DEPARTMENT OF TRAINING
AND WORKFORCE DEVELOPMENT

State Priority Occupation List – Scope, methodology and sources
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INFORMATION PAPER

The State Priority Occupation List 2017
Scope and methodology

1. Introduction

This information paper details the process undertaken to create the *State Priority Occupation List* in 2017.

The SPOL is produced each year by the Department of Training and Workforce Development in consultation with key stakeholders, including the State's industry training councils, to inform and guide workforce planning and development for Western Australia. It is a list of occupations rated according to their priority status for WA.

The main use of the SPOL is to help guide purchasing of publicly-funded training in WA through the State Training Plan and Future Skills WA.[1]

It is also used for migration purposes, such as informing the development of the *WA Skilled Migration Occupation List*, used to guide State Nominated migration to target those occupations where there is a genuine need to attract overseas workers and where such jobs cannot be filled by local workers.[2]

The list and background evidence is also used to form the basis for any labour market submissions the Department is asked to make to other agencies (both at a Commonwealth and State level) that relate to the State's occupational priorities, if and when required.

In addition, the SPOL is used to inform workforce development planning in the State and is used as a key source of labour market evidence in a number of policy areas.

This paper describes the analytical methodologies used to formulate the SPOL as well as details regarding:

- the statistical methodologies used to determine the initial rankings of 743 occupations in WA;
- the nature of consultations with industry in WA via the State's training council network and other key stakeholders;

[1] *Section 21(1)(a) of Western Australia's Vocational Education and Training Act (1996)* requires the State Training Board to prepare for the Minister's approval a State Training Plan. The Plan contributes to the policy and purchasing direction for the training system in WA (for more information, see stb.wa.gov.au/stp2017).

The current policy framework through which the Plan is implemented is Future Skills WA (dtwd.wa.gov.au/future-skills-wa).

A diagrammatic representation of the SPOL's policy framework is provided in Appendix 2.

[2] For further information on the WASMOL, see migration.wa.gov.au/services/skilled-migration-western-australia/occupations-in-demand.

- the business rules employed in order to determine the priority weightings for the final 187 State Priority occupations and 59 Priority 3 occupations; and
- details on changes and issues encountered with the methodological process for SPOL2017, relative to SPOL2016.

More general and higher level information on the SPOL2017 can be found in the Summary Paper, produced in conjunction with this paper.

2. Methodology

The Economic and Labour Market Analysis team of the Department of Training and Workforce Development has the responsibility of managing and generating the SPOL on an annual basis.

The Australian Bureau of Statistics and Statistics New Zealand's, *Australia and New Zealand Standard Classification of Occupations* coding structure is used for the identification and interpretation of occupations.

The total ANZSCO structure incorporates over 1,350 occupations. However, not all of these are used for SPOL purposes. Around 600 of these occupations are removed from SPOL consideration because they:

- are of a lower skill level, not requiring any post-school qualifications or experience; or
- do not have any clearly-articulated training or higher education pathways; or
- are for ABS statistical purposes only – these are occupations with the "catch-all" code 'not further defined' (nfd) which exist for Census collection purposes, where respondents' job descriptions are vague or nebulous and so cannot be coded to any specific 'real' occupation.[3]

This leaves a total of 743 suitable occupations to be considered for inclusion as a priority or State priority in the SPOL.

Occupations which are supported by compelling and substantial evidence and/or deemed to be State priorities must fulfil one or more of the following criteria (A through to C, following).

A) Criticality

The Department defines an occupation as critical:

> *"… where specialised skills are learned in formal education and training is needed at entry level, and the impact of market failure is potentially significant."*

It is an occupation that is highly important to industry operations and/or State growth and development.

Demand for a critical occupation may experience short term fluctuations over time, however continued supply is crucial. This is to avoid labour supply shortages and bottlenecks, which could have considerably negative

[3] For example a person identifying as a 'Manager' would be coded to ANZSCO 100000, rather than a more specific occupation such as Chief Executive Officer, as it is not clear what type of manager they were.

economic and/or social effects and multiply exponentially throughout the WA economy.

Some roles may critically support the employment of many others, entire organisational or sub-industry structures and/or the provision of key services in the community. It is therefore deemed essential that these occupations have a constant, reliable pool of skilled workers to avoid economic and social disruption.

In general (though not exclusively), an occupation will ***not*** be considered critical if issues are related to:

- seasonality;
- semi-skilled or unskilled workforce needs (ABS Skill Level 4 or 5);
- the result of ongoing staffing attraction and retention issues; or
- difficulty in filling positions because of industry pay and conditions.

Occupations deemed critical in accordance with the above definitions and guidelines are determined by the Department. At the end of the SPOL process 230 occupations have been deemed critical occupations in WA.

B) Unmet demand

The Department defines an occupation as experiencing unmet demand:

> *"… where the evidence shows that employers are currently unable to fill or have considerable difficulty filling vacancies due to skills or qualifications-related issues across Western Australia."*

Unmet demand is sometimes referred to as a 'skill shortage.' The evidence must show that there is a widespread shortage of suitably-skilled workers to fill vacant positions across an entire occupation.

Isolated, anecdotal cases of employers unable to source workers can (but not exclusively) be related to issues of employer-specific selection criteria, salary and conditions, as well as geographical location.

In themselves, such evidence is not compelling enough to define an occupation as experiencing unmet demand at a state-wide and cross-occupational level.

In practise this means that any evidence must show unmet demand is experienced across a significant proportion of specialisations within an occupation (defined at the six digit ANZSCO level).

For example, if there were to be a reported shortage of secondary teachers but for science teachers only; as this is only a single specialisation within the ANZSCO defined occupation of 'secondary teachers,' the overall occupation would not be considered as experiencing unmet demand in this isolated case.

In such instances, industry training councils are perhaps best placed to provide guidance on unique issues affecting occupational sub-specialisations as well as strategic workforce development options to address them specifically.

Contact details for all training councils can be found at:
stb.wa.gov.au/links#industry-training-councils

Similarly, an occupation is not considered as experiencing unmet demand if evidence shows that any shortages are confined to a remote or regional locality.

For example, if (hypothetically) shortages are reported for enrolled nurses in the Kimberley region, it would not be considered for unmet demand for SPOL purposes if there were otherwise an abundance of supply for this occupation across the rest of the State.[4]

It is, however, acknowledged that geographical issues have long played a role in attracting suitable labour in Western Australia and the Department does facilitate the development of a number of Regional Development Plans which include priority actions relating to any regional-specific issues.

Links to these plans can be found on the Department's website at: dtwd.wa.gov.au/workforce-development.

