

C653 Caerwern House – Surface Water Management Plan

1. Objectives

To prevent the release of silt-laden or contaminated water from construction activities into surrounding watercourses during the demolition and ground remediation of Caerwern House and construction of new apartments and infrastructure. Particular attention will be given to groundwater pathway protection during mine-working stabilisation works due to the presence of shallow abandoned workings beneath the site.

2. Key Project Phases and High-Risk Activities

Stage	Key Works	Principal Risks
A. Early Works / Vegetation Clearance	Tree removal and existing vegetation within	Exposure of soils to rainfall and runoff.
B. Demolitions	Demolition of existing structures, removal of foundations and hardstandings, and preparation of working platforms prior to construction and mine-working stabilisation works.	• Mobilisation of suspended solids during breaking and excavation • Alkaline runoff from concrete crushing and washout • Exposure of made ground and previously sealed surfaces to rainfall • Localised interception of perched groundwater during excavation • Migration of fines along site gradients during rainfall events.
C. Drilling & Grouting Operations	Stabilisation drilling and pressure grouting of shallow mine workings within the Swansea Four Feet seam	• Interception of perched groundwater within superficial deposits • Migration of grout through fractured Coal Measures strata • Loss of grout into mine voids and preferential pathways • Breakout of grout or drilling returns at surface or downslope margins • Mobilisation of suspended solids during rotary drilling • Alkaline discharge associated with cementitious materials • Creation of temporary groundwater pathways between strata
D. Construction Phase	Construction activities including foundation construction, service installation, drainage works,	• Localised mobilisation of suspended solids during service trenching

hardstanding formation and building works.

- Interception of perched groundwater during foundation excavations
- Alkaline runoff associated with concrete works
- Accidental fuel or material spillages
- Runoff from temporary storage areas and working platforms

3. Vegetation & Soil Management

- Strip only what is required for each stage; maintain vegetated margins on all non-active areas.
- Clearly mark and fence “no-strip” zones.
- Progressive reinstatement – don’t leave significant areas of exposed soils.
- Stockpiles to be sealed, bunded, and surrounded with silt fencing at least 5 m from any drainage feature.

4. Water and Silt Control Measures

4.1 General Controls

- Install silt fences and V-ditches perpendicular to slopes on the South Boundary.
- Use rock checks / silt wattles where gradients exceed 3°.
- Provide temporary sump for any necessary pumping to sewer (as licenced by DCWW) but primarily managed through infiltration / infiltration zone for pumping on low point Southwest Boundary (as indicated in Appendix 1 of CEMP) and avoid placing pumps directly on the excavation base.
- All discharges to ground or to be manually controlled and visually checked before release.
- Store surplus silt fences, silt mats, wattles, and spill kits on site for rapid deployment.

4.2 Demolition Controls:

Care will be taken during demolition, crushing and earthworks operations to prevent mobilisation of suspended solids or alkaline runoff into temporary drainage pathways or underlying Secondary A aquifers associated with the Coal Measures beneath the site.

- crushing plant to be located away from site runoff pathways
- crushing avoided during periods of heavy rainfall where practicable
- crusher washout water contained within designated washout area
- no direct discharge of washout water to ground
- crushed material stockpiles to be located on stable working platforms
- stockpiles to be positioned away from drainage route

4.3 Mine-Working Stabilisation – Additional Groundwater Protection Measures

Given the presence of shallow abandoned mine workings beneath the site and Secondary A aquifer classification of the Coal Measures, additional groundwater protection measures will be implemented during drilling and grouting operations.

Controls:

- Rotary drilling to be undertaken using controlled flushing methods to minimise mobilisation of fines
- Drillholes to be temporarily cased through superficial deposits where required
- Injection pressures to be limited to designed thresholds to avoid hydro-fracturing
- Grout volumes monitored continuously on a hole-by-hole basis
- Any sudden grout loss or pressure drop to trigger immediate pause and review
- No discharge of drilling returns to ground without settlement and visual inspection
- Existing groundwater monitoring wells (BH01, BH04 and BH05) to be checked during works where accessible
- Daily inspection of downslope margins for evidence of breakout or migration
- Grouting works to cease immediately if unexpected groundwater inflow or breakout is observed

Groundwater Pathway Protection Strategy

Groundwater movement within the Coal Measures underlying the site is expected to occur primarily through fracture-controlled flow. Local perched groundwater has also been identified within superficial deposits.

To reduce the risk of creating temporary pathways between strata during mine-working stabilisation:

- drilling will be undertaken progressively and under supervision
- injection pressures will be controlled to avoid hydro-fracturing
- grout volumes will be monitored against expected takes
- abnormal drilling conditions will trigger immediate review
- any groundwater encountered will be contained and inspected prior to discharge

These measures are intended to prevent migration of grout or suspended solids into controlled waters during stabilisation works.

Drilling and Grouting Phase Controls

- Establish temporary settlement tank adjacent to rig or sump for drill flush returns
- Prevent direct discharge of drill flush water to ground or surface drainage
- Monitor grout takes against expected design volumes
- Record injection pressures continuously
- Install temporary containment where drilling occurs on sloping ground
- Maintain spill kits adjacent to all grout batching locations
- Prevent grout washout during plant cleaning operations
- Ensure grout batching areas are located away from drainage routes and bunded where practicable.

