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Document Title	Storm Water Drainage Procedure
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Approved By	Brendan McKenna
Position	Director
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Purpose

Brendan McKenna Earthmoving is committed to constructing storm water drainage systems safely, efficiently and in accordance with engineering, environmental and quality requirements.

This procedure establishes the requirements for planning, excavating, installing and backfilling storm water drainage systems to protect workers, underground services, surrounding infrastructure and the environment while ensuring completed drainage systems meet project specifications.

This procedure supports compliance with the Work Health and Safety Act 2011 (Qld), Work Health and Safety Regulation 2011 (Qld), Environmental Protection Act 1994 (Qld) and Brendan McKenna Earthmoving's Integrated Management System (IMS).

Scope

This procedure applies to all Brendan McKenna Earthmoving employees and contractors undertaking storm water drainage construction at company worksites.

It applies to activities including:

- Survey and set-out.
- Trench excavation.
- Pipe bedding.
- Pipe installation.
- Pipe alignment.
- Backfilling and compaction.
- Construction of manholes and gully pits.
- Associated earthmoving plant operations.

Responsibilities

Role	Responsibilities
Director	Ensure adequate resources, plant and systems are available to safely undertake storm water drainage works.
Operations Manager	Plan drainage activities, verify project specifications and ensure this procedure is implemented.
Supervisors / Site Managers	Coordinate drainage construction, verify compliance with this procedure, monitor safety, quality and environmental controls and ensure work is completed in accordance with project specifications.
Health & Safety Representative (HSR)	Participate in worker consultation, assist with hazard identification and support continual improvement of drainage activities where required.
Employees / Plant Operators	Operate plant safely, follow this procedure, report hazards and equipment defects and maintain environmental controls.
Dogger / Spotter (where required)	Assist with lifting operations, guide suspended loads and ensure lifting activities are completed safely in accordance with company procedures.

Procedure

Brendan McKenna Earthmoving shall ensure all storm water drainage works are undertaken using suitable plant, competent personnel and approved engineering controls to achieve safe, compliant and durable drainage infrastructure.

1. Planning and Site Preparation

Prior to commencing storm water drainage activities, personnel shall ensure all planning activities have been completed and the work area has been assessed.

This shall include:

- Completing all required site inductions.
- Participating in the daily pre-start meeting.
- Completing a Personal Risk Assessment (Take 5) where required.
- Reviewing the relevant Safe Work Method Statement (SWMS) where applicable.
- Identifying underground and overhead services in accordance with Dial Before You Dig (1100) information and site investigations.
- Clearly demarcating and delineating the approved work area.
- Reviewing approved drainage drawings and confirming all personnel understand the installation requirements.
- Any discrepancies between approved drawings and site conditions shall be reported to the Site Manager before work proceeds.
- Confirming all required pipes, fittings, rubber rings, 5 mm drainage gravel and associated materials are available before commencing work.
- Confirming survey control points, access routes and excavation areas.

No person shall enter the drainage construction area unless authorised by the Site Manager.

Only trained, competent and authorised personnel shall undertake storm water drainage activities.

2. Trench Excavation and Bedding

Storm water drainage trenches shall be excavated in accordance with approved engineering drawings and project specifications.

The following operating sequence shall be followed:

- Set out the drainage alignment using GPS/UTS survey equipment.
- Establish a stringline between the upstream and downstream points and mark the excavation alignment.
- Commence excavation from the downstream end of the drainage system.
- Excavate using a bucket approximately **300 mm wider than the pipe** being installed.
- Confirm downstream invert levels and alignment before installing the pipe laser.
- Continue excavation allowing **200 mm of bedding** beneath the pipe invert.
- Excavations deeper than **1 metre** shall be benched where practicable.
- Excavations deeper than **3 metres**, or excavations greater than **1 metre where benching is not practicable**, shall be supported using an approved shoring system.
- Place **5 mm drainage gravel** evenly along the trench to form the bedding layer using suitable plant or equipment.

Personnel shall continually monitor:

- Ground conditions.
- Excavation stability.
- Underground services.
- Plant interaction.
- Exclusion zones.
- Weather conditions.
- Environmental controls.
- Groundwater infiltration and trench water accumulation.

Any unsafe condition shall be reported immediately to the Site Manager.

