LANDCORP

REGIONAL CENTRES CLUSTER ANALYSIS

PHASE 3 - FINAL REPORT

APRIL 2016

DISCLAIMER

This report has been prepared for **LandCorp**. The information contained in this report has been prepared with care by the authors and includes information from apparently reliable secondary data sources which the authors have relied on for completeness and accuracy. However, the authors do not guarantee the information, nor is it intended to form part of any contract. Accordingly all interested parties should make their own inquiries to verify the information and it is the responsibility of interested parties to satisfy themselves in all respects.

This report is only for the use of the party to whom it is addressed and the authors disclaim any responsibility to any third party acting upon or using the whole or part of its contents.

Document Control				
Document Version	Description	Prepared By	Approved By	Date Approved
v 1.0	Regional Centres Cluster Analysis	Per Sauer / Rob Kyne / Jason McFarlane / Bill Grace / Dawson Demassiet-Huning	Per Sauer	29 March 2016
v 2.0	Regional Centres Cluster Analysis - Final Report	Per Sauer / Rob Kyne / Jason McFarlane / Bill Grace / Dawson Demassiet-Huning	Per Sauer	29 April 2016

pracsys.

PERTH: Level 3, Suite 162, 580 Hay Street Perth Western Australia 6000 • t (08) 9325 6551
MELBOURNE: Cannons House Level 7, 12-20 Flinders Lane Melbourne Victoria 3000 • t (03) 9654 5775
e admin@pracsys.com.au • www.pracsys.com.au

CONTENTS

1.0

1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This report presents the findings of the initial Phases 1 and 2 of the Regional Cluster Analysis being performed on behalf of LandCorp and the State Government. This project is intended to assist in the development of the Regional Centres Development Plan Phase Two – Regional Centres (RCDP2) Growth Plans by providing an understanding of the geographical distribution of industry concentrations and the role each centre plays in this network of activity.

Broadly the report is structured in the following manner:

- Chapters 2 and 3 present a rationale for the economic development of regional centres and how a cluster-based approach assists in achieving this objective
- Chapter 4 outlines the approach, purpose and limitations of the current Regional Cluster Analysis project
- Chapters 5 to 9 present a summary, detailed results and spatial mapping of the first stage of cluster analysis conducted at the state-wide level. These results establish the context for the subsequent regional and centre-based analysis
- Chapters 10 to 14 present the findings of the detailed regional and centre-based analysis and spatial mapping, providing insights into the role of each RCDP2 centre in the regional and state-wide economy, and providing initial observations regarding potential opportunities within each region
- Chapter 11 presents initial conclusions from Phase 1 and Phase 2 of the analysis, this will be followed by further detailed analysis and reporting in Phases 4 and 5, which forms the final deliverables of this project.

1.2 AN INTRODUCTION TO CLUSTER-BASED ECONOMIC DEVELOPMENT

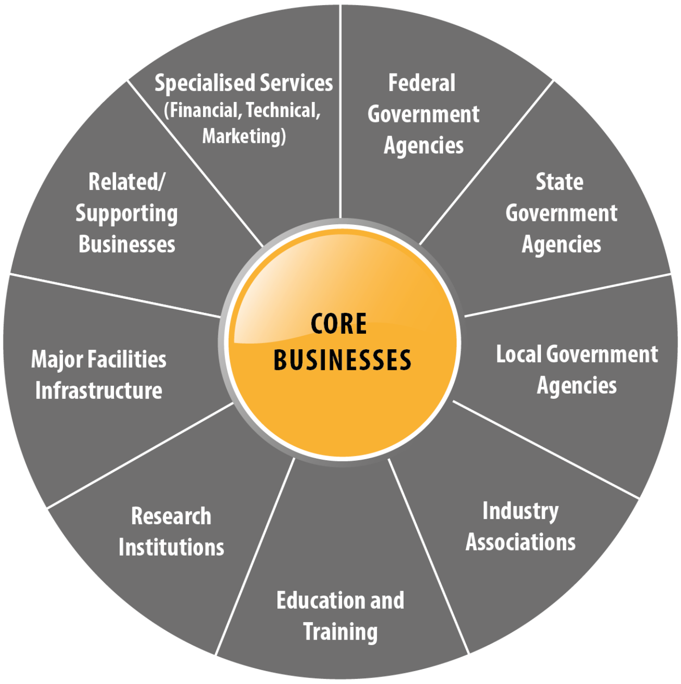
Regional economic development policy is receiving increasing attention, with industry cluster analysis and strategy in particular becoming an important focus in both the United States and European Union over the last decade. A large degree of influence in this field is derived from the work of Michael Porter[1]. Clusters, as defined in this work, are concentrations of related industries in a particular location or region consisting of firms and their supply chains, complemented by other actors that influence the productivity of the cluster including research, educational and training organisations and government agencies (represented in Figure 1).

A key concept in this field is that of Traded versus Local clusters. Traded clusters are characterised by concentrations of employment that are disproportionate to the local population base which indicates the trading of goods and services beyond the local region. Conversely, Local clusters are characterised by a more even distribution of employment that primarily serves the local populations and markets[2].

1 The Competitive Advantage of Nations (1990), The Economic Performance of Regions (2003) and Defining Clusters of Related Industries (2014)

2 Delgado, Mercedes, Richard Bryden, and Samantha Zyontz. Categorization of traded and local industries in the US economy. Mimeo. Available online at: http://www.clustermapping. us/[Accessed May 2015], 2014.

Figure 1. Cluster participant network



Source: Pracsys (2016)

This distinction clarifies the role each type of activity plays within the economy. Traded clusters are the 'engine' of the economy, being responsible for the majority of export trade. This is reflected in higher worker education and compensation levels, and proportionally higher cluster output, as a whole and per employee. Export income generated by Traded clusters has a multiplicative effect on the local economy, with a subsequent increase in gross value add (GVA) within the economy. This in turn is a significant precursor to population growth.

Local clusters account for a higher proportion of employment and play an important role in supporting local economic activity by providing local amenity. For example, a lack of Local cluster activity may represent a constraint for the traded economy due to resultant lack of amenity required to attract skilled workers. Such imbalances can indicate potential 'low hanging fruit' for intervention initiatives.

Knowledge of these cluster roles is fundamental to the development of targeted initiatives for all regions. Cluster analysis offers a useful spatial perspective of an economy, with boundaries defined by linkages in knowledge, skills, inputs and demand as opposed to conventional industrial or sectorial classifications.

A cluster-based approach to economic development relies on the recognition that increased productivity, employment growth and innovation can be achieved by strengthening the linkages within and between clusters, specifically those that provide goods and services for export. This approach lends itself to the identification of existing comparative and competitive advantages that have driven historic economic performance, and the implementation of measures that will further support and encourage industries to build on connections, leverage existing advantages and gain exposure to wider markets. This is as opposed to the 'manufacturing' of clusters through top down government lead initiatives, which based on the available research literature there is little evidence to support.

The Regional Cluster Analysis presented in this report is based on the method employed by the U.S. Cluster Mapping[3] project and provides an application of this internationally applied methodology to the Western Australian economy. Identification and examination of clusters involves a combination of hard data and local knowledge. The results presented in this report provide quantitative evidence of sustained comparative advantage in particular

3 http://www.clustermapping.us/

locations and are formed through a process of analysis that highlights clusters outperforming national averages in terms of employment concentration, employment growth, or both of these measures. Critical supporting clusters providing the bulk of inputs to outperforming clusters are also identified, as are potential emerging clusters based on the available data.

This analysis represents a top down scan that must be supplemented by local knowledge, providing the necessary filter through which to view the results. The benefits derived from a cluster hinge on the ability of actors to collaborate with one another. Whilst this quantitative analysis does not examine the extent of collaboration actually occurring it provides a baseline to be truth tested on the ground with input from local stakeholders.

1.3 KEY FINDINGS

At a state-wide level a number of clusters were observed to have outperformed over the data period used in the analysis (2006 to 2011) and displayed significant employment concentration across WA. The impact of these clusters on the WA economy is measured using the standard metrics of average salary, output, exports and GVA. These Clusters are summarised in Figure 2.

Figure 2. Summary of impact for the selected WA Traded clusters

WA Selected Traded clusters	Output ($m)	GVA ($m)	Export ($m)	Ave Salary
Metal Mining	76,960	47,608	65,128	91,000
Business Services	32,857	17,849	2,455	75,000
Oil and Gas Production and Transportation	24,171	14,643	16,052	93,000
Construction Products and Services	22,654	8,109	568	75,000
Transportation and Logistics	15,585	6,998	1,173	62,000
Upstream Metal Manufacturing	12,986	1,058	9,800	74,000
Agricultural Inputs and Services	7137	3027	2811	41,000
Hospitality and Tourism	4,989	2,096	426	41,000
Downstream Metal Products	3,932	1,605	334	68,000
Water Transportation	2,077	836	419	76,000
Non-metal Mining	1,347	729	719	83,000
Forestry	281	150	41	56,000
WA Total	408,084	211,517	113,044	-

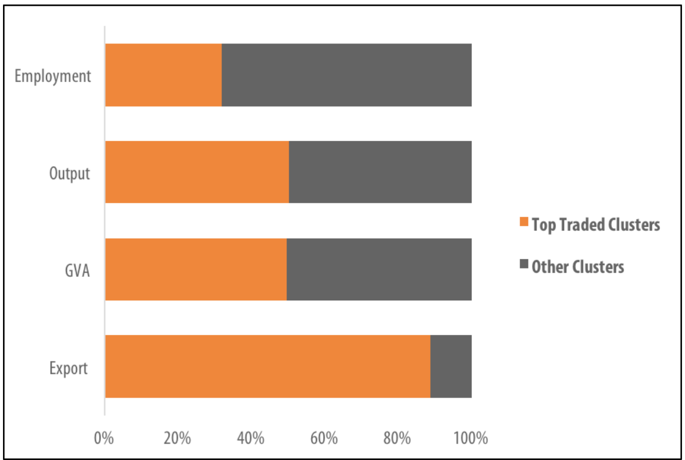
Source: Pracsys (2016)

It is important to note that these clusters were identified using a combination of factors and do not equate simply to a list of top output or export clusters for the state. Two clusters, Agricultural Inputs and Services and Forestry, are notable as having significantly higher employment concentrations in the regional areas of WA (excluding Perth Metro) and have therefore been included in this investigation.

The selected Traded clusters account for the vast majority of WA's exports and display proportionally higher output and GVA per employee (Figure 3). This is consistent with the findings of the US Cluster Mapping Initiative.

For the purpose of further analysis, these clusters have been grouped under four broad themes according to common characteristics, outputs and/or services, as shown in Figure 4.

Figure 3. WA Traded Clusters



Source: Pracsys (2016)

Figure 4. Themed Clusters

Theme	Clusters
Natural Resource Extraction	· Metal Mining · Oil and Gas Production and Transportation · Non-Metal mining · Agricultural Inputs and Services · Forestry
Manufacturing	· Water Transportation · Upstream Metal Manufacturing · Downstream Metal Products
Export Services	· Hospitality and Tourism
Industry Services	· Construction Products and Services · Transportation and Logistics · Business Services

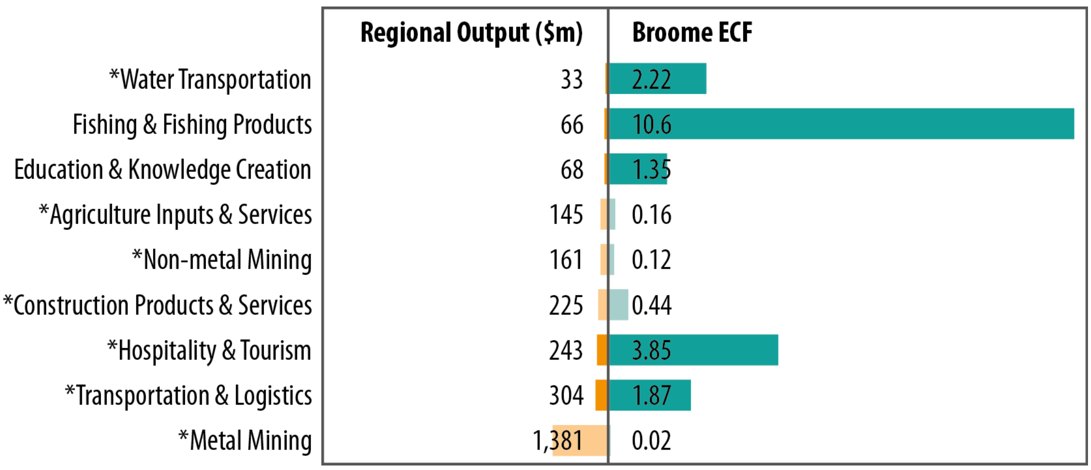
Source: Pracsys (2016)

In this analysis each cluster is comprised of a number of industries as per the Australian and New Zealand Standard Industrial Classification (ANZIC), however in reality true clusters include a range of other actors that support the productivity of the cluster. Such actors may include various government authorities, research institutions, educational institutions, investors and specialist service providers. The identification of these additional, highly important actors, is beyond the scope of quantitative analysis and can only be identified through consultation at the local level.

The decision criteria applied to identifying the WA state significant clusters has also been applied at a regional level allowing the investigation of regional specialisation in the context of clusters of primary importance to the state. Furthermore, centre based employment concentration factors (ECFs) have been calculated, which provide insight into centre specialisation and the role the centre plays in both the regionally significant and state significant clusters.

Figures 5 to 8 provide a summary of results for each centre and corresponding region. The results must be viewed in the context of the period used in the analysis. Between 2006 to 2011 Western Australia saw an unprecedented boom on the back of significant mining and oil & gas expansion projects. This period is recognised as one of exceptional growth, with the data therefore reflecting substantial expansion in capacity in resource-related sectors of the economy. In coming years such industries will likely feature quite different in analytic findings as activities shift from construction to production phases.

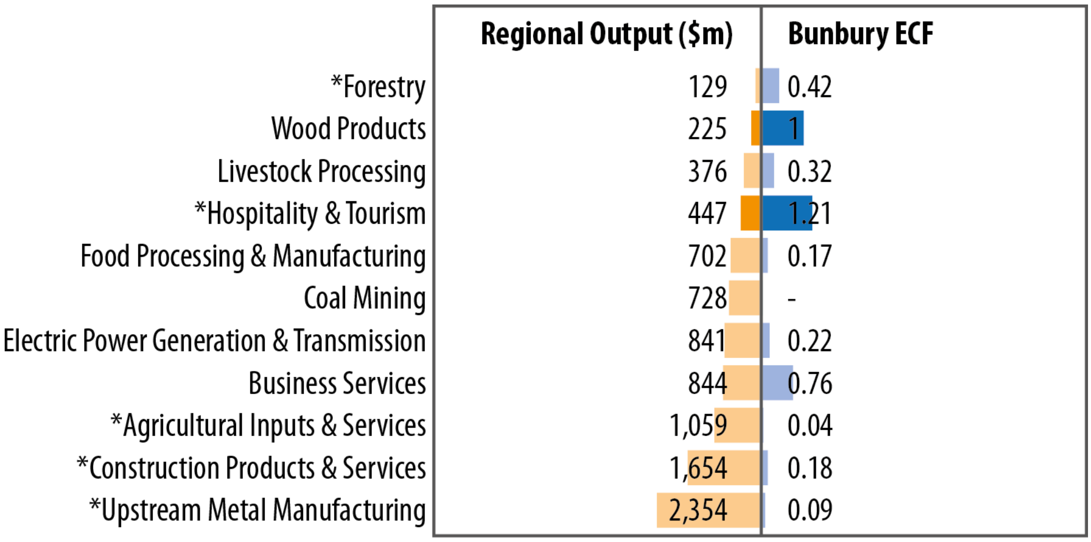
Figure 5. Broome – Kimberley



*Indicates state significance (otherwise of regional significance only)

Source: Pracsys (2016), ABS Census (2011)

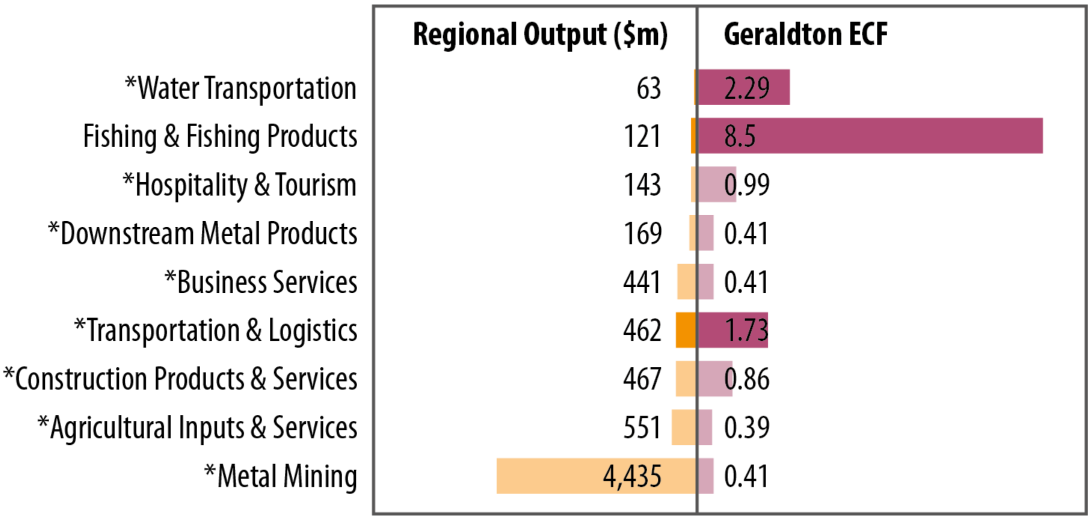
Figure 6. Bunbury – South West



*Indicates state significance (otherwise of regional significance only)

Source: Pracsys (2016), ABS Census (2011)

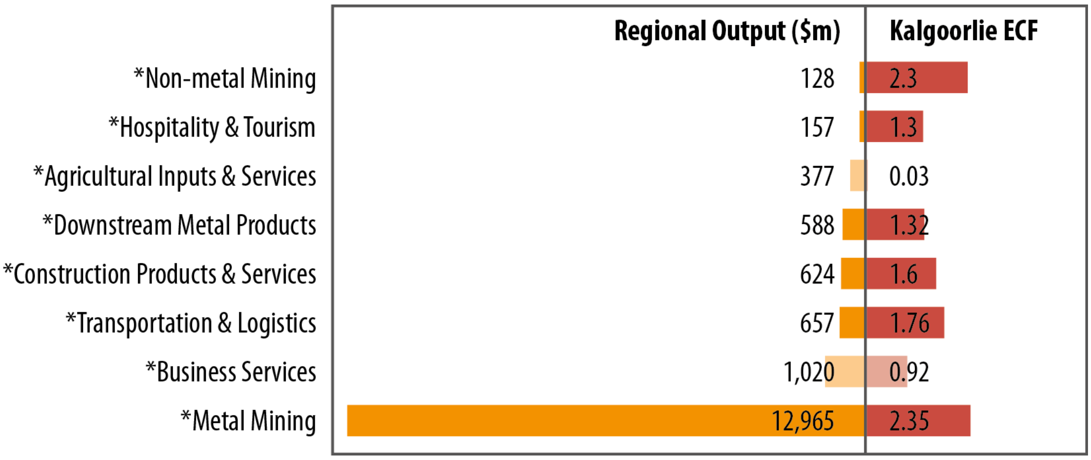
Figure 7. Geraldton – Mid West



*Indicates state significance (otherwise of regional significance only)

Source: Pracsys (2016), ABS Census (2011)

Figure 8. Kalgoorlie – Goldfields Esperance



*Indicates state significance (otherwise of regional significance only)

Source: Pracsys (2016), ABS Census (2011)

Viewed at this level, these initial results are somewhat unsurprising. The activity of most value to the state tends to be natural resource based and is distributed according to available resources. With some exceptions, centre based activities of highest value are often those which directly support these natural resource based clusters. Having said this, to a large extent growth in resource based industries is dependent on both global factors and local availability and cannot easily be supported through government or local industry based initiatives. There is however a continuing role for centres to play in supporting these statewide significant clusters and it is likely to be important for the regional centres to be in a position to respond if or when growth in these industries next occurs.

In a similar manner, it will not always be possible to sustain historically high output of particular non-renewable resource based industries. As long term strategies, the Regional Centre Growth Plans should consider the continuing sustainability of particular industries in their current form. Rather than simply investigating the effect of growth (or contraction) of major clusters, it is more useful to investigate a number of underlying factors in the potential growth of regional centres, for example:

- The comparative advantages or underlying characteristics, such as skills, climate, distance to key export markets and established infrastructure that have enabled historical performance, and how these may be further built upon in future initiatives
- The degree of local coordination and collaboration between businesses and other actors that may represent true cluster activity, and how this may be encouraged
- Industry clusters that may be 'pivoted' or re-purposed in meeting the needs of newly identified markets
- Industry Clusters that, while not currently being as significant for statewide output, display high degrees of specialisation, play a proportionally large role in supporting local employment and have the potential to sustain local growth
- Industry clusters that play a critical supporting role (including Local clusters) in providing direct business-to-business services for other significant clusters or local amenity for those employed in these clusters

As such, this report forms an initial statewide, regional and centre focused scan that provides a quantitative evidence base for the identification of State and Regionally Significant clusters. The results provide initial insights into the role of centres within the context of Regionally Significant clusters and leads to the investigation of potential constraints or opportunities for industry cluster development in the next phase of this project.

2.0

2 AN ECONOMIC DEVELOPMENT CASE FOR REGIONAL CENTRES

2.1 A FUTURE ROLE FOR REGIONAL CENTRES

Regional Western Australia (WA) plays a critical role in the State's economy, social fabric and identity. It has been a key source of wealth for the nation since well before Federation, with its importance increasing in step with global demand for the State's natural resources.

The prosperity of WA's regional communities, historically linked to a small number of key industries, will increasingly be dependent upon the development of vibrant, prosperous and growing regional centres. These centres will support ongoing improvement in the State's competitiveness, productivity and resilience through the development of unique yet interdependent regional economies and population bases.

The Regional Centres Development Plan program envisages a key role for WA's major regional centres in the State's future economic development. This is reflected in the program's vision, which states that:

"Western Australia's network of competitive, growing and resilient strategic regional centres will continue to grow and diversify with each one offering unique opportunities for the State, its regions and people to flourish. Driven by their talented people, these centres will achieve growth by building on their competitive and collaborative advantages to realise global opportunities. Strategic regional centres will be empowered, innovative and globally engaged, placing them in a strong position to lead and support long run regional growth with the support and enabling action of the Western Australian Government."

For this vision to be realised, each centre will need to develop a series of sustained comparative advantages that facilitate the development and movement of goods and services of value to export markets. These will need to reflect the unique role that each centre plays in linking their regional economy with the labour, investment and markets required to drive future growth.

2.2 THE URBANISATION OF WESTERN AUSTRALIA

It has been long recognised that populations the world over are relocating from regions to urban areas. Globally, more people live in urban areas than in rural areas, with 54 per cent of the world's population residing in urban areas in 2014. In 1950, 30 per cent of the world's population was urban, and by 2050, 66 per cent of the world's population is projected to be urban[4].

The experience of urbanisation in WA has fundamentally changed the settlement structure of the State. The features of WA's urbanisation experience[5] are described below:

Establishment, loss, growth and decline of towns as a natural part of the urban process

WA initially expanded with the discovery of gold and the gazetting of 212 towns within the space of 14 years. The number of towns that emerged however was unsustainable and the eventual decline and loss of some towns

4 United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352), p.1

5 Bureau of Infrastructure, Transport and Regional Economics (BITRE), (2014). The evolution of Australian towns, Report 136, pp. 77, 78, 88

followed. Even beyond the gold rush the pattern of establishing and abandoning towns continued well into the twentieth century.

Stronger population growth in coastal regional cities compared with inland regional cities

Many Australians regard living by the coast as ideal and coastal towns have benefited from Australians wanting to enjoy a coastal lifestyle.

A change in regional hierarchy

All regions, to varying degrees, have transitioned from a settlement hierarchy characterised by many small towns with fewer larger ones, to a mix of larger regional centres, substantial towns and small villages.

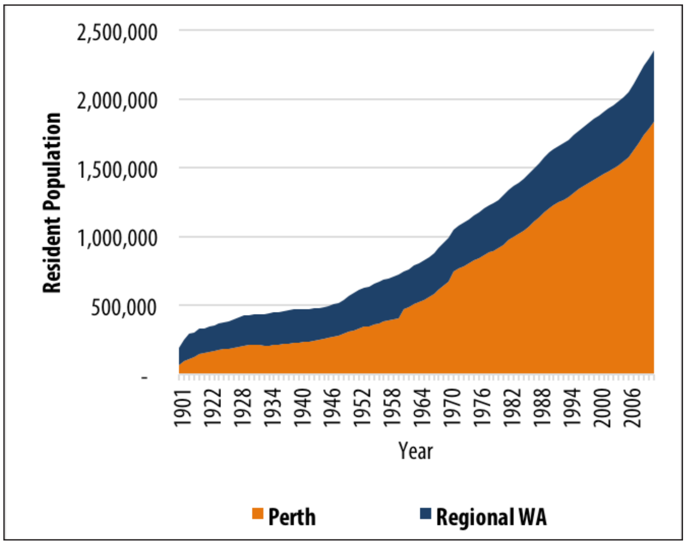
Increasing proportion of the population being centred within the greater Perth Region

This is representative of an economy that has evolved into 'primate city' distribution. The primate city distribution represents a State economy typified by a major population centre that dominates a relatively sparse hinterland.

A primate city economy is characterised by:

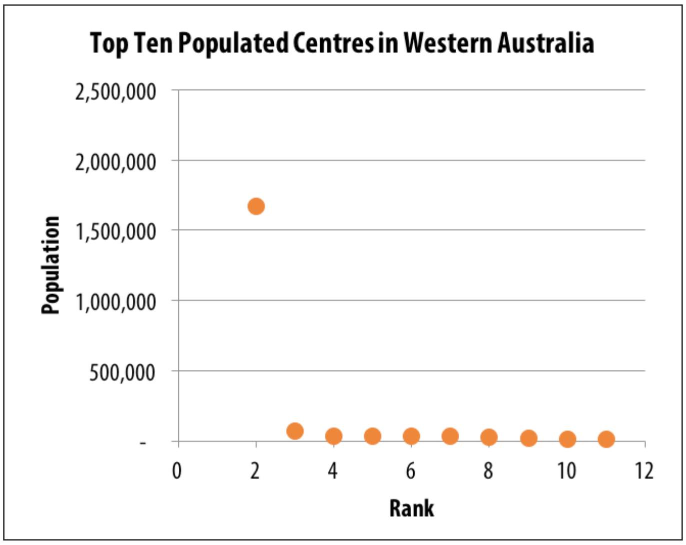
- A single centre that provides a majority of the human, financial, cultural and productive capital for the economy as a whole
- A network of significantly smaller centres that have developed to largely serve their regional hinterlands
- Hub and spoke infrastructure that reinforces flows of knowledge, goods and services through the primate city
- High level of centralisation of public and private sector decision-making in the primate city
- High proportion of investment occurring within the primate city, managing the demands associated with the city's scale

Figure 9. Population (1901-2008), Regional WA versus Perth



Source: Pracsys Analysis (2016)

Figure 10. Rank Size Distribution of Western Australian Centres (2011)



Source: Pracsys Analysis (2016), ABS Census of Population and Housing (2011)

2.3 ADVANTAGES OF PRIMATE CITIES

There are several advantages to concentrating growth in a primate city, derived from agglomeration economies/ economies of scale and increased specialisation.

First, higher city-level competitiveness and system efficiency can develop compared to that found in secondary cities[6]. Productivity is increased through the agglomeration of services and industry, greater access to human capital for firms, an increased global presence and the ability to attract foreign investment, and increased transport and communication infrastructure relative to smaller centres.

Second, increased scale allows for a finer division of labour as the population grows and further increased productivity. The outcome of these benefits can be sustained comparative advantages that would otherwise not have accrued without the co-location of enterprises.

Third, larger cities allow governments and the private sector to offer high-end goods and services (including education) at a lower cost and/or to a higher standard, due to a larger local market. These economies of scale and scope would not be possible in disaggregated centres.

2.4 WEAKNESSES OF PRIMATE CITIES

For all the regional and immediate advantages exhibited by the primate city settlement patterns characterised by WA' economy, there are significant shortcomings associated with an economy reliant on a single large city. These disadvantages will be more pronounced the proportionally larger a primate city becomes, and impinge on the competitiveness and efficiency of both the centre and the greater region. These diseconomies of scale include traffic congestion, supply-side shortages, excessive pollution and a higher crime rate and associated law and order costs.

Large cities also require expensive infill infrastructure upgrades to maintain the same standard of services for residents and enterprises. The cost of these infrastructure upgrades is often higher in existing built-up areas, due to space restrictions and the need to allow the surrounding area to continue functioning while construction work is going on.

For example, when a major urban highway is widened or otherwise upgraded, the road is generally still used while the work is going on. This creates such additional costs as requiring workers to be put on during the night, when the road is not being heavily used and creating temporary new road surfaces to allow a particular area of the road to be worked on uninterrupted.

The primate city model also creates an opportunity cost in terms of foregone development elsewhere in the economy. Resources concentrated on the primate city cannot be used to develop capacity in other centres. That is, something advantageous to the primate city might disadvantage the region[7]. The unequal distribution of investment

6 Getz, M. 1979. Optimum city size: fact or fancy? Law and Contemporary Problems: Spring 1979.

7 Duraton, G., and D, Puga. (1999). Diversity and Specialisation in Cities: Why, Where and When does it Matter? Research Papers in Environmental and Spatial Analysis, p.56

throughout regions that contain a primate city has been cited as a hindrance to regional economic development[8].

Decreased mobility as a result of urban sprawl can exacerbate cost pressures, when increasingly sluggish commutes create a premium on locating centrally. Apart from the development of greenfield sites and the associated negative environmental affects that may ensue, excessive public investment is also required to fund the infrastructure needed to support the functioning of new communities of the development. As is evidenced in the case of Perth, expansion away from the city without the simultaneous provision of land uses dedicated to employment can increase car dependency, thus exacerbating congestion and increasing the length of commutes travel time.[9]

An inequality in the distribution of economic and resource development, education infrastructure and wealth between the primate city and non-primate settlements is frequently reported under the primate city model. Perth's state primacy has resulted in relatively little regional investment in education, particularly at a tertiary level. This deficiency has been a contributing factor to regional youth migration, an issue associated with declining regional populations. It is perhaps difficult for governments under the primate city model to justify the cost of providing infrastructure and technologies to relatively smaller settlements however, the disjuncture between the primate city and the non-primate settlements creates inherent difficulties for regional populations.

In a region where a primate city is characteristically different to non-primate settlements, the option for migration is limited and very disparate. An urban hierarchy, which contains centres that are of varying levels of population, education, amenity, and provision of goods and services, may assist in mitigating the scale and concentration population growth in the primate city, which drives rapid increases in congestion, real estate prices, cost of living and inflation[10]. A diversity of places within a region with subtle distinctions in size provides an advantage that a more extreme distribution of city sizes cannot offer. Firms or residents are better able to transition up and down the city hierarchy as the gaps are less significant, for example, firms that do not need to be in the capital may opt for the second tier city[11].

Finally, the primate city model allows a limited choice in terms of balance between costs of production, and benefits of agglomeration economies[12]. This means that firms may have less choice in locations that meet their specific location requirements (e.g. proximity to infrastructure, customers, collaborators, and appropriate land cost). As a consequence, the risk that a firm cannot find a location within its optimal range in a primate region or state is greater than in an economy with a wider spectrum of cities.

8 Dijkstra, L. (2013). Why investing more in the capital can lead to less growth. Cambridge Journal of Regions, Economy and Society 6, pp.251-268

9 Curtis, C. (2005). The Windscreen World of Land Use Transport Integration: Experiences from Perth, a Dispersed City. Town Planning Review. 76(4) 423-453

10 ibid.

11 ibid.

12 McCann, P., and A,J, Zoltan. 2011. Globalization: Countries, Cities and Multinationals. Regional Studies 45 (Jan 2011) 17-32.

2.5 A VIBRANT AND COMPETITIVE WESTERN AUSTRALIAN ECONOMY FOR THE 21ST CENTURY

Building upon its current strengths, a competitive and prosperous Western Australia for the next century will be characterised by a series of highly competitive, globally connected clusters of activity that help address substantial global challenges. Such an economy will be characterised by:

- A diverse and resilient economy capable of thriving during both the booms and busts of commodity cycles
- Clusters of activity that meet the evolving needs of major export markets
- Clusters of activity that reorient traditional comparative and competitive advantages existing within the Western Australian economy to new business models, technologies and opportunities
- Targeted public and private sector investment that leverages previous investments and co-investment by other local, national and international sources
- Networks of highly skilled and entrepreneurial pools of human capital that are linked to the needs of cluster activity, and are able to adapt to changing needs and opportunities of a modern economy
- Strong linkages to markets that allow export clusters of activity to be competitive in the price and/or time it takes to deliver goods to market

A precursor to achievement of this vision will be the development of a network of export-oriented regional centres throughout the State that leverage traditional regional comparative advantages to develop internationally competitive clusters of export activity.

2.6 THE ROLE OF REGIONAL CENTRES

Regional centres will need to be major contributors in the achievement of this vision, acting as major sources of human, productive, social and financial capital around which cluster development can occur. To play this role, centres will need to proactively intervene and invest in their economy to:

- Leverage their own, and their region's diverse comparative advantages (representative in the presence of Traded clusters discussed in Chapter 3) to develop alternative value propositions to Perth
- Provide strong linkages to strategic economic activity in the regions – allowing for better understanding by governments, investors and the private sector resulting in more targeted investment, support and engagement
- Leverage legacy infrastructure around which new comparative and competitive advantages may be developed
- Build and leverage diverse pools of human capital from which different capabilities and characteristics will form
- Develop strong networks with key suppliers, collaborators, knowledge leaders and customers associated with existing and emerging Traded clusters

- Develop alternative linkages with markets based upon products and services that meet the needs of existing and emerging markets
- Provide a compelling location to attract immigrants considering Western Australia as a location

In addition, these centres represent an opportunity for Perth to:

- Get more out of existing infrastructure as pools of demand are met by other sources
- Provide alternative lifestyle choices for residents within the same broad economy (rather than forcing residents to emigrate out of the economy)
- Develop further pools of traded and local activity to support new and emerging Regionally Significant clusters

2.7 LEVERS FOR ECONOMIC DEVELOPMENT IN REGIONAL CENTRES

Western Australia's regional centres have generally evolved due to proximity to some environmental feature of strategic importance (such as a bay for a port, mineral resources or an agriculture precinct). Economists refer to this as a first advantage, representing how proximity to a valuable resource can be used as a basis for development of a competitive advantage.

Regional centres have a significant opportunity to contribute to the future economic development of the State through a range of levers including:

- Import substitution – producing within local value chains that which once was imported as economies of scale are developed
- Cross-fertilisation of ideas as economic players including local businesses, entrepreneurs and research institutions drive the sporadic and often unforeseeable discovery of new products, production processes, and services
- Diversification of activity away from an initial cluster specialisation to a range of value-added export-oriented and population-driven services
- Supporting continued development of one or more key export industries experiencing sustained demand that requires specialised infrastructure (e.g. ports and rail)

Regional Centres Development Plans represent a significant opportunity to create positive and sustained economic development interventions that help each centre realise its economic potential.

For this to occur, these plans need to be informed by a strong understanding of the economic building blocks available to each region and regional centre. These building blocks are likely to reflect the attributes of clusters of activity within regions and regional centres that have historically delivered growth and development outcomes. That is, future growth is likely to come about by leveraging that which has delivered growth to date.

3.0

3 A CLUSTER-BASED APPROACH TO REGIONAL DEVELOPMENT

"Clusters are a striking feature of economies, making regions uniquely competitive for jobs and private investment."

US Cluster Mapping Project

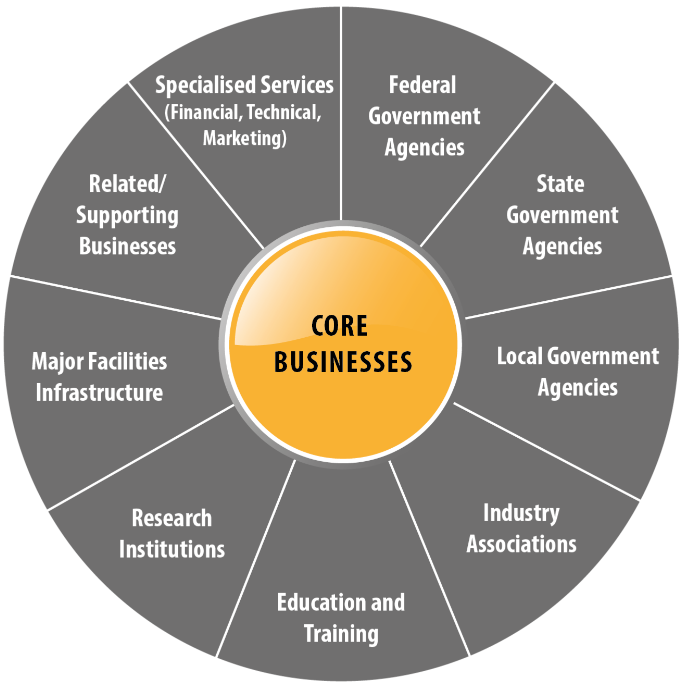
The study of economic agglomeration and clustering effects relies on the recognition that increased productivity, employment growth and innovation can be achieved by strengthening linkages between industries and between industries and research bodies, educational institutions, government and capital. Literature and research on economic agglomerations and clusters analyses the benefits associated with such linkages so as to direct public policy or private investment decisions.

In the recent paper "Defining Clusters of Related Industries" (2014), Delgado et al defines industry clusters as: geographic concentrations of industries related by knowledge, skills, inputs, demand, and/or other linkages. These can be described in terms of input-output linkages, labour market pooling, knowledge spill-overs, sophisticated local demand, specialised institutions, and the organisational structure of businesses and social networks[13].

The US Cluster Mapping Initiative has been examining the characteristics of clusters of activity within the US Economy for over a decade. Figure 11 provides a typical mix of business and non-business entities that contribute to cluster development, demonstrating the meaningful inter-industry linkages and wider linkages to research organisations, government and educational institutions. These connections can take the form of skills sharing, shared infrastructure, supply chain agreements, collaboration in approaching external markets or in the face of external competition and common links to financial, research or government institutions, all of which are necessary for supporting the production of specialised knowledge and high value output that defines cluster activity.

Importantly, economic development based on the identification and support of clusters should seek to identify all existing and potential interactions that can improve outcomes for the parties involved. This need not be limited to inter-company interactions and potential initiatives may encompass a broad range of development activities including the construction of hard infrastructure, skills development, building export market

Figure 11. Cluster participant network



Source: Pracsys (2016)

13 Working Delgado, M., Porter. M.E. and Scott, S., "Defining Clusters of Related Industries", National Bureau of Economic Research Paper, No. 20375, August 2014.

connections, investment prospectus development and collaborative research initiatives. The common element amongst the cluster development initiatives should be that they benefit a variety of interrelated businesses and organisations, with the strongest initiatives likely to be those are developed cross-cluster.

3.1 THE ROLE OF THE TRADED ECONOMY IN ECONOMIC DEVELOPMENT

Regional economies are made up for two types of clusters[14], Traded clusters and Local clusters. Traded clusters are groups of related industries that serve markets beyond which they are located[15] and are therefore highly exposed to external competition. In contrast, Local clusters service a local market with the scale of activities highly correlated to population growth (often referred to as 'population driven') and predominately exposed to local competition.

According to the U.S. Cluster Project:

"While Local clusters account for most of the employment and employment growth in regional economies, Traded clusters register higher wages, and much higher levels of innovation. Local clusters provide necessary services for the Traded clusters in a region, and both are needed to support a healthy and prosperous regional economy."

Traded clusters can be understood as the 'engines' of regional economies and Local clusters as the 'foundation' of local economies. Local clusters provide necessary services for the Traded clusters and population base in a region however, without strong Traded clusters it is virtually impossible for a region to reach high levels of overall economic performance[16].

3.2 A FRAME FOR EXAMINING ECONOMIC PERFORMANCE

In the context of the Regional Centres Development Plans, cluster analysis represents an opportunity to identify and examine sections of the economy that drive overall growth, prosperity and resilience through an internationally recognised and peer-reviewed methodology.

The study of economic agglomeration and clustering effects provides an insight as to where relevant comparative advantages may exist, and therefore be built upon in the future. It also allows for examination of the roles that local industry plays in supporting these clusters and where gaps and opportunities may currently exist within the centre and its regional economy.

Targeted evidence-based economic development initiatives can be developed by considering the distribution and relationship of clusters with factors including interacting clusters, pools of capital, infrastructure, activity centres and natural resources (especially if conducted in conjunction with on-the-ground truth testing and refinement).

The data presented in this report seeks to provide a high-level basis for such initiatives. It is based on the substantial peer reviewed work undertaken by the US Cluster Mapping Initiative. Cluster categories displayed have been adapted for use with the standard

14 Porter, M., "The Economic Performance of Regions", 2003

15 Within the Western Australian context we often refer to these activities as export-oriented or strategic

16 US Cluster Mapping, 2016, Clusters 101 [online] Available at: http://www.clustermapping.us/content/clusters-101

Australian and New Zealand Standard Industrial Classification (ANZIC) system (Figure 12). Broadly, this system serves to differentiate cluster activity and output between Traded and Local described above, and establishes a classification system where cluster inputs and outputs can be easily understood in investigations of supply chain and value adding activity.