The Department intends undertaking an annual labour market review of each of the State's nine regions in partnership with the Regional Development Commissions, the Department of Regional Development, and facilitated through regional alliance's (comprising representation from local business, industry groups, the not for profit sector, local government, State government agencies and the local TAFE college). The aim of the annual review is to identify labour market trends, occupations that have unmet demand in the region, and other issues relating to the attraction, recruitment and retention of workers in the region.

In addition to stakeholder feedback via the training council network regarding unmet demand, the Department undertakes extensive, ongoing environmental scanning of wider economic conditions and labour market trends in the State. This allows the Department to corroborate each qualitative occupation-specific submission it receives and ensures an adaptive, critical analysis of such occupations regarding this key SPOL indicator.[5]

The training council questionnaire submissions for the SPOL2017 had a total of 143 instances of unmet demand being claimed from the network.

However, further analysis within the broader context of the State's moderating economy and labour market, combined with the Commonwealth Government's skills shortage data, concluded that while demand did exist for those occupations, in most cases there was not enough (or no) compelling evidence to suggest that the level of demand was not being met sufficiently through existing labour supply streams.

At the end of the SPOL 2017 process there were 27 occupations being flagged as experiencing unmet demand.

[4] This example does not preclude occupations that are predominantly found in regional locations from being flagged as experiencing unmet demand (ie, varying types of agriculture or on-site mining occupations) if the evidence indicates the overall impact is broad or deep enough to affect the State's broader economy.

[5] Further information on these can be found in Appendix 6.

C) Non-market factors

Non-market factors refer to any set of influences, not related to immediate demand or supply in the regular labour market, which impact upon the training or migration requirements for that occupation.

An example of a non-market factor is regulatory or legislative changes which require the upskilling of a significant portion of workers in a particular occupation.

A good historical example of this was the case for the childcare sector in 2013-14, where state-based legislative changes saw the industry enforce a legal requirement for all child care workers in the sector to hold (or be progressing towards) a minimum level Certificate III level qualification[6].

The need to make training more readily available to new and particularly existing workers in these types of situations is usually recognised as legitimate and therefore affected occupations should be considered for inclusion as priorities.

However, it should be noted that such factors tend to be the exception rather than the rule, and are only applied in extraordinary circumstances, where all issues are well known and developed, and the impact on training requirements and the broader labour market is understood and is material.

Non-market factors may also be relevant where there is credible evidence of an impending disturbance to the occupational demand and supply balance in the near future (ie irregular shocks to the industry or labour market).

This may be a key material investment commitment which is soon due to commence and therefore requires priority consideration in the current SPOL, despite not currently qualifying as a case for unmet demand.

In such cases, as in all others, there must be convincingly sound evidence of a direct link between the impending occurrence and the provision of training towards certain occupations.

To ensure a systematic and transparent approach to considering these factors, the SPOL2017 questionnaire to the industry training council network included a question to specifically highlight such non-market factors. All submissions and associated evidence were considered by the Department in its deliberations.

The training council network cited 93 instances of non-market factors in their submissions for the SPOL2017. When considered along with additional research undertaken by the Department, 25 occupations were found to be experiencing non-market related factors influencing their requirements for training.

[6] Thereby bringing local child care workers in line with the National Quality Standard for the sector, agreed to by the Coalition of Australian Governments in 2012.

Occupational Priority Index

A further key element of each year's SPOL is the Occupational Priority Index which is the result of all of the statistical 'top down analysis' undertaken by the Department for SPOL purposes.

The overall standard deviation for every occupation against each of the six indicators below is calculated. The advantage of using standard deviations is that it allows a valid comparison across all six indicators, each of which represent different datasets and would not otherwise be comparable.

The six primary, State-based indicators used to determine occupational rankings which underpin the SPOL are as follows.

- ***Emploment levels*** – Based on the 2011 ABS Census (at an ANZSCO 6 digit level);
- ***Past labour demand or supply*** – Based on a number of data sources (see Appendix 6) the PLDOS provides an indication as to whether current labour supply trends (primarily via sources such as training/education and migration) are meeting current occupational demands for labour;
- ***Future labour demand or supply*** – Based on a number of data sources (also see Appendix 6) the FLDOS provides an indication as to whether continued labour supply trends will likely meet expected future occupational net employment growth as well as replacement needs;
- ***Average age of employed persons*** – Based on 2011 ABS Census (at an ANZSCO 6 digit level), to account for ageing population issues by occupation;
- ***Employee earnings and hours for full time adult employees*** – Based on an ABS Custom Request (at an ANZSCO 3 digit level), related to ABS Catalogue Number 6306.0; and
- ***Employee earnings and hours for wage growth*** – Based on an ABS Custom Request (at an ANZSCO 3 digit level), related to ABS Catalogue Number 6306.0.

PLDOS and FLDOS are measures that were first implemented for the SPOL in 2013. These were mostly made possible via data provision agreements reached with the Commonwealth Department of Immigration and Border Protection, and the Commonwealth Department of Education and Training.

Employment levels, employment growth (including occupational net replacement levels or 'churn' of workers), ageing of the workforce, wages and wages growth data are all used as proxy indicators of demand for skilled workers.

The supply of skilled workers is determined by the numbers of completions of training courses and higher education degrees in a specific field, and the persons who have migrated to the State through a skilled migration pathway.

The use of both demand and supply indicators enables a more accurate view of the 'marketplace' for skills in Western Australia.

It also recognises the current effort made by government at meeting skill and labour requirements within the wider economy, whether through VET / higher education outcomes, or through targeted migration of skilled labour into the State.

The standard deviation for each indicator is weighted and summed to determine an overall standard deviation factor for each occupation. The following weightings were applied to each indicator.

Table 1: Indicator weightings

Indicator	***Weighting***
Employment	10.0%
FLDOS	20.0%
PLDOS	40.0%
Average weekly wage	15.0%
Average weekly wage growth	5.0%
Age	10.0%
Total	**100.0%**

As can be seen, the bulk of the weighting (70%) is applied to the first three indicators of employment levels and labour supply and demand-related indicators. This recognises the primary purpose of the SPOL as being employment-related.

The results from the weighted calculations provide each occupation with an overall standard deviation factor.[7]

SDFs are calculated for all ANZSCO occupations using each of the six indicators and converted to a positive value by adding the absolute value of the lowest (negative) SDF to the SDF result for each ANZSCO.

This new value is then multiplied by the associated lead time for each respective occupation, and the resulting set of values for all occupations is then deemed the OPI.

This process ensures that a highly-skilled occupation with a long lead time is not disproportionately affected by a low SDF.

