Appendix 15

Remedial Action Plan

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Contamination | Remediation | Geotechnical

CONCRETE RECYCLERS PTY LTD

Remedial Action Plan

7 Montore Road, Minto NSW

E24373.E06_Rev1
24 March, 2020

DOCUMENT CONTROL

Report Title: Remedial Action Plan

Report No: E24373.E06_Rev1

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Revision	Details	Date	Amended By
0	Original	8 January 2020	-
1	Minor changes	24 March 2020	JH

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1. INTRODUCTION

Concrete Recyclers Pty Ltd (the client) engaged EI Australia (EI) to prepare a Remediation Action Plan (RAP) for the property located at 7 Montore Road, Minto NSW (herein referred to as 'the site'). The purpose of this RAP is to outline the procedures that will render the site suitable for the proposed industrial land use.

The site (see **Figure A.1**) is located within the Local Government Area of Campbelltown City Council, and is further identified as comprising Lot 52 in Deposited Plan (DP) 618900, covering a total area of approximately 23,000m^2.

Previous investigations completed at the site were:

- EIS (2018) *Stage 1 / Stage 2 Environmental Site Assessment; 7 Montore Road, Minto NSW 2566* (Environmental Investigation Services Report E29448KrptRev1, dated 10 January 2018); and
- EI (2020) *Additional Site Investigation; 7 Montore Road, Minto NSW* (EI Australia Report E24373.E03_Rev1, dated 24 March 2020).

The EIS (2018) site assessment established that the land had been used for a mixture of residential and commercial purposes from 1899 until the present day. Friable and bonded asbestos-containing materials (ACM) were identified in fill soils from the southern portion of the site, as well as within two stockpiles.

The EI (2020) additional investigation confirmed the presence of ACM in southern half of the site and delineated the areas of impact. It was concluded that the ACM posed a moderate to high risk to (future) human receptors. Remediation of the land was therefore necessary, in order for it to be suitable for the proposed (resource recovery facility) development.

1.1 Proposed Development

The following development and survey plans were provided to assist in the writing of this report:

- Proposed Plans, prepared by Martens & Associates Pty Ltd, Project No: 1203464, Release No: R12, dated 2 March 2020; and
- Survey Plan, prepared by William L. Backhouse Pty Ltd, Project Ref: CH5241.001, dated 8 June, 2019.

It was understood that the proposed development involved the construction of a resource recovery facility, with an intended capacity of 450,000 tonnes of bricks, concrete and sand processed per annum. It included site offices, weighbridge and wheel wash facilities, feed concrete and stockpiles, concrete crushing plant, sand washing plant, pug mill, repair workshop, rain and stormwater tanks, an employee carpark and driveway and hardstand areas. Copies of the proposed development and site survey plans are presented in **Appendix B**.

1.2 Remediation Objective

The main objective of this plan is to guide remediation of the site, by providing detailed procedures that comply with relevant guidelines, yet prevent adverse effects on human and environmental receptors.

1.3 Remediation Scope

The remediation objective will be achieved by:

- Outlining the legislative framework relevant to the works;

- Providing a summary of the previous investigations of the site, including the site setting and contamination status;
- Definition of remediation goals and acceptance criteria;
- Review of available remediation technologies, with identification of the most appropriate method of site clean-up;
- Description of work procedures that are compliant with relevant environmental legislation;
- Guidance on approvals and licences required for the remediation works;
- Provision of information to assist the contractor in their preparation of a Work, Health and Safety Plan (WHSP) and other site management/planning documents;
- Identification of the key stakeholders and their responsibilities; and
- Provision of a Sampling and Analytical Quality Plan (SAQP) that will validate the effectiveness of the remediation.

1.4 Regulatory Framework

The following regulatory framework and guidelines were considered during the preparation of this RAP:

- *Contaminated Land Management Act 1997*;
- *Campbelltown Development Control Plan 2015;*
- *Campbelltown Local Environmental Plan 2015*;
- *State Environment Protection Policy 55 (SEPP 55) - Remediation of Land*;
- EPA (1995) *Sampling Design Guidelines*;
- NEPC (2013) *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater*;
- NEPC (2013) *Schedule B(2) Guideline on Site Characterisation*; and
- OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

1.5 Deviations from this RAP

During the course of the program, it may be necessary to vary the sequence and/or details of the site remediation and validation works to meet site constraints. If so, any deviation from the methodology specified in this RAP is to be properly documented and approved, as required under the OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

Performing remedial works without the supervision of a qualified environmental engineer/scientist may lead to project delays and extra costs, due to additional investigation requirements imposed by an independent consultant, or the appointed Site Auditor, to confirm the environmental status of the site.

In worst case scenarios, waste materials removed from the site without proper characterisation and/or tracking, may lead to regulatory action and potential penalties, as described under the *Waste Regulation 2014*, the *Protection of the Environment Operations Act 1997* and the *Contaminated Land Management Act 1997*.

2. SITE DESCRIPTION

2.1 Property Identification, Location and Physical Setting

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	7 Montore Road, Minto NSW
Location Description	The site is located within the Minto Industrial Area. It is bound by existing industrial warehouses to the north, east and south, and a drainage easement containing Bow Bowing Creek (canal) to the west. The site itself is comprised of a storage facility in the northern half, leased by Coates Hire, with the southern half of the site unoccupied (and mostly vacant, with the exception of a dilapidated site shed and unused machinery). An access road runs down the eastern boundary of the site.
Site Coordinates	Northeast corner of site (GDA2020-MGA56): Easting: 300092.964 Northing: 6232263.541 (Source: http://maps.six.nsw.gov.au)
Site Area	Approximately 23,000m^2 (Source: http://maps.six.nsw.gov.au)
Lot and Deposited Plan (DP)	Lot 52 in DP 618900
State Survey Marks	Two State Survey (SS) marks are situated in proximity to the site: ▪ SS76002: 4m north of the site, in between the boundaries of the site and the neighbouring property; and ▪ PM33564: 40m south of the site, within the cul-de-sac of Pembury Road. (Source: http://maps.six.nsw.gov.au)
Local Government Authority	Campbelltown City Council
Parish	Minto
County	Cumberland
Current Zoning	IN1: General Industrial (Campbelltown Local Environment Plan, 2015)

2.2 Regional Setting

Local topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-2**.

Table 2-2 Regional Setting Information

Attribute	Description
Topography	The local topography is generally flat; however, strips of land along the northern, western and southern boundaries stepped down at approximately 0.5-1m. Area directly to the west of the site slopped downwards to Bow Bowing Creek, within the easement canal (being a bout 5m lower in elevation).
Site Drainage	Rainwater is expected to infiltrate directly into exposed soils. Surface runoff is expected to flow westerly, downslope towards Bow Bowing Creek.
Regional Geology	With reference to the 1:100 000 scale *Wollongong-Port Hacking Geological Series Sheet 9029-9129* (DMR, 1985), the site is underlain by two lithologies: ▪ Holocene and Pleistocene elements of fine-grained sands, silts and clays (*Qal*), potentially influenced from historical tributary lines of Bow Bowing Creek; and ▪ Laminite and dark grey siltstone comprised of Ashfield Shales from the Wianamatta Group (*Rwa*).
Soil Landscape	The Soil Conservation Service of NSW *Soil Landscapes of Penrith 1:100,000 Sheet* (Chapman and Murphy, 2002) indicates that the site overlies an interface between residual Blacktown (*bt*) and alluvial South Creek (sc) landscapes. The Blacktown landscape includes gently undulating rises on Wianamatta Group shales. Local relief up to 30 m, with slopes usually broad rounded crests and ridges, with gently inclined slopes. Soils are shallow to moderately deep, hard setting, mottled texture contrast soils, including red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines. The South Creek landscape includes floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain. Usually flat with incised channels and mainly cleared. Soils are often very deep layered sediments over bedrock or relict soils. Where pedogenesis has occurred, structured plastic clays or structured loams occur in and immediately adjacent to drainage lines, red and yellow podzolic soils are most common terraces, with structured grey clays, leached clays and yellow solodic soils.
Acid Sulfate Soil (ASS) Risk	There was no ASS risk map pertaining to the site available through the Department of Land and Water Conservation. There was no ASS class map pertaining to the site available on the Campbelltown Local Environmental Plan 2015. it was concluded that the presence of ASSs on the site was low and that further related assessment was unwarranted.
Likelihood and Depth of Filling	Based on observations during the investigation phase, fill materials were present on the site, the maximum depth being to 1.0m below ground level (BGL). The average depth was 0.4m BGL.
Typical Soil Profile	Anthropogenic fill, overlying alluvial and residual clays. Shale bedrock is inferred at depth.
Depth to Groundwater	Groundwater was not encountered during the previous investigations. Local groundwater was assumed to be reflective of the Bow Bowing Creek channel invert (approximately 5m BGL, or 39.3m Australian Height Datum (AHD)).
Nearest Surface Water Feature	Bow Bowing Creek, located approximately 30m west of the site. Bow Bowing Creek is a major tributary of Bunbury Curran Creek, which joins the Georges River approximately 10km north-east of the site.
Anticipated Groundwater Flow Direction	Groundwater is anticipated to flow west, towards Bow Bowing Creek.

3. SITE CHARACTERISATION

3.1 Previous Investigations

Previous investigations completed at the site were recorded under the following reports:

- EIS (2018) *Stage 1 / Stage 2 Environmental Site Assessment; 7 Montore Road, Minto NSW 2566* (Environmental Investigation Services Report E29448KrptRev1, dated 10 January 2018); and
- EI (2020) *Additional Site Investigation; 7 Montore Road, Minto NSW* (EI Australia Report E24373.E03_Rev1, dated 24 March 2020).

A summary of each report is provided in **Tables 3-1** and **3-2**.

Table 3-1 Summary of EIS (2018) Works and Findings

Task	Findings
Objectives of the ESA	▪ To assess the potential for contamination at the site; and ▪ To provide recommendations on the need for further works, as necessary, to make the site suitable for the proposed development.
Scope of the ESA	▪ Undertake site history searches (title deeds, aerial photographs, NSW WorkCover/Dangerous Goods, council records review); ▪ Review available information relating to local geology and groundwater bores; ▪ A site inspection, to identify areas of environmental concern; ▪ Preparation of a Preliminary Conceptual Site Model; ▪ Design and implementation of a sampling, analysis and quality plan (SAQP); ▪ Interpretation of the analytical results against the adopted criteria; and ▪ Provide a preliminary waste classification for the off-site disposal of soil.
ESA Findings	▪ The history review suggested the site had been used for a mixture of residential and commercial purposes from 1899 to the present day. ▪ Council records established that consent was granted for the erection of a waste recycling depot in 1989 and for the storage, processing and selling of railway sleepers, timber and firewood in 1998. ▪ SafeWork NSW records did not identify any licences relating to the storage of dangerous goods. ▪ NSW EPA records indicated that the site was formerly regulated under the *POEO Act 1997* for waste storage, transfer, separating or processing. ▪ Laboratory analytical results for soil samples obtained from 33 test pits all complied with the adopted investigation levels applicable to commercial / industrial land use settings, except for benzo(a)pyrene in samples collected along the northern and eastern boundaries, which exceeded the corresponding ecological criterion. These exceedances were not considered to pose a significant risk in relation to the proposed (resource recovery facility) development, however. ▪ Matted (friable) asbestos material was identified within fill at test pit TP14. Bonded asbestos fragments were identified in surface soils from the southern portion of the site (SS01), as well as within the 'Northern Stockpile' and 'Central Stockpile' (neither of which being present by the time of the EI (2020) additional site investigation).
Conclusions and Recommendations from the ESA	EIS considered the site could be made suitable for future industrial use, provided the following recommendations were implemented: ▪ Undertake a detailed soil investigation for asbestos; ▪ Prepare an Asbestos Management Plan (AMP) for future excavation works; and ▪ Prepare an Environmental Management Plan (EMP) for the ongoing management of the site during construction works.

Table 3-2 Summary of EI (2020) Works and Findings

Task	Findings
Objectives of the ASI	▪ To assess the potential for contamination at the site; and ▪ To provide recommendations on the need for further works, as necessary, to make the site suitable for the proposed development.
Scope of the ASI	▪ Review of relevant topographical, geological, hydrogeological and soil landscape maps for the project area; ▪ Review of the previous environmental report relating to the site; ▪ Present a conceptual site model, based on the available information; ▪ Preparation of a Work, Health, Safety and Environmental Plan (WHSP); ▪ Preparation of a fieldwork plan, with proposed test pit / borehole locations; ▪ A site inspection, performed in collaboration with a licensed services locator, whom utilised electro-magnetic equipment to search for buried services; ▪ Construction of test pits / boreholes at sixty (60) locations, distributed in a triangular grid pattern across the site; ▪ Soil sampling at each of the locations; ▪ Laboratory analysis of selected soil samples for the contaminants of potential concern (COPC); and ▪ Data interpretation and reporting.
ASI Findings	▪ The sub-surface was comprised of a layer of anthropogenic filling (up to 1m BGL), overlying residual clays (and shale at depth). ▪ Two soil stockpiles were present on the southern half of the site (SP1: approximately 125m^3; SP2: approximately 250m^3), with overgrown vegetation extruding from each. ▪ Former stockpiles identified in the EIS (2018) report had either been removed from site to an EPA licensed facility ('Central Stockpile') or flattened for site levelling ('Northern Stockpile'). ▪ Individual sample concentrations of heavy metals, polycyclic aromatic hydrocarbons, total recoverable hydrocarbons, the monocyclic aromatic hydrocarbons benzene, toluene, ethyl benzene and xylenes, pesticides and polychlorinated biphenyls all complied with the adopted soil investigation levels (SILs) applicable to commercial / industrial land use. ▪ Asbestos was identified in fill samples from eight test pits, all of which were within the southern half of the site (TP107, TP114, TP115, TP118, TP123, TP125, TP305 and TP306). Except for TP305_0.2-0.6, the concentration of asbestos in these samples all exceeded the corresponding SIL. ▪ The absence of ACM in stockpiles SP1 and SP2 indicated that these materials were *General Solid Waste* in accordance with the EPA (2014) *Waste Classification Guidelines*. ▪ The asbestos contamination appeared to be limited to the southern half of the site. Areas of recommended remediation were delineated.
Conclusions and Recommendations from the ASI	EI concluded the ACM at the site posed a moderate to high risk to (future) human receptors. Remediation of the land was therefore necessary, in order for it to be suitable for the proposed (resource recovery facility) development. The following recommendations were to be implemented as part of this process: ▪ Preparation of a RAP, the works for which could be integrated into the initial stages of the development. The scope of the RAP was to include: ‣ Procedures for effective site clean-up; ‣ A SAQP for the validation activities; ‣ Waste classification of materials designated for off-site disposal; ‣ Work health and safety matters, as well as environmental protection measures, and ‣ A contingency plan to address unexpected finds. ▪ Preparation of an Asbestos Management Plan (AMP) for the site; and ▪ Preparation of a final site validation report by a suitably qualified environmental consultant, certifying the suitability of site soils for the proposed development.

4. CONCEPTUAL SITE MODEL

In accordance with NEPC (2013*) Schedule B2 - Guideline on Site Characterisation* and to aid the assessment of data collected for the site, EI developed a conceptual site model (CSM) as part of the investigation phase. The CSM assessed plausible linkages between potential contamination sources, migration pathways and receptors. It concluded that contamination associated with both bonded and friable asbestos remained at the site, requiring remediation.

4.1 Existing Site Contamination

Based on the findings of previous investigations, the following sources of contamination were identified, and considered relevant to this RAP:

Southern Portion of Site

Both bonded and friable asbestos materials were present in the southern portion of the site, at locations:

- SS01 and TP14 (EIS, 2018); and
- TP107, TP114, TP115, TP118, TP125 and TP306, with friable 'rope' materials at TP123 and bonded asbestos fragments at TP305, although concentrations were below the SIL.

A stockpile, identified by EIS (2018) as the 'Central Stockpile', was also found to contain bonded asbestos fragments; however, this stockpile was removed off-site to an EPA licensed waste facility.

A plan showing identified site contamination is presented in **Figure A.2**.

Northern Portion of Site

EIS (2018) identified bonded asbestos materials within a stockpile along the northern site boundary (identified as the 'Northern Stockpile'). This stockpile was inaccessible by the time of the EI (2020) ASI, with sheds and equipment utilised by Coates Hire covering the area. It was assumed the majority of this stockpile had been flattened out across the site surface. Whilst subsequent intrusive investigations did not identify ACM contamination in this part of the site, it cannot be discounted until the site is completely cleared of buildings etc.

Figure A.2 identifies the area in question.

4.2 Contaminants of Potential Concern

Based on the findings from the investigation phase, ACM was the contaminant of concern for the site (both bonded and friable forms).

4.3 Potential Sources, Exposure Pathways and Receptors

EI concluded the ACM at the site posed a moderate to high risk to (future) human receptors. The imported anthropogenic / heterogeneous fill was likely to have contained ACM in portions, and had been spread across the site during levelling / stockpile relocation.

The potential exposure pathways and human and environmental receptors that were considered relevant for the remediation and validation at the site are summarised in **Table 4-1**. This table includes a qualitative assessment of the potential risks posed by complete exposure pathways.

Table 4-1 Conceptual Site Model

Potential Sources	Impacted Media	Chemicals of Potential Concern	Transport mechanism	Exposure pathway	Potential receptor
Fill soils of unknown origin, Impacts from uncontrolled demolition of historic site	Soil	Asbestos (bonded/friable)	Disturbance of surface and subsurface soils during site redevelopment, future site maintenance and future use of the site post redevelopment	Ingestion Dermal contact Inhalation of dust particulates	Construction and maintenance workers End users of the site post redevelopment
			Atmospheric dispersion from soil to outdoor and indoor air spaces	Inhalation of dust particulates	

5. REMEDIATION GOALS AND CRITERIA

5.1 Remediation Goals

The remediation goals for this RAP are consistent with the NSW EPA *SEPP 55* guidelines (DUAP / EPA, 1998) and Council's contaminated land policy, and include:

- Meeting the conditions of the planning consent and to render the site suitable for the proposed land use(s);
- Demonstrating that the proposed remediation strategy for the site is environmentally justifiable practical and technically feasible;
- Adopting clean-up criteria appropriate for the future use of the site to mitigate possible impacts to human health and the environment;
- Consideration of the principles of ecologically sustainable development in line with Section 9 of the *Contaminated Land Management Act 1997*;
- Minimising waste, as per the *Waste Avoidance and Resource Recovery Act 2001*;
- To remediate all contamination at the site so there are no unacceptable risks to onsite and offsite receptors; and
- Demonstrating that the plans for site management of remediation work consider work health and safety, environmental management, and site contingencies.

5.2 Remediation Criteria

The remediation criteria proposed for this project are outlined in **Table 5-1**. These were selected from available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenario that is expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 5-1 Proposed Remediation Criteria for Soil

Adopted Guidelines	Rationale
NEPC (2013) Soil HILs and HSLs	**Soil Health-based Investigation / Screening Levels (HILs / HSLs)** All soil samples will be assessed against the NEPC (2013) *HIL-D / HSL-D* thresholds for commercial/industrial sites, consisting of single or multi-storey buildings supported by ground-level slabs. Since asbestos represents the contaminant of concern for this site, soil asbestos results will be assessed against the NEPC (2013) *HSL* thresholds for "all forms of asbestos", which are derived from the WADOH (2009) criteria.

Prior to being removed from the site, excavated soils must be classified in accordance with the EPA (2014) *Waste Classification Guidelines*. Under these guidelines, fill/soils may be classified into the following groups: *General Solid Waste*, *Restricted Solid Waste,* or *Hazardous Waste*, subject to chemical assessment using NATA-registered laboratory methods for total and leachable (TCLP) contaminant levels. Any soils containing asbestos would also be classified as *Special Waste - Asbestos Waste*. In accordance with the *NSW Waste Regulation 2014*, waste soils must only be disposed to a waste facility that is appropriately licenced to receive the incoming waste. It is therefore recommended that confirmation is obtained from the waste facility prior the materials being removed from the site.

6. QUALITY OBJECTIVES

6.1 Data Quality Objectives

Table 6-1 identifies the Data Quality Objectives (DQO) that will apply for the site remediation and validation phases (NEPC, 2013; EPA, 2017; OEH, 2011).

Table 6-1 Data Quality Objectives

Step	Description
State the Problem	The site is to be rendered suitable for the proposed construction of a resource recovery facility. Previous site investigations (EIS, 2018 and EI, 2020) have indicated the presence of asbestos contamination within fill. In light of the proposed development and current information relating to contamination at the site, the remediation and validation must provide supportive information on the environmental conditions of the site, to determine its suitability for the proposed development.
Identify the Decision	Based on the remedial objectives outlined in **Section 1.2**, the following decisions are identified as: ▪ Has the nature and extent of soil impacts on-site been defined? ▪ Does the level of impact coupled with the fate and transport of identified contaminants represent an unacceptable risk to identified human and/or environmental receptors on or offsite? and ▪ Will further remediation and/or special management be required before the site is suitable for the intended land use?
Identify Inputs to the Decision	Inputs to the decision process include: ▪ Previous investigation works; ▪ Details of the proposed site use; ▪ Understanding of current site use and historic activities that have occurred, including potential offsite sources of contamination; ▪ Geological and hydrogeological data relevant to the area, including physicochemical parameters for calculating ecological criteria; ▪ Field screening data and site observations for the presence of visual/olfactory contamination indicators; ▪ Contaminant concentrations in soil validation samples confirming effective removal of identified impacts; and ▪ Further input to the decision will be sample collection and handling, field and laboratory QAQC and confirmation that data quality indicators (DQIs) were achieved.
Define the Boundary of the Assessment	**Lateral** – Works will be limited to the site boundaries (**Figure A.2**), and within the proposed excavation areas. **Vertical** – From existing ground surface, underlying fill and natural soil horizons, to the base of contaminated soil and/or bulk excavation level (BEL), including underlying water-bearing zones. **Temporal** – Results will be valid on the day samples are collected and will remain valid if no changes to site use occur, and contamination (if present) does not migrate from off-site sources. Constraints of sampling requiring consideration include access restrictions (due to site operations and/or conditions) and presence of both above and underground services / structures.