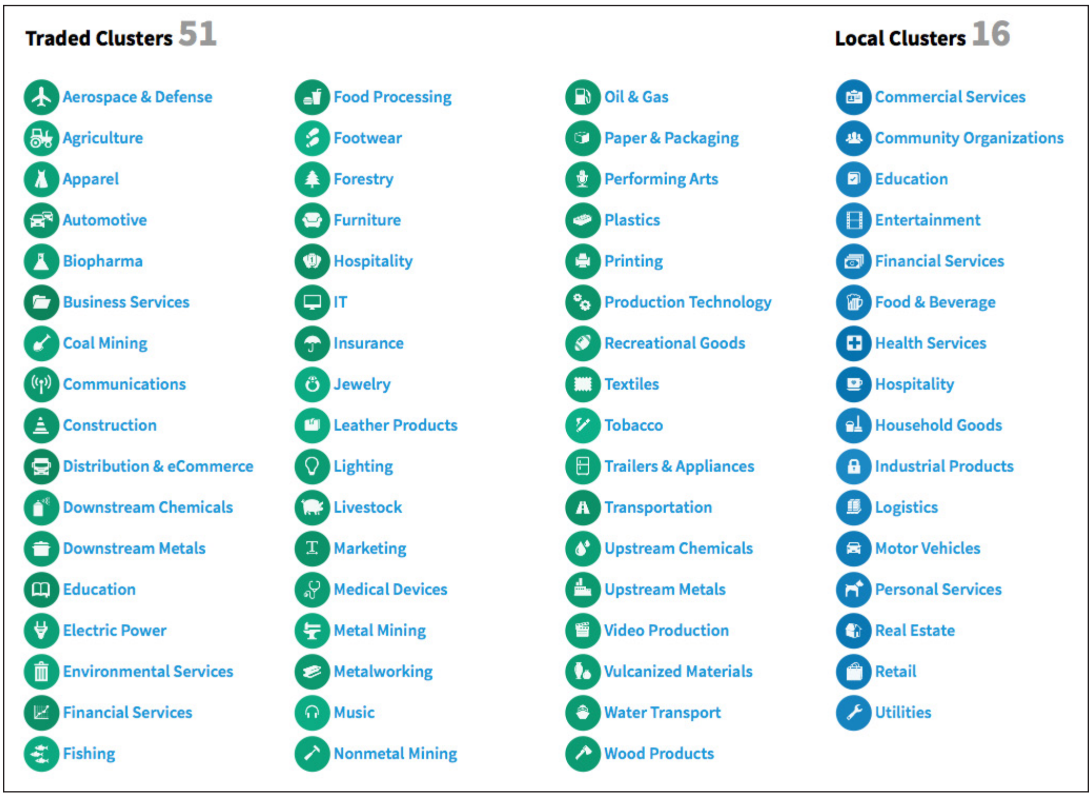
3.3 OPPORTUNITIES FOR INSIGHTS

The Regional Cluster Analysis represents a range of opportunities for the Western Australian regional development system in general, and the Regional Centres Development Plans specifically.

The project has the potential to provide for:

- A consistent, internationally recognised language for consideration of economic quality and characteristics
- Development and utilisation of a framework for identification state significant clusters
- Development and utilisation of a framework for identification of Regionally Significant clusters for each of Western Australia's nine regions
- Development and utilisation of a framework for identification of key business-to-business Local clusters that support the performance of State/ Regionally Significant clusters

Figure 12. US Cluster Mapping Initiative Classification of Traded and Local Clusters



Source: http://clustermapping.us/cluster

- Development and utilisation of a framework for identification of where clusters have sustained a comparative advantage over time, and examination of the spatial characteristics associated with these advantages
- Profiling of the roles that regional centres plays in State/Regionally Significant cluster performance
- Development and utilisation of a framework for identifying future economic development opportunities based upon matching historic comparative advantage with new opportunities and innovations
- Development and utilisation of a framework for identification of potential gaps in regional service provision

3.4 LIMITATIONS OF THE MODEL

The methodology used within the regional cluster analysis however, does have limitations that should be recognised upfront.

Foremost, it should always be recognised that this analysis is a historic analysis of what has happened to date. It therefore provides an insight into clusters that have shown evidence of a sustained comparative advantage in a particular location. This should not be taken a prediction of future cluster and firm competitive advantage.

The data available presents another limitation, at present the model is based purely on place of work and as such no place of residence metrics exist within it.

The analysis also seeks to be descriptive rather than prescriptive. It should raise questions/ areas for Regional Centre Development Plan project teams to consider and potentially test. It is not intended to replace local consultation and intimate knowledge of local economic characteristics.

Finally, like any classification model, generalisations are made in grouping activities together. There will always be exceptions to these assumptions. Local context is again therefore imperative when considering the implications of the analysis.

4.0

4 THE REGIONAL CLUSTER MAPPING PROJECT

4.1 SCOPE OF THE PROJECT

The scope of the Regional Cluster Analysis has been designed to support the development of evidence-based, transformative Regional Centre Growth Plans. As such the scope includes:

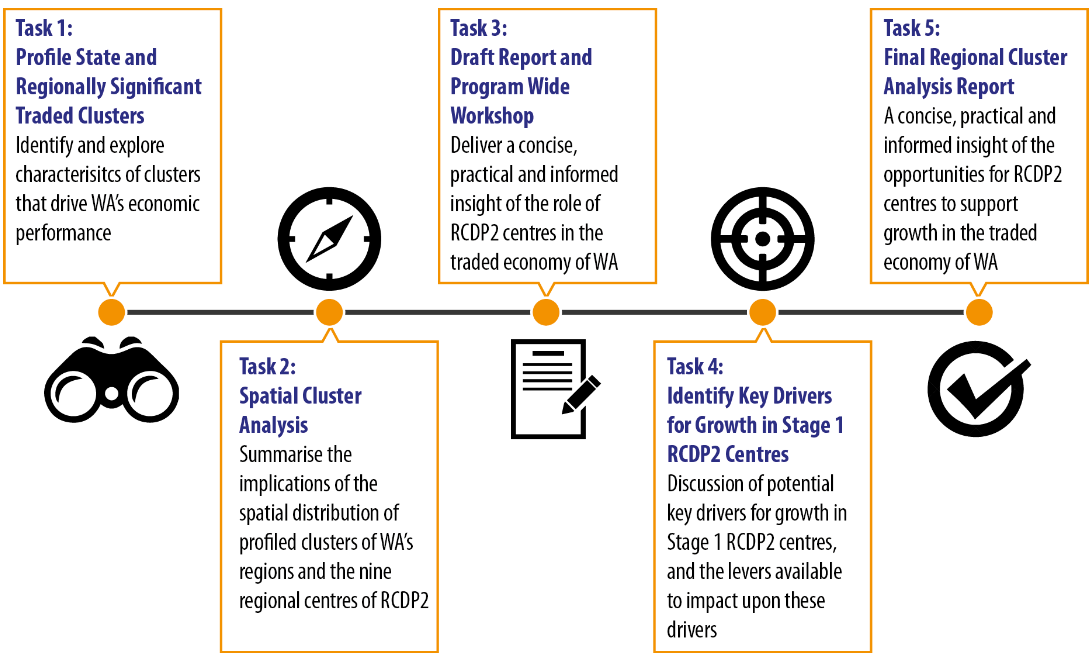
- Linking regional economic development initiatives, in particular the Regional Centre Development Plans, to contemporary global thinking in regards to economic performance and modelling
- Providing insights into the spatial relationships of WA's major regional centres to the State's strategic economy
- Identifying existing clusters of significant industry activity occurring within Regional WA
- Contributing to understanding of the underlying comparative advantages that contribute to cluster development
- Supporting identification of key drivers and capacity constraints impacting upon cluster growth within WA's regions and regional centres
- Where in-scope, aligning outputs with the needs of each individual Phase I RCDP2 center project team

This will require the project team to work closely with the project steering committee and each RCDP2 team to ensure that there is alignment in understanding and application between projects.

4.2 PROJECT APPROACH

Regional Cluster Analysis approach entails five tasks (Figure 13).

Figure 13. Regional Cluster Analysis Project Tasks



Source: Pracsys (2015)

These align as best as possible to the timeframes associated with the development of each of the Phase I Regional Centre Development Plans.

4.3 INTENTION OF THIS REPORT

This Draft Statewide Cluster Analysis provides a summary of the outcomes of Tasks 1-3 of the project for review by the project steering group, and for use by each of the Stage 1 RCDP2 centres. It is intended that the final version of this report will be accompanied by a collection of resources including maps and spreadsheet outputs that will be made freely available to the project steering committee and each individual Stage 1 RCDP2 Centre.

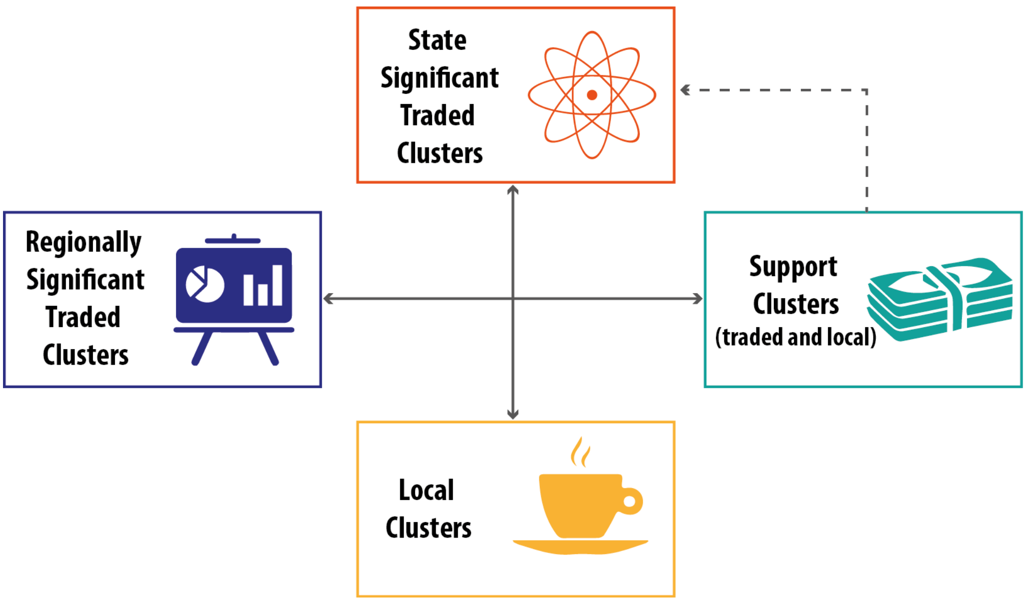
4.4 CLUSTER NOMENCLATURE

The Regional Cluster Mapping Project's methodology breaks Traded and Local clusters within the economy down into four categories. This allows for a more nuanced examination of the significance and role of cluster activity within a given spatial economy. The four categories of cluster activity that are of interest to this project are:

- **State Significant Traded clusters –** clusters of export-oriented activity of a level of performance, concentration and scale that they play a major role in the performance of WA's economy
- **Regionally Significant Traded clusters -** clusters of export-oriented activity of a level of performance, concentration and scale that they play a major role in the performance of a particular region's economy
- **Support clusters –** clusters of Traded or Local activity that plays a significant role in the performance of State or Regionally Significant Traded clusters
- **Local clusters –** clusters of activity that support the consumption needs and wants of a population within a given region

The interrelationships between these clusters are summarised in Figure 14. The significance of these relationships will become clear in later chapters as the characteristics of the economies of regions and regional centres are considered in detail.

Figure 14. Indicative Cluster Interaction Model



Source: Pracsys (2015)

5.0

5 STATE WIDE ANALYSIS

The analysis was conducted utilising a multi-pronged approach to identify both:

- Regionally significant industry clusters which provide a comparative advantage
- Supporting clusters that provide the necessary inputs to allow Regionally Significant clusters to function efficiently

It is important to note that clusters can be both Regionally Significant as well as providing key supporting inputs to Regionally Significant clusters.

5.1 REGIONAL FOCUS

The initial analysis was performed at a statewide level including the Perth Metropolitan Area (the Metro Area). Given the dominance of Perth as the primary location for employment within the state the analysis was then implemented excluding the Metro Area in order to capture Regionally Significant industry clusters for WA.

Figure 15. Statewide Top Traded clusters

WA Top Traded clusters (Including Perth)	Regional WA Top Traded clusters (Excluding Perth)
Metal Mining	Metal Mining
Oil and Gas Production and Transportation	Non-metal Mining
Non-metal Mining	Agricultural Inputs and Services
Upstream Metal Manufacturing	Upstream Metal Manufacturing
Downstream Metal Products	Forestry
Water Transportation	Agricultural Inputs and Services
Construction Products and Services	Upstream Metal Manufacturing
Business Services	Downstream Metal Products
Hospitality and Tourism	Water Transportation
Transportation and Logistics	Hospitality and Tourism
	Transportation and Logistics
	Business Services

Source: Pracsys (2015), ABS Census (2011), Australian Business Registrations (2015)

Without this exclusion the results tend to be skewed due to the employment concentration within Perth and Peel, reducing the prominence of Regionally Significant clusters. The analysis then narrowed its focus to the development commission regions of:

- Mid West
- South West
- Kimberley
- Goldfields-Esperance

This section of the report deals with the state level analysis. The aim of this section is to give a broad overview of the Regionally Significant clusters, excluding the Metro Area. The mapping used in this section includes the Metro Area in order to establish a comparison for regional areas.

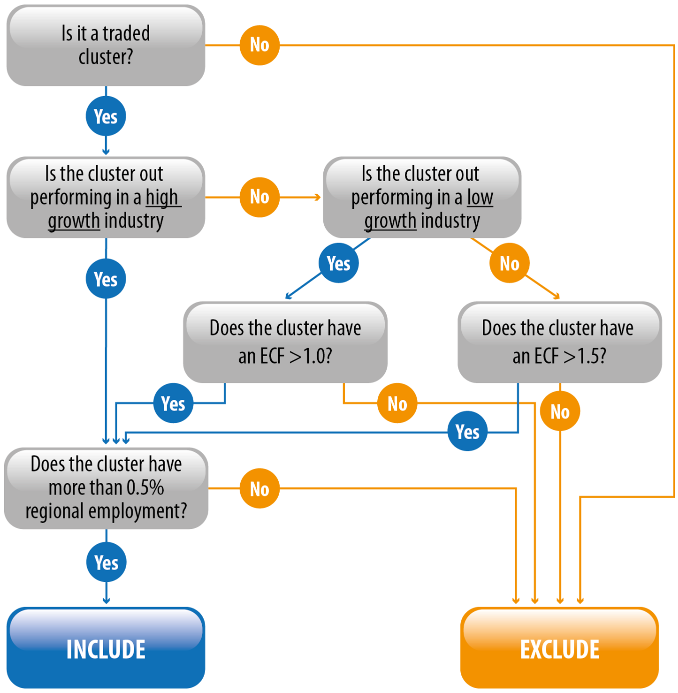
5.2 CLUSTER SELECTION

The project team utilised a range of data sources including Australian Business Registration (2016), Australian Bureau of Statistics Census of Population and Housing (2011) and on the ground consultation. The data allowed the team to identify, filter and analyse economic activity occurring broadly within the State economy and in more detail within Traded[17] and Local[18] clusters. The method was designed to identify the Traded clusters that were deemed most important to the State economy based on strategic measures. Identification measures used to define these 'Regionally Significant' clusters include:

- Type of cluster (Traded or Local)
- Scale
- Relative performance to the wider economy
- Growth trajectory
- Concentration

The resulting decision criteria model is shown in Figure 16.

Figure 16. State Traded Cluster Decision Criteria Model



Source: Pracsys (2016)

The analysis identified the Regionally Significant clusters for Western Australia. It is important to note and emphasise that this method has not necessarily targeted the largest and highest growth sectors in the WA economy. Instead, they represent traded industries considered to be a representation of the most important and strategic industries within the economy. Essentially this selection represents industries that will drive the rest of the economy forward through comparative advantage. Excluding the Perth metro area has ensured that the clusters selected are those important and specific to the regional economy. The Regionally Significant Traded clusters selected have been ranked based upon a combination of their employment concentration factor (ECF) and shift-share scores. These broadly describe the employment concentration and employment growth within the State or regional economy relative to the national economy as a whole.

17 Traded clusters are groups of related industries that serve markets beyond the region in which they are located. They are free to choose their location of operation (unless the location of natural resources drives where they can be) and are highly concentrated in a few regions, tending to only appear in regions that afford specific competitive advantages

18 Local clusters consist of industries that serve the local market. They are prevalent in every region of the country, regardless of the competitive advantages of a particular location.

Figure 17. Western Australian Regionally Significant clusters (2016)

Region	Cluster ECF											
Perth	1.9	3.9	1.3	0.8	1.5	2.4	0.2	1.1	0.9	1.5	1.5	0.9
Peel	7.5	0.3	1.4	0.5	0.5	1.2	1.2	12.1	1.0	0.9	0.6	1.1
South West	1.3	0.3	1.9	0.7	0.5	1.7	2.4	4.6	6.2	0.7	0.4	1.4
Great Southern	0.1	0.1	0.6	0.7	0.4	0.7	6.6	0.3	6.7	0.4	0.7	1.2
Wheatbelt	3.6	0.0	0.8	0.9	0.4	1.4	11.7	0.6	1.6	0.3	0.0	0.8
Goldfields-Esp.	28.2	0.1	1.5	1.3	1.4	10.0	1.7	0.7	0.5	7.8	0.9	1.0
Mid West	12.4	1.1	1.4	1.2	0.8	6.1	3.3	0.5	0.8	2.9	2.0	1.2
Gascoyne	1.2	2.0	0.9	1.1	0.5	22.4	3.9	0.4	0.0	0.3	1.8	4.3
Pilbara	42.4	10.1	5.4	1.0	1.6	8.2	0.2	0.5	0.1	1.4	4.5	0.9
Kimberley	5.8	0.8	1.0	1.1	0.6	25.1	1.3	0.3	5.0	0.3	1.6	2.8
Intra-Industry Use (%)	10	18	19	60	82	41	44	27	77	91	51	24
Total National Use (%)	15	34	98	93	93	47	61	25	85	92	80	92
	Export	Export	Service	Service	Service	Export	Internal	Export	Internal	Internal	Service	Service
	Metal Mining	Oil & Gas Production and Transportation	Construction Products and Services	Transportation and Logistics	Business Services	Non-metal Mining	Agricultural Inputs and Services	Upstream Metal Manufacturing	Forestry	Downstream Metal Products	Water Transportation	Hospitality and Tourism

Source: Pracsys (2015), ABS Census (2011), ABS National Accounts (2015)

A few predominant themes are apparent when considering the function of each cluster within a grouping of activity. These are:

- Natural Resource Extraction Clusters
- Support Clusters
- Manufacturing Clusters
- Export Services Clusters

At the simplest level, natural resource extraction clusters are about utilising and extracting the land's natural capital for output and value production. This involves a combination of both renewable and non-renewable resources, including: mining, agriculture and forestry clusters. Manufacturing clusters are focused on improving and adding value to raw materials or existing goods. The Export Services clusters are service-based cluster designed and focused on attracting money into the region from other regions. Support clusters are broadly defined as those clusters that exist to provide the skills, knowledge and capacity-building support enabling other Regionally Significant clusters to operate efficiently.

6.0

6 NATURAL RESOURCE EXTRACTION CLUSTER PROFILES

6.1 METAL MINING

6.1.1 Industry Profile

This cluster is made up of companies involved in mining metals including gold and bauxite as well as metal ores including iron, platinum, nickel and uranium ores. It also includes a range of directly related metal mining support services and suppliers. This reflects a range of companies and activities including:

- Major multinational mining companies (operational and corporate) such as Rio Tinto, Fortescue Metals Group and BHP Billiton
- Support services such as recruitment and investment support
- A range of mid-tier metal mining companies
- A number of small metal mining/ exploration companies

Employment in this area is the largest of the identified Regionally Significant clusters with approximately 26,000 jobs. A large proportion of these workers are trained in the fields of engineering and related technologies (37%), management and commerce (6%) and natural and physical sciences (4%) or have no field of study (36%). Levels of education are lower when compared to the same cluster in the Metro region. These lower education levels (relative to the metro) are reflective of the operational nature of much of the work carried out in the regions.

The cluster is defined by industries in ANZSIC4 categories described in Figure 18.

Figure 18. Metal Mining ANZSIC4 Categories

ANZSIC 4 Category	Activity
Iron ore mining	Mining iron ore or iron sands. Production of sinter and other agglomerates, except those associated with blast furnace operations. For example: · Iron ore dressing or beneficiating · Iron ore mining · Iron sand mining
Bauxite mining	Bauxite mining. For example: · Aluminium ore mining · Bauxite mining
Copper ore mining	Mining copper ore. For example: · Copper ore leaching · Copper ore mining · Electro won copper production
Gold ore mining	Mining gold ore and beneficiating gold ore, preliminary extraction of gold from ore mined by the same unit by smelting or by extraction of gold from liquid. For example: · Alluvial gold mining · Gold bullion production · Gold ore roasting and flotation extraction, including metallurgical hydro-extraction · Reworking of mullock heaps or tailings for gold
Mineral sand mining	Mining mineral sand (except iron sand). For example: · Mineral sand mining · Rutile sand mining · Zircon sand mining
Nickel ore mining	Mining nickel ore. For example: · Nickel ore mining
Silver-lead-zinc ore mining	Mining ores of silver, lead or zinc. For example: · Lead ore mining · Silver-lead-zinc ore mining · Zinc ore mining
Other metal ore mining	Mining metallic mineral ore not elsewhere classified. For example: · Manganese ore mining · Platinum group metal mining · Uranium ore mining

Source: Australian Bureau of Statistics, Pracsys (2016)

6.1.2 Economic Characteristics

The economic characteristics that result from direct activity of the Metal Mining Cluster are summarised in Figure 19.

Figure 19. Metal Mining Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	92,000
Output ($m)	56,140
Exports ($m)	47,509
Gross Value Add ($m)	34,729

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

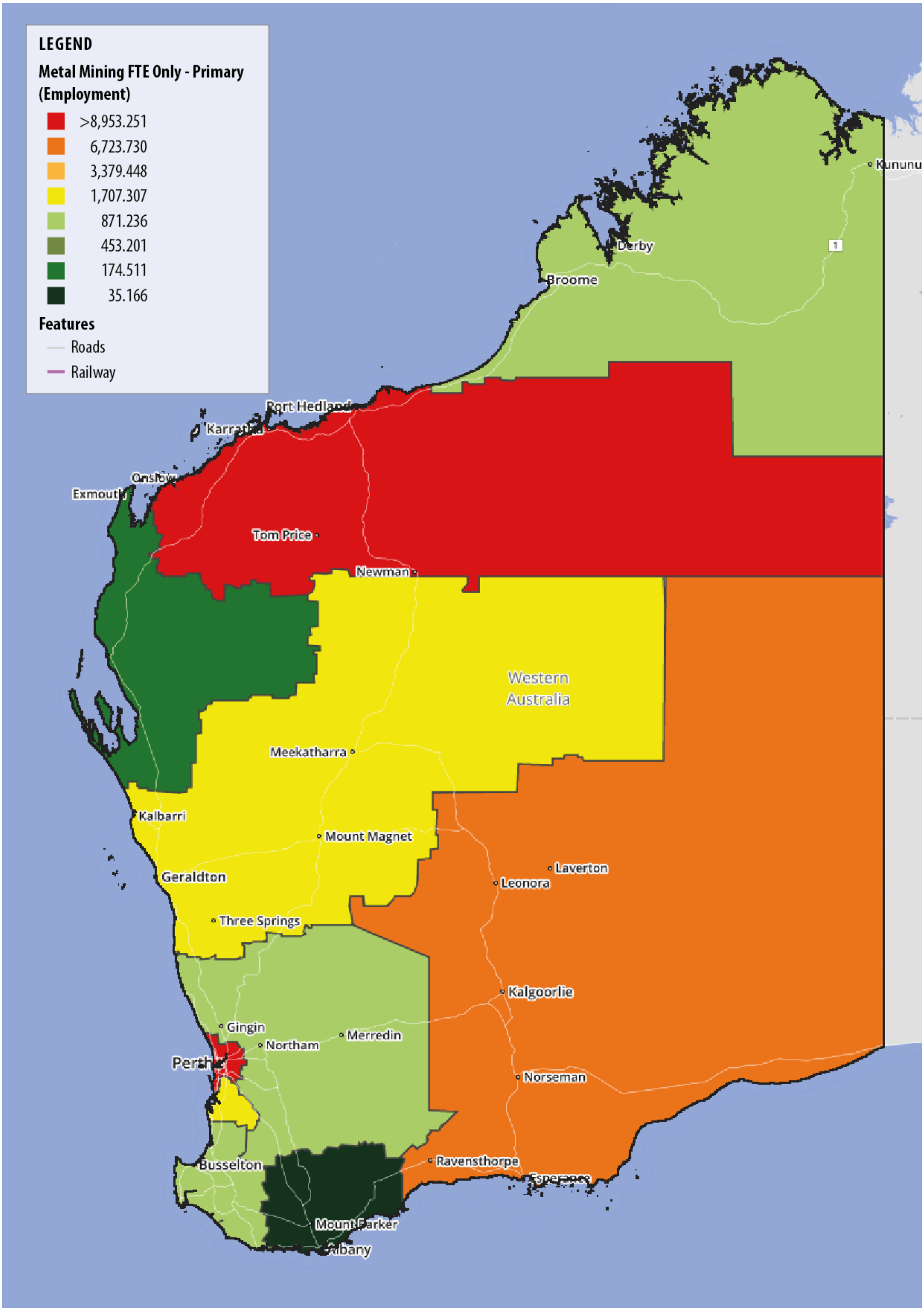
The Metal Mining Cluster is by far the most valuable cluster in WA in terms of raw output, Gross Value Add (GVA) and Exports. This is not unexpected given that iron ore is WA's most valuable export and probably the single biggest driver of economic activity in the state. This position as the largest contributor to the state with extremely high GVA is reflected in the high salaries in the Metal Mining Cluster. The average salary is the second highest of all Regionally Significant Traded clusters at approximately $92,000.

6.1.3 Spatial Characteristics

The spatial distribution of Metal Mining and its support clusters can be seen in Figure 20 and Figure 21.

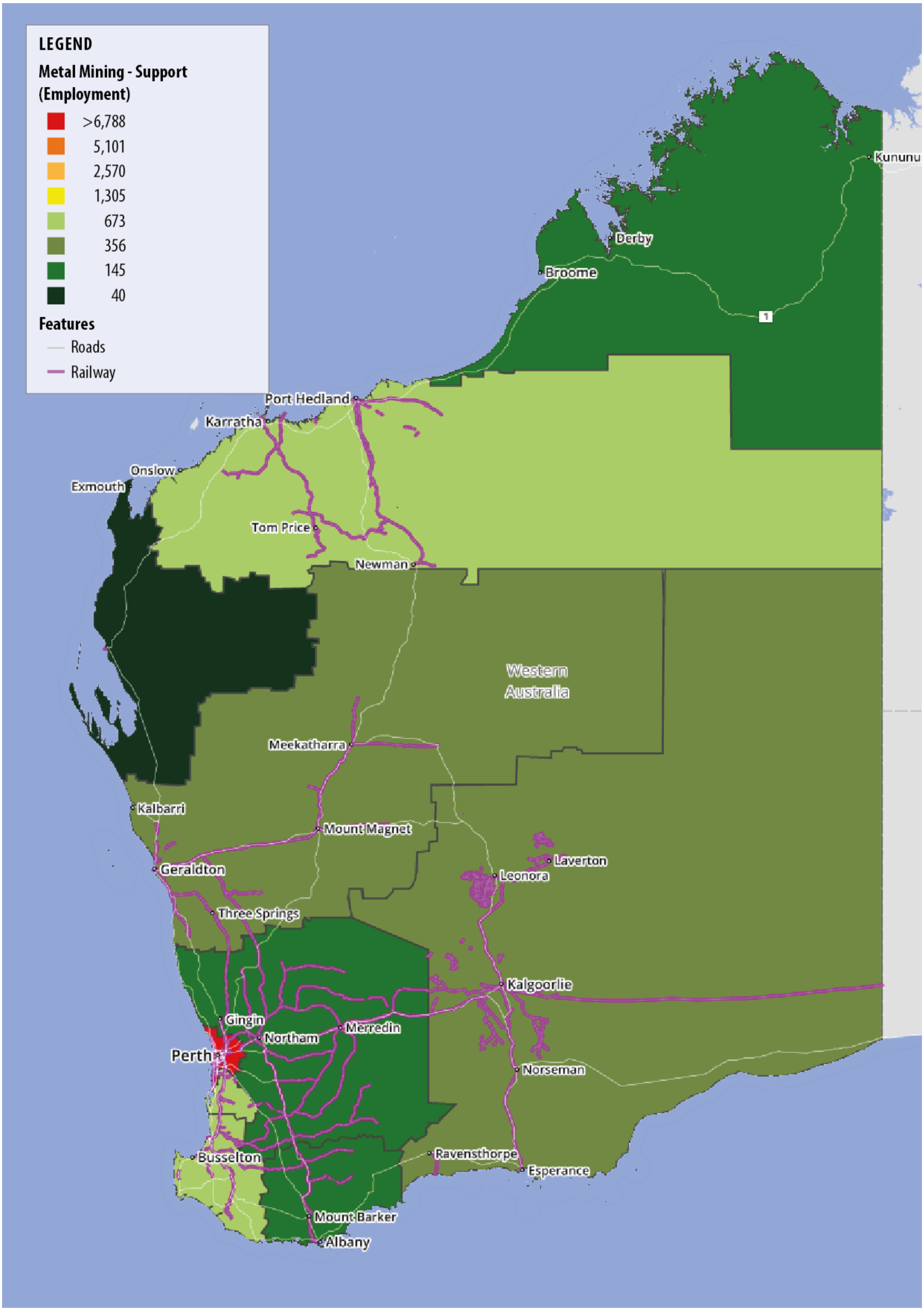
As shown, the major concentrations or hotspots for metal mining are in the Perth metro area, the Pilbara and the Goldfields Esperance region. This reflects the operating functions of mining companies, as well as the two major industries of iron ore and gold mining. Of the Regionally Significant Traded clusters it is the most widely represented and reflects its place as the major economic driver within the WA economy. Spatial characteristics of its support clusters indicate that the majority of activity is serviced from the Perth metro area. Lower concentrations exist in major mining areas indicating that there is some level of local servicing.

Figure 20. Metal Mining Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 21. Metal Mining Support Clusters



Source: Pracsys (2016), ALCES (2016)

6.2 OIL AND GAS PRODUCTION AND TRANSPORTATION

6.2.1 Industry Profile

This Regionally Significant cluster includes companies involved in:

- Exploration, extraction and refining of oil & gas
- Manufacturing products using oil & gas
- Other related products, such as coal and industrial gases. It also includes a range of directly related support services, manufacturers and product suppliers

This reflects a range of companies and activities including:

- Major multinational energy companies, such as Apache Energy and ConocoPhillips
- Major Australian and multinational oil & gas project management, consultancy and technical support services firms, such as Schlumberger, CGG and RISC
- A wide range of mid-tier oil & gas exploration/production companies
- A number of small oil & gas exploration companies
- Manufacturers and suppliers of exploration and production related equipment

The Perth metro area supports corporate activity while the regional focus is guided towards operational activities. As such, the skills needed and required for regional activities are vastly different to those needed in a more corporate setting. The total employment in this cluster stands at approximately 1,650 jobs. Proportions of employment across educational fields were derived from ABS census data, with a large proportion employed from engineering and related technologies (50%), management and commerce (7%) and Architecture and Building backgrounds (11%). This reflects a much larger operational functionality than that experienced purely in the metro region.

The cluster is defined by industries in ANZSIC4 categories described in Figure 22.

Figure 22. Oil and Gas Production and Transportation ANZSIC4 Categories

ANZSIC4 Category	Activity
Petroleum exploration	Exploring for crude petroleum and natural gas, for example: · Natural gas exploration · Petroleum exploration
Oil and gas extraction	Producing crude oil, natural gas or condensate through the extraction of oil and gas deposits. For example: · Natural gas extraction · Petroleum extraction
Petroleum refining and petroleum fuel manufacturing	Refining heavy and light component crude oil, manufacturing and/or blending materials into petroleum fuels, and manufacturing fuels from the liquefaction of petroleum gases. For example: · Automotive diesel manufacturing · Aviation fuel manufacturing · Petroleum refining or blending
Other petroleum and coal product manufacturing	Further refining heavy and light oil components into petroleum and coal products not elsewhere classified, using oil and grease base stocks, as well as synthetic organic compound base stocks. This class also includes units mainly engaged in distilling coal tars and/or manufacturing cyclic organic hydrocarbon intermediate compounds from refined petroleum or natural gas. For example: · Asphalt and bituminous material manufacturing · Lubricating oil manufacturing · Petroleum solvent manufacturing · Synthetic motor oil manufacturing
Industrial gas manufacturing	Manufacturing industrial organic and inorganic gas in compressed, liquid or solid forms. For example: · Methane manufacturing · Propane gas manufacturing

Source: Australian Bureau of Statistics, Pracsys (2016)

6.2.2 Economic Characteristics

The economic characteristics that result from direct activity of the Oil and Gas Production and Transportation cluster are summarised in Figure 23.

Figure 23. Oil and Gas Production and Transportation Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	98,000
Output ($m)	4,248
Exports ($m)	2,821
Gross Value Add ($m)	2,573

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys Modelling (2016)

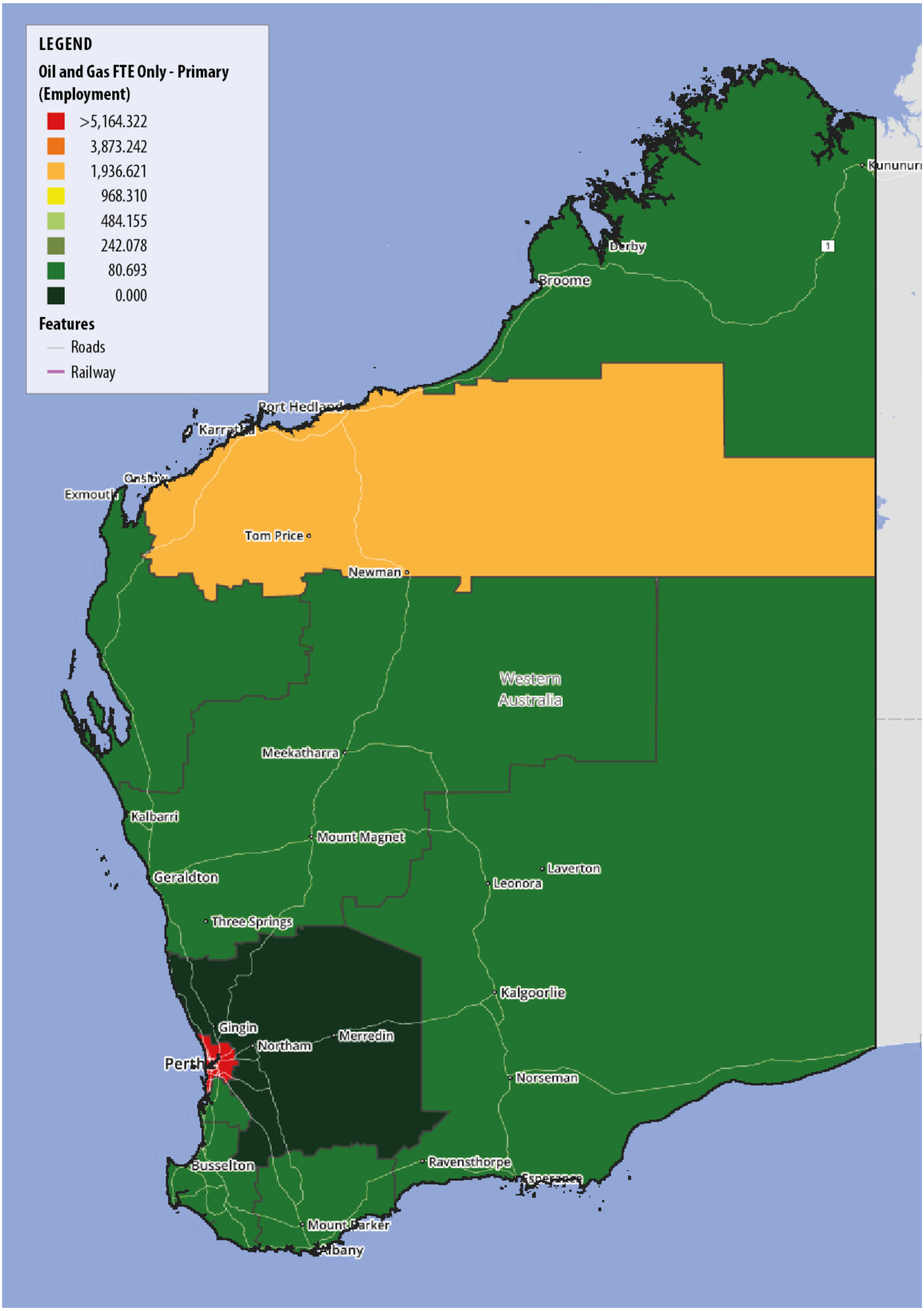
This is a high output (relative to total employment) industry as is reflected through average salary for its employees which is highest out of all Regionally Significant Traded clusters.

6.2.3 Spatial Characteristics

The Oil and Gas Production and Transportation cluster is concentrated in two main areas within the Western Australian economy, this can be seen in Figure 24, supporting clusters can be seen in Figure 25.

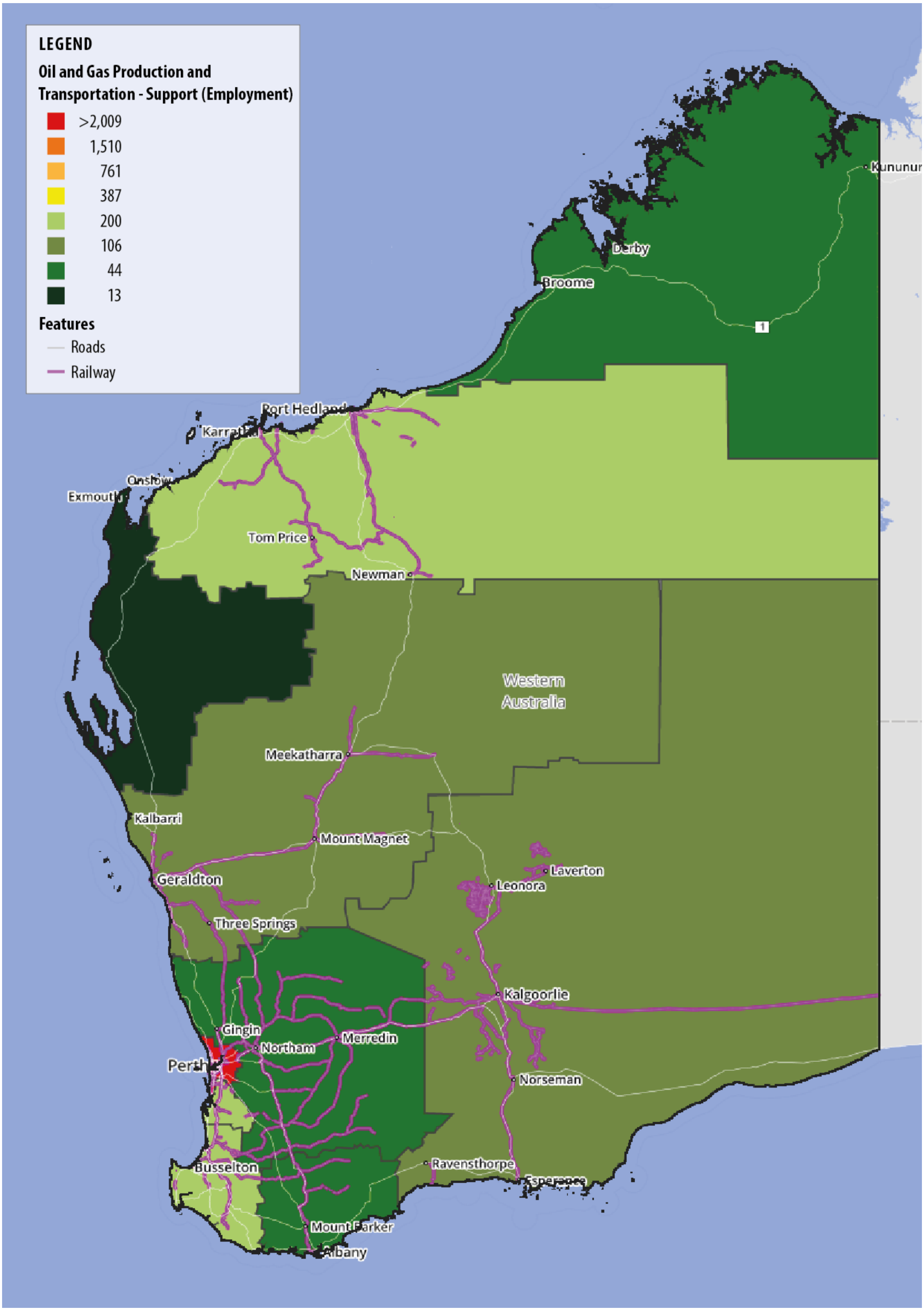
As shown, Oil and Gas is predominantly concentrated in the metro area, reflecting a strong corporate representation. This is also reflective of two major characteristics of the industry; the first is that a number of rigs are offshore, despite corporate functions locating onshore. The second is the relatively low number of operational staff that oil and gas production requires to function, due to high levels of automation. Support clusters appear to be relatively well aligned with major agglomerations of Oil and Gas activity.

Figure 24. Oil and Gas Production and Transportation spatial characteristics



Source: Pracsys (2016), ALCES (2016)

Figure 25. Oil and Gas Production and Transportation Support Clusters



Source: Pracsys (2016), ALCES (2016)

6.3 NON-METAL MINING

6.3.1 Industry Profile

Companies within this Regionally Significant Traded cluster are engaged in mining non-metal materials, such as borates, salt, coal, sand and diamonds. It also includes a range of non-metal related mining services. This includes a range of companies and activities such as:

- Major multinational mining companies involved in non-metal mining, such as Rio Tinto and BHP Billiton
- Mining support services such as crushing and screening services.
- A wide range of mid-tier non-metal mining houses
- A number of small non-metal mining and exploration companies
- Manufacturers and suppliers of exploration and processing equipment related to non-metal materials

The total employment in this cluster stands at approximately 2,712 jobs in regional areas. Like other extractive clusters, a large proportion of people employed in this field studied engineering and related technologies (25%), management and commerce (14%) and natural and physical sciences (12%).

