Soil and Water Management Plan

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Approvals

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1.0 Context

The New Sydney Fish Markets (nSFM) will be purpose built to expand and improve the functions of the existing Sydney Fish Market, which is the largest of its kind in the Southern Hemisphere. The new facility will be located within an improved public domain at the head of Blackwattle Bay, adjacent to the existing market, and provide linkages to surrounding areas and public transport.

In essence, the nSFM development comprise a 4-story structure, surrounded by several external precincts. These precincts include new foreshore promenades, wharves, outdoor dining areas, integrated public domain spaces and road upgrade works to bridge road.

The building itself will house a range of retail premises, wholesale facilities, auction rooms, offices and commercial space, the Sydney Seafood School, and various back-of-house facilities including car, truck, and coach parking spaces. The nSFM will be supported by state-of-the-art back-of-house plant and recycling/waste management facilities.

Throughout the course of the project, the existing Sydney Fish Market must continue to operate and trade without disruption. Due consideration will also need to be given to the various stakeholder and environmental sensitivities, as well as the significant authority interface and approvals requirements.

Ferrycarrig has been engaged to undertake the design and construction of an 11kV feeder route and temporary power, stormwater, culvert extensions and revetment works, combined services, service relocations, and Bridge Road upgrade works.

As part of the project a Soil and Water Management Plan is required to be prepared to address the construction stages involved in the works and be updated as required (as conditions change).

2.0 Scope

This SWMP details the environmental practices to be implemented to ensure that water pollution and erosion and sedimentation are avoided on the Project. The objective is to control sediment and erosion of soil materials and ensure no discharge of untreated sediment laden or contaminated water to catchment areas or stormwater drains. This procedure also details the practices used to ensure that contaminated land and other contaminated materials are managed correctly in the event they are known to be present on site or are unexpectedly discovered during works.

3.0 Objective

The objectives of this SWMP are to:

- Ensure appropriate soil conservation practices (management of erosion and sedimentation) are implemented and that stormwater runoff is effectively controlled.
- Minimise potential for erosion and subsequent sedimentation of water courses / bodies.
- Ensure adequate drainage and pollution control measures are implemented to manage runoff from disturbed areas of the site.
- Ensure materials that have the potential to be contaminants (including ASS/PASS soils) are not released to any waters either in a direct or indirect manner because of construction activities.
- Provide appropriate management measures required to handle contaminated soils and minimise the potential impact on the environment caused by any potential disturbance of contaminated soils.
- To ensure that:
  - Project sites are investigated to establish the presence of contamination
  - No unnecessary disturbance occurs to contaminated sites or potentially contaminated sites

- The construction processes do not cause contamination of the site.
- All contaminated material uncovered is managed in accordance with legal requirements
- Appropriately manage potential risks to human health and the environment.

4.0 References

Legislation:

- Protection of the Environment Operations Act (1997) and associated regulations
- Catchment Management Authorities Act 2003
- Contaminated Land Management Act 1997
- Contaminated Land Management Regulation 2008
- Coastal Protection Act 1979
- National Parks and Wildlife Act 1974
- National Parks and Wildlife Amendment Act 2010
- Native Vegetation Act 2003
- Plant Diseases Act 1924
- Plantations and Reafforestation Act 1999
- Biodiversity Conservation Act 2016
- Catchment Management Authorities Act 2003
- Noxious Weeds Act 1993
- Soil Conservation Act 1938
- Sydney Water Act 1994
- Sydney Water Catchment Management Act 1998
- Water Management Act 2000
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Environmental Planning and Assessment Regulation 2000
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Maritime Services Act 1935
- National Environment Protection Council (NSW) Act 1995
- Protection of the Environment Operations Act (Underground Petroleum Storage Systems)
- Work Health and Safety Act 2011 (WHS)
- Work Health and Safety Regulation 2011

Other:

- Acid Sulfate Soils Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual 1998
- Acid Sulphate Soils Remediation Guidelines for Coastal Floodplains in NSW 2007
- The NSW Acid Sulphate Soil Management Guidelines (ASSMAC,2009)
- Queensland Acid Sulphate Soil Technical Manual (QASSMAC 2009)
- SA EPA Guidelines Site Contamination – acid sulfate soil materials (Nov 2007)
- Water Quality Management Guidelines 2002
- Erosion and Sediment Control Standard Version 9 2000
- ANZECC Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 2002)
- Water Quality Sampling Manual Third Edition 1999 Environment Protection Agency
- NSW Waste Classification Guidelines
- National Environmental Protection Council Schedule B: Guideline for the Investigation of Soil and Groundwater
- ANZECC/NHMRC 1992 Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.
- Australian Government Department of Sustainability, Environment, Water, Population and Communities 2009