Step	Description
Develop a Decision Rule	The decision rules for validation are: ▪ Is the site suitable for the proposed land use? *If the concentrations of contaminants that remain are below the relevant criteria for the intended land use, then the site will be deemed suitable for the proposed development.* ▪ Is additional information required to determine the suitability of the site for its proposed use? *Should additional information be required, as determined by the conceptual site model (CSM), then appropriate recommendations will be provided.* Decision criteria for analytical data are defined by the Data Quality Indicators (DQI) in **Table 6-2**.
Specify Acceptable Limits on Decision Errors	Specific limits for this project will be in accordance with NEPM, appropriate data quality indicators (DQIs) for assessing the useability of the data and EI standard procedures for field sampling and handling. To assess the useability of the data, pre-determined DQIs for completeness, comparability, representativeness, precision, and accuracy, as presented below in **Table 6-2**. If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the useability of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of samples.
Optimise the Design for Obtaining Data	▪ Written instructions will be issued to guide field personnel in the required fieldwork activities. ▪ Soil excavation is to be performed as per **Section 8**. Soil validation sampling is to be completed as per the methodology prescribed in **Section 10.** ▪ Validation sampling procedures that would be implemented to optimise data collection for achieving the DQOs. ▪ Review of the results will be undertaken to determine if further excavation and additional sampling is warranted. Additional investigations would be warranted where soil concentrations are found to exceed remediation criteria endorsed by the NSW EPA, relevant to the proposed land use(s).

6.2 Data Quality Indicators

To ensure that the validation data are of an acceptable quality, the results will be evaluated against the data quality indicators (DQI) outlined in **Table 6-2**, which will apply to both field and laboratory-based procedures (where applicable).

Table 6-2 Data Quality Indicators

Data Quality Objective	Data Quality Indicator	Acceptable Range
Accuracy	Field – Trip blank (laboratory prepared) Laboratory – Laboratory control spike and matrix spike Field – Split duplicate	< laboratory limit of reporting (LOR) Prescribed by the laboratory <30% relative percentage difference (RPD)
Precision	Field – Blind duplicate Laboratory – Laboratory duplicate and matrix spike duplicate	<30% RPD Prescribed by the laboratory
Representativeness	Field – Rinsate and trip blanks Laboratory – Method blank	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Completeness	Completion (%)	-

7. REMEDIATION TECHNOLOGY

7.1 Regulatory Overview

Under the NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amendment Measure*, the preferred hierarchy for site remediation and/or management is:

- On-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or, if the above are not practicable:
- Consolidation and isolation of the soil on-site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or
- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

When deciding which option to choose, the sustainability (environmental, economic, and social) of each option should be considered, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option.

For this site, a number of remediation options were reviewed to examine the suitability of each method, the surrounding properties, geological and hydrogeological limitations and the following considerations:

- Development requirements (industrial, with limited access to soils and landscaped areas);
- Prioritisation of works in areas of most concern;
- Ability of remedial method to treat contamination with respect to material and infrastructure limitations;
- Remedial timetable;
- Defensible method to ensure the site is remediated to appropriate levels / validation criteria; and
- Regulatory compliance.

7.2 Remediation Technologies Review

A number of soil remediation options were reviewed to examine the suitability of each method, with due regard for the surrounding land uses, as well as the (hydro)geological limitations.

Each of the available remediation technologies is summarised in terms of its suitability in **Table 7-1**.

Table 7-1 Remediation Technology Review - Soils

Remediation Methodology	Description	Advantages	Disadvantages	Suitability
No Action	'No Action' can be considered if: ▪ There is no measurable contamination; ▪ Contaminant concentrations are below assessment guidelines; ▪ Contaminants are not mobile; or ▪ Exposure to contaminated soils is unlikely.	No remediation costs Creates minimal disturbance to the site Retains material on-site	Not applicable to the kind of contamination encountered at the site. Would pose limitations on land use options. May require an Environmental Management Plan and ongoing monitoring.	Not Suitable – As the key objective of the remedial strategy is to make the site suitable for industrial use without the need for ongoing monitoring.
On-site bioremediation	Excavated soils are thoroughly broken down and aerated, mixed with microorganisms and nutrients, stockpiled and aerated in above ground enclosures.	Cost effective if soils are utilised on-site. Lower disposal costs. Limited requirement to import fill material to site. Retains material on-site.	Significant area of site required to land farm material. Undefined remediation timeframe. Potential for odour problems. Not suitable for asbestos contamination.	Not suitable – May be utilised for hydrocarbon impacted soils. As there are currently no hydrocarbon impacted soils requiring remediation on-site, this technology is not suitable. Should hydrocarbon impacted soils be identified, this technology may be reconsidered.
In-situ treatment	*In-situ* treatment of impacted soils within the smear zone and saturated zone using *in-situ* treatment methods such as soil vapour extraction, injection of oxidising agents etc.	Creates minimal disturbance to the site (no excavation). Cost effective for large scale site remediation of light to mid-weight petroleum hydrocarbons. Potential to simultaneously remediate dissolved phase hydrocarbons in site groundwater.	Not applicable to the kind of contamination encountered at the site. Expensive establishment costs. Potential for odour problems. Requires detailed design, pilot trials and management.	Not suitable – This method is designed for widespread hydrocarbon impacted soils. Since the present dataset does not provide evidence of widespread hydrocarbon contamination; this is not considered to be an economically viable option.

Remediation Methodology	Description	Advantages	Disadvantages	Suitability
Consolidation and/or capping	Risk minimisation approach where impacted soils are managed on-site by capping the ground surface with a clean, impermeable layer of fill material.	Effectively removes risk to human health by eliminating exposure pathways.	Importance of capping design and materials utilised in the construction of capping layer. Would pose limitations on land use options. Typically requires an Environmental Management Plan and ongoing monitoring.	**Potentially suitable** – An environmental management plan (EMP) with ongoing monitoring would be required, due to the retention of contaminated materials on the site. There is sufficient space across the site to sufficiently bury impacted soils underneath hardstand.
Excavation and off-site disposal	Excavate impacted materials. Transport directly to a licensed landfill facility. Reinstate site with imported clean fill material.	Fast – impacted material removed immediately, significantly reducing potential for impact to groundwater. No storage or treatment problems. Reduced vapour/odour issues as impacted materials removed from site. Minimal design and management costs.	Transfer of waste to another location (licensed waste facility). High costs associated with the disposal of waste soils and importation of clean backfill). Requires waste classification prior to disposal, keeping of thorough waste records, waste tracking and reporting. Sustainability issues related with disposal to landfill.	**Suitable** – For meeting the key project objective to make the site suitable for commercial/industrial use without the need for ongoing monitoring. This will remove impacted fill breaking any pollutant linkages present at the site (source removal).
Natural attenuation	Allowing the contaminants to biodegrade naturally following removal of the contamination source.	No remedial excavation of site. Retains materials on site. Sustainable, cost effective remediation method.	Slow process. Potential for contamination to further impact on the groundwater aquifer and nearby environmental receptors. Typically requires an Environmental Management Plan and ongoing monitoring.	Not Suitable – This approach is primarily suited to addressing groundwater contamination, which at the time of this report has not been identified. If groundwater contamination is identified, this remediation technology will be reassessed.

7.3 Preferred Remediation Option

Based on the available remedial technologies, the proposed site development (resource recovery facility) the potential risks to human health and the environment, as well as the relative cost effectiveness of feasible remedial techniques, the preferred remedial option for the site is:

- Offsite disposal of impacted soils to licensed waste facilities. All wastes shall be transported to appropriate, EPA-licensed facilities, after formal classification. All excavated (remediation) areas shall be validated by base and wall, soil sampling; and
- Site reinstatement with validated, imported (or recovered) excavated natural materials (where required).

Note that on-site consolidation (encapsulation) and/or capping of impacted materials will be considered a secondary option, where economic constraints dictate.

7.4 Site Preparation, Licences and Approvals

7.4.1 Consent Requirements

In accordance with *SEPP 55 - Remediation of Land*, the category of the remediation works defines whether consent is required prior to their commencement. Under *SEPP 55*, works where there is the potential for significant environmental impact are classed as *Category 1* and require development consent. *Category 2* works pose a low potential for environmental impact and do not therefore require prior consent. The determination for the subject site is outlined in **Table 7-2**.

Table 7-2 Remediation Works Category Determination

Significant Environment Impact	Yes/No	Category
Designated Development or State Significant Development	Yes	1
Critical or threatened species habitat	No	2
Have significant impact on threatened species, populations, ecological communities or their habitats	No	2
In area identified environmental significance such as scenic areas, wetlands (see list*)	No	2
Comply with a policy made under the contaminated land planning guidelines by the council.	Yes	2
Is work ancillary to designated development	Yes	2

Notes: * Environmental significance list -coastal protection, conservation or heritage conservation, habitat area, habitat protection area, habitat or wildlife corridor, environment protection, escarpment, escarpment protection or escarpment preservation, floodway, littoral rainforest, nature reserve, scenic area or scenic protection, or wetland.

Based on the above determination, the remediation works for the site are considered Category 1 and will require development consent

7.4.2 Development Consent and Control Plans

All works should be in accordance with Campbelltown City Council DCPs and any development consent issued by Council for the development.

7.4.3 Other Licence Requirements

The appointed site contractor should prepare an appropriate Construction Environmental Management Plan (CEMP), health and safety plans, and other plans required by the Council DA and DCPs. Where asbestos removal is required, the contractor must be appropriately licensed to perform such works.

8. REMEDIATION WORKS

Site characterisations revealed the presence of bonded and friable asbestos contamination across the site, which made it unsuitable for the proposed industrial use. The remedial tasks required are as follows:

- Excavation and off-site disposal of friable asbestos materials at locations TP14 (EIS, 2018) and TP123 (EI, 2020); and
- Excavation and off-site disposal of fill materials at locations NS1, NS2 and SS01 (EIS, 2018) and TP107, TP114, TP115, TP118, TP125 and TP306 (EI, 2020), followed by hand picking of asbestos fragments and processing of oversize materials (to remove bricks/concrete).

A qualified environmental scientist, performing the role of Environmental Management Coordinator, will be appointed to the project, to ensure that critical stages of the site remediation are appropriately supervised and documented, with the relevant data collected for environmental reporting purposes. These will include, though not necessarily be limited to, site induction of personnel in relation to contamination hazards and environmental management issues, marking of remediation areas, inspection of environmental monitoring systems, implementation of specified control measures and validation sampling.

8.1 Remediation Sequence

The sequence of work for the remediation is proposed in **Table 8-1**, with an indicative timeframe of each task. Further details are provided in the sections that follow.

Table 8-1 Summary of Remediation Sequence

Task	Timeframe	Description of Work
Preliminaries/ Site Establishment/ Removal of equipment	Weeks 1-2	▪ Development of pre-work plans (construction environmental management plan, occupational health and safety plan, hazardous material survey), approvals and permits to commence work. ▪ Establishment of site pollution monitoring and control measures to be maintained for the duration of the works as outlined in management plans. ▪ Removal of Coates Hire equipment.
Remedial Works and Validation	Weeks 3-5	▪ Conduct remedial removal works for impacted soils in impacted areas (friable ACM areas). ▪ Following excavation of bonded ACM hotspots, conduct emu-pick and mechanical screening. ▪ Waste streams to be kept separate to prevent cross-contamination. ▪ Sampling of processed stockpiles to confirm absence of ACM. ▪ Following removal of fill, natural surfaces are to be inspected and sampled to validate removal of contaminated soils from the site.
Bulk Excavation and Backfill (if required)	Weeks 6-8	▪ Excavation of the site for soils not required for the proposed development.
Reporting	Weeks 9-11	▪ All findings and investigation methodologies of the remedial works will be reported within a validation report.

8.1.1 Preliminaries / Site Establishment

Notice will be given to Council at least 30 days prior to the commencement of remediation works. A list of all required work permits will be obtained from Council and arrangements are to be made to obtain the necessary approvals from the relevant regulatory authorities.

The site itself will be prepared in accordance with the requirements of the Site Management Plan outlined in **Section 9**. The site developer would also need to prepare and implement a Construction Environmental Management Plan (CEMP) and Site Work Health and Safety (WHS) Plan prior to any site works. Establishment of environmental controls, site access, security, fencing, warning signage and preparation of a Health Safety and Environment Plan is required prior to works commencement. A project plan should also be developed to outline engineering design for excavation support (if required), water treatment requirements and design, staging of excavation works, stockpiling, waste stabilisation, waste material loading, traffic management and waste tracking.

As part of the site preparation phase and preliminary tasks a remediation workshop should be conducted with the appointed contractor(s) to further develop any remedial measures, excavation plans and environmental management requirements.

Also prior to commencing work the site contractor is to complete a staging or project plan that outlines the basic stages of the remediation works. The staging plan should include, but not be limited to:

- Staging of the decommissioning and removal of tanks and associated equipment;
- Staging of areas to be excavated;
- Areas designated for waste segregation, screening and storage (stockpiling), amenities, soil and groundwater treatment (if required);
- Truck movements to allow loading to mitigate impacts to surrounding land users and council infrastructure; and
- Proposed environmental mitigation measures.

Removal of all Coates Hire equipment on the site will be required prior to commencing remedial works on-site.

Should unexpected finds be discovered during the course of the site remediation program, then the procedures described under the Contingency Management (**Section 8.2**) and Unexpected Finds Protocol (**Appendix C**) are to be implemented until the site remediation goals have been achieved and the site is deemed suitable for the intended land use.

8.1.2 Remedial Works and Validation

Site characterisation revealed the presence of both bonded and friable asbestos contamination across the site. The quality of soil remaining onsite following remediation requires validation to ascertain site suitability. The remedial methodology should progress in the following stages:

1 Excavate hotspots of friable asbestos material at locations TP14 (EIS, 2018) and TP123 (EI, 2020). Conduct classification sampling prior to off-site disposal. Remediation of these areas (identified as 4 and 5 in **Figure A.3**) is to be performed separately. Excavations of materials should be conducted to natural soils. All resulting stockpiles are to be placed on hardstand or builders plastic and covered to prevent cross contamination.

2 Excavate hotspots of bonded asbestos at locations NS1, NS2 and SS01 (EIS, 2018) and TP107, TP114, TP115, TP118, TP125 and TP306 (EI, 2020). Remediation of these areas (identified as 1, 2 and 3 in **Figure A.3**) is to be performed separately. Excavations should be conducted down to natural soils. All resulting stockpiles are to be placed on hardstand or builders plastic and covered to prevent cross contamination.

3 Following the excavation of bonded asbestos hotspots (i.e. Areas 1-3), the stockpiles are to be spread out on hardstand or builders plastic, to enable emu-picking for coarse asbestos materials. Following the removal of all visible asbestos materials, oversized products (eg: bricks/concrete) can be screened out.

4 Following stockpile processing of bonded hotspots, stockpiles are to be re-assessed for asbestos concentrations using WADOH (2009) sampling methods (%w/w). The validation sampling and analysis quality plan detailing the validation sampling methodology is described in **Section 10.1**.

8.1.3 Bulk Excavation (Site Wide)

Following the remedial excavation of hotspots as outlined in **Section 8.1.2**, remaining fill not suitable to remain on-site from a geotechnical perspective will be classified and disposed off-site.

8.1.4 Imported Materials

Following completion of the bulk excavations, importation of 'clean' materials may be required, to backfill remedial voids and bring the site to the intended finished levels. Imported materials must be previously classified as *virgin excavated natural material* (VENM) or *excavated natural material* (ENM), or deemed suitable under another EPA resource recovery exemption/order. In the absence of suitable validation information (as confirmed by the appointed environmental scientist), imported materials must be sampled and analysed as suitable for on-site use, in accordance with the methodology outlined in **Section 10.1**.

8.1.5 Reporting

All methodologies and findings of remediation / validation phase will be reported within a final report. Should significant contamination be identified, further works will be addressed via an addendum to this RAP. These works may include soil vapour sampling, indoor air quality assessment, active groundwater remediation and bioremediation of significantly contaminated soil.

Once site validation has been achieved, the findings of the work will be reported and conclusions on suitability of the land will be evaluated.

8.2 Remedial Contingencies

At this stage it is anticipated that the proposed remedial technologies will be effective in dealing with the contamination present; however, remedial contingencies may be required should scenarios detailed in **Table 8-2** arise.

Table 8-2 Remedial Contingencies

Scenario	Remedial Contingencies/Actions Required
Highly contaminated soils / sludges not identified during previous investigations are encountered, particularly at site boundaries	Work to be suspended until the Environmental Project Manager can assess impacted materials and associated risks. The leachability of contaminants to be assessed, before disposal options are considered. Follow the unexpected finds protocol in **Appendix C** of this RAP.
Underground tanks (i.e. USTs that have not been previously identified) are encountered at the site	Should unexpected USTs be identified at the site, a GPR survey and visual inspection may be conducted by a certified and experienced service locator, to confirm the presence / absence of any further UPSS and any unknown subsurface infrastructure. Systems to be removed and the excavations appropriately validated and backfilled by an experienced contractor. Tank removal works to be reported by an appropriate environmental consultant, in accordance with EPA (2014b) *Technical Note: Investigation of Service Station Sites* and Australian Standard AS4976 (2008). Follow the unexpected finds protocol in **Appendix C** of this RAP.

Scenario	Remedial Contingencies/Actions Required
Unexpected asbestos wastes are encountered	Work to be suspended and asbestos removed by a suitably qualified contactor, in accordance with SafeWork NSW regulations. Follow the unexpected finds protocol in **Appendix C** of this RAP.
Residual soil impacts remain on-site	Assess potential vapour hazard and delineate plume. Should significant soil vapour contamination be identified, consider soil vapour monitoring program and the implementation of a vapour membrane barrier system within the final development design.
Contaminated groundwater (including LNAPL or DNAPL) encountered	Review groundwater conditions on site (if required) and determine need for further investigation/remediation and/or longer-term management plan. Any dewatering may require approval under the *Water Management Act 2000*. Remedial options may include natural attenuation, extraction, bioremediation, PSH recovery using active pumping (including hydraulic control), installation of a groundwater permeability barrier, *in situ* oxidation or stabilisation.
Contaminated groundwater plume is identified and is migrating off-site, or there are increases in concentration due to increased infiltration	Review contaminant increase and analytes. Review active remediation alternatives (if necessary). Ensure down-gradient monitoring is undertaken. Carry out fate and transport modelling and assess the need for further action.
Contamination is identified near heritage items or significant trees (if identified)	Stop work. Review contaminant concentrations and risks to heritage items / flora. Assess human health and environmental risks if contamination remains in place. Review natural attenuation options.
Changes in proposed excavation depth	Review remediation works for the site.
Changes in proposed land use(s) at the site	Review remediation works for the site.

9. SITE MANAGEMENT

9.1 Roles and Responsibilities

Roles and responsibilities of key personnel required to complete the remedial works are provided in **Table 9-1**. The details of people responsible should be kept up to date throughout the remedial works.

Table 9-1 Remediation Management Team

Team Member	Organisation	Responsibilities
Property Owner	Concrete Recyclers Pty Ltd	▪ Overall responsibility of site and key liaison for council. ▪ Appoint site contractors and all other members of the remediation.
Project Manager – Site Operations	Concrete Recyclers Pty Ltd	▪ Overall site management and day to day decision maker. ▪ Key communicator between site and owner. ▪ Ensure relevant control plans are developed and implemented and appoints required staff to the roles required.
Remediation Contractor	TBA	▪ Site preparation including the implementation of environmental controls required by the site management plans and relevant legislation. ▪ Completion of remedial tasks in accordance with the methods of the RAP and relevant legislation. ▪ Ensure consultant is informed of remedial schedules and is employed for key components, such as waste classification and validation. ▪ Effectiveness of mitigating measures required for remedial activities. ▪ Ensure appropriate handling of all material and correct offsite disposal of waste under appropriate documentation. Copies of all waste documents are required by the environmental consultant for inclusion to the site validation report. ▪ Reporting any environmental issues, complaints or unexpected finds to the project manager and environmental consultant.
Environmental Scientist / Engineer	TBA	▪ Development of the remediation objectives and strategy. ▪ Support all other members of RMT in understanding the requirements of the RAP and the potential risks posed should measures not be implemented. ▪ Supervision of key remediation components, collection of all environmental samples and provide guidance to ensure the remediation is understood and effective. ▪ Complete site validation tasks and detail the works in a validation report concluding on site suitability.
Local Authority	Campbelltown City Council	▪ Responsible for the granting of all consents and ensuring the recommendations of environmental reports are implemented. ▪ Regulator of consent conditions.

9.2 Materials Handling and Management

Table 9-2 summarises the measures that should be implemented in respect of materials handling during remedial and bulk excavation works at site.

Table 9-2 Materials Handling and Management Requirements

Item	Description/ Requirements
Excavation Contractors	Excavation should be completed by a suitably qualified contractor to ensure all staff are aware of the site's environmental and health and safety requirements, and that all adverse effects are mitigated, isolated, or reduced.
Stockpiling of Materials	All stockpiles will be maintained as follows: ▪ Present on sealed surfaces such as concrete, asphalt, or high-density polyethylene. If placed on bare soil, the land will be over-excavated to ensure adequate removal of all impacted material and located in areas of the site which do not pose environmental risk (e.g. sheltered areas). ▪ No greater than 2m in height, be appropriately battered and sediment measures surrounding each base to manage stormwater runoff. Material will either be covered or kept moist to prevent dust blow. ▪ Stockpiles will be in approved locations of the site, selected to mitigate environmental impacts while facilitating material handling requirements. Any contaminated material will only be stockpiled in non-remediated areas of the site or at locations that do not pose any risk (e.g. sheltered areas).
Transport of Material (off-site)	▪ Material shall be transported via a clearly distinguished haul route defined within construction management plans. All haulage routes for trucks transporting soil, materials, equipment, and machinery shall comply with all road traffic rules. ▪ Implementation of sediment measures to reduce the mechanical movement of soil onto public roadways or vehicle wheels is required, such as wheel washing/cleaning facilities placed at each site entry/exit. Any residue from the cleaning facility will be collected and deemed contaminated unless proven otherwise. ▪ Spoil material will require offsite disposal. Trucks transporting soils from the site are to be covered with tarpaulins (or equivalent). All deliveries of soil, materials, equipment, or machinery should be completed during the approved hours of remediation and exit the site in a forward direction. ▪ Removal of waste materials from the site shall only be carried out by a recognised contractor holding the appropriate EPA NSW licenses, consents, and approvals.
Material Tracking	Materials excavated from the site should be tracked from the time of their excavation until their disposal ("cradle to grave"). Tracking of the excavated materials should be completed by recording the following: ▪ Origin of material; ▪ Material type; ▪ Approximate volume; and ▪ Truck registration number. Disposal locations will be determined by the remediation contractor and the receiving facility, weighbridge dockets and waste certification information should be provided to the environmental consultant for validation reporting.