The cluster is defined by industries in the ANZSIC4 categories identified in Figure 26.

Figure 26. Non-Metal Mining ANZSIC4 Categories

ANSZIC 4 Category	Activity
Gravel and sand quarrying	Quarrying, washing or screening sand or natural gravel, for example: · Pebble quarrying · River gravel quarrying, washing or screening · Rock, ornamental, gathering · Sand quarrying, washing or screening
Other construction material mining	Quarrying, crushing or screening crushed or broken stone or in quarrying dimension stone or construction materials not elsewhere classified. Includes the quarrying of clay, marble, granite, limestone, slate or dolomite for use as a manufacturing input. For example: · Aggregate quarrying · Building stone quarrying · Construction material crushing or screening · Earth, soil or filling quarrying · Tile clay quarrying
Other non-metallic mineral mining and quarrying	Mining or quarrying non-metallic minerals, except construction materials. For example: · Abrasives mining · Barite mining · Lithium mineral mining · Salt harvesting · Silica mining (for industrial purposes)
Mineral exploration	Exploring for minerals (excluding for crude petroleum or natural gas). For example: · Mineral exploration

Source: Australian Bureau of Statistics, Pracsys (2016)

6.3.2 Economic Characteristics

The economic characteristics that result from direct activity of the Non-Metal Mining Cluster are summarised in Figure 27.

Figure 27. Non-Metal Mining Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2015)
Average Salary ($)	83,000
Output ($m)	626
Exports ($m)	334
Gross Value Add ($m)	339

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

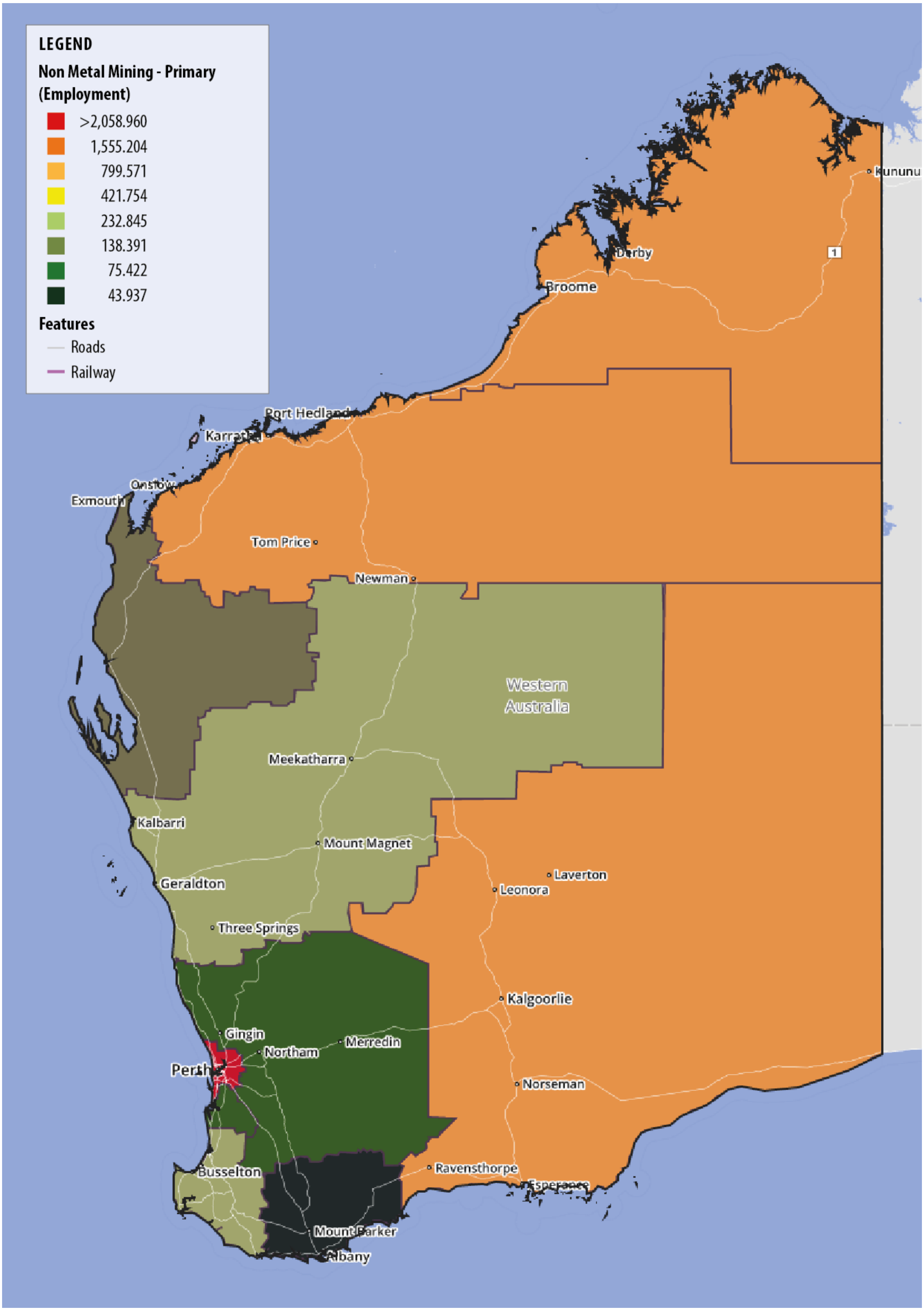
The average salary for this cluster is $83,000 per annum. Total output for the cluster is relatively low, reflecting the low value of a number of its key products.

6.3.3 Spatial Characteristics

The spatial distribution of Non-Metal Mining and its support clusters is shown in Figure 28 and Figure 29.

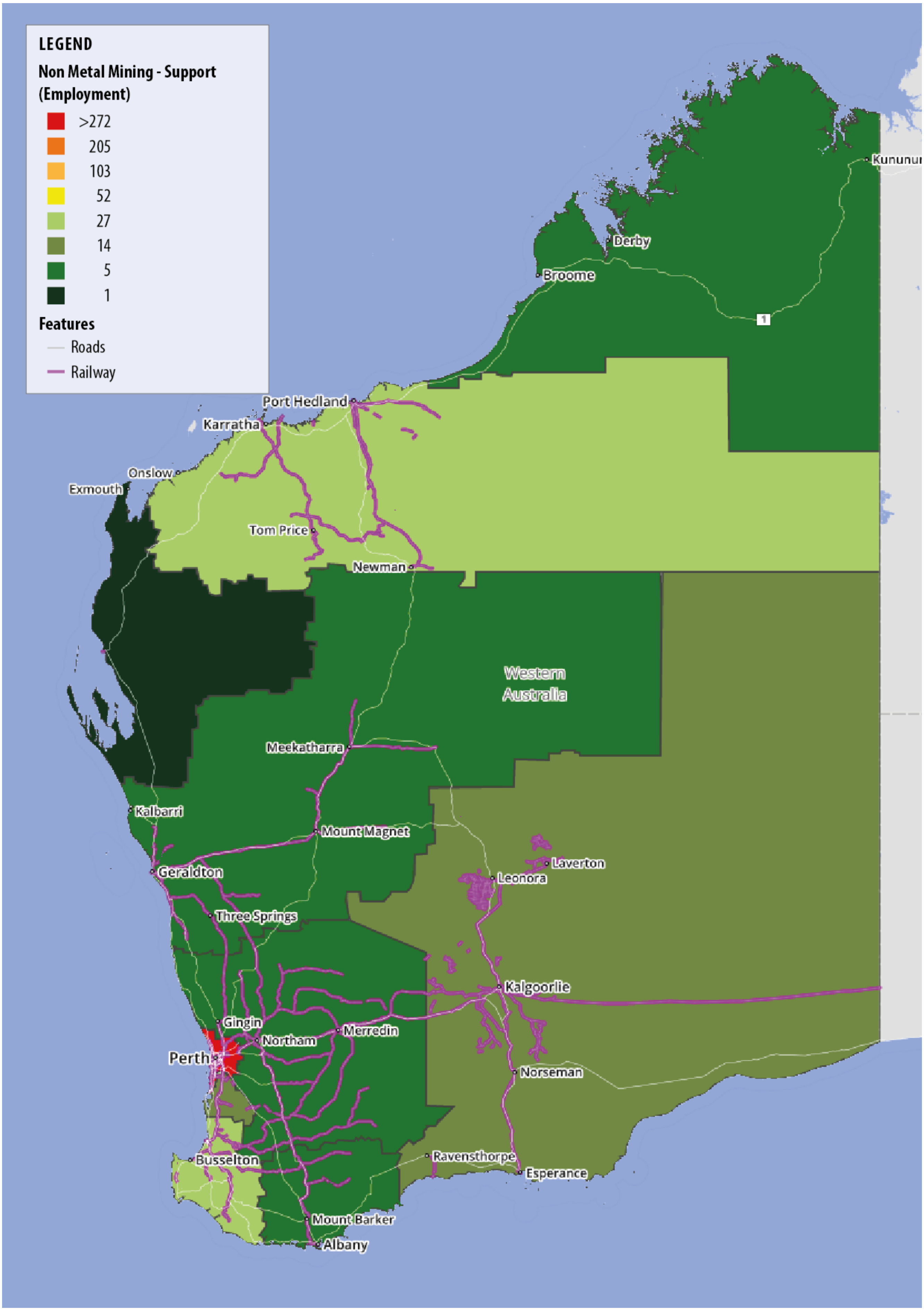
Non-Metal Mining employment is primarily found in the Perth Metro Area, the Kimberley, the Pilbara and the Goldfields-Esperance regions. These areas are likely involved in mining of Cobalt, Zinc, Gypsium, Lime-sand and other construction materials. Support clusters appear to be well aligned with regional cluster activity. There may be some opportunity to increase the servicing in both the Mid West and the Kimberley.

Figure 28. Non-Metal Mining Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 29. Non-Metal Mining Support Clusters



Source: Pracsys (2016), ALCES (2016)

6.4 AGRICULTURAL INPUTS AND SERVICES

6.4.1 Industry Profile

Companies and employees within this Regionally Significant cluster are engaged in agricultural activities such as animal farming, crop growing, and other horticulture. It also includes the various agricultural support services related to these activities. This reflects a range of different activities and participants including:

- Independent and family owned farms on freehold land or pastoral leases
- Large multifaceted agricultural companies such as Elders
- A wide range of mid-tier specialist agricultural companies
- Agricultural support companies such as Aerial crop spraying, irrigation, fertilizer companies

The total employment in this cluster stands at approximately 20,000 jobs, giving it the second largest quantum of jobs in the Regionally Significant Traded clusters. This is in large part due to the breadth of industries included in the cluster. Based on ABS Census data, the majority of those working in this field did not have a field of study attributed to them (62%). Of those that did study, the majority studied agriculture, environmental and related studies (12%) with the next largest proportion of people studying engineering and related technologies (7%).

The cluster is defined by industries in ANZSIC4 categories described in Figure 30.

Figure 30. Agricultural Inputs and Services (selected) ANZSIC4 Categories

ANZSIC4 Category	Activity
Livestock, Poultry and other Animal Farming	Farming of various livestock and other animals as well as associated services: · Beef cattle farming · Buffalo, domesticated grazing · Dairy cattle agistment service · Poultry farming · Sheep farming · Shearing services
Other Livestock Farming	This classification is primarily concerned with activity revolving around the breeding or raising of farm and domestic animals not elsewhere classified. For example: · Alpaca farming · Bird breeding (except poultry or game birds) · Crocodile farming · Emu farming · Goat farming
Various Crop Growing	Various crop growing types in Western Australia, this could include (but not limited to): · Stone fruit growing · Mushroom Growing · Cotton Growing · Rice Growing · Wheat Growing · Vegetable Growing
Agricultural Support Services	Support Services for various agricultural activities. These services improve productivity and act as enablers for various agricultural activities. Examples include: · Fruit or vegetable picking · Aerial crop spraying or dusting · Farm irrigation services · Hay or silage baling or pressing

Source: Australian Bureau of Statistics, Pracsys (2016)

6.4.2 Economic Characteristics

The economic characteristics that result from direct activity of the Agricultural Inputs and Services cluster are summarised in Figure 31.

Figure 31. Agricultural Input and Services Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	39,000
Output ($m)	6,006
Exports ($m)	2,365
Gross Value Add ($m)	2,547

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys Modelling (2016)

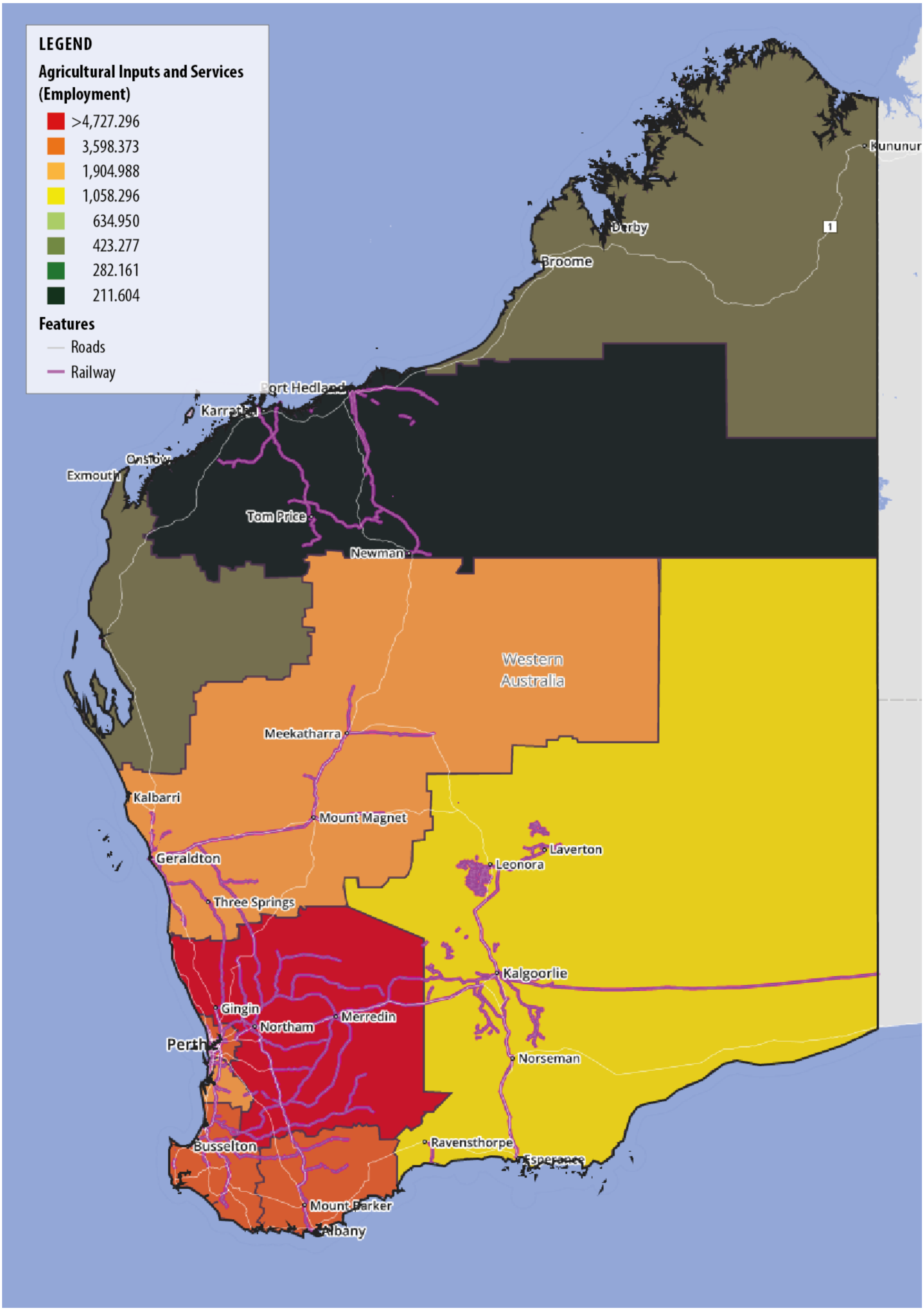
The Agricultural Input and Services cluster represents one of the major employers in Western Australia. Despite this, its relative output, exports and gross value add per employee is relatively low in comparison to the other Regionally Significant Traded clusters. This could be explained by a high number of seasonal or part time work in the industry. This characteristic of the industry is also reflected in its relatively low average salary. Despite this it plays an integral role in the Western Australian economy and represents an industry with vast growth potential for the state.

6.4.3 Spatial Characteristics

The spatial distribution of the Agricultural Inputs and Services cluster in Western Australia is shown in Figure 32 and Figure 33.

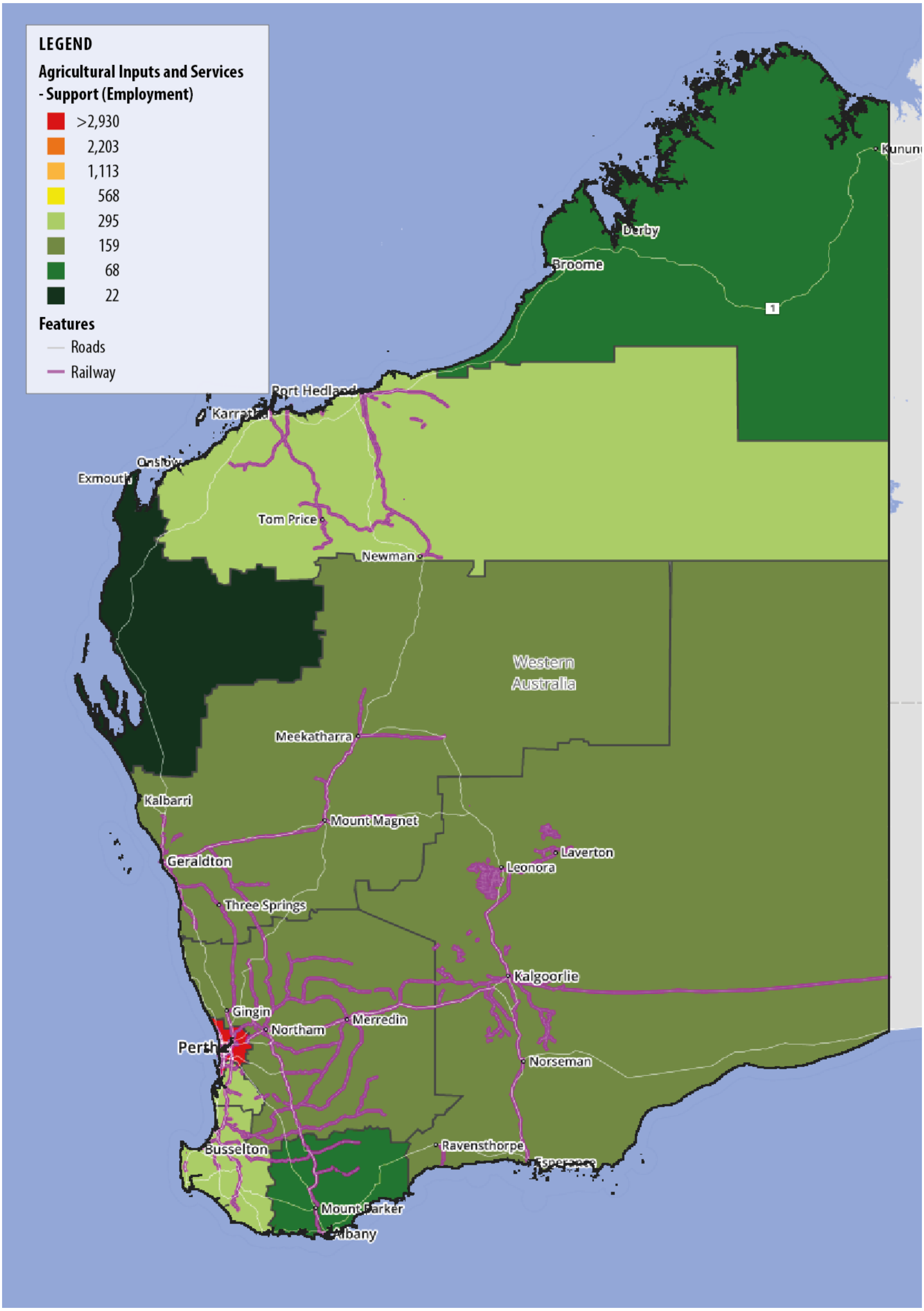
The Agricultural Inputs and Services cluster is dispersed around the state with major concentrations in the Wheatbelt, Great Southern, South West, Mid West and Goldfields-Esperance regions. Conversely, Agricultural Inputs and Services support clusters appear to be underrepresented in all of these regions. The spatial distribution indicates that the majority of activity is serviced from the metro region. As such, this underservicing represents a potential opportunity for further investigation.

Figure 32. Agricultural Inputs and Services Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 33. Agricultural Inputs and Services Support Clusters



Source: Pracsys (2016), ALCES (2016)

6.5 FORESTRY

6.5.1 Industry Profile

Companies and employees within this Regionally Significant cluster are engaged in activities related to logging, forestry and forestry support services. This occurs predominately in the South West where approximately half of Western Australia's forests are located. This cluster reflects a range of different activities and companies:

- Logging of native hardwoods by large and small companies
- Plantation timber forestry by individual landholders and large companies
- Softwood logging

Based on ABS Census data, half of those working in this field did not have a field of study attributed to them (50%). Of those that did study, the majority studied agriculture, environmental and related studies (18%) with the next largest proportion of people studying engineering and related technologies (13%). This represents a slightly higher proportion of people educated than the similar cluster, Agricultural Inputs and Services but is generally below the levels of education found in other Natural Resource Extraction clusters.

The cluster is defined by industries in ANZSIC4 categories described in Figure 34.

Figure 34. Forestry ANZSIC4 Categories

ANZSIC4 Category	Activity
Forestry	Growing standing timber in native or plantation forests, or timber tracts examples include: · Forest product gathering · Forestry growing operation · Kauri gum digging · Resin gathering
Logging	Logging of native or plantation forests, including felling, cutting and/or roughly hewing logs into products such as railway sleepers or posts, examples include: · Firewood cutting · Mine timber hewing · Pole hewing · Post shaping · Rough shaping of forest timber
Forestry Support Services	Activities engaged in providing support services to forestry and logging activities, examples include: · Planting, pruning and thinning trees · Forest reafforestation · Forest plantation conservation or maintenance

Source: Australian Bureau of Statistics, Pracsys (2016)

6.5.2 Economic Characteristics

The economic characteristics that result from direct activity of the Agricultural Inputs and Services cluster are summarised in Figure 35.

Figure 35. Agricultural Input and Services Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	56,000
Output ($m)	220
Exports ($m)	32
Gross Value Add ($m)	118

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys Modelling (2016)

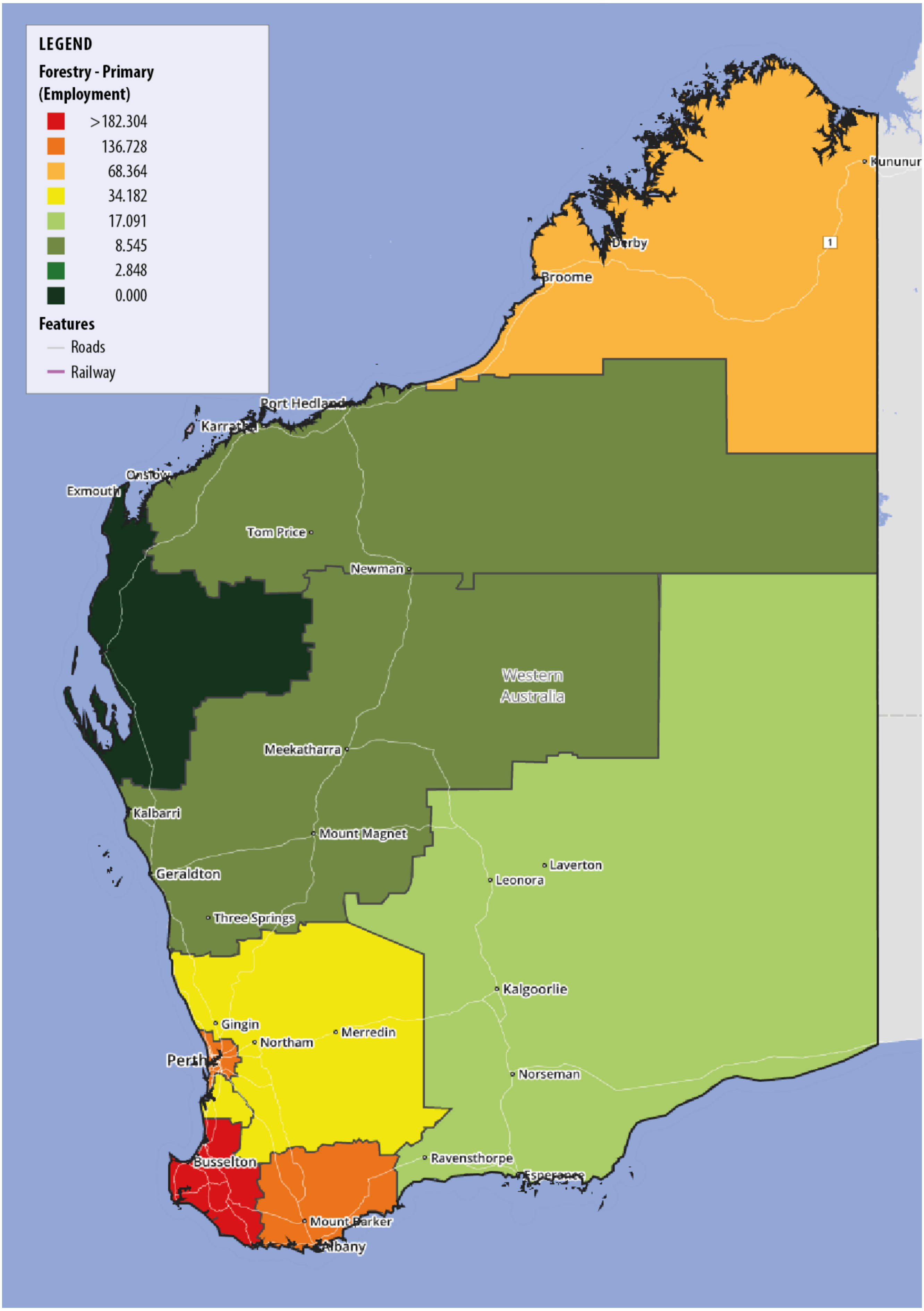
In terms of total scale the Forestry Regionally Significant cluster is relatively small. It is the smallest of the Natural Resource Extraction clusters and the smallest of all Regionally Significant Traded clusters in Western Australia. Despite this, it is a significant contributor of economic growth in the South West region of Western Australia with high local significance.

6.5.3 Spatial Characteristics

The spatial characteristics of the Forestry cluster and its supporting clusters are shown in Figure 36 and Figure 37.

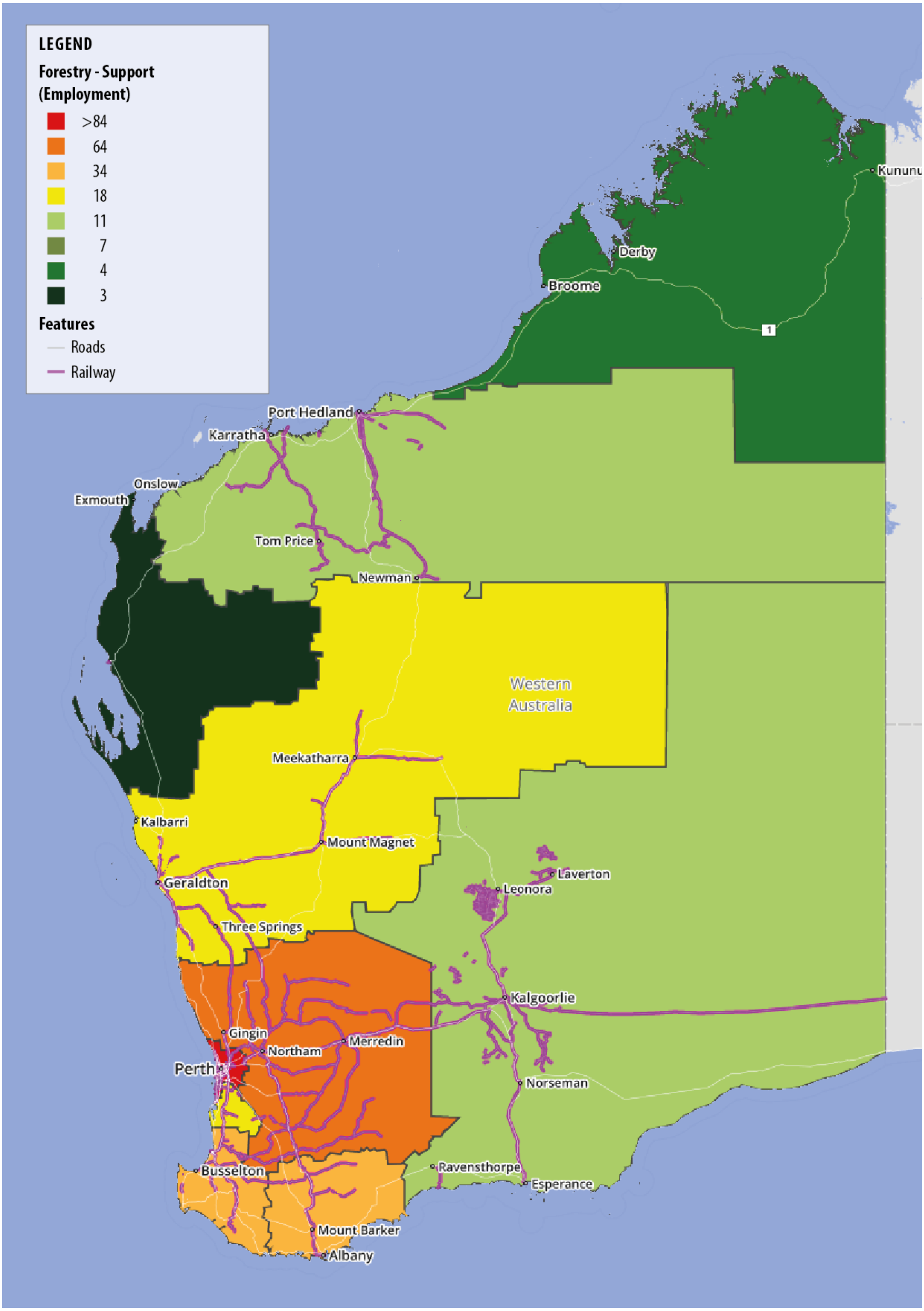
The Forestry cluster appears to be concentrated in both the South West and Central-Northern areas of the state. Spatially, there appears to be a strong relationship with the support clusters indicating a significant proportion of activity is serviced locally.

Figure 36. Forestry Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 37. Forestry Support Clusters



Source: Pracsys (2016), ALCES (2016)

7.0

7 MANUFACTURING CLUSTER PROFILES

7.1 WATER TRANSPORTATION

7.1.1 Industry Profile

This cluster includes companies incorporating water based operations involving the transportation of people and material goods. It also includes the manufacturing of boats, stevedoring services, and other related support services. This reflects a range of companies and activities including:

- Container handling and marine terminal services
- Marine supplies that provide tools and specialist rigging and fastening equipment and boat painting services
- Marine electronics companies that service ship and boatbuilding, commercial fishing and workboats providing services to offshore oil and gas firms, search and rescue services and passenger ferry operators

This cluster accounts for moderate levels of employment, totaling approximately 1,439 jobs. Education in the cluster is dominated by engineering and related technologies (46%) followed by management and commerce fields of study (10%). Almost a third of employment in this area does not have a field of study (26%).

The cluster is defined by industries in ANZSIC4 categories as described in Figure 38.

Figure 38. Water Transportation ANZSIC4 Categories

ANZSIC 4 Category	Activity
Shipbuilding and Repair Services	Manufacturing or repairing vessels of 50 tonnes and over displacement, submarines or major components for ships and submarines not elsewhere classified. For example: · Drydock operation · Hull cleaning · Ship repairing · Submarine constructing
Boatbuilding and repair services	Manufacturing or repairing vessels of under 50 tonnes displacement. For example: · Boat repairing · Sailboat manufacturing
Water freight transport	Operation of vessels for the transportation of freight or cargo by water. For example: · Coastal sea freight transport service between domestic ports · River freight transport service · Ship freight management service (i.e. operation of ships and behalf of owners)
Water passenger transport	Operation of vessels for the transportation of passengers by water. For example: · Boat charter, lease or rental, with crew for passenger transport · Ship charter, lease or rental, with crew, for passenger transport · Water passenger transport service · Water taxi service
Stevedoring services	Providing stevedoring services for the loading or unloading of vessels. For example: · Ship loading or unloading service (provision of labour) · Stevedoring service

ANZSIC 4 Category	Activity
Port and water transport terminal operations	Maintenance and leasing of port facilities to facilitate the land-sea transition of goods and passengers. Also includes operation of ship mooring facilities or water transport terminals for passenger or freight (including sea cargo container terminals and coal or grain loaders). For example: · Coal loader operation (water transport) · Port operation · Water freight terminal operation · Wharf operation
Other water transport and support services	Providing water transport support services not elsewhere classified. For example: · Lighterage service · Salvage service, marine · Towboat and tugboat operation

Source: Australian Bureau of Statistics, Pracsys (2016)

7.1.2 Economic Characteristics

The economic characteristics that result from direct activity of the Water Transportation cluster are summarised in Figure 39.

Figure 39. Water Transportation Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2015)
Average Salary ($)	$86,000
Output ($m)	518
Exports ($m)	105
Gross Value Add ($m)	209

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

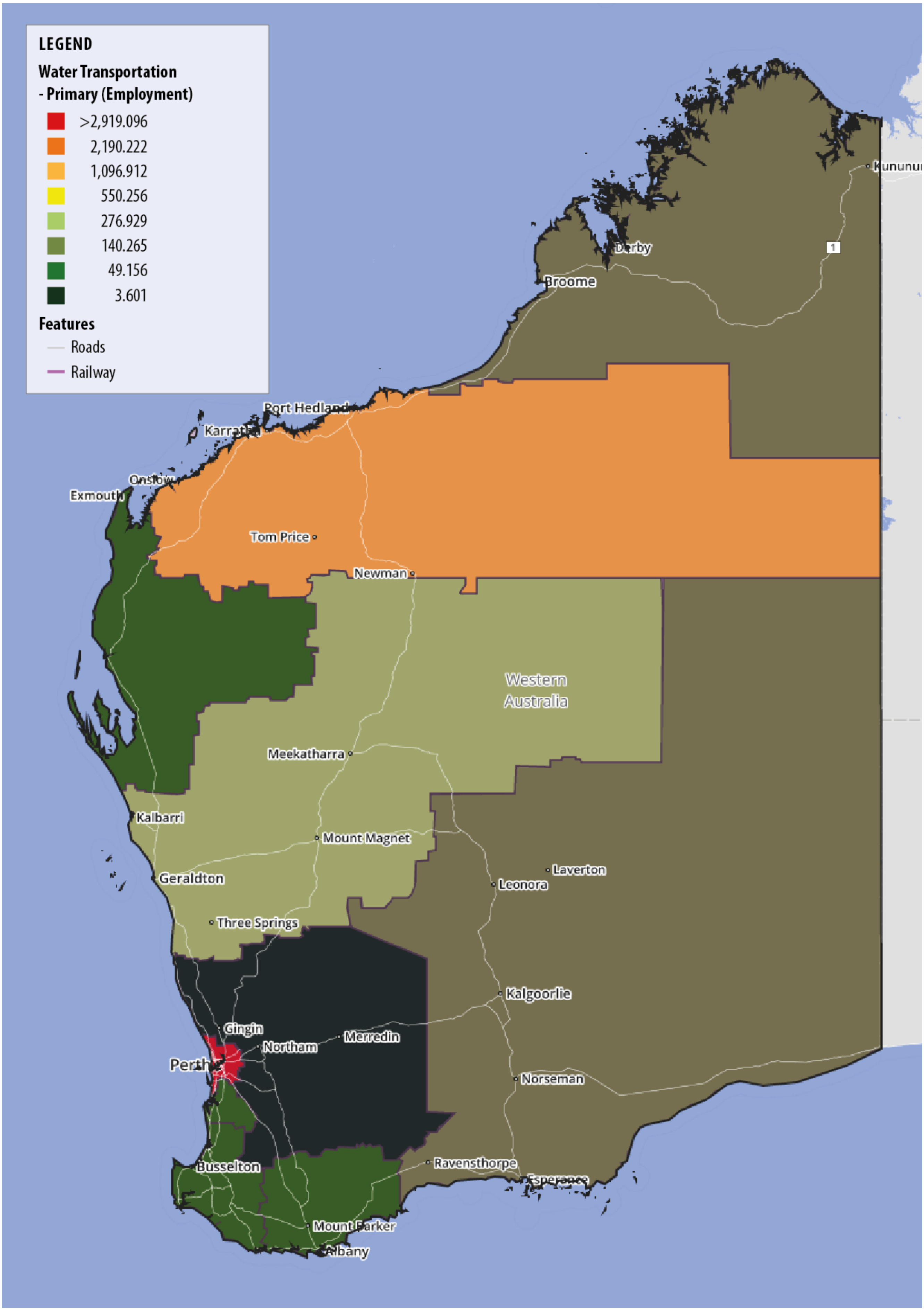
The Water Transportation Traded cluster is characterised by high salaries and relatively high output with regards to employment. Additionally, a high proportion (approximately 20%) of activity within this cluster is exported internationally.

7.1.3 Spatial Characteristics

The spatial characteristics and distribution of employment within the Water Transportation cluster and its supporting clusters can be seen in Figure 40 and Figure 41.

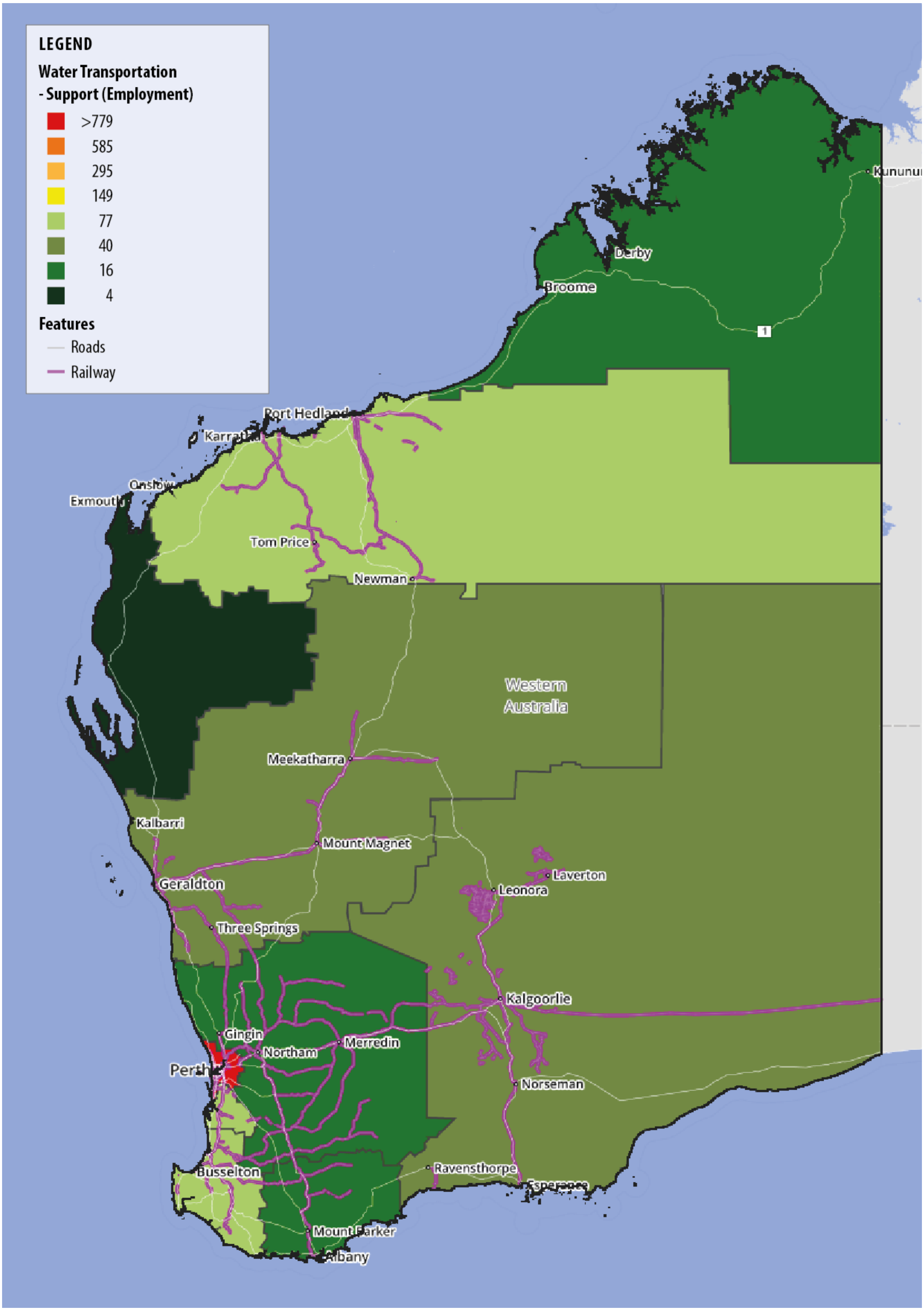
The Water Transportation cluster has high spatial correlation with the Oil and Gas Production and Transportation cluster due to important linkages between the two. Like Oil and Gas, the two highest concentration areas are in the Perth area and the Pilbara. There appears to be a relatively strong correlation with its supporting clusters though some opportunity to investigate further may exist in the Pilbara region.

