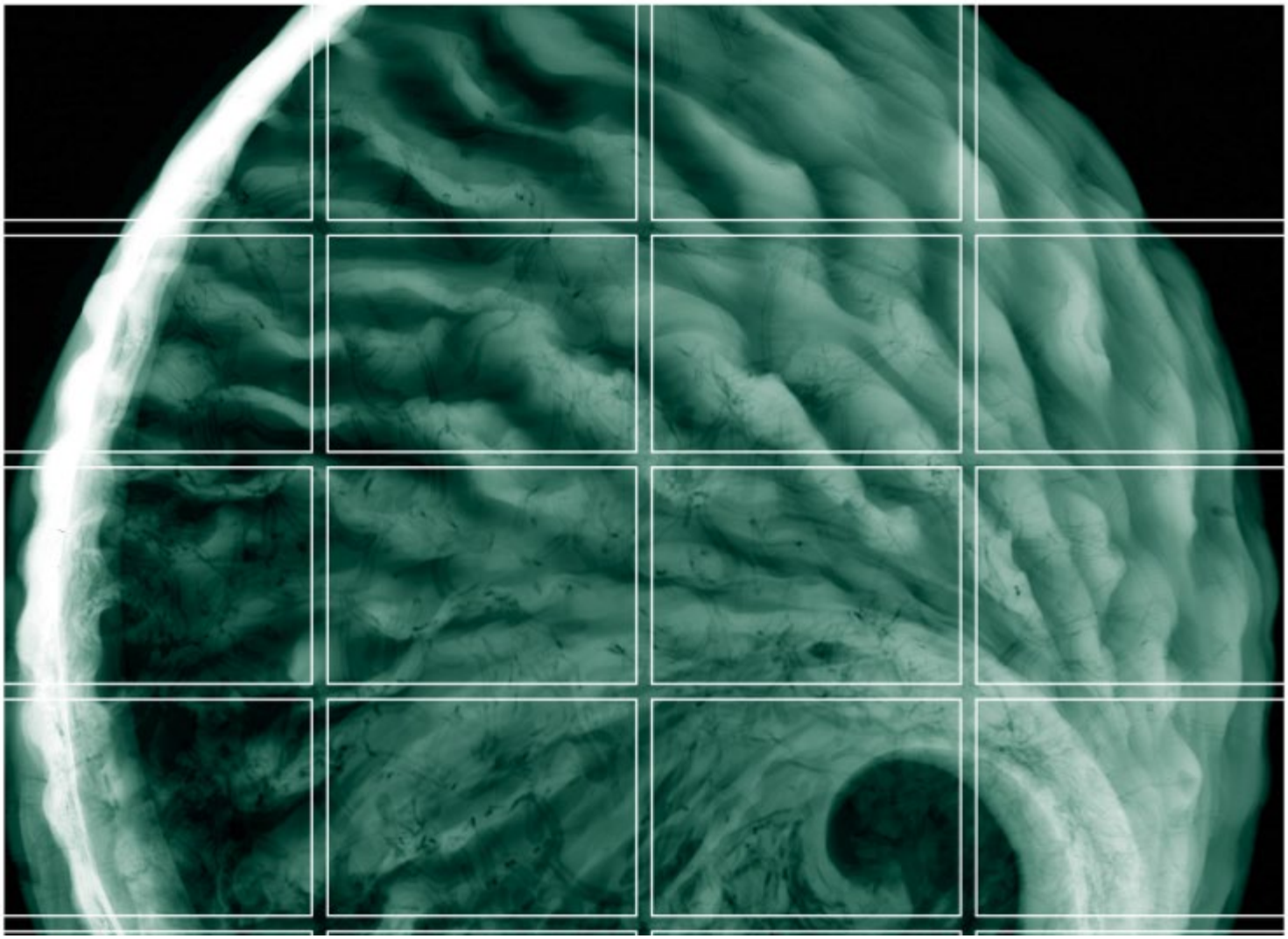

Fill Management Plan

Badgerys Creek Quarry and Brick Making Project

01 August 2023

Project No.: 0606483_S011411

The business of sustainability

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1 August 2023

Fill Management Plan

Badgerys Creek Quarry and Brick Making Project

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1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by CSR Building Products Limited (CSR) to prepare a Fill Management Plan (FMP) for the CSR Badgerys Creek site located at 225 Martin Road, Bradfield (formerly Badgerys Creek) [the Site].

This FMP forms part of the Environmental Management Strategy (EMS) for the Site and has been prepared to address the requirements of the Conditions of Consent (CoC), the Statement of Commitments (SoC) and applicable legislation, following The Department of Planning and Environment's (DPIE) determination of State Significant Development (SSD) Badgerys Creek Quarry and Brickworks (application number MP10_0014) on 27/09/2011, and more recently Modification 5 on 19/01/2022.

This FMP details management procedures for imported fill and site-won fill materials. At the time of writing, further investigation pertaining to potential contamination within portions of the Site was not completed, therefore although this FMP details the procedures for filling with site-won materials, site-won fill materials will require assessment by the environmental consultant and determined as suitable / unsuitable to remain onsite.

It is based on the current preliminary bulk earth works plan provided in **Appendix E Preliminary Bulk Earthworks**, approximately 1,013,150 m^3 of fill material will be required to be imported to Site to meet project requirements. In addition to this, a total of 1,074,600m^3 of site won materials will require assessment for site compliance.

The Site layout has been provided within **Appendix A** – Figure 1.

1.1 Background

The Site, as aforementioned, is located at 265 Martin Road, Bradfield, 41 kilometres to the southwest of Sydney, within the Liverpool City Council Local Government Area (LGA). Primary access to the Site is provided through Martin Road at the north-eastern corner of the site. This vehicle access currently terminates at the northern site boundary, although the road reservation continues through the site. The Site is a consolidation of lots which occupies an irregular shaped area of circa 200 ha located to the south of Elizabeth Drive. The Site is bound to the east by South Creek and to the west by Badgerys Creek while the large Inghams Enterprise site adjoins to the south and Australian Native Landscapes and rural residential properties adjoin to the north. The old brickmaking facility is located towards the centre of the site surrounded by excavated pits (a number of which are filled with water) and stockpiles.

It is understood that rehabilitation of the Site is to be undertaken in a phased approach, as follows:

- Phase 1 - 2021 to 2027
- Phase 2 - 2027 to 2031
- Phase 3 - 2031 to 2034
- Phase 4 - 2034 onwards

All fill importation works will be completed within Phase 1 of project. Phase 1 project will include the following activities:

- Construction activities;
- Dewatering of pits 1, 2 and 3;
- Quarrying activities in Pit 3; and
- Fill import for quarry rehabilitation activities and preferential backfilling of Pits 1, 2 and 3.

The proposed development under Modification 5 and the current proposed filling schedule of the Site across three stages is presented in **Appendix A – Figure 2**.

Phase 1 of the Project also allows for construction activities and brickmaking activities, however, the construction and operation of the brick factory does not form part of the current project.

1.2 Purpose and Objectives

1.2.1 Purpose

The development consent incorporates numerous requirements and restrictions in relation to the quantities of fill to be imported to site and in particular Schedule 3, Condition 39A requires the preparation of a Fill Management Plan (FMP).

- The purpose of this FMP is to outline the measures CSR will implement to endeavour to comply with the fill management as outlined within the Conditions of Consent (CoC). This FMP aims to demonstrate how imported spoil will be managed during construction of the Project.

The FMP must adhere to the conditions of approval; the conditions of approval and compliance has been further discussed within **Section 2** below.

1.2.2 Objective

The key objectives of the FMP are to:

- provide procedures for the management of fill during the rehabilitation of the site; and
- procedures for assessing, recording, handling and managing any contamination found on Site.

To achieve this objective, the FMP will establish details on the acceptance requirements for material providers, material inspection procedures, and quality control procedures required for material importation.

2. MINISTER'S CONDITIONS OF CONSENT

2.1 Environmental Requirements

The principal controls and constrains specified in the CoC in relation to Fill are detailed within **Table 2-1** below.

Table 2-1: Environmental Requirements

Schedule	Condition Number	Item	Environmental Requirement
2	12A	Truck movement	Truck movements entering or exiting the site on Sundays are restricted to the importation of Fill for the purpose of backfilling quarry pits and rehabilitation activities.[1]
3	1A	Operating hours	With the written agreement of the Secretary, the Applicant may undertake limited campaign trucking (within the limits imposed under conditions 10 and 12 of Schedule 2) for the import of Fill outside of the operating hours prescribed in condition 1 of this Schedule.
3	24	Signage	Erect signage on Elizabeth Drive advising of "trucks turning".
3	24	Wheel Wash	Install a wheel wash on the quarry access road and Fill haul road to prevent material being deposited on Martin Road.
3	24	Heavy vehicles	Ensure the access driveway from Martin Road is capable of catering for all heavy vehicles associated with the development in accordance with AS2890.2, to the satisfaction of Council.
3	26	Record Keeping	The Applicant must keep accurate records of all truck movements to and from the site (including time of arrival and dispatch and nature of material transported).
3	26	Record Keeping	The Applicant must keep accurate records of the weight of all bricks, Fill and quarry products transported to and from the site.
3	26	Record Keeping	The Applicant must keep accurate records of publish a summary of these records on its website every 6 months.
3	27	Trucks	The Applicant must ensure that all laden trucks carrying quarry products, raw materials or Fill have their loads covered when arriving at or leaving the site.
3	27	Trucks	The applicant must ensure that all trucks are cleaned of material that may fall from vehicles, before leaving the site.
3	27	Signage	The Applicant must use its best endeavours to ensure that appropriate signage is displayed on trucks used to transport finished building materials, quarry products or raw materials to or from the development so they can be easily identified by road users.
3	27	Planning	The Applicant must continue to engage with TfNSW regarding the detailed planning and design for the Eastern Airport Ring Road.

2.2 Reporting Conditions

Prior to recommencing quarrying operations or Fill import, and annually thereafter, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must include the requirements summarised in the table below.

The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.

Table 2-2: Reporting Requirements as stated by Schedule 5, Condition 12

Reference	Reporting Requirement
a	Describe the development (including any progressive rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year.
b	Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the: - Relevant statutory requirements, limits or performance measures / criteria; - Requirements of any plan or program required under this consent; - Monitoring results of previous years; and - Relevant predictions in the documents listed in condition 3 of Schedule 2.
c	Evaluate and report on: - The effectiveness of the air quality and noise management systems; and - Compliance with the performance measures, criteria and operating conditions in this consent.
d	Identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence.
e	identify any trends in the monitoring data over the life of the development.
f	Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies.
g	Describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.

2.3 Interface with Environmental Strategy

In operational terms, the FMP aims to minimise impacts from the Project at nearby sensitive receivers. In this way, the FMP supports the EMS of Badgerys Creek Quarry and Brick Making Project by helping minimise harm to the environment.

2.3.1 Onsite Surface Water Management

Onsite surface water is to be managed under the CSR *Badgerys Creek Surface Water Management System,* provided as **Appendix B**. The management system comprises two separate basins; Basin A for primary surface water collection and treatment basin and Basin B as a secondary discharge high efficiency sediment basin.

Basin A is utilised as the main catchment basin for the Site and captures surface water run-off and the water is subject to 'pre-treatment' within the basin to address levels of turbidity and pH. The water is then pumped into Basin B via a flow path which includes a treatment line fitted with a dosing system to aid flocculation and maintenance of turbidity and pH levels. Basin B is connected to the Site's licenced discharge point operated under Environment Protection Licence (EPL) no. 684.