Item	Description/ Requirements
Importation of Material	Landscaping soil, or material imported as fill for planter boxes, is to be certified as either Virgin Excavated Natural Material (VENM) or Excavated Natural Material (ENM) criteria by the supplying contractor. Copies of certification are to be provided to site management and the Environmental Consultant. Any material outside of these classifications are to be sampled for characterisation, which can be achieved by: 1. Collecting one soil sample per 100m^3 of imported soil in deposited areas. 2. Analysis of samples for contaminants of concern, including TRH, BTEX, PAH, Metals / Metalloids, PFAS, OCP / OPP, PCBs and asbestos (at least). 3. Acceptance will be achieved once all contaminant concentrations are reported to be below the site criteria. 4. Analysis results should be presented to the Environmental Consultant for inclusion in the site validation report. Visual inspection of the imported material to confirm consistency is recommended, and should excavated materials be identified as potentially contaminated or unsuitable for reuse, the following procedure should be undertaken: ▪ Visually assess if the contaminated material can be isolated from other material, and stockpile separately if possible. ▪ Stockpile in contaminated material area and sample in accordance with waste classification procedure detailed in **Section 10.1**. ▪ Subject to classification, 'clean' materials may then be reused as filling material on-site or disposed of at an appropriate receiving facility.
Excessive Rainfall	Ensure sediment and surface water controls are operating correctly. If possible, divert surface water away from active work areas or excavations. Stockpiles should be covered to minimise run off.
Excessive Dust	▪ Use water spray to suppress the dust or stop site activities generating the dust until it settles. ▪ Cover all stockpiled soils
Excessive Noise	Identify the source, and isolate if possible. Modify the actions of the source or erect temporary noise barriers if required.
Excessive Odours / Vapours.	Stage works to minimise odours/vapours. If excessive organic odours/vapours are being generated, stop works and monitor ambient air across the site and at site boundaries with a PID. Implement control measures including respirators for on-site workers, use of odour suppressants, wetting down of excavated material

9.3 Waste Management

Prior to any soil material being removed from the site, a formal waste classification certificate shall be completed, in accordance with the EPA (2014a) *Waste Classification Guidelines*.

Soil samples designated for waste classification will be collected at a rate of one sample per 25m^3 (minimum of three per stockpile), up to 250m^3. For soil exceeding 250m^3 but less than 2,500m^3, a minimum of 10 samples is required and 95% UCL statistical calculations of contaminant concentrations may be compared to the criteria. Samples are to be analysed for metals / metalloids, total recoverable hydrocarbons (TRH), the monocyclic aromatic hydrocarbons benzene, toluene, ethyl benzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine / organophosphorus pesticides (OCP / OPP), polychlorinated biphenyls (PCBs) and asbestos.

Any unexpected asbestos identified will be treated as an unexpected find and the unexpected finds protocol (**Appendix C**) will be engaged.

Results of analyses will be compared to the waste classification criteria set out in the NSW EPA (2014) *Waste Classification Guidelines* and a classification certificate will be provided, to enable off-site disposal.

Ensuring that the waste fill/soil streams are kept separate, material will be loaded, transported, and disposed offsite to waste landfill facilities that are appropriately licensed to receive the materials corresponding to the documented waste classifications.

In accordance with the *POEO (Waste) Regulation 2014*, waste movements will be tracked and disposal receipts (dockets) will be maintained by the site manager and copies provided to the Environmental Scientist for final reporting purposes.

10. VALIDATION SAMPLING, ANALYTICAL AND QUALITY PLAN

The remediation of the site will be deemed acceptable based on the achievement of the following validation objectives:

- ***Remedial Excavations and Stockpiles*** – Validation of all remedial excavation areas and stockpiles where infrastructure or contaminated soils have been removed will involve sampling and analysis to ensure that contaminant concentrations are below the soil remediation criteria (**Section 5.2**). The sampling frequency will be in accordance with the NEPC (2013) and EPA (1995) *Sampling Design Guidelines*. All tests shall be performed by NATA-accredited environmental analytical laboratories.
- ***Backfill Materials*** – Should backfilling be required, validation of imported fill materials used for the backfilling of remediated areas would be required to verify their suitability for the proposed land use.

The sampling, analytical and quality plan (SAQP) will be crucial to the site validation phase. It must ensure that the data collected are representative and provide a robust basis for site decisions.

10.1 Validation Sampling Methodology

The recommended validation methodology for sample collection is presented in **Table 10-1.**

Table 10-1 Validation Sampling Design

Remediation Area	Sampling Density	Potential Contaminants
Validation Pits	Wall – 1 sampling location per wall or per 5 m length of excavation wall. Base – 1 sample per $25m^2$	Asbestos
Validation Stockpiles	Any soil material stockpiled on-site following contaminant removal and processing, will be sampled for validation purposes at a rate of one per $25m^3$ (with a minimum of 3 samples for stockpiles $<25m^3$).	Asbestos
Stockpiled Materials	Any soil material stockpiled on-site for off-site disposal, will be sampled for waste classification purposes at a rate of one per $25m^3$ (with a minimum of 3 samples for stockpiles $<25m^3$).	HM, TRH, BTEX, PAHs, OCP, OPP, PCB and asbestos
Imported Fill Materials	If material is required to be sourced from off-site to reinstate excavations, it will be certified suitable for the intended use by sampling at a rate of one per $100m^3$.	HM, TRH, BTEX, PAHs, OCP, OPP, PCB and asbestos

Excavation of contaminated material shall continue until the analytical results indicate compliance with the criteria (i.e. either the concentrations of all contaminants are within the criteria, or the 95% UCL average contaminant concentration for each detected parameter is within the criteria). If results indicate that additional excavation is necessary, the excavation shall be extended until the excavation surface samples indicate that the location is validated as meeting the criteria for each respective contaminant.

Soil sampling and handling of the collected samples will be as described in **Table 10-2**.

Table 10-2 Validation Sample Collection and Handling Procedures

Action	Description of Required Works
Sample Collection	Soil validation sampling will be directly from the exposed surface of excavation, or from the material brought to the surface by the backhoe/excavator bucket. Bulk soil samples for asbestos analysis are to be prepared in the field using the following protocol: ▪ Approximately 10 litres (L) of soil from indicated excavation depths collected into a bulk bag. Soil characteristics recorded (constituents, grain size, etc.). ▪ Sample bags sent to the laboratory and a 0.001% detection limit for FA/AF analysis requested and 0.01% detection limit for ACM and asbestos identification, if identified.
Sampling, Handling, Transport and Tracking	▪ The use of stainless-steel or disposable (one time use) sampling equipment. ▪ All sampling equipment (including hand tools or excavator parts) to be washed in a 3% solution of phosphate free detergent (Decon 90), followed by a rinse with potable water prior to each sample being collected. ▪ Direct transfer of the sample into new glass jars, bottles, vials or plastic bags is preferred, with each plastic bag individually sealed to eliminate cross contamination during transportation to the laboratory. ▪ Label sample containers with individual and unique identification including Project No., Sample No., depth, date and time of sampling; ▪ Place sample containers into a chilled, enclosed, and secure container for transport to the laboratory. ▪ Provide chain of custody documentation to ensure that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to the environmental laboratory.
Sample Containers and Holding Times	▪ Metals - 250g glass jar / refrigeration 4^{o}C / 6 months (maximum holding period). ▪ TRH/BTEX - 250g glass jar / refrigeration 4^{o}C / 14 days (maximum holding period). ▪ PAH/OCP/OPP - 250g glass jar / refrigeration 4^{o}C / 14 days (maximum holding period). ▪ Asbestos – up to a 10 Litre resealable plastic (polyethylene) bag / no refrigeration / indefinite holding time.
Field QA/QC	Quality assurance (QA) and quality control (QC) procedures will be adopted throughout the field sampling program to ensure sampling precision and accuracy, which will be assessed through the analysis of 10% field duplicate/replicate samples. Appropriate sampling procedures will be undertaken to prevent cross contamination, in accordance with EI's Standard Operating Procedures Manual. This will ensure: ▪ Standard operating procedures are followed; ▪ Site safety plans are developed prior to works commencement; ▪ Split duplicate field samples are collected and analysed; ▪ Samples are stored under secure, temperature-controlled conditions; ▪ Chain of custody documentation is employed for the handling,

Action	Description of Required Works
	transport and delivery of samples to the contracted environmental laboratory; and ▪ Contaminated soil, fill or groundwater originating from the site area is disposed in accordance with relevant regulatory guidelines. In total, field QA/QC will include one in 10 samples to be tested as intra-laboratory, blind field duplicates, one in 20 samples to be tested as inter-laboratory, split field duplicates, as well as one VOC trip blank, one VOC spike sample and one equipment wash blank sample per sample batch.
Laboratory Quality Assurance and Quality Control	The contract laboratory will conduct in-house QA/QC procedures involving the routine analysis of: ▪ Reagent blanks; ▪ Spike recoveries; ▪ Laboratory duplicates; ▪ Calibration standards and blanks; ▪ QC statistical data; and ▪ Control standards and recovery plots.
Achievement of Data Quality Objectives	Data quality objectives (**Table 6-1**) are to be achieved and an assessment of the overall data quality should be presented in the final validation report, in accordance with the EPA (2017) *Guidelines for the NSW Site Auditor Scheme*.

10.2 Validation Reporting

All fieldwork, chemical analyses, discussions, conclusions and recommendations will be documented in a final validation report for the site. The validation report will be prepared in accordance with requirements of the OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites* and EPA (2017) *Guidelines for the NSW Site Auditor Scheme* and will confirm that the site has been remediated to a suitable standard for the proposed development.

The Site Validation Report will be submitted for Council and/or Site Auditor review at the completion of the remediation works program.

11. CONCLUSIONS

This RAP has been prepared to inform the remediation works at 7 Montore Road, Minto NSW. Removal of asbestos-contaminated hotspots is required to remediate the site to a condition suitable for the proposed commercial/industrial use.

The preferred approach involves excavation and off-site disposal of impacted fill materials, according to the corresponding waste classification. It is envisaged that the remediation works will be implemented in stages, as follows:

- Preliminaries and site establishment;
- Remedial works and validation;
- Bulk excavation and backfill (if required);
- Reporting.

Material management procedures are provided to characterise soil for off-site disposal, and contingency measures are provided for any unexpected finds. In summary, EI considers that the site can be made suitable for the proposed industrial land use through the implementation of the works described in this RAP.

12. STATEMENT OF LIMITATIONS

This report has been prepared for the exclusive use of Concrete Recyclers Pty Ltd (the client), being the only intended beneficiary of our work. The scope of the RAP is limited to that agreed with our client.

No other party should rely on the document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices and attachments.

The methods and conclusions presented in this report are based on a limited investigation of conditions, with specific sampling locations chosen to be as representative as possible under the given circumstances.

EI's professional opinions are reasonable and based on its professional judgment, experience, training and results from analytical data. EI may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified by EI.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

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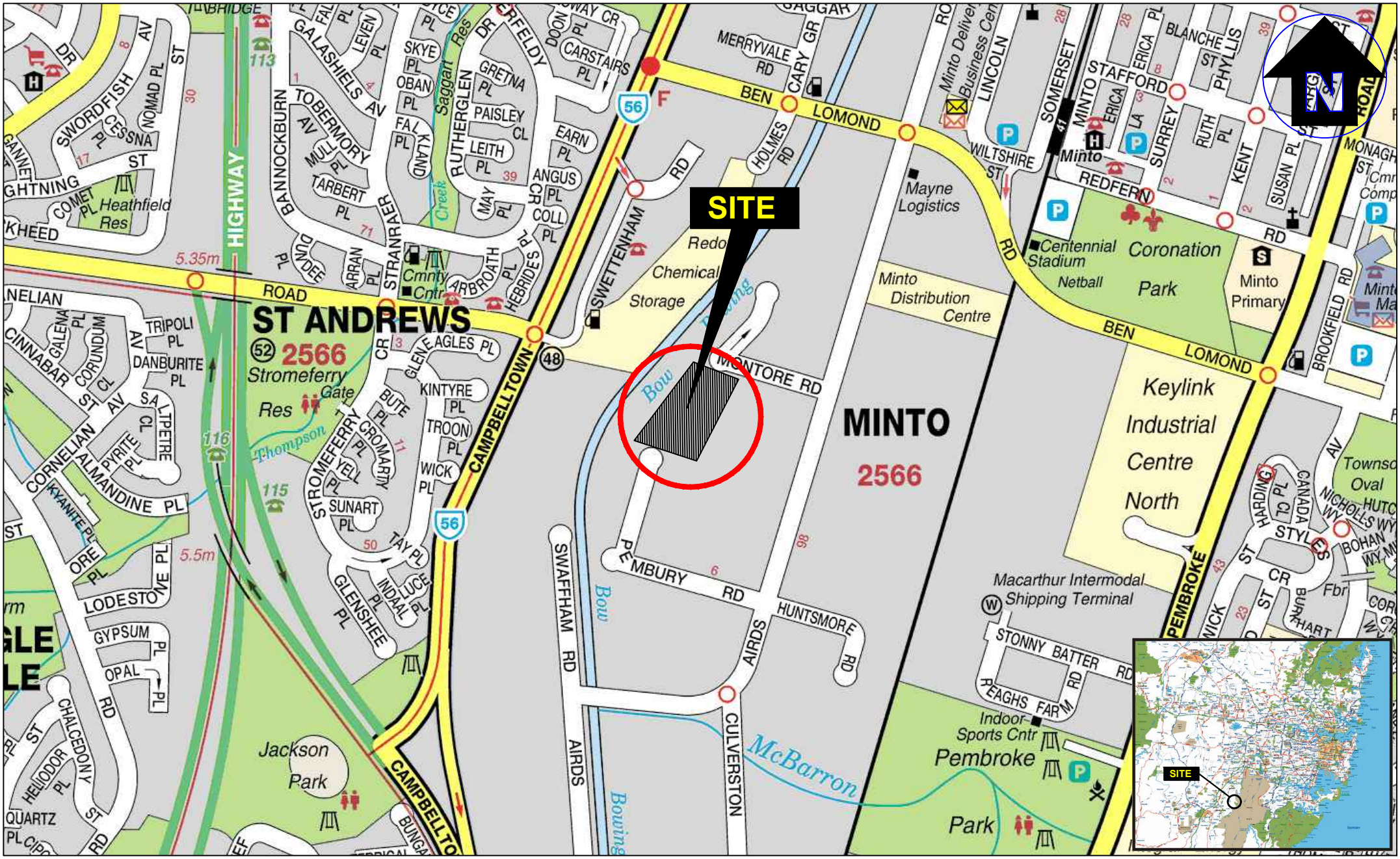
ABBREVIATIONS

ABC	Ambient Background Concentration
ACL	Added Contaminant Limit
ACM	Asbestos-Containing Materials
AGST	Above-Ground Storage Tank
AS	Australian Standard
ASS	Acid Sulfate Soils
ANZG	Australian and New Zealand and Australian State and Territory Governments
B(a)P	Benzo(a)Pyrene (a PAH compound)
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CBD	Central Business District
CSM	Conceptual Site Model
CLM	Contaminated Land Management
COC	Chain of Custody
COPC	Contaminants of Potential Concern
cVOCs	Chlorinated Volatile Organic Compounds (a sub-set of the VOC analysis suite)
DA	Development Application
DBYD	Dial Before You Dig
DO	Dissolved Oxygen
DP	Deposited Plan
DSI	Detailed Site Investigation
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
ESL	Ecological Screening Level
F1	C_6-C_{10} TRH fraction, less sum of BTEX concentrations
F2	>C_{10}-C_{16} TRH fraction, less naphthalene
F3	>C_{16}-C_{34} TRH fraction
F4	>C_{34}-C_{40} TRH fraction
GPR	Ground Penetrating Radar
HDPE	High Density Polyethylene
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
LNAPL	Light Non-Aqueous Phase Liquid (also referred to as PSH)
LOR	Limit of Reporting (of laboratory analytical method)
DNAPL	Dense Non-Aqueous Phase Liquid
m	Metres
mAHD	Metres Australian Height Datum
mBGL	Metres Below Ground Level
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NSW	New South Wales
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Poly-Chlorinated Biphenyls
PFAS	Per or Poly-Fluoroalkyl Substances

PFHxS	Perfluorohexane Sulfonate
PFOA	Perflurorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PID	Photo-ionisation Detector
pH	Measure of the acidity or basicity of an aqueous solution
PSH	Phase-Separated Hydrocarbons (also referred to as LNAPL / DNAPL)
PQL	Practical Quantitation Limit (limit of detection for laboratory method)
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance / Quality Control
RAP	Remedial Action Plan
SIL	Soil Investigation Level
SRA	Sample Receipt Advice
TCLP	Toxicity Characteristics Leaching Procedure
TEQ	Toxicity Equivalent Quotient
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific petroleum hydrocarbon fractions)
UCL	Upper Confidence Limit of the Mean
UPSS	Underground Petroleum Storage System
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

Appendix A - Figures



eiaustralia Contamination | Remediation | Geotechnical Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	L.C.	**Concrete Recyclers Pty Ltd** Remediation Action Plan 7 Montore Road, Minto NSW Site Location Plan
	Approved:	J.H.	Figure: A.1
	Date:	05-11-19	
	Scale:	Not To Scale	Project: E24373.E06_Rev0

KEY

Exceedance	Criteria Limit
Asbestos in soil (>7mm ACM)	0.05 %w/w
Asbestos in soil (>2mm to <7mm AF/FA)	0.001 %w/w
Asbestos in soil (<7mm AF/FA)	0.001 %w/w

Notes:
All concentrations are in %w/w.
The table above shows exceedance criteria for HIL-D: *Commercial / Industrial Sites*.
= Exceedance of Health Screening Level

Exceedances	NS2
Sampling Depth (mBGL)	N/A
Bonded asbestos detected	Yes

Exceedances	NS1
Sampling Depth (mBGL)	N/A
Bonded asbestos detected	Yes

Exceedances	TP125
Sampling Depth (mBGL)	0.2-0.5
Asbestos in soil (>7mm ACM)	2.4
Asbestos in soil (>2mm to <7mm AF/FA)	0.046
Asbestos in soil (>7mm AF/FA)	0.046

Exceedances	TP306
Sampling Depth (mBGL)	0.2-0.6
Asbestos in soil (>7mm ACM)	0.23

Exceedances	TP114
Sampling Depth (mBGL)	0.1-0.4
Asbestos in soil (>2mm to <7mm AF/FA)	0.006
Asbestos in soil (>7mm AF/FA)	0.006

Exceedances	TP115
Sampling Depth (mBGL)	0.2-0.6
Asbestos in soil (>2mm to <7mm AF/FA)	0.003
Asbestos in soil (>7mm AF/FA)	0.003

Exceedances	TP107
Sampling Depth (mBGL)	0.1-0.3
Asbestos in soil (>2mm to <7mm AF/FA)	0.019
Asbestos in soil (>7mm AF/FA)	0.019

Exceedances	TP123
Sampling Depth (mBGL)	0.3-0.6
Asbestos in soil (>2mm to <7mm AF/FA)	0.009
Asbestos in soil (>7mm AF/FA)	0.009

Exceedances	TP14
Sampling Depth (mBGL)	0.0-0.2
Matted asbestos detected	Yes

Exceedances	TP118
Sampling Depth (mBGL)	0.4-0.8
Asbestos in soil (>7mm ACM)	0.99

Exceedances	SS01
Sampling Depth (mBGL)	N/A
Bonded asbestos detected	Yes

0 10 50 100
Approx. Scale (m)

Map Source: Nearmap, Imagery date: 04-09-2019

LEGEND

- Approximate site boundary
- Approximate borehole location
- Approximate test pit location
- Approximate stockpile location
- Approximate surface / stockpile sample location (EIS, 2018)
- Approximate test pit location (EIS, 2018)

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

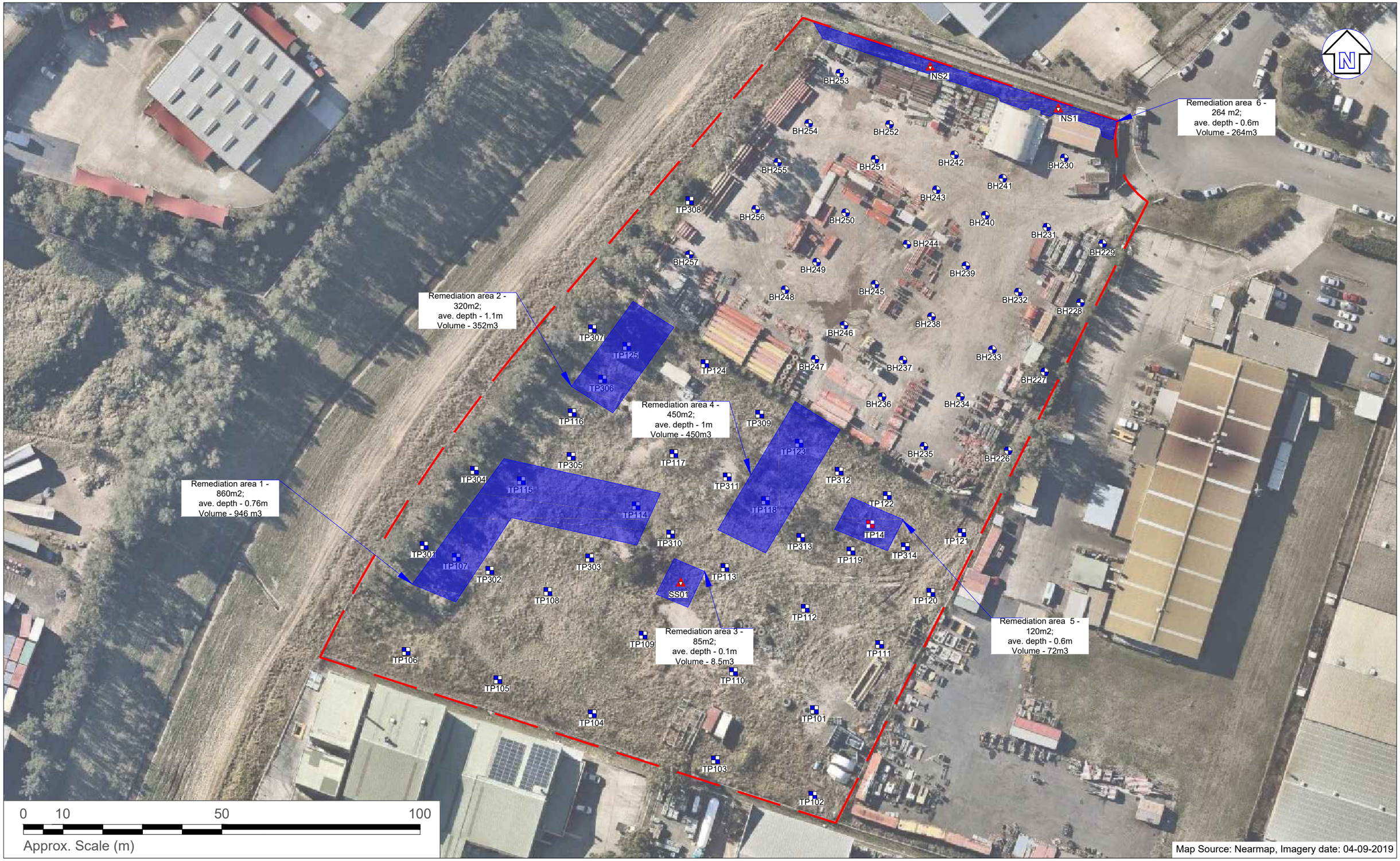
Drawn:	J.H.
Approved:	E.W.
Date:	18-12-19

Concrete Recyclers Pty Ltd
Remediation Action Plan
7 Montore Road, Minto NSW

Analytical Exceedance Plan

Figure: A.2

Project: E24373.E06_Rev0



LEGEND

- Approximate site boundary
- Approximate borehole location (EI, 2019)
- Approximate test pit location (EI, 2019)
- Approximate surface / stockpile sample location (EIS, 2018)
- Approximate test pit location (EIS, 2018)

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Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	L.C.
Approved:	J.H.
Date:	18-12-19

Concrete Recyclers Pty Ltd
Remediation Action Plan
7 Montore Road, Minto NSW

Proposed Remediation and Validation Plan

Figure: A.3

Project: E24373.E06_Rev0

Appendix B – Proposed Development Plans

PROJECT: MINTO CONCRETE RECYCLERS

PLANSET: SITE EARTHWORKS

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

LOCALITY PLAN
N.T.S.

