



Australian Government

Department of Education, Employment and Workplace Relations

MSS024009A Assist with assessing and monitoring stormwater systems

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to inspect and/or monitor small-scale urban or semi-urban drainage systems. Personnel will plan and conduct survey/inspection/audit activities, collect and interpret information about the characteristics and condition of the catchment, and identify environmental issues and possible causes. This work assists engineers and planners to develop stormwater management plans and/or assess the environmental impacts of existing conditions or activities.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- stormwater management
- clean water (e.g. catchments, supply and environmental flows)
- environmental services (e.g. monitoring of water quality)
- environmental compliance, auditing and inspection.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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| 1 | Confirm details of assigned activities with supervisor | <ul style="list-style-type: none"> 1.1 Clarify the scope and objectives of the assessment, constraints, stormwater components involved and stormwater management techniques already in use 1.2 Identify regulations, standards, guidelines, enterprise procedures that apply to assigned activities 1.3 Clarify the required outputs, timeframe, available resources and stakeholder involvement |
| 2 | Source and assess available stormwater system data | <ul style="list-style-type: none"> 2.1 Locate and obtain existing stormwater system information and review its relevance and accuracy 2.2 Locate external sources of relevant data sets and assess their availability, price, value and limitations 2.3 Obtain selected data sets in accordance with enterprise procedures 2.4 Use available data to identify (sub)catchment boundaries and modifications, 'hydrologic range', major land use categories, areas of potential pollution and environmental issues relevant to the study 2.5 Identify any significant information gaps |
| 3 | Plan and organise assigned field activities | <ul style="list-style-type: none"> 3.1 Confirm data collection points and data quality requirements 3.2 Analyse field activities to identify related tasks and plan efficient sequences 3.3 Identify risks, safety and environmental requirements associated with field activities 3.4 Assemble required field equipment and materials and check that they are fit for purpose 3.5 Liaise with relevant personnel to explain the scope and purpose of field activities, organise site |

- access and obtain permits, as necessary
- 3.6 Review work plan in response to new information, changed circumstances or instructions from appropriate personnel
- 3.7 Update work plan and communicate changes to appropriate personnel as necessary
- 4 Safely collect global positioning system (GPS) and environmental data
 - 4.1 Set up/optimize GPS equipment with correct datum and projection settings
 - 4.2 Set up measuring instruments on site and perform pre-use/calibration checks
 - 4.3 Operate GPS equipment/measuring instruments in accordance with manufacturer specifications and enterprise procedures
 - 4.4 Collect point positional data and attribute environmental data for each location in accordance with data collection plan
 - 4.5 Verify GPS/environmental data, identify atypical results and review procedures/troubleshoot equipment, as necessary
- 5 Perform field work
 - 5.1 Visually inspect stormwater systems to determine the degree of erosion/sediment transport along drainage channels
 - 5.2 Assess the apparent effectiveness of current stormwater control devices
 - 5.3 Assess the state of riparian vegetation associated with earth formed channels, ponds and basins
 - 5.4 Assess the diversity of vertebrate and invertebrate fauna in stormwater channels and receiving bodies
 - 5.5 Collect representative water, soil and/or sediment samples using specified sampling methods and equipment
 - 5.6 Obtain valid and reliable in-situ measurements

- using specified test methods and equipment
- 5.7 Identify litter generation areas and visually inspect the effectiveness of gross pollutant traps
 - 5.8 Identify and promptly report any illegal discharge to the stormwater system
 - 5.9 Inspect the condition of flood mitigating structures along drainages
- 6 Finalise field work
- 6.1 Pack and safely transport all samples, equipment and supplies back to home base
 - 6.2 Ensure all samples and data are stored safely
 - 6.3 Ensure dispatch of collected samples for subsequent analysis
 - 6.4 Clean and test equipment before storage
- 7 Report current stormwater system conditions
- 7.1 Review field measurements and/or results of laboratory analyses to identify significant trends and/or problems with data
 - 7.2 Analyse data relating to catchment characteristics, existing conditions and management values, as required
 - 7.3 Identify environmental issues that may impact on current stormwater management objectives/practices
 - 7.4 Report findings using a format and style that suits the intended use and in accordance with enterprise guidelines
 - 7.5 Communicate results within the specified time and in accordance with enterprise confidentiality and security guidelines

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| 8 | Maintain a safe work environment | 8.1 | Use safe work procedures and protective equipment to ensure personal safety and that of others |
| | | 8.2 | Minimise environmental impacts of testing/sampling and generation of waste |
| | | 8.3 | Collect and/or dispose of all waste in accordance with environmental requirements and enterprise procedures |

Required Skills and Knowledge

Required skills

Required skills include:

