

# RIICPL302E

## Install Stormwater Systems

### Learner Guide Instructions

Who is this document for?

The learner.

What is in this document?

- Course training content (this matches the PowerPoint Presentation).
- Review questions.

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.

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



# LEARNER GUIDE

# RIICPL302E Install Stormwater Systems

<b>Learner Name:</b>	
<b>Learner ID:</b>	
<b>Learner Contact Number:</b>	
<b>Learner Email Address:</b>	
<b>Date Training Commenced:</b>	

## This Book Contains:

- Course Information.
- Review Questions.

Evaluation Copy Only

# Table of Contents

<b>1.1 Introduction</b>	<b>5</b>
1.1.1 What is a Stormwater System?	5
1.1.2 Construction of Stormwater Systems	5
1.1.3 Installation Procedures	5
Review Questions	6
<b>1.2 Site Policies and Procedures</b>	<b>7</b>
1.2.1 Health and Safety Rules	7
1.2.2 Operations Documentation	8
1.2.3 How to Keep Everyone Safe	8
1.2.4 Working in Confined Spaces	9
Review Questions	10
<b>1.3 Work Instructions</b>	<b>11</b>
1.3.1 Reading and Checking Your Work Instructions	12
1.3.2 Work Method Statements	12
1.3.3 Safety Data Sheets	13
1.3.4 Project Quality Requirements	13
1.3.4.1 Plans, Drawings and Sketches	14
1.3.5 Worksite Communications	14
1.3.5.1 Communicating with Others	16
Review Questions	16
<b>1.4 Emergency Procedures</b>	<b>18</b>
1.4.1 Emergency Response	18
1.4.2 Emergency Shutdown of Equipment	19
1.4.3 Evacuation	19
1.4.4 First Aid	19
1.4.5 Fire Fighting Equipment	19
Review Questions	20
<b>1.5 Identify and Manage Risks and Hazards</b>	<b>20</b>
1.5.1 Identify Hazards	21
1.5.2 Assess Risks	22
1.5.3 Control Hazards	23
1.5.3.1 Personal Protective Equipment	24
1.5.3.2 Traffic Control Barricades and Signage	25
1.5.4 Environmental Protection Requirements	26
1.5.4.1 Waste Management	27
1.5.4.2 Sediment and Erosion Control	27
1.5.5 Reporting Hazards and Environmental Issues	28
Review Questions	29
<b>2.1 Select Tools and Equipment</b>	<b>32</b>
2.1.1 Choose Tools and Equipment	32
2.1.2 Common Tools, Equipment and Plant	33
2.1.3 Manufacturer Specifications	33
2.1.4 Check Tools and Equipment	34
2.1.4.1 Report All Faults	34
Review Questions	34
<b>2.2 Prepare the Work Area</b>	<b>35</b>
2.2.1 Inspect and Prepare the Work Area	36
2.2.2 Identify Services	36
2.2.3 Prepare Materials	37
2.2.3.1 Types of Pipes	38
2.2.3.2 Sourcing Backfill Materials	38
2.2.4 Dewater the Site	39
Review Questions	40

<b>2.3 Identify Stormwater System Details</b> .....	<b>41</b>
2.3.1 Gather Stormwater System Details .....	41
2.3.1.1 Location .....	41
2.3.1.2 Alignment Direction .....	42
2.3.1.3 Level and Grade .....	42
Review Questions .....	42
<b>2.4 Set Out Works</b> .....	<b>43</b>
2.4.1 Set Out Excavation Site .....	43
2.4.1.1 Mark Excavation Site .....	44
Review Questions .....	44
<b>2.5 Inform Operators of Requirements</b> .....	<b>45</b>
2.5.1 Communicate with Operators .....	45
2.5.2 Excavation Safety .....	46
Review Questions .....	46
<b>2.6 Install Bedding</b> .....	<b>47</b>
2.6.1 Bedding Materials .....	47
2.6.2 Laying Bedding Materials .....	48
Review Questions .....	48
<b>3.1 Install Stormwater System</b> .....	<b>49</b>
3.1.1 Lower Pipes .....	49
3.1.2 Position and Align Pipes .....	50
3.1.3 Join Pipes .....	50
3.1.4 Fit Devices .....	51
3.1.4.1 Valves .....	52
3.1.4.2 Concreting Requirements .....	52
3.1.5 Fit Inspection Openings .....	53
3.1.6 Position Side Support/Overlay .....	54
3.1.6.1 Check Support Structure .....	54
3.1.7 Continuously Check Alignment and Grade .....	55
3.1.7.1 Calculating Grade .....	55
Review Questions .....	56
<b>3.2 Monitor Backfilling</b> .....	<b>59</b>
3.2.1 Backfilling process .....	59
Review Questions .....	60
<b>3.3 Test the Stormwater System</b> .....	<b>60</b>
3.3.1 Test Stormwater System for Faults .....	60
3.3.1.1 Pressure Testing .....	61
3.3.1.2 Operational Testing .....	61
3.3.1.3 Record and Report Test Results .....	62
Review Questions .....	63
<b>3.4 Clean Up After Operations</b> .....	<b>64</b>
3.4.1 Clearing the Work Area .....	64
3.4.2 Checking and Maintaining Equipment .....	64
3.4.2.1 Cleaning, Checking and Maintenance .....	65
3.4.2.2 Storage .....	65
Review Questions .....	66