LGA: CAMPBELLTOWN

7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

DRAWING LIST		
DWG NO.	REV	DWG TITLE
GENERAL		
PS02-A000	L	COVER SHEET
PS02-A300	B	RIPARIAN FEATURES CONSTRAINTS PLAN
PS02-A400	I	SITE LAYOUT
PS02-AZ00	E	SITE FENCING, FIRE FIGHTING AND SPRINKLERS PLAN
CONSTRUCTION MANAGEMENT WORKS		
PS02-B300	G	SEDIMENT AND EROSION CONTROL PLAN
PS02-B350	B	SEDIMENT AND EROSION CONTROL DETAILS
EARTHWORKS		
PS02-C100	G	EARTHWORKS PLAN - SHEET 01
PS02-C105	C	EARTHWORKS PLAN - SHEET 02
PS02-C600	G	EARTHWORKS CUT & FILL ANALYSIS PLAN
PS02-C700	E	EARTHWORKS SECTIONS - SHEET 01
PS02-C701	E	EARTHWORKS SECTIONS - SHEET 02
ROADWORKS		
PS02-DZ01	H	SWEPT PATH ANALYSIS - SHEET 1 (TURNING MANOEUVRE ON SITE)
PS02-DZ02	H	SWEPT PATH ANALYSIS - SHEET 2 TURNING MANOEUVRE ON SITE)
PS02-DZ03	E	SWEPT PATH ANALYSIS - SHEET 3 (ENTRANCE AND EXIT MANOEUVRES)
PS03-DZ04	E	SWEPT PATH ANALYSIS - SHEET 4 (TURNING MANEOUVRE ON SITE)
PS03-DZ05	E	SWEPT PATH ANALYSIS - SHEET 5 (TURNING MANEOUVRE ON SITE)
PS03-DZ10	E	SITE LOADING AND UNLOADING PLAN
DRAINAGE		
PS02-E100	J	DRAINAGE PLAN
PS02-E200	D	DRAINAGE DETAILS
PS02-E201	A	SEDIMENT BASIN CROSS SECTIONS
PS02-E410	A	DRAINS CATCHMENT PLANS
PS02-E600	C	DRAINS MODELLING RESULTS
PS02-E700	A	WATER QUALITY CATCHMENT PLAN
SITEWORKS		
PS02-F101	F	DRIVEWAY PLAN
PS02-F102	F	CARPARK PLAN
PS02-F103	E	DRIVEWAY CROSS SECTION
PS02-F200	G	RETAINING WALL PLAN
PS02-F201	E	RETAINING WALL DETAILS
PS02-F400	C	DRIVEWAY LONGITUDINAL AND TYPICAL CROSS SECTIONS
PAVEMENT AND SIGNAGE		
PS02-G100	F	PAVEMENT PLAN

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
L	**MINOR AMENDMENTS**	**02/03/2020**	LL	**EZ**	**TH**	**TH**
K	NEW PAGE ADDED	15/11/2019	RK/LL	EZ	TH	TH
J	MINOR AMENDMENTS	12/10/2018	RK	EZ	TH	TH
I	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	EG/JCF/EZ	TH	TH
H	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
G	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
F	UPDATE	09/08/2018	PB	EZ		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE

GRID	DATUM	PROJECT MANAGER
---	---	TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: COVER SHEET

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-A000	L

DRAWING ID: P1203464-PS02-R12-A000

PRINTED: ---- - USER: LUU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

KEY:

- SITE BOUNDARY
- CONCRETE LINED CHANNEL
- 40 m WATERFRONT LAND BUFFER
- RIPARIAN ZONE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
A	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF	JCF		

SCALE
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GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
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DRAWING TITLE
RIPARIAN FEATURES CONSTRAINTS PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-A300	B

DRAWING ID: P1203464-PS02-R12-A300

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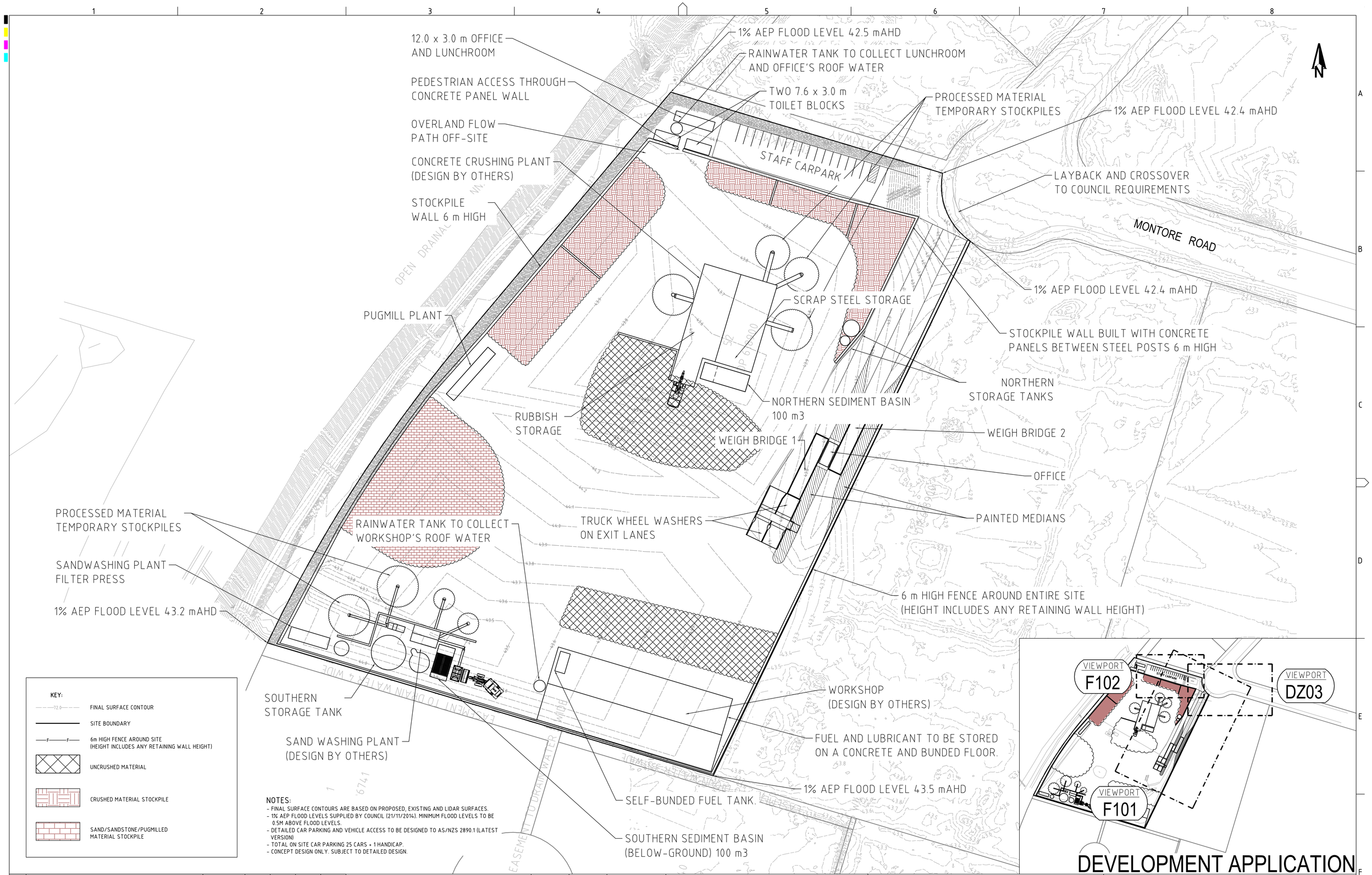

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REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
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H	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
G	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	

SCALE
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GRID	DATUM	PROJECT MANAGER
MGA	MAHD	TH

CLIENT
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DRAWING TITLE
SITE LAYOUT

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-A400	I

PRINTED: --- USER: LLU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)
DRAWING ID: P1203464-PS02-R12-A400

KEY

- SITE BOUNDARY
- CONCRETE PANEL FENCE
- CHAIN WIRE FENCE
- CLIP LOCK FENCE
- VYR-60 SPRINKLER
- TORO TG101 OR EQUIVALENT SPRINKLER
- VYR-65 OR EQUIVALENT SPRINKLER (NOTE: ENDS OF CONVEYORS WILL ALSO HAVE MISTING SPRAYS)

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**02/03/2020**	**LL**	**JCF**	**TH**	**TH**
D	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
C	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE
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A1 (A3) 1:500 (1:1,000)

GRID | DATUM | PROJECT MANAGER: TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

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DRAWING TITLE
SITE FENCING, FIRE FIGHTING AND SPRINKLERS PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-AZ00	E

DRAWING ID: P1203464-PS02-R12-AZ00

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A1 / A3 LANDSCAPE (ATLC_v02.0.01)

KEY:

- INDICATIVE STOCKPILE
- GEOTEXTILE INLET FILTER
- SEDIMENT FENCE
- STABILISED SITE ACCESS

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
G	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**CG/JCF**	**TH**	**TH**
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	PB	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE
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A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	MAHD	TH

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DEVELOPMENT APPLICATION

DRAWING TITLE
SEDIMENT AND EROSION CONTROL PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-B300	G

DRAWING ID: P1203464-PS02-R12-B300

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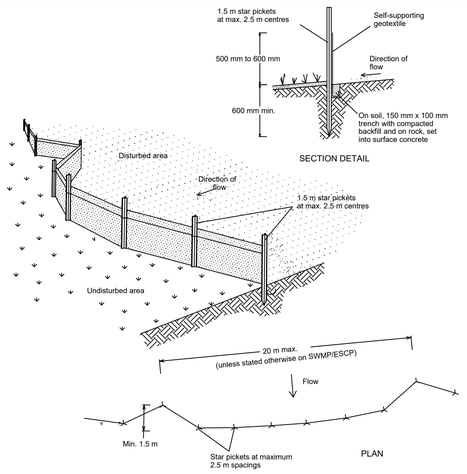
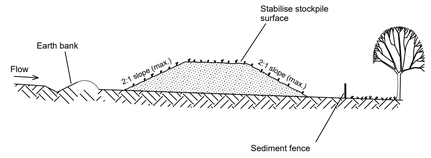


Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

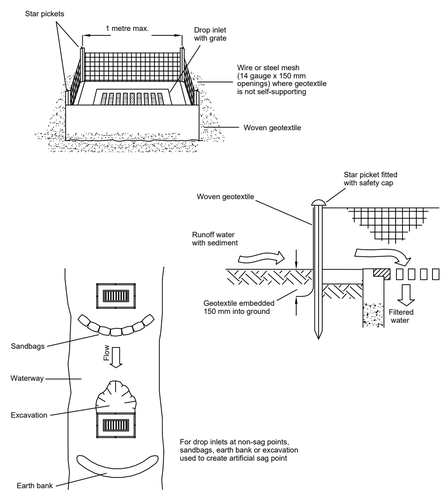
SEDIMENT FENCE — SD 6-8



Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

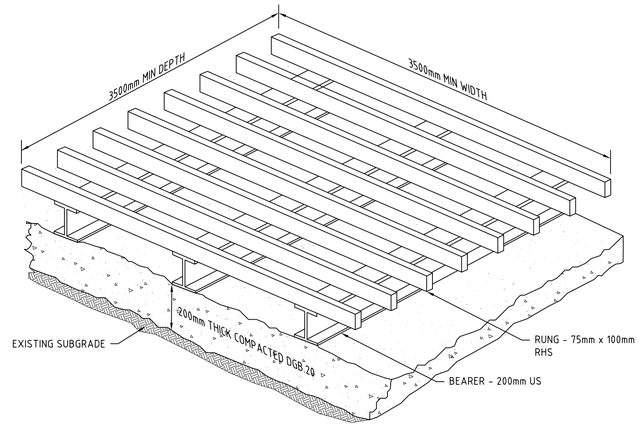
STOCKPILES — SD 4-1



Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER — SD 6-12



Construction Notes

A correctly designed and installed shaker pad will assist in preventing sediment transfer from a site. Any stabilised access point (SAP) can be designed with a shaker pad (compulsory in Type II SAP's)

Shaker pads can be designed and constructed to enable re-use on future projects.

The shaker pad:

1. Must be designed and certified by a practicing structural engineer. The certified design should be submitted with the relevant application.
2. Can be constructed from any suitable material.
3. Must be located on a suitably prepared and compacted sub-grade/base material.
4. Must be situated such thatthe rungs of the shaker pad are level with the adjoining natural surface.
5. Must be a minimum of 3.5 m in length.
6. Must be a minimum of 3.5 m in width.
7. Must have clear spacing between rungs of 200 - 250 mm.
8. Rings must have a maximum width (bearing area) of 75 mm.
9. Must have a minimum clear depth of 300 mm ie. from the top of the rung to the finished sub-grade/base level.
10. Must be provided with suitable barriers at the sides to ensure that all tyres of vehicles leaving the site traverse the device.

SHAKER PAD (CATTLE GRID)

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	**CLIENT REQUESTED AMENDMENTS**	**03/08/2018**	**PB**	**JCF**	**TH**	**TH**
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE

GRID	DATUM	PROJECT MANAGER
---	---	TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Email: mail@martens.com.au Internet: www.martens.com.au

DEVELOPMENT APPLICATION

DRAWING TITLE
SEDIMENT AND EROSION CONTROL DETAILS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-B350	B

DRAWING ID: P1203464-PS02-R12-B350

EXISTING SITE CONTOURS

PROPOSED SITE CONTOURS

KEY

- EXISTING CONTOURS — 72.0 —
- DESIGN CONTOURS — 72.0 —
- INTERFACE
- RETAINING WALL
- EXTERNAL BOUNDARY
- OVERLAND FLOW

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
G	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**CG/JCF**	**TH**	**TH**
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE
0 7.5 15.0 22.5 30.0 37.5 45.0 52.5 60.0 67.5 75.0 METRES
A1 (A3) 1:750 (1:1,500)

GRID	DATUM	PROJECT MANAGER
MGA	MAHD	TH

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CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

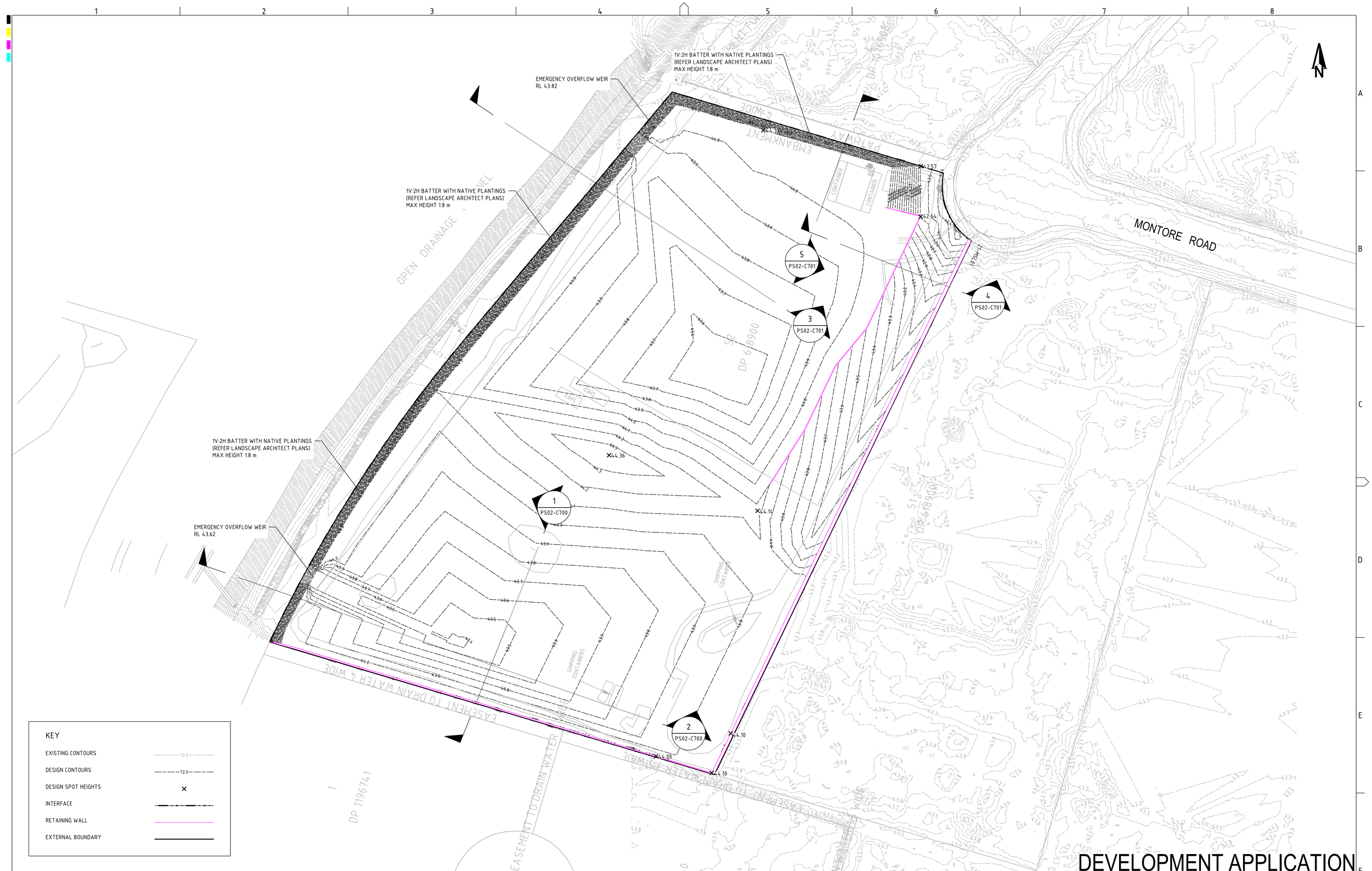
DRAWING TITLE
EARTHWORKS PLAN
SHEET 01

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-C100	G

DRAWING ID: P1203464-PS02-R12-C100

PRINTED ---- USER LUU

A1 / A3 LANDSCAPE (A1LC_v02.0.01)



DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	CG/JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
		TH

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PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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DRAWING TITLE
EARTHWORKS PLAN
SHEET 02

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-C105	C

DRAWING ID: P1203464-PS02-R12-C105

PRINTED: ---- - USER: LUU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

CUT FILL ANALYSIS

LESS THAN -3.000m			
-3.000	to	-2.250	m
-2.250	to	-1.500	m
-1.500	to	-0.750	m
-0.750	to	-0.150	m
-0.150	to	0.150	m
0.150	to	0.750	m
0.750	to	1.500	m
1.500	to	2.250	m
2.250	to	3.000	m
GREATER THAN 3.000m			

EARTHWORKS SUMMARY

	CUT	FILL
EARTHWORKS VOLUME (m^3)	-1298	7810
EARTHWORKS BALANCE (m^3)	-	6512
IMPORTED PAVEMENT (m^3)	-	6432
TOTAL BALANCE (m^3)	-	80

NOTES:
- EARTHWORKS VOLUMES MEASURED FROM EXISTING LEVELS TO DESIGN SURFACE LEVELS.
- APPROX. 6432 M3 OF HARDSTAND PAVEMENT AT 0.3 M DEPTH REQUIRED (21440 X 0.3).