3. Pipe Installation

Storm water pipes shall be installed carefully to achieve the required alignment, grade and structural integrity.

The following installation sequence shall be followed:

- Confirm all lifting equipment is inspected, tagged and serviceable prior to lifting pipes.
- Lift and lower pipes into the trench using approved lifting equipment.
- Adjust and verify pipe alignment and grade using the pipe laser.
- Install the rubber ring onto the spigot end of each subsequent pipe before placement.
- Use a crowbar where necessary to carefully bring adjoining pipes together and ensure joints are fully engaged.
- Continue the installation sequence until all required storm water pipes have been installed.
- Regularly verify line, level and pipe alignment throughout installation.

Operators and ground personnel shall maintain continual awareness of suspended loads, excavation hazards, surrounding personnel and mobile plant throughout pipe installation.

4. Backfilling, Compaction and Environmental Controls

Storm water drainage systems shall be backfilled and completed in a manner that protects the installed pipeline, achieves the required compaction and maintains environmental controls throughout the works.

This shall include:

- Filling the trench with approved bedding and surround material (sand where specified) to the top of the installed pipe.
- Continuing backfilling in **300 mm compacted layers** using suitable material in accordance with project specifications.
- Compacting each **300 mm layer** before placing the next layer of fill.
- Undertaking **compaction testing every 500 mm of fill**, or as otherwise specified by the client, local authority or project requirements.
- Constructing final concrete floors at upstream and downstream ends where required to facilitate the construction of manholes and gully pits.
- Maintaining erosion and sediment controls throughout the duration of the works.
- Preventing unnecessary disturbance outside the approved work area.
- Reporting environmental incidents, spills or failures of environmental controls immediately to the Site Manager.
- Inspecting completed drainage works to confirm alignment, levels, compaction and compliance with project specifications before leaving the work area.

5. Documentation and Completion

Storm water drainage activities shall be documented in accordance with company requirements to demonstrate compliance with engineering specifications, quality requirements and the Integrated Management System.

This shall include:

- Completing Pre-start Inspections for all plant and equipment used.
- Completing a Personal Risk Assessment (Take 5) through the MCK Group App where available.
- Completing paper versions of the Pre-start Inspection and Personal Risk Assessment where mobile coverage is unavailable and forwarding completed records once adequate signal is available.
- Completing a Job Hazard Analysis (JHA) where activities fall outside the scope of this procedure or additional risks have been identified.
- Recording compaction test results and survey verification records where required.
- Reporting hazards, incidents, near misses and equipment defects in accordance with company procedures.
- Confirming all drainage works have been completed in accordance with approved drawings, project specifications and quality requirements before leaving the work area.

Records

The following records may be retained where relevant to storm water drainage activities.

Record	Responsibility	Retention Location
Personal Risk Assessments (Take 5)	Employees and Contractors	MCK Group App / Site Records
Plant Pre-start Inspection Records	Plant Operators	Plant Records
Validation of Competency Records	Operations Manager	Training Records
Survey Records	Site Manager	Project Records
Compaction Test Results	Site Manager / Supervisor	Project Quality Records
Drainage Inspection Records	Supervisors	Inspection & Audit Register
Incident and Hazard Reports	Employees and Supervisors	Incident Records
Corrective Actions	Operations Manager	Incident / NCR / Corrective Action Register

Related Information

- HS-PR-001 Risk Assessment Procedure
- HS-PR-003 Personal Risk Assessment (Take 5) Procedure
- HS-PR-005 Incident Investigation & Reporting Procedure
- OP-PR-018 Spill Response & Management Procedure
- HS-SWMS-006 Operating Mobile Plant
- HS-SWMS-005 Working in or around trenches & excavation
- Environmental Management Plan (where applicable)
- Environmental Aspects & Impacts Register
- Inspection & Audit Register
- Training & Competency Register
- Incident / NCR / Corrective Action Register
- MCK Group App
- Work Health and Safety Act 2011 (Qld)
- Work Health and Safety Regulation 2011 (Qld)
- Environmental Protection Act 1994 (Qld)

Review and Revision

This procedure shall be reviewed every two years or earlier following legislative changes, organisational changes, incidents, audit findings, changes to work practices or identified improvement opportunities.