A blanket rule is applied to all low or unskilled occupations, in the form of a manual adjustment of the OPI to a score of -30.

This rule does not completely eliminate these occupations from consideration,[8] but does ensure there is no undue effort put towards prioritising such occupations for VET training/education delivery or targeted migration when those options are not typically available for such occupations.

[7] Further information on the use of standard deviations in a SPOL context can be found at Appendix 5.
[8] There are approximately 750 occupations currently eligible for SPOL (cf. 'Criteria for consideration' section above). However, OPIs are calculated for 1008 occupations. This allows for analysis and potential consultation which may occur in the future as occupational requirements (and therefore skill requirements) change over time.

An additional weighting is applied to each occupation following the above calculations to reflect that occupation's lead time – the length of time it takes to educate and/or train an individual in the skills required for an occupation. These occupational lead times are included within the ABS ANZSCO coding structure as the designated 'skill level' for the occupation.

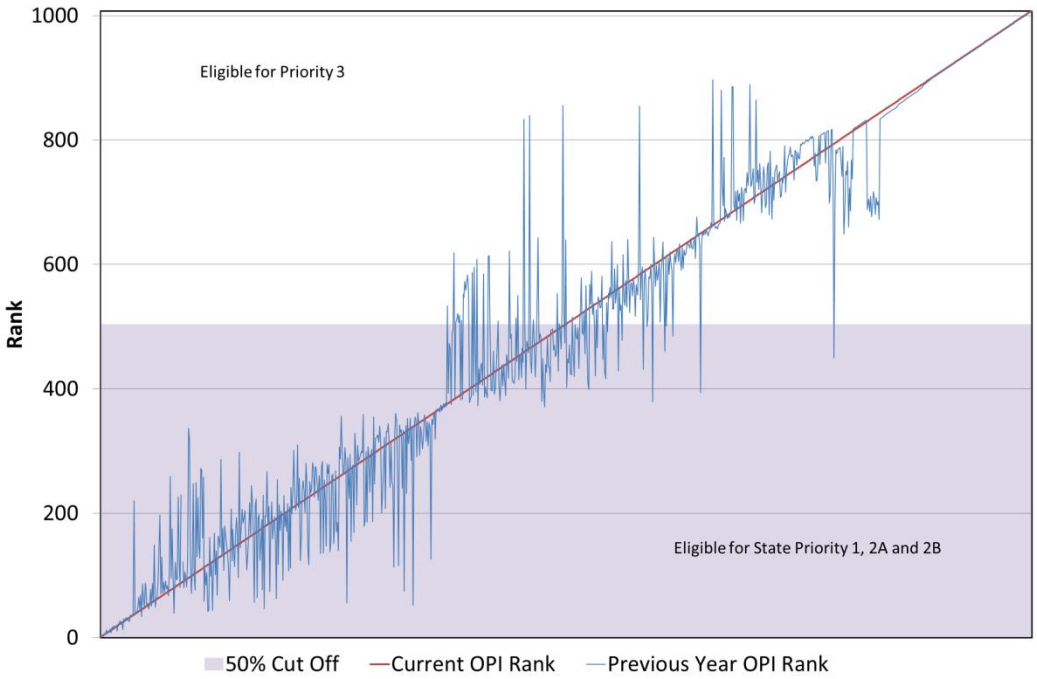
Incorporating this business rule, as well as blanket -30 rule for low and unskilled occupations outlined above, skews the results heavily and purposefully in favour of skilled occupations.[9]

An occupation's OPI score will determine its rank against all other occupations, with lower OPI scores associated with higher rank levels. An occupation with an OPI rank higher than the median is therefore generally ineligible for State priority status.

In Figure 2, each blue line represents a single occupation. The longer the vertical line, the greater the change that particular occupation has experienced in its OPI rank between the SPOL2016 and the SPOL2017.

As can be seen, the movement of an individual occupation's rank year-on-year is in most cases small. In rare circumstances statistical evidence suggests conditions have changed significantly and the resultant movement is much larger, leading to potential changes in an occupation's priority status.

Figure 2: OPI rankings (2016 – 2017)



In addition, the use of the OPI rankings allows the DTWD to pay particularly close due diligence, care and consideration in respect to its own holistic occupational analysis.

[9] An example of some of the calculations for a sample of occupations is included in Appendix 1.

For any of those occupations that fall right at the borderline of being in one SPOL category or another or that have displayed a very sizable OPI change from one year to the next are flagged for investigation through the training council consolation process.

The SPOL2016 also marked the first year following the introduction of Future Skills WA whereby its effects can be seen in the historical VET data available to the Department. For some occupations there has been a marked decrease in VET qualification completions since and this has subsequently impacted upon their SPOL outcome.[10]

Further occupation-related data

In addition to the OPI described previously, a raft of supplementary information sources are investigated in the Department's assessment of unmet demand, such as the Commonwealth Department of Employment skills shortage data, Internet Vacancy Index data, major projects data, WA Treasury forecasts, and many other sources.

Evidence provided by these sources is generally not suitable enough to be included in OPI calculations (as such sources are either not encompassing of the entire ANZSCO, and/or are not provided at a reasonably detailed occupational level, such as at least at the ANZSCO three digit level).

Consequently, these sources are treated as additional sources of labour market evidence, used to either support or qualify data from other, more comprehensive sources.[11]

In particular, qualitative occupational specific submissions provided by training councils are heavily incorporated in the Department's assessment of unmet demand, as detailed in Section 3 below.

3. Training council consultation

Western Australia's current industry training advisory arrangements comprise of nine training councils, each covering a particular industry sector of the State's economy.

Among other roles, the training councils provide advice on the training needs and priorities of industry in Western Australia. This involves the provision of market intelligence on skills supply and demand, and advice on current or emerging skills shortages.

In addition to the training councils, the Public Sector Commission and the Western Australian Local Government Association both provide input through a memorandum of understanding with the State Training Board and the Department.

[10] Special Notes: The introduction of Future Skills WA in 2014 resulted in a structural change in the policy framework surrounding the delivery of VET. The full impact of this change upon the time series for VET completions will only become apparent as more data becomes available over coming years. It is further worth noting that the changes to the national skilled migration program made by the Commonwealth Government in April 2017, though in some cases coming into effect immediately, have no bearing on the makeup of SPOL2017 in a statistical sense. Further details of all such measures and their impact on the SPOL are provided in Appendix 2. Details on additional data sources used in the production of the SPOL are provided in Appendix 6.

[11] These tertiary data sources are listed in Appendix 6.

