



Building and Construction

TEACHERS and PARENTS

Introduction

PURPOSE:

The purpose of this booklet is to provide an overview of one of Tasmania's major employing industries to provide advice for parents and teachers and to inform any career and subject choice discussions that teachers may have with their students.

It is produced by the Tasmanian Building and Construction industry Training Board with the aim of increasing and awareness of the wide range of opportunities that the industry offers.

The Board welcomes feedback or requests for further information.

OVERVIEW:

The Building and Construction Industry offers a wide range of employment opportunities in a well defined career structure underpinned by further vocational or tertiary education.

All these opportunities are open to both males and females.

The career and training pathway begins with school based vet or pre-employment training, has apprenticeship based trades at the Certificate 3 level, opportunities to move on to licensed contractor, licensed builder or other building practitioner roles at the Certificate Four and Diploma level and has a range of roles requiring a university degree.

As qualifications and experience are required at all levels of licensing continuing training and education is part of advancing along the pathway.

The industry divides into civil construction, domestic construction and commercial construction to deliver all of Tasmanians built environment:

- transport infrastructure such as roads rail, bridges, wharves and airports,
- water infrastructure such as dams and reservoirs, distribution networks, water pipes, domestic plumbing and sewerage,
- energy infrastructure such as dams, wind farms, solar installations, gas and electricity distribution networks and domestic connections.
- domestic dwellings such as houses, apartments, villas and units
- commercial buildings such a schools, hospitals, office and retail complexes, hotels and warehouses

The industry is not only a major employer of Tasmanians but is also global with trade skills or professional skills opening the door to overseas work.

The standard entry point to the industry is through an apprenticeship (trades) or traineeship (civil) at the Certificate 3 level. Before enrolling for the Certificate 3 a person must be employed

in that role. This ensures that skills learnt are practiced or gained on the job. The number of apprenticeship commencements vary depending on the state of the industry but tend to be in the range 5 to 9 hundred a year. In 2018 there were 1876 apprentices in training across the four years. Selection for an apprenticeship is competitive and should be promoted as an achievement and a life stage mile stone.

The major trades are carpentry, plumbing and electrotechnology. The latter two are licensed trades that guarantees an ongoing workload. The major professions characterised by having a university degree qualification include engineering, architecture, building (unlimited), building design, building surveying and quantity surveying.

The bigger companies will employ Human Resource and Finance specialists as well as a variety of sales and admin staff. It is most likely that the specialist roles will be filled by people who have trained and gained experience elsewhere.

Traditionally a bastion of male employment the industry view is changing to increasingly employing young women as apprentices and in other industry roles.

The future of the industry will be technology based, the use of virtual models to design, build and operate structures known as BIM will replace current plans, robotics will lead to new building techniques and offsite construction will see whole building components built factory style and assembled onsite.





Some Industry Facts

- The ten year rolling average for employment in the sector is 19,960 people, 16,860 full time and 3,100 part-time jobs state-wide. In 2018 the numbers peaked at 26,000 people, 22,200 full time and 3,800 part-time. This was 12.5 % of the state's full time jobs and 10 % of all jobs at the time.
 - The Board's modelling shows that:
 - 55% of industry employees are employed in one of the trades.
 - 15% of industry employees are employed in a management role
 - 10% of industry employees are employed in semiskilled or labouring roles.
 - 9% of industry employees are employed in sales, clerical or administrative roles
 - 8.5% of industry employees are employed as machine operators or drivers and
 - 2 % of industry employees are employed in one of the professions.
- Building and Construction work totalled 2.7 billion dollars in 2017/18, is expected to reach 2.8 billion in 2018/19 and to remain at or even exceed these levels in future years. It is the fourth biggest contributor to Gross State Product and is the only sector where majority of the employment growth is in full time jobs.
- Award wage rates for qualified tradespersons are a minimum of around \$900 a week and will increase depending on experience, market conditions, site allowances, union agreements etc. Recent newspaper ads for carpenters have been offering nearly 70k. The ABS reported average weekly earnings for trades and technical workers in Australia at \$1296 in 2018 and at above \$1500 a week for the construction industry generally.
- The career training pathway through building, plumbing and electrotechnology is mature and well defined and allows a person to continue training through to degree level to access a wide variety of trades, building management and professional roles.

The Career Training Pathway

The industry has two traditional career and training pathways. The norm for Engineering and Architecture is for people to proceed to university and complete a degree and then gain the experience and knowledge to work in the industry.