- National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council 2013
- RMS Guideline for the Management of Contamination September 2013 Page 20 National Health and Medical Research Council (NHMRC) 2011 Australian Drinking Water Guidelines (ADWG), 2011.
- Managing Urban Storm water, Soils and Construction, The Blue Book (4th Edition, Landcom 2004)

5.0 General

Contamination is defined as: 'the condition of land or water where any chemical substance or waste has been added at above background level and represents, or potentially represents, an adverse health or environmental impact' (NEPM, 2013).

5.1 Vegetation Clearing

All vegetation to be retained is to be clearly identified prior to clearing operations taking plant. Areas which are not to be disturbed are to be clearly delineated with a minimum delineation of temporary fencing.

No storage of materials, plant or equipment will be permitted under the dripline of trees to be retained.

Only vegetation required for the completion of the works will be removed. All suitable weed free (no camphor laurel, privet, etc.) vegetation will be chipped for use in landscaping activities.

Tree removal and management shall be in accordance with the project's Arborist tree management procedure.

5.2 Construction Corridor Definition

Prior to work, the construction corridor will be identified and established by clearly visible delineation. Following this, vegetation removal can occur (pending fauna spotter requirements). Re-instatement of areas will follow completion of all construction and will remain in place until re-instatement is completed. Mapping of vegetation assemblages along the project route will be undertaken prior to clearing or construction commencing. Sensitive vegetation areas will be fenced off.

5.3 Translocation of Native Grass/Sod Material/Plants

For some projects in sensitive environments, it may be necessary to relocate native grasses or plants. This will require the development of:

- A harvesting technique
- Delineation of suitable weed free zones
- Recipient location sites to be identified.

The extent and design of the translocation of grasses or plants are to be agreed upon with the client prior to work commencing.

5.4 Soil Stripping

Prior to any earthworks on site, an Excavation Permit is required to be completed. The clearing and stripping works will be staged so this work is carried out immediately prior to excavations and earthwork. Near water courses, excavation works will be undertaken at times of low flow.

Wherever possible, cleared surface will be left in a rough condition to assist the reduction of surface

runoff. Where topsoil materials are to be stripped, stockpile topsoil to assist in rehabilitation. Stockpiles are to be managed accordingly:

- Stockpiles of materials must do not exceed 4m in height
- Stockpiles of material are constructed and maintained to prevent cross contamination
- Suitable erosion and sediment controls are in place for stockpiles
- No stockpiles of soil or other materials shall be placed on footpaths or nature strips unless prior approval has been obtained
- All stockpiles of soil or other materials shall be placed away from drainage lines, gutters or stormwater pits or inlets;
- All stockpiles of soil or other materials likely to generate dust or odours shall be covered
- All stockpiles of contaminated soil shall be stored in a secure area and be covered if remaining more than 24 hours.
- Replace subsoil layers in reverse order to original stripping and to the prescribed depths and compaction.

5.5 Stabilisation

Vegetation is an ideal and usually inexpensive method of stabilisation because it reduces soil erosion hazards by:

- Absorbing the impact of raindrops
- Reducing volume and velocity of run-off
- Binding the soil with roots
- Protecting the soil from wind erosion.

To ensure rehabilitation progresses adequately:

- Ensure that no vehicle traffic occurs over weed infested areas (where this is unavoidable it may be necessary to set up a wheel wash facility at the project site on exit from weed infested areas)
- Cut trees to be removed and grind stumps to ground level to minimise soil disturbance
- Segregate inappropriate vegetation (weed species) prior to chipping/mulching and reuse.

5.6 Design Activities

The proposed stormwater disposal and drainage for the development will be designed in accordance with:

(i) Australian Rainfall and Runoff-A Guide to Flood Estimation, Volumes 1 and 2 (1987)

(ii) (ii) SA/NZS 3500.3.2 National Plumbing and Drainage Part 3.2: Stormwater Drainage - Acceptable Solutions;

5.7 Construction Activities

Construction activities will be programmed to minimise the area of disturbed ground that is exposed to erosion at any time. Works will be staged to minimise exposure of soils to erosion. Vegetation shall be retained as much as possible. No clearing will be allowed outside the limits of the works. Works shall limit as far as practical the disturbance to water ways and drainage lines. Disturbed areas will be progressively re-vegetated as soon as practicable.