Figure 40. Water Transportation Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 41. Water Transportation Support Services



Source: Pracsys (2016), ALCES (2016)

7.2 UPSTREAM METAL MANUFACTURING

7.2.1 Industry Profile

This Traded cluster contains companies involved in smelting and refining of metals such as iron, aluminium and copper, as well as steel manufacturing and upstream metal product manufacturing including pipes or tubes, gas and water fittings, aluminium castings and related products. This reflects a range of companies and activities including:

- Major bauxite/alumina refineries (e.g. Alcoa)
- A range of medium and small metal manufacturing companies involved in steel fabrication and manufacturing of metal products such as bolts, fasteners, wire and springs, as well as the designing of products such as stainless steel balustrades and automatic gates

This cluster displays a relatively large proportion of regional employment, totaling approximately 5,200 jobs. It is made up of predominately professionals from an engineering and related technologies background (45%). Other significant fields of study include management and commerce (7%) and architecture and building (4%). There is also a significant number of employment with no field of study (32%).

The cluster is defined by industries in ANZSIC4 categories a described in Figure 42.

Figure 42. Upstream Metal Manufacturing ANZSIC4 Categories

ANZSIC 4 Category	Activity
Iron smelting and steel manufacturing	Smelting and refining iron ore, and iron ore sands into basic iron products such as ingots, billets and slabs. Also includes manufacturing steel from iron alloyed with other elements (e.g. with carbon to produce carbon steel; with chromium to produce stainless steel), the conversion of basic iron and steel products (generally by hot or cold rolling) into primary shapes such as sheets, bars and rods, and recycling scrap ferrous metals. For example: · Pig iron manufacturing · Tinplate sheet or strip manufacturing
Iron and steel casting	Manufacturing finished iron and steel products by casting molten ferrous metals in moulds. For example: · Castings, iron, manufacturing · Die-casting, steel, manufacturing · Moulded cast iron pipe or tube manufacturing · Tube, spun-cast iron, manufacturing
Steel pipe and tube manufacturing	Manufacturing seamless or welded steel pipes or tubes, ferrous metal pipe or tube fittings (except cast or forged). For example: · Cold drawn steel pipe or tube manufacturing · Fittings, steam, gas or water, manufacturing (ferrous metal, except cast or forged) · Galvanised seamless or welded steel pipe or tube manufacturing · Hot rolling pipe and tube manufacturing
Alumina Production	Refining bauxite to form alumina (aluminium oxide). For example: · Alumina manufacturing · Bauxite refining
Aluminium smelting	Smelting alumina to produce aluminium, or recovering aluminium from scrap. The aluminium is cast into basic shapes or may be cast according to customer specifications. Also includes manufacturing aluminium alloys from primary aluminium smelted at the same unit. For example: · Aluminium casting · Aluminium smelting (from alumina)

ANZSIC 4 Category	Activity
Copper, silver, lead and zinc smelting and refining	Primary smelting or refining of copper, silver, lead, zinc, or recovery of these metals from waste or scrap. The metal is cast into ingots or other basic shapes. Also includes by-production of sulphuric acid in conjunction with the smelting of these metals. For example: · Electrolytic zinc manufacturing · Spelter manufacturing
Iron and steel forging	Manufacturing finished or semi-finished iron or steel products by forging (compressive force exerted through a die). For example: · Chain, forged steel, manufacturing · Valves or valve parts, steam, gas or water, forged iron or steel, manufacturing
Other metal container manufacturing	Manufacturing of metal containers not elsewhere classified. For example: · Drum, metal, manufacturing · Metal container, metal, manufacturing

Source: Australian Bureau of Statistics, Pracsys (2016)

7.2.2 Economic Characteristics

The economic characteristics that result from direct activity of the Upstream Metal Manufacturing cluster are summarised in Figure 43.

Figure 43. Upstream Metal Manufacturing Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	$82,000
Output ($m)	6,166
Exports ($m)	4,653
Gross Value Add ($m)	502

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

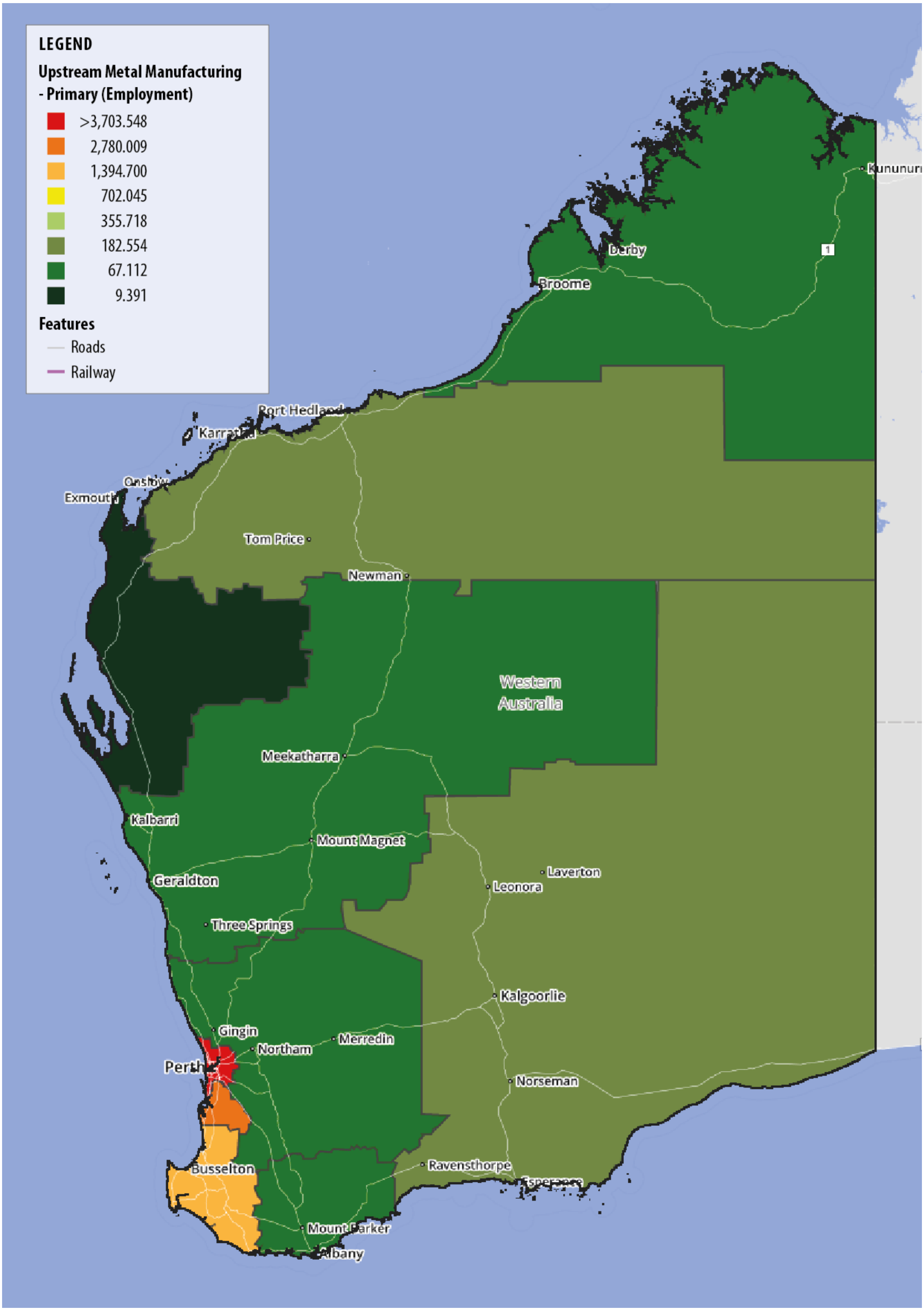
Upstream metal manufacturing has a relatively high output. Of particular interest is its ratio of exports to output, which indicates that the majority of its produce is exported overseas. This is largely due to the significant amount of metal industries in WA providing more metal products than can be consumed locally.

7.2.3 Spatial Characteristics

The spatial distribution and characteristics of the Upstream Metal Manufacturing cluster can be seen in Figure 44 and Figure 45.

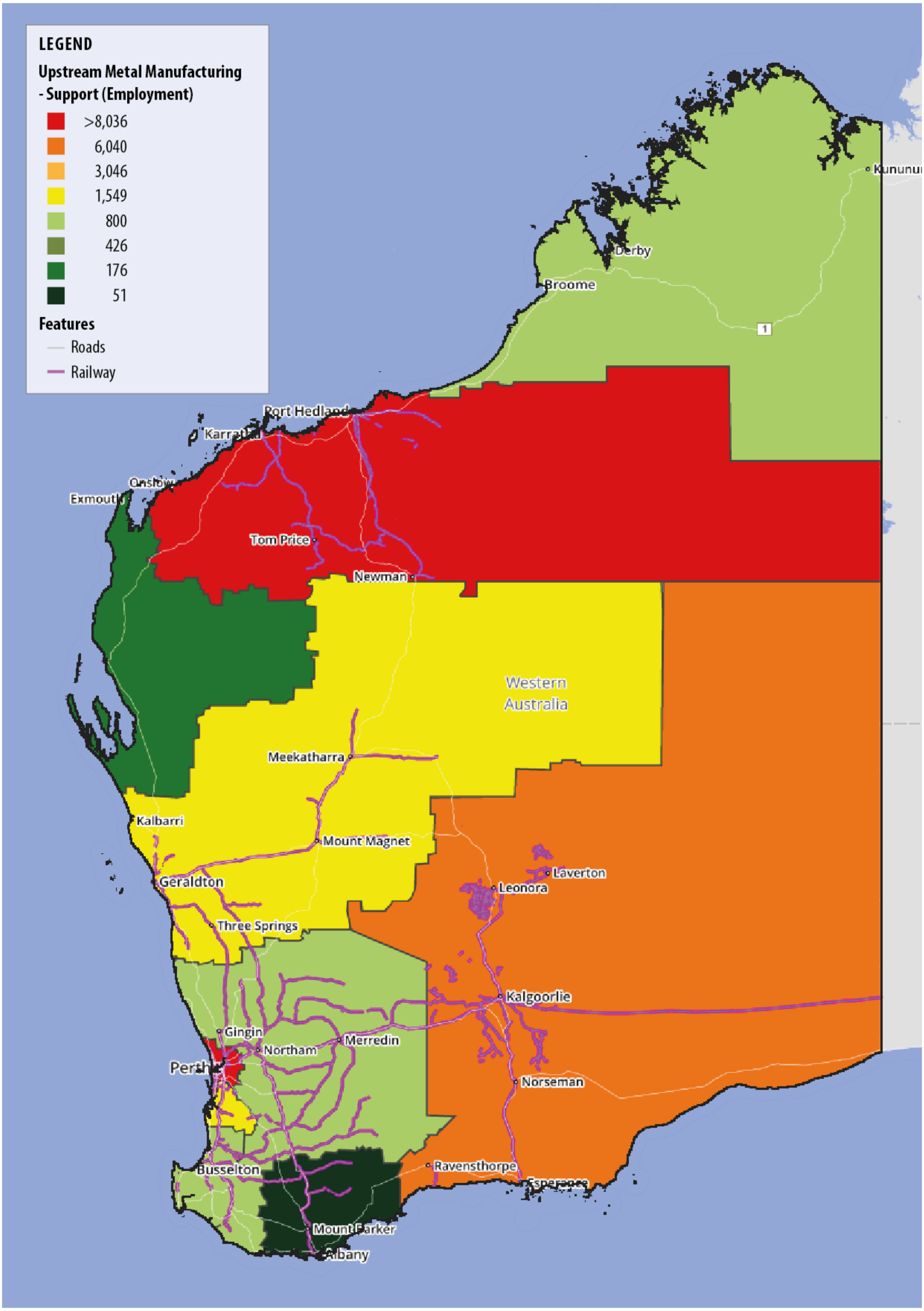
As shown, this cluster is predominantly underrepresented in the majority of the state. Major agglomerations appear to be in in the Perth and South West regions of the state. This is likely a result of the Kwinana industrial area as well as the alumina smelting activity to the south of the Metro Area. Heavy concentrations of primary activity do not appear to be matched with associated levels of servicing in the South West and may represent an opportunity for further investigation.

Figure 44. Upstream Metal Manufacturing Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 45. Upstream Metal Manufacturing Support Clusters



Source: Pracsys (2016), ALCES (2016)

7.3 DOWNSTREAM METAL PRODUCTS

7.3.1 Industry Profile

This Traded cluster contains companies involved in manufacturing of basic metal products. This reflects a range of companies and activities including:

- Spring and wire product as well as nut, bolt and screw and rivet manufacturing
- A range of medium and small metal manufacturing companies involved in prefabricated metal building manufacturing and sheet metal product manufacturing.

This cluster provides a total of approximately 1,911 jobs. Like other manufacturing products industries, education is dominated by those who studied engineering and related technologies (41%) followed by management and commerce fields (8%). Unique to downstream metal products, Architecture and Building is also represented relatively highly (6%).

The cluster is defined by industries in ANZSIC4 categories a described in Figure 46.

Figure 46. Downstream Metal Products ANZSIC4 Categories

ANZSIC 4 Category	Activity
Metal Container Manufacturing	Manufacture of metal containers such as: · Boilers, tank and other heavy gauge metal containers · Bins, cans, drums, garbage cans, letter boxes
Structural Metal Product Manufacturing	Manufacturing of components of buildings and other structures as well as prefabricated structures, examples include: · Structural steel fabricating · Prefabricated metal building manufacturing · Architectural aluminium product manufacturing · Metal roof and guttering manufacturing
Steel pipe and tube manufacturing	Manufacturing seamless or welded steel pipes or tubes, ferrous metal pipe or tube fittings (except cast or forged). For example: · Cold drawn steel pipe or tube manufacturing · Fittings, steam, gas or water, manufacturing (ferrous metal; except cast or forged) · Galvanised seamless or welded steel pipe or tube manufacturing · Hot rolling pipe and tube manufacturing
Spring and wire product manufacturing	Manufacturing wire or wire products, cable, wire netting, nails or rolled steel fence posts. For example: · Barbed wire manufacturing · Chain manufacturing (except forged, cast or sprocket chain) · Woven wire product manufacturing (Except mattress supports)
Nut, bolt, screw and rivet manufacturing	Manufacturing metal nuts, bolts, screws, rivets, fasteners, metal washers or other precision turned metal items. For example: · Dowel pin, metal, manufacturing · Masonry anchor, metal, manufacturing · Set screw, metal, metal, manufacturing

Source: Australian Bureau of Statistics, Pracsys (2016)

7.3.2 Economic Characteristics

The economic characteristics that result from direct activity of the Downstream Metal Products cluster are summarised in Figure 47.

Figure 47. Downstream Metal Products Direct Contribution to the West Australian Economy

Category of Benefit	Economic Benefit (2015)
Average Salary ($)	85,000
Output ($m)	1,162
Exports ($m)	99
Gross Value Add ($m)	474

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

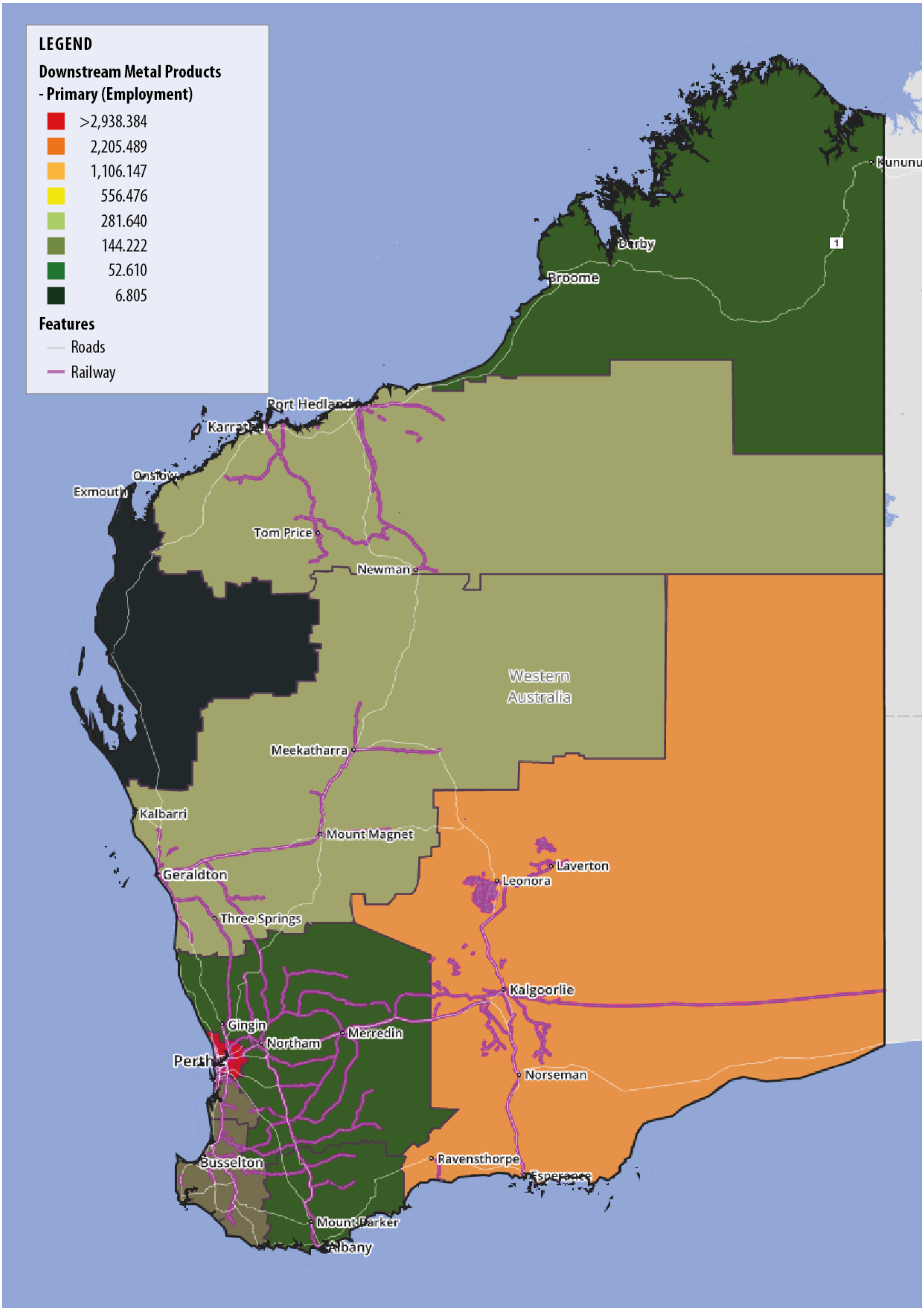
The downstream metal products Primary Cluster is characterised by a relatively high output with a low export proportion. This indicates that a significant amount of its output is being used domestically to service existing industries. This is likely to be the mining industries (especially given the presence of boilermakers in this cluster). Average salary for employees in the cluster is quite high, and interestingly much higher in the regions than that found in the Metro area, again likely due to the demand from the mining industry.

7.3.3 Spatial Characteristics

The spatial characteristics and distribution of the Downstream Metal Products cluster is shown in Figure 48 and Figure 49.

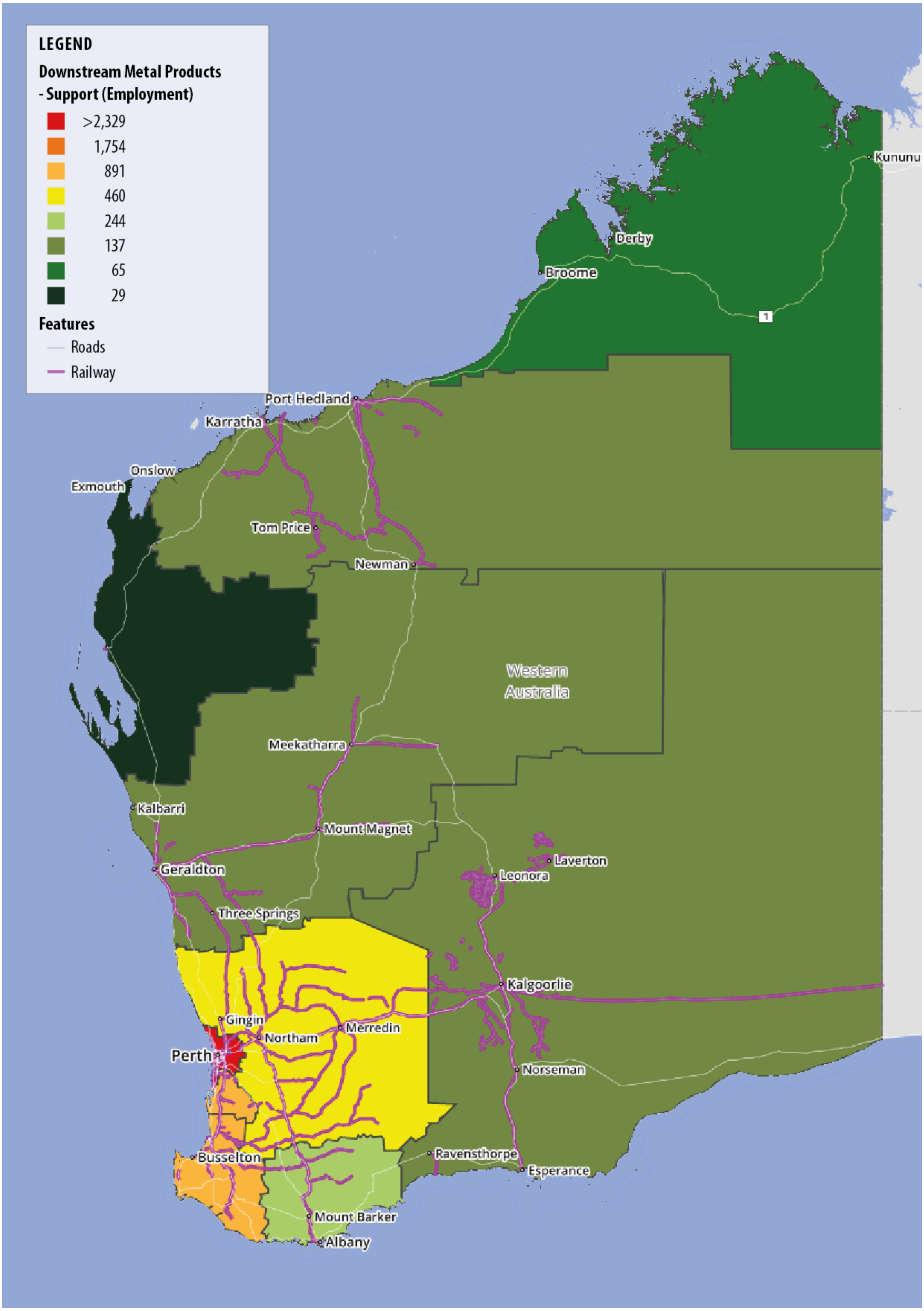
Employment is concentrated in two areas, the Perth metro area as well as the Goldfields-Esperance area. This cluster likely provides Regionally Significant support to a variety of regional areas from its Perth metro concentration while also supporting mining activity in the Goldfields-Esperance region. There is potentially an opportunity to support the Regionally Significant cluster locally in the South West area as currently its spatial characteristics indicate that it is serviced from the Perth metro area.

Figure 48. Downstream Metal Products Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 49. Downstream Metal Products Support Clusters



Source: Pracsys (2016), ALCES (2016)

8.0

8 EXPORT SERVICES CLUSTER PROFILES

8.1 HOSPITALITY AND TOURISM

8.1.1 Industry Profile

This Regionally Significant cluster includes the operation of hospitality and entertainment facilities/venues, parks and reserves, tourism services and sporting clubs. It is primarily involved in attracting and serving a mix of local, interstate and international visitors. This reflects a range of companies and activities including:

- High-end accommodation, dining and gambling activities
- Small recreational and holiday cruise companies, backpacking accommodation and museums
- Specialty tours such as whale watching and outback exploring

Total employment in this cluster is relatively large with approximately 8,200 jobs in regional areas. The majority of employees in this cluster do not have a field of study (50%). A fairly even spread of other fields of study exist with representation in food, hospitality and personal services (9%), management and commerce (7%), engineering and related technology (6%) and society and culture (5%).

The cluster is defined by ANZSIC4 categories as described in Figure 50.

Figure 50. Hospitality and Tourism ANZSIC4 Categories

ANZSIC 4 Category	Activity
Hunting and trapping	Trapping or taking animals, birds or reptiles in the wild for commercial, population control or pest control purposes. For example: · Bird trapping · Fur skin animal hunting or trapping · Game preserve, commercial, operation · Snake catching
Scenic and sightseeing transport	Operating transportation equipment for scenic and sightseeing activities. This form of transport is distinguished from transit passenger services, as the emphasis is not on the efficiency or speed of the transport service but rather on providing recreation and entertainment. The service provided is usually local in nature and generally includes tour commentary, highlighting features of the scenery and/or the vehicle. For example: · Aerial cable car operation · Charter fishing boat operation · Hovercraft operation · Whale watching cruise operation
Travel agency and tour arrangement services	Agents selling travel, tour and accommodation services as well as units providing travel arrangement and reservation services for airlines, cars, hotels and restaurants. Includes arranging, assembling, wholesaling and retailing tours. For example: · Booking service (accommodation and travel) · Travel ticket agency operation · Tour operator service (arranging and assembling tours) · Tour wholesaling service
Zoological and botanical gardens operation	Active management, breeding, preservation, study and exhibition of live plants and animals in a controlled environment such as zoological or botanical gardens. For example: · Arboretum operation · Botanical garden operation · Reptile park operation · Wildlife park or reserve operation (wildlife actively managed)
Nature reserves and conservation parks operation	Engaged in preservation of flora and fauna in their natural environment such as nature reserves and conservation parks. For example: · Conservation park operation · Fauna reserve operation (fauna not actively managed) · National or state/territory park or reserve operation · Wildlife park or reserve operation

ANZSIC 4 Category	Activity
Sports and physical recreation clubs and sports professionals	Operating individual sports or physical recreation clubs or teams, which provide sporting or physical recreation opportunities to participants, or entertainment for spectators. Also includes sports professionals.
Amusement parks and centres operation	Providing amusement and recreation services in the form of amusement parks, arcades or centres. Includes operating from fixed or permanent sites and includes selected mobile amusement operators. For example: · Amusement arcade or centre operation · Amusement machine or ride operation (including concession operators) · Water park operation
Casino operation	Operating facilities with a range of gambling services such as table wagering games and poker/gaming machines. For example: · Casino operation
Lottery operation	Operating lotteries or selling lottery products. Also includes operating lotto-style games and football pools. For example: · Keno operation · Lottery agency operation
Other gambling activities	Operating other gambling services such as totalisator or betting services. Also includes offering gambling services through the internet. For example: · Betting shop operation · Internet gambling operation · TAB operation

Source: Australian Bureau of Statistics, Pracsys (2016)

8.1.2 Economic Characteristics

The economic characteristics that result from direct activity of the Hospitality and Tourism cluster are summarised in Figure 51.

Figure 51. Hospitality and Tourism Direct Contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	39,000
Output ($m)	1,712
Exports ($m)	146
Gross Value Add ($m)	719

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2015)

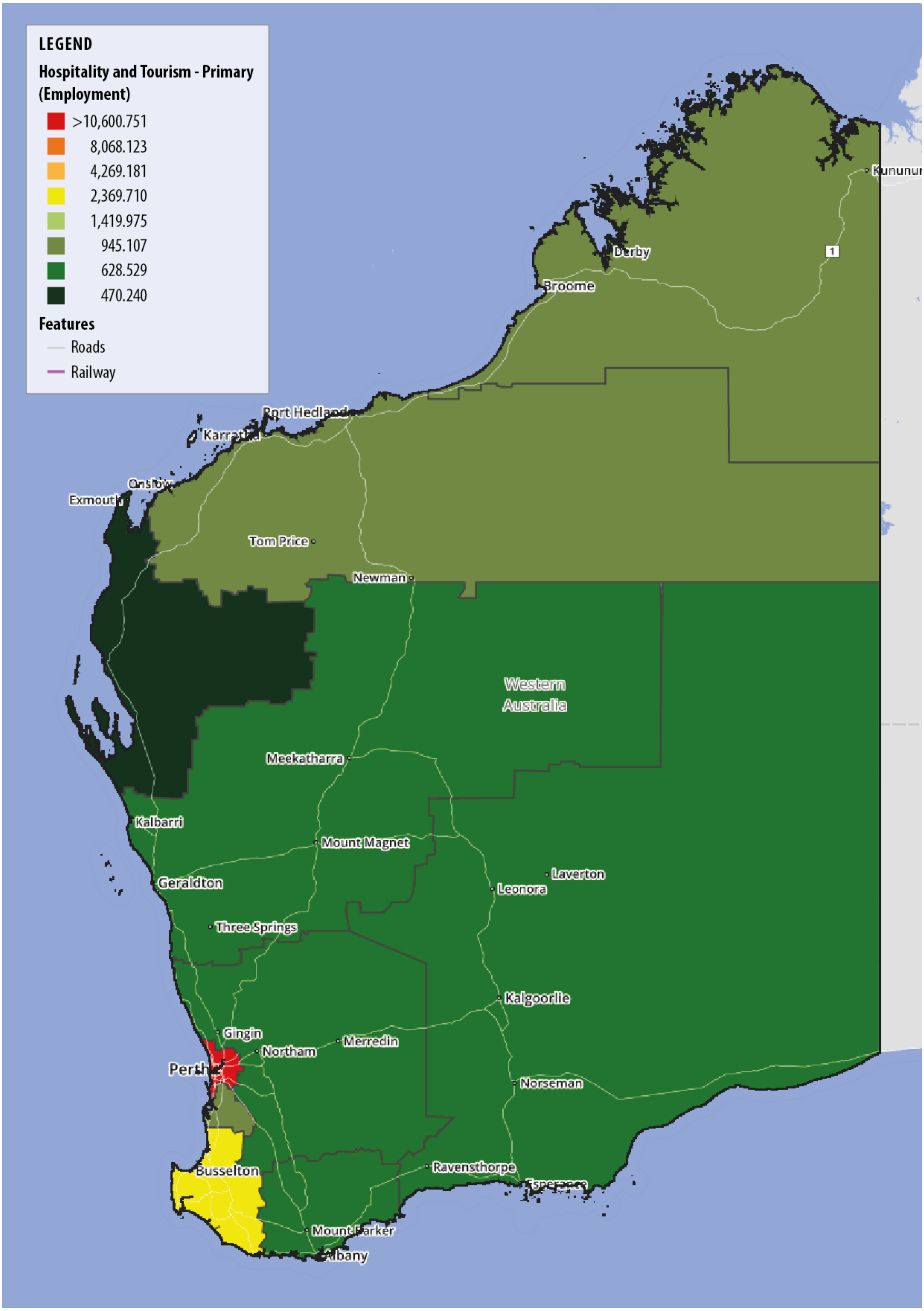
Hospitality and Tourism is characterised by its low average salaries (the lowest of all Regionally Significant Traded clusters) but high employment. It also has the lowest output per employee however, this is likely due to the substantial amount of part time, casual and transient work that takes place in this cluster. The relatively low proportion of exports can be explained by Western Australia's tourism industry being predominantly domestic based at this time.

8.1.3 Spatial Characteristics

The spatial characteristics and distribution of the Hospitality and Tourism cluster and its supporting clusters are shown in Figure 52 and Figure 53.

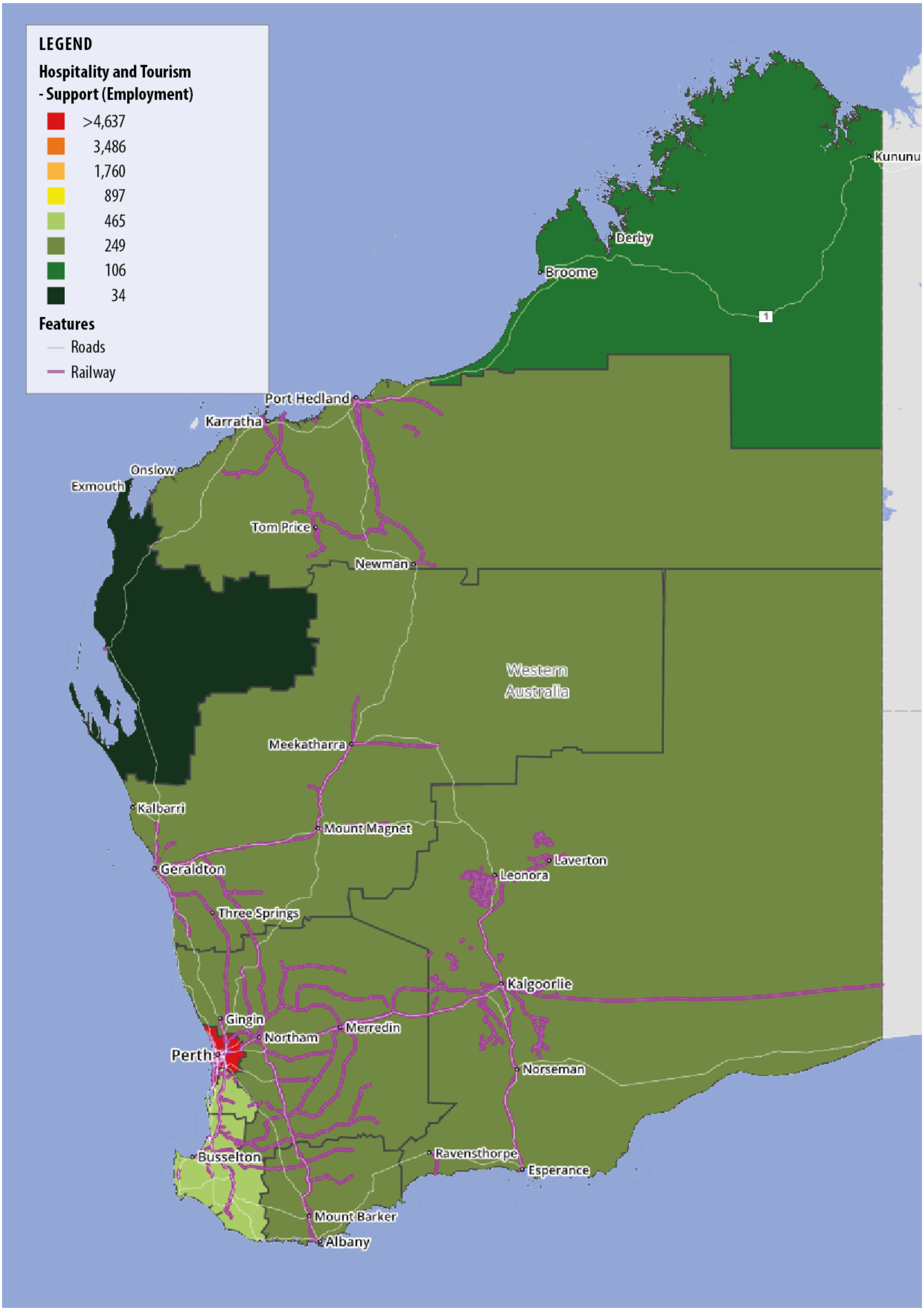
As shown, the spatial concentrations are active in the South West and Perth metro with lighter concentrations in the North West of the economy. This broadly matches the distribution of the state's natural capital assets and major tourism draw cards. Supporting clusters appear to align with major Regionally Significant Traded cluster activity though some opportunity may exist in both the Kimberley and the South West.

Figure 52. Hospitality and Tourism Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 53. Hospitality and Tourism Support Cluster



Source: Pracsys (2016), ALCES (2016)

9.0

9 INDUSTRY SERVICES CLUSTER PROFILES

9.1 CONSTRUCTION PRODUCTS AND SERVICES

9.1.1 Industry Profile

This Regionally Significant Traded cluster includes the heavy-duty construction that enables other activity to occur. This cluster includes residential building, infrastructure construction, basic construction material manufacturing among others. The range of skill levels required in this cluster varies greatly. This reflects a range of companies and activities including:

- Heavy and civil engineering construction
- Concrete product manufacturing and concreting services
- Heavy machinery and scaffolding rental and hiring

Total employment in this cluster is fourth highest of the Regionally Significant Trade clusters with approximately 10,800 jobs. In terms of education the greatest proportion of workers had no field of study (39%), engineering and related technologies (34%) and architecture and building (10%) were then the highest proportions of educated employees.

The cluster is defined ANZSIC4 categories as described in Figure 54.

Figure 54. Construction Products and Services ANZSIC4 Categories

ANZSIC 4 Category	Activity
Heavy and Civil Engineering Construction	Activity is mainly engaged in the construction or general repair of various structures and infrastructure. For example: · Cable laying · Canal construction · Dam construction · Dredging · Road construction
Hire of Construction Machinery and Services	This category involves hire of machinery and services that assist in various types of construction. Examples include: · Construction machinery rental · Mobile platform rental · Scaffolding rental · Rental and leasing of heavy machinery with operator · Erection of scaffolding
Construction Services	A broad category that encompasses building construction and construction services. Examples of this activity include: · House construction and alteration · Other residential construction · Land development and site preparation services · Building structure services · Building installation services
Construction Material Manufacturing	This is the manufacturing component of the Construction Products and Services cluster. It involves the manufacturing of materials used in various construction activities. Examples include: · Lime and cement manufacturing · Plaster product manufacturing · Ready-mix concrete manufacturing

Source: Australian Bureau of Statistics, Pracsys (2016)

9.1.2 Economic Characteristics

The economic characteristics that result from direct activity of the Construction Products and Services cluster are summarised in Figure 55.

Figure 55. Construction Products and Services direct contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	$82,000
Output ($m)	8,510
Exports ($m)	214
Gross Value Add ($m)	3,046

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

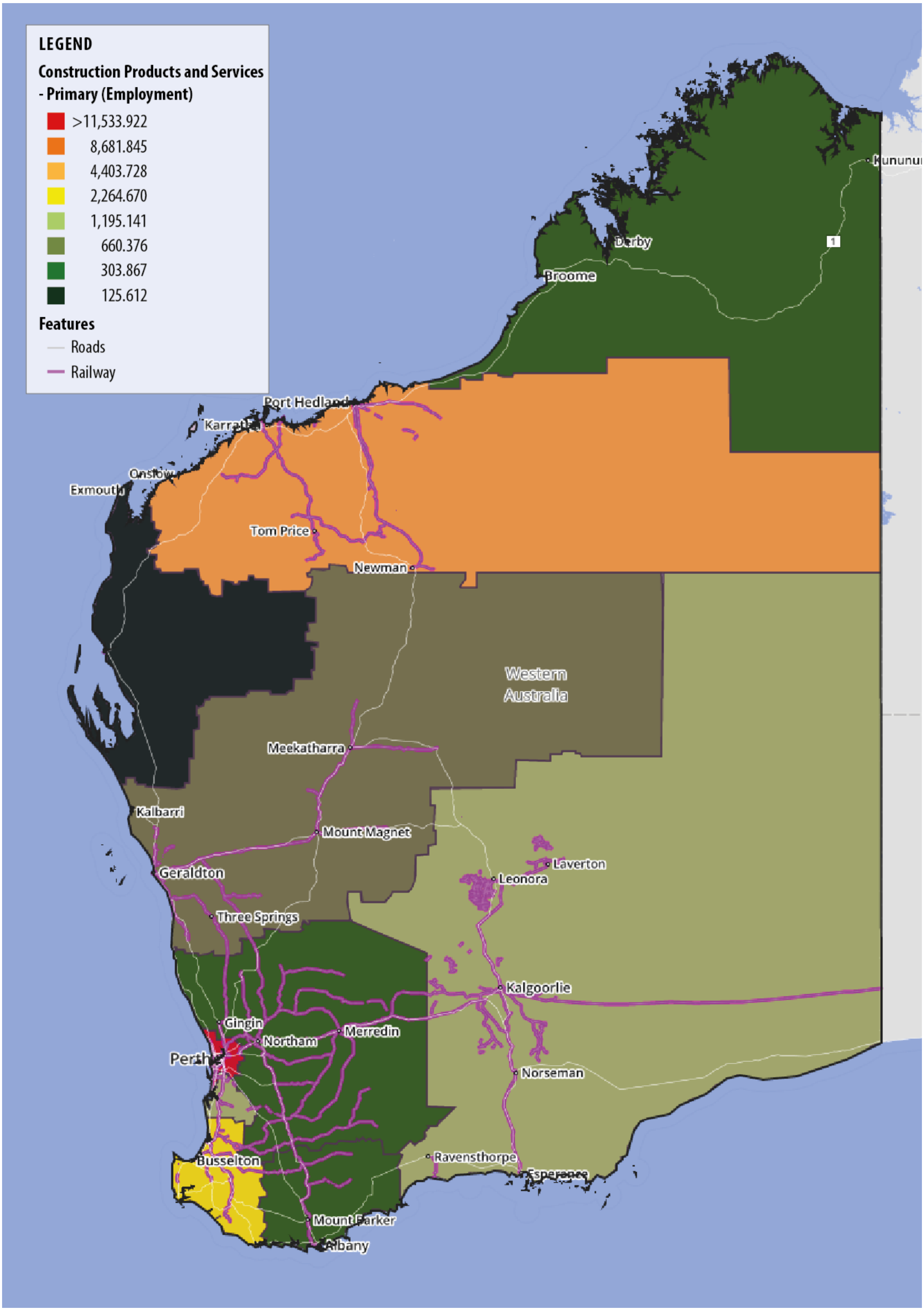
The Construction Products and Services cluster is characterised by high salaries and high output. As could be expected total exports as a proportion of exports are relatively low but there is likely a significant degree of interregional trade.

9.1.3 Spatial Characteristics

The spatial characteristics and distribution of the Construction Products and Services cluster and its support clusters is shown in Figure 56 and Figure 57.