2.4 Strategic Framework for Environmental Management

In addition to meeting the specific performance measures and criteria established under the CoC, CSR will endeavour to implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction or operation of the project, and any rehabilitation required under the approval.

2.5 Compliance with Conditions of Consent

The development consent incorporates numerous requirements and restrictions in relation to the quantities of Fill to be imported to site and in particular Schedule 3, Condition 39A requires the preparation of a Fill Management Plan (FMP). The plan must adhere to the conditions of approval as presented in **Table 2-3**.

"Prior to the import of Fill to the site, the Applicant must prepare a Fill Management Plan for the development to the satisfaction of the Secretary. The Applicant must implement the Fill Management Plan as approved by the Secretary."

Table 2-3: Minister's Conditions of Consent

Condition of Project Approval	Location of where addressed in FMP
Identify the quantities of Fill to be imported to site.	An approximate anticipated volume has been provided within Section 1
Describe the procedures for monitoring Fill imported to the site to ensure that it meets relevant quality specifications for VENM or ENM.	Section 4, 5, and 6
Describe a protocol to prevent materials that fail to meet the requirements of the ENM Exemption and ENM Order from being accepted.	Seciton 5, and 6
Describe the management of reject materials.	Section 6
Describe management measures for the direct placement and/or temporary stockpiling of Fill.	Section 6
Describe the process for handling Fill for use in rehabilitation.	Section 6
Describe measures for the on-site use of water captured in sediment basins to ensure that the water does not present a contamination risk.	Section 2.3.1
Describe processes for assessing, recording, handling and managing any contamination found on the site.	Section 7 and Appendix D
Provide an indicative schedule of Fill material to be imported to the site for each phase of the development, in order to achieve the conceptual final landform.	Section 1.1 (all fill is proposed to be imported during Phase 1)

3. FILL MANAGEMENT PLAN IMPLEMENTATION

3.1 Responsibilities and Authorities

The requirements for quality of material, procedure and limitations of the filling of the quarry are outlined in the CoC. **Table 3-1** summarises these responsibility requirements.

The work must be continuously supervised (full-time) by the relevant nominated Geotechnical Consultant and Environmental Consultant during the importation of soil, on-site material testings / inspections and filling as identified. The primary responsibilities of the personnel undertaking the site supervision are also discussed below.

Table 3-1: Site Roles and Responsibilities

Role	Responsibility
Site Superintendent / Site Manager	The primary role of the Site Superintendent is to ensure that only VENM or ENM is imported to the site. Additionally, the Site Superintendent is to be responsible for ensuring that materials tracking documentation is obtained that will be sufficient to allow the Site Auditor to independently check whether imported materials meet NSW EPA and Council requirements. The Site Superintendent will ensure that a mechanism exists for notification to both consultants of site details as well as a system for notification to the Superintendent from the civil contractor. Details should be able to be passed from the Earthworks Contractor to the Site Superintendent if any issues are identified on-site. As part of the works, the Site Superintendent will be responsible for notifying the Site Auditor without delay of non-conformances with the FMP, geotechnical specification and additional other non-compliance events notifiable to the Auditor. The roles of the Superintendent will include coordinating the haulage Contractor, Earthworks Contractor, Geotechnical Consultant and Environmental Consultant and to issue formal contractual instructions to the haulage Contractor and Earthworks Contractor. This will also include ensuring all procedures are assessed and complied with by the relevant consultants / parties for each relevant profession. Additionally, the Site Superintendent is to ensure a gatekeeper is working at the entrance gate to the site at all times when the gate is unlocked and open to traffic. The Site Superintendent will ensure that inspections are being undertaken on materials and will maintain records of materials used in filling. The Superintendent will also provide a written record to both the Geotechnical and Environmental Consultants, prior to the delivery of materials, of all imported materials, including origin, volume and estimated time of arrival on-site. The Site Superintendent will be responsible for the overall tracking of materials used on-site, maintenance of records and details of material imported and suppliers. Overall supervision should also include screening of material suppliers for suitable material for the filling works.
Earthworks Contractor	To perform all contracted tasks resulting in the infilling of the fill area with controlled filling that complies with all project designs and specifications. Civil works should only be undertaken following the authorisation / release of material by both the Geotechnical and Environmental Consultants. Continued auxiliary inspection of imported material to ensure non-compliant material is not used on-site (assessing visual indicators such as foreign materials, staining and odours). Any suspect materials should be notified to the Site Superintendent, relevant consultants and flagged for inspection.
Environmental Consultant	Inspection of all fill soils being placed into the site to assess if materials analysed and approved for placement are suitable and accurate, and that only compliant materials are used.

Role	Responsibility
	Develop a procedure for the assessment of materials prior to the importation of materials on-site. When available, previous reports such as Environmental Investigations, Geotechnical Investigations, Validation Reports and Remediation Action Plans should be revised to ensure the proposed material to be imported is suitable and in compliance with the requirements of the Development Consent Modification and this FMP. Visual assessment of material during placement and importation to ensure that authorised materials are compliant and unsuitable soils are not allowed to be used on-site. Undertake ongoing testing / assessment of imported soils as required to confirm compliance with the importation standards. Provide immediate notification to the Superintendent of any identified non-compliances on-site. Provide details and procedures for material identified as non-compliant for use on-site along with details of the management of that material. Undertake material validation testing and release of compliant soils where required.
Geotechnical Consultant	All geotechnical requirements are outlined in: - R.002 - Specification for fill material; - R.003 - Specification for bulk earthworks; and - R.004 – Detailed Investigation Part 1. These requirements should be adhered to at all times. Level 1 geotechnical supervision will be required by the nominated Geotechnical Consultant for the site. Additionally, the Geotechnical Consultant is required to specify and design the compaction works and to monitor all processes affecting the compaction of the filling placed on-site, including testing to ensure the finished filling volume satisfies the end development's requirements. To specify and monitor a technical specification for filling as outlined in the Earthworks Specification Report. The Geotechnical Consultant is responsible for notifying the Superintendent of non-compliances with the specification.
Gatekeeper	A gatekeeper is to be present at the entry gate to the site at all times when the gate is unlocked and open to traffic, with no deliveries to the site to be made when a gatekeeper is not present. The gatekeeper will be responsible for recording and inspecting all deliveries of imported material to the site, as well as keeping records as detailed in Section 5. The gatekeeper will be responsible for recording and inspecting all deliveries of imported material to the site. Reduced supervision of imported material is acceptable only when material is imported from a single source. Reduced supervision is justified by the presence of closed-circuit television (CCTV) cameras, heterogeneity of material and reduced truck numbers. If inconsistencies in material loads are identified during reduced supervision, import will cease until a gatekeeper is appointed to inspect trucks at the site gate prior to tipping.
Filling Supplier(s)	Only supply material that is compliant with the criteria provided in this FMP and in accordance with geotechnical requirements. Provide documentations, tracking the material from the source to the site, including but not limited to details of the load, date, time, vehicle registration, transporter and time of arrival. Accept responsibility of all material transported to the receiving site, including any material deemed to be not acceptable for on-site reuse. All unsuitable materials will need to be removed from the site.

3.2 Periodic Review

According to Department of Environment *Environmental Management Plan Guidelines* (2014), and Department of Infrastructure, Planning and Natural Resources (DIPNR) *Guideline for the Preparation of Environmental Management Plans* (2004), periodic review of this FMP should be undertaken when:

- When there is a change in scope of work;
- Following significant environmental incidents;
- When a non-compliance and/or incident occurs (as per definitions set out within CoC);
- when there is a need to improve performance in an area of environmental impact;
- at the completion of environmental audits; and
- at the end of each phase of works.

The process should include review of environmental controls and procedures in use to make sure they remain effective.

In addition, this FMP should be subject to the Independent Environmental Audit that is required as per CoC *Schedule 5, Condition 5, 13, 14* and *14A*, to ensure:

- Information and environmental management strategies remain relevant;
- Opportunities for improvement are identified;
- Changes to legislation, licence and approval conditions are compiled with; and
- Any field data collected are in compliance with selected criteria (if applicable).

Changes to this FMP should be documented and copies of all versions of the FMP should be kept for project records (DIPNR, 2004). Revisions of this FMP, following consultation with the planning authority, should be submitted for approval to the planning authority if required, and should be in accordance with CoC *Schedule 5 Condition 6.*

Reviews shall take the following form:

- management consideration of environmental issues on an ongoing basis as aforementioned (minimum annually);
- a duly qualified environmental consultant engaged by the Site Manager following significant environmental incidents or changes in Site conditions or operations that require changes to the environmental management of the Site; and
- a formal review by a duly qualified environmental consultant engaged by the Site owner every 3 years.

3.3 Incidents, Non-Compliances and Non-Conformances

For the purposes of this report, deviations from this FMP, outlined procedures or specifications are regarded as a non-conformance, with deviations from the act or regulations are defined as a non-compliance.

Non-conformances with this FMP are to be handled as detailed within Sections Error! Reference source not found. and **7.6.**

Reporting requirements for non-compliances are also provided within these Sections.

In addition to that provided within aforementioned sections, the Site Manager is required to notify the Department of incidents and non-compliances as per the definitions set out within CoC and *Condition 9* and *Condition 10:*

- Incident Notification –

"9. The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be made in writing through the Department's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident."

- Non-Compliance Notification –

"10. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be made in writing through the Department's Major Projects website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance."

4. MATERIAL IMPORTATION

Only virgin excavated natural material (VENM) or excavated natural material (ENM) is to be imported to the site for filling works if required. Importation should be conducted in accordance with the conditions of consent for the site.

4.1 VENM

The Protection of the Environment Operations Act 1997 defines VENM as:

> 'natural material (such as clay, gravel, sand, soil or rock fines) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals or process residues, as a result of industrial, commercial, mining or agricultural activities, and that does not contain any sulfidic ores or soils or any other waste'.

No other criteria for VENM have been approved. By definition, VENM cannot be 'made' from processed soils. Excavated material that has been stored or processed in any way cannot be classified as VENM.

4.2 ENM

The Resource Recovery Order (RRO) under Part 9, Clause 91, 92 and 93 of the Protection of the Environment Operations (Waste) Regulation 2014 defines ENM as:

> 'naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:
>
> a) Been excavated from the ground, and
>
> b) Contains at least 98% (by weight) natural material, and
>
> c) Does not meet the definition of Virgin Excavated Natural Material in the Act.'

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

The NSW EPA *The excavated natural material order 2014* outlines the requirements for the producer of excavated natural material and the NSW EPA *The excavated natural material exemption 2014* outlines the requirements for any person that applies or intends to apply excavated material to land.

Sampling requirements are outlined within Section 8 of this report, in accordance with NSW EPA *The excavated natural material order 2014*.

5. PRE-IMPORTATION REQUIREMENTS

Only certified VENM and ENM can be imported on-site for the filling of the site.

At all times, the acceptance of materials on-site is at the discretion of CSR Limited and its authorised parties, including the Environmental Consultant. In exercising this discretion, CSR will rely fully on the certification of each proposed delivery of material to the Site and the independent advice provided by the Environmental Consultant following a review of certification provided by the generator.

The following sub-sections detail the classifications, documentation and procedures that are required to obtain 'pre-importation approval' for the fill material, prior to importation of material to Site.