All soil erosion and sediment controls will be planned and installed prior to the start of any works that will disturb soils. Erosion and Sediment Controls will be covered in Ferrycarrig EWMS, Inductions and will be communicated to all site personnel prior to starting on site. Erosion and sediment controls are required for all project areas where soil erosion and sedimentation impacts are potential.

Measures such as temporary storage, filter barriers, dissipaters, silt fences, straw bales and kerb filter socks shall be installed on all road drains and around access points. Erosion and sediment controls at waterway crossings (i.e. waterway barrier works) will include silt fencing and straw bales along waterways in a multibarrier system, to prevent sediment reaching waterways.

Construction barrier bunds shall be constructed to divert water around disturbed work areas. Pumping of water around construction zones may be necessary for significant water flows. Where water is pumped around the construction zone precautions should be taken to avoid scour and turbidity at the discharge point (e.g. in shallow water affix geofabric to bed at discharge point).

Sediment controls shall be installed in accordance with relevant guidelines and standards for the installation of such controls. These shall be continuously maintained to filter sediment from site runoff. Sediment shall be removed from all sediment controls where the accumulated sediment has reduced the capacity of the structure by 30% or more. Sediment controls shall be maintained regularly, and controls replaced immediately when deteriorated or damaged.

The sediment removed will be disposed of in such locations that the sediment will not be conveyed back into watercourses. These areas include subsoil stockpiles, trenches, backfill batters etc. Suitable access to sedimentation control structures will be maintained to allow cleaning out in all weather conditions.

Rock rumble/shaker grids or equivalent will be provided at all site access/egress points where there is a risk of dust/dirt/mud being tracked onto public roads. Concrete truck washouts will occur greater than 50m from any watercourse or drainage line and waste concrete materials will be removed to concrete recyclers.

Sediment and erosion controls shall not be removed from their respective locations until rehabilitation is completed.

All relevant controls will be further developed or updated as required upon further development of the design and construction methodology.

5.8 Topsoil Handling

Reuse topsoil material within 1 week of stripping, where possible. If it is to be stored for longer than 1 week, covers may be considered to prevent wind and rain erosion for stockpiles. Cover with a sterile crop if stockpiled for longer than 3 months. Cover crops that may typically be applied are shown in Table 1 as are the rates that may be applied.

Table 1 – Cover Crops

Description	Species Composition	Sowing Rate
Pasture Grass	Lolium, Festuca, Phalaris, Trifolium spp	75 kg/ha (hydro) 50 kg/ha (direct)
Road Verge	Lolium, Festuca, Phalaris, Trifolium spp	75 kg/ha (hydro) 50 kg/ha (direct)
Sterile Cover Crop	Jap Millet, Rye Corn	100 kg/ha (hydro) 50 kg/ha (direct)

5.9 Matting Overlay Materials

These materials are to be used in channel sections where creek channels are to be crossed. The material is to be 100% coconut fibre of similar organic product.

Matting is to be pegged at 1 metre centres with at least 150mm overlap on the vertical sections and 300mm overlap on the horizontal sections.

5.10 Reinstatement of Improvements

All damaged improvements such as lawns, driveways, paths and plantings shall be negotiated with the landowner, the relevant road authority and the local relevant council prior to disturbance. In general the areas should be reinstated back to the pre-disturbance status. No trees shall be planted over pipelines without the approval of the asset owner.

Weeding and management of the reinstated areas shall continue for the duration of contract's warranty period.

5.11 Revegetation

Revegetation is best carried out under qualified supervision taking into consideration the following: Stockpile Management

Stockpile all soil materials in separate horizons as they are removed. Stockpiles are to be no greater than 3 metres in height and should be re-spread as soon as possible – maximum 3 months placement. If stockpiles are to be in place longer than 3 months, a crop cover (as per section 4.7) may be required.

Stockpiles are to be protected from erosion by wind and rain. Temporary sediment control fences will be installed on the downslope side and diversion drains on the upslope side of all stockpile sites.

Stockpiles will not be placed in drainage channels, creek lines (within 1 in 5 year flood line), or within 2 metres of roads, fences or closer than 5 metres to any vegetation that is to be retained.