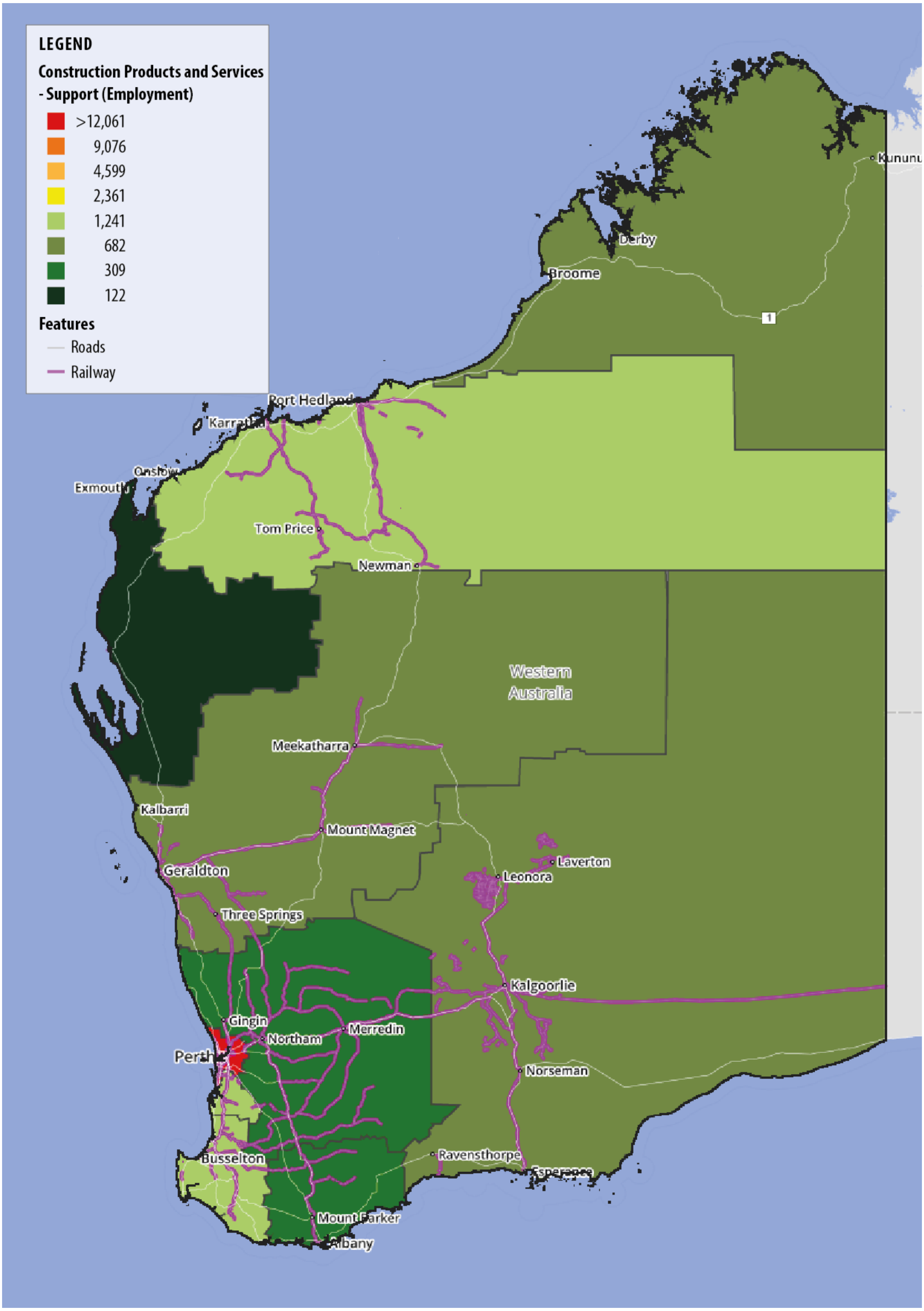
The spatial concentrations and distribution of activity broadly align with economic activity in the state. There are large concentrations in the Metro and Pilbara areas (the major economic engines of Western Australia's state economy). Lower concentrations also exist in the South West and Goldfields-Esperance regions. Support clusters appear to be aligned with Regionally Significant Traded activity and no obvious gaps in servicing are apparent.

Figure 56. Construction Products and Services Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 57. Construction Products and Services Support Clusters



Source: Pracsys (2016), ALCES (2016)

9.2 TRANSPORTATION AND LOGISTICS

9.2.1 Industry Profile

The Transportation and Logistics Regionally Significant Traded cluster is primarily involved in the movement of goods to enable other clusters to operate. Essentially, it operates as an enabler to other clusters without which production and economic output would halt. This cluster reflects a range of companies and activities including:

- Road transport (e.g. Linfox)
- Rail transport (e.g. Aurizon)
- Air freight (e.g. Toll IPEC)

Total employment in this cluster is approximately 7,000 jobs in regional areas. In terms of education the greatest proportion of workers had no field of study (57%), while the only other significant proportion in terms of field of study was engineering and related technologies (22%).

The cluster is defined by the ANZSIC4 categories found in Figure 58.

Figure 58. Transportation and Logistics ANZSIC4 Categories

ANZSIC 4 Category	Activity
Freight Transport	Activity is mainly engaged in the transport of goods via road, examples include: · Road freight services · Rail freight services · Water transport · Air and space transport
Warehousing and Storage Services	This category includes services involved in storage of goods. Examples include: · Cool room storage · Warehousing · Controlled atmosphere storage · Bulk petroleum storage · Bond store operation
Transport Support Services	A broad category that encompasses maintenance and leasing of support facilities for various freight activities. Examples of this activity include: · Port and water transport terminal operations · Stevedoring services · Airport operations and other air transport support services · Customs agency services · Freight forwarding services

Source: Australian Bureau of Statistics, Pracsys (2016)

9.2.2 Economic Characteristics

The economic characteristics that result from direct activity of the Transportation and Logistics cluster are summarised in Figure 59.

Figure 59. Transportation and Logistics direct contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	$67,000
Output ($m)	4,161
Exports ($m)	313
Gross Value Add ($m)	1,869

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2015)

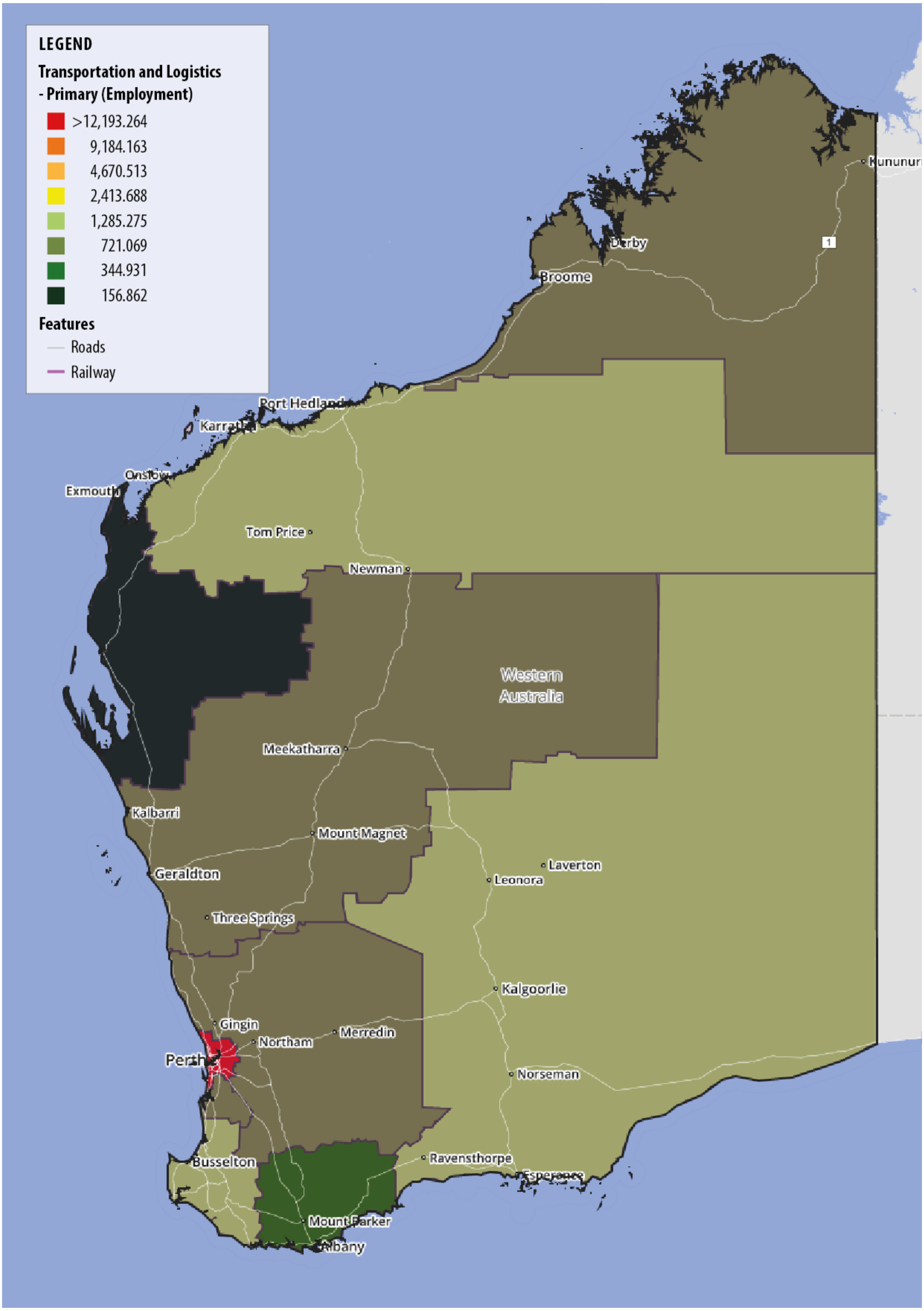
The Transportation and Logistics cluster is characterised by mid-tier salaries and relatively high output per capita (in comparison to non-natural resource extraction clusters). The proportion of exports relative to total output is reasonably low, this is not unexpected given that this cluster primarily services other more export-oriented clusters. The cluster is classified as Traded in nature due to its operation between regions.

9.2.3 Spatial Characteristics

The spatial characteristics and distribution of the Transport and Logistics cluster and its supporting clusters are shown in Figure 60 and Figure 61.

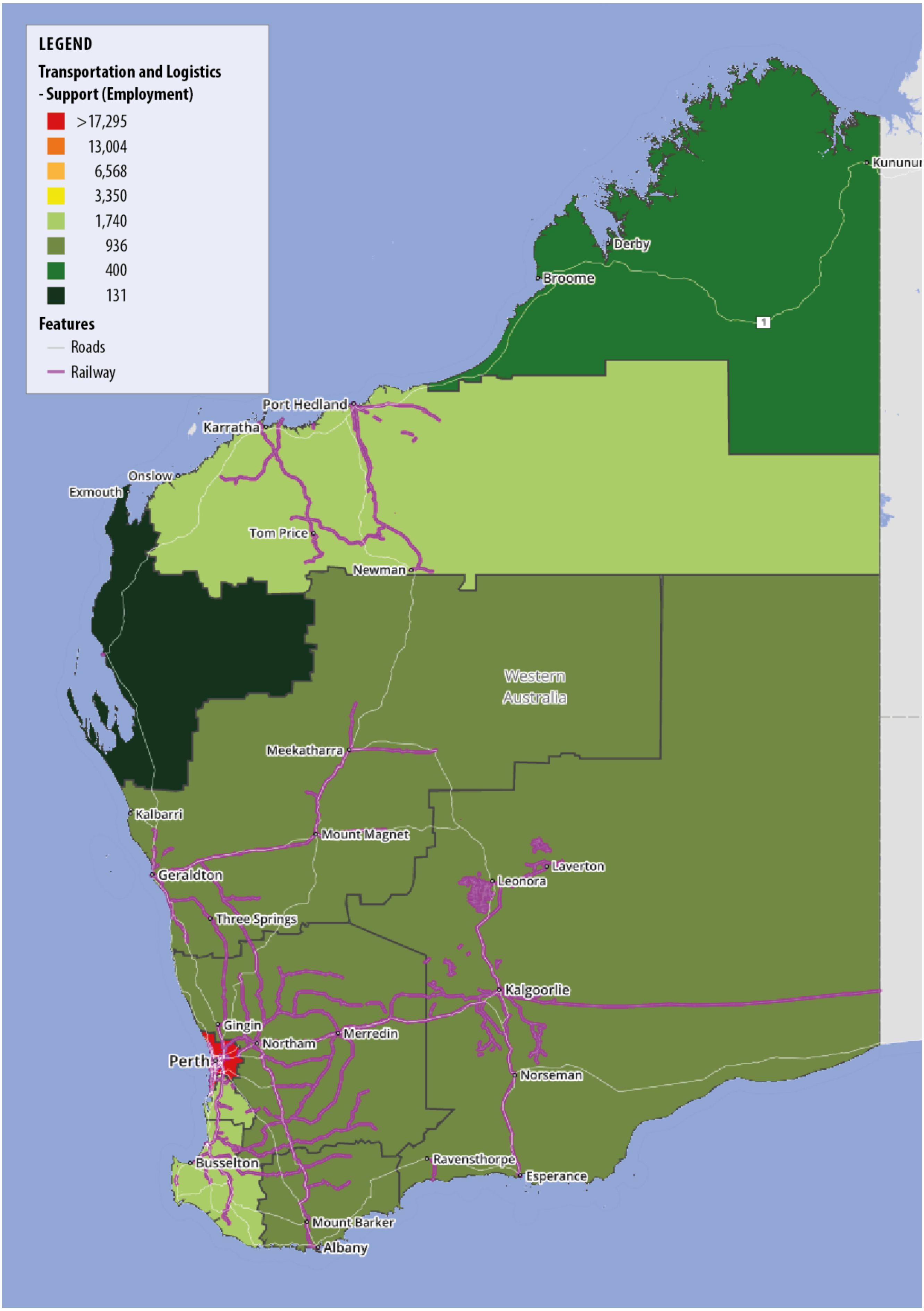
The spatial characteristics of the Transport and Logistics cluster suggest that the entire state is predominantly serviced from the Metro area. This would seem likely given the majority of logistical infrastructure (ports, airports, etc) are located here. Other lighter concentrations (though still significant) appear to correlate with mining activity in the state and the infrastructure that is associated with these activities. Given the major aggregation of Regionally Significant Traded activity is within the Perth metro area, it is expected that supporting cluster would also be located there.

Figure 60. Transportation and Logistics Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 61. Transportation and Logistics Support Clusters



Source: Pracsys (2016), ALCES (2016)

9.3 BUSINESS SERVICES

9.3.1 Industry Profile

The Business Services cluster is another cluster designed to service other more production centric clusters. It is a labour and knowledge intensive cluster and typically serves more corporate, niche and advisory roles rather than operational roles. This cluster reflects a range of companies and activities including:

- Architectural services
- Internet service providers
- Employment services
- Professional, scientific and professional services

Business Services is an important Regionally Significant cluster in terms of employment with over 10,800 jobs. Education predominantly rested in the engineering and related technologies (31%) with other smaller representation in the fields of management and commerce (9%), architectural and building (5%) and health (3%).

The cluster is defined by the ANZSIC4 categories found in Figure 62.

Figure 62. Business Services ANZSIC4 Categories

ANZSIC 4 Category	Activity
Administrative Services	Activity that is typically designed to assist corporate headquarters of companies in a variety of different fields: · Employment services · Office administrative services · Document preparation services · Travel agency and tour arrangement services · Data processing, web hosting and electronic information storage services
Professional Services	This is a broad category that contains a number of different industries within it. It focuses on those services which need higher education and are typically knowledge intensive but are performed across a variety of fields: · Scientific research services · Architectural and technical services · Legal and accounting services · Advertising services · Market research and statistical services · Management and related consulting services · Veterinary services · Computer system design and related services
Engineering Design and Consulting Services	Activity primarily involved with applying physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems. A highly knowledge and education intensive section. Examples of this activity include: · Boat designing · Building consulting service · Chemical engineering consulting service · Civil engineering consulting service · Pipeline engineering consulting service · Process engineering consulting service · Traffic engineering consulting service · Quantity surveying service
Mining support services	Activity designed to assist and support mining activities carry out their functions more efficiently. Examples of this include: · Surveying and mapping services · Mineral exploration · Petroleum exploration

Source: Australian Bureau of Statistics, Pracsys (2016)

9.3.2 Economic Characteristics

The economic characteristics that result from direct activity of the Transportation and Logistics cluster are summarised in Figure 63.

Figure 63. Business Services direct contribution to the Western Australian Economy

Category of Benefit	Economic Benefit (2016)
Average Salary ($)	$80,000
Output ($m)	5,420
Exports ($m)	405
Gross Value Add ($m)	2,944

Source: ABS National Accounts (2015), ABS Census (2011), ABS Catalogue 5220, ABS Catalogue 6202, ABS Catalogue 6401, Pracsys modelling (2016)

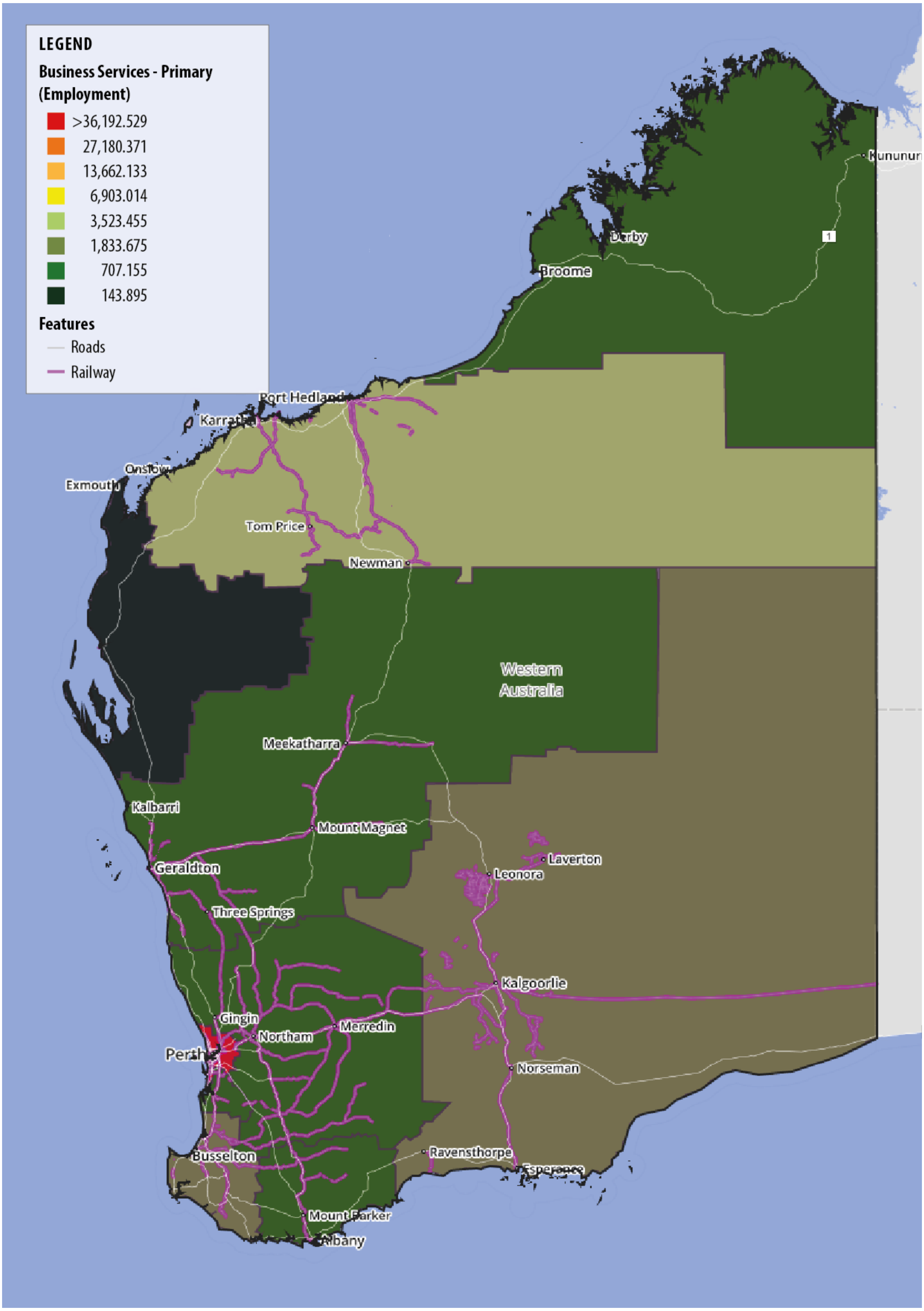
The Business Services cluster is characterised by its wide variety of services. The cluster's average salary is relatively high in comparison to both the rest of the economy and other Regionally Significant Traded clusters. As with other service-oriented clusters, it is predominantly focused on interregional and local servicing of existing activity and as such its ratio of exports to output is quite low. Interestingly, it holds a significant GVA contribution (in quantum), in regional areas.

9.3.3 Spatial Characteristics

The spatial characteristics and distribution of the Business Services and supporting clusters are shown in Figure 64 and Figure 65.

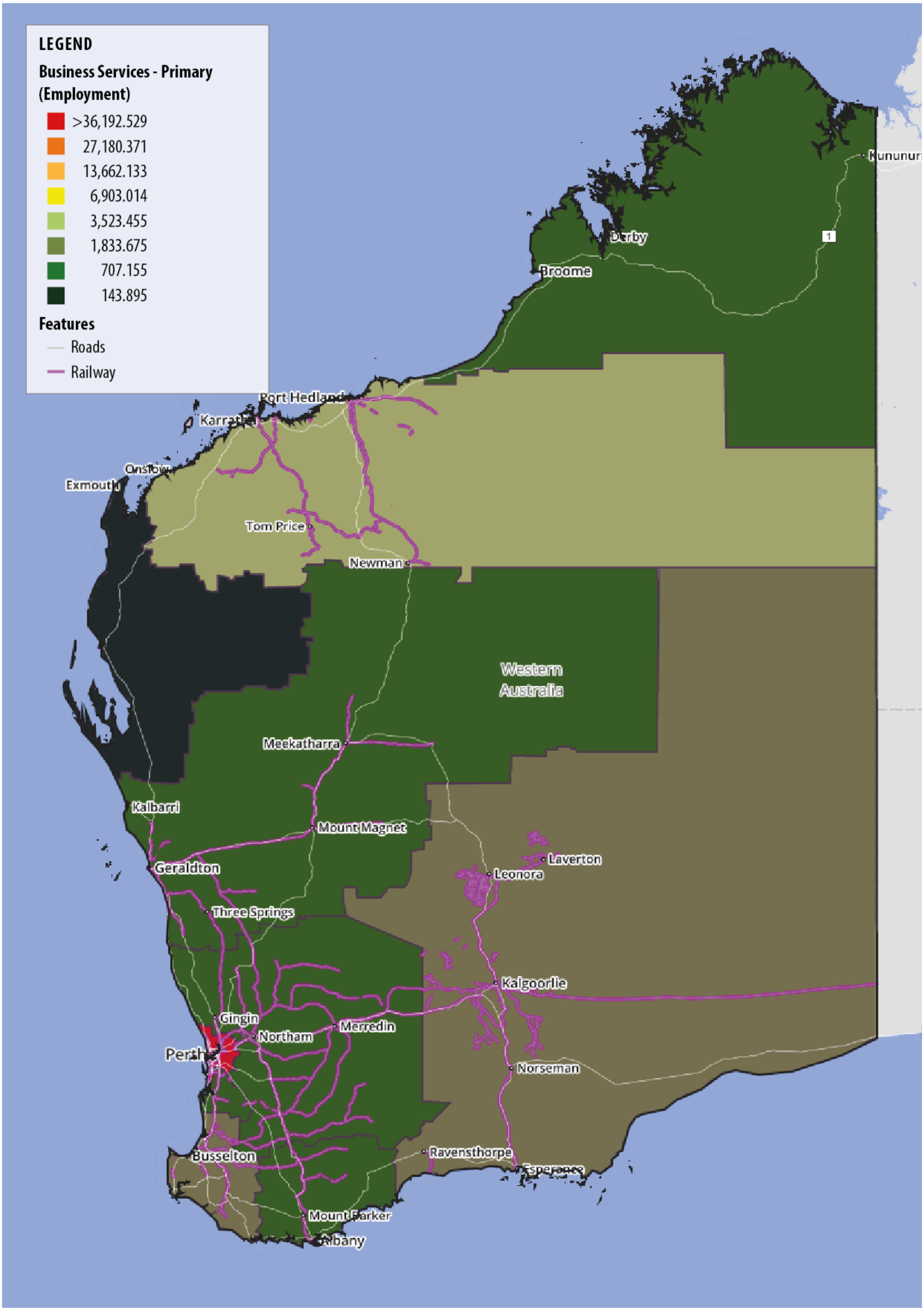
Like other service clusters, this cluster is predominantly found in areas of major economic activity. As such, we can see that the major concentration is found in the Perth metro area. Other concentrations are again correlated with mining activity and predominantly located within the engine rooms of the economy. Spatial distribution shows that support cluster activity is broadly in alignment with Regionally Significant Traded activity. No obvious opportunities for intervention exist.

Figure 64. Business Services Spatial Distribution



Source: Pracsys (2016), ALCES (2016)

Figure 65. Business Services Support Clusters



Source: Pracsys (2016), ALCES (2016)

10.0

10 REGIONAL ANALYSIS

The Regional Analysis takes the statewide analysis conducted and looks at the data in finer detail to provide new data relevant to specific regions and regional centres. The regions and regional centres examined are:

- Kimberley – Broome
- South West – Bunbury
- Mid West – Geraldton
- Goldfields Esperance – Kalgoorlie

The analysis was designed to provide a more targeted set of insights that can feed into future economic development, policy formulation and vision setting. This section of the report aims to:

- Illustrate the clusters significant to a specific region
- Show spatially, in a regional context, the distribution of clusters and their supporting clusters
- Highlight regional strengths and areas of comparative advantage
- Highlight opportunities relevant to the region
- Highlight areas of underservicing that could require further investigation for potential import substitution

11.0

11 BROOME – KIMBERLEY PROFILE

11.1 REGIONAL CLUSTER PERFORMANCE

The decision criteria applied to identify the WA statewide significant clusters was applied at a regional level to identify regionally significant industry clusters. There is a large degree of overlap in the results, however this level of analysis has also identified Regionally Significant clusters that, while not forming a large part of the WA Traded economy, are important areas of specialisation within each specific region. The results of the analysis are summarised in Figure 66, for both Traded and Local cluster groups, these clusters outperform in terms of employment concentration, employment growth, or both of these measures. Identified clusters with ECF values of below one are under-represented within the region, however have experienced growth rates over the national average for each cluster.

Figure 66. Regionally Significant clusters for the Kimberley (ranked by ECF)

Traded clusters	ECF	Local clusters	ECF
*Non-metal Mining	25.14	Local Community and Civic Organizations	1.81
Fishing and Fishing Products	7.56	Local Education and Training	1.61
*Metal Mining	5.80	Local Health Services	1.07
*Hospitality and Tourism	2.83	Local Real Estate, Construction, and Development	1.00
Performing Arts	1.84	Local Hospitality Establishments	0.57
*Water Transportation	1.56	Local Personal Services (Non-Medical)	0.51
*Agricultural Inputs and Services	1.30	Local Commercial Services	0.51
*Transportation and Logistics	1.14		
Education and Knowledge Creation	1.08		
*Construction Products and Services	1.05		

*State significance

Source: Pracsys (2016)

The ECFs for all Traded and Local clusters (see Section 4.2) have been averaged in order to provide an overview of the region's performance in the Traded and Local economy.

Figure 67. Average Traded cluster ECF and Local cluster ECF for the Kimberley region

Average Traded ECF (All Traded clusters)	Average Local ECF (All Local clusters)
2.02	0.84

Source: Pracsys (2016)

The ECFs indicate the degree to which the region specialises in the respective areas of economic activity, by this measure the Kimberley is highly specialised in a number of Traded clusters, however is marginally under-represented by Local industries. Where this gap is too disparate it is likely that lack of amenity in the local economy is a constraint to the development of a more diverse Traded and Local economy for the region and centres within the region. At this high level, there is evidence to suggest that Broome can play a greater role in consolidating its position as a major local service centre within the region.

The economic performance of the Kimberley's top Traded clusters is presented below. In terms of GVA, exports and output, Metal Mining is the dominant cluster. Direct employment is spread over a range of clusters with Hospitality and Tourism displaying the highest level of employment.

Figure 68. Regionally Significant Traded clusters for the Kimberley (ranked by ECF)

Cluster	Employment	GVA ($m)	Export ($m)	Output ($m)
Non-metal Mining	695	87	86	161
Fishing and Fishing Products	93	36	24	66
Metal Mining	644	854	1,168	1,381
Hospitality and Tourism	1,086	102	21	243
Performing Arts	86	*	*	*
Water Transportation	91	13	7	33
Agricultural Inputs and Services	473	62	57	145
Transportation and Logistics	508	137	23	304
Education and Knowledge Creation	480	51	12	68
Construction Products and Services	285	80	6	225
Total	4,441	1,422	1,403	2,626

*Results have been agglomerated with Hospitality and Tourism due to constraints within the available data sets

Source: Pracsys (2016)

Figure 69. Regionally Significant Traded clusters for the Kimberley (ranked by output)

Cluster	Employment	GVA ($m)	Export ($m)	Output ($m)
Metal Mining	644	854	1,168	1,381
Transportation and Logistics	508	137	23	304
Hospitality and Tourism	1,086	102	21	243
Construction Products and Services	285	80	6	225
Non-metal Mining	695	87	86	161
Agricultural Inputs and Services	473	62	57	145
Education and Knowledge Creation	480	51	12	68
Fishing and Fishing Products	93	36	24	66
Water Transportation	91	13	7	33
Performing Arts	86	*	*	*
Total	4,441	1,422	1,403	2,626

*Results have been agglomerated with Hospitality and Tourism due to constraints within the available data sets

Source: Pracsys (2016)

The emerging Traded clusters below represent outperforming clusters, in terms of employment growth and/or concentration beyond the Regionally Significant clusters, which have low total employment. Given the low employment in these clusters, ranging from approximately 20 to 70 persons, these industries may be represented by a small number of companies or individuals, and may not truly represent an agglomeration or specialisation of activity. Further investigation would be required at the local level to determine if these clusters, or specific industries within these clusters, represent opportunities for future growth. Potential emerging Traded clusters identified include:

- Forestry
- Electric Power Generation and Transmission
- Downstream Chemical Products
- Wood Products
- Upstream Metal Manufacturing
- Financial Services
- Food Processing and Manufacturing

To further investigate flows between industries, the Supporting clusters providing the bulk of inputs into the regionally significant Traded clusters have been identified. These selected Supporting clusters provide approximately 90% of inputs by cluster industry use. Employment attributable to both the Regionally Significant and supporting clusters has been derived and is presented as a ratio in Figure 70. By comparing this ratio to the WA average it is possible to provide an indication of the degree to which the Primary Clusters drive employment and activity within the region.

Figure 70. Kimberley Supporting cluster employment for State and Regionally Significant clusters (ranked by regional employment)

Cluster	Employment	Supporting Employment Estimate	Ratio of Supporting Employment	WA Average
Hospitality and Tourism	1,086	347	0.3	0.5
Non-metal Mining	695	473	0.7	0.3
Metal Mining	644	1501	2.3	2.1
Transportation and Logistics	508	690	1.3	1.3
Education and Knowledge Creation	480	76	0.2	0.2
Agricultural Inputs and Services	473	375	0.8	0.6
Construction Products and Services	285	577	1.9	1.5
Fishing and Fishing Products	93	65	0.7	1.0
Water Transportation	91	124	1.3	0.5
Performing Arts	86	*	*	*

*Refer to Hospitality and Tourism

Source: Pracsys (2016)

Clusters displaying a low supporting ratio may represent an opportunity for supply chain augmentation. In contrast, clusters displaying a high supporting ratio may indicate that a catchment beyond the immediate region is being serviced. This is not conclusive however as in some instances Supporting cluster employment may also be sourced from beyond a region, as is likely the case for the Metal Mining cluster.

11.2 ROLE OF BROOME

Based on the above results there is evidence to suggest that, as a region, the Kimberley specialises in Traded cluster activity, of which many of the industries are of statewide significance. The results also indicate that the Kimberley specialises in several regionally important Local clusters, namely community, education and health services. Feedback from the regional consultation suggests that Broome serves as a base for these local services and attracts users from a broad area of the Kimberley. Centre specific ECFs have been produced in order to further investigate the current function.

Figure 71. Broome centre ECFs for Regionally Significant clusters (ranked by regional ECF)

Traded clusters	ECF	Local clusters	ECF
Non-metal Mining	0.12	Local Community and Civic Organizations	1.66
Fishing and Fishing Products	10.60	Local Education and Training	1.20
Metal Mining	0.02	Local Health Services	1.27
Hospitality and Tourism	3.85	Local Real Estate, Construction, and Development	1.09
*Performing Arts	-	Local Hospitality Establishments	0.81
Water Transportation	2.22	Local Personal Services (Non-Medical)	0.97
Agricultural Inputs and Services	0.16	Local Commercial Services	0.70
Transportation and Logistics	1.87		
Education and Knowledge Creation	1.35		
Construction Products and Services	0.44		

*Refer to Hospitality and Tourism

Source: Pracsys (2016)

In addition, the Kimberley region and Broome centre employment levels are displayed in the figures below with a base map of the regional and centre-based infrastructure.

These results, and stakeholder consultation previously conducted, provide evidence that Broome currently displays the following high-level comparative advantages and opportunities for further development.

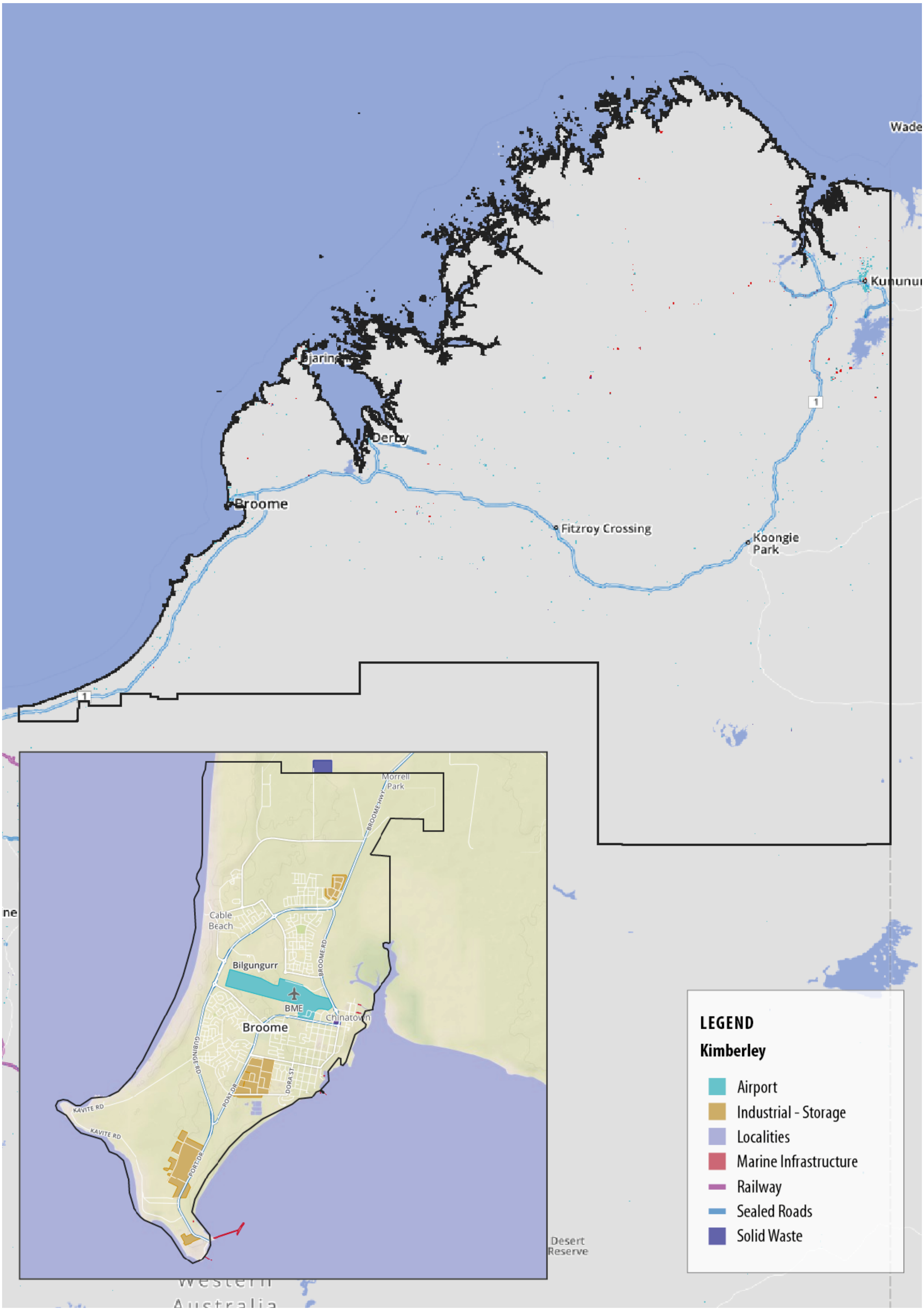
Areas of comparative advantages:

- Access to Port infrastructure
- Access to Airport infrastructure capable of hosting international flights
- Well developed Traded industry activity in:
  - Hospitality and Tourism
  - Aquaculture
  - Freight and logistics based clusters
- Well developed Local industry activity in:
  - Social capital based clusters

Opportunities for further development:

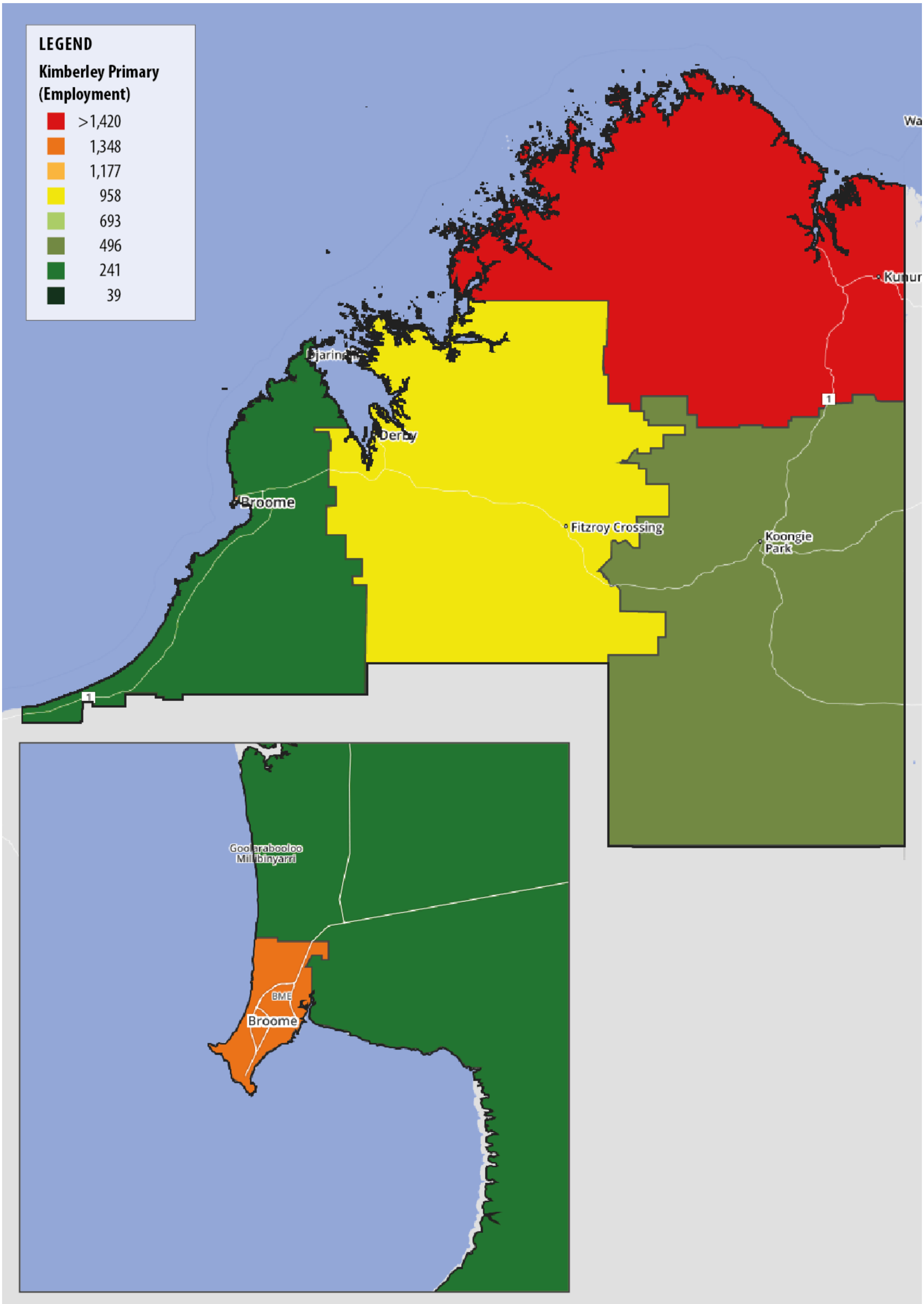
- Limited and seasonally affected primary road network
- Competing port uses/capacity
- Potential to develop stronger links to servicing mining (and oil and gas) based clusters
- Potential to develop stronger links to land based agriculture
- Potential to further develop diversity in Local cluster industries and services, particularly when considering the large transient tourism based population

