RIICPL301E

Learner Guide Instructions

Who is this document for?

The learner.

What is in this document?

- Course information that matches the PowerPoint presentation.
- Review questions.
- Practical assessment instructions for learners.

What do you need to do before you use it for the first time?

1. Rebrand the document.
2. Review the document as part of your validation process.
3. Set the reading and test time limits that are highlighted in pink at the end of the document.

See the 'Read Me First' document for a complete set of instructions on how to use these resources.

LEARNER GUIDE

RIICPL301E Install Water Mains Pipelines

Learner Name:	
Learner ID:	
Learner Contact Number:	
Learner Email Address:	
Date Training Commenced:	

This Book Contains:

- ☐ Course Information.
- ☐ Review Questions.
- ☐ Practical Assessment overview and Instructions.

Table of Contents

1.1 Introduction

These materials are based on the National Unit of Competency **RIICPL301E Install Water Mains Pipelines.**

You will learn about:

- Planning and preparing for installing pipelines.
- Setting out and excavating the trenches for the pipelines.
- Installing the pipelines.
- Testing the pipeline systems.
- Clearing up the work area.

1.1.1 Water Main Systems

A water mains system, or pipeline, is a network of pipes used for distributing water to people (residential, industrial, commercial, and fire hydrants).

Water main system types can include:

In-Ground Systems	Combined with pressure, these make up the most common systems installed in Australia.
Above Ground Systems	These are less common. Sometimes used when retro-fitting a mains system to small, remote rural settlements.

Systems are normally delivered by pressurised systems. The system may be pressurised by gravity or mechanical methods such as pumps and compressed air.

These systems are vital for regulated supply of water from its storage location to consumers. Installation of these systems must meet the design requirements otherwise the system may have incorrect pressure.

Generally the pipe will start as a large diameter, gradually progressing to smaller pipe sizes with various outlets, valves and reducing structures through the system.

The system, when complete must be 'charged', meaning that the water is pumped to meet specified pressures.

1.1.2 Construction of Pipelines

Water mains are constructed based on the principle of water reticulation. Water reticulation is the process of moving water or other fluids from one location to another. It is the primary focus of any mains pipe system.

Water reticulation systems may include:

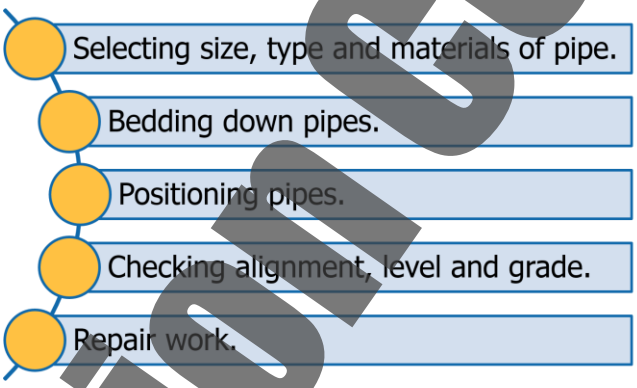
- Urban drinking water supplies.
- Regional water source management and transfer.
- Recycled wastewater systems.
- The collection and distribution of treated wastewater into drinking water supplies.

1.1.3 Installation Procedures

The installation procedures for pipelines will be outlined in the work instructions and job specifications.

The specific installation procedures will vary depending on your location, what materials you are using, and the local and state government requirements that must be met.

The installation procedures in your work instructions will guide you through the process of:



Depending on the worksite and design requirements, the type of system being installed and the materials involved, different methods of installation may be used. These methods may include:

- Open trenching.
- Direct pipe laying.
- Direct boring.
- Raised pipeline.

Installation Method	Explanation
Open Trenching	Open trenching is where a trench is dug and the pipes are then laid within the trench confines. This is most commonly used with large bore pipe systems and systems that are not very flexible (such as concrete).
Direct Pipe Laying	Direct pipe laying usually involves specific pipe laying plant ripping a line then inserting the flexible pipeline into the ground. This method is very efficient in soft ground and long distances can be covered in each section. It is not ideal for very hard ground, which can damage the machinery.
Direct Boring	Direct boring uses a direct drill system to drill the hole and insert the pipe or conduit in one process. This method is very useful for short sections or in ground that may not respond well to excavation and could collapse. Sometimes direct boring is done in urban areas to minimise the disruption and inconvenience to traffic and pedestrians.
Raised Pipeline	In a raised pipeline, some or all of the pipe is mounted on blocks or installed above the ground. The pipeline is then lowered into the ground using large plant items designed for this work. This method is generally used for mains pressure systems leading to storage reservoirs or where large pipes are required over a long distance.

Review Questions

1. List two (2) things that water reticulation systems may include. ☐

1.

2.

2. What will the specific water mains installation procedures vary depending on? ☐

1.2 Site Policies and Procedures

You must follow all safety rules and instructions when performing any work. If you are not sure about what you should do, ask your boss or supervisor. They will tell you what you need to do and how to do it in a safe way.