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
G	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	CG/JCF	TH	TH
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
---	MAHD	TH

CLIENT
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PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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DRAWING TITLE
EARTHWORKS CUT & FILL ANALYSIS PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-C600	G

DRAWING ID: P1203464-PS02-R12-C600

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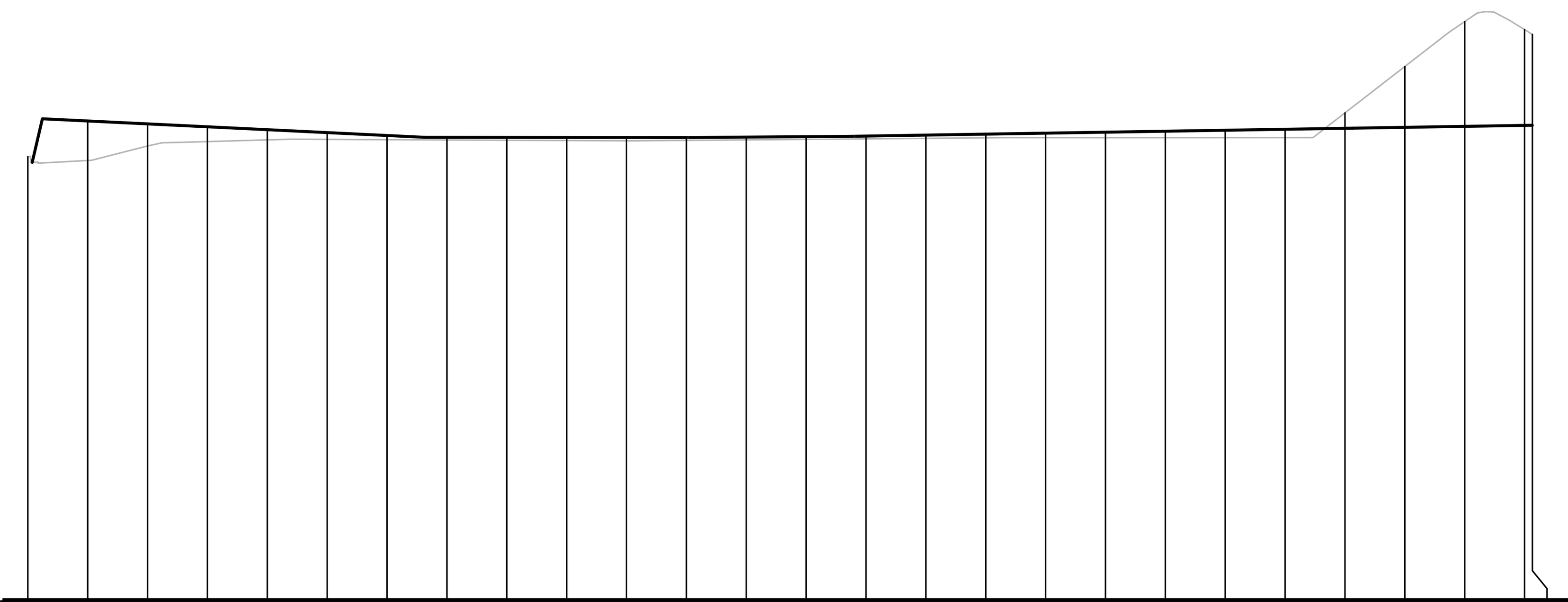
A1 / A3 LANDSCAPE (A1LC_v02.0.01)



DATUM RL 28.000

CHAINAGE	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS	CUT / FILL DEPTH
0.000		42.834	-0.432
2.000	44.027	42.707	1.241
4.000	43.93	43.192	0.558
6.000	43.833	43.338	0.218
8.000	43.736	43.395	0.080
10.000	43.639	43.411	0.065
12.000	43.542	43.402	0.076
14.000	43.479	43.392	0.086
16.000	43.478	43.383	0.096
18.000	43.476	43.373	0.103
20.000	43.475	43.365	0.110
22.000	43.473	43.378	0.095
24.000	43.488	43.395	0.092
26.000	43.503	43.412	0.091
28.000	43.522	43.429	0.092
30.000	43.555	43.446	0.104
32.000	43.587	43.464	0.116
34.000	43.62	43.471	0.138
36.000	43.652	43.469	0.169
38.000	43.685	43.470	0.199
40.000	43.717	43.471	0.228
42.000	43.75	43.473	0.258
44.000	43.782	44.298	-0.537
46.000	43.815	45.847	-2.055
48.000	43.847	47.348	-3.524
50.000	43.879	47.080	-3.225
50.260	43.884	46.921	-3.061

SECTION 1

SCALE: HORIZONTAL - 1:200
VERTICAL - 1:200

DATUM RL 26.000

CHAINAGE	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS	CUT / FILL DEPTH
0.000		40.224	0.000
2.000		40.668	0.000
4.000		41.170	0.000
6.000		41.522	0.000
8.000		41.713	0.000
10.000		42.119	0.000
12.000		42.609	0.000
14.000		42.629	0.000
16.000		42.680	0.000
18.000	43.17	42.713	0.457
20.000	44.098	42.653	1.432
22.000	43.988	42.822	1.158
24.000	43.965	43.369	0.445
26.000	43.946	43.348	0.397
28.000	43.929	43.342	0.372
30.000	43.913	43.336	0.360
32.000	43.896	43.330	0.349
34.000	43.878	43.325	0.301
36.000	43.847	43.329	0.238
38.000	43.816	43.332	0.174
40.000	43.785	43.336	0.109
42.000	43.753	43.347	0.039
44.000	43.722	43.335	0.035
46.000	43.691	43.323	0.047
48.000	43.66	43.311	0.059
50.000	43.629	43.301	0.069
52.000	43.597	43.301	0.069
54.000	43.566	43.303	0.067
56.000	43.535	43.311	0.059
58.000	43.504	43.319	0.051
60.000	43.486	43.327	0.043
62.000	43.49	43.335	0.035
64.000	43.495	43.344	0.026
66.000	43.499	43.355	0.015
68.000	43.503	43.367	0.013
70.000	43.507	43.379	0.018
72.000	43.511	43.391	0.023
74.000	43.514	43.403	0.027
76.000	43.518	43.403	0.044
78.000	43.522	43.400	0.064
80.000	43.526	43.400	0.081
82.000	43.53	43.400	0.098
84.000	43.533	43.399	0.115
86.000	43.537	43.399	0.133
88.000	43.551	43.399	0.150
90.000	43.568	43.400	0.165
92.000	43.585	43.402	0.180
94.000	43.602	43.417	0.182
96.000	43.619	43.435	0.181
98.000	43.636	43.453	0.180
100.000	43.652	43.473	0.177
102.000	43.669	43.492	0.174
104.000	43.686	43.512	0.171
106.000	43.703	43.532	0.168
108.000	43.72	43.552	0.165
110.000	43.737	43.540	0.193
112.000	43.754	43.527	0.223
114.000	43.77	43.532	0.235
116.000	43.787	43.533	0.251
118.000	43.804	43.566	0.234
120.000	43.821	43.552	0.266
122.000	43.838	43.511	0.323
124.000	43.855	43.491	0.361
126.000	43.872	44.308	-0.434
128.000	43.888	43.726	0.170
129.289	43.899	43.336	0.572

SECTION 2

SCALE: HORIZONTAL - 1:200
VERTICAL - 1:200

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**CG/JCF**	**TH**	**TH**
D	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

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A1 / A3 LANDSCAPE (A1LC_v02.0.01)

SCALE 0 2 4 6 8 10 12 14 16 18 20 METRES
A1 (A3) 1:200 (1:400)

GRID	DATUM	PROJECT MANAGER	CLIENT
MGA	MAHD	TH	CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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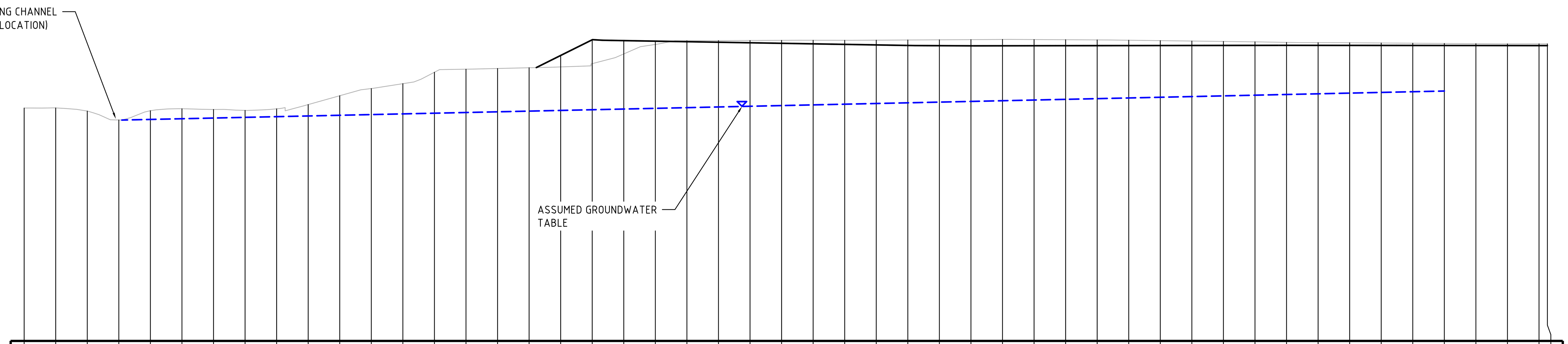
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
EARTHWORKS SECTIONS
SHEET 01

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-C700	E

DRAWING ID: P1203464-PS02-R12-C700

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

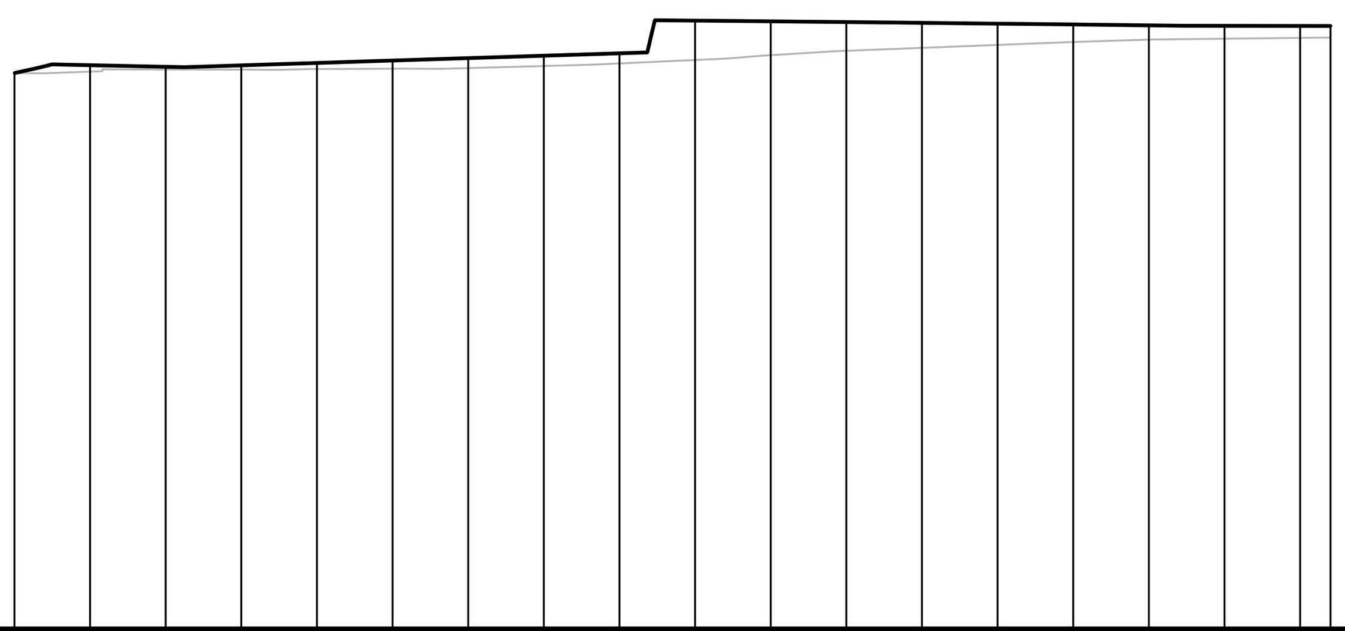


DATUM RL 25.000

CHAINAGE	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS	CUT / FILL DEPTH
0.000		39.764	0.000
2.000		39.771	0.000
4.000		39.572	0.000
6.000		39.008	0.000
8.000		39.594	0.000
10.000		39.719	0.000
12.000		39.674	0.000
14.000		39.615	0.000
16.000		39.715	0.000
18.000		39.984	0.000
20.000		40.545	0.000
22.000		41.000	0.000
24.000		41.310	0.000
26.000		42.034	0.000
28.000		42.228	0.000
30.000		42.272	0.000
32.000		42.319	0.000
34.000	43.098	42.372	0.727
36.000	44.093	42.579	1.514
38.000	44.039	43.196	0.843
40.000	44.005	43.797	0.208
42.000	43.971	44.031	-0.060
44.000	43.937	44.039	-0.102
46.000	43.903	44.047	-0.144
48.000	43.869	44.057	-0.188
50.000	43.835	44.061	-0.226
52.000	43.801	44.059	-0.258
54.000	43.767	44.067	-0.301
56.000	43.733	44.079	-0.346
58.000	43.718	44.090	-0.372
60.000	43.709	44.101	-0.392
62.000	43.711	44.113	-0.402
64.000	43.714	44.107	-0.392
66.000	43.718	44.096	-0.378
68.000	43.721	44.084	-0.363
70.000	43.724	44.064	-0.339
72.000	43.727	44.038	-0.310
74.000	43.731	44.012	-0.282
76.000	43.734	43.987	-0.253
78.000	43.737	43.961	-0.224
80.000	43.74	43.926	-0.186
82.000	43.738	43.909	-0.171
84.000	43.736	43.903	-0.167
86.000	43.734	43.888	-0.154
88.000	43.732	43.873	-0.141
90.000	43.73	43.858	-0.128
92.000	43.728	43.843	-0.115
94.000	43.726	43.833	-0.107
96.000	43.723	43.834	-0.111
96.531	43.723	43.835	-0.112

SECTION 3 - CONCEPTUAL GROUNDWATER MODEL

SCALE: HORIZONTAL - 1:200
VERTICAL - 1:200

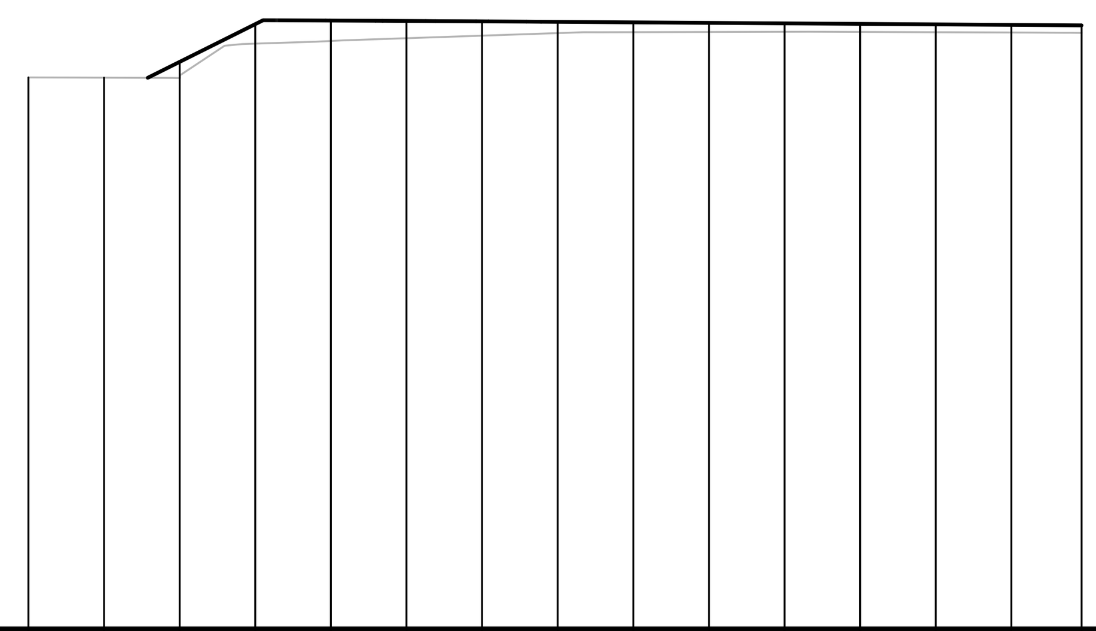


DATUM RL 28.000

CHAINAGE	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS	CUT / FILL DEPTH
0.000		42.706	0.000
2.000	42.912	42.741	0.171
4.000	42.87	42.799	0.071
6.000	42.907	42.794	0.113
8.000	42.971	42.810	0.161
10.000	43.035	42.819	0.216
12.000	43.099	42.835	0.264
14.000	43.162	42.890	0.272
16.000	43.226	42.959	0.267
18.000	44.091	43.049	1.041
20.000	44.071	43.176	0.894
22.000	44.052	43.292	0.757
24.000	44.032	43.370	0.657
26.000	44.01	43.448	0.556
28.000	43.989	43.525	0.454
30.000	43.965	43.588	0.365
32.000	43.953	43.612	0.315
34.000	43.95	43.634	0.265
34.804	43.949	43.639	0.248

SECTION 4

SCALE: HORIZONTAL - 1:200
VERTICAL - 1:200



DATUM RL 28.000

CHAINAGE	DESIGN SURFACE LEVELS	EXISTING SURFACE LEVELS	CUT / FILL DEPTH
0.000		42.587	0.000
2.000		42.582	0.000
4.000	42.999	42.572	0.427
6.000	43.997	43.482	0.515
8.000	44.092	43.552	0.534
10.000	44.082	43.625	0.444
12.000	44.071	43.693	0.359
14.000	44.058	43.760	0.272
16.000	44.044	43.785	0.227
18.000	44.031	43.790	0.200
20.000	44.018	43.795	0.173
22.000	44.004	43.791	0.153
24.000	43.991	43.784	0.137
26.000	43.978	43.776	0.122
27.857	43.965	43.767	0.113

SECTION 5

SCALE: HORIZONTAL - 1:200
VERTICAL - 1:200

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**CG/JCF**	**TH**	**TH**
D	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE: 0 2 4 6 8 10 12 14 16 18 20 METRES
A1 (A3) 1:200 (1:400)

GRID: ---
DATUM: MAHD
PROJECT MANAGER: TH
CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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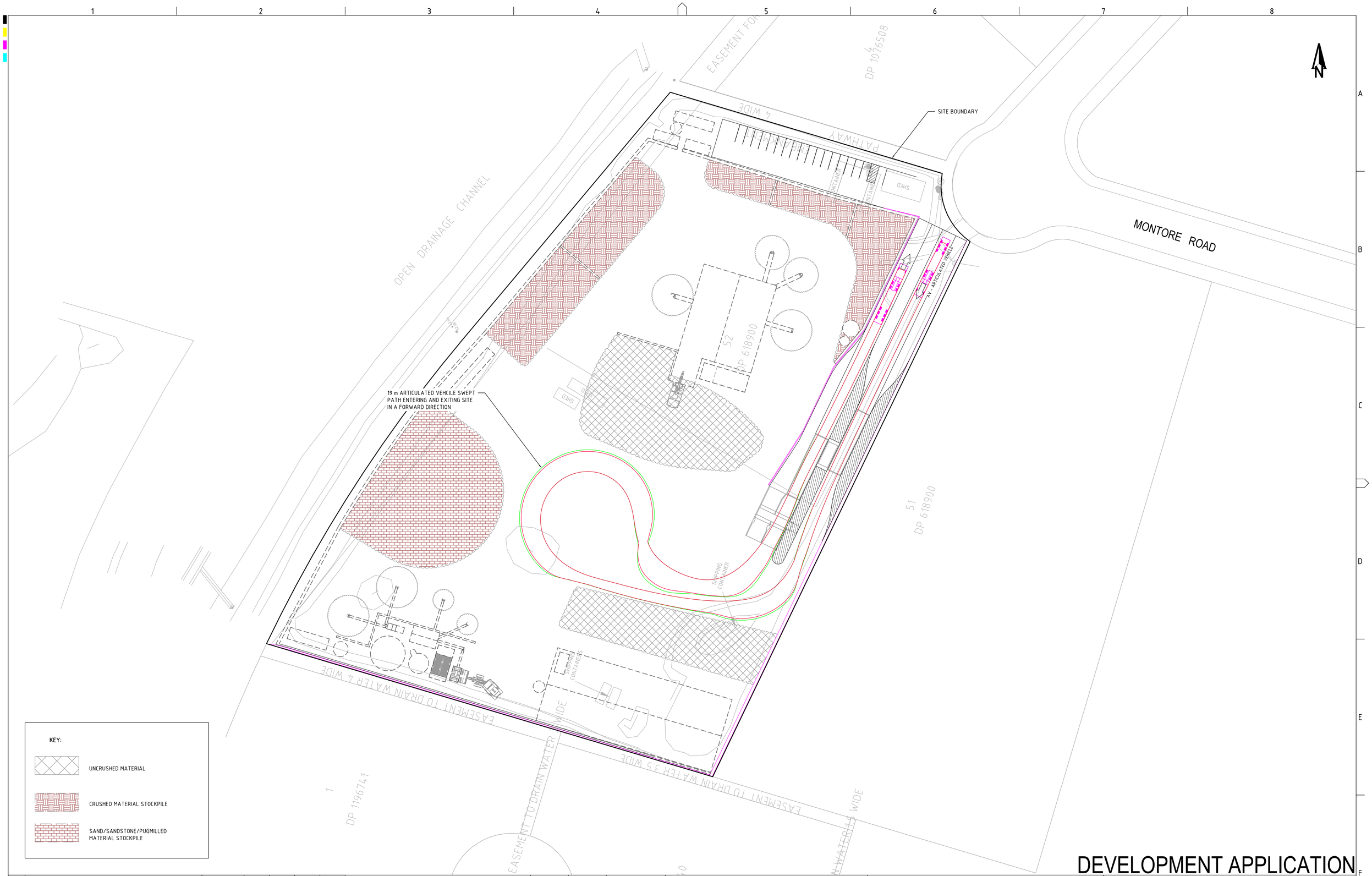
DRAWING TITLE: EARTHWORKS SECTIONS SHEET 02

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-C701	E



KEY:

- UNCRUSHED MATERIAL
- CRUSHED MATERIAL STOCKPILE
- SAND/SANDSTONE/PUGMILLED MATERIAL STOCKPILE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
H	**MINOR AMENDMENTS**	**02/03/2020**	**LL**	**JCF**	**TH**	**TH**
G	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
F	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
E	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
D	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

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PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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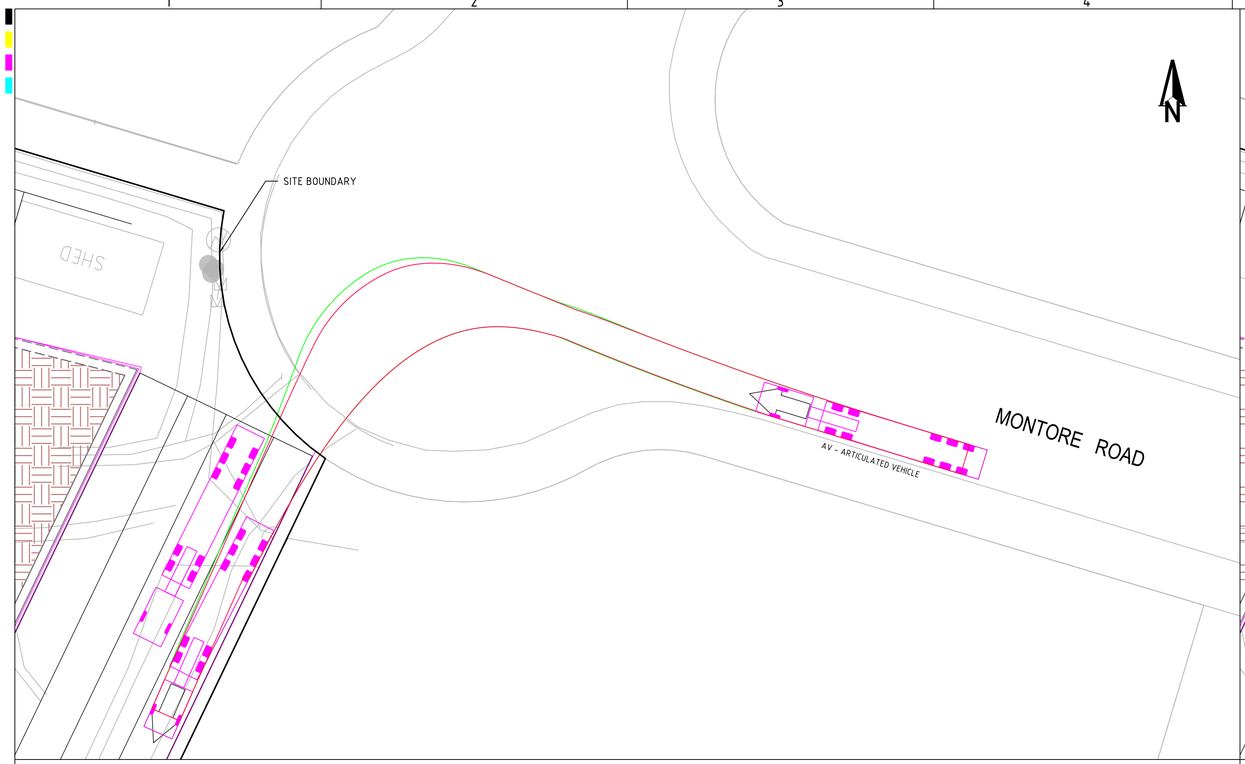
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
SWEPT PATH ANALYSIS - SHEET 1
TURNING MANOEUVRE ON SITE