5.1 General

Source sites must be able to produce greater than 1,000 m^3 (loose) of VENM / ENM unless otherwise approved in writing by the Environmental Consultant. Checks by the Site Superintendent will confirm that no VENM / ENM is to be imported from sites where an organisation working have been fined or prosecuted by the NSW EPA in the past 5 years for contraventions involving pollution or waste offences to a degree that would potentially jeopardise the quality of material being delivered to the Site.

CSR Limited and its authorised parties have full discretion in the use or acceptance of material from any party. All trucks importing material on-site will be authorised by the Site Superintendent prior to entering the site.

5.2 VENM

5.2.1 Classification Requirements

Once the source site has been identified as a potential to provide VENM, a classification report will be required prior to any authorisation to import the soils. A VENM classification report is required to ensure all imported material meets the definition of VENM.

The VENM classification report will provide information specified in Table 5-1.

Table 5-1: VENM Classification Required Information

Information Type	Details to be provided
Site details of where the material is scoured:	Site address (street, suburb, lot and DP).
	Description of previous land use and current land use (e.g. residential, service station, supermarket etc.) and details of any demolition work (if any) where the material is sourced.
	Review of site history from historical aerial photographs and available past environmental assessments, brief description of the environmental setting of the site (i.e. geology, hydrogeology, soil type, acid sulphate risk assessment) and any potential contamination risks from surrounding or on-site land use.
	Brief description of proposed works (e.g. excavation of basement car park, footings, tunnel etc.) which will generate the material.
Material Details:	VENM description (e.g. clay, shale, sandstone etc.) and approximate volume.
	Certification that the material is VENM and contains no material that is not VENM (topsoil, building rubble, fill etc.).
	Location of material on the site and approximate depth(s) (e.g. all material below 0.3m bgl) or RL Level (AHD).

Information Type	Details to be provided
Procedures	Description of the methodologies and strategies employed in the sampling and assessment of the site, including analytical requirements.
	Plan showing site layout and location of samples collected.
	Bore logs / test pit logs of materials during VENM assessment.
NATA certified analytical results	A summary of the NATA certified analytical results for the material must be included in the report, along with copies of the laboratory results as appendix in the VENM classification.
VENM Statement	A section of the report will have a clear statement about the VENM classification and a statement stating the suitability of the source material for off-site reuse.

5.2.2 Sample Requirements

Currently there is no requirement by the NSW EPA for soil samples to be collected from VENM to validate its suitability for importation. Despite this, a conservative approach has been adopted for importation of VENM to the Bradfield site. VENM soils should be analysed for potential chemical contamination and visually inspected for foreign materials.

Where possible, characterisation and analysis of the soils should be undertaken by the Environmental Consultant, however if characterisation of the material has already been undertaken by others, a review of the provided documentation will be undertaken by the CSR appointed Environmental Consultant.

This review should compare the sampling rate and analysis schedule to those nominated in this FMP. A review of provided documentation may reveal the need for verification or additional sampling to be undertaken, and will be determined by the CSR appointed Environmental Consultant.

Sample numbers for importation as VENM should be collected at the rate outlined in **Table 5-2** below.

As there is no current required sample rate for VENM, ERM has developed a sample rate using NSW EPA *Sampling Design Part 1 – application, Contaminated Land Guidelines* (2022) and guidance provided within National Environment Protection (Assessment of Site Contamination) Measure 1999 (the ASC NEPM).

Table 5-2: VENM Sample Rate

Unit	Description	Density
Area[1] (m^2 or ha)	Source site sampling for VENM was undertaken in-situ based on the area assessed. The minimum number of sample locations apply to each geological layer.	As per Table 2 of *Sampling design part 1* (NSW EPA, 2022)
Volume[1] (m^3)	Source site sampling was undertaken on stockpiled VENM following excavation. The minimum number of samples apply to each soil type of VENM.	As per Table 4 of *Sampling design part 1* (NSW EPA, 2022)

1 It should be noted that where sampling densities are not met, a statistical approach may be adopted (95% UCL method), however, this will be solely dependent on Environmental Consultant advice and discretion.

In the event that a larger volume of VENM is imported from a source site than originally estimated, additional sampling will be required. Reassessment and classification will be required when approved import quantities are exhausted.

5.2.3 Importation Criteria

For the material to be deemed suitable for importation on-site, the analytes must present concentrations below the limits presented in **Table 5-3** below.

Table 5-3: VENM Screening Criteria (mg/kg)

Compounds	VENM Trigger Levels
Arsenic (total)	40[1]
Cadmium	1[1]
Chromium (total)	150[1]
Copper	200[1]
Lead	100[1]
Mercury (inorganic)	1[1]
Nickel	60[1]
Zinc	300[1]
Foreign Materials	None Present
Aesthetics	No odour, no staining
pH	<5
ASS / PASS*	None
Benzo(a)pyrene	0.5[2]
Polycyclic Aromatic Hydrocarbons	1[2]
Organochloride Pesticides (OCPs)	0.1[2]
Polychlorinated Biphenyls (PCBs)	0.1[2]
Benzene	0.2[2]
Toluene	0.5[2]
Ethylbenzene	1[2]
Total Xylene	1.5[2]
Naphthalene	1[2]
Petroleum Hydrocarbons F1 (C_6-C_{10})	25[2]
Petroleum Hydrocarbons F2 (C_{10}-C_{16})	50[2]
Petroleum Hydrocarbons F3 (C_{16}-C_{34})	100[2]
Petroleum Hydrocarbons F4 (C_{34}-C_{40})	100[2]

1 Criteria adopted from the absolute maximum concentration in the Excavated Natural Material Order 2014 as an appropriate screening level in the absence of specific limits for the classification of VENM. The adopted criterion is below the NEPM 2013 Residential A land use.

2 Criteria based on the VENM source material having a concentration below the Practical Quantitation Limit (PQL) for the specified compound. Detections that are shown to be from natural sources and not anthropogenic contamination can be considered VENM.

**Analysis only required if pH is measured below 5 and / or review of Acid Sulfate Soil Risk Map indicates potential presence of acid sulfate soils.*

5.3 ENM

Once the source site has been identified as a potential to provide ENM, a classification report will be required prior to any authorisation to import the soils. An ENM classification report is required to ensure all imported material meets the definition of ENM.

Details of the information required for an ENM classification report are provided in the ENM Order (2014), refer to Appendix B.

Requirements for ENM classifications are detailed specifically in the NSW EPA *The excavated natural material order 2014.* All materials that are assessed as ENM for inclusion into the Site must at a minimum address all sampling density and analysis requirements of the order.

The excavated natural material order (2014) has been provided as **Appendix C**.

5.4 Pre-importation Approval

The procedure to obtain pre-importation approval is summarised below:

- Identification of source site for VENM / ENM, and provision of classification reports;
- Classification reports will be independently reviewed by the CSR appointed Environmental Consultant to ensure the criteria specified within Sections **5.1**, **5.2**, and **5.3**;
- Once the VENM / ENM classification produced for a source site has been reviewed by the Environmental Consultant, if the documentation is deemed satisfactory / sufficient, a source site inspection will be undertaken by the Environmental Consultant. The source site inspection will include a visual assessment of the material to verify the soils described within the classification report; and
- Following completion of the site inspection, if the visual assessment is deemed satisfactory, and all aspects of the characterisation process completed and the soils are classified as VENM / ENM, then authorisation of importation will be provided by the Environmental Consultant.

The authorisation to import fill materials is at the sole discretion of CSR Limited and its authorised parties, including the Environmental Consultant.

If excavation works on the identified site uncover any issues that would prohibit the material from being classified as VENM / ENM, then no further material will be received from that site until the issue is rectified and confirmed by a site inspection by the Environmental Consultant. No soils are to be imported onto the site without the clearance from the Environmental Consultant and the Site Superintendent.

Clearance to import / authorisation of VENM / ENM materials for filling will be provided for each source site, along with an estimated volume of material to be imported. Should any variation to the material and / or estimated volume occur, new authorisation will be required to approve the material for importation.

6. IMPORTATION PROCEDURES AND CONTROLS

The following subsections outline the procedures and controls that are required to be implemented during importation, once VENM / ENM has been approved for importation.

6.1 Prior to Material Importation

The following will be required to be undertaken before delivery to the site:

- Material consignment notes for each load to be issued at the source site that includes, but is not limited to the following information:
  - Date;
  - Time;
  - Source Site address;
  - Transport company details;
  - Truck and trailer registration;
  - Truck configuration description;
  - Material description (soil description);
  - Truck tracking register at the source site and the receiving site, documenting truck registration and arrival/departure times;
- Expected turnaround times for individual truck to travel from source site, to fill site as well as reload times and arrival back at the fill site; and
- Preparation of a daily inspection checklist for the fill area to confirm the quality of material placed.

The use of the consignment notes will be tightly regulated so that only trucks with completed and correct consignment notes will be allowed to import material on-site. The generation of the consignment notes will be controlled by the Site Superintendent so that each individual site will have designated identification numbers and details, preventing the uncontrolled generation of consignment notes.

When a list of registered trucks for material importation has been received by the Site Superintendent at least the day prior to importation, the truck register can be used instead of the Material Consignment notes. The truck register will have a list of approved and authorised truck registration details, where only trucks on the register list are approved for material importation. If a truck arrives and is not on the registration list and without a Material Consignment note, no offloading is to be permitted and the truck refused entry to the site.

Regular inspection of the implemented strategies and equipment should be undertaken on a weekly basis to ensure that the quality and effectiveness are of the highest standard. Regular maintenance of equipment will be required in areas where degradation of the system quality is observed e.g. maintenance of the wheel-wash and rattle grid will be required to ensure the effectiveness of the processes.

Site security must be in place and maintained at the filling Site prior to the importation of soils, with no works to be undertaken outside of normal work hours. All aspects of the security procedure must be adhered to and is further outlined within **Section 6.2** below.

At all times, the acceptance of materials on-site is at the discretion of CSR Limited and its authorised parties, including the Environmental Consultant.

6.2 Site Security

The security of the site will established before importation of materials can commence and will be maintained at all times during filling works and will include, but is not limited to:

- Installation and maintenance of a secure and solid perimeter fencing around the site to prevent unauthorised entrance to the site;
- Solid and lockable gate at the front entrance that is to be kept lock at all times when the Site Superintendent is not present;
- Loads only being received at the site during hours permitted by the Conditions of Consent under the supervision of the gatekeeper;
- Only accepting loads from pre-certified delivery trucks as listed on the daily truck register;
- Regular inspection of the integrity of Site perimeter fencing; and
- Daily locking up of the gate to prevent unauthorised access to the site outside of work hours.

It is considered that the implementation of the above listed procedures will prevent unauthorised access to the site, as well as early identification of any potential non-conformances prior to a security breach occurring.

6.3 Delivery and Placement Inspections

The procedure outlined below is to be followed upon arrival of the imported material at the Site:

- The Earthworks Contractor will provide the Superintendent with a list of the approved trucks for fill importation prior to delivery to Site;
- Gatekeep to verify that pre-importation verification documentation is available;
- Imported material will then be subject to a thorough visual inspection to confirm classification of the materials are consistent with approved documentation. A gatekeeper will be present at the entry gate to the site at all times when the gate is unlocked and open to traffic:
  - No deliveries to the site are to be made when the gatekeeper is not present at the gate;
  - Only trucks pre-approved by the Site Superintendent are permitted to import fill (VENM and ENM) to the site, as detailed above within **Section 6.1**. The approval of the specific trucks selected to import fill is at the discretion of the Site Superintendent;
  - Any unauthorised trucks that enter the site or any loads identified to be inconsistent with the classification or material type approved for the source site will be rejected and must be removed from site at the expense of the haulage contractor;
- Following verification of material and appropriate documentation, the truck will be approved to enter the Site and be advised to the location of the tipping face;
- The Gatekeeper will record the truck number, quantity of material and a description of the material from each truck that enters the site;
- Daily inspection sheets will be completed detailing material types delivered and placed by The CSR appointed Site Supervisor:
  - In the unlikely event that unsuitable material enters the site, then this will be formally documented on the daily inspection sheet and the importation and screening procedures should be reviewed.

