Unit of Competency CPCPPS5032 Design siphonic stormwater drainage systems

Application

This unit specifies the skills and knowledge required to design siphonic stormwater drainage systems, determine installation details, and prepare specifications for a range of residential, commercial and industrial buildings.

The role involves interaction with architects, builders, suppliers, clients and relevant planning authorities and requires a sound understanding of applicable legislation, standards and codes.

The unit requirements are typically carried out by experienced people such as hydraulic design consultants or persons in a supervisory capacity in relation to plumbing services on a new or existing site.

In some jurisdictions, this unit of competency may form part of accreditation, licensing, legislative, regulatory or certification requirements.

Prerequisite Unit

Nil.

Elements and Performance Criteria

1. Evaluate design parameters.	1.1 Establish scope of work for siphonic stormwater drainage systems. 1.2 Determine design parameters from relevant statutory and regulatory requirements, codes, plans, specifications and client brief. 1.3 Establish performance requirements considering safety of system users or building occupants. 1.4 Apply sustainability principles and concepts as part of the design process. 1.5 Interpret stormwater design manuals, manufacturer requirements and trade and technical manuals. 1.6 Conduct additional research, including a desktop study, to outline design parameters. 1.7 Determine factors that contribute to quality, safety and time efficiency. 1.8 Evaluate siphonic system attributes and conduct cost-benefit analysis, comparing a range of pipe materials and system designs.
2. Plan and detail system components.	2.1 Integrate siphonic stormwater drainage systems with the building structure. 2.2 Calculate volume of roof water and stormwater using approved methods. 2.3 Plan layout of pipework systems including type and location of fittings. 2.4 Calculate pipe size and flow requirements for applications according to stormwater collection requirements. 2.5 Plan pipe supports for applications. 2.6 Specify approved materials and components, jointing methods and installation requirements for siphonic stormwater drainage systems.
3. Design and size systems.	3.1 Design siphonic stormwater drainage systems for applications. 3.2 Calculate catchment areas, determine collection points and size siphonic

	systems. 3.3 Design and size siphonic stormwater drainage systems using calculations and computer software packages.
4. Prepare documentation.	4.1 Prepare client brief of the preferred design. 4.2 Prepare plans and specification for siphonic stormwater drainage systems. 4.3 Prepare testing and commissioning schedule. 4.4 Produce operation and maintenance manual, including information on how to properly and safely maintain the system.

Foundation skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Supersedes and is equivalent to CPCPPS5032A Design siphonic stormwater drainage systems.

Links

Companion Volume Implementation Guide:
https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad

Assessment Requirements for CPCPPS5032 Design siphonic stormwater drainage systems

Performance Evidence

To demonstrate competency, a candidate must meet the performance criteria for this unit by:

- designing, sizing and documenting the layout details, including a specification for two siphonic stormwater drainage system that include:
    - a site incorporating a high-rise mixed development building
    - a wide span project (such as a large bulk goods warehouse)
- preparing documentation which includes:
    - evaluation and details of design parameters relevant to codes and manufacturer requirements for siphonic stormwater drainage systems
    - evaluation of health risks associated with the siphonic system
    - materials and components that are compliant, fit for purpose, durable, compatible and cost-effective.

Knowledge Evidence

To be competent in this unit, a person must demonstrate knowledge of:

- common terminology and definitions used in the design of siphonic stormwater drainage systems for residential, commercial and industrial buildings
- drafting principles
- nature of materials used and effects of performance under various conditions
- procedures for estimating volume of stormwater run-off from rainwater collection areas
- principles of technology in the design of siphonic stormwater drainage systems
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards
- scope of work:
    - calculation of rainfall intensities in given catchment areas:
        - average rainfall intervals
        - meteorological information
        - rainfall intensities
        - stormwater collection area calculations
        - time and concentration
    - interpretation of plans and specifications
    - sizing and documenting layout of siphonic stormwater drainage systems for residential, commercial and industrial applications
- design requirements:
    - owner requirements
    - architectural plans