Figure 72. Kimberley and Broome infrastructure base map



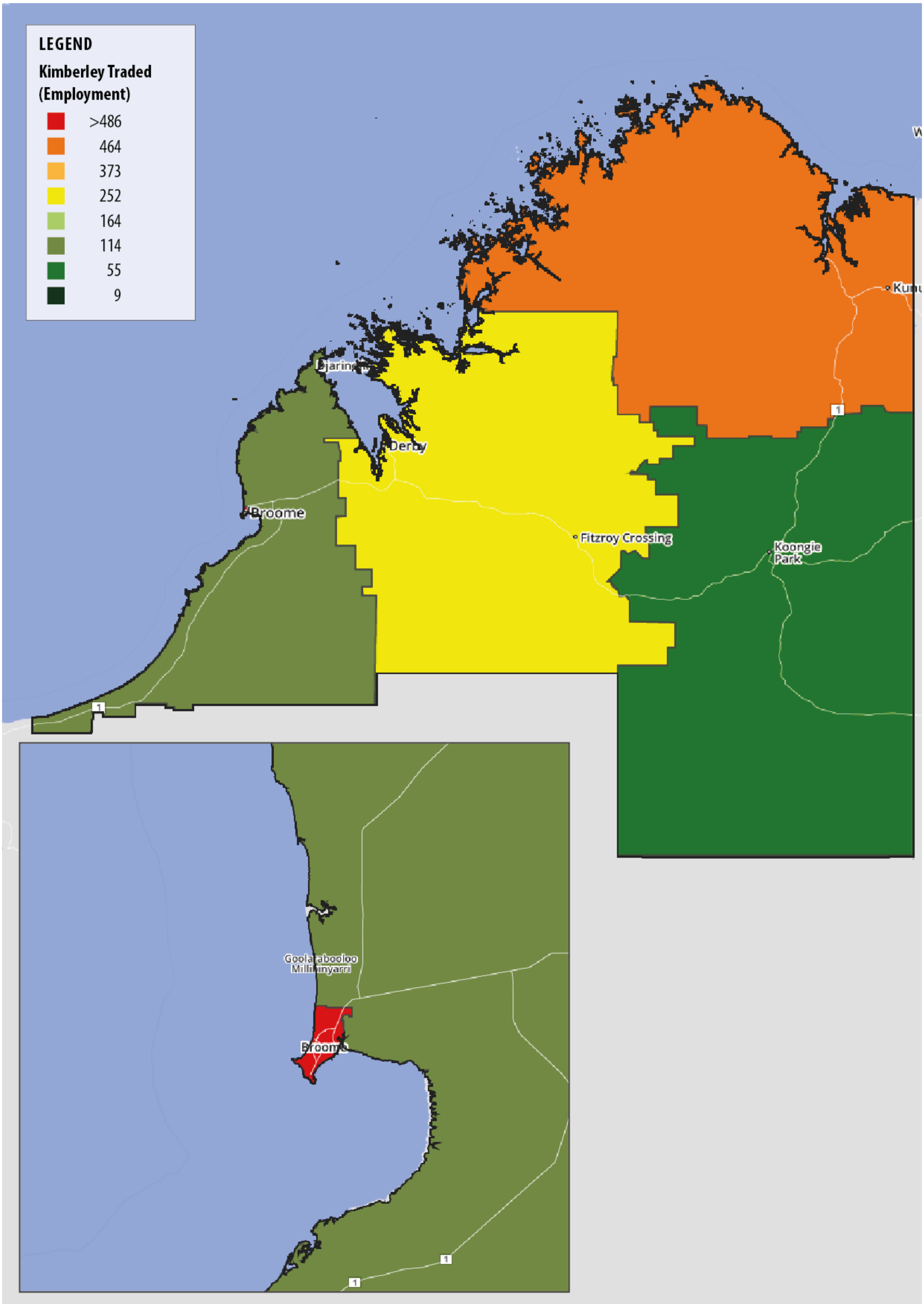
Source: Pracsys (2016), ALCES (2016)

Figure 73. Regionally Significant Traded cluster employment for the Kimberley region and Broome



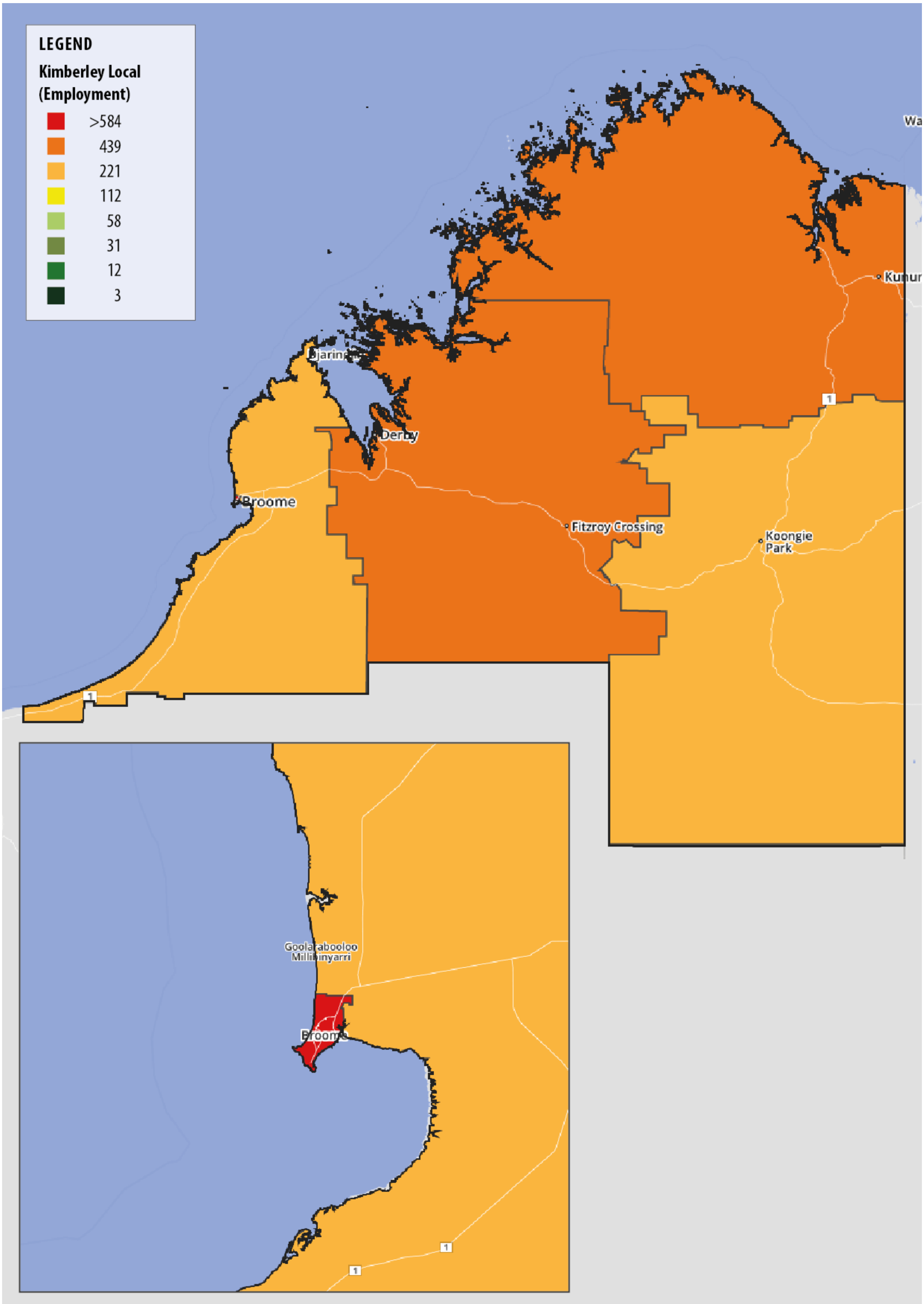
Source: Pracsys (2016), ALCES (2016)

Figure 74. Supporting Traded cluster employment for the Kimberley region and Broome



Source: Pracsys (2016), ALCES (2016)

Figure 75. Supporting Local cluster employment for the Kimberley region and Broome



Source: Pracsys (2016), ALCES (2016)

12.0

12 BUNBURY – SOUTH WEST PROFILE

12.1 REGIONAL CLUSTER PERFORMANCE

Analysis has identified the Regionally Significant Traded and Local clusters for the South West region (Figure 76). These clusters outperform in terms of employment concentration, employment growth, or both of these measures. Identified clusters with ECF values of below one are under-represented within the region, however have experienced growth rates over the national average for each cluster.

Figure 76. State and Regionally Significant clusters for the South West

Traded clusters	ECF	Local clusters	ECF
*Forestry	6.22	Local Education and Training	1.35
Electric Power Generation and Transmission	5.12	Local Utilities	1.27
*Upstream Metal Manufacturing	4.61	Local Motor Vehicle Products and Services	1.25
Wood Products	3.44	Local Industrial Products and Services	1.22
*Agricultural Inputs and Services	2.37	Local Real Estate, Construction, and Development	1.19
Livestock Processing	2.31	Local Household Goods and Services	1.19
Coal Mining	2.28	Local Health Services	0.87
*Construction Products and Services	1.92	Local Logistical Services	0.80
Food Processing and Manufacturing	1.72	Local Commercial Services	0.59
Business Services	0.54		
*Hospitality and Tourism	1.40		

*Statewide significance

Source: Pracsys (2016)

The ECFs for all Traded and Local clusters (see Section 4.2) have been averaged in order to provide an overview of the region's performance in the Traded and Local economy.

Figure 77. Average Traded Cluster ECF and Local cluster ECF for the South West region

Average Traded ECF (All Traded clusters)	Average Local ECF (All Local clusters)
1.32	0.99

Source: Pracsys (2016)

The ECFs indicate the degree to which the region specialises in the respective areas of economic activity. By this measure the South West is slightly weighted towards Traded clusters and specialisation in Traded clusters appears to be well supported by Local clusters, reflected by a proportionally large and well-established population base. At this high level, there is evidence to suggest that the region is well positioned for growth driven by export oriented industries or local population driven activity. The role of Bunbury within the region is further investigated below.

The economic performance of the South West's top Traded clusters is presented below. In terms of GVA, exports and output, Upstream Metal Manufacturing is the dominant cluster. This likely to be due to the presence of processing facilities directly linked to mine sites, such as the Boddington Gold Mine. Direct employment is spread over a range of clusters with Agriculture, Hospitality and Tourism, Upstream Metal Manufacturing, Business Services and Food Processing and Manufacturing being noticeably prominent.

Figure 78. Impact of State and Regionally significant Traded clusters for the South West (ranked by ECF)

Cluster	Employment	GVA ($m)	Export ($m)	Output ($m)
Forestry	334	69	19	129
Electric Power Generation and Transmission	420	432	4	841
Upstream Metal Manufacturing	1,970	192	1,777	2,354
Wood Products	853	78	9	225
Agricultural Inputs and Services	3,444	449	417	1,059
Livestock Processing	543	88	132	376
Coal Mining	624	296	396	728
Construction Products and Services	2,098	592	42	1,654
Food Processing and Manufacturing	1,403	240	143	702
Business Services	1,695	458	63	844
Hospitality and Tourism	2,152	188	38	447
Total	15,536	3,082	3,040	9,359

Source: Pracsys (2016)

Figure 79. Impact of State and Regionally significant Traded clusters for the South West (ranked by output)

Cluster	Employment	GVA ($m)	Export ($m)	Output ($m)
Upstream Metal Manufacturing	1,970	192	1,777	2,354
Construction Products and Services	2,098	592	42	1,654
Agricultural Inputs and Services	3,444	449	417	1,059
Business Services	1,695	458	63	844
Electric Power Generation and Transmission	420	432	4	841
Coal Mining	624	296	396	728
Food Processing and Manufacturing	1,403	240	143	702
Hospitality and Tourism	2,152	188	38	447
Livestock Processing	543	88	132	376
Wood Products	853	78	9	225
Forestry	334	69	19	129
Total	15,536	3,082	3,040	9,359

Source: Pracsys (2016)

The emerging Traded clusters below represent outperforming clusters, in terms of employment growth and/or concentration beyond the Regionally Significant clusters, which have low total employment. Given the low employment in these clusters, ranging from approximately 80 to 200 persons, these industries may be represented by a small number of companies and may not truly represent an agglomeration or specialisation of activity. Further investigation would be required at the local level to determine if these clusters, or specific industries within these clusters, represent opportunities for future growth. Potential emerging clusters:

- Plastics
- Vulcanised and Fired Materials
- Downstream Metal Products
- Performing Arts
- Paper and packaging
- Insurance Services

In order to further investigate flows between industries, the Supporting clusters providing the bulk of inputs into the regionally significant Traded clusters have been identified. These selected Supporting clusters provide approximately 90% of inputs by cluster industry use. Employment attributable to both the Regionally Significant and Supporting clusters has been derived and is presented as a ratio in Figure 80. By comparing this ratio to the WA average it is possible to provide an indication of the degree to which the Primary Clusters drive employment and activity within the region.

Figure 80. South West Supporting cluster employment for State and Regionally significant clusters (ranked by regional employment)

Cluster	Employment	Supporting Employment Estimate	Ratio of Supporting vs. Primary Employment	WA Average
Agricultural Inputs and Services	3,444	1,958	0.6	0.6
Hospitality and Tourism	2,152	787	0.4	0.5
Construction Products and Services	2,098	3,594	1.5	1.5
Upstream Metal Manufacturing	1,970	2,419	1.2	3.6
Business Services	1,695	1,449	0.9	0.7
Food Processing and Manufacturing	1,403	2,733	2.0	1.4
Wood Products	853	625	0.7	0.4
Coal Mining	624	1,397	2.2	2.0
Livestock Processing	543	1,317	2.4	2.9
Electric Power Generation and Transmission	420	707	1.7	1.2
Forestry	334	136	0.5	0.6

Source: Pracsys (2016)

Clusters displaying a low supporting ratio may represent an opportunity for supply chain augmentation. In contrast, clusters displaying a high supporting ratio may indicate that a catchment beyond the immediate region is being serviced. This is an area in which locally based research is required.

12.2 ROLE OF BUNBURY

Based on the above results there is evidence to suggest that, as a region, the South West specialises in a range of Traded cluster activities such as Hospitality and Tourism, secondary processing and manufacturing, and natural resources. In addition, it also features a well-developed Local cluster mix that services both local population and industry needs. Centre specific ECFs have been produced in order to further investigate the function of Bunbury centre.

Figure 81. Bunbury centre ECFs for State and Regionally Significant clusters (ranked by regional ECF)

Traded clusters	ECF	Local clusters	ECF
Forestry	0.42	Local Education and Training	1.12
Electric Power Generation and Transmission	0.22	Local Utilities	1.05
Upstream Metal Manufacturing	0.09	Local Motor Vehicle Products and Services	1.86
Wood Products	1.00	Local Industrial Products and Services	0.60
Agricultural Inputs and Services	0.04	Local Real Estate, Construction, and Development	1.16
Livestock Processing	0.32	Local Household Goods and Services	2.16
Coal Mining	-	Local Health Services	1.19
Construction Products and Services	0.18	Local Logistical Services	0.79
Food Processing and Manufacturing	0.17	Local Commercial Services	1.20
Business Services	0.76		
Hospitality and Tourism	1.21		

Source: Pracsys (2016)

South West region and Bunbury centre employment levels are displayed in the figures below with a base map of the regional and centre-based infrastructure.

These results, and stakeholder consultation previously conducted, provide evidence that Bunbury currently displays the following high-level comparative advantages and opportunities for further development.

Areas of comparative advantages:

- Access to Port infrastructure
- Proximity to surrounding industrial land
- Well developed road infrastructure
- Close proximity to Perth CBD (which may also be a constraint in some cases, see leakage below)
- Well developed Traded industry activity in:
  - Hospitality and Tourism
- Well developed Local industry activity in:
  - Social capital based clusters
  - Commercial services
  - General population driven consumption

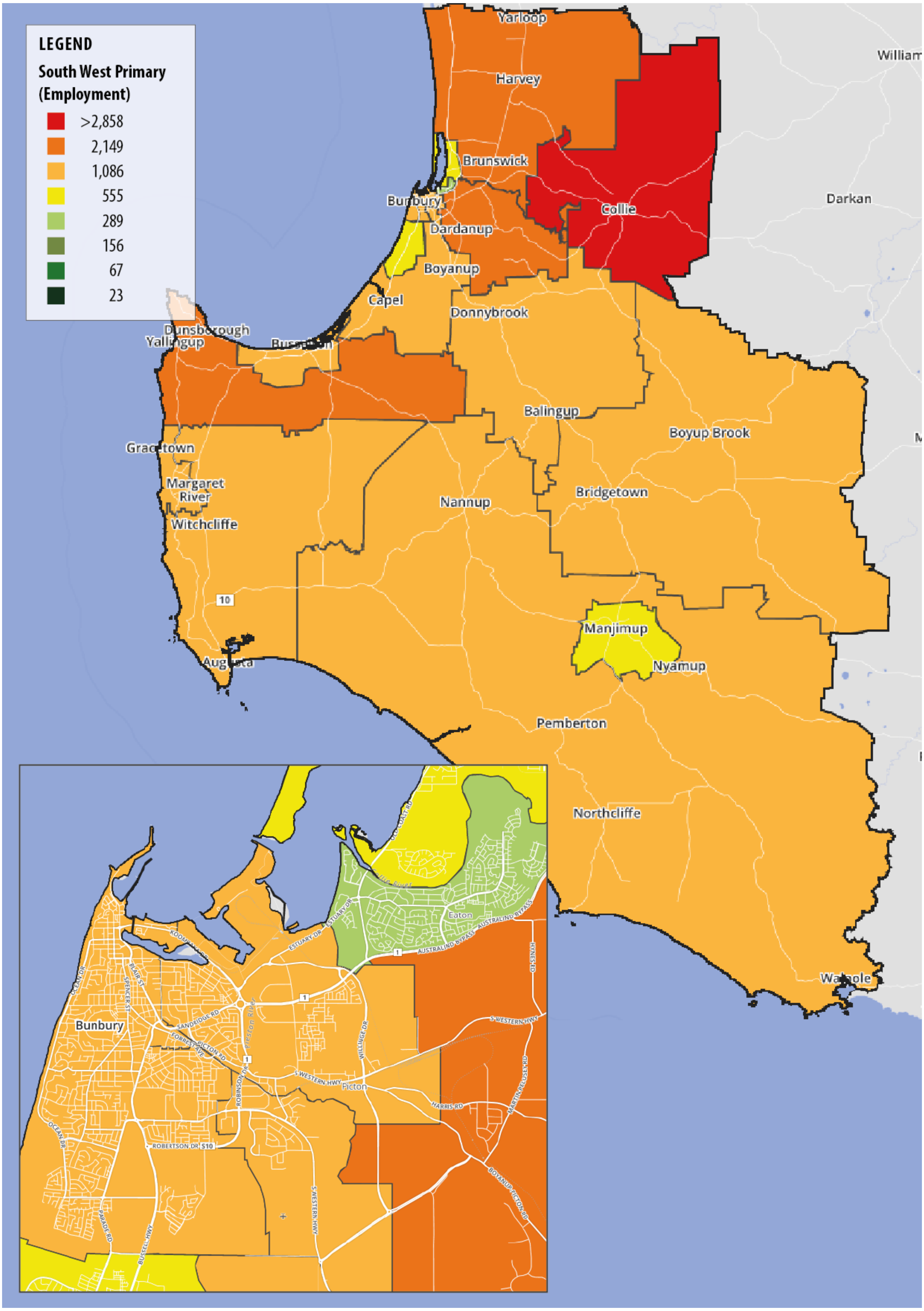
Opportunities for further development:

- Attraction and retention of employment in specialised Traded fields (i.e. counter leakage to Perth Metro)
- In addition to the above, potential to improve on Local clusters beyond basic consumption needs to include attractors
- Potential to develop stronger links to local agriculture and food processing

Figure 82. South West and Bunbury infrastructure base map

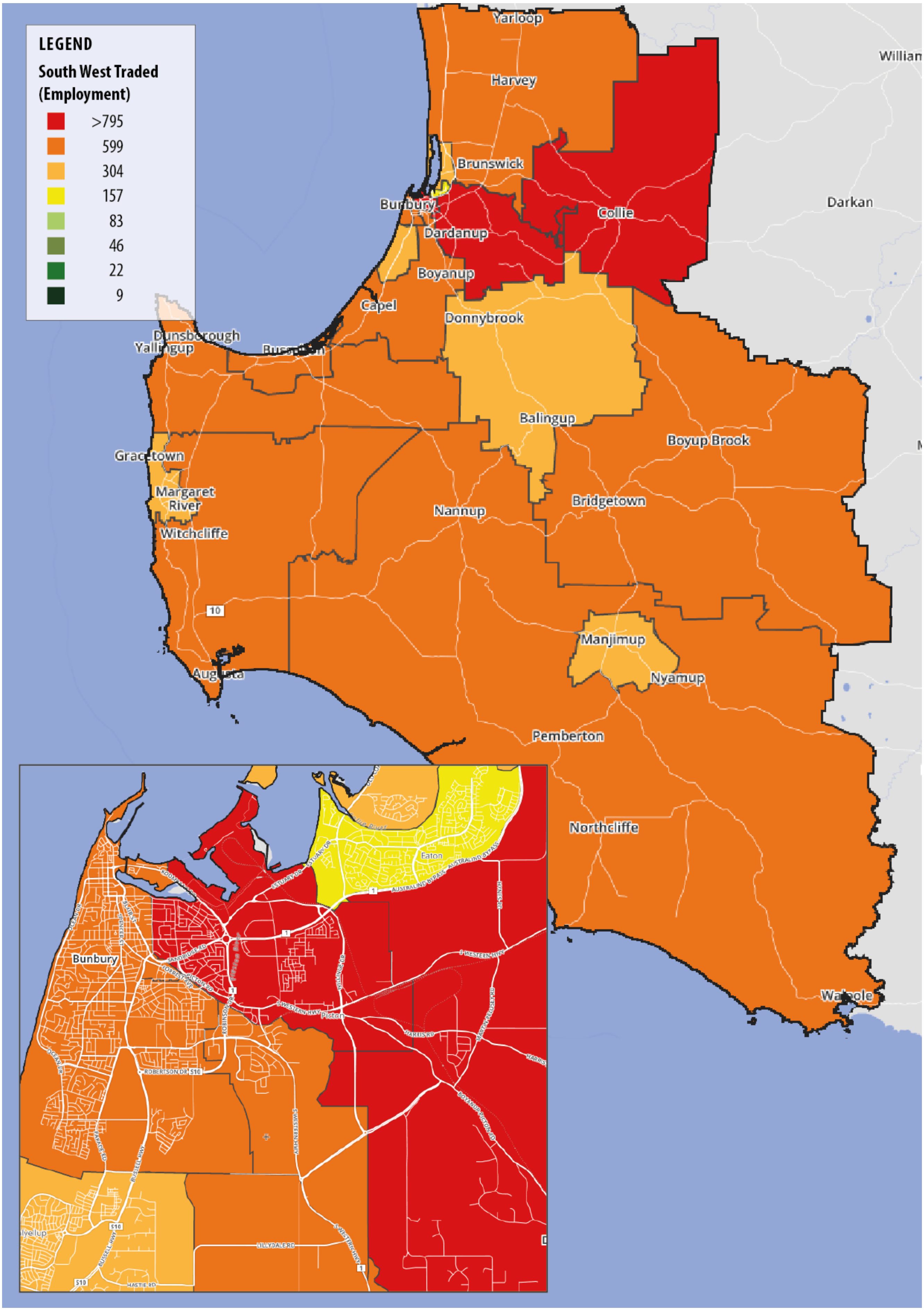
Source: Pracsys (2016), ALCES (2016)

Figure 83. Statewide Traded Cluster employment for the South West region and Bunbury



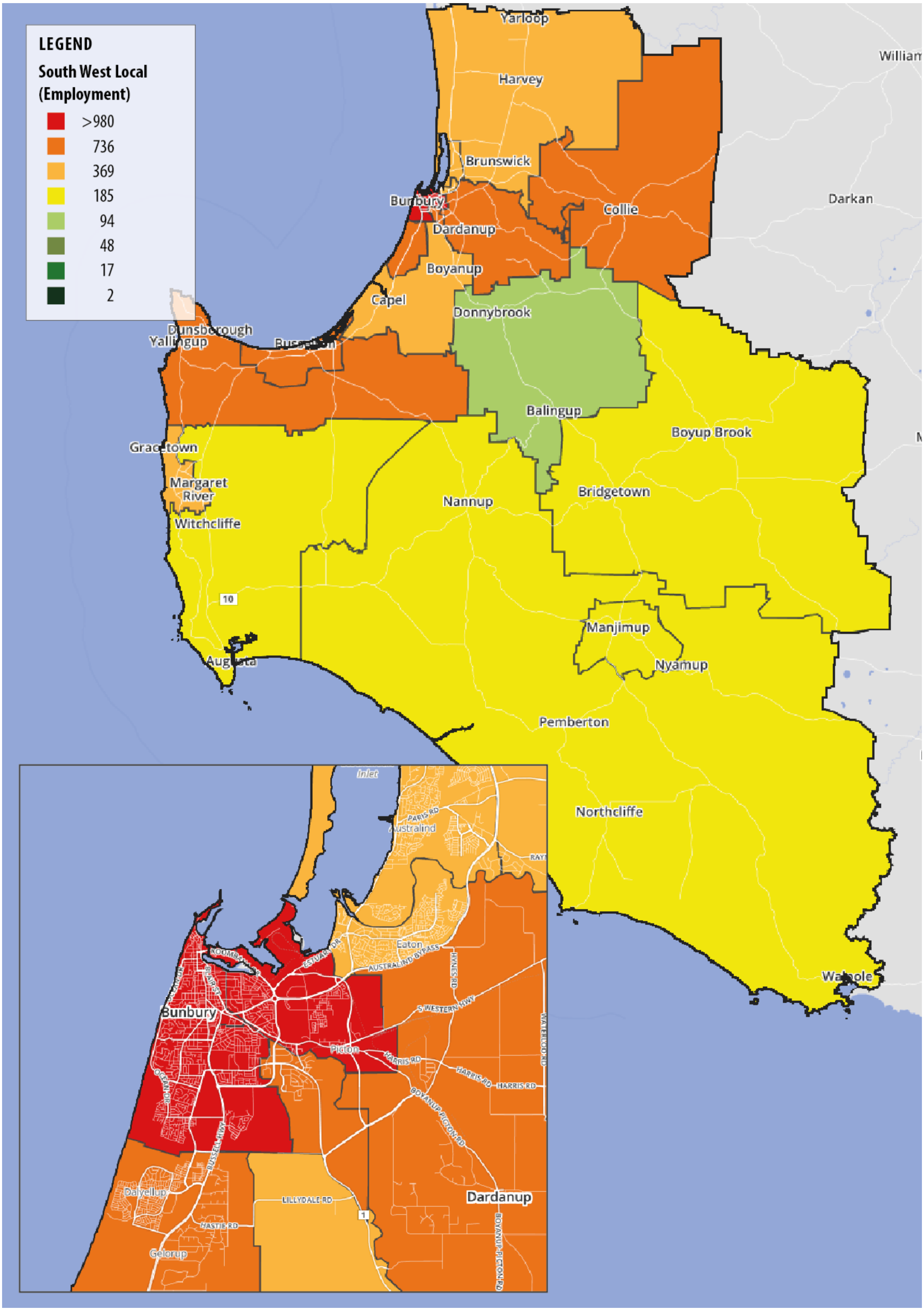
Source: Pracsys (2016), ALCES (2016)

Figure 84. Supporting Traded clusters for the South West region and Bunbury



Source: Pracsys (2016), ALCES (2016)

Figure 85. Supporting Local Supporting clusters for the South West region



Source: Pracsys (2016), ALCES (2016)

13.0

13 GERALDTON – MID WEST PROFILE

13.1 REGIONAL CLUSTER PERFORMANCE

Analysis has identified the Regionally Significant Traded and Local clusters for the Mid West region (Figure 86). These clusters outperform in terms of employment concentration, employment growth, or both of these measures. Identified clusters with ECF values of below one are under-represented within the region, however have experienced growth rates over the national average for each cluster.

Figure 86. Outperforming Clusters within the Mid West region (ranked by ECF)

Traded clusters	ECF	Local clusters	ECF
*Metal Mining	12.39	Local Industrial Products and Services	1.63
Fishing and Fishing Products	9.14	Local Community and Civic Organizations	1.01
*Non-metal Mining	6.11	Local Real Estate, Construction, and Development	0.99
*Agricultural Inputs and Services	3.29	Local Health Services	0.85
*Downstream Metal Products	2.90	Local Hospitality Establishments	0.78
*Water Transportation	2.01	Local Personal Services (Non-Medical)	0.67
*Construction Products and Services	1.45	Local Commercial Services	0.49
*Hospitality and Tourism	1.19		
*Transportation and Logistics	1.15		
*Business Services	0.75		

*Statewide significance

Source: Pracsys (2016)

The ECFs for all Traded and Local clusters (see Section 4.2) have been averaged in order to provide an overview of the region's performance in the Traded and Local economy.

Figure 87. Average Traded cluster ECF and Local cluster ECF for the Mid West region

Average Traded ECF (All Traded clusters)	Average Local ECF (All Local clusters)
1.29	0.85

Source: Pracsys (2016)

The ECFs indicate the degree to which the region specialises in the respective areas of economic activity. By this measure the Mid West is slightly weighted towards Traded clusters, however specialisation in Traded clusters appears to be somewhat constrained by relative proportion of Local clusters. At this high level, there is evidence to suggest that the region's strong performance in a number of Traded clusters may be further supported through growth and diversification of Local cluster industries.

The economic performance of the Mid West's top Traded clusters is presented below. In terms of GVA, exports and output, Metal Mining is the dominant cluster. Direct employment also heavily influenced by Metal Mining as well as Agriculture, which is the other dominant industry in the region. The region also displays strengths in port and freight/logistics services as well as Local industrial support.

Figure 88. State and Regionally Significant Traded clusters for the Mid West (ranked by ECF)

Cluster	Employment	GVA ($M)	Export ($M)	Output ($M)
Metal Mining	2,069	2,744	3,753	4,435
Fishing and Fishing Products	169	66	44	121
Non-metal Mining	254	32	31	59
Agricultural Inputs and Services	1,793	234	217	551
Downstream Metal Products	278	69	14	169
Water Transportation	176	26	13	63
Construction Products and Services	592	167	12	467
Hospitality and Tourism	689	60	12	143
Transportation and Logistics	771	207	35	462
Business Services	886	240	33	441
Total	7,677	3,845	4,164	6,911

Source: Pracsys (2016)

Figure 89. State and Regionally Significant Traded clusters for the Mid West (ranked by output)

Cluster	Employment	GVA ($M)	Export ($M)	Output ($M)
Metal Mining	2,069	2,744	3,753	4,435
Agricultural Inputs and Services	1,793	234	217	551
Construction Products and Services	592	167	12	467
Transportation and Logistics	771	207	35	462
Business Services	886	240	33	441
Downstream Metal Products	278	69	14	169
Hospitality and Tourism	689	60	12	143
Fishing and Fishing Products	169	66	44	121
Water Transportation	176	26	13	63
Non-metal Mining	254	32	31	59
Total	7,677	3,845	4,164	6,911

Source: Pracsys (2016)

The emerging Traded clusters below represent outperforming clusters, in terms of employment growth and/or concentration beyond the Regionally Significant clusters, which have low total employment. Given the low employment in these clusters, ranging from approximately 25 to 500 persons, these industries may be represented by a small number of companies and may not truly represent an agglomeration or specialisation of activity. Further investigation would be required at the local level to determine if these clusters, or specific industries within these clusters, represent opportunities for future growth. Potential emerging clusters are:

- Distribution and Electronic Commerce (Wholesaling)
- Upstream Metal Manufacturing
- Textile Manufacturing
- Wood Products
- Communications Equipment and Services

The Supporting clusters providing the bulk of inputs into the Regionally Significant Traded clusters have been identified in order to further investigate flows between industries. These selected Supporting clusters provide approximately 90% of inputs by cluster industry use. Employment attributable to both the Regionally Significant and supporting clusters has been derived and is presented as a ratio in Figure 90. By comparing this ratio to the WA average it is possible to provide an indication of the degree to which the Regionally Significant clusters drive employment and activity within the region.

Figure 90. Mid West Supporting cluster employment for State and Regionally Significant clusters (ranked by regional employment)

Cluster	Employment	Supporting Employment Estimate	Ratio of Supporting vs. Primary Employment	WA Average
Metal Mining	2,069	3,297	1.6	2.1
Agricultural Inputs and Services	1,793	1,552	0.9	0.6
Business Services	886	589	0.7	0.7
Transportation and Logistics	771	783	1.0	1.3
Hospitality and Tourism	689	147	0.2	0.5
Construction Products and Services	592	802	1.2	1.5
Downstream Metal Products	278	66	0.2	0.9
Non-metal Mining	254	40	0.15	0.25
Water Transportation	176	46	0.2	0.5
Fishing and Fishing Products	169	209	1.2	1.0

Source: Pracsys (2016)

Clusters displaying a low supporting ratio may represent an opportunity for supply chain augmentation. In contrast, clusters displaying a high supporting ratio may indicate that a catchment beyond the immediate region is being serviced. This is an area in which locally based research is required.

13.2 ROLE OF GERALDTON

Based on the above results there is evidence to suggest that, as a region, the Mid West specialises primarily in resources and agriculture based activity, with associated specialisation in ports, logistics and industrial support services. Centre specific ECFs have been produced in order to further investigate the function of the Geraldton centre.

Figure 91. Geraldton centre ECFs for Regionally Significant clusters (ranked by regional ECF)

Traded clusters	ECF	Local clusters	ECF
Metal Mining	0.41	Local Industrial Products and Services	1.65
Fishing and Fishing Products	8.50	Local Community and Civic Organizations	1.24
Non-metal Mining	0.41	Local Real Estate, Construction, and Development	1.26
Agricultural Inputs and Services	0.39	Local Health Services	1.20
Downstream Metal Products	0.41	Local Hospitality Establishments	0.91
Water Transportation	2.29	Local Personal Services (Non-Medical)	1.10
Construction Products and Services	0.86	Local Commercial Services	0.85
Hospitality and Tourism	0.99		
Transportation and Logistics	1.73		
Business Services	0.41		

Source: Pracsys (2016)

Mid West and Geraldton centre employment levels are displayed in the figures below with a base map of the regional and centre-based infrastructure.

These results, and stakeholder consultation previously conducted, provide evidence that Geraldton currently displays the following high-level comparative advantages and opportunities for further development.

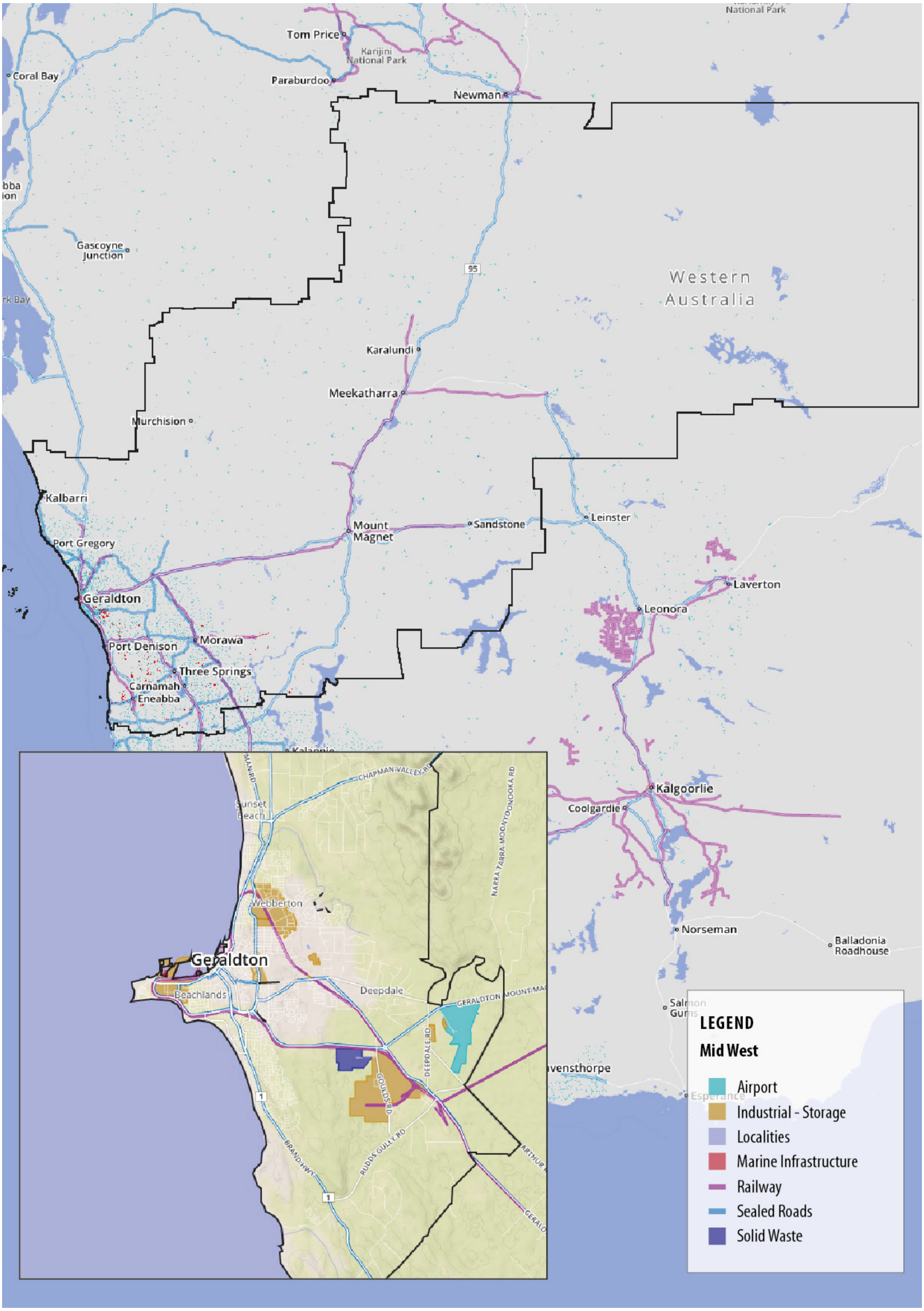
Areas of comparative advantages:

- Access to Port infrastructure
- Well developed road and industrial rail infrastructure
- Well developed Traded industry activity in:
    - Fishing and Fishing Products
    - Water Transportation (ship building and port activity)
    - Transportation and Logistics
- Well developed Local industry activity in:
    - Local Industrial Products and Services
- And to a degree, the presence of Local oriented:
    - Social capital based clusters

Opportunities for further development:

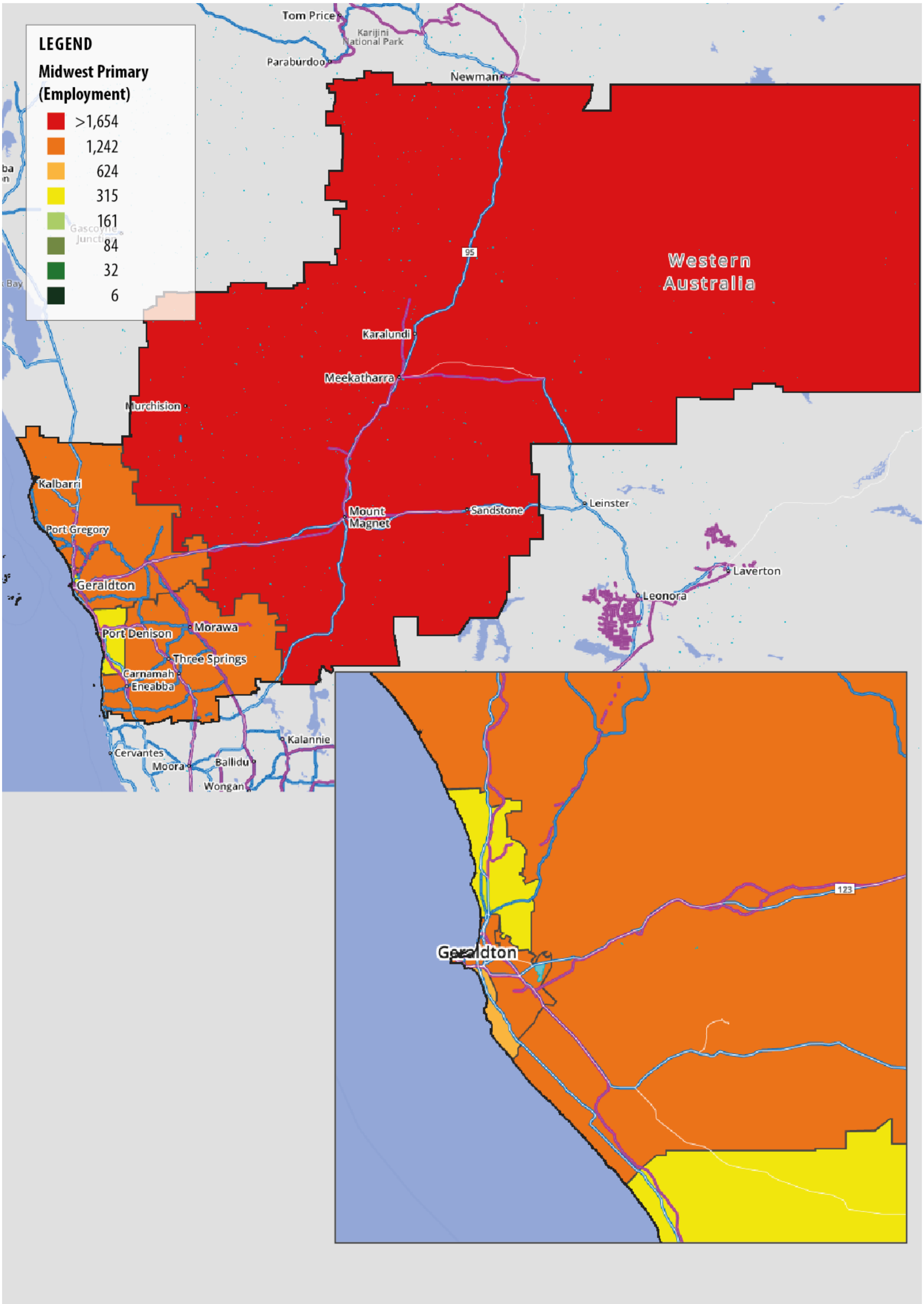
- A disconnect seems to exist between the major regional resource and agriculture based industries and centre based activity. Opportunities may exist to provide a base of service for these industries beyond freight and logistics services
- Potential exists to build on the Local industry base to provide an improved level and diversity of offerings