# 1.1 Introduction

These materials are based on the national unit of competency **RIICPL302E Install Stormwater Systems**.

You will learn about:

- ◆ Planning and preparing for line installation.
- ◆ Setting out and excavating the trenches for the stormwater system.
- ◆ Installing the stormwater system.
- ◆ Testing the stormwater system.
- ◆ Clearing up and finalising the work areas.



## 1.1.1 What is a Stormwater System?



A stormwater system is an independent, standalone collection of pipes, inlet points, pits and outlet points that is used to catch water runoff in areas where people live.

Stormwater systems cannot be used as mains water delivery systems or as waste collection systems.

It is essential that stormwater systems are standalone systems to avoid cross contamination of the water and risk making people and animals ill.

Permits, certificates and other legislative requirements must be obtained before starting the stormwater installation work.

## 1.1.2 Construction of Stormwater Systems

Stormwater systems 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 stormwater system.

Water reticulation systems may include:

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



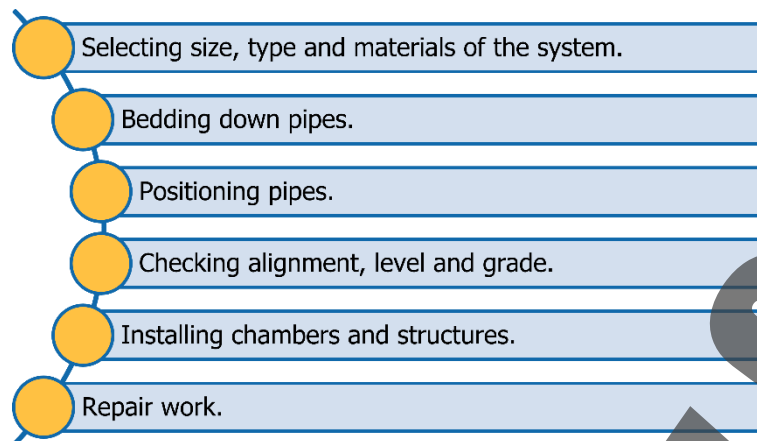
## 1.1.3 Installation Procedures



Stormwater systems are only installed in the ground. It is necessary for these systems to be in-ground to allow for the control of the incoming water in a non-dangerous manner.

The specific installation method 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.
- ◆ Cast-in-place systems.



## Review Questions

<b>1.</b>	List two (2) things that water reticulation systems may include.	<input type="checkbox"/>
1.		
2.		

**2.**

What will the specific stormwater system installation procedures vary depending on?



## 1.2 Site Policies and Procedures

You must follow all site 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 Health and Safety Rules

Every workplace has to follow laws and rules to keep everyone safe. There are 4 main types:

Rule	Explanation
<b>Acts</b>	Laws that protect the health, safety and welfare of people at work.
<b>Regulations</b>	Gives more details or information on particular parts of the Act.
<b>Codes of Practice</b>	Are practical instructions on how to meet the terms of the Law.
<b>Australian Standards</b>	Give you the minimum levels of performance or quality for a hazard, work process or product.

Some states use OHS laws, and other states use WHS laws. They both talk about the same thing, but use different words or names for people. If you have any questions about safety rules you should talk to your boss or supervisor.