The other pathway is the vocational pathway. This way people gain knowledge, experience and skills while employed and complete further study to achieve Certificates 3 and 4, Diplomas and Degrees. Their career progresses as a combination of experience and qualification enables them to achieve licensing to operate at various levels either as an employee or running their own business.

The career training pathway begins at school with certificate 1 and 2 courses. The Building and Construction Pathways Course Selection Guides provide comprehensive advice on suitable course selection to support this career direction. These certificates will give students a head start when competing for apprenticeship opportunities.

Traditional apprenticeships are now one of the few secure employment, career development opportunities available for young people. They feature work, training and secure employment. The big three are Carpentry, Plumbing and Electrotechnology. Other certificate threes include Bituminous surfacing, Bricklaying, Cabinet making, Civil construction, Concreting, Fire protection, Floor and wall tiling, Painting and decorating, Plant operators, Plastering, Road construction and maintenance, Road marking, Roof tiling, Signage, Stonemasonry and Waterproofing.

A career as a trades person can be satisfying and rewarding in its own right. The next step is to complete a Certificate Four in building, plumbing and gas fitting or electrotechnology and obtain a practitioners licence. You can work as an employee or operate as a small business and contact to builders.

For a builder or construction manager the Certificate 4 plus suitable experience enables licensing as a Builder (Low Rise). You can renovate, demolish, make additions or build new one storey domestic dwellings and guest houses up to twelve people and 300 square metres in floor size and non habitable dwellings such as garages and sheds. You can work as an employee or run your own business employing and subcontracting other skilled workers.

For a plumber or gasfitter a Certificate 4 allows you to certify work in the areas where you have completed study and a completed certificate 4 allows you to gain a licence to contract for work and employ other skilled workers. You may work for a big firm or establish your own business.

In Electrotechnology the Certificate 3 allows you to apply for a licence to perform electrical services but you must complete the Certificate 4 and be licensed to be allowed to sell and manage electrical services to the public. Again this presents opportunities to establish your own business or be an employee of a bigger firm.





The pathway continues at the Diploma or advanced diploma level. For plumbing and electrotechnology diplomas and advanced diplomas offer a new direction as you move to system design and technical operation in the lower levels of engineering work. For builders or construction managers the diploma is the prerequisite to move up to the next classes of buildings as a building or construction manager, medium rise. This includes buildings to a maximum of three stories.

The pathway continues to degree level. For plumbing and electrotechnology this means extending your qualification into an engineering degree. As a builder a degree and suitable experience allows for a licence as an open builder or construction manager and the right to work on buildings of any class. The Building Degree is not currently available in Tasmania but TBCITB has an arrangement where Tasmanians are supported to study at the University of Newcastle. Newcastle offers one year of credit towards a degree for the Diploma.

Fire Protection Services. This is a small but vital niche of work with a similar a career training pathway. It carries out the design, installation and maintenance of fire protection systems in buildings. Apprentices train in Melbourne to gain a certificate 3 and the career pathway then goes Certificate 4 for low rise buildings, diploma for medium rise buildings and advanced diploma for open classes of buildings. Certificate three holders work as employees or contract to a licenced practitioner. Certificate four and above enables you to establish your own business

Building Design. This is another area of licenced activity. A building designer is a practitioner that specialises in providing both design and documentation for small to medium scale projects, both residential and commercial. The basic employee level is Certificate four and proceeds through Diploma and Advanced Diploma qualifications. Similar to other areas the scale of building you are licenced to perform increases with qualification. At all levels the qualification must be matched with relevant experience to gain a licence. The experience could in part come from being a builder or working as a trades person. The unlimited level is an architect with a degree.

Building Service Design. This a specialist role that plans and designs the various services a building needs There are four categories; Mechanical services, Electrical services, Hydraulic services and Fire services. There are three classes; Restricted, Limited and Domestic. Similar to other areas the scale of building you can work on increases with your qualification that ranges from Certificate 4 to Diploma to Advanced Diploma.

Building Surveying. Building surveying has become a pivotal role in construction and is profession in its own right. Building surveyors provide independent supervision of buildings and building work throughout the construction process and upon completion of construction to ensure that buildings are safe for use.

A building surveyor is engaged by the owner of a property to ensure building work is carried out in accordance with national and state laws such as the National Construction Code and the Building Act .

A building surveyor needs to be able to assist the property owner with the categories of work that require building permits, or regulatory oversight.

There are two classes for building surveyor; Building surveyor and Building surveyor limited. The latter requires completion of an advanced Diploma and the former a degree, both in building surveying.