Consultation methodology

Similar to previous years, training councils were sent a standardised questionnaire requesting industry information regarding occupations eligible for SPOL.[12] In 2017, the availability of a broad range of labour market data and evidence (including prior submissions from training councils) meant that an in-depth analysis of occupations could be undertaken by the Department prior to the questionnaires being sent out.

Training councils were asked to report on a 'focus list' of 155 occupations which had at least met the initial eligibility screening criteria for the SPOL (see page 2 above), but where the Department did not have sufficient evidence for their inclusion on SPOL2017.

This list included all occupations that training councils had previously commented on relating to unmet demand or non-market factors.

Occupations which were under threat of falling off from a previous State priority status rating were also included.

Training councils were also invited to provide evidence relating to any of the remaining 588 occupations eligible for SPOL consideration, if they so wished and where they believed they had suitable enough evidence for doing so.

Consultation process

All nine training councils and two advisory bodies representing government (from here on will be collectively referred to as advisory bodies) were provided with the questionnaire on 31 January 2017.

A face-to-face group workshop on the SPOL2017 to discuss its methodology, the questionnaire and any occupation-related issues was hosted by the Department on 10 February 2017.

As this workshop was held towards the start of the consultation period, it provided both an introduction to SPOL to any staff members of the external stakeholders who were new to the SPOL, followed by an audience driven question and answer session for both new and experienced staff. The Economic and Labour Market Analysis team from the Department formed an answering panel for the event. All advisory bodies were in attendance for the event.

Each advisory body was provided with four explicit questions about each eligible ANZSCO occupation, and a customised questionnaire to highlight occupations on their respective focus lists.

In *all* cases where claims were made relating to specific occupations, training councils were required to provide sufficient evidence to support these claims, including relevant citations of appropriate sources wherever appropriate.

If such evidence was not provided, advisory bodies were informed that the occupation would not be considered for inclusion on the SPOL.

[12] A copy of the questionnaire is provided in Appendix 3.

During the five week consultation period, the ELMA team ensured at least one staff member was always present to answer queries either by phone or via email. All queries received were responded to within the same business day.

The advisory bodies were given give five weeks (until 10 March 2017) to complete the questionnaire and submit their responses electronically to the Department. Nine of the 11 advisory bodies provided their submissions on schedule, with the remaining two training councils receiving small extensions.

In all, 357 written submissions relating to 329 distinct occupations were received. The level of response the Department received was less than the equivalent process undertaken for SPOL2016 when 365 responses were submitted. Departmental staff then undertook a comprehensive analysis of the responses, as well as a statistical review of the OPI, as described in Section 2.

By the end of this analysis, 27 occupations were deemed to be experiencing unmet demand and 25 occupations as experiencing other non-market factors that were assessed to be impacting upon their training requirement.

A further 37 occupations were identified as experiencing reported issues where there was insufficient evidence of unmet demand or non-market factors (that is, they were deemed 'other identified occupations').

The preliminary results of the Department's analysis (including draft occupational rankings) were then provided to the advisory bodies on 4 May 2017 for their information and consideration, prior to a face to face meeting with Departmental staff to go through the analysis in detail. All advisory bodies were offered and accepted meetings from Departmental staff as part of the SPOL2017 process.

As a result of further evidence provided at these meetings, 20 occupations had their final ratings adjusted.

4. Business rules for the prioritisation of the final list

The SPOL includes a three-tier structure indicating occupational priority. The first two occupational tiers are simply called 'State priority 1' and 'State priority 2'. The third tier is deemed 'Priority 3' and includes occupations which are priorities at an industry or regional level, but not at the State level (hence the dropping of the word 'State' for this tier).

The terminology gives an indication of each occupation's relative priority, and provides a transparent reasoning underpinning that relative priority.

'Identified occupation' is a rating that has existed behind the scenes of the SPOL process in the past and was first published with SPOL2015. These occupations are those raised by the training council network but were not recognised as priorities by the Department at this time. This rating acts as a 'watch list' and ensures the occupation will be reassessed for inclusion during the next SPOL annual process. For all intents and purposes these occupations are not considered a priority at this time.

Each tier has a specific set of business rules which include references to statistical information about each occupation, as well as the nature of qualitative advice provided by various sources, including training councils.

Summarised below are the business rules used in determining the relative priority for each occupation on the SPOL.

State priority 1 – 'Of the highest priority'

An occupation is deemed to be within the '**State priority 1**' tier if:

- the occupation is a critical occupation; ***and***
- there is sufficient evidence that the occupation is experiencing;
  - unmet demand, ***or***
  - other non-market related factors influencing future training; ***and***
- it has a statistical OPI rating in the top 50% of occupations in the State;

OR

- the occupation is a critical occupation; ***and***
- there is sufficient evidence that the occupation is experiencing;
  - unmet demand, ***and***
  - other non-market related factors influencing future training; ***and***
- it has a statistical OPI rating in the bottom 50% of occupations in the State.

There are 24 occupations in the 2017 SPOL which are deemed State priority 1.

State priority 2 – 'Of high priority'

An occupation is deemed to be within the '**State priority 2A'** tier if:

- the occupation is a critical occupation; ***and***
- it has a statistical OPI rating in the top 50% of occupations in the State.

OR

- the occupation is a critical occupation; ***and***
- there is sufficient evidence that the occupation is experiencing;
  - unmet demand, ***or***
  - other non-market related factors influencing future training; ***and***
- it has a statistical OPI rating in the bottom 50% of occupations in the State.

An occupation is deemed to be within the '**State priority 2B'** tier if:

- the occupation is not a critical occupation, but is a skilled occupation;
- there is sufficient evidence that the occupation is experiencing unmet demand; ***and***
- it has a statistical OPI rating in the top 50% of occupations in the State.

OR

- the occupation is not a critical occupation, but is a skilled occupation;
- there is sufficient evidence that the occupation is experiencing;
  - unmet demand, ***and***
  - other non-market related factors influencing future training; ***and***
- it has a statistical OPI rating in the bottom 50% of occupations in the State.

Critical occupations in the top 50% of OPI rankings but not experiencing unmet demand are designated 2A priority status, while those occupations which are not critical but are experiencing unmet demand are designated 2B. This delineation allows for a more nuanced evaluation of these occupations within a migration or training purchasing context.

In all, this tier has 158 critical (2A) occupations, and 5 occupations experiencing unmet demand (2B), making a total of 163 State priority 2 occupations (and an overall 187 State priority occupations – both tiers combined).