5.12 Creek Crossings

At all crossing points, maintain creek flow during construction where possible. Rehabilitate areas as soon as works are completed. Replace rock and creek line vegetation to ensure the environment is returned as close to possible to its pre existing condition.

5.13 Dewatering

Where dewatering is required, refer to 'Dewatering Procedure 10-3-001**'.**

5.14 Severe Weather Preparedness

In the event of/or forecast of severe weather the following precautions should be implemented at a minimum:

- Severe Weather Identification – Identification of the weather system approaching and identification of potential outcome of the weather system (i.e. high winds, heavy rains, lightning etc.). This identification should be made with the support of the latest available information from the Bureau of Meteorology (BOM).
- Site specific plans will be incorporated on site when weather forecasts are reviewed to manage stormwater and flood flows for small and large sized events, including but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.
- Risk Evaluation – Based on the identification of the weather system and latest information from BOM, a risk evaluation should be completed for the site and a determination of appropriate treatments should be formulated.

- Weather Treatments – A list of weather treatments formulated in the process of the risk evaluation should include immediate short term, mid-term, and long-term measures where appropriate to ensure the stability of the site and the protection of the environment to the greatest extent practicable based upon the type of severe weather anticipated. Measures should include appropriate controls to effectively mitigate risks to; pavement or hardstand areas, earthworks and excavations, batters or embankments, culverts and stormwater inlets, drainage systems, surface waters, and general environmental protection. Such controls would include:
    - Sediment controls to prevent surface erosion and surface runoff to stormwater and the bay.
    - Battering of excavations and slopes to prevent stockpile run off.
    - Implementation of FIFM controls as agreed with Sydney Water.
    - Temporary back fill of excavations to minimise ponding on site.
    - Laydown areas of equipment and materials etc to positioned on high ground above flood mark.

- Rectification and Recovery – Following a return to site, rectification of site environmental controls and a recovery of site to acceptable environmental standards shall occur prior to the re-commencement of works.
- Contact Personnel – A list of responsible persons for the project found in the CEMP for the project shall be available onsite in an accessible location so that all personnel on site are aware of whom to contact and able to do so.

5.15 Offsite - Stormwater flows

The existing stormwater networks consists of stormwater inlets on bridge road, the stormwater network on bridge road connects to the culverts which discharge to Blackwattle Bay.
The stormwater inlets will be protected from potential stormwater runoff from site.
Stormwater runoff from site will be controlled through sediment and erosion controls and where possible will be contained on site where FC dewatering procedure will be followed. A detailed sediment control methodology for offsite flow will be developed as required upon further development of the stormwater design.

6.0 Potentially and/or Known Contaminated Sites

6.1 Site History Review and Preliminary Site Investigation

The first stage of contaminated site assessment involves establishing a site history of Potentially Contaminating Activities (PCAs). This Site History Review involves the collation of information, from various sources, to determine if the site is, or may have hosted, or is likely to have been impacted by, a potentially contaminating activity. Where a site history review clearly demonstrates that site activities have been non-contaminating this information can be used to justify not progressing with further assessment.

However, where there is an indication that the land may potentially be contaminated, because of current or past PCAs, a Preliminary Site Investigation (PSI) should be conducted by a suitably qualified and experienced consultant. A PSI usually includes a desktop study to identify the site characteristics (site location, site layout, building construction, geological setting, historical land uses and activities at the site and on adjacent sites) and a site inspection (including interviews with site representatives).

The PSI should be sufficient to determine contaminants of concern and identify areas of potential contamination, including all areas of potential contamination sources. The PSI may also include

initial sampling to provide a preliminary assessment of site contamination and need for further investigation.

6.2 Site Assessment

The investigations work done to date include extensive utility locating and potholing along the 11kv feeder route on bridge road. Soil samples have been taken and sent for laboratory testing to determine soil classification along the route.

Further site investigations are still to be conducted as required once possession of the fish markets site is taken.

The site assessment should:

- be undertaken in accordance with the NEPM; and
- be undertaken by professionals who have the relevant qualifications, competencies and experience for the site contamination issues under investigation.

6.3 Risk Assessment

A risk assessment is undertaken to establish baseline risks and to determine whether site remediation or other action is required and to determine a tolerable level of contaminants that can remain in place whilst adequately protecting health and ecological values. Site specific response levels are determined for contaminants of concern at the site and compared with laboratory results. If results are lower than the response levels no further action will be required. If results are higher than response levels a Remediation Plan must be developed.