6.4 Site Inspections

The Environmental Consultant is required to undertake the following site inspections during the fill importation works:

- A minimum of one random source site inspection per fill provider, during the course of each approved importation period or approval; and
- A Site inspection of the tip face and the visual inspection of imported materials, once a week as a minimum. This Site inspection should also include a review of the implementation of the procedures and controls outlined within this FMP.

6.5 Hold and Witness Points

- Geotechnical hold and witness points during fill importation and filling will be undertaken in accordance with geotechnical report under the direction of the Geotechnical Consultant. Regular reporting and inspection by the Geotechnical Consultant will be undertaken that includes site surveys.
- Fortnightly meetings (or as determined during the meeting) will be held on-site overseeing the progress of the works. These meetings will discuss and verify the delivery and placement controls are adhered to and that required documentation has been provided.
- Environmental hold and witness points during fill importation and filling will be undertaken by the Environmental Consultant during random site inspections and review of documentation, as specified within this FMP.

6.6 Non-conformances

The imported material will be deemed as non-conforming if any of the requirements outlined within this FMP are not considered to be met. In addition to that outlined within the preceding sections of this report, the following should be noted with regards to non-conformance procedures:

- During initial inspection at the gate area, the truck will be denied authorisation to entire the Site and offload the material if:
  - the truck is not on the approved list provided by the Earthworks Contractor;
  - the material is not considered compliant following a visual inspection; and
  - the documentation provided is not compliant.
- The importation process for the filling will adopt a two-strike policy, where if one load from a Contractor is identified as being unsuitable, they will be required to remove the material. If a second load from the same Contractor is identified as unsuitable, the load is to be removed, and no further importation by that Contractor will be permitted.
- Where any issues are identified from a source site, no further material will be received from that site, until the issue is rectified and confirmed by a site inspection by the Environmental Consultant.
- If, in the unlikely circumstances, the material is imported and not identified as non-complaint until after the vacation of the offending truck, material will be treated as waste. This material will be required to be tested and classified by an Environmental Consultant in accordance with the NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste* (2014). Reporting requirements are specified within **Section 6.6.1** below.
  - Removal of any unsuitable waste materials will be at the cost of the haulage Contractor.

- In the event, the Superintendent or the Environmental Consultant identifies any other scenario of non-conformance not explicitly listed within this FMP, follow up actions will be solely at the discretion of CSR and the Environmental Consultant, and will be dealt with on a case-by-case basis.
- The Superintendent shall notify the Site Auditor and client of any non-conformances involving the importing of material to the quarry pit as well as any illegal tipping without delay.

6.6.1 Reporting

- For any material identified to be imported that is non-compliant; an incident report will be completed, outlining, but not limited to the following:
  - Filling Suppliers transport contractor;
  - Truck configuration;
  - Truck and trailer registration;
  - Material type;
  - Reason for non-conformance; and
  - Actions taken.
- A non-conformance register will be maintained for the site by Project Manager appointed by CSR. A review should be undertaken quarterly, and a report should be produced to indicate completion and conclusions of the review. This non-conformance register and review reports are to be included within the Site Suitability Assessments produced by the Environmental Consultant at the completion of each filling stage. Further details on this provided within **Section 9**.
- In the event of a non-compliant imported load that was not rejected at the gate, a waste classification should be undertaken and a waste classification report should be produced by the Environmental Consultant. This material should be lawfully disposed offsite at a landfill or resource recovery centre legally able to accept the waste in accordance with NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste* (2014).

7. ASSESSMENT ON-SITE MATERIALS FOR FILL

The onsite materials that are proposed to be used for filling during the projects, are required to be subject to additional sampling and analysis based on that outlined as follows:

- A Preliminary Site Investigation was undertaken at the Site by Element Environment Pty Ltd, *Preliminary Site Investigation MOD4, 235 Martin Road Badgerys Creek NSW,* March 2019. The PSI concluded the site was suitable for its proposed use provided the recommendations provided were implemented. The recommendations relevant to the Site included addressing areas which may contain potential contamination including asbestos containing materials (ACM) within the Pit 1 area, former underground storage tank (UST) pits and associated residual contamination.
- Due to the history and use of the Site as a brick factory, large volumes of VENM clays have been received on-site for use as brick making materials over the course of operations. This material has been stockpiled, and the stockpiled soils generally consist of shale clay soils, as well as crushed sandstone and shale material.
- There is also the potential that contamination of on-site soils was not identified by previous investigations. Large volumes of material were unable to be tested previously as they were located at depth. Clay material quarried or imported for brick making have been used to fill former quarry voids at depths >15m below ground level in some areas.

Based on the above, the previously untested material is required to be sampled, in order to confirm suitability of soils to remain onsite in accordance with the NEPM (2013) Health Investigation Level (HIL) consistent with Commercial / Industrial land use.

7.1 Hold Point

At the time of writing, further investigation pertaining to potential contamination within portions of the Site was not completed, as such site-won fill has not yet been determined as suitable / unsuitable to be used for onsite filling works.

Therefore, at the time of writing, this is considered a hold point.

- Prior to the use of site-won fill materials, the Environmental Consultant will confirm proposed further investigations have been undertaken and any outstanding risks have been addressed. Following completion of relevant additional investigations, the Environmental Consultant will provide a summary report or similar (as appropriate); and
- In the event the additional investigations identify contamination, a Remedial Action Plan (RAP) will be required to be prepared by the Environmental Consultant. The RAP should be submitted to the Site Auditor for approval prior to implementation.

Upon approval from Environmental Consultant, onsite materials used for filling are to be assessed in accordance with Section **7.2, 7.3, 7.4, 7.5**, and **7.6** below. Once the process of assessing material as per the aforementioned sections has commenced, the following hold points are applicable:

- A current hold and release system is in place on-site for environmental assessment of soils, whereby no onsite soils are permitted for use by the Superintendent until confirmation has been provided by the Environmental Consultant stating that soils are suitable;
- Environmental hold and witness points will be incorporated with the hold and release of materials to be used for filling works. No soils are to be excavated and placed for fill until authorised by the Environmental Consultant. Formal documentation (ITPs) of the hold and witness points will be maintained by the Site Superintendent.

7.2 Assessment Requirements

7.2.1 Sampling Frequency

Initial sampling of on-site soils to determine land use suitability should be undertaken at a rate of:

- 1 sample / 1,000 m^3 or part thereof + QC duplicates.

7.2.2 Analysis

Soil samples should be tested for (but not limited to) the following analytes:

- Priority heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Petroleum Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Asbestos;
- Organochloride Pesticides (OCPs); and
- Polychlorinated Biphenyls (PCBs).

Additionally, soil samples may be analysed for foreign material content to confirm compliance with aesthetic criteria from NEPM (2013).

7.2.3 Criteria

7.2.3.1 Health Investigation Levels (HILs)

Soils currently present on-site should be assessed for suitability against HILs for Commercial / Industrial land use as provided in **Table 7-1**.

Table 7-1: Commercial / Industrial HILs (NEPM 2013)

Analytes	HIL-D
Heavy Metals	
Arsenic	3,000 mg/kg
Cadmium	900 mg/kg
Chromium	3,600 mg/kg
Copper	240,000 mg/kg
Lead	1,500 mg/kg
Mercury	730 mg/kg
Nickel	6,000 mg/kg
Zinc	400,000 mg/kg
PAH	
BaP TEQ	40 mg/kg
Total PAHs	4,000 mg/kg
PCB	
PCB	7 mg/kg

Analytes	HIL-D
Pesticides	
DDT+DDE+DDD	3,600 mg/kg
Aldrin and Dieldrin	45 mg/kg
Chlordane	530 mg/kg
Endosulfan	2,000 mg/kg
Endrin	100 mg/kg
Heptachlor	50 mg/kg
HCB	80 mg/kg
Methoxychlor	2,500 mg/kg
Mirex	100 mg/kg
Toxaphene	160 mg/kg
Asbestos	
Bonded ACM	0.05% w/w
Friable Asbestos/Asbestos Fines	0.001% w/w
Surface Asbestos (0.1m)	No Visible

7.2.3.2 Health Screening Levels (HSLs)

Health Screening Levels (HSLs) are used to assess selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact with affected soils and groundwater. In order to determine whether the HSLs tabulated in Schedule B1 of NEPC (2013) are applicable or whether a site specific determination is required, CRC CARE provide an application checklist which should be completed prior to using the HSLs. The following parameters were considered in completing the checklist:

- Potential Contaminants – Petroleum Hydrocarbons;
- Land use – HSL D;
- Potential Pathways – soil vapour intrusion, direct contact;
- Media – soil;
- Soil Types – clay is the dominant sub-surface profile; and
- Depth to Contamination – various, all data will initially be compared with the HSLs for the shallowest depth range, with any failures then further considered with respect to expected depth below design level.

On the basis of these considerations, the following HSL has been adopted (*Table 1A(3) and Table 1A(6) of ASC NEPM 2013*):

Table 7-2: Commercial / Industrial HIL D for 'Clay' (NEPM 2013) (mg/kg)

Analytes	HSL-D (Clay) 0-1.0m	HSL-D (Clay) 1.0 to <2.0m	HSL-D (Clay) 2.0 to <4.0m	Direct Contact HSL-D
Benzene	4	6	9	430
Toluene	NL	NL	NL	99,000
Ethylbenzene	NL	NL	NL	27,000
Xylenes	NL	NL	NL	81,000
Naphthalene	4	NL	NL	11,000
F1: C_6-C_{10}	310	480	NL	26,000
F2: C_{10}-C_{16}	NL	NL	NL	20,000
F3: C_{16}-C_{34}	NA	NA	NA	27,000
F4: C_{34}-C_{40}	NA	NA	NA	38,000

NL = *Not Limiting (i.e. the soil vapour concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario).*

NA = *Not Applicable (i.e. NEPM (NEPC, 2013) does not provide HSLs for the F3 and F4 hydrocarbon fractions).*

Vapour Intrusion Criteria sourced from NEPM (NEPC, 2013) *Table 1A(3) – Soil HSLs for vapour intrusion.*
Direct Contact Criteria sourced from Friebel and Nadebaum 2011, Health Screening Levels for petroleum Hydrocarbons in Soil and Groundwater, Part 1: Technical Development Document, *Table A4 – Soil Health Screening Levels for Direct Contact.*

7.2.3.3 Aesthetic Requirements

If inert foreign materials are observed, then an aesthetic assessment of the material as outlined in Section 3.6.3 in Schedule B1 of NEPM (2013) will be undertaken. In relation to the aesthetic assessment, Section 3.6.3 in Schedule B1 of NEPM (2013) notes that:

- *"In arriving at a balanced assessment, the presence of small quantities of non-hazardous inert material and low odour residue (for example, weak petroleum hydrocarbon odours) that will decrease over time should not be a cause of concern or limit the use of a site in most circumstances. Similarly, sites with large quantities of well-covered known inert materials that present no health hazard such as brick fragments and cement wastes (for example, broken cement blocks) are usually of low concern for both non-sensitive and sensitive land uses."*

Schedule B1 of NEPM (2013) notes that there is no specific numeric criteria for foreign material in soils and that sites assessed from a human health and environmental perspective may still contain inert foreign material. Therefore, the identification of foreign material will not necessarily preclude the soils from being suitable to remain on-site.