This is another career direction that can start with an apprenticeship.

Quantity Surveying. A Quantity Surveyor is a qualified professional who specialises in building measurement and estimating the value of construction costs. They apply their expertise during various stages of construction to ascertain the cost of building works on any residential or commercial property and to manage contracts. This role requires a degree and accreditation with the an industry body such as the Australian Institute of Quantity Surveyors.

Training and Education. This is another career opportunity where the knowledge and experience gained on site can be combined with a Certificate Four (**TAE40116** Certificate IV in Training & Assessment) to have a career in training.

Engineers. There are three classes of licensed engineers.

- 1. Engineer fire safety.** This class is unrestricted in the field of fire safety engineering and includes alternative solutions. Fire safety engineering is the application of engineering principles, rules and expert judgement based on a scientific appreciation of fire and its effects, and of the reaction and behaviour of people in the event of fire.
- 2. Engineer building services.** This class is unrestricted in the field of building services and includes alternative solutions. Building services may include mechanical building services, hydraulic building services, electrical building services, fire safety systems, building acoustics and energy management in buildings.
- 3. Engineer civil.** This class is unrestricted in the field of civil engineering and includes alternative solutions. Civil engineering may include civil, structural, geotechnical and environmental engineering.

All classes require a degree as the base qualification. The following Youtube link leads to an excellent explanation of the various professional management roles.

Youtube: <https://www.youtube.com/watch?v=Pc40yA0eyZo>

Civil Construction. Civil Construction workers maintain and build roads, railways, bridges, tunnels, pipelines and dams. They also work with concrete, steel, build sub-divisions and technical infrastructure like sewer systems, wind farms and power stations.

There are many different ways to work on a civil construction site. From labouring, traffic management, operating machinery through to team leaders, project management and engineering. Although there isn't always a structured pathway into the industry with one formal qualification, there are many qualifications depending on the site and skills needed.



The Course Selection Guide

The course selection guide is an industry approved advice that contains recommendations on course selection that will best prepare a student for the Building and Construction sector career training pathway.

Excerpt from page 4 of the guide:

The following course selection guides have been designed to help teachers, career advisors, students and parents make informed decisions about programs of study in Years 11 and 12. If a student wants to undertake a building and construction pathway qualification as part of their Tasmanian Certificate of Education (TCE), they will also need to choose a small number of TASC-accredited courses to meet the 120 credit point requirement of the TCE. The selection guides offer suggestions as to which TASC courses are best suited to support student learning, and they also include options across TASC Levels to address variance in student capability. The following options have been provided:

- **Program A** (for students who need to develop their literacy and computing skills)
- **Program B** (for students who have not yet attained the requisite levels of literacy and numeracy identified in the Essential Skills – Reading and Writing and Essential Skills – Maths courses)
- **Program C** (for students who have already attained the requisite levels of literacy and numeracy identified in the Essential Skills – Reading and Writing and Essential Skills – Maths courses)
- **Program D** (for students who want to achieve an ATAR)
- **Program D+** (for students who want to gain entry to the Bachelor of Engineering course at UTAS).

While students are encouraged to use the guides to inform their intended programs of study, they are also encouraged to consider personal interest courses.

The Course Selection Guide can be found at: <http://pathways.tbcitb.com.au/teachers-resources/>

The Technology Driven Future

The industry is already seeing change that will create new roles and change existing ones. The future of the industry will be technology based, the use of virtual models to design, build and operate structures known as BIM will replace current plans, robotics will lead to new building techniques and offsite construction will see whole building components built factory style and assembled onsite.

Building Intelligent Models (BIM). This is a process for managing the shared information produced for a development project forming a single data base for decisions during the life of the asset. BIM is where everyone involved with the project shares the one set of data, which is live and up to date. BIM is about collaboration and must involve all project participants clients, builders, consultants, suppliers and subcontractors, and regulators. This means that a virtual building model is developed and information is collated from project participants and through the decision making processes of design, construction, and maintenance. Clients will be able to have a virtual walk through of their projects.

New role such as BIM Managers and BIM modellers will emerge, existing roles will change in areas such as building approvals, estimating, quoting, procurement and the scheduling of work. On site workers will record their progress and the as built data will become a management tool for building owners. They can use the model for things like environmental control and scheduling of maintenance. See <http://www.tbcitb.com.au/bimhub/>

Offsite Construction. Building components can be manufactured off site, transported and assembled on site changing the skillsets needed on location. A prime example can be seen in this Chinese video - <https://www.youtube.com/watch?v=rwvmru5JmXk>

In Tasmania we saw the entire bathrooms of the student accommodation in Elizabeth Street Hobart manufactured in Sydney and placed onsite to be plumbed and wired in. For the student accommodation in Invermay Launceston entire living units were manufactured in a factory up the road, stacked up onsite and had stairways and facades added.