6.4 Remediation

Remediation is to be undertaken as per an approved Remediation Plan. This plan is to be approved by the QHSE Manager and be developed in line with the site and risk assessments. The Remediation Plan is a site-specific document.

6.5 Validation

At the completion of site remediation, validation sampling will be undertaken and compared with the appropriate investigation or response levels to determine remediation success. A Remediation Validation Report is then prepared.

7.0 Unexpected Contamination

7.1 Segregation

Where unexpected contamination is encountered, the area of suspected contamination will be delineated and further testing to confirm contamination and type of contamination will be conducted.

Once an area containing contaminated soil is fully delineated the soil is to be removed in layers corresponding to it classification. To ensure all the contaminated soil is removed 50-100mm of clean soil vertically and horizontally is to be included in the excavated contaminated soil. It must be noted that this mixing of layers will always result in the material being classified as the highest classified substance within the stockpile, as a result, mixing of profiles in any other circumstances is not recommended.

7.2 Storage

If the storage of contaminated soil is permitted on site by the landowner and relevant environmental approval (EIS, REF, SEE, EA etc.) the following will apply:

- The contaminated soil must be placed on a fully bunded pad that is covered.
- Preliminary testing of the contaminated soil may be required before stockpiling and potential treatment occurs, the Project Engineer is to be contacted prior to stockpiling for confirmation
- Untreated contaminated soil must be removed from site as soon as practicable.
- Stockpiles are to be no greater than 4m in height at any time
- Drains are to be constructed upslope of the treatment area to divert water away from the contaminated soil stockpile.

8.0 Acid Sulphate Soils

8.1 Introduction

Acid Sulphate Soils (ASS) and Potential Acid Sulphate Soils (PASS) are naturally occurring sediments which may be found in low lying areas near waterways swamps and wetlands. Environmental risk is associated with Potential Acid Sulphate Soils relates to when it is exposed to air by either excavating or the lowering of water tables the soil profile can oxidize to generate sulphuric acid. The acid generation and subsequent mobilization of metals can cause fish kills, vegetation death, contamination of groundwater and corrosion of concrete and metal infrastructure.

8.2 Identification

ASS is predominantly located around coastal lying areas. Before construction works begin site supervisors are to review the contents of the CEMP as previous testing may have identified existing ASS conditions. If the CEMP details the presence of ASS, the location and depth is to be clearly pegged/ marked onsite by the project Engineer. A site-specific ASS Management plan should be developed and followed as preference.

If no testing has occurred, the site supervisor should contact the QHSE Manger to ensure no further testing is required. If testing is required, no excavation works are permitted until testing has been conducted.

In all circumstances including where no further testing is required the site supervisor and Project Engineer are to remain vigilant for the following signs of ASS.

1. *Mottling of the profile. This is the combination of two profiles in a blotched or mottled arrangement. This is usually present in the B horizon (second layer form the surface). This is commonly associated with acid sulphate soils.*

2. *Strong Organic "sulphurous smell" (similar to rotten eggs), sulphur is the main active element which causes the disassociation of Hydrogen to produce an acid, as a result sulphur is commonly smelt initially when ASS is encountered.*

3. *The presence of marine sediments or shells, despite the fact that shells will have a neutralising effect on the acid producing soil, shell and items commonly found in marine environment are key indicators which are also commonly associated with ASS.*

If no further testing was recommended for the site and the above signs are noticed works are to stop and the Project Engineer & MPX personnel informed.

If testing areas have been identified by previous ASS testing and signs of ASS are identified outside the designated area, excavation is to halt and MPX personnel and the Ferrycarrig HSEQ called for further instruction.

8.3 Segregation and Storage

Once the area containing ASS soil is fully delineated the soil is to be removed in layers corresponding to it classification. To ensure all ASS is removed 50-100mm of clean soil vertically and horizontally is to be included in the excavated ASS. It must be noted that this mixing of layers will always result in the material being classified as the highest classified substance within the stockpile, as a result mixing of profiles in any other circumstances is not recommended.