1.2.1 Operations Documentation

Before starting your work you need to make sure you have access to all operations documentation for the job. This will help you to do your work in the safest way and make sure all work is compliant.

Operations documentation includes:

Site Details
The information and safety requirements of the workplace environment (where you will be working).

Hazard Details
Any hazards in the work area or related to the work. This could also include instructions on how to handle dangerous or hazardous materials.

Task Details
Instructions of what the work is or what you will be doing (this can include diagrams or plans). Also instructions on how to safely do the job.

Faulty Equipment Procedures
Isolation procedures to follow or forms to fill out.

Signage
Site signage tells you what equipment you need to have, or areas that are not safe to be in.

Emergency Procedures
Instructions on what to do in emergency situations, for example if there is a fire, accident or emergency where evacuation or first aid is needed.

Equipment and Work Instructions
Details of how to operate plant and equipment and the sequence of work to be done.

Your worksite will also have instructions for working safely including:

- Emergency procedures, including using fire fighting equipment, first aid and evacuation.
- Handling hazardous materials.
- Safe operating procedures.
- Personal protective clothing and equipment.
- Safe use of tools and equipment.

1.2.2 Working in Confined Spaces

During your pipeline activities you need to be aware of the requirements, relevant legislation and standards for working in a confined space.

Depending on the tasks to be completed, you will come across a confined space when working:

- Inside deep trenches.
- In access chambers.
- Inside pipes large enough to enter.

Working in confined or enclosed spaces can be extremely dangerous and can lead to serious injury, illness or death for individuals or whole groups of workers.

It is very important that you have the ability to correctly identify a confined space in order to ensure the appropriate safety procedures can be followed and to determine if you are qualified to enter the space.

The Code of Practice for confined spaces defines a confined space as an enclosed or partially enclosed space that:

1. Is not designed or intended primarily to be occupied or entered by a person.
2. Is, or is intended to be, at normal atmospheric pressure while any person is in the space.
3. Presents a risk to health and safety from:
   - An atmosphere that does not have a safe oxygen level, or
   - Contaminants, including airborne gases, vapours and dusts, that may cause injury from fire or explosion, or
   - Harmful concentrations of any airborne contaminants, or
   - Engulfment.

Confined spaces may include:

- Culverts and storm water systems.
- Pipes and live or inactive sewer mains.
- Shafts, ducts and access chambers.
- Pits, trenches and gullies.
- Environmental traps and tanks.
- Box girders and bridge voids.

Before entering and working in a confined space you must have specific confined spaces training and the appropriate permit to work.

If you feel uncomfortable about working in confined spaces, speak with your supervisor about further training, task reallocation or other methods.

Review Questions

3.	List four (4) things that may be included in 'operations documentation'.	☐

1.

2.

3.

4.

4.	What two (2) things must you have before entering and working in a confined space?	☐

1.

2.

5.	What are two (2) examples of risks to health and safety that the Code of Practice for confined spaces considers when determining if an area is considered a confined space?	☐

1.

2.

1.3 Work Instructions

You need to be clear about what work you will be doing. Make sure you have everything about the job written down before you start. This includes what you will be doing, how you will be doing it and what equipment you will be using.

Make sure you have all of the details about where you will be working. For example:

- **The Site** – Is there clear access for all equipment? Are there buildings, structures, facilities or traffic in the way?
- **The Weather** – Is there wind, rain or other bad weather? Is it too dark?
- **Facilities and Services** – Are there power lines or underground services to think about?
- **Traffic** – Are there people, vehicles or other equipment in the area that you need to think about? Do you need to get them moved out of the area? Do you need to set up barriers or signs?
- **Hazards** – Are there dangerous materials to work around or think about? Will you be working close to traffic or machinery?

You also need to make sure you have all of the details about the kind of work you will be doing:

- **The Task** – What type of pipes need to be laid? How many? How long will it take?
- **Equipment and Materials** – What type of equipment will be used? How big is it? How much room does it need? Are there any special materials or chemicals that will be used? Will any plant items be involved in the work?
- **Communications** – How are you going to communicate with other workers?
- **Procedures and Rules** – Do you need any special permits or licences? Are there site rules that affect the way you will do the work?

1.3.1 Reading and Checking Your Work Instructions

All work needs to follow worksite, environment and company safety procedures.

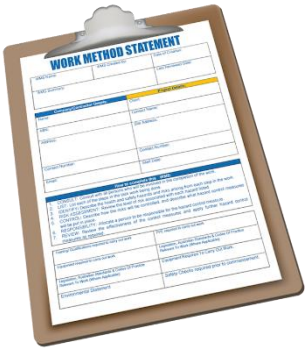
Procedures help to make sure that all work is done in a safe way, without damaging equipment or putting people in unsafe situations. They also help to make sure that work is done in the correct order and doesn't interrupt or get in the way of other work that is happening on the site.