    - building specifications
    - pipework identification
    - catchment area
    - approved point of discharge
    - acoustic performance
- siphonic system attributes:
    - availability
    - cost
    - installation requirements
    - risks
    - site conditions
- cost–benefit analysis to enable cost-effective choices to be made without compromising integrity of project:
    - design styles
    - expected design life
    - labour costs
    - material costs
    - safety factors
    - speed of installation
- statutory and regulatory requirements and relevant Australian Standards and codes:
    - AS/NZS 3500 Plumbing and drainage set
    - AS 2200 Design charts for water supply and sewerage
    - Geberit or equivalent approved siphonic drainage system design criteria
    - Commonwealth, state or territory requirements and local governments requirements
    - National Construction Code (NCC)
    - other relevant Australian Standards and codes
- manufacturer requirements:
    - material specifications
    - sizing tables
    - technical and trade manuals
    - special siphonic drainage collection inlets
- information gathered during desktop study:
    - architectural and building plans
    - manufacturer data
    - developer plans
    - applications
    - brochures
    - forms
    - policies
    - reports
- performance requirements, including pipe flow velocities, flow conditions and discharge requirements established using relevant Australian Standards, codes and local authorities' requirements

- layout of pipework systems:
    - acoustic performance
    - amenity of the building
    - clipping and pipe support
    - fireproofing
    - function of the building
    - impingement on floor heights
    - location of pipework (fire rating of enclosure)
    - materials to be used
    - size of penetrations
    - type of building structure
    - principles of economy, serviceability, durability and fit for use
    - design which does not unduly affect building integrity and aesthetic appeal
- fittings:
    - bends
    - junctions
- pipe size and flow requirement calculations:
    - discharge
    - flow
    - manufacturers' tables
    - sizing, according to relevant Australian Standards and codes
    - velocity
    - volumes
- pipe supports:
    - anchors
    - bracket spacing
    - corrosion protection
    - cover
    - hanging brackets
    - material requirements
    - saddles
    - wall and ceiling brackets
    - acoustic resilient mounts
- appropriate materials specified, based on fit for purpose, durability, compatibility and cost-effectiveness:
    - copper (Cu)
    - polyethylene (PE)
    - polypropylene (PP)
    - stainless steel
    - other approved material
    - clips
    - fasteners
    - fittings

    - pipework
    - siphonic collection inlets
- jointing methods:
    - brazing
    - electrofusion welding
    - mechanical joints
    - rubber ring
    - other approved jointing methods
- installation requirements:
    - fire rating
    - level of workmanship
    - manufacturer-recommended specific fixings
    - pipe support
    - provision for expansion
    - serviceability and access
    - pipe protection:
        - corrosion
        - impact
- computer software packages:
    - manufacturer software
    - proprietary design software
- methods of applying sustainability principles and concepts:
    - selecting appropriate material to ensure minimal environmental impact
    - efficient use of material
    - efficient energy usage/capital outlay comparison
    - effect on the environment due to overflow or leakage
    - consideration of the Green Building Council of Australia rating scheme
- types of plans:
    - axonometrics
    - elevations
    - details
    - cross-sections
    - isometrics
    - schematics
    - sections
- plans produced using:
    - computer generation
    - drawing equipment
- specification:
    - commissioning
    - bedding
    - support
    - jointing

    - manufacturer requirements
    - materials
    - testing
    - workmanship
    - WHS
- testing:
    - hydrostatic test
    - inspection
    - performance
    - quality assurance (QA) audit
- commissioning schedule information:
    - system certification
    - checking for foreign material
    - checking leaks
    - cleaning grates
    - system defects
    - system functions as per design
- operation and maintenance information:
    - as installed drawings
    - certification documentation
    - results of commissioning test
    - maintenance schedules
    - manufacturer brochures and technical information
    - check for blockages
    - leak detection
    - regular inspection
    - regular maintenance requirements.

Assessment Conditions

Assessors must satisfy the requirements for assessors listed in the Standards for Registered Training Organisations.

This unit must be assessed in the workplace or a close simulation using realistic workplace conditions, materials, activities, responsibilities, procedures, safety requirements and environmental considerations.

Links

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