Monitoring will be undertaken throughout demolition, earthworks, culvert diversion and mine-working stabilisation operations to ensure protection of surface water and groundwater receptors.

4.4 Construction Water Protection Measures

During the construction phase the following measures will be implemented:

- Maintain temporary drainage controls established during earthworks phase

- Minimise duration of open foundation excavations where practicable
- Inspect excavation bases for groundwater ingress prior to progression
- Direct any pumped groundwater to settlement features prior to discharge
- Locate concrete washout areas away from drainage routes
- Store fuels, oils and chemicals in designated bunded areas
- Maintain spill kits adjacent to refuelling and plant locations
- Prevent storage of materials within temporary drainage pathways
- Maintain progressive reinstatement of completed working areas

5. Monitoring

5.1 Demolition, Clearance & Earthworks

- Inspection of exposed working areas during rainfall events
- Inspection of stockpiles and crushing areas weekly
- Inspection of temporary drainage routes
- Monitoring for perched groundwater ingress during excavation
- Monitoring of settlement features where pumping is required
- Inspection of downslope boundaries for evidence of sediment migration

5.2 Drilling & Grouting Works

- Daily inspection of site drainage routes and settlement features
- Visual monitoring of pumped discharges prior to release
- Inspection of downslope boundaries for evidence of silt migration
- Monitoring of temporary settlement tanks and sediment basins
- Monitoring existing groundwater observation points where accessible
- Recording grout injection volumes and pressures during stabilisation works
- Inspection of culvert diversion works during over-pumping operations
- Monitoring during and immediately following heavy rainfall events

Trigger levels requiring escalation:

- Visible turbidity leaving site boundary
- Unexpected groundwater inflow during drilling
- Sudden grout loss during injection
- Evidence of grout breakout at surface
- Settlement basin overtopping risk
- Failure of over-pumping system

5.3 Monitoring During Construction Phase

Monitoring will continue throughout the construction phase and will include:

- Inspection of excavation bases during foundation works
- Monitoring of any pumping associated with substructure works
- Inspection of temporary drainage routes following rainfall events
- Inspection of material storage areas and refuelling locations
- Monitoring for sediment migration toward site boundaries

6. Incident Response

Trigger

Forecast heavy rainfall / flood alert

Sump or temporary detention basin near capacity

Silt release detected

pH > 8.5 or visible cement washout

Immediate Actions

Stop excavation; lower basin water levels; deploy extra tanks; secure fuels.

Suspend works; tanker off excess water; activate secondary storage.

Cease pumping; check / install silt mats/wattles; notify site management & NRW (0300 065 3000).

Stop discharge; isolate source; treat water before re-release.

7. Responsibilities

- Site Manager: Implement and maintain all control measures and ensure stabilisation works follow agreed method statements
- Environmental Clerk / Supervisor: Carry out monitoring of settlement features, pumping operations and drilling/grouting activities; record observations weekly and following rainfall events
- Groundworks / Stabilisation Contractor: Monitor injection pressures and grout volumes; report abnormal losses immediately
- All Operatives: Report any discoloured water, grout breakout, unexpected groundwater inflow or sediment escape immediately

8. Review and Conclusion

This Surface Water Management Plan has been prepared to identify the principal risks to surface water and groundwater arising from demolition, crushing operations, earthworks and mine-working stabilisation activities associated with the Caerwern House redevelopment, and to define appropriate mitigation and monitoring measures to control those risks during construction.

The site is underlain by Coal Measures strata classified as a Secondary A aquifer, with local perched groundwater previously identified within superficial deposits. Historic shallow mine workings are also present beneath parts of the site. These conditions mean that construction activities have the potential to create temporary pathways for sediment-laden runoff or alkaline water if not appropriately managed. The control measures set out in this plan have therefore been designed to minimise exposed ground, manage runoff progressively, control drilling and grouting operations, and ensure that any pumped or disturbed water is inspected prior to discharge.

Demolition and crushing activities will be undertaken in controlled locations with appropriate containment of concrete washout and runoff. Earthworks will be sequenced to limit the extent and duration of exposed soils, with temporary interception measures installed where required to prevent migration of suspended solids across the site or toward downslope boundaries. Where perched groundwater is encountered during excavations or stabilisation works, flows will be directed through temporary settlement features and monitored prior to discharge.

Monitoring will be undertaken throughout the works to identify any unexpected groundwater ingress, sediment mobilisation or breakout associated with drilling or grouting operations. Defined trigger levels and incident response procedures are included to ensure that corrective action can be implemented promptly where required.

Overall, the measures described within this Surface Water Management Plan provide a proportionate and site-appropriate strategy for managing surface water and groundwater risks during the construction phase and are considered suitable to prevent unacceptable impacts on controlled waters during the proposed development works. The plan will remain a live document and will be reviewed and updated as construction progresses to reflect any changes in sequencing, working methods or site conditions.