If the storage of ASS soil is permitted on site by the landowner the following will apply:

- ASS soil must be placed on a fully bunded pad that is covered with a minimum of 5 kg lime/m^2 prior to soil stockpiling (pending the strength of the ASS/PASS greater applications may be required).
- The treatment pad must be fully bunded with sufficient free board in the bund to contain rainfall from storm events without risk of overflow. Both the pad and the bunding should be limed at a rate of no less than 5 kg/m^2 pending the strength of the ASS/PASS. The area should not be placed in flood prone zones where and when possible. In low lying areas the bund height should be sufficient to not be inundated by flooding events.
- Preliminary testing of the PASS may be required before stockpiling and treatment occurs, the Project Engineer is to be contacted prior to stockpiling for confirmation.
- ASS soil treatment pad must contain a sump in the lowest point of the area to catch all runoff from the pad. The water collected within the sump can only be pumped out if water is within ph6.5-8.5, turbidity is less than 20ntu and all other water quality requirements stated in the CEMP are met.
- Untreated ASS soil must be treated within 3 days and covered overnight.
- Stockpiles are to be no greater than 4m in height.

- Drains are to be constructed upslope of the treatment area to divert water away for the site.

Segregation and storage methods of ASS will be further developed or updated as required upon further development of the construction methodology.

8.4 Treatment

ASS soil is to be treated with fine grade agricultural lime at the rates specified by the laboratory testing, site engineers may be required to convert liming rates to simplified ratios based on the size of the excavator's bucket. Operators are to be tool boxed on these rates to ensure over or under dosing of lime does not occur.
Treatment is to occur by leveling the stockpile to no thicker than 500mm and applying lime at the specified rate. Once distributed the lime is to be worked into the soil until uniform mixing is achieved.

Soil is not to be reused or taken from site until validation testing has been undertaken by a trained person and the material is confirmed to be neutralized.

Treatment methods of ASS will be further developed or updated as required upon further development of the construction methodology.

8.5 Sampling

1. Collecting Samples: All equipment is to be clean and dry.

   Note: Trace amounts of sulfuric material from previous sampling may contaminate a sample that has no sulfides present, resulting in a false positive test.

2. Sample from the treated material a sample size 40 grams at a minimum of once per 50 cubic meters or 4 samples for any project having less than 50m3 in total. (See ASSMAC guideline located in the IMS for further details). Sample from top of pile, mid and lower sections of pile.

3. Remove large shells, stones and fragments of wood, charcoal and record removed contents. Small roots must be removed, as they contain sulfides and will contaminate the sample.

4. Place in a leak proof, temperature tolerant container and minimise the samples contact with air and moisture. Label with date time location and depth. Place in a cooler with dry ice or frozen bricks, preferably at 4oc or below.

5. Field Tests are preferentially done within 24 hours. If not, samples are to be frozen until dispatch.

6. Field tests are to be taken once every 50 cubic meters. See below for details.

8.6 Testing

ASS screening test (pH f)

Weigh 10 g of soil and mix with 40 ml of distilled water (use scientific scales 0.01gm accuracy)

- Stir for 30 seconds to create a homogenous mixture.
- Insert calibrated pH probe and record results

PASS screening test (pH fox)

- Weigh 10g of soil

- Check the pH of the 30% Hydrogen Peroxide solution is between 4.5-5.5, raising or lowering the pH can be done using either NaOH or HCL.
- Next with an eyedropper place two ml of a 30% solution of Hydrogen Peroxide on the 10 gm of soil
- Stir soil for 30 seconds to create a homogenous mixture
- Allow at least 30 minutes for the reaction to finish, keep longer if reaction processes such as fizzing are still evident
- Mix soil with 40ml of distilled water
- Insert pH probe and record the result

After addition of peroxide make note of temperature and colour changes, commonly reactions will emit heat and gases. Reaction intensity and odour must be recorded as the reaction takes place.

Results will be analysed based on

- **Parent material/ soil description**
- **initial moisture content**
- **presence of buffering material such as shells**
- **reaction intensity/odours/temp change/gas emissions and colour change**
- **pH change**

Soil is considered treated if pH (f) >5.5 and the pH (fox) is between pH 5.5-8.5. If the results fall outside these values untreated soil or additional lime will be added and retested before the soil is taken offsite.

The results will then be recorded in hardcopy

If deemed necessary by the client, 1:10 samples will be sent to the laboratory for confirmatory analysis by SPOCAS.

8.7 Transportation of Acid Sulphate Soils

Vehicles transporting ASS/PASS are to be fully covered when operating on public roads, onsite transportation uncovered may be allowed if approval is given by the Project Manager.

