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Document Title	Sub Soil Drainage Procedure
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Approved By	Brendan McKenna
Position	Director
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Purpose

Brendan McKenna Earthmoving is committed to installing sub soil drainage systems safely, efficiently and in accordance with engineering, environmental and quality requirements.

This procedure establishes the requirements for the installation of sub soil drainage, including trench excavation, AGI pipe installation, drainage aggregate placement, backfilling and final trimming to protect the pavement structure and provide effective subsurface drainage.

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 sub soil drainage activities at company worksites.

It applies to activities including:

- Survey and set-out.
- Trench excavation.
- AGI pipe installation.
- Drainage aggregate placement.
- Backfilling.
- Removal of contaminated material.
- Final trimming and compaction.
- Associated earthmoving plant operations.

Responsibilities

Role	Responsibilities
Director	Ensure adequate resources, plant and systems are available to safely undertake sub soil drainage activities.
Operations Manager	Plan sub soil drainage activities, verify design requirements and ensure this procedure is implemented.
Supervisors / Site Managers	Coordinate sub soil drainage activities, 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 sub soil drainage activities where required.
Employees / Plant Operators	Operate plant safely, comply with this procedure, report hazards and equipment defects and maintain environmental controls.
Survey Personnel (where required)	Establish survey control, verify levels and provide survey information to support accurate installation of the sub soil drainage system.

Procedure

Brendan McKenna Earthmoving shall ensure all sub soil drainage activities are undertaken using suitable plant, competent personnel and approved engineering controls to achieve a safe, stable and compliant drainage system.

Sub soil drainage shall be installed in accordance with approved drawings, survey control and engineering specifications to achieve effective subsurface drainage and protect the integrity of the pavement structure.

1. Planning and Site Preparation

Prior to commencing sub soil 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.
- Completing a **Dial Before You Dig (1100) / Before You Dig Australia (BYDA)** enquiry and identifying underground and overhead services in accordance with service plans and site investigations.
- Clearly demarcating and delineating the approved work area.
- Reviewing approved construction drawings and confirming the required trench depth, trench width and drainage layout.
- Confirming the Total Station, survey information and line marking equipment are available and calibrated.
- Ordering the correct sized agricultural (AGI) pipe and **5 mm drainage gravel** in accordance with the project specifications.
- Confirming all required plant, equipment and supporting resources have been organised prior to commencing work.
- Confirming survey control points, benchmarks and access routes.
- Reporting any discrepancies between approved drawings, survey information or site conditions to the Site Manager before sub soil drainage installation commences.

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

Only trained, competent and authorised personnel shall undertake sub soil drainage activities.

2. Sub Soil Drainage Installation

Sub soil drainage shall be installed in accordance with approved construction drawings and project specifications.

The following construction sequence shall be followed:

- Set up the **Total Station** in accordance with the manufacturer's instructions and project survey requirements.
- Connect the grader to the Total Station.
- Mark the lip of the kerb with line marking paint using the Total Station to establish the drainage alignment.
- Excavate the drainage trench using the **Ditch Witch** along the marked alignment to the required depth and width.
- Install the correctly sized agricultural (AGI) pipe within the trench in accordance with the approved drawings and project specifications.
- Ensure the AGI pipe is installed in the correct orientation and is free from damage or blockages before backfilling commences.
- Backfill the trench using **5 mm drainage gravel** to the height of the sub base.
- Windrow excess drainage material to either side of the trench, noting that material contaminated with subgrade shall be removed from the work area.
- Trim contaminated material using the grader to form a windrow adjacent to the pavement crown.
- Remove contaminated material using the bobcat and dispose of it in accordance with project and environmental requirements.
- Retrim the sub base that was previously left approximately **10 mm above the designed finished level** to remove all contaminated material.
- Complete the final static roll using the flat drum roller.

Personnel shall continually monitor:

- Survey accuracy.
- Trench dimensions.
- Pipe alignment.
- Drainage material quality.
- Ground conditions.

- Plant interaction.
- Material contamination.
- Environmental controls.
- Trench stability.

Any unsafe condition or non-conformance shall be reported immediately to the Site Manager.

3. Plant and Equipment Operations

Sub soil drainage activities shall be completed using suitable plant and equipment appropriate for the work activity.

Plant selection shall be appropriate for the ground conditions, trench dimensions and stage of pavement construction being undertaken.

Plant movements shall be controlled to minimise disturbance to completed pavement layers and the installed drainage system.

Plant and equipment that may be utilised includes:

- Grader
- Ditch Witch
- Bobcat
- Flat Drum Roller
- Total Station Survey Equipment

All operators shall hold the appropriate licences, competencies or verified training applicable to the plant or equipment being operated.

The Operations Manager or delegated Supervisor shall ensure operator competencies have been verified prior to commencing work.

Validation of Competency records shall be retained with the operator's training records in accordance with company requirements.

Operators and ground personnel shall maintain continual awareness of surrounding personnel, mobile plant, changing ground conditions and exclusion zones throughout sub soil drainage activities.

4. Quality, Compaction and Environmental Controls

Sub soil drainage shall be installed in a manner that achieves the required drainage performance, pavement integrity and finished surface while protecting the surrounding environment.

This shall include:

- Verifying the completed trench, AGI pipe installation and drainage material comply with the approved drawings and project specifications.
- Confirming the AGI pipe is installed to the correct alignment, grade and orientation to provide effective subsurface drainage.
- Inspecting the AGI pipe for damage, deformation or blockages prior to backfilling.
- Confirming the specified **5 mm drainage gravel** has been placed and compacted where required around the AGI pipe in accordance with project specifications.
- Ensuring contaminated material is completely removed from the sub base prior to final trimming.
- Retrimming the sub base to the designed finished level following completion of the drainage installation.
- Completing the final static rolling of the sub base using the flat drum roller.
- 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.
- Leaving the work area in a clean, safe and compliant condition.

5. Documentation and Completion

Sub soil 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 survey verification, trench inspections, pipe installation checks and quality control results in accordance with project requirements.
- Reporting hazards, incidents, near misses and equipment defects in accordance with company procedures.
- Confirming the completed sub soil drainage installation complies with the approved drawings, project specifications and quality requirements before leaving the work area.

Records

The following records may be retained where relevant to sub soil 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 Verification Records	Survey Personnel / Site Manager	Project Records
Drainage Installation Inspection Records	Site Manager / Supervisor	Project Quality Records
Construction 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
- Before You Dig Australia (BYDA)
- 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.