Priority 3 – 'Of industry or regional level priority'

An occupation is deemed to be '**Priority 3'** if:

- the occupation is a skilled occupation; ***and***
- the occupation is either;
    - critical, ***or***
    - experiencing unmet demand, ***or***
- experiencing other non-market related factors influencing future training; ***and***
- it has a statistical OPI rating in the bottom 50% of occupations in the State.

As flagged above, Priority 3 occupations are not considered priorities at the State level. While there may be evidence of unmet demand or other non-market-related factors impacting upon training or migration requirements at an industry (or potentially regional) level, these factors are not considered appropriate for SPOL inclusion as State priorities.

While Priority 3 occupations are a lower priority than the State priority categories, they are still a higher priority than the 490-plus occupations that are eligible for SPOL consideration but are not deemed priorities.

There are 59 occupations in the 2017 SPOL which are deemed Priority 3.

Other identified occupations

These refer to occupations that have been identified as experiencing industry or regional issues but where there is not currently enough evidence to support claims of unmet demand or other, non-market factors which would see their elevation to a priority status.

They are however monitored by the Department for any evidence which may see them elevated to a priority status in the future.

An occupation is deemed to be an '**other identified'** occupation if:

- the occupation is not a critical occupation; ***and***
- the occupation is identified by the training council network or some other consultative arrangement (such as a regional alliance) as having issues relating to unmet demand or non-market factors; ***and***
- the available evidence does not indicate that the raised issues are having a negative effect on the occupation. It is likely that any reported issues relate to factors other than labour demand or supply, and they are not impacting the occupation at a State, industry or regional level.

‘Other Identified’ occupations are not considered priorities at this time, however they will be closely monitored by the Department for possible review in future.

There are 37 occupations in the 2017 SPOL which are deemed other identified occupations.

Not identified as a priority

This refers to occupations that are eligible for SPOL consideration but are not raised as a priority by any stakeholder.

An occupation is deemed to be **not identified as a priority** if:

- the occupation is not a critical occupation, ***and***
- there is no evidence of that the occupation is experiencing unmet demand; ***and***
- there is no evidence of the occupation experiencing non-market factors.

There are 460 occupations in the 2017 SPOL which are not identified as a priority.

APPENDIX 1

Example of calculations of the Occupational Priority Index

Occupation	Employment	PLDOS	FLDOS	Age	Average Weekly Earnings	Average Weekly Earnings Growth	SDF Total	Lead Time	OPI
253211 Anaesthetist	-0.019	0.195	0.045	0.072	0.580	-0.097	0.775	13.000	10.078
253411 Psychiatrist	-0.026	0.134	0.037	0.148	0.580	-0.097	0.775	13.000	10.072
253311 Specialist Physician (General Medicine)	-0.035	0.063	0.030	0.197	0.580	-0.097	0.738	13.000	9.600
253324 Thoracic Medicine Specialist	-0.036	0.049	0.030	0.196	0.580	-0.097	0.722	13.000	9.389
253914 Ophthalmologist	-0.034	0.068	0.034	0.148	0.580	-0.097	0.699	13.000	9.081
253314 Medical Oncologist	-0.036	0.052	0.031	0.165	0.580	-0.097	0.695	13.000	9.040
253915 Pathologist	-0.030	0.112	0.041	0.086	0.580	-0.097	0.691	13.000	8.989
253323 Rheumatologist	-0.036	0.048	0.031	0.164	0.580	-0.097	0.689	13.000	8.960
253312 Cardiologist	-0.034	0.073	0.034	0.120	0.580	-0.097	0.677	13.000	8.797
253316 Gastroenterologist	-0.036	0.056	0.031	0.142	0.580	-0.097	0.675	13.000	8.779
253399 Specialist Physicians, nec	-0.033	0.076	0.035	0.099	0.580	-0.097	0.659	13.000	8.571
253521 Vascular Surgeon	-0.036	0.035	0.023	0.154	0.580	-0.097	0.659	13.000	8.563
253318 Neurologist	-0.036	0.056	0.032	0.109	0.580	-0.097	0.645	13.000	8.383
253313 Clinical Haematologist	-0.036	0.049	0.031	0.113	0.580	-0.097	0.639	13.000	8.313
253913 Obstetrician and Gynaecologist	-0.032	0.087	0.033	0.056	0.580	-0.097	0.626	13.000	8.133
253512 Cardiothoracic Surgeon	-0.036	0.034	0.022	0.122	0.580	-0.097	0.624	13.000	8.116
253513 Neurosurgeon	-0.036	0.037	0.025	0.113	0.580	-0.097	0.622	13.000	8.092
253321 Paediatrician	-0.031	0.082	0.026	0.060	0.580	-0.097	0.619	13.000	8.052
253511 Surgeon (General)	-0.035	0.014	0.005	0.143	0.580	-0.097	0.610	13.000	7.928
253912 Emergency Medicine Specialist	-0.028	0.118	0.037	-0.025	0.580	-0.097	0.585	13.000	7.610
253918 Radiation Oncologist	-0.037	0.045	0.030	0.061	0.580	-0.097	0.583	13.000	7.574
253917 Diagnostic and Interventional Radiologist	-0.028	0.046	-0.005	0.082	0.580	-0.097	0.578	13.000	7.515
253911 Dermatologist	-0.035	0.056	0.032	0.021	0.580	-0.097	0.557	13.000	7.237
253317 Intensive Care Specialist	-0.035	0.058	0.031	0.016	0.580	-0.097	0.553	13.000	7.188
253514 Orthopaedic Surgeon	-0.033	-0.005	-0.014	0.096	0.580	-0.097	0.528	13.000	6.860
253322 Renal Medicine Specialist	-0.036	0.048	0.030	-0.008	0.580	-0.097	0.517	13.000	6.716
253517 Plastic and Reconstructive Surgeon	-0.036	0.031	0.020	0.017	0.580	-0.097	0.514	13.000	6.686
253315 Endocrinologist	-0.037	0.044	0.030	-0.008	0.580	-0.097	0.511	13.000	6.647
253516 Paediatric Surgeon	-0.037	0.043	0.030	-0.008	0.580	-0.097	0.510	13.000	6.634
253515 Otorhinolaryngologist	-0.036	0.036	0.024	0.002	0.580	-0.097	0.509	13.000	6.612
253518 Urologist	-0.036	0.029	0.018	0.004	0.580	-0.097	0.498	13.000	6.470
253999 Medical Practitioners, nec	-0.034	-0.025	-0.018	0.080	0.580	-0.097	0.485	13.000	6.306
253111 General Medical Practitioner	0.094	0.060	-0.505	0.115	0.580	-0.097	0.246	8.000	1.968
253112 Resident Medical Officer	0.012	-0.190	-0.305	-0.091	0.580	-0.097	-0.090	5.000	-0.452
134211 Medical Administrator	-0.026	0.097	0.043	0.057	0.211	0.085	0.467	5.000	2.334
134311 School Principal	0.070	0.718	0.231	0.156	0.211	0.085	1.471	5.000	7.354
221111 Accountant (General)	0.504	0.936	-0.089	-0.010	0.051	-0.005	1.387	7.000	9.709
111111 Chief Executive or Managing Director	0.184	0.014	0.184	0.156	0.372	0.071	0.980	5.000	4.902
132311 Human Resource Manager	0.146	0.180	0.264	0.042	0.295	-0.039	0.889	5.000	4.444
133512 Production Manager (Manufacturing)	0.108	0.302	0.103	0.076	0.266	-0.012	0.843	5.000	4.217
134299 Health and Welfare Services Managers, nec	-0.001	0.265	0.095	0.141	0.211	0.085	0.796	6.000	4.778
111311 Local Government Legislator	-0.034	0.043	0.033	0.240	0.372	0.071	0.725	5.000	3.626
133312 Wholesaler	0.040	0.213	0.087	0.123	0.266	-0.012	0.718	7.000	5.024
111399 Legislators, nec	-0.036	0.043	0.031	0.235	0.372	0.071	0.716	5.000	3.579
131112 Sales and Marketing Manager	0.311	-0.235	0.495	0.035	0.111	-0.035	0.682	5.000	3.408
111312 Member of Parliament	-0.032	0.043	0.034	0.174	0.372	0.071	0.662	5.000	3.311
134411 Faculty Head	-0.022	0.129	0.054	0.162	0.211	0.085	0.620	5.000	3.098
133513 Production Manager (Mining)	0.067	0.164	0.046	0.071	0.266	-0.012	0.602	5.000	3.011
225311 Public Relations Professional	0.027	0.270	0.073	-0.031	0.144	0.117	0.601	5.000	3.003
225411 Sales Representative (Industrial Products)	0.051	0.217	0.011	0.045	0.144	0.117	0.585	5.000	2.924