If an aesthetic assessment determines material to be inert, material will be suitable to remain on-site provided it is subject to screening and hand picking and it be placed at depths greater than 3 m below the final surface level. Screening and hand picking of material will enable the removal of large foreign material through sieving soils and hand picking remaining material. Stockpiled foreign material will be disposed off-site to a suitably licenced landfill facility lawfully able to accept the waste.

Soils placed 3 m bgl are not considered to impact the aesthetic features of the future intended land use scenario. It is expected that there will be no significant risk of human interaction with materials placed at this depth with the proposed future land use.

If an aesthetic assessment determines that soils are not suitable to remain on-site then remediation options may be discussed with the Site Auditor or the material will be disposed off-site to a suitably licenced landfill.

It is noted that geotechnical requirements of soil may preclude some material from being used as fill material on-site due to foreign material content. Geotechnical requirements of soils should be treated separately to environmental and health requirements and are at the discretion of the Geotechnical Consultant.

7.3 Methodology

Soil samples collected for the assessment of on-site materials will be collected in-situ or from excavated stockpiles. An excavator will be used to excavate test pits with samples collected at the surface and every metre thereafter, at depths where changes to the soil profile are observed, or where there are signs of contamination.

Volumes and areas of the on-site material to be assessed will be provided by the Site Superintendent through the use of monthly surveys of the Site. Test pits will be excavated in a systematic pattern to obtain representative samples from across the sampling area.

Soil samples will be obtained using a decontaminated trowel and immediately transferred to sample containers of appropriate composition (glass jars for chemical analysis and plastic bags for asbestos). Job number; sample identification number; sampler's initials and date of sampling will be recorded on sample labels affixed to the sample containers.

Chemical samples will then be placed immediately into a chilled esky to prevent the loss of potential volatile components. The samples are to be transported under standard chain-of-custody protocols to a relevant NATA accredited laboratory. All chemical samples were stored and transported at temperatures below 4°C.

7.4 Reporting

- Daily check sheets outlining the supervision and quality of soils sourced on-site, that have been used in the quarry as fill, should be prepared consisting of:
  - Date and personnel details;
  - Material description;
  - Details of material stockpile origin;
  - Placement locations;
  - Details on odour, staining and foreign materials; and
  - Overall quality of fill material used.
- The Environmental Consultant will prepare quarterly material assessment reports on the assessment of onsite soils in general accordance with ASC NEPM (2013).The reports will include all the sampling and analysis undertaken within relevant quarter, and detail the compliance / non-compliance of assessed materials. These reports are to be included within the Site Suitability Statement to be issued by the Environmental Consultant at the completion of the filling works.

7.5 Approvals

- Prior to the potential use of any onsite material for excavation and filling, approval for the release of the analysed material will have to be provided by the Environmental Consultant.
  - No material is to be reused on-site without the expressed authorisation of the Environmental Consultant and Site Superintendent through written confirmation that the material is suitable to remain onsite.

- Re-use approvals will be granted through the issuing and completion of Inspection and Testing Plans (ITPs). ITPs will identify the material that requires investigation to determine whether it is suitable to remain onsite. Once the material has been investigated, the Environmental Consultant will confirm with the Site Superintendent in written form whether or not the material is suitable to remain onsite.
    - Any soils that are identified to not be compliant with the land use criteria should be isolated and subject to further investigation. This will be considered an unexpected find and the UFP provided as **Appendix D** should be followed.

7.6 Non-Conformances

The following to be implemented for non-conformance material:

- During excavation, if any material is identified as containing foreign material such as bitumen, steel or household waste then excavation will cease and the area isolated for investigation by the Environmental Consultant.
- Soils identified as not suitable to remain onsite following sampling and analysis, will be isolated and clearly marked to allow future identification.
- Notification to the Superintendent will be provided to allow further notification to the client and the Site Auditor, if required.

In order to minimise off-site disposal of this material, the following strategy may be utilised to remediate soils to make them suitable to remain onsite.

7.6.1 Assess Suitability for Remediation

Soils will be deemed suitable for remediation if the contaminant(s) of concern are able to be remediated. For example, soils containing excessive foreign materials may be remediated through the physical removal of foreign inclusions, however soils containing chemical concentrations that exceed the criteria cannot be removed from soils.

In the event remediation is considered appropriate, the requirement for a RAP will be assessed by the Environmental Consultant. If a RAP is deemed necessary, the Environmental Consultant will prepare a RAP and be submitted to the Site Auditor for approval. It should also be noted that validation sampling and associated reporting may be required at the completion of remedial works.

7.6.2 Screening

Screening involves the separation of coarse and fine material by placement through a screen. The size of material that passes through the screen can be adjusted as necessary. Screening may be used in order to reduce the foreign material content in soils.

7.6.3 Additional Testing

After remediation of soils has occurred, soils should be re-sampled for additional sampling and analysis.

The rates for testing remediated soils should be undertaken as outlined within a RAP prepared, and/or at the discretion of the Environmental Consultant, in consultation with the Site Auditor.

7.6.4 Placement

Soils found to be compliant in accordance with site criteria after this process may be used as fill on-site.

7.6.5 Disposal

Soils not compliant with the adopted land use criteria after additional testing will be classified in accordance with the NSW EPA Waste Classification Guidelines 2014 for off-site disposal to a suitably licensed landfill. All material identified as unsuitable will have a material classification clearly identifying the material characterisation and the approximate volume of material for removal.

Unsuitable material should be consolidated in a designated holding area that is clearly marked out. Material should be removed off-site at the completion of remediation works for each material type, or at such a time that the volume of unsuitable material necessitates off-site disposal.

Following off-site disposal, validation sampling of the footprint of the material should be collected to confirm all contaminated soils have been removed and residual soils are suitable to remain on-site.

7.6.6 Reporting

The non-conformance and/or exceedance identified should be added to the non-conformance register maintained for the site by Project Manager appointed by CSR. A review should be undertaken quarterly, and a report should be produced to indicate completion and conclusions of the review. This non-conformance register and review reports are to be included within the Site Suitability Assessments produced by the Environmental Consultant at the completion of each filling stage. Further details on this provided within **Section 9**.

At the completion of each separate remediation event, the results of additional testing can be reported in the form of a summary letter, which is to be included within the Site Suitability Statement to be issued by the Environmental Consultant at the completion of these works.

This summary letter should include the volumes of material made suitable to remain on-site and material not suitable to remain on-site, methodology, sampling results and remediation undertaken.

In the event a RAP was prepared, reporting should be completed in accordance with that outlined within the RAP.

8. CONTINGENCY PLANS

The purpose of the contingency plan is to identify unexpected situations that could occur, to specify procedures that can be implemented to manage such situations and to prevent adverse impacts to the environment and human health should these situations occur.

The conditions that may be encountered when excavating are uncertain. As unknown and variable sub-surface conditions impose a degree of uncertainty for the project, a set of anticipated conditions associated primarily with handling site-won fill has been assumed in developing this FMP.

Specific contingencies associated with imported fill material has been detailed across **Sections 5 – 6**.

The conditions that can reasonably be expected, the resulting problems they may cause, and how these problems may be resolved within the context of the excavation program have been summarised below:

Anticipated Project Risks	Corrective Action
Chemical spill / exposure	■ Stop work, refer to Health and Safety Plan and immediately contact the Site Supervisor.
Excessive rain	■ Cover those working areas not located under cover, where possible, with plastic during off-shifts. Inspect and maintain sediment controls and filter fences. ■ Stop and reassess the requirement for temporarily suspending unloading, based on the directive/ at the discretion of the Site Supervisor.
Excessive dust (caused by high winds or otherwise)	■ Use water sprays, biodegradable dust sprays, cease dust-generating activity until better dust control is achieved, or apply interim capping systems. ■ If necessary, install dust deposition gauges prior to and during works to monitor the effectiveness of dust controls implemented onsite.
Excessively wet materials	■ Stockpile and dewater onsite or add absorbents.
Equipment failures	■ Maintain spare equipment or parts, maintain alternative rental options; or shut down affected operations until repairs are made.
Release of fuel/oil from machinery	■ Remove source, use absorbent booms to remove oil and make any repairs and clean-up as required. If necessary, implement temporary measures until booms can be deployed; (e.g. earth embankments) to prevent movement of spill into water courses.
Excessive noise	■ Identify source and review noise attenuation equipment and as necessary provide silencers on noisy equipment and/or amend truck schedules and protocols.

8.1 Unexpected Finds Protocol

In addition to the above listed contingencies, an unexpected finds protocol (UFP) has been provided as **Appendix D** which should be implemented in the event an unexpected find is identified.

The UFP details the procedures and controls to be implemented should unexpected finds such as stained or odorous materials, buried drums or tanks, or suspect impact materials (other than identified impacts) be discovered during the fill management.

9. REPORTING

A Site Suitability Statement will be prepared by the Environmental Consultant at the completion of each stage of works (three reports in total) in general accordance with *National Environment Protection (Assessment of Site Contamination) Amendment Measure* 2013 (NEPM 2013) and NSW EPA *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines* (2020).

The Site Suitability Statement will assess suitability of the Site the intended end land use consistent with Commercial/Industrial, as defined in the NEPM 2013.

The report shall include, but not be limited to:

- Inclusion of relevant site surveys including site boundary and staged filling works;
- Inclusion of quarterly reports of onsite material assessment, quarterly non-conformance reviews of imported material and non-conformance summary reports of onsite material;
- Unexpected finds;
- Validation of remediation of onsite contamination (if required) and conditions of material used onsite;
- A detailed description of the infilling work conducted by all parties associated with the work;
- Documentation generated/required by the material assessment and importation protocol;
- Checks on the tracking of imported material to the site using the survey data, fill suppliers' volume data, and gatekeeper trucking log;
- Details on the geotechnical test work conducted during the pit filling operation;
- Environmental control measures undertaken during the work;
- Disposal documentation if waste disposal was undertaken;
- Details of and responses to any and all environmental incidents that occurred during the pit filling operation; and
- Details of community consultation work undertaken during the work, if required.

10. REFERENCES

Contaminated Land Management Act 1997 (NSW);

Contaminated Land Guidelines: Consultants Reporting on Contaminated Land (NSW EPA, 202020;

Contaminates Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997 (NSW DECC, 2009);

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (NSW EPA, 3rd ed., 2017);

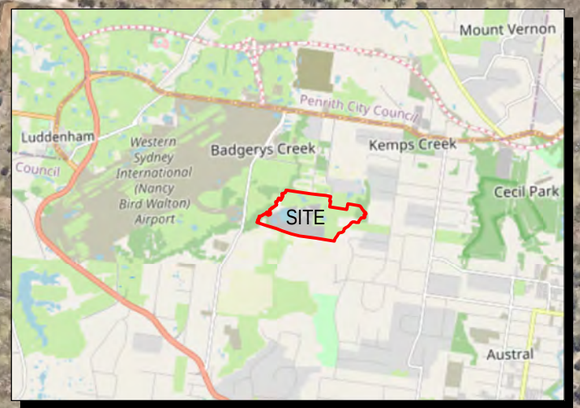
Contaminated Land Guidelines: Sampling Design Guidelines (NSW EPA 2020);

National Environment Protection (Assessment of Site Contamination) Measure (No.1) (NEPC, 2013);

Waste Classification Guidelines (NSW EPA, 2014); and,

Work Health and Safety Act 2011 (NSW) and associated regulations.