Figure 92. Mid West and Geraldton infrastructure base map



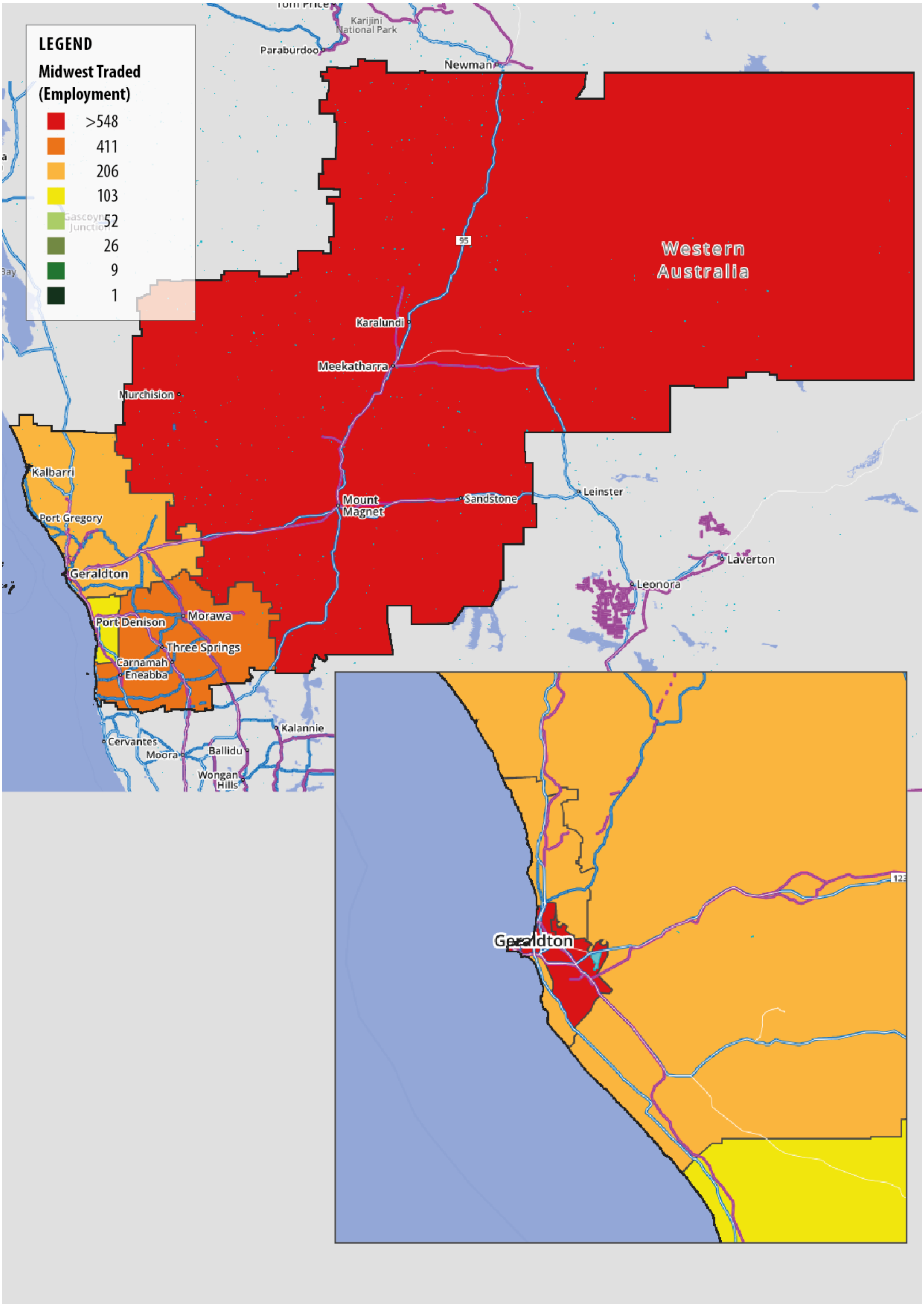
Source: Pracsys (2016), ALCES (2016)

Figure 93. Statewide Traded Cluster employment for the Mid West region and Geraldton



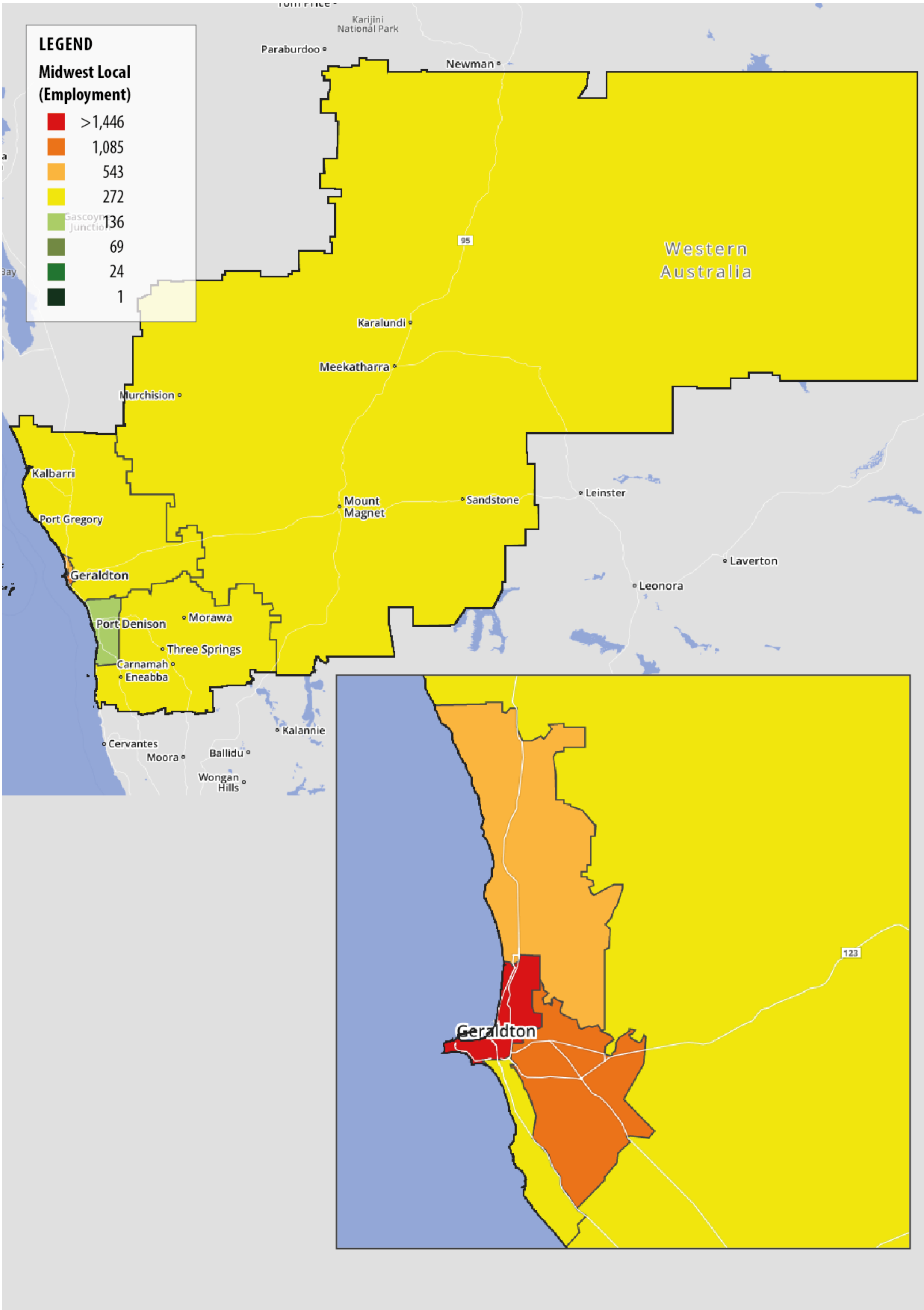
Source: Pracsys (2016), ALCES (2016)

Figure 94. Supporting Traded Supporting clusters for the Mid West region and Geraldton



Source: Pracsys (2016), ALCES (2016)

Figure 95. Supporting Local Supporting clusters for the Mid West region and Geraldton



Source: Pracsys (2016), ALCES (2016)

14.0

14 KALGOORLIE – GOLDFIELDS ESPERANCE

14.1 REGIONAL CLUSTER PERFORMANCE

Analysis has identified the Regionally Significant Traded and Local clusters for the Goldfields Esperance region (Figure 96). These clusters outperform in terms of employment concentration, employment growth, or both of these measures. Identified clusters with ECF values of below one are under-represented within the region, however have experienced growth rates over the national average for each cluster.

Figure 96. Outperforming Clusters within the Goldfields Esperance region (ranked by ECF)

Traded clusters	ECF	Local clusters	ECF
*Metal Mining	28.18	Local Industrial Products and Services	3.55
*Non-metal Mining	9.98	Local Education and Training	1.07
*Downstream Metal Products	7.85	Local Hospitality Establishments	0.66
*Agricultural Inputs and Services	1.75	Local Logistical Services	0.66
*Construction Products and Services	1.50		
*Business Services	1.35		
*Transportation and Logistics	1.27		
*Hospitality and Tourism	1.02		

*Statewide significance

Source: Pracsys (2016)

The ECFs for all Traded and Local clusters (see Section 4.2) have been averaged in order to provide an overview of the region's performance in the Traded and Local economy.

Figure 97. Average Traded cluster ECF and Local cluster ECF for the Goldfields Esperance region

Average Traded ECF (All Traded clusters)	Average Local ECF (All Local clusters)
1.63	0.68

Source: Pracsys (2016)

Both the Regionally Significant Traded and Local cluster list, and the relative proportion of Traded versus Local cluster ECFs provide evidence that the Goldfields-Esperance regional economy is strongly aligned to the WA statewide economic activity. Employment concentrations and growth are strongly directed towards conducting and servicing Traded activity and the area appears to be somewhat underserviced in Local population based industries and services. This result indicates that efforts are best directed in developing Local clusters in order to support further growth within the region.

The economic performance of the Goldfield Esperance's top Traded clusters is presented below. In terms of GVA, exports and output, Metal Mining is the dominant cluster. Apart from this cluster, relatively high levels of employment are seen in Business Services, Agriculture and Transportation and Logistics. Hospitality and Tourisms is notable for relatively high levels of employment and the fact that it provides a point of difference in the region.

Figure 98. Statewide and Regionally Significant Traded clusters for Goldfields Esperance (ranked by ECF)

Cluster	Employment	GVA ($M)	Export ($M)	Output ($M)
Metal Mining	6,048	8,020	10,972	12,965
Non-metal Mining	533	69	68	128
Downstream Metal Products	967	240	50	588
Agricultural Inputs and Services	1,226	160	148	377
Construction Products and Services	791	223	16	624
Business Services	2,050	554	76	1,020
Transportation and Logistics	1,096	295	49	657
Hospitality and Tourism	758	66	13	157
Total	13,469	9,627	11,392	16,516

Source: Pracsys (2016)

Figure 99. Statewide and Regionally Significant Traded clusters for Goldfields Esperance (ranked by output)

Cluster	Employment	GVA ($M)	Export ($M)	Output ($M)
Metal Mining	6,048	8,020	10,972	12,965
Business Services	2,050	554	76	1,020
Transportation and Logistics	1,096	295	49	657
Construction Products and Services	791	223	16	624
Downstream Metal Products	967	240	50	588
Agricultural Inputs and Services	1,226	160	148	377
Hospitality and Tourism	758	66	13	157
Non-metal Mining	533	69	68	128
Total	13,469	9,627	11,392	16,516

Source: Pracsys (2016)

Beyond the Regionally Significant clusters, some evidence of emerging Clusters can be observed in:

- Environmental Services
- Local Food and Beverage Processing and Distribution
- Local Logistical Services

However it is unclear if these clusters represent genuine opportunities for future growth.

Clusters displaying a low supporting ratio may represent an opportunity for supply chain augmentation. In contrast, clusters displaying a high supporting ratio may indicate that a catchment beyond the immediate region is being serviced. Generally, the Supporting ratio within the Goldfields-Esperance region is below the state average, this may indicate that the region is largely serviced through Perth or other regions. This may present an opportunity for development within this region; however further research in this area would be required at the local level.

Figure 100. Goldfields Esperance Supporting vs. Regionally and Statewide significant clusters (ranked by employment)

Cluster	Employment	Supporting Employment Estimate	Ratio of Supporting vs. Primary Employment	WA Average
Metal Mining	6,048	7,682	1.3	2.1
Business Services	2,050	1,015	0.5	0.7
Agricultural Inputs and Services	1,226	676	0.6	0.6
Transportation and Logistics	1,096	623	0.6	1.3
Downstream Metal Products	967	55	0.1	0.9
Construction Products and Services	791	733	0.8	1.5
Hospitality and Tourism	758	127	0.2	0.5
Non-metal Mining	533	55	0.1	0.3

Source: Pracsys (2016)

14.2 ROLE OF KALGOORLIE

Based on the above results there is evidence to suggest that, as a region, Goldfields-Esperance is highly specialised in resource based Traded cluster activities and associated activities. Centre specific ECFs have been produced in order to further investigate the function of Kalgoorlie centre, which serve to reinforce Kalgoorlie's role in these industries. As with other centres, Hospitality and Tourism performs better at the centre level than the region level. This result highlights Hospitality and Tourism and the current primary point of diversification in the Kalgoorlie centre's economy.

Figure 101. Kalgoorlie centre ECFs for Regionally Significant clusters (ranked by regional ECF)

Traded clusters	ECF	Local clusters	ECF
Metal Mining	2.35	Local Industrial Products and Services	4.76
Non-metal Mining	2.30	Local Education and Training	1.07
Downstream Metal Products	1.32	Local Hospitality Establishments	0.83
Agricultural Inputs and Services	0.03	Local Logistical Services	1.08
Construction Products and Services	1.60		
Business Services	0.92		
Transportation and Logistics	1.76		
Hospitality and Tourism	1.30		

Source: Pracsys (2016)

In addition, Goldfields-Esperance region and Kalgoorlie centre employment levels are displayed in the figures below with a base map of the regional and centre-based infrastructure.

These results, and stakeholder consultation previously conducted, provide evidence that Kalgoorlie currently displays the following high-level comparative advantages and opportunities for further development.

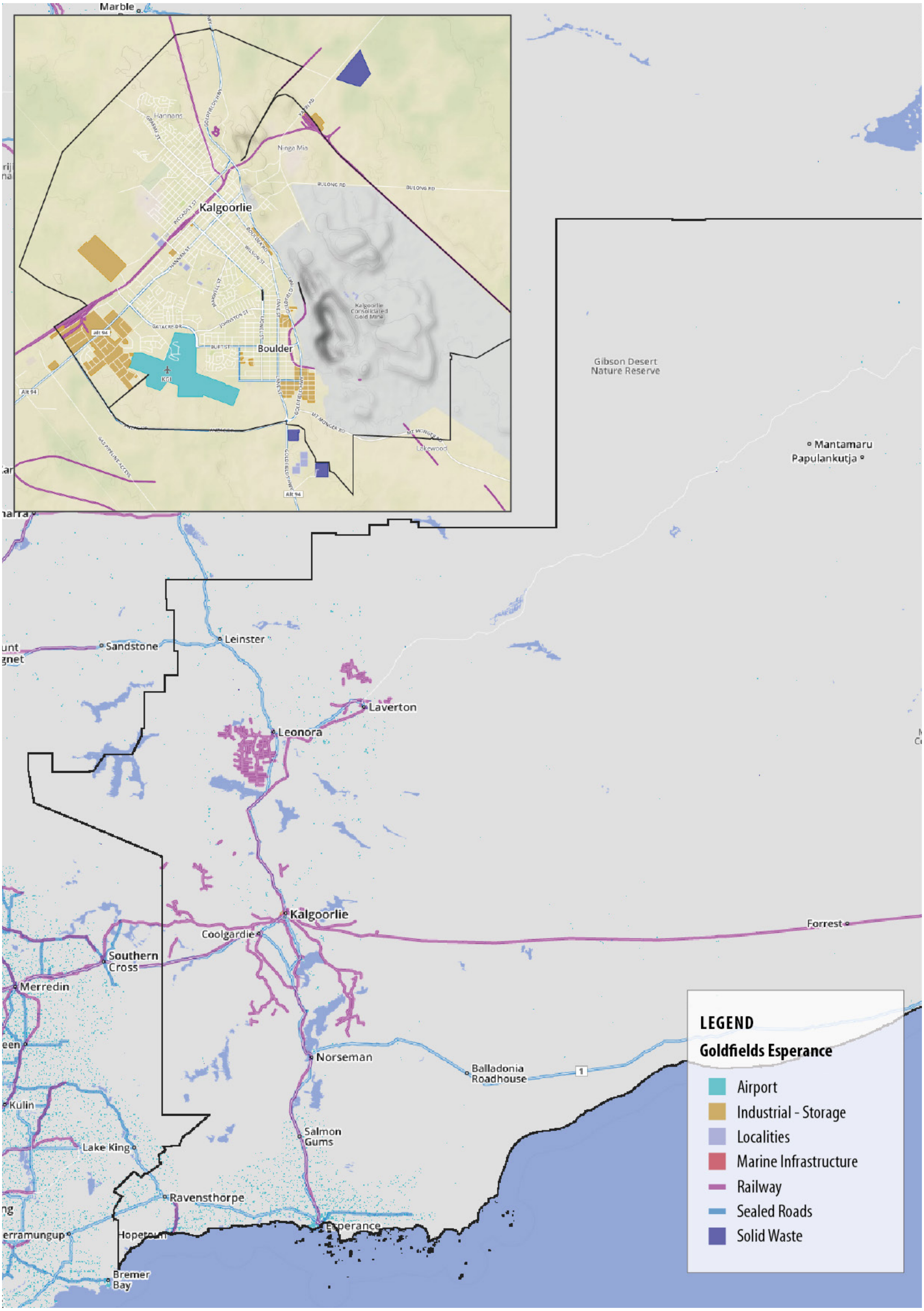
Areas of comparative advantages:

- Access to rail infrastructure
- High degree of connection to Regional Traded clusters
- High degree of specialisation in associated Transport and Logistics and Local Industrial Products and Services clusters
- A well developed Local Education and Training cluster (e.g. Kalgoorlie School of Mines)

Opportunities for further development:

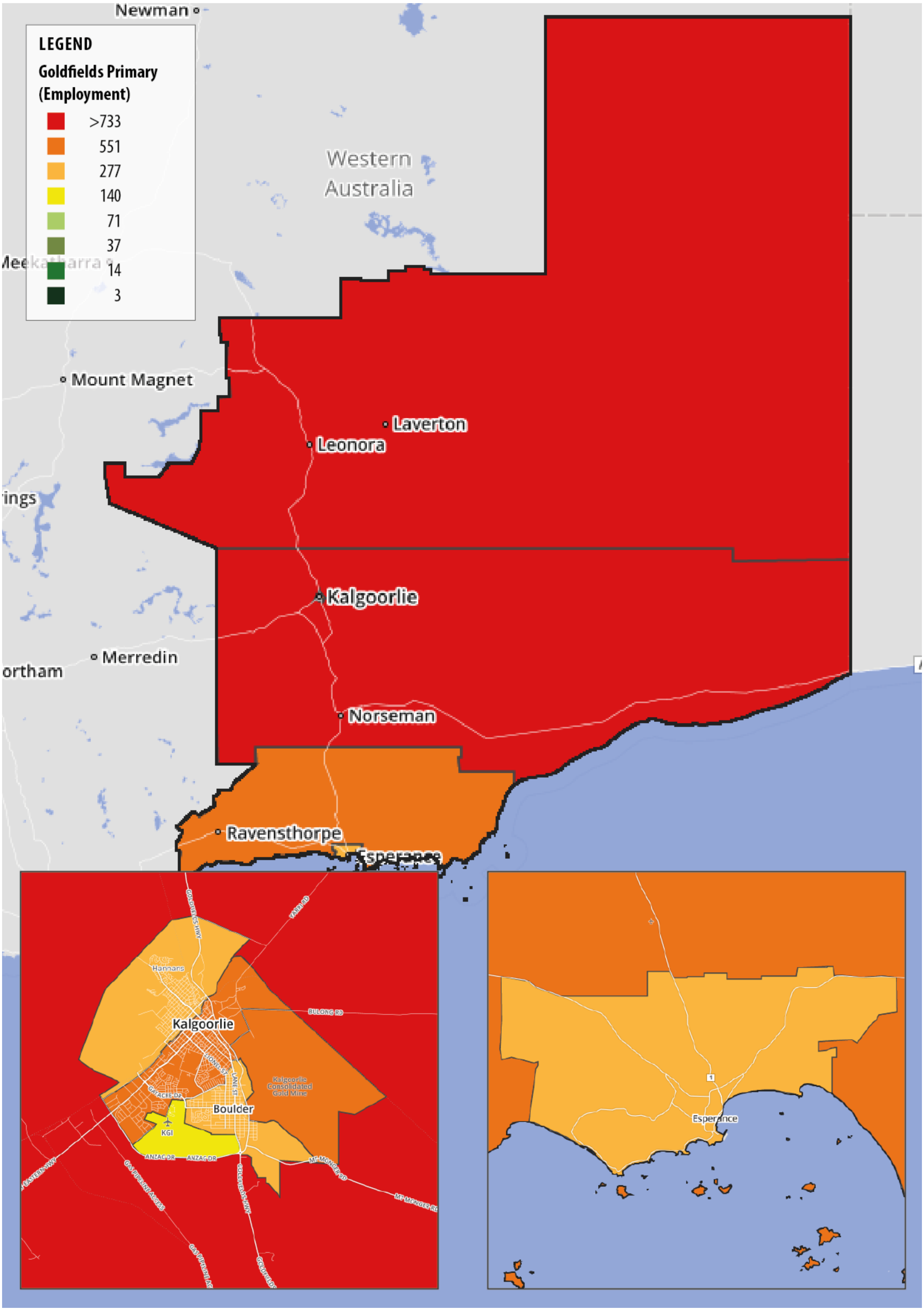
- Opportunity to build on established Hospitality and Tourism industries
- Potential to build on Local based industries and offerings

Figure 102. Goldfields and Esperance infrastructure base map



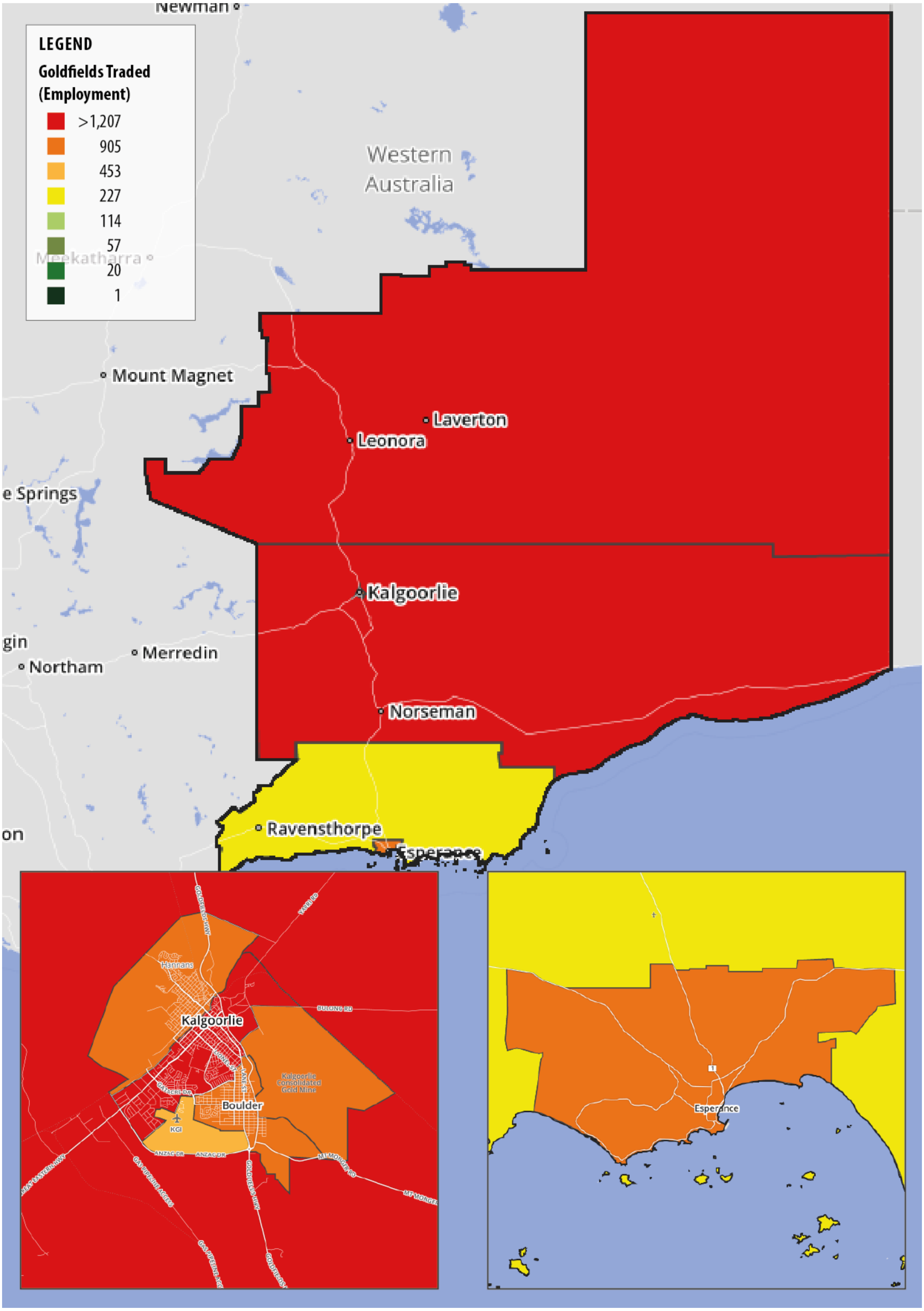
Source: Pracsys (2016), ALCES (2016)

Figure 103. Statewide Traded Cluster employment for the Goldfields Esperance region and Kalgoorlie



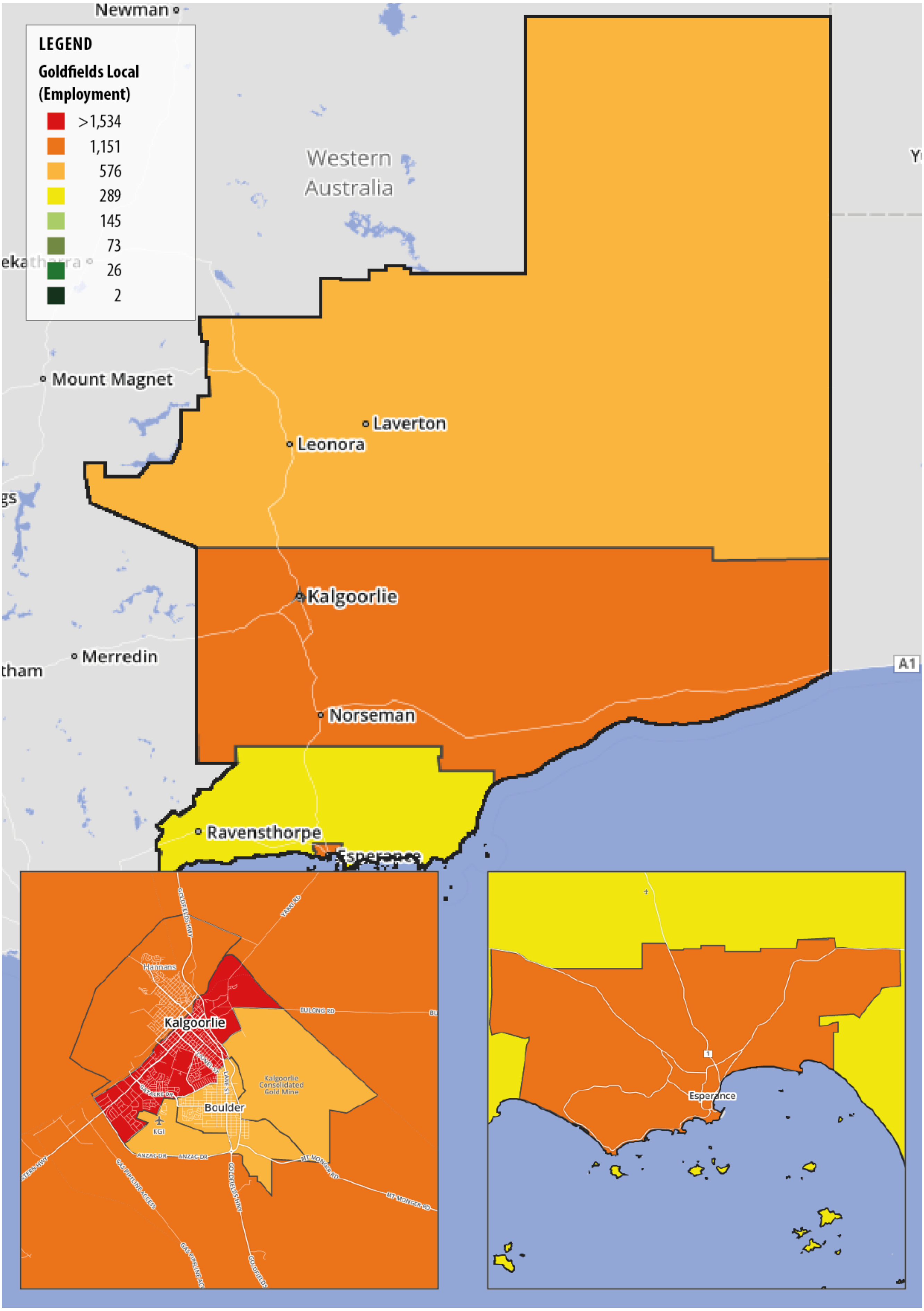
Source: Pracsys (2016), ALCES (2016)

Figure 104. Supporting Traded Supporting clusters for the Goldfields Esperance region and Kalgoorlie



Source: Pracsys (2016), ALCES (2016)

Figure 105. Supporting Local Supporting clusters for the Goldfields Esperance region and Kalgoorlie



Source: Pracsys (2016), ALCES (2016)

15.0

15 CONCLUSIONS

The outputs provided within this report seek to provide a range of insights including:

- A consistent, internationally recognised language for consideration of economic quality and characteristics
- Development and utilisation of a framework for identification state significant clusters
- Development and utilisation of a framework for identification of Regionally Significant clusters for each of Western Australia's nine regions
- Development and utilisation of a framework for identification of key business-to-business Local clusters that support the performance of State/ Regionally Significant clusters
- Development and utilisation of a framework for identification of where clusters have sustained a comparative advantage over time, and examination of the spatial characteristics associated with these advantages
- Profiling of the roles that regional centres plays in State/Regionally Significant cluster performance
- Development and utilisation of a framework for identifying future economic development opportunities based upon matching historic comparative advantage with new opportunities and innovations
- Development and utilisaition of a framework for identification of potential gaps in regional service provision

These will be further develped in the final task of the project, within which the project team will be working with each of the Centre Growth Plan teams to explore specific areas of focus. This may include:

- Opportunities for further consultation with cluster representatives
- Further spatial analysis utilising Curtin iFutures ALCES platform
- Or further econometric analysis including examination of the Australian Business Registration 2015 data

APPENDIX 1: SOUTH WEST CLUSTERS

South West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Forestry	Agricultural Inputs and Services	42%
	Oil and Gas Production and Transportation	25%
	Forestry	19%
	Distribution and Electronic Commerce	6%
	Transportation and Logistics	2%
	Local Retailing of Clothing and General Merchandise	2%
	Local Commercial Services	1%
	Local Real Estate, Construction, and Development	1%
	Local Industrial Products and Services	0%
	Production Technology and Heavy Machinery	0%
	Financial Services	0%
	Local Motor Vehicle Products and Services	0%
	Downstream Metal Products	0%
	Downstream Chemical Products	0%
	Local Hospitality Establishments	0%
Electric Power Generation and Transmission	Local Utilities	34%
	Coal Mining	28%
	Financial Services	14%
	Business Services	5%
	Local Real Estate, Construction, and Development	4%
	Transportation and Logistics	2%
	Oil and Gas Production and Transportation	2%
	Electric Power Generation and Transmission	2%
	Distribution and Electronic Commerce	2%
	Local Commercial Services	1%
	Water Transportation	1%
	Local Retailing of Clothing and General Merchandise	1%
	Construction Products and Services	1%
	Local Industrial Products and Services	1%
	Production Technology and Heavy Machinery	0%

South West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Upstream Metal Manufacturing	Metal Mining	78%
	Upstream Metal Manufacturing	10%
	Electric Power Generation and Transmission	3%
	Local Utilities	2%
	Transportation and Logistics	2%
	Coal Mining	1%
	Oil and Gas Production and Transportation	1%
	Distribution and Electronic Commerce	0%
	Water Transportation	0%
	Local Real Estate, Construction, and Development	0%
	Downstream Metal Products	0%
	Financial Services	0%
	Local Retailing of Clothing and General Merchandise	0%
	Business Services	0%
	Non-metal Mining	0%
Wood Products	Forestry	42%
	Transportation and Logistics	22%
	Local Real Estate, Construction, and Development	10%
	Wood Products	6%
	Distribution and Electronic Commerce	5%
	Local Retailing of Clothing and General Merchandise	3%
	Business Services	2%
	Downstream Metal Products	2%
	Local Commercial Services	1%
	Local Industrial Products and Services	1%
	Local Utilities	1%
	Downstream Chemical Products	1%
	Electric Power Generation and Transmission	1%
	Financial Services	1%
	Construction Products and Services	1%
Agricultural Inputs and Services	Agricultural Inputs and Services	45%
	Local Real Estate, Construction, and Development	9%
	Distribution and Electronic Commerce	5%
	Business Services	5%
	Financial Services	5%
	Transportation and Logistics	4%
	Local Utilities	3%
	Downstream Chemical Products	3%
	Oil and Gas Production and Transportation	3%
	Local Retailing of Clothing and General Merchandise	3%
	Food Processing and Manufacturing	2%
	Local Commercial Services	2%
	Construction Products and Services	1%
	Local Industrial Products and Services	1%
	Production Technology and Heavy Machinery	1%

South West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Livestock Processing	Agricultural Inputs and Services	72%
	Transportation and Logistics	8%
	Livestock Processing	7%
	Business Services	2%
	Distribution and Electronic Commerce	2%
	Local Retailing of Clothing and General Merchandise	1%
	Local Utilities	1%
	Local Real Estate, Construction, and Development	1%
	Electric Power Generation and Transmission	1%
	Financial Services	1%
	Local Commercial Services	1%
	Food Processing and Manufacturing	1%
	Oil and Gas Production and Transportation	0%
	Local Community and Civic Organizations	0%
	Production Technology and Heavy Machinery	0%
Coal Mining	Business Services	23%
	Coal Mining	11%
	Local Real Estate, Construction, and Development	8%
	Transportation and Logistics	6%
	Downstream Metal Products	5%
	Local Industrial Products and Services	4%
	Distribution and Electronic Commerce	4%
	Local Commercial Services	4%
	Production Technology and Heavy Machinery	4%
	Financial Services	3%
	Hospitality and Tourism	3%
	Oil and Gas Production and Transportation	3%
	Construction Products and Services	3%
	Local Community and Civic Organizations	2%
	Local Retailing of Clothing and General Merchandise	2%
Food Processing and Manufacturing	Agricultural Inputs and Services	35%
	Food Processing and Manufacturing	13%
	Transportation and Logistics	8%
	Business Services	6%
	Local Hospitality Establishments	6%
	Distribution and Electronic Commerce	4%
	Financial Services	3%
	Local Commercial Services	3%
	Downstream Metal Products	3%
	Vulcanized and Fired Materials	2%
	Local Retailing of Clothing and General Merchandise	2%
	Local Real Estate, Construction, and Development	2%
	Local Utilities	2%
	Electric Power Generation and Transmission	1%
	Hospitality and Tourism	1%

South West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Business Services	Business Services	41%
	Local Real Estate, Construction, and Development	13%
	Financial Services	6%
	Local Commercial Services	4%
	Local Hospitality Establishments	4%
	Local Community and Civic Organizations	3%
	Distribution and Electronic Commerce	3%
	Local Utilities	3%
	Transportation and Logistics	2%
	Local Retailing of Clothing and General Merchandise	2%
	Local Industrial Products and Services	2%
	Construction Products and Services	2%
	Local Entertainment and Media	1%
	Marketing, Design, and Publishing	1%
	Information Technology and Analytical Instruments	1%
Hospitality and Tourism	Business Services	14%
	Local Commercial Services	13%
	Local Real Estate, Construction, and Development	13%
	Food Processing and Manufacturing	8%
	Local Retailing of Clothing and General Merchandise	6%
	Financial Services	6%
	Hospitality and Tourism	6%
	Distribution and Electronic Commerce	5%
	Livestock Processing	4%
	Local Utilities	4%
	Agricultural Inputs and Services	4%
	Transportation and Logistics	3%
	Local Entertainment and Media	3%
	Electric Power Generation and Transmission	2%
	Local Hospitality Establishments	1%

Source: Pracsys (2016)

APPENDIX 2: MID WEST CLUSTERS

Mid West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Metal Mining	Business Services	20%
	Local Real Estate, Construction, and Development	17%
	Local Industrial Products and Services	6%
	Distribution and Electronic Commerce	6%
	Transportation and Logistics	6%
	Construction Products and Services	5%
	Production Technology and Heavy Machinery	5%
	Oil and Gas Production and Transportation	5%
	Local Commercial Services	4%
	Financial Services	3%
	Local Utilities	3%
	Local Community and Civic Organizations	3%
	Local Retailing of Clothing and General Merchandise	3%
	Downstream Metal Products	2%
	Downstream Chemical Products	2%
Fishing and Fishing Products	Agricultural Inputs and Services	33%
	Oil and Gas Production and Transportation	10%
	Distribution and Electronic Commerce	9%
	Local Commercial Services	7%
	Water Transportation	7%
	Transportation and Logistics	5%
	Production Technology and Heavy Machinery	5%
	Local Retailing of Clothing and General Merchandise	4%
	Financial Services	3%
	Local Real Estate, Construction, and Development	3%
	Business Services	2%
	Downstream Metal Products	2%
	Local Motor Vehicle Products and Services	2%
	Construction Products and Services	1%
	Local Industrial Products and Services	1%

Mid West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Non-metal Mining	Business Services	22%
	Local Real Estate, Construction, and Development	13%
	Local Utilities	8%
	Local Commercial Services	6%
	Oil and Gas Production and Transportation	6%
	Transportation and Logistics	5%
	Financial Services	5%
	Distribution and Electronic Commerce	5%
	Construction Products and Services	4%
	Electric Power Generation and Transmission	3%
	Local Industrial Products and Services	2%
	Local Community and Civic Organizations	2%
	Production Technology and Heavy Machinery	2%
	Downstream Metal Products	2%
	Local Retailing of Clothing and General Merchandise	2%
Agricultural Inputs and Services	Agricultural Inputs and Services	44%
	Transportation and Logistics	10%
	Local Real Estate, Construction, and Development	9%
	Distribution and Electronic Commerce	7%
	Business Services	5%
	Financial Services	4%
	Downstream Chemical Products	3%
	Local Retailing of Clothing and General Merchandise	3%
	Local Utilities	3%
	Oil and Gas Production and Transportation	2%
	Local Commercial Services	1%
	Local Industrial Products and Services	1%
	Construction Products and Services	1%
	Food Processing and Manufacturing	1%
	Production Technology and Heavy Machinery	1%
Downstream Metal Products	Upstream Metal Manufacturing	37%
	Transportation and Logistics	17%
	Downstream Metal Products	10%
	Distribution and Electronic Commerce	8%
	Business Services	7%
	Local Real Estate, Construction, and Development	3%
	Local Retailing of Clothing and General Merchandise	3%
	Production Technology and Heavy Machinery	2%
	Local Utilities	2%
	Local Community and Civic Organizations	1%
	Local Hospitality Establishments	1%
	Oil and Gas Production and Transportation	1%
	Local Commercial Services	1%
	Water Transportation	1%
	Construction Products and Services	1%

Mid West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Water Transportation	Water Transportation	24%
	Transportation and Logistics	22%
	Business Services	10%
	Local Real Estate, Construction, and Development	8%
	Financial Services	5%
	Distribution and Electronic Commerce	4%
	Oil and Gas Production and Transportation	4%
	Upstream Metal Manufacturing	3%
	Production Technology and Heavy Machinery	3%
	Local Retailing of Clothing and General Merchandise	2%
	Local Commercial Services	2%
	Construction Products and Services	2%
	Local Industrial Products and Services	1%
	Local Utilities	1%
	Local Hospitality Establishments	1%
Construction Products and Services	Local Real Estate, Construction, and Development	42%
	Business Services	15%
	Construction Products and Services	9%
	Transportation and Logistics	7%
	Local Commercial Services	4%
	Downstream Metal Products	4%
	Distribution and Electronic Commerce	3%
	Upstream Metal Manufacturing	2%
	Local Community and Civic Organizations	2%
	Non-metal Mining	2%
	Oil and Gas Production and Transportation	2%
	Local Retailing of Clothing and General Merchandise	1%
	Downstream Chemical Products	1%
	Metal Mining	1%
	Production Technology and Heavy Machinery	1%
Hospitality and Tourism	Business Services	16%
	Local Real Estate, Construction, and Development	14%
	Local Commercial Services	14%
	Distribution and Electronic Commerce	7%
	Local Retailing of Clothing and General Merchandise	7%
	Financial Services	6%
	Transportation and Logistics	6%
	Local Utilities	4%
	Hospitality and Tourism	4%
	Food Processing and Manufacturing	3%
	Agricultural Inputs and Services	3%
	Local Entertainment and Media	2%
	Local Hospitality Establishments	2%
	Electric Power Generation and Transmission	1%
	Production Technology and Heavy Machinery	1%

Mid West		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Transportation and Logistics	Transportation and Logistics	25%
	Business Services	16%
	Local Real Estate, Construction, and Development	12%
	Local Motor Vehicle Products and Services	8%
	Local Retailing of Clothing and General Merchandise	5%
	Local Community and Civic Organizations	4%
	Distribution and Electronic Commerce	4%
	Financial Services	4%
	Local Commercial Services	4%
	Oil and Gas Production and Transportation	4%
	Construction Products and Services	2%
	Local Industrial Products and Services	2%
	Upstream Metal Manufacturing	1%
	Local Logistical Services	1%
	Local Utilities	1%
Business Services	Business Services	41%
	Local Real Estate, Construction, and Development	10%
	Financial Services	5%
	Transportation and Logistics	5%
	Local Commercial Services	5%
	Distribution and Electronic Commerce	3%
	Local Industrial Products and Services	3%
	Local Community and Civic Organizations	3%
	Local Hospitality Establishments	2%
	Construction Products and Services	2%
	Local Utilities	2%
	Production Technology and Heavy Machinery	2%
	Upstream Metal Manufacturing	2%
	Local Retailing of Clothing and General Merchandise	2%
	Water Transportation	2%