APPENDIX 2

Additional information, issues and recent methodology changes

SPOL ratings – Manual adjustments

Some final manual adjustments may be required to ensure related/similar/joined occupations are given a joint rating.

For example, this occurs in the case of carpenters and joiners, where three occupations are consolidated for the purpose of a single SPOL rating (ie carpenter and joiner [ANZSCO code: 331211]; carpenter [ANZSCO code: 331212]; and joiner [ANZSCO code: 331213]). While officially in Western Australia, the relevant trade is 'carpenters and joiners', it is commonly referred to as simply 'carpenters' by those working in the occupation and by the general public.

This impacts on the collection of Census and labour market data which indicates significant levels of employment under the 'carpenters' category and little under 'carpenters and joiners' even though the official trade in Western Australia is the latter, and the former does not officially exist with a related training pathway. In this case, all three of the occupations are grouped at a broader ANZSCO 4 digit occupational level.

Similar rules were applied for occupations that relate to pressure welders / welders (first class), registered nurses, childcare centre workers and child care centre managers. Tertiary sources of evidence and pathways to employment are considered in these adjustments.

In 2017, the need for undertaking these direct manual adjustments has been minimal.

New training council and key stakeholder arrangements

Following a reprioritisation of deliverables for the training council network between SPOL2016 and SPOL2017, the councils were reduced from ten to nine.

Industry coverage was divided between the eight continuing councils and one new merged entity, with most organisations not having a change in focus.

One notable gap that emerged from this process was coverage of the public sector as an employer of occupations, following the disbandment of the Electrical, Utilities and Public Administration Training Council.

Public administration / sector reporting duties were transferred to the Public Sector Commission and the Western Australian Local Government Association. In both cases these organisation have a memorandum of understanding signed with the State Training Board to provide training and labour market intelligence from their respective levels of Government.

Missing data – Migration program outcomes 2014–15 and 2015–16

For SPOL2016, unlike prior years, the Department was unable to source detailed skilled visa grant data for permanent arrivals into Western Australia by ANZSCO from the Department of Immigration and Border Protection. This data set is one of the many data sources which were introduced alongside methodology changes to SPOL during the 2013 release, (see Appendix 5). The provision of this data provides the Department with an accurate permanent migration profile across all industries.

For SPOL2017, this situation was rectified with the DIBP, and the respective data sets for the most recent financial year and for the missing years prior were provided to the Department. Results as presented in this data were inputted into the SPOL related modelling.

Migration program policy changes

In April 2017, the Commonwealth Government announced numerous changes to the temporary and permanent pathways to the skilled migration programme. Included in these changes were the replacement of the *Consolidated skilled occupation list* and the *Skilled occupation list* which specified eligible occupations that underpinned skilled migration visa options.

The new *Short term skilled occupation list* and the *Medium and long term strategic skills list* replaced the CSOL, resulting in the removal of 200 ANZSCOs from being eligible for consideration through skilled migration pathways. Additional caveats were placed on a further 59 ANZSCOs still eligible for skilled migration.

From a statistical sense the timing of these changes are as such they have no influence on SPOL2017, as the policy was not implemented nor was there relevant data available for the historical period the current iteration of SPOL covers. For the forward looking inputs into the modelling, the Department has never attempted to forecast specific migration visa grants as part of the SPOL process, and as such has not attempted to model the impact of the recently announced changes.

While data provision against these new lists and other migration policy changes is not expected to be fully felt on the SPOL for some time yet, this situation will nevertheless be closely monitored by the Department to better understand ramifications for migration supply into occupations in the State.

Also as another prudent measure, in the second stage of the Department's SPOL consultation process with the training council network (which occurred in May 2017 after the migration policy announcement) the Department asked each council if the changes announced would have influenced their pre-existing written SPOL submissions. Identified cases where there were potential issues were limited, but had no major bearing on the make-up of the final list (mostly given the overall softer labour market conditions being experienced at this time).

APPENDIX 3

State Priority Occupational List

Survey questions for training councils 2017

1. Are you aware of instances of unmet demand in relation to this occupation?
    - These are sometimes called ‘skill shortages’.
    - Highlight the breadth and extent of the shortages, for example: specialties within the occupation or geographic-specific bounds that may be applicable.
    - If ‘Yes’ can you please provide details? Provide guidance in your response regarding how you came to your conclusions.