- Trucks are to be clean and free of debris when transporting ASS offsite.
- Preference is given onsite treatment and reuse. However, if ASS soil must be removed from site it can only be taken offsite after the soil has been treated and verified.
- Disposal can only be undertaken at licensed ASS handling landfills
- Prior to transportation offsite the project manager is to check with the QHSE Manager if any transportation license is required.
- Soil classified as contaminated and ASS will need to be classified for contamination and disposed of as per its contamination classification, i.e., Hazardous/ASS.

9 Transportation of non-Acid Sulphate Soils

Vehicles transporting contaminated soil are to be fully covered when operating on public roads, onsite transportation uncovered may be allowed if approval is given by the Environmental Representative.

- Trucks are to be clean and free of debris when transporting contaminated soil offsite.

- Disposal can only be undertaken at licensed waste handling landfills
- Prior to transportation offsite the project manager is to check with the Environmental Representative if any transportation licenses are required.
- Soil classified as contaminated will need to be classified for contamination and disposed of as per its contamination classification, i.e. hazardous.

10 Monitoring

Site inspections will be carried out by the Environment Representative and the Site Supervisor during excavation, storage and transport of contaminated materials. The works shall be monitored on an ongoing basis.

The results of all inspections and monitoring activities shall be recorded. Regular inspections of the site (including plant and construction activities) in respect of possible ground contamination will also be done and recorded.

Water quality monitoring for pH and turbidity shall be conducted in all nearby water bodies on a weekly basis or after a rainfall event exceeding 10mm in a 24 hour period. Results are to be recorded. Testing of the water quality (suspended solids, turbidity and contaminants) prior to discharging from the site to be in compliance with Managing Urban Stormwater - Soils and Construction Volume 1 (4lh Edition March 2004) and Conditions C24, C25 and C26 of SSD-8925.

Environmental auditing will be undertaken from time to time by the HSEQ Manager who will assess compliance to this procedure.

The Project Engineer and the Site Supervisor will monitor erosion and sediment control to ensure that water bodies adjacent the work site are well protected, and the findings recorded**.** Erosion and pollution controls will be inspected after rainfall events exceeding 10mm in 24 hours, and during periods of prolonged rain. Water discharge limits shall be in accordance with ANZECC Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 2002).

The frequency and type of monitoring under this SWMP is shown below in Table 2.

Table 2 - Monitoring Frequency

Control Parameter	Monitoring Frequency	Responsibility	Target Level	Record
Soil stripping/ stockpiling	Regular site inspections. European and aboriginal heritage monitors as required	Project Engineer/Site Supervisor/ Foreman	Stockpile locations and heights as per ECP **14-3-003** Soil stripping as per ECP **14-3-003** Possible European and aboriginal heritage monitors as required for initial earthworks in first 100mm of soil in any area of work.	Daily Site Diary
Silt fences/	Weekly and after periods of heavy rain	Project Engineer/Site	To ensure no pollution of water courses.	Daily Site Diary

Control Parameter	Monitoring Frequency	Responsibility	Target Level	Record
erosion controls	(>10mm in 24 hours),	Supervisor.		
Water Quality	pH, turbidity and oil and grease (visual). One background sampling instance per week in the waterway (downstream and upstream of the Project) and after rainfall exceeding 10mm in 24 hours. Every dewatering instance. ***Note: Background monitoring sample must be collected at least 100m from the nearest point of works.***	Project Engineer/Site Supervisor.	pH 6.5 – 8.5 Turbidity <20ntu No visible oil and grease Turbidity and pH can be tested with litmus paper or turbidity tubes or meters if meters are used Calibration is to be performed monthly on all pH and turbidity meters. Please refer to the Instruction Manual Folder in the IMS. For further details contact the FC QHSE Manger.	Background Monitoring Log Dewatering permit
Dirt/Mud on Roads	Visual monitoring during work hours	Site Supervisor	No mud tracked on to roads	Daily Site Diary
Rehabilitation	Weekly inspection of reinstated areas or following rain greater than 10mm per 24 hours	Project Engineer/Site Supervisor.	Cover factor of at least 50% to be maintained. Weeds to be controlled.	Daily Site Diary

11 Reporting

In the event of a breach of this SWMP, an improvement opportunity or non-conformance can be raised by anyone in the organization.

All complaints / incidents regarding erosion and sediment control and the management of water quality shall be reported to MPX, the Ferrycarrig Project Manager, the Ferrycarrig HSEQ Manager and an Incident Report shall be completed.

12 Revision History

Rev	Date	Description of Change	Approved
0.1	31/03/2021	- First Document Version	Y