APPENDIX A SITE FIGURES



LAWSON ROAD

BADGERYS CREEK

SOUTH CREEK / WIANAMATTA

Legend
- Site Boundary
- Cadastre (Lot)

Data Source:
NSW DFSI, DCDB/DTDB 2022
Nearmap Imagery March 2023
Inset - Esri OpenStreetMap 2023

Site Location

F1

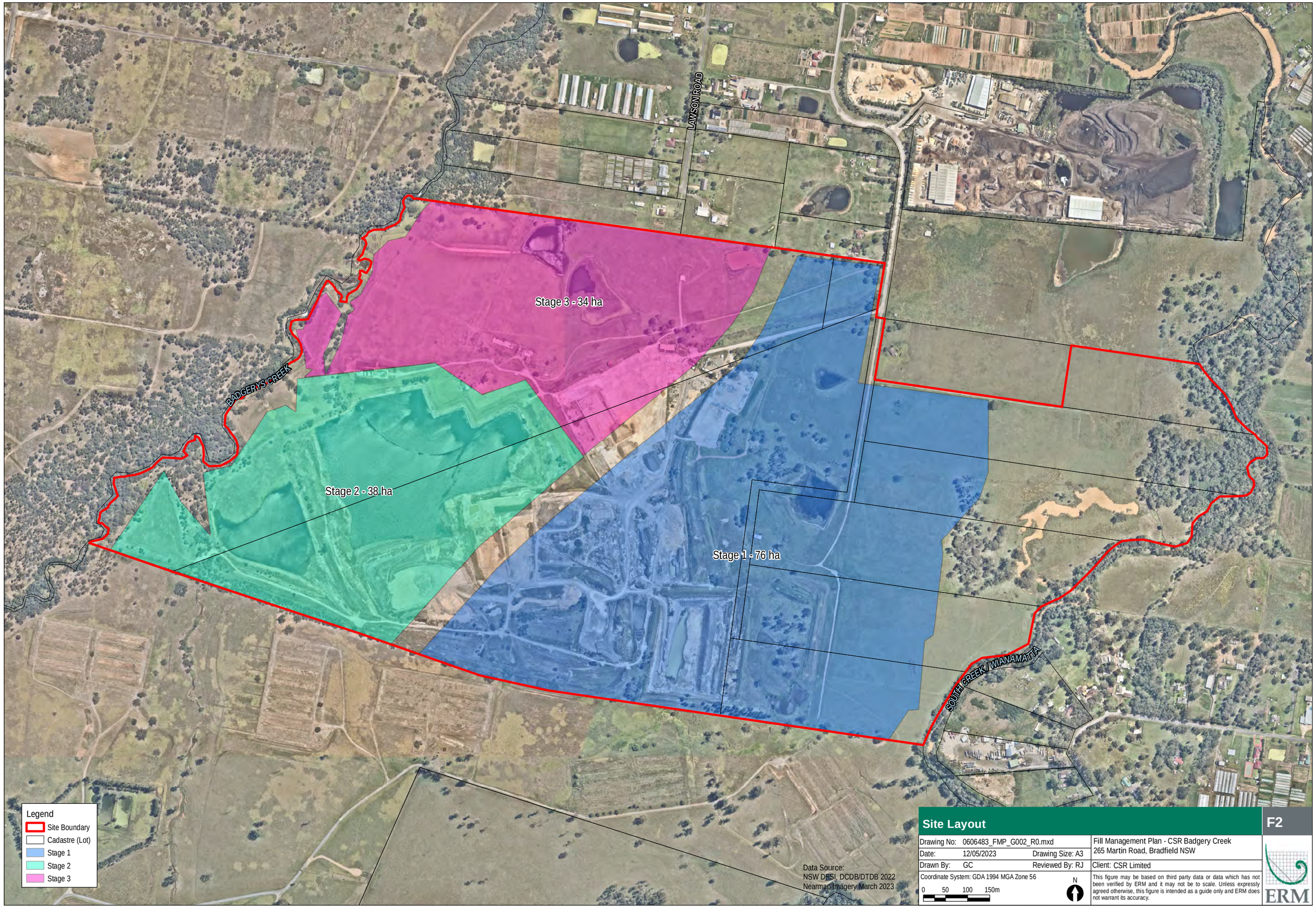
Drawing No:	0606483_FMP_G001_R0.mxd		Fill Management Plan - CSR Badgery Creek 265 Martin Road, Bradfield NSW
Date:	12/05/2023	Drawing Size: A3	
Drawn By:	GC	Reviewed By: RJ	Client: CSR Limited

Coordinate System: GDA 1994 MGA Zone 56

0 50 100 150m

N

ERM



Site Layout

F2

Drawing No:	0606483_FMP_G002_R0.mxd		Fill Management Plan - CSR Badgery Creek 265 Martin Road, Bradfield NSW
Date:	12/05/2023	Drawing Size: A3	
Drawn By:	GC	Reviewed By: RJ	Client: CSR Limited
Coordinate System: GDA 1994 MGA Zone 56 0 50 100 150m		N	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

APPENDIX B CSR SURFACE WATER MANAGEMENT SYSTEM

Badgerys Creek surface water management system

The surface water management system utilised at the Badgerys Creek Quarry and Brick Making Project is comprised of two separate basins and illustrated below in figures 1 and 2;

- Basin A – a primary surface water collection and treatment basin,
- Basin B – a secondary discharge HES Basin (High Efficiency Sediment)

Figure 1 – Surface run off water diversion design

Figure 2 – Aerial of Pit 1, Basin A and Basin B

Note: Pits 1, 2 and 3 have been fitted with diversion bunds to prevent surface water from collected in the pits.

Basin A is the main catchment basin for the site and captures surface water run-off from 16ha of previously disturbed land. The extend of the catchment is shown in figure 3.

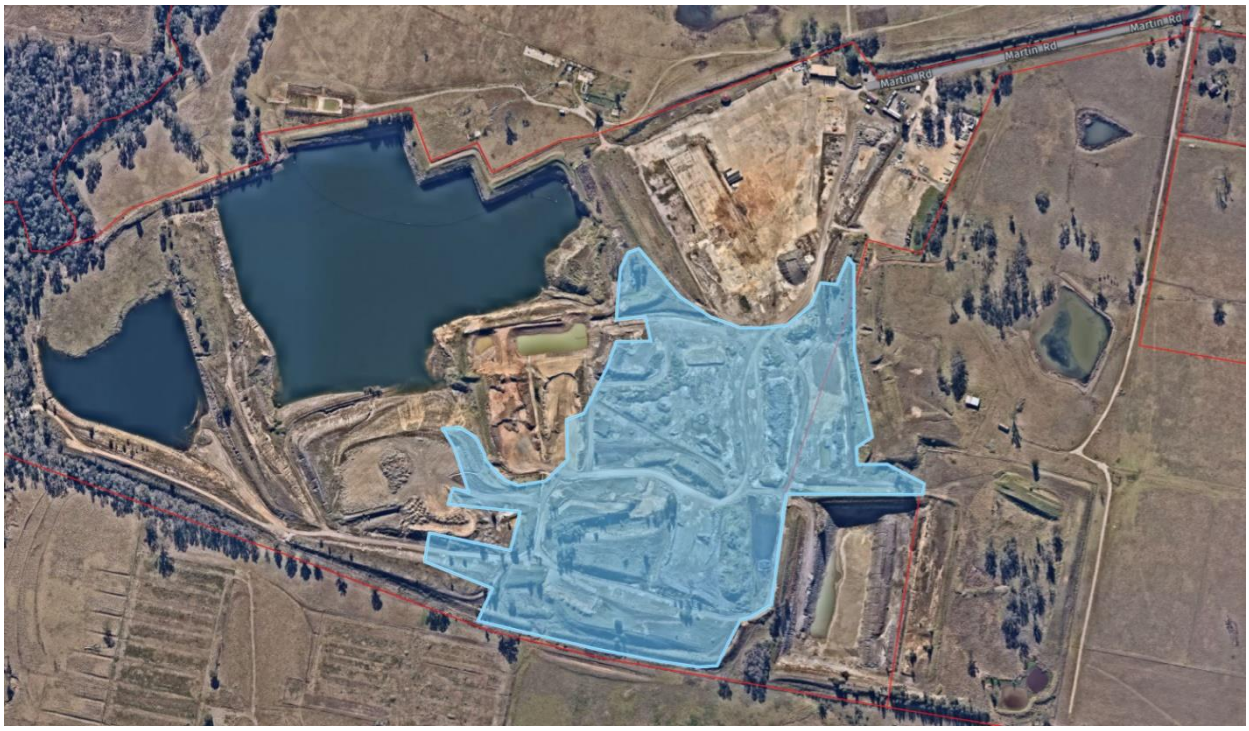
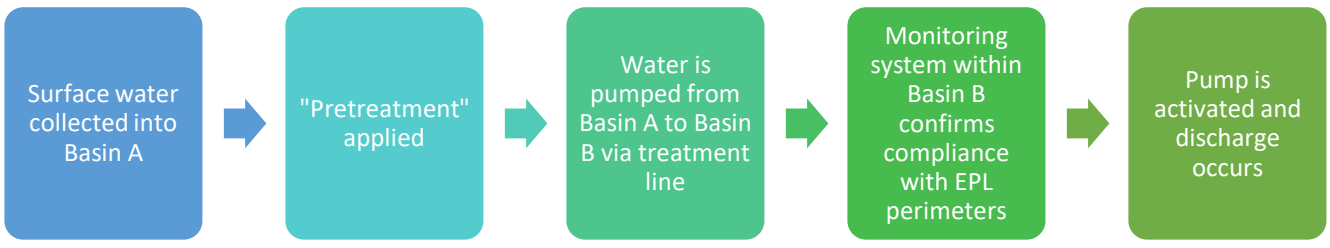


Figure 3 – Catchment extent

Surface water within the 16ha is diverted to Basin A that has a storage capacity of 17,200m^3. Within this basin, the water is subjected to "pre-treatment" to address the levels of turbidity and pH present. These perimeters are then further treated when the water leaves basin A and is pumped into Basin B. The flow path between these two basins includes a treatment line fitted with a dosing system which circulates flocculate and acid to further control the levels of turbidity and pH.

The secondary discharge high efficiency sediment (HES) basin has a storage capacity of 600m^3 and is connected to the site's licenced discharge point into Badgery's Creek. This discharge point is fitted to a monitoring system which confirms once the water has reached the defined perimeters within EPL 684 of 50 NTU for turbidity and between 6.5-8.5 for pH and is determined to be "clean". This process is repeated every five minutes. It is only following this verification that the pump is switched on and water is discharged.

This process is further explained in the flow chart below;



As additional work fronts open, through the lifecycle of the project, additional catchment basins may be deployed and fitted with the same dosing and treatment system. All additional catchment basins will continue to pump water into the secondary discharge high efficiency sediment (HES) basin where monitoring will determine when discharge can occur into Badgerys Creek.

APPENDIX C THE EXCAVATED NATURAL MATERIAL ORDER 2014

Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014

The excavated natural material order 2014

Introduction

This order, issued by the Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of excavated natural material to which 'the excavated natural material exemption 2014' applies. The requirements in this order apply in relation to the supply of excavated natural material for application to land as engineering fill or for use in earthworks.