2. If you answered ‘Yes’ to question 1. What are the causes and pathways to addressing unmet demand for this occupation?
    - Highlight any recent history that has led to increased demand and/or lowered the supply of skilled workers.
    - Provide solutions from industry that can help address these circumstances, eg: detail about improving training/education/migration pathways or current industry actions in place to address known issues.
    - Statements like – ‘Should be considered a priority 1’ in itself is not a suitable response.

3. Are there any other, non-market-related, factors influencing future training?
    - For example, impending legislation/licensing regulations or technological change.
    - How are these issues causing disruption?
    - Provide insight into how these changes will impact on the wider industry.

4. Do you consider the issues, if any, associated with the occupation to be:
    - Short term (1–02 years),
    - Medium term (3–5 years), or
    - Long term (5+ years) in nature?
    - No issues.

If you have nominated a time period, can you provide further details?

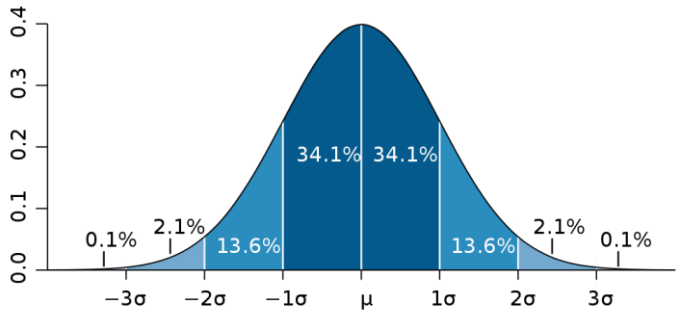
APPENDIX 4

A note on standard deviations

Standard deviation is the most commonly-used measure of the spread of values in a distribution and refers to the extent by which scores in a distribution differ from the mean, or overall average of those scores.

For a normal distribution of data as shown in the graph below, approximately 68% of scores (or data points) lie within 1 standard deviation of the mean, 95% lie within 2 standard deviations, and 99% lie within 3 standard deviations.

Figure 1: Example of a normal distribution curve



As an example, the occupation civil engineer had an employment level of 2523 in 2011, which is a value greater than the mean employment level for all occupations (806). Using traditional standard deviation calculations, this value represents 0.8 standard deviations above the mean. This places the employment level of civil engineers in WA firmly within the dark blue area of the bell curve above (indicated), along with 68% of all other occupations.

The advantage of using standard deviations is that it allows a valid comparison across all six indicators, each of which represent different datasets and would not otherwise be comparable.

The standard deviation for each indicator can be weighted and summed to determine an overall standard deviation factor for each occupation.

APPENDIX 5

Supply data and the revision of the OPI (PLDOS and FLDOS)

BACKGROUND

Introduced for SPOL2013, OPI calculations now include data at an occupational level regarding the supply of skilled workers into the Western Australian labour market.

The supply of skilled workers is determined by the number of completed tertiary training courses and higher education degrees in a specific field, persons who have migrated to the state through a skilled migration pathway, and from 2015, long term arrivals and departures of permanent residents and select long term visitors.

This incorporated data allows the OPI calculations to include an allowance for whether the number of newly qualified and migrant workers for a specific occupation is meeting, not meeting or exceeding historical changes in demand.

The labour market supply data used is official historical counts from a number of government departments at both the State and Commonwealth level, who hold central responsibility for collecting and organising the material.

In particular, the use of counts greatly improves accuracy over relying on estimates or forecasts of completions across a range of education institutions and through migration.

As a result, this new data set is provided with a significant weighting in the calculations, with PLDOS (ie 'past labour demand or supply') contributing 40%, and FLDOS (ie 'future labour demand or supply') contributing 20%.

To calculate these new two new indicators, the following data is collected and sorted by ANZSCO (Australian and New Zealand Standard Classification of Occupations), utilising the following sources.

For demand:

- ABS Census 2006 levels of employment (ANZSCO 6-Digit);
- ABS Census 2011 levels of employment (ANZSCO 6-Digit);
- ABS Labour Force Survey, Australia, Detailed, Quarterly, 6291.0.55.003 (ANZSCO 3-Digit via data cubes)
- Monash University, Centre for the Economics of Education and Training (CEET) historical estimate of Net Replacement Rate by Occupation (ANZSCO 3-Digit) (PLDOS only);
- Victoria University, Centre of Policy Studies (CoPS – formerly at Monash University) Forecast of Occupation Employment Growth (ANZSCO 3-Digit) (FLDOS only); and

- Monash University, Centre for the Economics of Education and Training (CEET) forecast estimate of Net Replacement Rates by Occupation (ANZSCO 3 Digit) (FLDOS only).

For supply:

- higher education domestic student completions for post graduate and undergraduate courses for the six year period 2007-2013 (by course, sorted by *Australian standard classification of education – Field of education* which is cross coded to ANZSCO by the Department);
- vocational education and training completions by course and Australian Qualification Frameworklevel between 2007–2013;
- migration arrivals to Western Australia through visas that fall under skilled pathways between 2007–2013 (primary applicants only);
- arrivals to Western Australia of Australian permanent residents/citizens who have spent 12 months or more overseas.
- departures of permanent residents/citizens and select long term visitors where Western Australia has been the primary place of residence.

Administratively sourced supply side data has a significant time lag prior to publication from the various responsible agencies. Data from 2014 was not fully available at the time of calculations.

DEMAND CONSIDERATIONS

An indicative demand indicator at the 6-Digit ANZSCO level is determined by calculating the employment difference between the two points in time dependent on the availability of supply side data. This figure at an occupation level is also adjusted upwards on the basis of the net replacement rate provided by the Centre for the Economics of Education and Training. This is to account for the level of staff turnover that has occurred within the time period. The NRR provides an estimate on general staff turnover, retirements and occupation wastage that an occupation group has experienced.

Unlike the process undertaken for SPOL2013, data availability has moved beyond the period defined 2006 and 2011 Census years. Labour force survey data was used in its place to assist in generating an indicative demand number between 2011 and 2015 for PLDOS and as a 2016 base figure for FLDOS. Labour force data at the ANZSCO 3 digit was used and proportioned out to the 6 digit detailed occupation level along the proportions from the closest Census date. Census information therefore still has a significant impact on the PLDOS and FLDOS results.

This combined indicative demand figure provides an indication of the overall change in employment within a seven year block, including the number of new workers required to replace existing staff leaving each occupation.

A positive number indicates demand for labour has grown, while a negative number indicates an overall decline or the occupation shrinking in size.

SUPPLY CONSIDERATIONS

Please note that the Department is unable to publish or provide counts of higher education completions and migration outcomes to the public. Users wishing to access such data should contact the relevant Commonwealth agency in these instances.