Your work instructions will tell you the safest way to do the job, and the equipment that you will need to use. It is a good idea to check your work instructions with your boss or supervisor to make sure you know exactly what you need to do.

In some situations you may be required to put together a clear set of instructions from various sources. To do this you may need to understand and obtain relevant information from site drawings, blueprints or plans.

If you don't know where to get your instructions or you can't understand them, you can ask your boss or supervisor. They will tell you where to find your work instructions and explain what they mean.

1.3.2 Work Method Statements



Many worksites require a work method statement before any work can start. A work method statement is a list of steps that outlines how a job will be done. It also includes any hazards that occur at each step, and what you need to do about them.

These statements can also be known as Safe Work Method Statement (SWMS), Job Safety Analysis (JSA) or Safe Operating Procedure (SOP).

Work method statements are a great tool for organising your work activities and making sure you have completed everything. This is because they will outline the details of all tools, equipment and coordination with other workers relating to your job. Make sure all of these are available and ready before you start.

1.3.3 Safety Data Sheets

A Safety Data Sheet (SDS) is a detailed document outlining the risks and hazards associated with handling chemicals and other materials.

The SDS will contain details that can help you to identify:

Basic Details of the Chemical or Material	Name, type and identification number.
Hazards Associated with Use of the Material	Whether it is flammable or corrosive.
Safe Handling and Storage Procedures	PPE to use, sealed containers or storage temperatures.
Emergency Procedures	What to do if the chemical or material gets out of hand.
Disposal Procedures	Suggestions for removing the chemical or material from the site.

It will be issued by the manufacturer and may or may not include material handling methods.

Talk to your WHS representative or supervisor if you have any questions about legislative requirements relating to your work.

1.3.4 Project Quality Requirements

Every civil construction project will have quality requirements. These outline when tasks need to be completed and the required standard of the work.

Project quality requirements will tell you the types, quantities, grades and classifications of materials you will be working with.

Your work instructions and plans or drawings will guide you, and help you to make sure you are achieving the quality standard for the project.

They can include:

- Project dimensions.
- Project tolerances.
- Standards of work.
- Material standards.

1.3.4.1 Plans, Drawings and Sketches

Some of your work instructions might be given to you in drawings and sketches. You will need to get the information out of these and use it to do your job.

Project plans and drawings give you an overview of the site, for example:

- Location of the site and earthworks in relation to the surrounding area.
- The position of structures, roads, access areas.
- Layout of drainage lines.
- Foundation details and landscaping features.

The design of the water pipeline system may include engineering drawings. They illustrate the construction process, showing the location, depth, layout and dimensions of pipelines.

Types of engineering drawings or plans that you may find in the workplace include:

- Plan or overhead view.
- Long section.
- Cross section.
- Structural drawings.

Depending on the project, drawings may be very detailed or they could be simple sketches.

Interpreting the drawings can take time and practice. You should learn about the conventions and symbols used in the plans and drawings so you can understand what the information means.

Where possible, it is helpful to talk to site supervisors, engineers, managers or other experienced people in the organisation.

These people will be able to explain what the drawings are used for and how the installation of the pipeline may be done.

1.3.5 Worksite Communications

A pipe installation project is a team effort, from the planners through to the inspectors who check the final product.

It is important to coordinate your activities with other workers when you are planning for and carrying out the work to make sure everyone knows:

- The work being completed.
- How, when and where you will be operating.
- What they need to do.

All workers on site must understand their own role and the roles of others before starting work. It helps to make sure work is done safely and efficiently.

Workers you may need to coordinate with on site include:

- Supervisors and management.
- Plant and vehicle operators.
- Traffic controllers or other workers on the site.
- Team leaders.
- Site safety personnel.
- Processing plant operators.
- Maintenance workers.
- Crane and float operators.
- Contractors.
- Inspectors (both internal and external, including WHS, environmental and quality assurance officers).
- Site visitors.

You need to resolve any coordination requirements with all appropriate personnel before starting your work. This can be done by organising communications equipment, filling out documents and deciding on any special hand or whistle signals that will be used with other personnel.

Some communication methods may involve:

- Site meetings.
- Toolbox meetings.
- Team briefings.
- Notice boards.
- Policies, procedures and manuals.
- Work Methods Statements (WMS).
- Communications equipment, including:
  - Two-way radio.
  - Mobile phones.
  - Computers.
  - Landline phones.
  - Whistles, horns or bells.
  - Hand signals.
  - Flag signalling.
  - Verbal instructions.

If you are at all unsure about any aspects of communication on your worksite, re-read your work instructions or plans and speak with your supervisor.

Review Questions

6.	Why is it a good idea to check your work instructions with your boss or supervisor?	☐

7.	What is a Work Method Statement (WMS)?	☐

8.	List three (3) things that a safety data sheet (SDS) will help you to identify.	☐

1.

2.

3.

9.	What will project quality requirements tell you about the materials you will be working with?	☐

10.	What do engineering drawings illustrate?	☐