1. Waste to which this order applies

1.1. This order applies to excavated natural material. In this order, excavated natural material means naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground, and
b) contains at least 98% (by weight) natural material, and
c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

2. Persons to whom this order applies

2.1. The requirements in this order apply, as relevant, to any person who supplies excavated natural material, that has been generated, processed or recovered by the person.

2.2. This order does not apply to the supply of excavated natural material to a consumer for land application at a premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

3. Duration

3.1. This order commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Generator requirements

The EPA imposes the following requirements on any generator who supplies excavated natural material.

Sampling requirements

4.1. On or before supplying excavated natural material, the generator must:

4.1.1. Prepare a written sampling plan which includes a description of sample preparation and storage procedures for the excavated natural material.

4.1.2. Undertake sampling and testing of the excavated natural material as required under clauses 4.2, 4.3, and 4.4 below. The sampling must be carried out in accordance with the written sampling plan.

4.2. The generator must undertake sampling and analysis of the material for ASS and PASS, in accordance with the NSW Acid Sulfate Soil Manual, Acid Sulfate Soils Management Advisory Council, 1998 and the updated Laboratory Methods Guidelines version 2.1 – June 2004 where:

4.2.1. the pH measured in the material is below 5, and/or

4.2.2. the review of the applicable Acid Sulfate Soil Risk Maps (published by the former Department of Land and Water Conservation and available at http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm) indicates the potential presence of ASS.

4.3. For stockpiled material, the generator must:

4.3.1. undertake sampling in accordance with Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent);

4.3.2. undertake characterisation sampling by collecting the number of samples listed in Column 2 of Table 1 with respect to the quantity of the waste listed in Column 1 of Table 1 and testing each sample for the chemicals and other attributes listed in Column 1 of Table 4. For the purposes of characterisation sampling the generator must collect:

4.3.2.1. composite samples for attributes 1 to 10 and 18 in Column 1 of Table 4.

4.3.2.2. discrete samples for attributes 11 to 17 in Column 1 of Table 4.

4.3.2.3. The generator must carry out sampling in a way that ensures that the samples taken are representative of the material from the entire stockpile. All parts of the stockpile must be equally accessible for sampling.

4.3.2.4. for stockpiles greater than 4,000 tonnes the number of samples described in Table 1 must be repeated.

4.3.3. store the excavated natural material appropriately until the characterisation test results are validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 4 and the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 1

Sampling of Stockpiled Material		
Column 1	**Column 2**	**Column 3**
Quantity (tonnes)	**Number of samples**	**Validation**
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

4.4. For in situ material, the generator must:

4.4.1. undertake sampling by collecting discrete samples. Compositing of samples is not permitted for in-situ materials.

4.4.2. undertake characterisation sampling for the range of chemicals and other attributes listed in Column 1 of Table 4 according to the requirements listed in Columns 1, 2 and 3 of Table 2. When the ground surface is not comprised of soil (e.g. concrete slab), samples must be taken at the depth at which the soil commences.

4.4.3. undertake sampling at depth according to Column 1 of Table 3.

4.4.4. collect additional soil samples (and analyse them for the range of chemicals and other attributes listed in Column 1 of Table 4), at any depth exhibiting discolouration, staining, odour or other indicators of contamination inconsistent with soil samples collected at the depth intervals indicated in Table 3.

4.4.5. segregate and exclude hotspots identified in accordance with Table 2, from material excavated for reuse.

4.4.6. subdivide sites larger than 50,000 m² into smaller areas and sample each area as per Table 2.

4.4.7. store the excavated natural material appropriately until the characterisation test results are validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 4 and the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 2

***In Situ* Sampling at surface**				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Size of *in situ* area (m^2)	**Number of systematic sampling points recommended**	**Distance between two sampling points** (m)	**Diameter of the hot spot that can be detected with 95% confidence** (m)	**Validation**
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 2 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Table 3

***In Situ* Sampling at Depth**	
Column 1	**Column 2**
Sampling Requirements *	**Validation**
1 soil sample at 1.0 m bgl from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0 m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9 m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0 m bgl

* Refer to Notes for examples

Chemical and other material requirements

4.5. The generator must not supply excavated natural material waste to any person if, in relation to any of the chemical and other attributes of the excavated natural material:

4.5.1. The chemical concentration or other attribute of any sample collected and tested as part of the characterisation of the excavated natural material exceeds the absolute maximum concentration or other value listed in Column 3 of Table 4:

4.5.2. The average concentration or other value of that attribute from the characterisation of the excavated natural material (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 2 of Table 4.

4.6. The absolute maximum concentration or other value of that attribute in any excavated natural material supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 4

Column 1	Column 2	Column 3
Chemicals and other attributes	**Maximum average concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**Absolute maximum concentration** (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	1
2. Cadmium	0.5	1
3. Lead	50	100
4. Arsenic	20	40
5. Chromium (total)	75	150
6. Copper	100	200
7. Nickel	30	60
8. Zinc	150	300
9. Electrical Conductivity	1.5 dS/m	3 dS/m
10. pH *	5 to 9	4.5 to 10
11. Total Polycyclic Aromatic Hydrocarbons (PAHs)	20	40
12. Benzo(a)pyrene	0.5	1
13. Benzene	NA	0.5
14. Toluene	NA	65
15. Ethyl-benzene	NA	25
16. Xylene	NA	15
17. Total Petroleum Hydrocarbons C_{10}-C_{36}	250	500
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%

* The ranges given for pH are for the minimum and maximum acceptable pH values in the excavated natural material.

Test methods

4.7. The generator must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.

4.8. The generator must ensure that the chemicals and other attributes (listed in Column 1 of Table 4) in the excavated natural material it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.

4.8.1. Test methods for measuring the mercury concentration.

4.8.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Column 3 of Table 2 (i.e. < 0.20 mg/kg dry weight).

4.8.1.2. Report as mg/kg dry weight.

4.8.2. Test methods for measuring chemicals 2 to 8.

4.8.2.1. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils (or an equivalent analytical method).

4.8.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Column 3 of Table 2, (e.g. 10 mg/kg dry weight for lead).

4.8.2.3. Report as mg/kg dry weight.

4.8.3. Test methods for measuring electrical conductivity and pH.

4.8.3.1. Sample preparation by mixing 1 part excavated natural material with 5 parts distilled water.

4.8.3.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.3.3. Report electrical conductivity in deciSiemens per metre (dS/m).

4.8.4. Test method for measuring Polynuclear Aromatic Hydrocarbons (PAHs) and benzo(a)pyrene.

4.8.4.1. Analysis using USEPA SW-846 Method 8100 Polynuclear Aromatic Hydrocarbons (or an equivalent analytical method).

4.8.4.2. Calculate the sum of all 16 PAHs for total PAHs.

4.8.4.3. Report total PAHs as mg/kg dry weight.

4.8.4.4. Report benzo(a)pyrene as mg/kg.

4.8.5. Test method for measuring benzene, toluene, ethylbenzene and xylenes (BTEX).

4.8.5.1. Method 501 (Volatile Alkanes and Monocyclic Aromatic Hydrocarbons) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.5.2. Report BTEX as mg/kg.

4.8.6. Test method for measuring Total Petroleum Hydrocarbons (TPH).

4.8.6.1. Method 506 (Petroleum Hydrocarbons) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.6.2. Report as mg/kg dry weight.

4.8.7. Test method for measuring rubber, plastic, bitumen, paper, cloth, paint and wood.

4.8.7.1. NSW Roads & Traffic Authority Test Method T276 Foreign Materials Content of Recycled Crushed Concrete (or an equivalent method).

4.8.7.2. Report as percent.

Notification

4.9. On or before each transaction, the generator must provide the following to each person to whom the generator supplies the excavated natural material:

- a written statement of compliance certifying that all the requirements set out in this order have been met;
- a copy of the excavated natural material exemption, or a link to the EPA website where the excavated natural material exemption can be found; and
- a copy of the excavated natural material order, or a link to the EPA website where the excavated natural material order can be found.

Record keeping and reporting

4.10. The generator must keep a written record of the following for a period of six years:

- the sampling plan required to be prepared under clause 4.1.1;
- all characterisation sampling results in relation to the excavated natural material supplied;
- the volume of detected hotspot material and the location;
- the quantity of the excavated natural material supplied; and
- the name and address of each person to whom the generator supplied the excavated natural material.

4.11. The generator must provide, on request, the characterisation and sampling results for that excavated natural material supplied to the consumer of the excavated natural material.

5. Definitions

In this order:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

Bgl means below ground level, referring to soil at depth beneath the ground surface.

composite sample means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

consumer means a person who applies, or intends to apply excavated natural material to land.

discrete sample means a sample collected and analysed individually that will not be composited.

generator means a person who generates excavated natural material for supply to a consumer.

hotspot means a cylindrical volume which extends through the soil profile from the ground surface to the proposed depth of excavation, where the level of any contaminant listed in Column 1 of Table 2 is greater than the absolute maximum concentration in Column 3 of Table 2.

***in situ* material** means material that exists on or below the ground level. It does not include stockpiled material.

***in situ* sampling** means sampling undertaken on *in situ* material.

N/A means not applicable.

stockpiled material means material that has been excavated from the ground and temporarily stored on the ground prior to use.

systematic sampling means sampling at points that are selected at even intervals and are statistically unbiased.

transaction means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of excavated natural material that is not repeated.
- in the case where the supplier has an arrangement with the recipient for more than one supply of excavated natural material, the first supply of excavated natural material as required under the arrangement.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the generator and processor to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on ' www.epa.nsw.gov.au

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies excavated natural material should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of excavated natural material remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.

Examples

In situ sampling at depth

Example 1.

If the proposed depth of ENM excavation is between 1 m bgl and 1.4 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- No further depth sampling after 1 m bgl, unless required under section 4.4.4.

Example 2.

If the proposed depth of ENM excavation is at 1.75 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- 1 sample at 1.75 m bgl.
- No further depth sampling after 1.75 m bgl, unless required under section 4.4.4.

Example 3.

If the proposed depth of ENM excavation is at 2.25 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- 1 sample at 2 m bgl.
- No further depth sampling after 2 m bgl, unless required under section 4.4.4.

APPENDIX D UNEXPECTED FINDS PROTOCOL

ERM

Level 14
207 Kent Road
Sydney NSW 2000

Telephone: +61 2 8586 8750
Fax: +61 2 9299 7502

www.erm.com

1. UNEXPECTED FINDS PROTOCOL

ERM Services Australia Pty Ltd (ERM) was commissioned by CSR Limited (the Client) to prepare an Unexpected Finds Protocol (UFP) for the land identified as 225 Martin Road, Bradfield, NSW (the site).

This UFP has been developed as part of the Fill Management Plan for implementation during site works primarily associated with site filling activities. It has been prepared to ensure appropriate management of natural soils / fill which may contain undefined levels of asbestos and chemical contamination should they be encountered during site works.

Historically, land use on the site has comprised quarrying works and the associated brick making factory. Due to the history of the site, and discoveries of asbestos contamination during previous environmental investigations, there is potential for previously unidentified contamination to be present on-site. These materials may require additional assessment or management. It is imperative that the potential for such material to impact site workers and the remainder of the site is minimised during these works.

Asbestos, hydrocarbons, metals, pesticides, PCBs and foreign material, based on the history of the site and unknowns associated with uncontrolled filling have been identified as potential contaminants of concern. Due to this it is thought prudent to implement a UFP to cover all possible potential contamination scenarios.