Supply data in the form of counts from the official government collection sources is collated and then added together to provide an accurate count of new skilled labour entering the market at an occupational level.

As with demand side data, this information spans the same five year period (from 2011 to 2015, inclusive).

Though the data used are official counts, some limitations on the data exist. It is acknowledged:

- that not all people completing a certain qualification will move into the assigned occupation immediately, for example an undergraduate upon completing their bachelor may move into postgraduate study;
- many fields of study do not lead to employment in one specific occupation. In areas of study where this is a common occurrence (such as in business and ICT), completions are proportioned out to nearby occupations in the ANZSCO coding at the four, three or two digit ANZSCO level where appropriate (see below for further details); and
- that it is not possible to accurately estimate interstate migration between Western Australia and the rest of Australia at an occupational level at this time.

Higher education specific data

Higher education results are provided by the Commonwealth Department of Education and Training – the appointed agency responsible for collecting national higher education data. Data is not coded to ANZSCO by this Commonwealth agency.

The Australian Standard Classification of Education system in place reflects that in many cases, a completion of a University level course does not necessarily lead to a specific occupation, but to a general area of expertise. Completion numbers are therefore usually proportioned out against Census information regarding employment numbers to either a four, three or two digit ANZSCO level (as determined by the Department).

However, the preferred option undertaken for OPI purposes is where ASCED results cn be successfully coded to the more detailed 6 digit ANZSCO level.

All higher education data only includes completions by domestic students from the five Western Australia based Universities, as these graduates have the highest chance of remaining within WA for employment purposes.

Overseas students who study in WA are picked up through skilled migration visa counts if they decide to remain in WA for employment purposes. Incorporating overseas graduates into higher education figures was determined to lead to cases of possible double counting, and so was not undertaken.

Vocational education and training specific data

VET data includes all completions from both employment and institution based training courses, and is collected by the Department as the Western Australian State Training Authority. Individual courses are matched to an ANZSCO by DTWD. Courses rated by the Industry training councils as being either entry level or post entry (ie re-skilling / up skilling) are included in the completion counts.

However, courses that are identified as pre-entry (ie pre-apprenticeships) are not included, as further training is required following completion before entering the labour market. Adult and Community Education courses are also not counted in these figures as they do not relate to a specific occupation.

Such treatments ensure the SPOL remains consistent with the 'clear pathways' criteria (as per the SPOL's 'criteria for consideration' – see Section 2 of the main paper).

Introduced for SPOL2015, metrics now acknowledge that the completion of a VET level course in some subject areas does not necessarily lead to a specific occupation, but potentially a series of related occupations as coded by ANZSCO at the 6 digit level. Similar to what has been undertaken in the past for higher education data, completion numbers are therefore usually proportioned out against Census information regarding employment levels to either a four, three or two digit ANZSCO level (as determined by the Department).

However, in those cases where results can be successfully coded to the more detailed 6 digit ANZSCO level, this is the preferred option undertaken for OPI purposes.

Migration-specific data

Migration data is provided by the Commonwealth Department of Immigration and Border Protection. As part of their data services, the DIBP codes visa and migration outcomes by six-digit ANZSCO, and no alterations were required nor undertaken by the Department. Data incorporated includes all long term and permanent skilled visas granted in addition to the long term temporary '457' visa sub-class.[13]

It is worth noting that the data does not include secondary visa holders (which represent partners, children and dependents of the primary visa holder). Though secondary visa holders can have their own work rights, they are not aligned and cannot be matched to actively working in a specific occupation, as defined by ANZSCO.

The data used in the calculations also does not include migrants arriving in Western Australia through family, humanitarian or special eligibility streams.

To address a known knowledge gap in historical SPOL statistical analysis, select arrivals and departures data outside of the visa grant administrative dataset was sourced, assessed and included within the PLDOS calculations for the first time in 2015. Given the moderation in the Western Australian labour market over recent years, there was a greater risk that Western

[13] Note: See Appendix 2 for current issues with this data set.

Australia would begin to see a drain of skilled workers (particularly professionals) away from the State. The following categories of movements were selected for inclusion in the SPOL statistical analysis:

- resident permanent departure;
- long term resident departure[14];
- long term visitor departure (subclass 457 Visa holders only); and
- long term resident return.

This process was continued for SPOL2017. The migration data used was sourced from the Commonwealth DIBP on a calendar year basis to align with other data sets employed.

[14] Note: Long term defined as being 12 months or longer.

APPENDIX 6

Major (and supporting) sources of data and related evidence used in the construction of the SPOL 2017

- Australian Bureau of Statistics
  - Census 2006 and 2011 data
  - Monthly and quarterly labour force data
  - State final demand / Gross State product data
  - Average weekly earnings data
  - Various other economic and labour market data sets used as supporting evidence
- Department of Training and Workforce Development
  - AVETMISS enrolment and delivery data
  - Training Record System data
  - EVAC submission information
  - Training package implementation and advice (as provided by Industry training councils)
  - Regional Workforce Development Plan information
- Industry training Councils
  - SPOL survey returns, and related input
- Commonwealth Department of Education and Training
  - Higher Education data
- Commonwealth Department of Immigration and Border Protection
  - Permanent skilled migration stream data
  - 457 Visa data
  - The *Consolidated skilled occupation list*
  - Quarterly and annual migration reports
- Commonwealth Department of Employment
  - Survey of employers who have recently advertised
  - Survey of employers' recruitment experiences
  - Internet Vacancy Index (IVI)
  - Employment forecast data
- Commonwealth Department of Industry
  - Australian apprenticeships – *National skills needs list*
- Victoria University
  - Centre of Policy Studies' CGE employment forecast data
- Monash University
  - Centre for the Economics of Education and Training net replacement rate data
- State and Federal Treasury economic / labour market forecasts
- WA Treasury economic notes

- Deloitte Access Economics
  - Scenario planning data
  - Business outlook forecast data
  - Investment monitor data
- WA Chamber of Commerce and Industry
  - Curtin Business School – CCI Survey of consumer confidence
  - Westpac – CCI Survey of business expectations
  - Westpac – CCI Leading index of WA economic activity
  - Quarterly outlook
- Chamber of Minerals and Energy
  - State growth outlook
- Housing Industry Forecasting Group
  - Report on forecast dwelling commencements in WA
- National Institute of Labour Studies
  - A system for monitoring shortages and surpluses in the market for skills

[NB: Please note the above list is not necessarily comprehensive, and may change over time. Numerous other one-off occupational and/or sector specific publications, studies, articles and reports are also used for validation purposes as required].