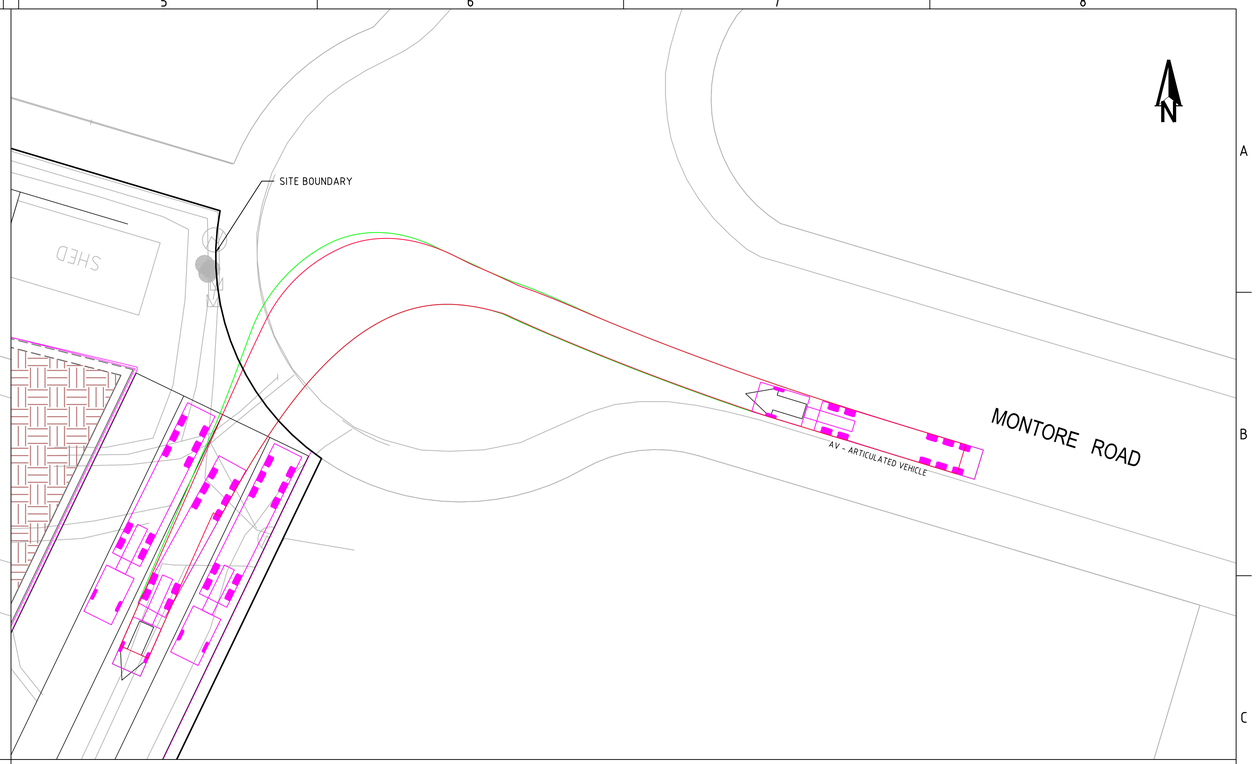
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ01	H

DRAWING ID: P1203464-PS02-R12-DZ01

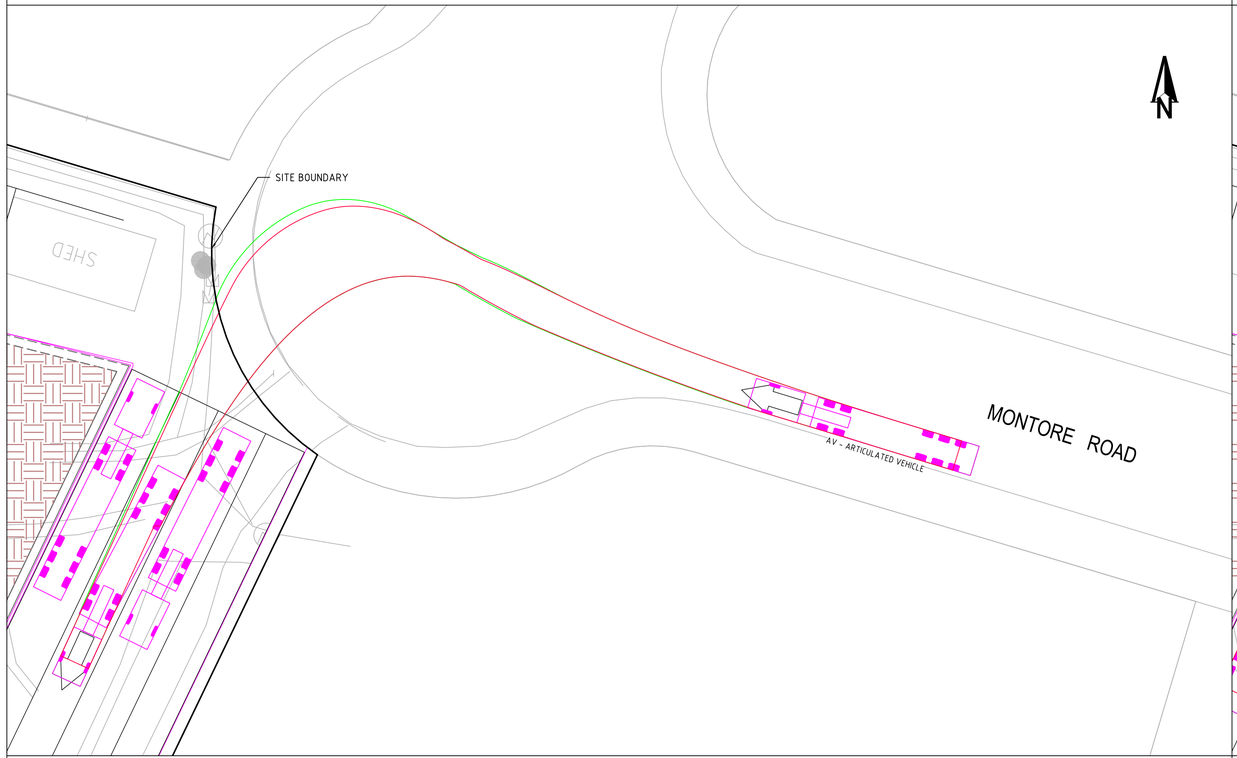
PRINTED: ---- USER: LUU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)



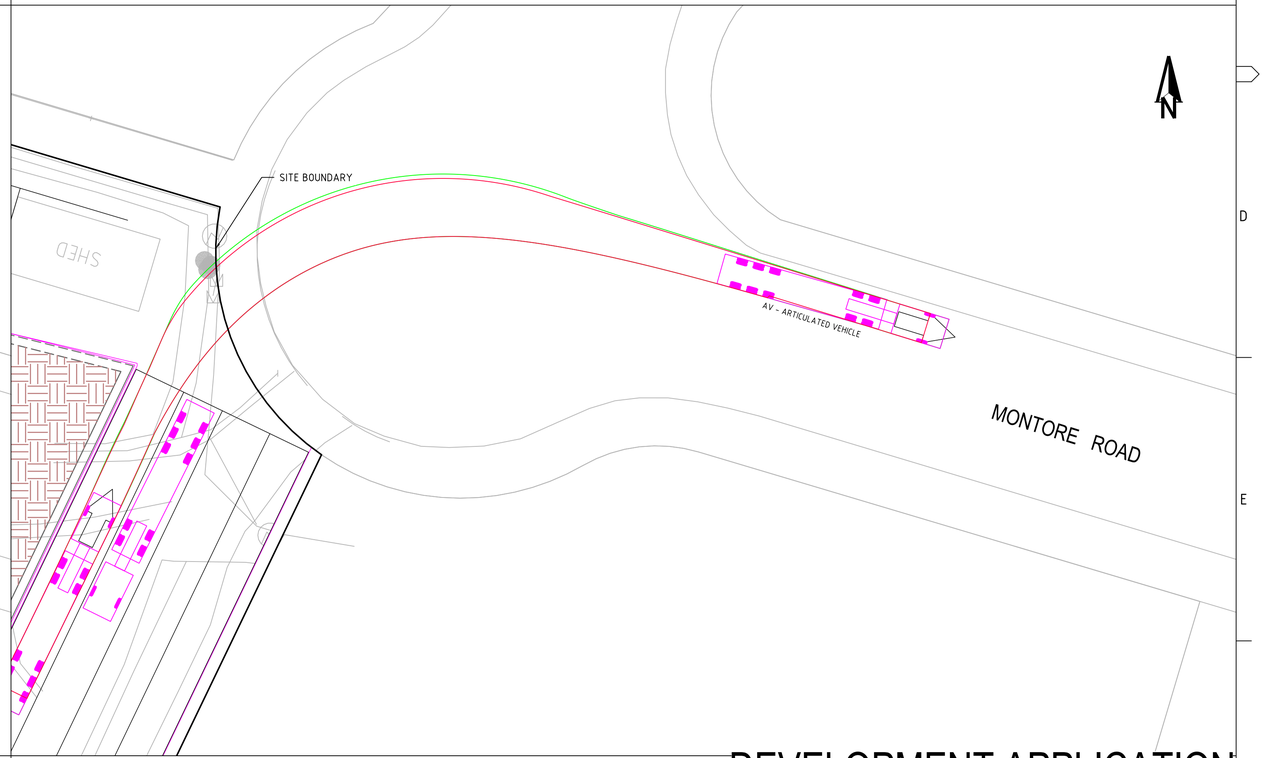
ENTERING SITE, LEFT LANE



ENTERING SITE, MIDDLE LANE



ENTERING SITE, RIGHT LANE



EXITING SITE

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**02/03/2020**	LL	JCF	TH	TH
D	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0 METRES
A1 (A3) 1:250 (1:500)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

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All measurements in millimetres unless otherwise specified.

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
SWEPT PATH ANALYSIS - SHEET 3
ENTRANCE AND EXIT MANOEUVRES

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ03	E

DEVELOPMENT APPLICATION

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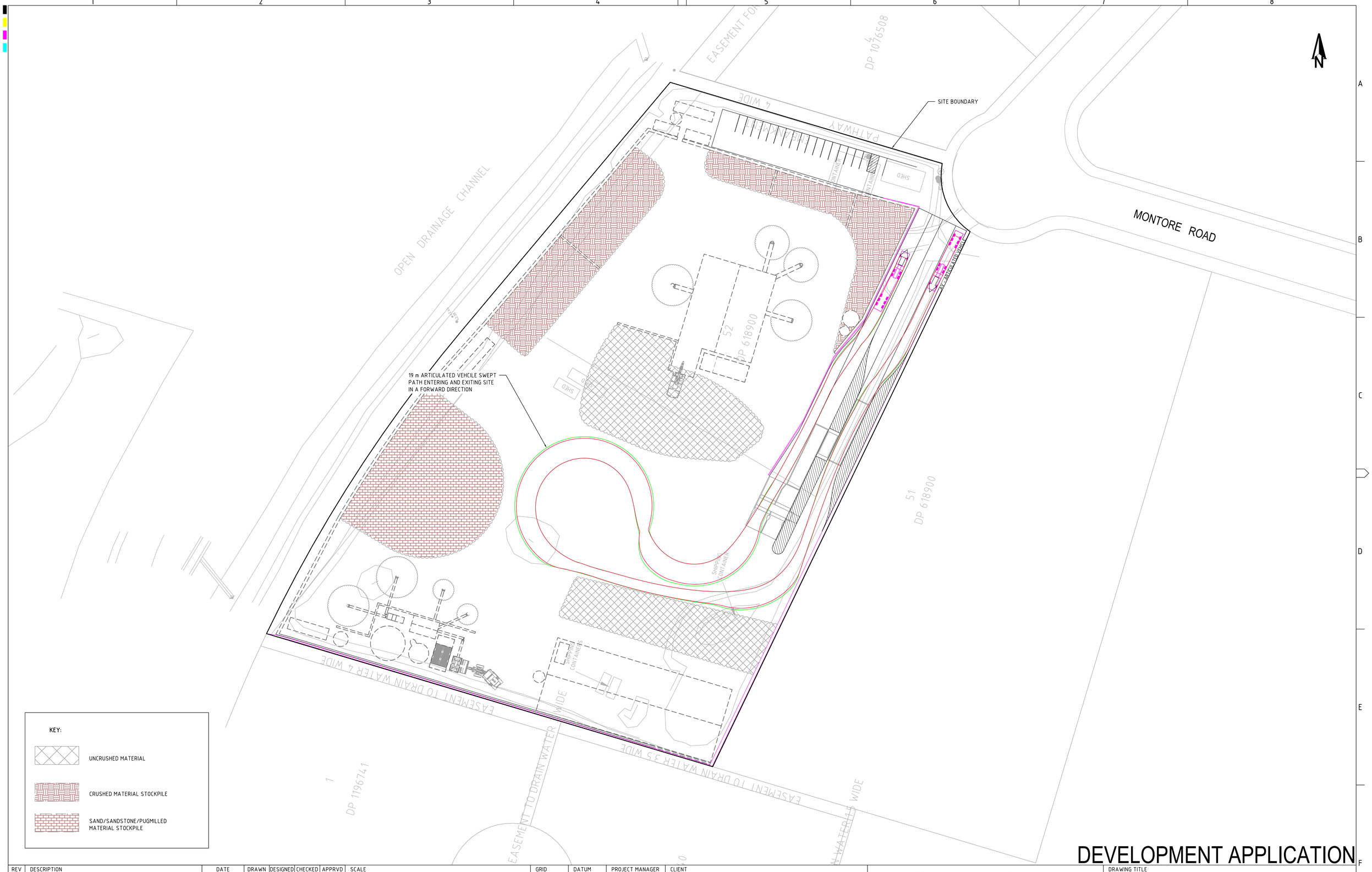
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

DRAWING ID: P1203464-PS02-R12-DZ03



DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
H	**MINOR AMENDMENTS**	**02/03/2020**	**LL**	**JCF**	**TH**	**TH**
G	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
F	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
E	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
D	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
Consulting Engineers
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Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
SWEPT PATH ANALYSIS - SHEET 2
TURNING MANOEUVRE ON SITE

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ02	H

DRAWING ID: P1203464-PS02-R12-DZ02

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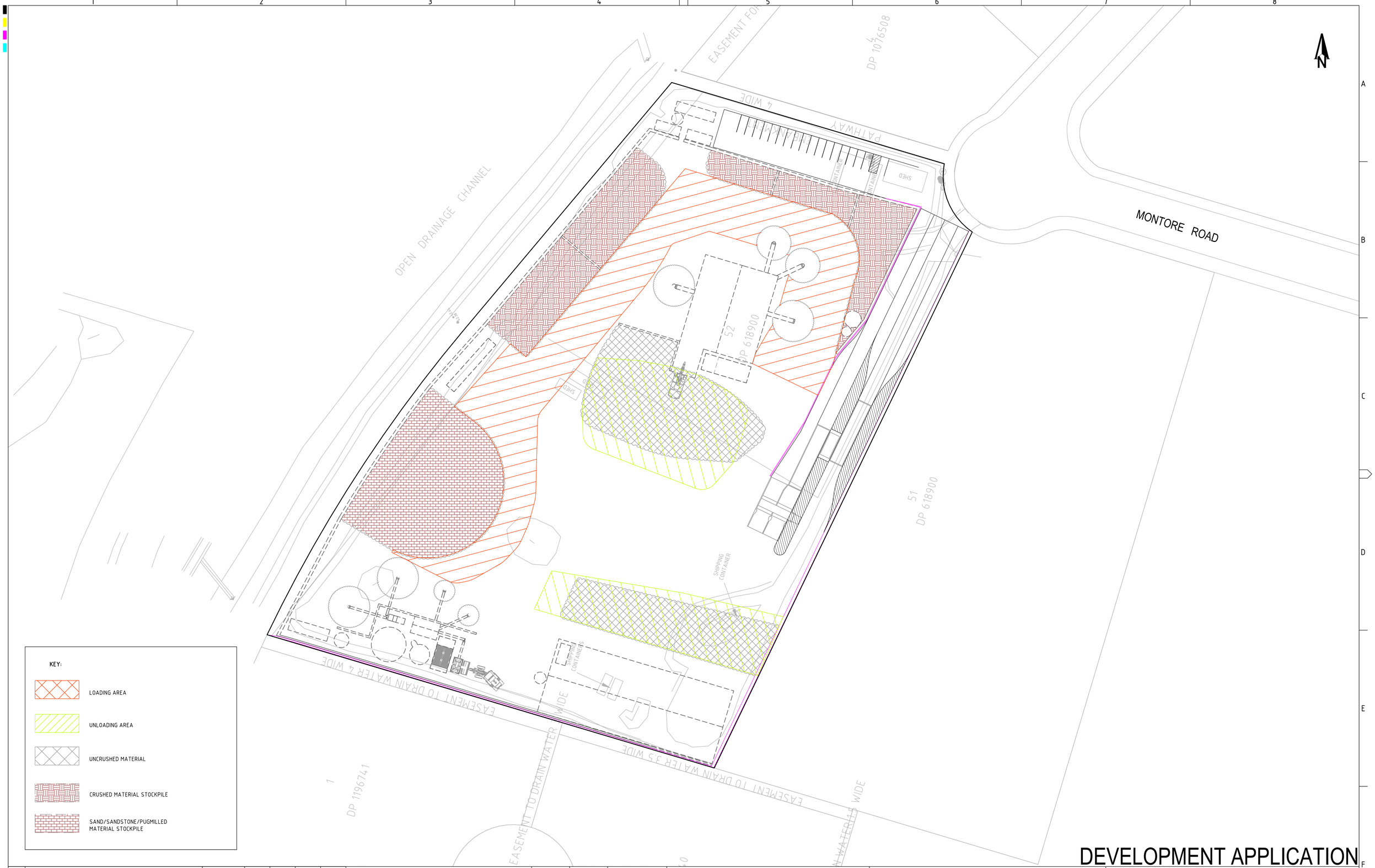
A1 / A3 LANDSCAPE (A1LC_v02.0.01)



KEY:

- LOADING AREA
- UNLOADING AREA
- UNCRUSHED MATERIAL
- CRUSHED MATERIAL STOCKPILE
- SAND/SANDSTONE/PUGMILLED MATERIAL STOCKPILE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**02/03/2020**	**LL**	**JCF**	**TH**	**TH**
D	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
C	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE: 0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

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All measurements in millimetres unless otherwise specified.

PROJECT NAME/PLANSET TITLE

MINTO CONCRETE RECYCLERS
SITE EARTHWORKS

7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
Consulting Engineers
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Water
Geotechnical
Civil

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DRAWING TITLE: SITE LOADING & UNLOADING PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ10	E

DRAWING ID: P1203464-PS02-R12-DZ10

PRINTED: --- (USER: LL)

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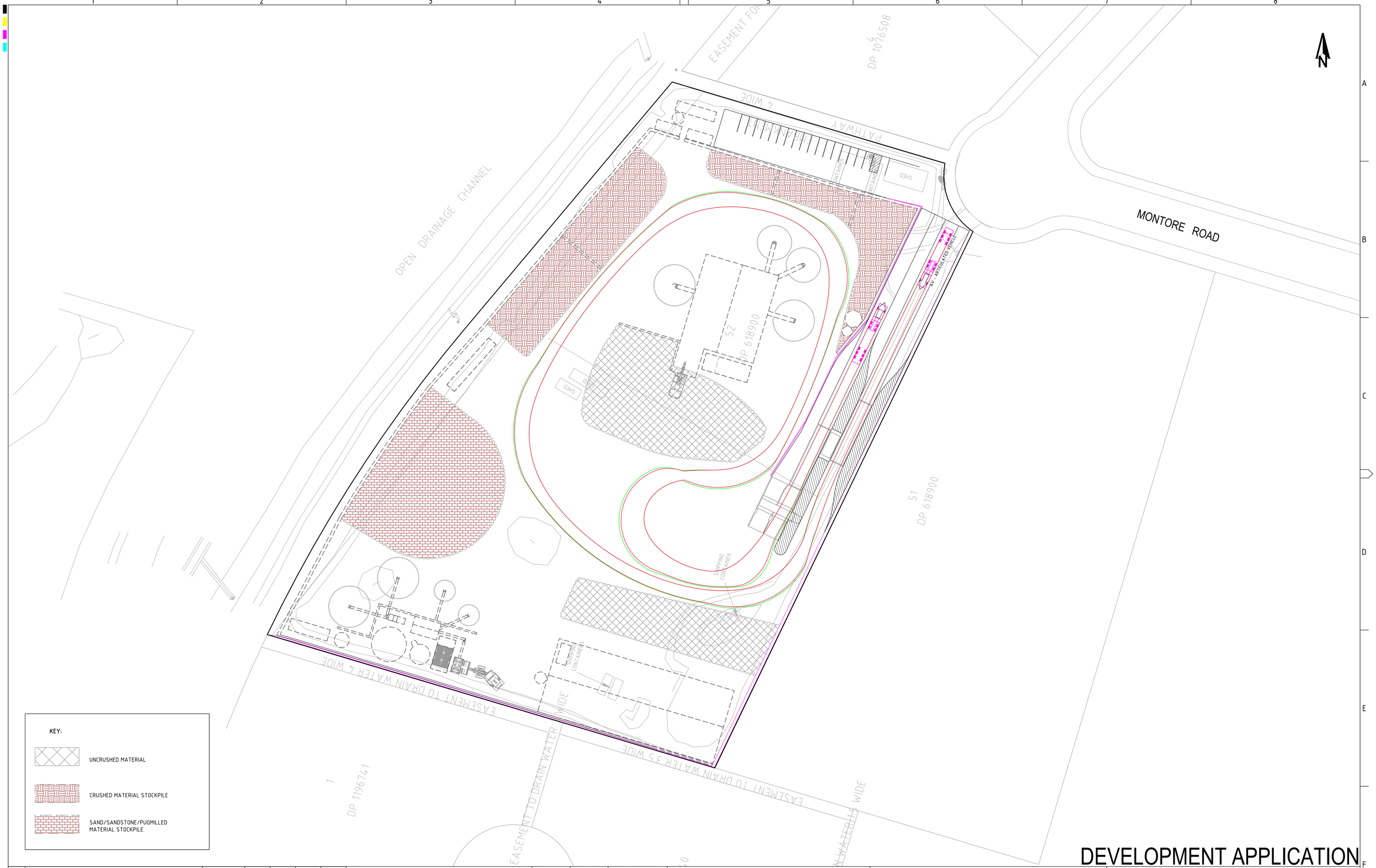