## 1.2.2 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:

<b>Site Details</b>	The information and safety requirements of the workplace environment (where you will be working).
<b>Hazard Details</b>	Any hazards in the work area or related to the work. This could also include instructions on how to handle dangerous or hazardous materials.
<b>Task Details</b>	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.
<b>Faulty Equipment Procedures</b>	Isolation procedures to follow or forms to fill out.
<b>Signage</b>	Site signage tells you what equipment you need to have, or areas that are not safe to be in.
<b>Emergency Procedures</b>	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.
<b>Equipment and Work Instructions</b>	Details of how to operate plant and equipment and the sequence of work to be done.

## 1.2.3 How to Keep Everyone Safe

WHS law says that all companies and workers need to keep themselves and other people safe while they work. This is called a duty of care.

To keep yourself and other workers safe you need to:

- ◆ Follow your instructions.
- ◆ Follow all workplace rules.
- ◆ Make sure all equipment is safe to use.
- ◆ Carry out your work safely.
- ◆ Report any problems.



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.



## 1.2.4 Working in Confined Spaces

During your stormwater installation 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 stormwater systems 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 or dusts, that may cause injury from fire or explosion, **or**
  - ◆ Harmful concentrations of any airborne contaminants, **or**
  - ◆ Engulfment.



Confined spaces may include:

- ◆ Culverts and stormwater 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	What are the four (4) main types of health and safety rules that you need to follow?	<input type="checkbox"/>
1.		
2.		
3.		
4.		

4	List three (3) things that may be included in 'operations documentation'.	<input type="checkbox"/>
1.		
2.		
3.		

5

What two (2) things must you have before entering and working in 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 stormwater system needs to be installed? How big is it? 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 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

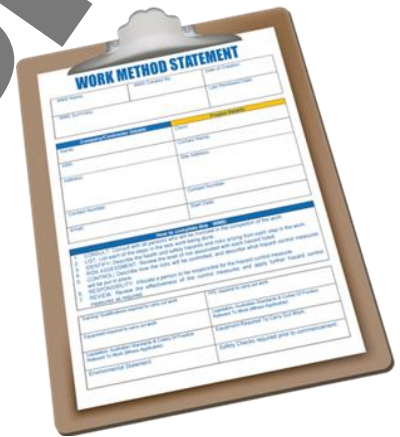
Many worksites require a work method statement before any work can start. A work method statement is a list of steps that outlines how a job will be done. It also includes any hazards that occur at each step, and what you need to do about them.

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.

A Job Safety and Environmental Analysis (JSEA) is a written document that details the high risk work activities carried out at a workplace, the hazards and risk arising from these activities, and the measures to be put in place to control the risks.

A JSEA considers both environmental and health hazards. Its purpose is to help you implement and monitor the control measures established at the workplace to ensure high risk work is carried out safely.



### 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:

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



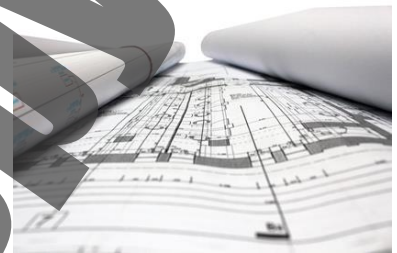
Project plans and drawings give you an overview of the site, for example:

- ◆ 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 stormwater system may include engineering drawings. They illustrate the construction process, showing the location, depth, layout and dimensions of the systems.

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 stormwater system 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:

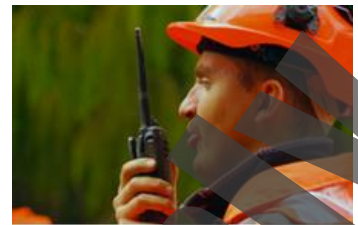
- ◆ The work being completed.
- ◆ How, when and where you will be operating.
- ◆ What they need to do.



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.

### 1.3.5.1 Communicating with Others

When communicating with others on site, make sure that you:

- ◆ Speak clearly and unambiguously – stick to the important details, don't waffle.
- ◆ Give instructions or directions so that they are easily understood.
- ◆ Provide complex information or explain issues to your listener in a way that ensures they understand. You could try breaking down the details, simplifying the information or referring to related examples.
- ◆ Listen carefully, answer questions and provide clarification as necessary. You can also ask questions to clarify understanding.
- ◆ Use all communications equipment appropriately, following the required procedures and protocols.



Make sure that you follow your site procedures and protocols for communicating on site. This may include using the correct communication processes for communicating work activities or exclusion zones.

### Review Questions

<b>6</b>	What should you do if you don't know where to get your work instructions?	<input type="checkbox"/>
<b>7</b>	What is a Work Method Statement (WMS)?	<input type="checkbox"/>