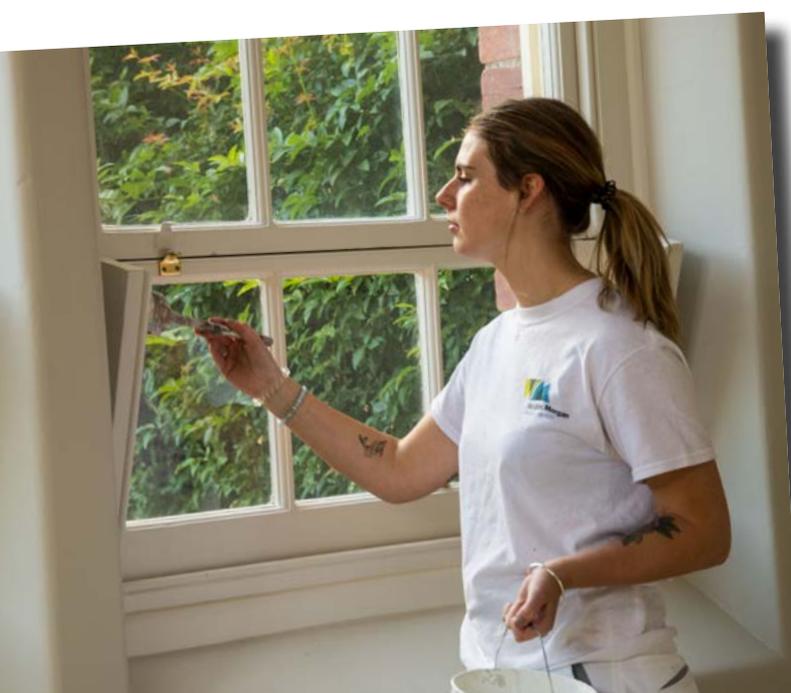
Robotics. Robots have already been developed that can build small structures and it is anticipated this will evolve further over the working life of current students.

See this news report from Perth Western Australia:

<https://www.youtube.com/watch?v=A6IQB5S1N5I>

or this 3d printer report from the USA:

<https://www.youtube.com/watch?v=j1yQzqR9cu0>





Useful Resources

1. <http://pathways.tbcitb.com.au/>

This website has been built by the TBCITB specifically to provide information to students, teachers and parents about the industry and its many opportunities. It includes downloadable copies of the various information brochures.

2. TBCITB Brochures.

TBCITB has produced a set of ten brochures designed for senior high school students outlining the various trades, occupations and professions on offer as part of the extensive career training pathway. They are available at no cost to all schools from the Director Vocational Learning and Career Education or by contacting TBCITB direct on 62237804

3. Master Builders Pathways Program

The MBAT runs an annual program of school visits usually in October, funded by the TBCITB and currently reaching around sixty schools. The visit includes structured presentations about the industry from industry leaders and current apprentices who provide advice on their experiences.

4. HIA Youthbuild

The Housing Industry Association Youthbuild program is centred around a purpose built facility at Claremont College and provides a range of industry related experiences for high school students. It particularly welcomes female students who want to know more about the industry.

5. Attachment 1

Attachment 1 is a list of websites government, industry and service providers that contain further information on the industry and advice on how to get an apprenticeship.

6. Attachment 2

Attachment 2 is a list containing most of the VET qualifications on offer in the building and construction sector. It highlights the great diversity of opportunity and the career training pathway through the industry.