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**02/03/2020**	**LL**	**JCF**	**TH**	**TH**
D	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
C	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
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Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
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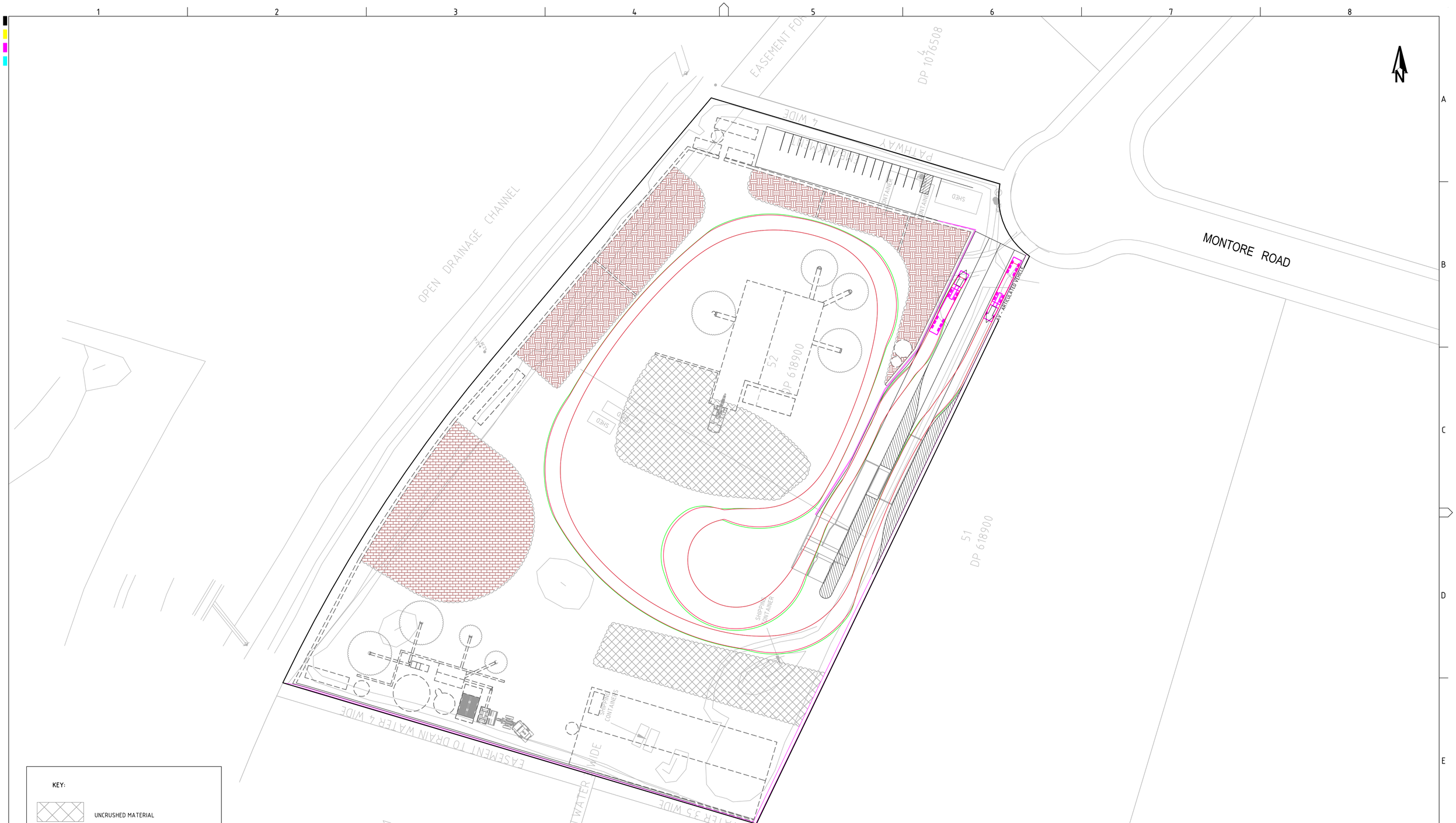
DRAWING TITLE
SWEPTH PATH ANALYSIS - SHEET 4
TURNING MANEOUVRE ON SITE

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ04	E

DRAWING ID: P1203464-PS02-R12-DZ04



KEY:

- UNCRUSHED MATERIAL
- CRUSHED MATERIAL STOCKPILE
- SAND/SANDSTONE/PUGMILLED MATERIAL STOCKPILE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**02/03/2020**	LL	JCF	TH	TH
D	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	JCF	TH	TH
C	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID: MGA | DATUM: m AHD | PROJECT MANAGER: TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

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PROJECT NAME/PLANSET TITLE

MINTO CONCRETE RECYCLERS
SITE EARTHWORKS

7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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DRAWING TITLE

SWEPTH PATH ANALYSIS - SHEET 5
TURNING MANEOUVRE ON SITE

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-DZ05	E

DRAWING ID: P1203464-PS02-R12-DZ05

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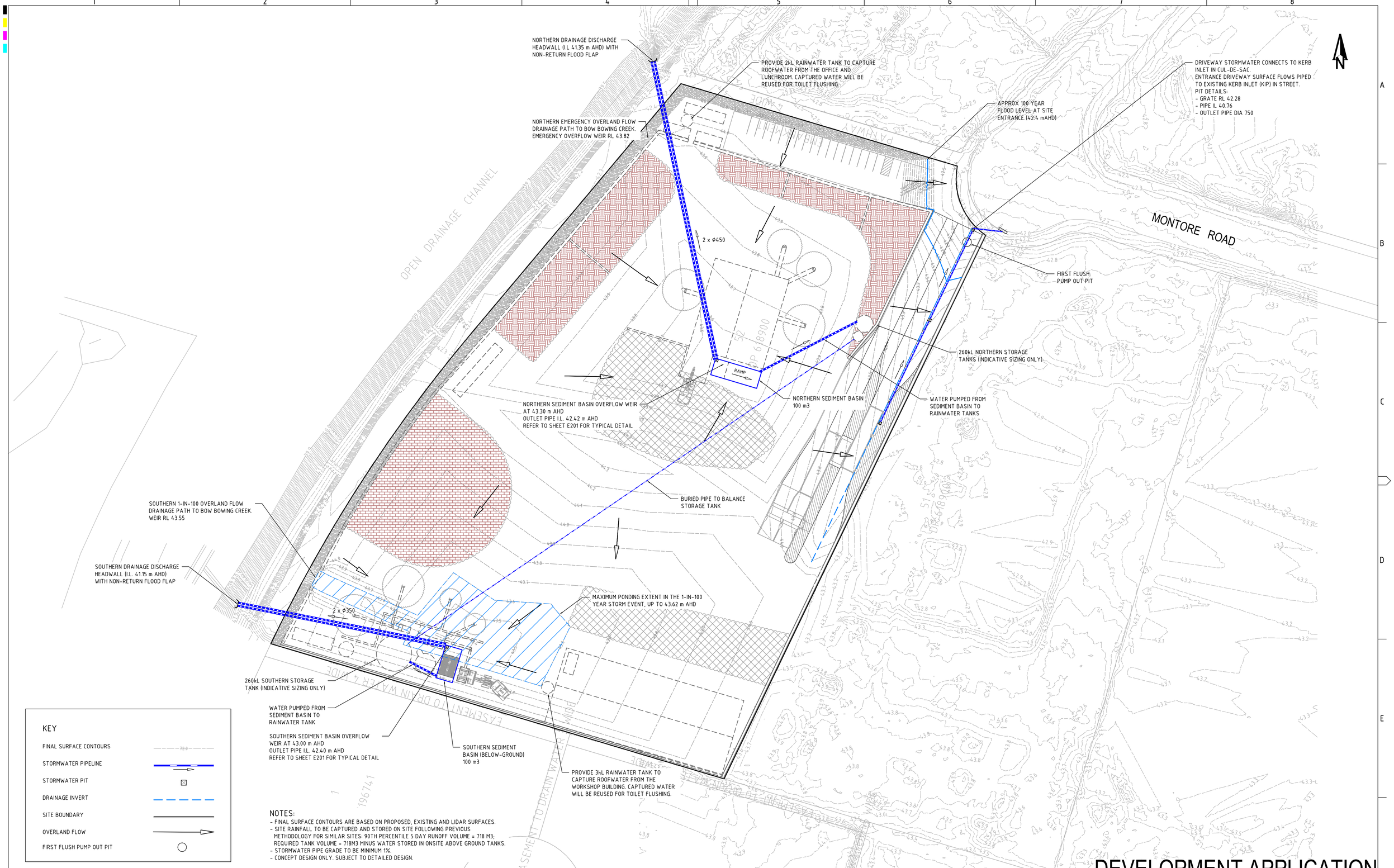

KEY

- FINAL SURFACE CONTOURS
- STORMWATER PIPELINE
- STORMWATER PIT
- DRAINAGE INVERT
- SITE BOUNDARY
- OVERLAND FLOW
- FIRST FLUSH PUMP OUT PIT

NOTES:

- FINAL SURFACE CONTOURS ARE BASED ON PROPOSED, EXISTING AND LIDAR SURFACES.
- SITE RAINFALL TO BE CAPTURED AND STORED ON SITE FOLLOWING PREVIOUS METHODOLOGY FOR SIMILAR SITES: 90TH PERCENTILE 5 DAY RUNOFF VOLUME = 718 M3; REQUIRED TANK VOLUME = 718M3 MINUS WATER STORED IN ONSITE ABOVE GROUND TANKS.
- STORMWATER PIPE GRADE TO BE MINIMUM 1%.
- CONCEPT DESIGN ONLY. SUBJECT TO DETAILED DESIGN.

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
J	**MINOR AMENDMENTS**	**02/03/2020**	LL	EZ	TH	TH
I	MINOR AMENDMENTS	12/10/2018	RK	EZ	TH	TH
H	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	DG/EZ/JCF	TH	TH
G	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	EZ/JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	PB	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	

SCALE: A1 (A3) 1:500 (1:1,000) — METRES

GRID	DATUM	PROJECT MANAGER
MGA	MAHD	TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE: MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
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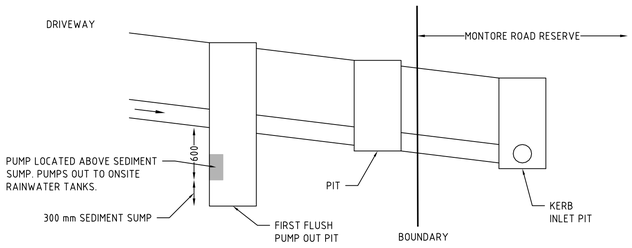
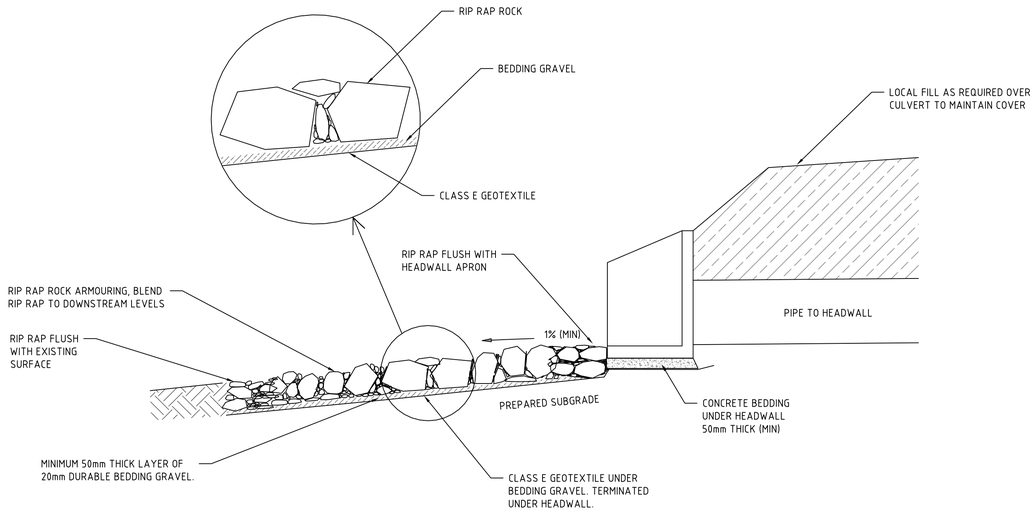
DRAWING TITLE: DRAINAGE PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E100	J

DRAWING ID: P1203464-PS02-R12-E100



DETAIL: DRIVEWAY FIRST FLUSH PUMP



DETAIL: HEAD WALL OUTLET AND RIP RAP SECTION

NOT TO SCALE

NOTES:
- CONCEPT DESIGN ONLY. SUBJECT TO DETAILED DESIGN.

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
D	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**EZ/JCF**	**TH**	**TH**
C	AMENDMENTS AS PER CLIENT COMMENTS	20/09/2018	PB/JCF/LZ	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	EZ/JCF		
A	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH

SCALE

GRID	DATUM	PROJECT MANAGER
		TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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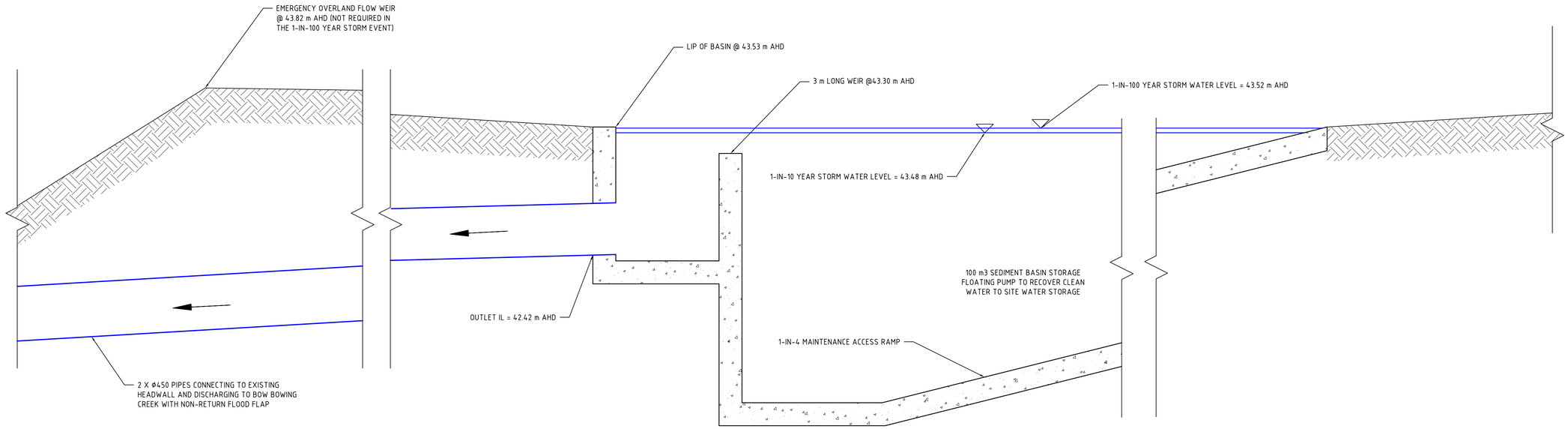
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: DRAINAGE DETAILS

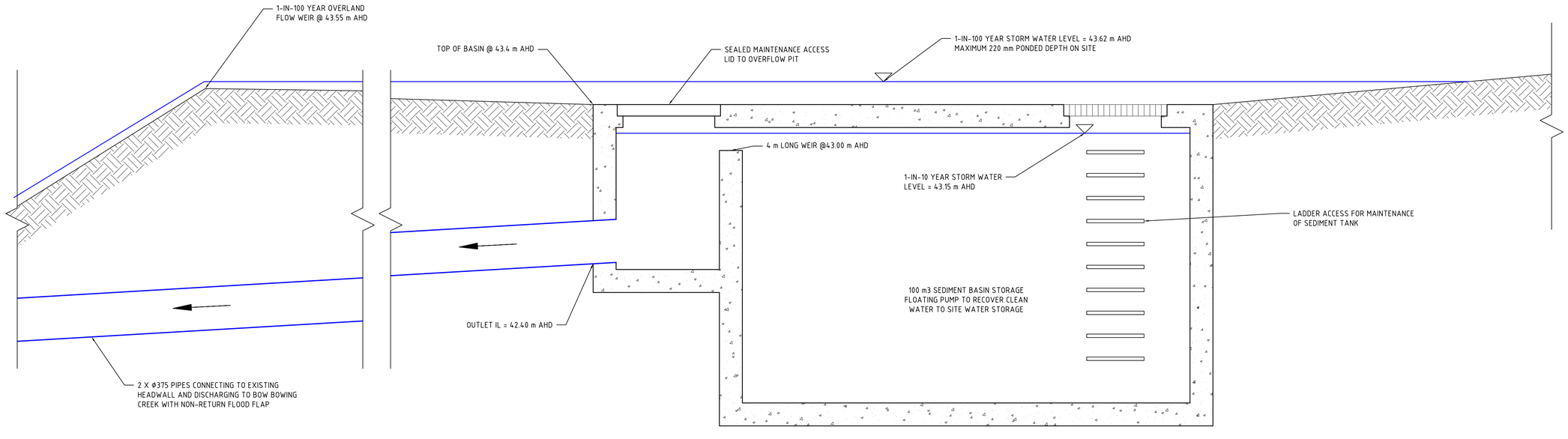
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E200	D

DRAWING ID: P1203464-PS02-R12-E200



SECTION 01 - NORTHERN BASIN CONCEPT DESIGN

NOT TO SCALE



SECTION 02 - SOUTHERN BASIN CONCEPT DESIGN

NOT TO SCALE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
A	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	DG/EZ/JCF	TH	TH

SCALE: 0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 METRES
A1 (A3) 1:20 (1:40)

GRID | DATUM | PROJECT MANAGER: TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: SEDIMENT BASIN CROSS SECTIONS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E201	A

DRAWING ID: P1203464-PS02-R12-E201

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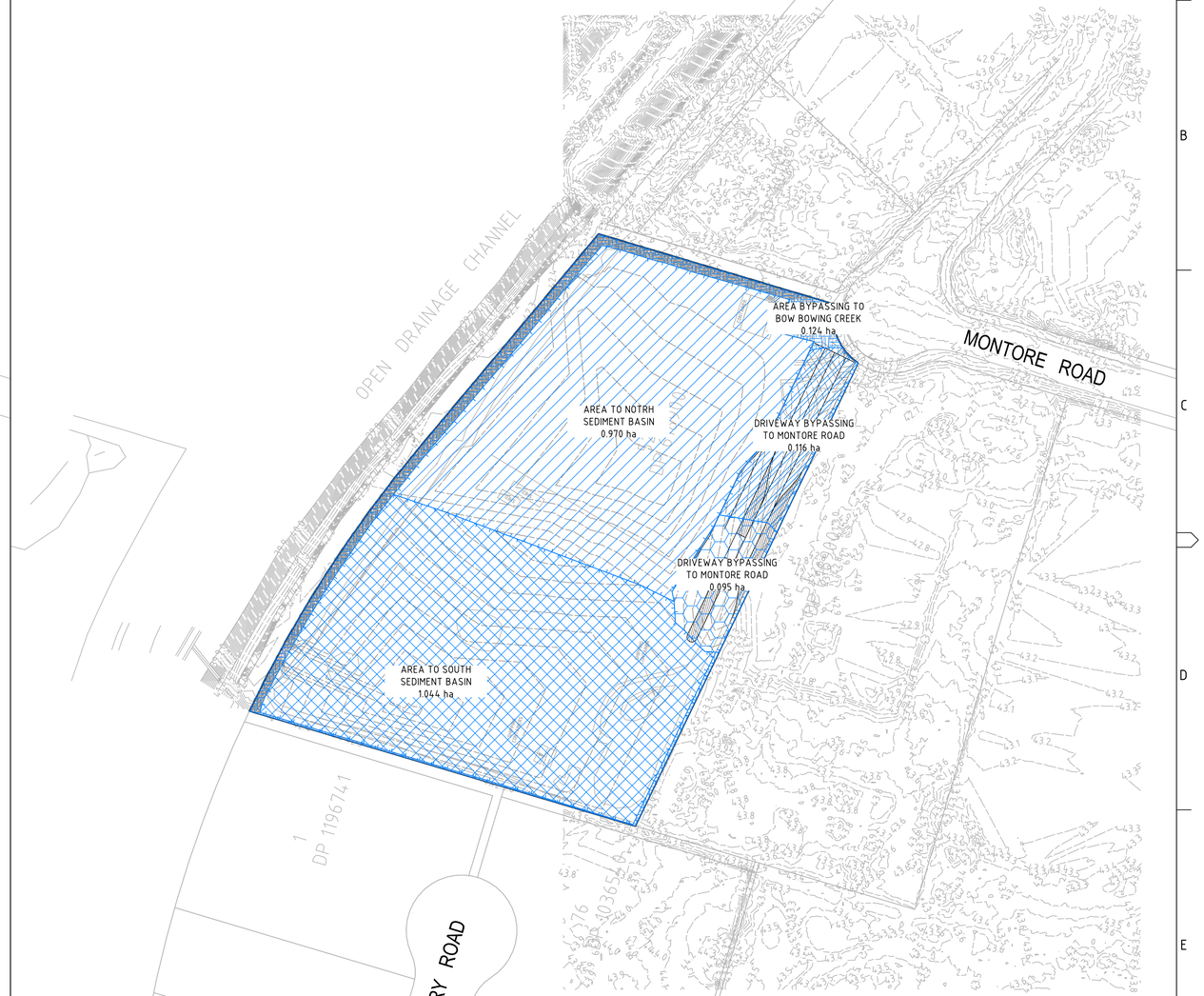

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
A	MINOR AMENDMENTS	12/10/2018	RK	EZ	TH	TH

SCALE
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A1 (A3) 1:1,000 (1:2,000)

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	TH

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CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
DRAINS CATCHMENT PLANS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E410	A