- interpreting procedures, guidelines and manuals
- locating and evaluating stormwater system information
- planning and conducting assigned field activities efficiently
- making objective observations based on clear criteria
- demonstrating correct and safe use of sampling/measuring equipment, including pre-use checks, to obtain valid samples and data
- identifying and rectifying basic equipment faults
- calculating simple flow rates, scientific quantities, uncertainties and unit conversion factors
- analysing findings of field work to produce reliable data and logical conclusions
- providing written reports that meet user needs
- communicating effectively with others, such as enterprise staff, members of the public, clients, council members and consultants
- responding effectively to changed or unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

Required knowledge includes:

- specific legislation, policies and guidelines relevant to field activities
- sources of stormwater system information
- terminology and principles of stormwater management
- basic design of stormwater transport systems, constructed wetlands and flood mitigation structures
- procedures and equipment for collecting soil, water and (micro) biological samples
- procedures and equipment for maintaining, storing and transporting samples/specimens to ensure their wellbeing, viability and integrity
- procedures and equipment for basic water flow and quality measurements
- fundamental principles of ecology and assessment of site environmental indicators
- environmental factors that impact on soils, water quality, population and diversity of flora and fauna
- enterprise procedures for the recording of field data
- reporting requirements
- protocols for the confidentiality and security of information and communicating with the

<p>community and media</p> <ul style="list-style-type: none"> • relevant health, safety and environment requirements

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include:</p> <ul style="list-style-type: none"> • planning and safely conducting surveys/inspections of a range of stormwater system components that meet user needs • accessing and using existing environmental data sets • obtaining reliable field samples and measurements • providing detailed descriptions of catchment characteristics, existing conditions, management values, environmental issues and possible causes • completing all documentation in the required format and timeframe • working safely.
Context of and specific resources for assessment	<p>This unit of competency is to be assessed in the workplace or simulated workplace environment.</p> <p>Assessment should emphasise a workplace context and procedures found in the candidate's workplace.</p> <p>This unit of competency may be assessed with:</p> <ul style="list-style-type: none"> • <i>MSS024005A Collect spatial and discrete environmental data</i> • <i>MSS024006A Perform sampling and testing of water</i> • <i>MSS024007A Collect and evaluate meteorological data.</i> <p>The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.</p> <p>Resources may include:</p> <ul style="list-style-type: none"> • access to natural and constructed drainage systems

	<p>and combinations of these</p> <ul style="list-style-type: none"> • sampling equipment, field instruments and materials • enterprise procedures, test methods and equipment manuals.
Method of assessment	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> • review of data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, sampling/measurement procedures and works safely • oral/written questioning associated with inspection/survey of stormwater systems, sampling/measurement equipment and procedures and stormwater assessment techniques • observation of the candidate collecting samples and conducting field tests. <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</p> <p>The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.</p>
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, guidelines, procedures and/or enterprise requirements	<p>Legislation, standards, codes, procedures and/or enterprise requirements may include:</p> <ul style="list-style-type: none"> • federal legislation, such as: • Environment Protection and Biodiversity

	<p>Conservation Act 1999</p> <ul style="list-style-type: none"> • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • Australian and international standards, such as: • AS/NZS 5667 set Water quality • state/territory Environmental Protection Agency (EPA) guidelines and manuals: • Managing urban stormwater: Council handbook (NSW EPA) • Water quality sampling manual (QLD EPA) • Regulatory monitoring and testing: Water and wastewater sampling (EPA SA)
Stormwater survey/inspection/audit activities	<p>Stormwater survey/inspection/audit activities may include:</p> <ul style="list-style-type: none"> • broad scale, ‘whole of catchment’ assessment of catchment health • assessment of environmental conditions or risk in a smaller, localised study area or individual premises
Stormwater management plan	<p>A stormwater management plan may include:</p> <ul style="list-style-type: none"> • existing and future values of a catchment • stormwater management objectives to protect these values • problems and issues that may compromise these objectives • agreed stormwater management practices (non-structural/structural) to mitigate existing impacts and minimise future impacts
Stormwater management techniques	<p>Stormwater management techniques may include:</p> <ul style="list-style-type: none"> • retention and restoration of existing watercourses and wetlands and riparian/foreshore vegetation, and aquatic habitats • control of source water quality and quantity through minimising impervious areas, stormwater re-use and infiltration, limiting development of flood plains,