Attachment 1

SOME USEFUL LINKS FOR FURTHER INFORMATION

| | |
|---|--|
| https://www.masterbuilders.com.au/Resources/Career-Centre | Master Builders Australia Career Centre - provides information about occupations in the building industry including personal and education and training requirements. Promotes women in the building industry |
| https://www.open.edu.au/your-career/construction | Open Universities Australia Construction Career Page - provides information about construction related degrees and subjects and training providers. Describes a range of occupations in the building and construction industry including duties and tasks, skills required, working conditions, and industry associations. |
| http://www.constructmycareer.com.au/career-planning | Construct My Career - contains comprehensive information on career options in the building and construction and property services industries. It includes information on career planning, pathway charts, occupational information sheets, and women in those industries. |
| https://www.australianapprenticeships.gov.au/ | Australian Apprenticeships – maintained by the Australian Department of Education and Training. Provides quick and easy access to information regarding Australian Apprenticeships. This includes: <ul style="list-style-type: none"> • Australian Apprenticeship Support Network providers (Apprenticeship Network provider) • Australian Apprenticeships programs • Employer incentives • Information and support for apprentices looking to start their own business • Support and assistance for apprentices during their apprenticeships • Support and advice for people looking to start apprenticeships, whether in school, just out of school, or mature-age |
| https://www.tasbgas.com.au/ | Tasmanian Building Group Apprenticeship Scheme – a group training organisation and registered training organisation focusing on the building and construction industry. |
| https://myfuture.edu.au/ | My Future – provides information on career planning, industries, occupations, and career pathways. Developed by Education Services Australia, a ministerial company established by the Education Council. |
| http://www.skillsone.com.au/tv-guide/ | SkillsOne works with Industry, Educators, Government and TAFE to engage and promote the extensive career opportunities and pathways in traditional trades and emerging skills areas ranging from automotive, construction & mining; through to hairdressing, healthcare and horticulture. Provides a rich tapestry of information about trades and skills. Features all stories appearing on SkillsOne TV and is continually updated with new video stories and industry snapshots. 40 – 50,000 videos are viewed on the SkillsOne site monthly, increasing significantly during October and November when students are seeking ideas and guidance on career paths within the Vocational Education and Training (VET) sector. |



Attachment 1 (cont.)

SOME USEFUL LINKS FOR FURTHER INFORMATION

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|---|--|
| https://www.myskills.gov.au/ | <p>My Skills website is the national directory of vocational education and training (VET) organisations and courses. It is an Australian Government initiative to enable consumers to search for, and compare, VET courses and training providers.</p> |
| https://joboutlook.gov.au/ | <p>Job Outlook is an initiative of the Australian Government Department of Jobs and Small Business. Job Outlook provides information about Australian careers, labour market trends and employment projections.</p> |
| https://jobsearch.gov.au/ | <p>Jobsearch provides information for job seekers (training providers, job application tips) and employers (advertising jobs, service providers).</p> |
| https://www.masnational.com.au/ | <p>MAS National is an apprenticeship network provider. They are contracted by the Australian Government to provide free Australian Apprenticeships support services to apprentices and employers. Apprenticeship Network providers provide advice and support services tailored to the needs of employers and apprentices throughout the apprenticeship lifecycle – from pre-commencement to completion - through:</p> <ul style="list-style-type: none"> • Universal services for all employers and apprentices, providing essential administrative support, payment processing and regular contact; and • Targeted services for employers and individuals assessed as needing additional support to complete the apprenticeship. |
| https://www.jobnet.org.au | <p>JobNet Tasmania provides a free service to employers and Australian Apprentices Its Role is to:</p> <ul style="list-style-type: none"> • Assist with Completion of Training Contracts • Lodge Training Contracts with the State Training Authority • Provide Advice/Assessment on government incentives • Process Incentive payments to employers & Personal Benefits to Australian Apprentices (where applicable) • Maintain Regular Contact throughout the Training Contract |
| http://www.megt.com.au/ | <p>MEGT is an Australian not-for-profit organisation that has been supporting local employers, apprentices, trainees, job seekers and students for over 35 years.</p> <p>Services include recruitment, apprentice sign up, group training employment</p> |