Source: Pracsys (2016)

A3

APPENDIX 3: GOLDFIELDS-ESPERANCE CLUSTERS

Goldfields-Esperance		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Metal Mining	Business Services	20%
	Local Real Estate, Construction, and Development	13%
	Local Industrial Products and Services	8%
	Distribution and Electronic Commerce	8%
	Transportation and Logistics	6%
	Production Technology and Heavy Machinery	6%
	Construction Products and Services	6%
	Local Commercial Services	4%
	Downstream Metal Products	4%
	Local Community and Civic Organizations	4%
	Electric Power Generation and Transmission	3%
	Downstream Chemical Products	3%
	Local Retailing of Clothing and General Merchandise	2%
	Financial Services	2%
	Local Motor Vehicle Products and Services	2%
Non-metal Mining	Business Services	23%
	Local Real Estate, Construction, and Development	13%
	Electric Power Generation and Transmission	9%
	Local Commercial Services	7%
	Transportation and Logistics	6%
	Distribution and Electronic Commerce	5%
	Construction Products and Services	4%
	Local Utilities	3%
	Financial Services	3%
	Downstream Metal Products	3%
	Production Technology and Heavy Machinery	3%
	Local Industrial Products and Services	3%
	Local Community and Civic Organizations	2%
	Downstream Chemical Products	2%
	Hospitality and Tourism	2%

Goldfields-Esperance		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Downstream Metal Products	Upstream Metal Manufacturing	39%
	Transportation and Logistics	14%
	Downstream Metal Products	13%
	Business Services	8%
	Distribution and Electronic Commerce	7%
	Production Technology and Heavy Machinery	2%
	Local Real Estate, Construction, and Development	2%
	Local Retailing of Clothing and General Merchandise	2%
	Electric Power Generation and Transmission	2%
	Local Community and Civic Organizations	1%
	Local Hospitality Establishments	1%
	Local Commercial Services	1%
	Downstream Chemical Products	1%
	Vulcanized and Fired Materials	1%
	Local Industrial Products and Services	1%
Agricultural Inputs and Services	Agricultural Inputs and Services	40%
	Transportation and Logistics	11%
	Distribution and Electronic Commerce	9%
	Local Real Estate, Construction, and Development	9%
	Business Services	6%
	Downstream Chemical Products	4%
	Local Retailing of Clothing and General Merchandise	3%
	Financial Services	3%
	Local Commercial Services	2%
	Local Utilities	2%
	Local Industrial Products and Services	2%
	Construction Products and Services	1%
	Production Technology and Heavy Machinery	1%
	Electric Power Generation and Transmission	1%
	Local Motor Vehicle Products and Services	1%
Construction Products and Services	Local Real Estate, Construction, and Development	42%
	Business Services	16%
	Construction Products and Services	8%
	Transportation and Logistics	7%
	Downstream Metal Products	5%
	Local Commercial Services	4%
	Distribution and Electronic Commerce	3%
	Upstream Metal Manufacturing	3%
	Local Community and Civic Organizations	2%
	Non-metal Mining	1%
	Downstream Chemical Products	1%
	Local Retailing of Clothing and General Merchandise	1%
	Production Technology and Heavy Machinery	1%
	Metal Mining	1%
	Local Industrial Products and Services	1%

Goldfields-Esperance		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Electric Power Generation and Transmission	Local Utilities	25%
	Financial Services	16%
	Business Services	10%
	Coal Mining	8%
	Local Real Estate, Construction, and Development	8%
	Transportation and Logistics	6%
	Distribution and Electronic Commerce	4%
	Electric Power Generation and Transmission	3%
	Water Transportation	3%
	Local Commercial Services	3%
	Oil and Gas Production and Transportation	2%
	Local Industrial Products and Services	1%
	Construction Products and Services	1%
	Local Retailing of Clothing and General Merchandise	1%
	Local Community and Civic Organizations	1%
Business Services	Business Services	45%
	Local Real Estate, Construction, and Development	7%
	Local Commercial Services	5%
	Transportation and Logistics	4%
	Local Industrial Products and Services	4%
	Distribution and Electronic Commerce	4%
	Financial Services	4%
	Upstream Metal Manufacturing	3%
	Production Technology and Heavy Machinery	3%
	Downstream Metal Products	2%
	Local Community and Civic Organizations	2%
	Construction Products and Services	2%
	Local Hospitality Establishments	2%
	Hospitality and Tourism	1%
	Local Retailing of Clothing and General Merchandise	1%
Transportation and Logistics	Transportation and Logistics	28%
	Business Services	14%
	Local Real Estate, Construction, and Development	13%
	Local Motor Vehicle Products and Services	9%
	Distribution and Electronic Commerce	5%
	Local Retailing of Clothing and General Merchandise	4%
	Local Community and Civic Organizations	4%
	Local Commercial Services	4%
	Construction Products and Services	3%
	Financial Services	3%
	Local Industrial Products and Services	2%
	Upstream Metal Manufacturing	1%
	Electric Power Generation and Transmission	1%
	Local Logistical Services	1%
	Downstream Metal Products	1%

Goldfields-Esperance		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Hospitality and Tourism	Business Services	18%
	Local Commercial Services	13%
	Local Real Estate, Construction, and Development	13%
	Distribution and Electronic Commerce	8%
	Transportation and Logistics	7%
	Local Retailing of Clothing and General Merchandise	6%
	Hospitality and Tourism	5%
	Financial Services	4%
	Electric Power Generation and Transmission	4%
	Food Processing and Manufacturing	2%
	Local Utilities	2%
	Local Entertainment and Media	2%
	Local Hospitality Establishments	1%
	Livestock Processing	1%
	Local Community and Civic Organizations	1%

Source: Pracsys (2016)

A4

APPENDIX 4: KIMBERLEY CLUSTERS

Kimberley		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Non-metal Mining	Business Services	26%
	Local Real Estate, Construction, and Development	15%
	Electric Power Generation and Transmission	10%
	Local Commercial Services	7%
	Transportation and Logistics	6%
	Construction Products and Services	5%
	Oil and Gas Production and Transportation	4%
	Financial Services	3%
	Local Community and Civic Organizations	3%
	Local Industrial Products and Services	3%
	Distribution and Electronic Commerce	2%
	Hospitality and Tourism	2%
	Local Utilities	2%
	Downstream Metal Products	2%
	Local Retailing of Clothing and General Merchandise	2%
Fishing and Fishing Products	Agricultural Inputs and Services	29%
	Local Commercial Services	12%
	Transportation and Logistics	6%
	Fishing and Fishing Products	6%
	Business Services	6%
	Distribution and Electronic Commerce	5%
	Local Real Estate, Construction, and Development	5%
	Local Retailing of Clothing and General Merchandise	5%
	Water Transportation	5%
	Local Industrial Products and Services	3%
	Oil and Gas Production and Transportation	2%
	Financial Services	2%
	Local Motor Vehicle Products and Services	2%
	Downstream Metal Products	2%
	Construction Products and Services	2%

Kimberley		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Metal Mining	Business Services	24%
	Local Real Estate, Construction, and Development	23%
	Transportation and Logistics	6%
	Construction Products and Services	5%
	Local Commercial Services	5%
	Electric Power Generation and Transmission	5%
	Local Industrial Products and Services	5%
	Local Community and Civic Organizations	3%
	Oil and Gas Production and Transportation	3%
	Financial Services	3%
	Distribution and Electronic Commerce	2%
	Downstream Metal Products	2%
	Local Retailing of Clothing and General Merchandise	2%
	Local Motor Vehicle Products and Services	1%
	Hospitality and Tourism	1%
Hospitality and Tourism	Business Services	20%
	Local Commercial Services	16%
	Local Real Estate, Construction, and Development	12%
	Hospitality and Tourism	7%
	Local Entertainment and Media	6%
	Transportation and Logistics	6%
	Local Retailing of Clothing and General Merchandise	4%
	Food Processing and Manufacturing	4%
	Electric Power Generation and Transmission	3%
	Financial Services	3%
	Agricultural Inputs and Services	3%
	Distribution and Electronic Commerce	3%
	Local Utilities	1%
	Local Community and Civic Organizations	1%
	Local Hospitality Establishments	1%
Water Transportation	Water Transportation	34%
	Transportation and Logistics	27%
	Business Services	8%
	Local Real Estate, Construction, and Development	7%
	Financial Services	4%
	Oil and Gas Production and Transportation	3%
	Construction Products and Services	2%
	Local Commercial Services	2%
	Local Industrial Products and Services	2%
	Local Motor Vehicle Products and Services	2%
	Local Retailing of Clothing and General Merchandise	1%
	Distribution and Electronic Commerce	1%
	Local Hospitality Establishments	1%
	Local Utilities	1%
	Local Community and Civic Organizations	1%

Kimberley		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Agricultural Inputs and Services	Agricultural Inputs and Services	53%
	Transportation and Logistics	9%
	Local Real Estate, Construction, and Development	9%
	Business Services	6%
	Distribution and Electronic Commerce	3%
	Local Utilities	3%
	Local Retailing of Clothing and General Merchandise	3%
	Financial Services	2%
	Local Commercial Services	2%
	Downstream Chemical Products	2%
	Local Industrial Products and Services	2%
	Construction Products and Services	1%
	Electric Power Generation and Transmission	1%
	Forestry	1%
	Local Motor Vehicle Products and Services	1%
Transportation and Logistics	Transportation and Logistics	37%
	Business Services	24%
	Local Real Estate, Construction, and Development	8%
	Local Commercial Services	5%
	Local Motor Vehicle Products and Services	4%
	Local Community and Civic Organizations	3%
	Local Retailing of Clothing and General Merchandise	2%
	Distribution and Electronic Commerce	2%
	Financial Services	2%
	Construction Products and Services	2%
	Local Industrial Products and Services	2%
	Local Entertainment and Media	1%
	Local Hospitality Establishments	1%
	Communications Equipment and Services	1%
	Water Transportation	1%
Education and Knowledge Creation	Business Services	23%
	Transportation and Logistics	11%
	Local Real Estate, Construction, and Development	9%
	Local Commercial Services	7%
	Local Community and Civic Organizations	6%
	Hospitality and Tourism	6%
	Marketing, Design, and Publishing	4%
	Local Retailing of Clothing and General Merchandise	4%
	Distribution and Electronic Commerce	4%
	Financial Services	4%
	Communications Equipment and Services	3%
	Education and Knowledge Creation	3%
	Local Hospitality Establishments	2%
	Electric Power Generation and Transmission	2%
	Local Industrial Products and Services	1%

Kimberley		
State/Regionally Significant cluster	Supporting Cluster	% Input into S/R Cluster
Construction Products and Services	Local Real Estate, Construction, and Development	51%
	Business Services	15%
	Transportation and Logistics	6%
	Local Commercial Services	5%
	Construction Products and Services	5%
	Downstream Metal Products	3%
	Local Community and Civic Organizations	2%
	Distribution and Electronic Commerce	1%
	Upstream Metal Manufacturing	1%
	Local Retailing of Clothing and General Merchandise	1%
	Non-metal Mining	1%
	Oil and Gas Production and Transportation	1%
	Local Industrial Products and Services	1%
	Metal Mining	1%
	Wood Products	1%

Source: Pracsys (2016)

A5

APPENDIX 5: LOCAL CLUSTER CONCORDANCE

Local cluster Concordance	
Cluster	ANZSIC 4
Environmental Services	Other Waste Collection Services
	Solid Waste Collection Services
	Waste Collection Services, nfd
	Waste Collection, Treatment and Disposal Services, nfd
	Waste Remediation and Materials Recovery Services
	Waste Treatment and Disposal Services
	Waste Treatment, Disposal and Remediation Services, nfd
Local Commercial Services	Accounting Services
	Building and Other Industrial Cleaning Services
	Building Cleaning, Pest Control and Gardening Services, nfd
	Building Cleaning, Pest Control and Other Support Services, nfd
	Building Pest Control Services
	Document Preparation Services
	Fire and Security Alarm Installation Services
	Investigation and Security Services
	Legal and Accounting Services, nfd
	Legal Services
	Non-Financial Intangible Assets (except Copyrights) Leasing
	Non-Residential Property Operators
	Other Goods and Equipment Rental and Hiring, nec
	Other Goods and Equipment Rental and Hiring, nfd
	Other Warehousing and Storage Services
	Printing
	Printing (including the Reproduction of Recorded Media), nfd
	Printing and Printing Support Services, nfd
	Printing Support Services
	Professional Photographic Services
	Regulatory Services
	Rental and Hiring Services (except Real Estate), nfd

Local cluster Concordance	
Local Community and Civic Organizations	Business and Professional Association Services
	Central Government Administration
	Civic, Professional and Other Interest Group Services, nfd
	Correctional and Detention Services
	Domestic Government Representation
	Fire Protection and Other Emergency Services
	Foreign Government Representation
	Government Representation, nfd
	Justice
	Labour Association Services
	Libraries and Archives
	Library and Other Information Services, nfd
	Local Government Administration
	Other Interest Group Services, nec
	Other Public Order and Safety Services
	Other Social Assistance Services
	Police Services
	Public Administration and Safety, nfd
	Public Administration, nfd
	Public Order and Safety Services, nfd
	Public Order, Safety and Regulatory Services, nfd
	Religious Services
	Social Assistance Services, nfd
	Sports and Physical Recreation Administrative Service
	State Government Administration
Local Education and Training	Arts Education
	Combined Primary and Secondary Education
	Preschool and School Education, nfd
	Preschool Education
	Primary Education
	School Education, nfd
	Secondary Education
	Special School Education
Local Entertainment and Media	Broadcasting (except Internet), nfd
	Cable and Other Subscription Broadcasting
	Entertainment Media Retailing
	Free-to-Air Television Broadcasting
	Information Media and Telecommunications, nfd
	Internet Publishing and Broadcasting
	Lottery Operation
	Magazine and Other Periodical Publishing
	Newspaper and Book Retailing
	Newspaper Publishing
	Newspaper, Periodical, Book and Directory Publishing, nfd
	Radio Broadcasting
	Reproduction of Recorded Media
	Television Broadcasting, nfd
	Video and Other Electronic Media Rental and Hiring

Local cluster Concordance	
Local Financial Services	Banking
	Building Society Operation
	Credit Union Operation
	Depository Financial Intermediation, nfd
	Other Depository Financial Intermediation
Local Food and Beverage Processing and Distribution	Bakery Product Manufacturing (Non-factory based)
	Bakery Product Manufacturing, nfd
	Dairy Produce Wholesaling
	Fish and Seafood Wholesaling
	Food Retailing, nfd
	Fresh Meat, Fish and Poultry Retailing
	Fruit and Vegetable Retailing
	Fruit and Vegetable Wholesaling
	General Line Grocery Wholesaling
	Grocery, Liquor and Tobacco Product Wholesaling, nfd
	Liquor and Tobacco Product Wholesaling
	Liquor Retailing
	Meat, Poultry and Smallgoods Wholesaling
	Other Grocery Wholesaling
	Other Specialised Food Retailing
	Specialised Food Retailing, nfd
	Supermarket and Grocery Stores
Local Health Services	Aged Care Residential Services
	Allied Health Services, nfd
	Ambulance Services
	Chiropractic and Osteopathic Services
	Dental Services
	General Practice Medical Services
	Health Care and Social Assistance, nfd
	Hospitals (except Psychiatric Hospitals)
	Hospitals, nfd
	Medical and Other Health Care Services, nfd
	Medical Services, nfd
	Optometry and Optical Dispensing
	Other Allied Health Services
	Other Health Care Services, nec
	Other Health Care Services, nfd
	Other Residential Care Services
	Pathology and Diagnostic Imaging Services
	Physiotherapy Services
	Psychiatric Hospitals
	Residential Care Services, nfd
	Specialist Medical Services
	Veterinary Services

Local cluster Concordance	
Local Hospitality Establishments	Cafes and Restaurants
	Cafes, Restaurants and Takeaway Food Services, nfd
	Catering Services
	Clubs (Hospitality)
	Food and Beverage Services, nfd
	Health and Fitness Centres and Gymnasia Operation
	Horse and Dog Racing Administration and Track Operation
	Takeaway Food Services
Local Household Goods and Services	Antique and Used Goods Retailing
	Computer and Computer Peripheral Retailing
	Domestic Appliance Repair and Maintenance
	Electrical and Electronic Goods Retailing, nfd
	Electrical, Electronic and Gas Appliance Retailing
	Floor Coverings Retailing
	Flower Retailing
	Furniture and Floor Covering Wholesaling
	Furniture, Floor Covering and Other Goods Wholesaling, nfd
	Furniture, Floor Coverings, Houseware and Textile Goods Retailing, nfd
	Garden Supplies Retailing
	Gardening Services
	Hardware and Building Supplies Retailing
	Hardware, Building and Garden Supplies Retailing, nfd
	Houseware Retailing
	Other Electrical and Electronic Goods Retailing
	Other Goods and Equipment Rental and Hiring nec
	Other Store-Based Retailing nec
	Toy and Game Retailing
	Watch and Jewellery Retailing
Local Industrial Products and Services	Electronic (except Domestic Appliance) and Precision Equipment Repair and Maintenance
	Machinery and Equipment Repair and Maintenance, nfd
	Other Machinery and Equipment Repair and Maintenance
Local Logistical Services	Courier Pick-up and Delivery Services
	Motor Vehicle and Transport Equipment Rental and Hiring, nfd
	Other Motor Vehicle and Transport Equipment Rental and Hiring
	Other Transport Support Services, nec
	Other Transport Support Services, nfd
	Other Transport, nec
	Passenger Car Rental and Hiring
	Postal and Courier Pick-up and Delivery Services, nfd
	Postal Services
	Road Passenger Transport, nfd
	Taxi and Other Road Transport
	Transport, Postal and Warehousing, nfd
	Urban Bus Transport (Including Tramway)

Local cluster Concordance	
Local Motor Vehicle Products and Services	Automotive Body, Paint and Interior Repair
	Automotive Electrical Services
	Automotive Repair and Maintenance, nfd
	Car Retailing
	Car Wholesaling
	Commercial Vehicle Wholesaling
	Fuel Retailing
	Motion Picture Exhibition
	Motor Cycle Retailing
	Motor Vehicle and Motor Vehicle Parts Retailing, nfd
	Motor Vehicle Dismantling and Used Parts Wholesaling
	Motor Vehicle New Parts Wholesaling
	Motor Vehicle Parts and Tyre Retailing, nfd
	Motor Vehicle Parts Retailing
	Motor Vehicle Retailing, nfd
	Other Automotive Repair and Maintenance
	Parking Services
	Trailer and Other Motor Vehicle Retailing
	Trailer and Other Motor Vehicle Wholesaling
	Tyre Retailing
Local Personal Services (Non-Medical)	Brothel Keeping and Prostitution Services
	Child Care Services
	Clothing and Footwear Repair
	Diet and Weight Reduction Centre Operation
	Funeral, Crematorium and Cemetery Services
	Hairdressing and Beauty Services
	Laundry and Dry-Cleaning Services
	Other Personal Services, nec
	Other Personal Services, nfd
	Other Services, nfd
	Personal and Other Services, nfd
	Personal Care Services, nfd
	Photographic Film Processing
	Private Households Employing Staff
	Private Households Employing Staff and Undifferentiated Goods and Service-Producing Activities of Households for Own Use, nfd
	Sports and Physical Recreation Instruction
	Undifferentiated Goods-Producing Activities of Private Households for Own Use
	Undifferentiated Service-Producing Activities of Private Households for Own Use

Local cluster Concordance	
Local Real Estate, Construction, and Development	Air Conditioning and Heating Services
	Bricklaying Services
	Building Completion Services, nfd
	Building Construction, nfd
	Building Installation Services, nfd
	Building Structure Services, nfd
	Carpentry Services
	Construction Services, nfd
	Construction, nfd
	Electrical Services
	Glazing Services
	House Construction
	Labour Supply Services
	Land Development and Site Preparation Services, nfd
	Land Development and Subdivision
	Landscape Construction Services
	Non-Residential Building Construction
	Other Building Installation Services
	Other Construction Services, nec
	Other Construction Services, nfd
	Other Repair and Maintenance, nec
	Other Repair and Maintenance, nfd
	Other Residential Building Construction
	Painting and Decorating Services
	Plastering and Ceiling Services
	Plumbing Services
	Property Operators and Real Estate Services, nfd
	Property Operators, nfd
	Real Estate Services
	Rental, Hiring and Real Estate Services, nfd
	Repair and Maintenance, nfd
	Residential Building Construction, nfd
	Residential Property Operators
	Roofing Services
	Site Preparation Services
	Tiling and Carpeting Services

Local cluster Concordance	
Local Retailing of Clothing and General Merchandise	Clothing Retailing
	Clothing, Footwear and Personal Accessory Retailing, nfd
	Department Stores
	Footwear Retailing
	Manchester and Other Textile Goods Retailing
	Other Personal Accessory Retailing
	Other Store-Based Retailing, nec
	Other Store-Based Retailing, nfd
	Pharmaceutical and Other Store-Based Retailing, nfd
	Pharmaceutical, Cosmetic and Toiletry Goods Retailing
	Recreational Goods Retailing, nfd
	Retail Commission-Based Buying and/or Selling
	Retail Trade, nfd
	Sport and Camping Equipment Retailing
	Stationery Goods Retailing
Local Utilities	Electricity Distribution
	Electricity Supply, nfd
	Electricity, Gas, Water and Waste Services, nfd
	Gas Supply
	On Selling Electricity and Electricity Market Operation
	Sewerage and Drainage Services
	Water Supply
	Water Supply, Sewerage and Drainage Services, nfd

Source: Pracsys (2016)

A6

APPENDIX 6: TRADED CLUSTER CONCORDANCE

Traded cluster Concordance	
Cluster	ANZSIC 4
Aerospace Vehicles and Defence	Aircraft Manufacturing and Repair Services
	Defence
Agricultural Inputs and Services	Agriculture and Fishing Support Services, nfd
	Agriculture, Forestry and Fishing Support Services, nfd
	Agriculture, Forestry and Fishing, nfd
	Agriculture, nfd
	Apple and Pear Growing
	Beef Cattle Farming (Specialised)
	Beef Cattle Feedlots (Specialised)
	Beekeeping
	Berry Fruit Growing
	Citrus Fruit Growing
	Cotton Ginning
	Cotton Growing
	Dairy Cattle Farming
	Deer Farming
	Farm Animal and Bloodstock Leasing
	Fertiliser and Pesticide Manufacturing, nfd
	Fertiliser Manufacturing
	Floriculture Production (Outdoors)
	Floriculture Production (Under Cover)
	Fruit and Tree Nut Growing, nfd
	Grain-Sheep or Grain-Beef Cattle Farming
	Grape Growing
	Horse Farming
	Kiwifruit Growing
	Mushroom and Vegetable Growing, nfd

Traded cluster Concordance	
Agricultural Inputs and Services	Mushroom Growing
	Nursery and Floriculture Production, nfd
	Nursery Production (Outdoors)
	Nursery Production (Under Cover)
	Olive Growing
	Other Agriculture and Fishing Support Services
	Other Crop Growing, nec
	Other Crop Growing, nfd
	Other Fruit and Tree Nut Growing
	Other Grain Growing
	Other Livestock Farming, nec
	Other Livestock Farming, nfd
	Pig Farming
	Poultry Farming (Eggs)
	Poultry Farming (Meat)
	Poultry Farming, nfd
	Rice Growing
	Shearing Services
	Sheep Farming (Specialised)
	Sheep-Beef Cattle Farming
	Sheep, Beef Cattle and Grain Farming, nfd
	Stone Fruit Growing
	Sugar Cane Growing
	Turf Growing
	Vegetable Growing (Outdoors)
	Vegetable Growing (Under Cover)
Automotive	Automotive Electrical Component Manufacturing
	Motor Vehicle and Motor Vehicle Part Manufacturing, nfd
	Motor Vehicle and Motor Vehicle Parts Wholesaling, nfd
	Motor Vehicle Manufacturing
	Other Motor Vehicle Parts Manufacturing
Biopharmaceuticals	Human Pharmaceutical and Medicinal Product Manufacturing
	Pharmaceutical and Medicinal Product Manufacturing, nfd

Traded cluster Concordance	
Business Services	Administrative and Support Services, nfd
	Administrative Services, nfd
	Architectural Services
	Architectural, Engineering and Technical Services, nfd
	Call Centre Operation
	Computer System Design and Related Services
	Corporate Head Office Management Services
	Data Processing and Web Hosting Services
	Data Processing, Web Hosting and Electronic Information Storage Services, nfd
	Electronic Information Storage Services
	Employment Placement and Recruitment Services
	Employment Services, nfd
	Engineering Design and Engineering Consulting Services
	Exploration and Other Mining Support Services, nfd
	Internet Service Providers and Web Search Portals
	Internet Service Providers, Web Search Portals and Data Processing Services, nfd
	Management Advice and Related Consulting Services
	Management and Related Consulting Services, nfd
	Office Administrative Services
	Other Administrative Services, nec
	Other Administrative Services, nfd
	Other Mining Support Services
	Other Professional, Scientific and Technical Services, nec
	Other Professional, Scientific and Technical Services, nfd
	Professional, Scientific and Technical Services (except Computer System Design and Related Services), nfd
	Professional, Scientific and Technical Services, nfd
	Scientific Testing and Analysis Services
	Surveying and Mapping Services
Coal Mining	Coal Mining
Communications Equipment and Services	Communications Equipment Manufacturing
	Other Telecommunications Network Operation
	Other Telecommunications Services
	Telecommunications Services, nfd
	Wired Telecommunications Network Operation

Traded cluster Concordance	
Construction Products and Services	Architectural Aluminium Product Manufacturing
	Boiler, Tank and Other Heavy Gauge Metal Container Manufacturing
	Cement and Lime Manufacturing
	Cement, Lime, Plaster and Concrete Product Manufacturing, nfd
	Concrete Product Manufacturing
	Concreting Services
	Heavy and Civil Engineering Construction, nfd
	Heavy Machinery and Scaffolding Rental and Hiring
	Hire of Construction Machinery with Operator
	Non-Metallic Mineral Product Manufacturing, nfd
	Other Construction Services nec
	Other Heavy and Civil Engineering Construction
	Other Non-Metallic Mineral Product Manufacturing
	Plaster Product Manufacturing
	Ready-Mixed Concrete Manufacturing
	Road and Bridge Construction
	Structural Steel Erection Services
	Structural Steel Fabricating
Distribution and Electronic Commerce	Agricultural and Construction Machinery Wholesaling
	Agricultural Product Wholesaling, nfd
	Basic Material Wholesaling, nfd
	Book and Magazine Wholesaling
	Clothing and Footwear Wholesaling
	Commission-Based Wholesaling
	Computer and Computer Peripheral Wholesaling
	Grain Storage Services
	Industrial and Agricultural Chemical Product Wholesaling
	Jewellery and Watch Wholesaling
	Kitchen and Diningware Wholesaling
	Machinery and Equipment Wholesaling, nfd
	Metal and Mineral Wholesaling
	Mineral, Metal and Chemical Wholesaling, nfd
	Non-Store Retailing
	Non-Store Retailing and Retail Commission-Based Buying and/or Selling, nfd
	Other Agricultural Product Wholesaling
	Other Electrical and Electronic Goods Wholesaling
	Other Goods Wholesaling, nec
	Other Goods Wholesaling, nfd

Traded cluster Concordance	
Distribution and Electronic Commerce	Other Hardware Goods Wholesaling
	Other Machinery and Equipment Wholesaling, nec
	Other Machinery and Equipment Wholesaling, nfd
	Other Specialised Industrial Machinery and Equipment Wholesaling
	Paper Product Wholesaling
	Petroleum Product Wholesaling
	Pharmaceutical and Toiletry Goods Wholesaling
	Plumbing Goods Wholesaling
	Professional and Scientific Goods Wholesaling
	Specialised Industrial Machinery and Equipment Wholesaling, nfd
	Telecommunication Goods Wholesaling
	Textile Product Wholesaling
	Textile, Clothing and Footwear Wholesaling, nfd
	Timber and Hardware Goods Wholesaling, nfd
	Timber Wholesaling
	Toy and Sporting Goods Wholesaling
	Warehousing and Storage Services, nfd
	Wholesale Trade, nfd
	Wool Wholesaling
Downstream Chemical Products	Adhesive Manufacturing
	Basic Chemical and Chemical Product Manufacturing, nfd
	Cleaning Compound and Toiletry Preparation Manufacturing, nfd
	Cleaning Compound Manufacturing
	Cosmetic and Toiletry Preparation Manufacturing
	Explosive Manufacturing
	Other Basic Chemical Product Manufacturing, nec
	Other Basic Chemical Product Manufacturing, nfd
	Paint and Coatings Manufacturing
	Pesticide Manufacturing
	Photographic Chemical Product Manufacturing
	Polymer Product and Rubber Product Manufacturing, nfd

Traded cluster Concordance	
Downstream Metal Products	Basic Ferrous Metal Product Manufacturing, nfd
	Basic Non-Ferrous Metal Product Manufacturing, nfd
	Fabricated Metal Product Manufacturing, nfd
	Metal Container Manufacturing, nfd
	Metal Roof and Guttering Manufacturing (except Aluminium)
	Non-Ferrous Metal Casting
	Nut, Bolt, Screw and Rivet Manufacturing
	Other Fabricated Metal Product Manufacturing nec
	Other Basic Non-Ferrous Metal Manufacturing
	Other Basic Non-Ferrous Metal Product Manufacturing
	Other Fabricated Metal Product Manufacturing, nec
	Other Fabricated Metal Product Manufacturing, nfd
	Other Metal Container Manufacturing
	Other Structural Metal Product Manufacturing
	Prefabricated Metal Building Manufacturing
	Primary Metal and Metal Product Manufacturing, nfd
	Sheet Metal Product Manufacturing (except Metal Structural and Container Products)
	Spring and Wire Product Manufacturing
Education and Knowledge Creation	Adult, Community and Other Education, nec
	Adult, Community and Other Education, nfd
	Adult, Community and Other Education, nfd2
	Education and Training, nfd
	Educational Support Services
	Higher Education
	Scientific Research Services
	Technical and Vocational Education and Training
	Tertiary Education, nfd
Electric Power Generation and Transmission	Electricity Generation, nfd
	Electricity Transmission
	Fossil Fuel Electricity Generation
	Hydro-Electricity Generation
	Other Electricity Generation
Financial Services	Auxiliary Finance and Insurance Services, nfd
	Auxiliary Finance and Investment Services, nfd
	Central Banking
	Credit Reporting and Debt Collection Services
	Finance, nfd
	Financial and Insurance Services, nfd
	Financial Asset Broking Services
	Financial Asset Investing
	Insurance and Superannuation Funds, nfd
	Non-Depository Financing
	Other Auxiliary Finance and Investment Services
	Superannuation Funds

Traded cluster Concordance	
Fishing and Fishing Products	Aquaculture, nfd
	Fish Trawling, Seining and Netting
	Fishing, Hunting and Trapping, nfd
	Fishing, nfd
	Line Fishing
	Offshore Caged Aquaculture
	Offshore Longline and Rack Aquaculture
	Onshore Aquaculture
	Other Fishing
	Prawn Fishing
	Rock Lobster and Crab Potting
Food Processing and Manufacturing	Beer Manufacturing
	Beverage and Tobacco Product Manufacturing, nfd
	Beverage Manufacturing, nfd
	Biscuit Manufacturing (Factory based)
	Bread Manufacturing (Factory based)
	Cake and Pastry Manufacturing (Factory based)
	Cereal Grain Wholesaling
	Cereal, Pasta and Baking Mix Manufacturing
	Cheese and Other Dairy Product Manufacturing
	Confectionery Manufacturing
	Cured Meat and Smallgoods Manufacturing
	Dairy Product Manufacturing, nfd
	Food Product Manufacturing, nfd
	Fruit and Vegetable Processing
	Grain Mill and Cereal Product Manufacturing, nfd
	Grain Mill Product Manufacturing
	Ice Cream Manufacturing
	Milk and Cream Processing
	Oil and Fat Manufacturing
	Other Food Product Manufacturing, nec
	Other Food Product Manufacturing, nfd
	Potato, Corn and Other Crisp Manufacturing
	Prepared Animal and Bird Feed Manufacturing
	Seafood Processing
	Soft Drink, Cordial and Syrup Manufacturing
	Spirit Manufacturing
	Sugar and Confectionery Manufacturing, nfd
	Sugar Manufacturing
	Wine and Other Alcoholic Beverage Manufacturing
Footwear	Footwear Manufacturing

Traded cluster Concordance	
Forestry	Forestry
	Forestry and Logging, nfd
	Forestry Support Services
	Logging
	Other Wood Product Manufacturing, nec
	Other Wood Product Manufacturing, nfd
Furniture	Furniture and Other Manufacturing, nfd
	Furniture Manufacturing, nfd
	Furniture Retailing
	Mattress Manufacturing
	Metal Furniture Manufacturing
	Other Furniture Manufacturing
	Wooden Furniture and Upholstered Seat Manufacturing
Hospitality and Tourism	Accommodation
	Accommodation and Food Services, nfd
	Amusement and Other Recreation Activities, nfd
	Amusement and Other Recreational Activities, nec
	Amusement Parks and Centres Operation
	Arts and Recreation Services, nfd
	Casino Operation
	Gambling Activities, nfd
	Heritage Activities, nfd
	Horse and Dog Racing Activities, nfd
	Hunting and Trapping
	Museum Operation
	Nature Reserves and Conservation Parks Operation
	Other Gambling Activities
	Other Horse and Dog Racing Activities
	Other Transport, nfd
	Parks and Gardens Operations, nfd
	Scenic and Sightseeing Transport
	Sports and Physical Recreation Activities, nfd
	Sports and Physical Recreation Clubs and Sports Professionals
	Sports and Physical Recreation Venues, Grounds and Facilities Operation
	Sports and Recreation Activities, nfd
	Travel Agency and Tour Arrangement Services
	Zoological and Botanic Gardens Operation
Information Technology and Analytical Instruments	Computer and Electronic Equipment Manufacturing, nfd
	Computer and Electronic Office Equipment Manufacturing
	Other Electrical Equipment Manufacturing
	Other Electronic Equipment Manufacturing
	Other Professional and Scientific Equipment Manufacturing
	Photographic, Optical and Ophthalmic Equipment Manufacturing
	Professional and Scientific Equipment Manufacturing, nfd

Traded cluster Concordance	
Insurance Services	Auxiliary Insurance Services
	General Insurance
	Health and General Insurance, nfd
	Health Insurance
	Life Insurance
Jewellery and Precious Metals	Jewellery and Silverware Manufacturing
Leather and Related Products	Leather Tanning, Fur Dressing and Leather Product Manufacturing
Lighting and Electrical Equipment	Electric Cable and Wire Manufacturing
	Electric Lighting Equipment Manufacturing
	Electrical Equipment Manufacturing, nfd
Livestock Processing	Meat and Meat Product Manufacturing, nfd
	Meat Processing
	Poultry Processing
Marketing, Design, and Publishing	Advertising Services
	Book Publishing
	Directory and Mailing List Publishing
	Market Research and Statistical Services
	Other Information Services
	Other Publishing (except Software, Music and Internet)
	Other Specialised Design Services
	Publishing (except Internet and Music Publishing), nfd
	Pubs, Taverns and Bars
	Software Publishing
Medical Devices	Medical and Surgical Equipment Manufacturing
	Veterinary Pharmaceutical and Medicinal Product Manufacturing
Metal Mining	Bauxite Mining
	Copper Ore Mining
	Exploration, nfd
	Gold Ore Mining
	Iron Ore Mining
	Metal Ore Mining, nfd
	Mineral Sand Mining
	Mining, nfd
	Nickel Ore Mining
	Other Metal Ore Mining
	Silver-Lead-Zinc Ore Mining
Metalworking Technology	Machine Tool and Parts Manufacturing
	Metal Coating and Finishing
Music and Sound Recording	Music and Other Sound Recording Activities
	Music Publishing
	Sound Recording and Music Publishing, nfd

Traded cluster Concordance	
Non-metal Mining	Construction Material Mining, nfd
	Gravel and Sand Quarrying
	Mineral Exploration
	Non-Metallic Mineral Mining and Quarrying, nfd
	Other Construction Material Mining
	Other Non-Metallic Mineral Mining and Quarrying
Oil and Gas Production and Transportation	Oil and Gas Extraction
	Other Petroleum and Coal Product Manufacturing
	Petroleum and Coal Product Manufacturing, nfd
	Petroleum Exploration
	Petroleum Refining and Petroleum Fuels Manufacturing
Paper and Packaging	Converted Paper Product Manufacturing, nfd
	Corrugated Paperboard and Paperboard Container Manufacturing
	Other Converted Paper Product Manufacturing
	Packaging Services
	Paper Bag and Sack Manufacturing
	Paper Bag Manufacturing
	Paper Stationery Manufacturing
	Pulp, Paper and Converted Paper Product Manufacturing, nfd
	Pulp, Paper and Paperboard Manufacturing
	Sanitary Paper Product Manufacturing
Performing Arts	Creative and Performing Arts Activities, nfd
	Creative Artists, Musicians, Writers and Performers
	Performing Arts Operation
	Performing Arts Venue Operation
Plastics	Basic Polymer Manufacturing, nfd
	Other Basic Polymer Manufacturing
	Other Polymer Product Manufacturing
	Polymer Film and Sheet Packaging Material Manufacturing
	Polymer Foam Product Manufacturing
	Polymer Product Manufacturing, nfd
	Rigid and Semi-Rigid Polymer Product Manufacturing
	Synthetic Resin and Synthetic Rubber Manufacturing

Traded cluster Concordance	
Production Technology and Heavy Machinery	Agricultural Machinery and Equipment Manufacturing
	Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing
	Lifting and Material Handling Equipment Manufacturing
	Machinery and Equipment Manufacturing, nfd
	Manufacturing, nfd
	Mining and Construction Machinery Manufacturing
	Other Machinery and Equipment Manufacturing, nec
	Other Machinery and Equipment Manufacturing, nfd
	Other Manufacturing, nec
	Other Manufacturing, nfd
	Other Specialised Machinery and Equipment Manufacturing
	Pump and Compressor Manufacturing
	Pump, Compressor, Heating and Ventilation Equipment Manufacturing, nfd
	Railway Rolling Stock Manufacturing and Repair Services
	Specialised Machinery and Equipment Manufacturing, nfd
Recreational and Small Electric Goods	Toy, Sporting and Recreational Product Manufacturing
Textile Manufacturing	Clothing and Footwear Manufacturing, nfd
	Clothing Manufacturing
	Cut and Sewn Textile Product Manufacturing
	Knitted Product Manufacturing
	Natural Textile Manufacturing
	Rope, Cordage and Twine Manufacturing
	Synthetic Textile Manufacturing
	Textile Finishing and Other Textile Product Manufacturing
	Textile Floor Covering Manufacturing
	Textile Manufacturing, nfd
	Textile Product Manufacturing, nfd
	Textile, Leather, Clothing and Footwear Manufacturing, nfd
	Wool Scouring
Tobacco	Cigarette and Tobacco Product Manufacturing
Trailers, Motor Homes, and Appliances	Domestic Appliance Manufacturing, nfd
	Motor Vehicle Body and Trailer Manufacturing
	Other Domestic Appliance Manufacturing
	Whiteware Appliance Manufacturing

Traded cluster Concordance	
Transportation and Logistics	Air and Space Transport
	Airport Operations and Other Air Transport Support Services
	Customs Agency Services
	Freight Forwarding Services
	Interurban and Rural Bus Transport
	Other Transport Equipment Manufacturing, nec
	Other Transport Equipment Manufacturing, nfd
	Other Transport nec
	Other Transport Support Services nec
	Pipeline and Other Transport, nfd
	Pipeline Transport
	Rail Freight Transport
	Rail Passenger Transport
	Rail Transport, nfd
	Road Freight Transport
	Road Transport, nfd
	Transport Equipment Manufacturing, nfd
	Transport Support Services, nfd
Upstream Chemical Products	Basic Chemical Manufacturing, nfd
	Basic Inorganic Chemical Manufacturing
	Basic Organic Chemical Manufacturing
	Industrial Gas Manufacturing
Upstream Metal Manufacturing	Alumina Production
	Aluminium Rolling, Drawing, Extruding
	Aluminium Smelting
	Basic Non-Ferrous Metal Manufacturing, nfd
	Copper, Silver, Lead and Zinc Smelting and Refining
	Iron and Steel Casting
	Iron and Steel Forging
	Iron Smelting and Steel Manufacturing
	Steel Pipe and Tube Manufacturing
	Structural Metal Product Manufacturing, nfd
Video Production and Distribution	Motion Picture and Sound Recording Activities, nfd
	Motion Picture and Video Activities, nfd
	Motion Picture and Video Distribution
	Motion Picture and Video Production
	Post-production Services and Other Motion Picture and Video Activities
Vulcanized and Fired Materials	Ceramic Product Manufacturing, nfd
	Clay Brick Manufacturing
	Glass and Glass Product Manufacturing
	Natural Rubber Product Manufacturing
	Other Ceramic Product Manufacturing
	Tyre Manufacturing

Traded cluster Concordance	
Water Transportation	Boatbuilding and Repair Services
	Marine Equipment Retailing
	Other Water Transport Support Services
	Port and Water Transport Terminal Operations
	Shipbuilding and Repair Services
	Stevedoring Services
	Water Freight Transport
	Water Passenger Transport
	Water Transport Support Services, nfd
	Water Transport, nfd
Wood Products	Log Sawmilling
	Log Sawmilling and Timber Dressing, nfd
	Other Wood Product Manufacturing nec
	Prefabricated Wooden Building Manufacturing
	Reconstituted Wood Product Manufacturing
	Timber Resawing and Dressing
	Veneer and Plywood Manufacturing
	Wood Chipping
	Wood Product Manufacturing, nfd
	Wooden Structural Fitting and Component Manufacturing

Source: Pracsys (2016)