Potential contamination on the Site which may exist outside the scope of the past environmental investigations will also be managed through the following UFP.

2. TYPICAL FEATURES OF UNEXPECTED FINDS

The main visual features of potential contamination to be looked for are:

1. Material containing anthropogenic artefacts such as ash, rubble, plastics, metal etc.;
2. Material with an obvious unnatural odour, i.e. fuel, solvent, burnt odour;
3. Material that is noticeably stained in colour;
4. Asbestos or suspected asbestos containing material;
5. Material with fibres visible;
6. Any material that has evidently been dumped/buried on the Site.

3. IMPLEMENTATION OF THE PROTOCOL

3.1 General

This UFP has been designed to be incorporated into the Fill Management Plan (FMP) for the Site. Prior to the commencement of any filling activities onsite, an occupational health and safety induction should be attended by all Site staff. The aim and importance of this UFP and how it is to be implemented should be discussed at this time. Responsibility for its implementation will be assigned to the Principal Contractor.

Monitoring of environmental issues will be undertaken on a daily basis. If an unexpected find is revealed during Site works, the following protocol is to be followed.

3.2 Implementation Process

1. Cease disturbance of the affected portion of the site and evacuate the immediate area.
2. Contact the Principal Contractor and the Contractors Environmental Representative (CER).
3. Principal Contractor to conduct an assessment of the location and extent of the unexpected find.
4. High risk areas should be isolated and secured against unintended access.
5. Temporary encapsulation (sealing) of the high risk area to ensure no airborne spread of contamination occurs may be appropriate. This may involve clean soil, plastic sheeting, etc.
6. Dust should be prevented by wetting the soil and drainage controls should be arranged where there is a potential for runoff to occur (runoff should be minimised).
7. Warning signs should be placed in the vicinity.
8. If the Principal Contractor considers that the material warrants further investigation, the area is to be barricaded to provide an exclusion zone.
9. If necessary, environmental controls should be established to minimise the potential for migration of contaminants from the impacted area.
10. Principal Contractor to complete UFP form (refer to Section 4.0) and issue to all relevant stakeholders.
11. The CER will undertake further visual assessment and sample collection and analysis. If necessary, samples will be sent to a NATA registered laboratory.
12. Evaluation of analytical data with respect to specific health screening levels will be undertaken. Determination will be made if soils are suitable for the proposed land use, need to be remediated or disposed of offsite to a suitably licensed facility.

    a. If soils are suitable to remain on-site and/or the area is found to be clean, a work instruction will be provided to this effect.

b. If soils are unsuitable to remain on-site, however can be remediated to be made suitable to remain on-site, the CER will advise on the subsequent steps required, including the requirement for the preparation of a RAP.

c. If soils are unsuitable to remain on-site and cannot be remediated, it will be required to dispose the material offsite. A waste classification letter must be provided prior to any offsite disposal.

13. If the material is subsequently found to contain asbestos, an appropriately licensed contractor will be required to remove it.

14. Affected areas will be reopened for earthworks following a clearance of the location and issuance of a report by the CER.

3.3 Notes

1. Any suspected asbestos containing should be left in place and not disturbed. The CER will organise appropriate environmental professionals for further investigation purposes.

2. To reduce the risk of cross contamination materials of differing compositions should not be mixed.

3. All sampling for validation, waste classification or characterisation purposes will be carried out in accordance with the following documents:

    - Contaminated Sites: Sampling Design Guidelines (NSW EPA, 1995);
    - National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) (NEPC, 2013);
    - Contaminated Sites: Guidelines for Assessing Service Station Sites (NSW EPA, 1994);
    - Waste Classification Guidelines (NSW EPA, 2014).

4. Any unexpected finds encountered should be listed on a UFP register, which should include the action taken and the status of the unexpected find. A suitable register is included in Section 5.0.

5. Once an unexpected find has been identified and a UFP form filled in the Principal Contractor and CER should liaise with the client as to the appropriate means of managing the situation. This should include discussions around the handling, treatment and disposal of material, WHS considerations and how the affected area will be validated and reopened for works.

6. Prior to closing out an unexpected find it will be important to ensure the appropriate documentation is obtained, such as: photographs, the UFP form, waste classification letter(s) and a validation report or letter.

7. A UFP form should be completed on each day of the remedial works as part of the daily site records. This will ensure that the process is being undertaken even if no unexpected finds are encountered. The form should include the name, company and the position of the person undertaking the field observations. Any movement of the Unexpected Find Materials should be logged within the Material Tracking Record for the Site.

4. UNEXPECTED FINDS PROTOCOL FORM

To be completed by the Site Controller

Unexpected Find Protocol		
Site:		
Personnel/Contractors on Site:		
Date:		
Daily Summary:		
1. Suspect Material encountered during daily activities? (if YES complete 2 to 5)	Yes	No
2. CER Contacted	Yes	No
3. UFP Reference No.: (Label occurrences sequentially 1, 2, 3 etc.)		
Description of Materials Encountered:		
4. Asbestos of Suspected Asbestos present	Yes	No
Description of ACM observed		
5. Material Isolated:	Yes	No
6. Location of Material (attach a field sketch/map where possible)		
7. Photographs taken/attached	Yes	No

Name: Signature:

5. UNEXPECTED FINDS REGISTER

Unexpected Finds Register						
UFP No.	**Date Found**	**Suspect Material Type**	**Brief Description**	**Recorded on UFP Form**	**Action Taken**	**Status (Open/Closed)**
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		
				Yes / No		

APPENDIX E PRELIMINARY BULK EARTHWORKS

FLOOD EXTENTS (FROM WIANAMATTA SOUTH CREEK CATCHMENT FLOOD STUDY, ADVISIAN, MAY 2022)

1% AEP

N

ESTIMATED VOLUME OF MATERIAL REQUIRED TO FILL PIT 1 TO RL 58.0 = 1,619,700m³ MATERIAL TO BE A BLEND OF SITE-WON AND IMPORTED FILL

ESTIMATED VOLUME OF MATERIAL REQUIRED TO FILL PIT 2 TO RL 61.0 = 406,590m³ MATERIAL TO BE A BLEND OF SITE-WON AND IMPORTED FILL

ESTIMATED VOLUME OF MATERIAL REQUIRED TO FILL PIT 3 TO RL 62.0 = 444,500m³. ALLOW MATERIAL TO BE SITE-WON CLASS A MATERIAL

BADGERYS CREEK

SOUTH CREEK

EXISTING MARTIN ROAD

ROAD 01

ROAD 02

ROAD 03

ROAD 04

ROAD 05

ROAD 06

ROAD 07

ROAD 08

ROAD 09

RING

EASTERN

1 BE 61.0
2 BE 64.0
3 BE 65.0
4 BE 62.0
5 BE 58.0
6 BE 55.0
7 BE 58.0
8 BE 61.0
9 BE 60.0
10 BE 62.0
11 BE 62.0
12 BE 59.0
13 BE 59.0
14 BE 54.0
15 BE 53.0
16 BE 60.0
17 BE 61.0
18 BE 59.0
19 BE 53.0
19A BE 53.0
20 BE 59.0
21 BE 61.0
22 BE 62.0
23 BE 58.0
24 BE 61.0

BE 62.0
BE 63.0
BE 66.0
BE 67.0
BE 68.0
BE 64.0
BE 60.0
BE 57.0

LEGEND

- EXTENT OF STAGE 1 DEVELOPMENT
- LOT BOUNDARY
- MINING LEASE BOUNDARY (ML1771)
- 60 — EXISTING CONTOUR 1m INTERVALS
- 1 — LOT ID
- B 56.0 — BULK EARTHWORKS LEVEL
- ENVIRONMENTAL ZONE
- LAND RESERVATION ACQUISITION
- 3 — STOCKPILES ASSIGNED TO PGH (STOCKPILE NO.) TOTAL ESTIMATED VOLUME BASED ON CRAIG & RHODES (JANUARY 2023) SURVEY = 210,978m³
- 2 — STOCKPILES CLASS A MATERIAL TO BE USED TO FILL PIT 3 (STOCKPILE NO.) TOTAL ESTIMATE VOLUME BASED ON CRAIG & RHODES (JANUARY 2023) SURVEY = 471,849m³
- PIT

CUT\FILL DEPTH RANGE LEGEND

Lower_value		Upper_value	Colour
-100	to	-16.0 m	
-16.0	to	-14.0 m	
-14.0	to	-12.0 m	
-12.0	to	-10.0 m	
-10.0	to	-8.0 m	
-8.0	to	-6.0 m	
-6.0	to	-4.0 m	
-4.0	to	-2.0 m	
-2.0	to	0.0 m	
0.0	to	2.0 m	
2.0	to	4.0 m	
4.0	to	6.0 m	
6.0	to	8.0 m	
8.0	to	10.0 m	
10.0	to	12.0 m	
12.0	to	14.0 m	
14.0	to	16.0 m	
16.0	to	100 m	

NOTES

1. ASSUMED 200mm TOP SOIL STRIPPING
2. EXISTING SURFACE BASED ON CROSSMULLER TECHNOLOGY SURVEY DATED 2017 AND CRAIG & RHODES STOCKPILE SURVEY DATED JANUARY 2023, MODIFIED TO REMOVE VOLUME OF STOCKPILES ASSIGNED TO PGH
3. ALIGNMENT AND GRADING OF EASTERN RING ROAD IS SUBJECT TO ADJUSTMENT
4. INTERNAL ROAD LAYOUT AMENDED FROM INDICATIVE MASTERPLAN CONCEPT (WATCH THIS SPACE DESIGN, 15/10/2020) AND SUBJECT TO FURTHER DESIGN DEVELOPMENT
5. STOCKPILES CLAIMED BY PGH HAVE BEEN REMOVED FROM EXISTING SURFACE. BOTTOM OF STOCK PILE LEVEL HAS BEEN ASSUMED AT EXISTING GROUND LEVEL, WHICH MAY NOT REFLECT NATURAL (UNDISTURBED) GROUND LEVEL

EARTHWORKS VOLUMES

ESTIMATED VOLUME OF CUT (m³) (EXCLUDING TOPSOIL VOLUME)	ESTIMATED VOLUME OF FILL REQUIRED TO FORM SITE TO NOMINAL PAD LEVELS (m³)	BALANCE OF MATERIAL GENERATED ON SITE (m³)	VOLUME OF MATERIAL REQUIRED TO FILL PITS 1 & 2 (m³)	FILL TO BE IMPORTED FOR PITS 1 & 2 (m³) (ASSUMING BLENDING WITH SITE-WON MATERIAL)	OVREALL MATRERIAL BALANCE (m³)
-2,791,300	+3,865,900	1,074,600	2,026,300	1,013,150	-61,450

Issue	Description	Date
P1	ISSUED FOR INFORMATION	09-06-23

100mm on Original

Bar Scales

0 100 200 300 400m

1 : 4000

Client: CSR

Scales: 1 : 4000

Grid: MGA 94

Height Datum: AHD

Drawn	BL
Designed	BL
Checked	TM
Approved	AM

Project: CSR BADGERYS CREEK

Title: BULK EARTHWORKS CUT AND FILL PLAN ALL STAGES

Civil Engineers and Project Managers
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Status: FOR INFORMATION NOT TO BE USED FOR CONSTRUCTION

A1

Project - Drawing No.: 21-871-SKC017

Issue: P1

F:\21-871 CSR Badgerys Creek\6.0 Drgs\Civil\Sketches\21-871-SKC017_CSR BULK EARTHWORKS.dwg

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