Attachment 2

LIST OF PATHWAY QUALIFICATIONS

| Code | Title |
|---|---|
| CPC10111- Certificate I in Construction | Certificate I in Construction |
| CPC20112- Certificate II in Construction | Certificate II in Construction |
| CPC20912- Certificate II in Urban Irrigation | Certificate II in Urban Irrigation |
| CPC20812- Certificate II in Metal Roofing and Cladding | Certificate II in Metal Roofing and Cladding |
| CPC20211- Certificate II in Construction Pathways | Certificate II in Construction Pathways |
| CPC20712- Certificate II in Drainage | Certificate II in Drainage |
| CPC30911- Certificate III in Scaffolding | Certificate III in Scaffolding |
| CPC30211- Certificate III in Carpentry | Certificate III in Carpentry |
| CPC30111- Certificate III in Bricklaying/Blocklaying | Certificate III in Bricklaying/Blocklaying |
| CPC31712- Certificate III in Post-Tensioning | Certificate III in Post-Tensioning |
| CPC31912- Certificate III in Joinery | Certificate III in Joinery |
| CPC31611- Certificate III in Paving | Certificate III in Paving |
| CPC32211- Certificate III in Joinery (Stairs) | Certificate III in Joinery (Stairs) |
| CPC31311- Certificate III in Wall and Floor Tiling | Certificate III in Wall and Floor Tiling |
| CPC30313- Certificate III in Concreting | Certificate III in Concreting |
| CPC32813- Certificate III in Fire Protection | Certificate III in Fire Protection |
| CPC32011- Certificate III in Carpentry and Joinery | Certificate III in Carpentry and Joinery |
| CPC32413- Certificate III in Plumbing | Certificate III in Plumbing |
| CPC32111- Certificate III in Signage | Certificate III in Signage |
| CPC31011- Certificate III in Solid Plastering | Certificate III in Solid Plastering |
| CPC32912- Certificate III in Construction Crane Operations | Certificate III in Construction Crane Operations |
| CPC31211- Certificate III in Wall and Ceiling Lining | Certificate III in Wall and Ceiling Lining |
| CPC30711- Certificate III in Rigging | Certificate III in Rigging |
| CPC30511- Certificate III in Dogging | Certificate III in Dogging |
| CPC32713- Certificate III in Gas Fitting | Certificate III in Gas Fitting |
| CPC30413- Certificate III in Demolition | Certificate III in Demolition |
| CPC31511- Certificate III in Formwork/Falsework | Certificate III in Formwork/Falsework |
| CPC32612- Certificate III in Roof Plumbing | Certificate III in Roof Plumbing |
| CPC32313- Certificate III in Stonemasonry (Monumental/Installation) | Certificate III in Stonemasonry (Monumental/Installation) |
| CPC31812- Certificate III in Shopfitting | Certificate III in Shopfitting |
| CPC31411- Certificate III in Construction Waterproofing | Certificate III in Construction Waterproofing |



Attachment 2 (cont.)

LIST OF PATHWAY QUALIFICATIONS

| | |
|---|---|
| CPC30611- Certificate III in Painting and Decorating | Certificate III in Painting and Decorating |
| CPC32513- Certificate III in Plumbing (Mechanical Services) | Certificate III in Plumbing (Mechanical Services) |
| CPC31111- Certificate III in Steelfixing | Certificate III in Steelfixing |
| CPC30812- Certificate III in Roof Tiling | Certificate III in Roof Tiling |
| CPC40508- Certificate IV in Building and Construction (Site Management) | Certificate IV in Building and Construction (Site Management) |
| CPC40808- Certificate IV in Swimming Pool and Spa Building | Certificate IV in Swimming Pool and Spa Building |
| CPC40110- Certificate IV in Building and Construction (Building) | Certificate IV in Building and Construction (Building) |
| CPC40708- Certificate IV in Building and Construction (Trade Contracting) | Certificate IV in Building and Construction (Trade Contracting) |
| CPC40611- Certificate IV in Building and Construction (Specialist Trades) | Certificate IV in Building and Construction (Specialist Trades) |
| CPC40208- Certificate IV in Building and Construction (Contract Administration) | Certificate IV in Building and Construction (Contract Administration) |
| CPC40912- Certificate IV in Plumbing and Services | Certificate IV in Plumbing and Services |
| CPC41013- Certificate IV in Demolition | Certificate IV in Demolition |
| CPC40408- Certificate IV in Building and Construction (Sales) | Certificate IV in Building and Construction (Sales) |
| CPC40308- Certificate IV in Building and Construction (Estimating) | Certificate IV in Building and Construction (Estimating) |
| CPC50210- Diploma of Building and Construction (Building) | Diploma of Building and Construction (Building) |
| CPC50612- Diploma of Hydraulic Services Design | Diploma of Hydraulic Services Design |
| CPC50509- Diploma of Fire Systems Design | Diploma of Fire Systems Design |
| CPC50308- Diploma of Building and Construction (Management) | Diploma of Building and Construction (Management) |
| CPC50412- Diploma of Plumbing and Services | Diploma of Plumbing and Services |
| CPC60108- Advanced Diploma of Building Surveying | Advanced Diploma of Building Surveying |
| CPC60212- Advanced Diploma of Building and Construction (Management) | Advanced Diploma of Building and Construction (Management) |
| CPC70109- Graduate Certificate in Fire Systems Design Management | Graduate Certificate in Fire Systems Design Management |