	<p>community education, small on-site treatment measures</p> <ul style="list-style-type: none"> • ‘end of pipe’ techniques, such as use of retarding basins, gross pollutant traps, channel stabilisation/design, erosion and sediment control, and large off-site treatment
Stormwater system information	<p>Stormwater system information may include:</p> <ul style="list-style-type: none"> • terrain models • stormwater drainage plans • flood and drainage studies • water and sediment quality studies • contaminated site reports • aquatic ecology and riparian vegetation studies • land use information, such as topographical maps, aerial photos, satellite imagery and land use/zoning maps • reports of consultations with the scientific community, local environmental groups and industry associations, catchment management committees and councils • history of engineering works and modifications
Field equipment and materials	<p>Field equipment and materials may include:</p> <ul style="list-style-type: none"> • stormwater drainage maps, topographic maps, aerial photos, compass, survey point markers and drivers, GPS, tape measure, flagging tape and binoculars • data recording sheets, palm pilot, laptop, data logger and digital camera • sampling equipment, such as bottles, bags, biological specimen containers, secateurs, scoop nets, esky, preservatives, water pumps and tubing • automatic water samplers • portable water quality probe that measures dissolved oxygen, temperature, turbidity, pH, conductivity and field test reagents • tipping bucket rain gauge and data logger • flow meters • soil infiltration test rigs • personal protective equipment • appropriate clothing and footwear • phone • first aid kit • insect repellent

Laboratory analyses	<p>Laboratory analyses may include:</p> <ul style="list-style-type: none"> • suspended solids • total phosphorus • filterable reactive phosphorus • total nitrogen • total Kjeldahl nitrogen • oxidised nitrogen • faecal Coliforms • soil permeability
Catchment characteristics and existing conditions	<p>Catchment characteristics and existing conditions may include:</p> <ul style="list-style-type: none"> • physical characteristics, such as: <ul style="list-style-type: none"> • soils and sediments • topography, including slope characteristics • climate, including rainfall, evaporation • bridge and culvert crossings, major utility services that may impact on management practices • point sources of pollution (e.g sewage treatment) • major sewer outflows • existing stormwater management structures (e.g. retarding basins and constructed wetlands) • social characteristics, such as: <ul style="list-style-type: none"> • recreational areas • land use and land use zoning • waterway characteristics, such as: <ul style="list-style-type: none"> • stormwater transport via piped, lined or natural channels • characteristics of receiving water bodies (e.g. lakes, reservoirs, wetlands and estuaries) • erosion/sediment transport processes for natural/modified stormwater systems • surface hydrology (e.g. flooding and low flow) • water quality in stormwater transport systems and receiving bodies (dry/wet conditions) • ecological characteristics, such as: <ul style="list-style-type: none"> • aquatic fauna and flora in stormwater transport systems and receiving bodies • riparian zone fauna and flora • areas of urban bushland
Catchment values	<p>Catchment values may include:</p> <ul style="list-style-type: none"> • aquatic fauna habitats, such as appropriate substrate,

	<p>woody debris and aquatic plants</p> <ul style="list-style-type: none"> • terrestrial fauna habitats, such as riparian zone vegetation • aquatic flora (e.g. macrophytes) habitats, such as appropriate sediment, stream flow and water quality • terrestrial flora habitats, such as morphology of banks/floodplain, prevailing stream flow and groundwater conditions • avifauna (e.g. land-based and water birds) habitats, such as riparian zone, stormwater transport system and receiving water bodies • public health and safety (e.g. risk of bacterial pollution in stormwater run-off) • recreational values • visual amenity of stormwater systems and riparian zone • use of surface or groundwater as a water source • aquaculture and other commercial fishing • reuse of stormwater for (non)potable use • value of properties adjacent to visually attractive constructed wetlands and natural channels
<p>Environmental issues and possible causes</p>	<p>Environmental issues and possible causes may include:</p> <ul style="list-style-type: none"> • poor water quality in waterways (wet/dry conditions) due to excess fertiliser application, washing of cars in streets, sewer overflows, domestic animal droppings and atmospheric deposition • inappropriate stream flow regime (flooding, base flows) due to increased run-off from impervious areas and insufficient stormwater reuse • degraded aquatic habitats due to increased sediment deposition, removal of riparian vegetation • barriers to aquatic fauna migration weirs • degraded riparian vegetation due to introduction of exotic species and vegetation removal • channel erosion and sedimentation due to increased flood flows following urbanisation and vegetation removal • litter in watercourses due to insufficient number/emptying of rubbish bins and commercial waste • weed growth in urban bushland due to stormwater nutrients, weeds from residential gardens, and removal of canopy vegetation • degradation of ecologically sensitive water bodies

	<ul style="list-style-type: none"> • health risks associated with recreational use of polluted waters • low visual amenity and landscape value due to litter along watercourses and concrete lined channels
<p>Occupational health and safety (OHS) and environmental management requirements</p>	<p>OHS and environmental management requirements:</p> <ul style="list-style-type: none"> • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.