DRAWING ID: P1203464-PS02-R12-E410

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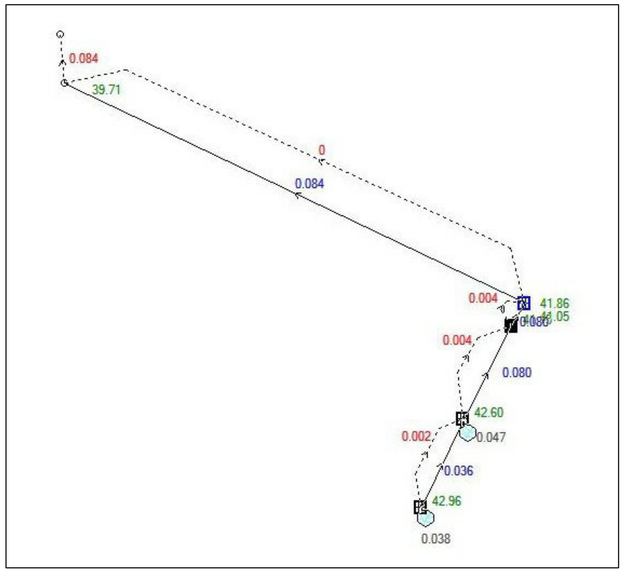
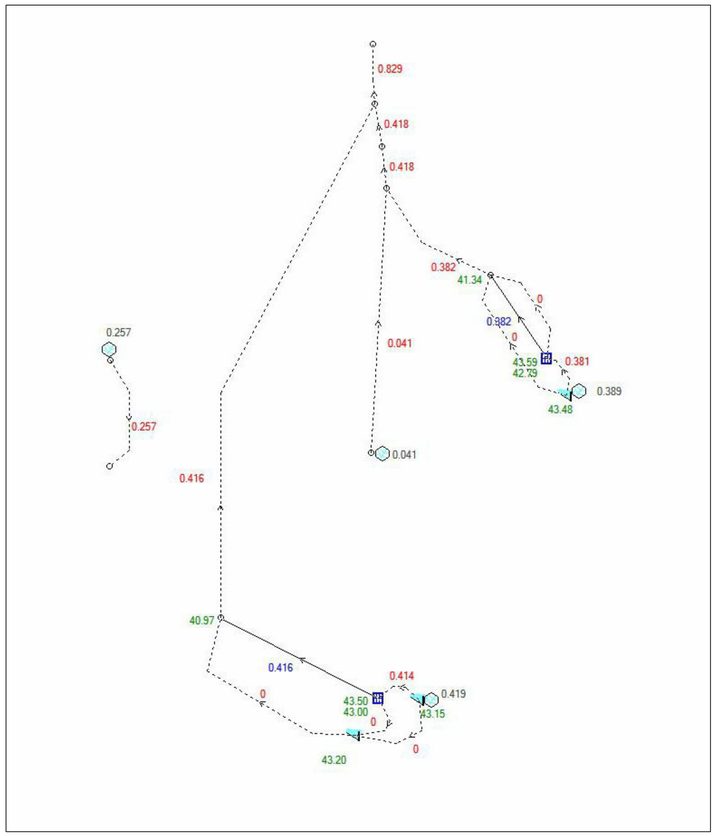
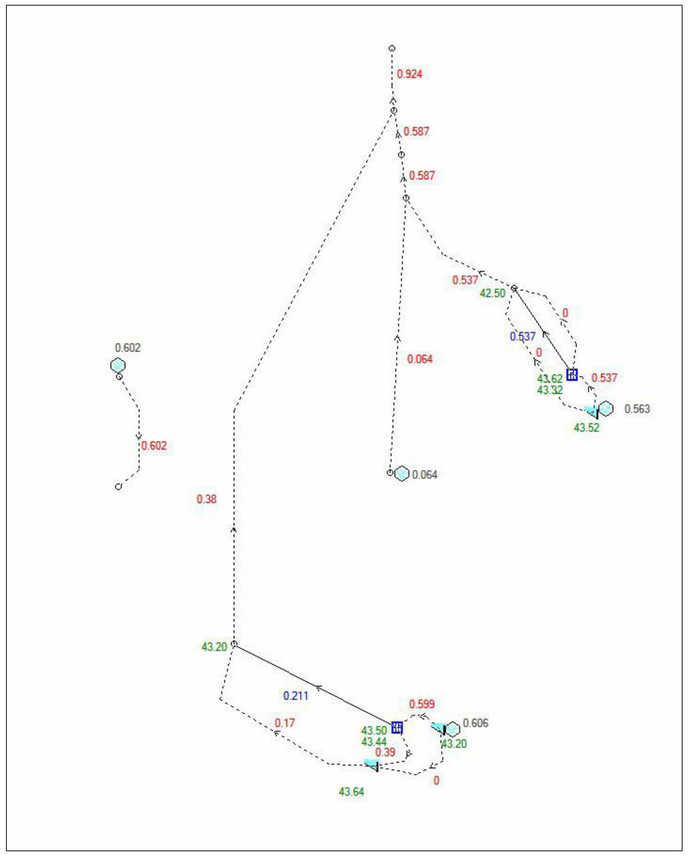


DRIVEWAY DRAINAGE 1-IN-10 YEAR ARI



SEDIMENT BASINS 1-IN-10 YEAR ARI



SEDIMENT BASINS 1-IN-100 YEAR ARI

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
D	MINOR AMENDMENTS	15/11/2019	JCF/LZ/PB	DG/EZ/JCF	TH	TH
C	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	DG/EZ/JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	EZ/JCF		
A	UPDATE	09/08/2018	PB	EZ		

SCALE

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A1 / A3 LANDSCAPE (A1LC_v02.0.01)

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
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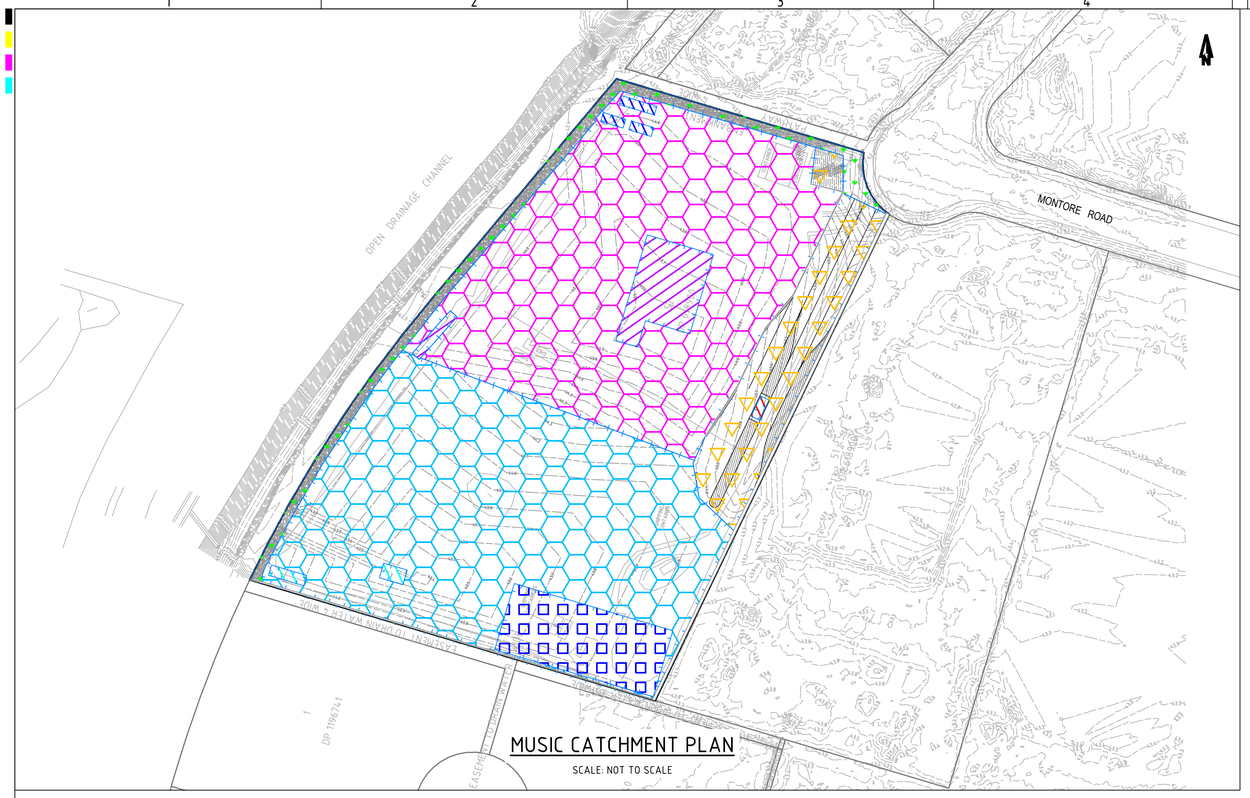
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: DRAINS MODELLING RESULTS

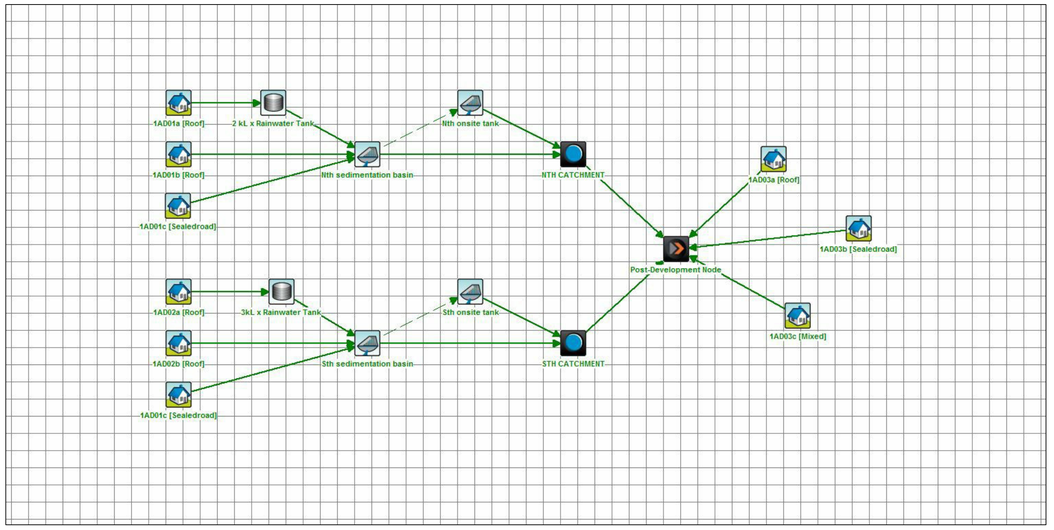
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E600	D

DRAWING ID: P1203464-PS02-R12-E600



MUSIC CATCHMENT PLAN

SCALE: NOT TO SCALE



MUSIC LAYOUT

MUSIC CATCHMENTS (P12034641MUS01V01)

KEY	DESCRIPTION	MUSIC NODE ID	AREA (ha)	IMPERVIOUS %	MUSIC NODE REFERENCE
NORTHERN CATCHMENT					
	ROOF TO 2kL RWT	1AD01a	0.008	100	NSW MUSIC MODELLING GUIDELINES 2015
	ROOF BYPASS 2kL RWT	1AD01b	0.073	100	NSW MUSIC MODELLING GUIDELINES 2015
	SEALED ROAD TO SEDIMENT BASIN	1AD01c	0.887	100	NSW MUSIC MODELLING GUIDELINES 2015
SOUTHERN CATCHMENT					
	ROOF TO 3kL RWT	1AD02a	0.122	100	NSW MUSIC MODELLING GUIDELINES 2015
	ROOF BYPASS 3kL RWT	1AD02b	0.008	100	NSW MUSIC MODELLING GUIDELINES 2015
	SEALED ROAD TO SEDIMENT BASIN	1AD02c	0.913	100	NSW MUSIC MODELLING GUIDELINES 2015
CATCHMENT BYPASS SEDIMENT BASINS					
	ROOF	1AD03a	0.002	100	NSW MUSIC MODELLING GUIDELINES 2015
	SEALED ROAD	1AD03b	0.215	100	NSW MUSIC MODELLING GUIDELINES 2015
	BUFFER	1AD03c	0.118	0	NSW MUSIC MODELLING GUIDELINES 2015
TOTAL SITE					
		TOTAL - OVERALL		2.346	= 100 % OF OVERALL AREA
		TOTAL - IMPERVIOUS		2.228	= 95 % OF OVERALL AREA
		TOTAL - PERVIOUS		0.118	= 5 % OF OVERALL AREA
NOTES:					
1. INTERNAL REUSE FOR TOILET FLUSHING IS 20 kL/PERSON/DAY.					
2. INTERNAL REUSE FOR DUST SUPPRESSION AND SAND WASHING SYSTEM IS 81.65 kL/DAY FOR EACH SEDIMENTATION BASIN.					

MUSIC MODELLING RESULTS (P1203464MUS01V01)

MUSIC NODE	POST DEVELOPMENT NODE			
PARAMETER	SOURCES	RESIDUAL LOAD	% REDUCTION	% TARGET
Flow (ML/yr)	16.6	8.73	47.3	NONE
Total Suspended Solids (kg/yr)	5.25E+03	9.69E+02	81.5	80
Total Phosphorus (kg/yr)	8.91	2.31	74	45
Total Nitrogen (kg/yr)	39.4	17.5	55.5	45
Gross Pollutants (kg/yr)	427	40.9	90.4	90

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
A	INITIAL RELEASE	15/11/2019	LL	EZ	TH	TH

SCALE

GRID | DATUM | PROJECT MANAGER: TH

CLIENT: CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

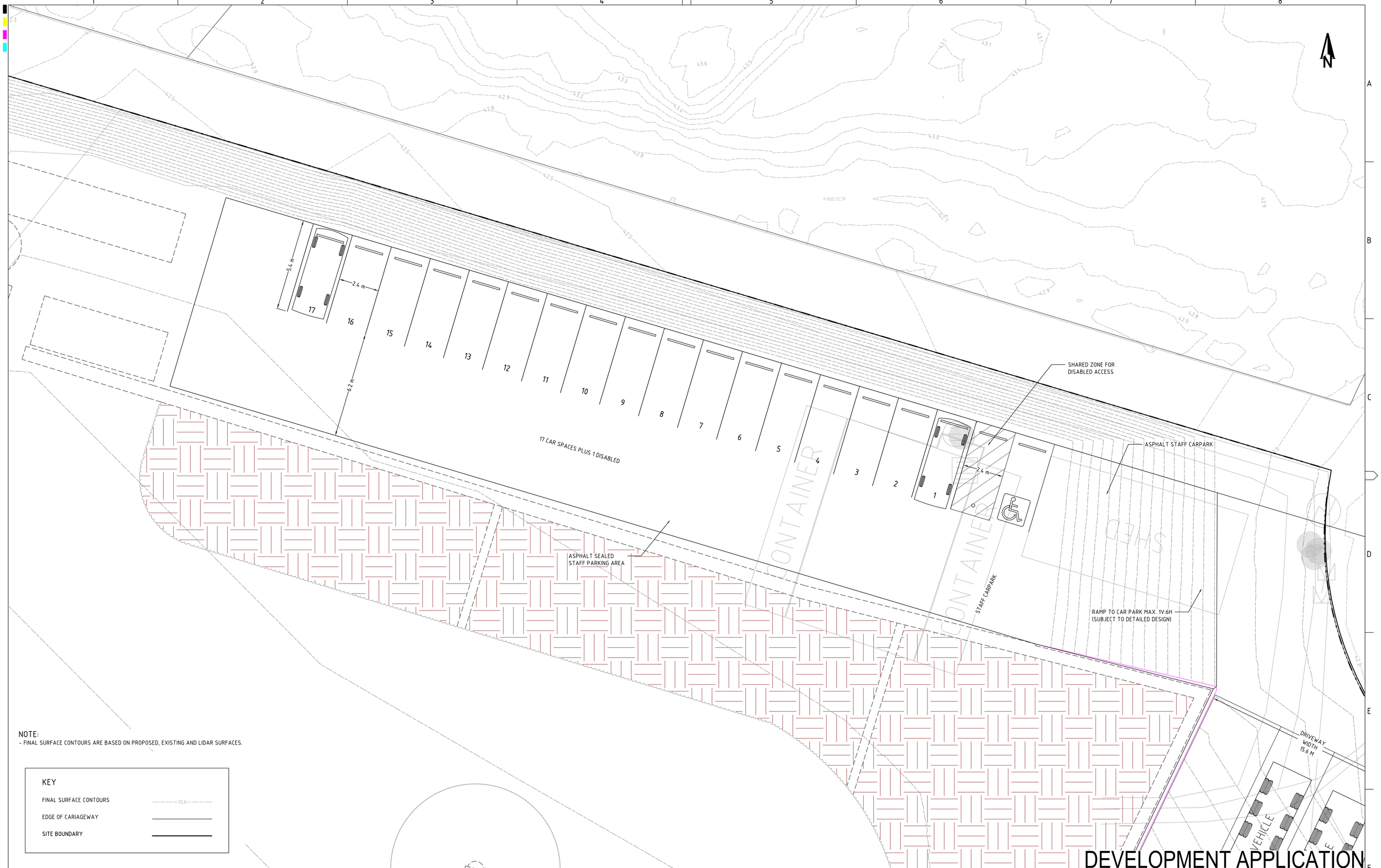
DRAWING TITLE
WATER QUALITY CATCHMENT PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-E700	A

DRAWING ID: P1203464-PS02-R12-E700

PRINTED: --- - USER: LLU

A1 / A3 LANDSCAPE (A1LC_v02.0.01)



NOTE:
- FINAL SURFACE CONTOURS ARE BASED ON PROPOSED, EXISTING AND LIDAR SURFACES.

KEY

FINAL SURFACE CONTOURS — 72.0 —

EDGE OF CARIAGEWAY

SITE BOUNDARY

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
F	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**JCF**	**TH**	**TH**
E	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
D	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 1 2 3 4 5 6 7 8 9 10 METRES
A1 (A3) 1:100 (1:200)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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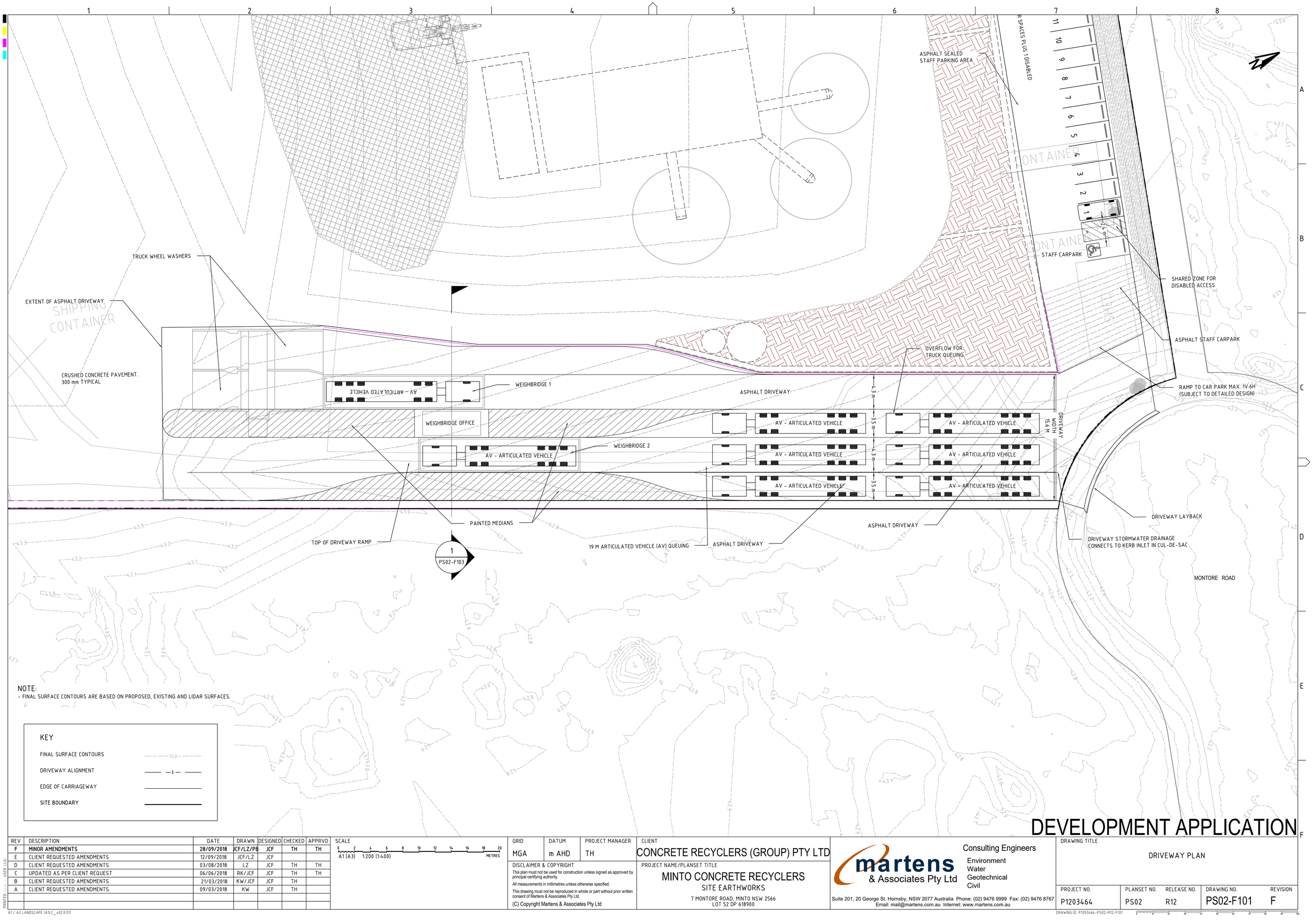
DRAWING TITLE
CARPARK PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F102	F

PRINTED: USER LUU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)
DRAWING ID: P1203464-PS02-R12-F102



NOTE:
- FINAL SURFACE CONTOURS ARE BASED ON PROPOSED, EXISTING AND LIDAR SURFACES.

KEY

- FINAL SURFACE CONTOURS — 72.0 —
- DRIVEWAY ALIGNMENT
- EDGE OF CARRIAGEWAY
- SITE BOUNDARY

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
F	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**JCF**	**TH**	**TH**
E	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
D	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 2 4 6 8 10 12 14 16 18 20 METRES
A1 (A3) 1:200 (1:400)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
DRIVEWAY PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F101	F

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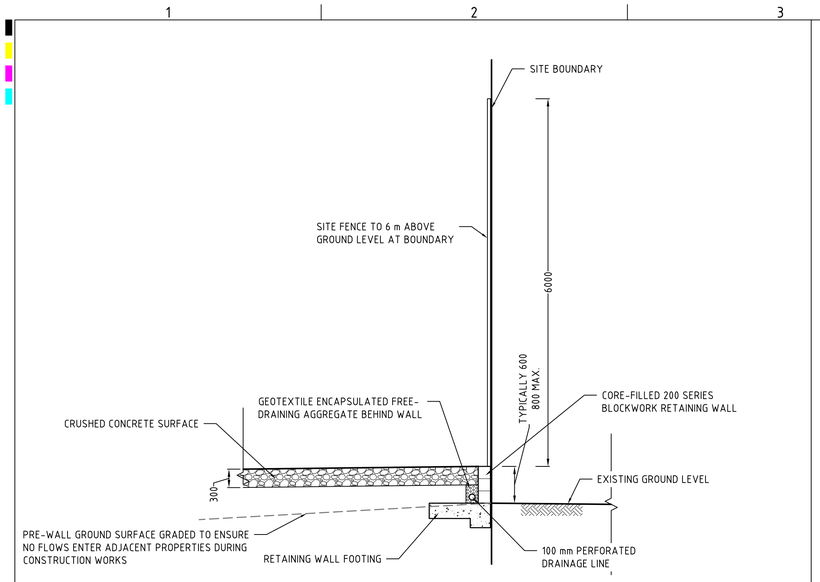
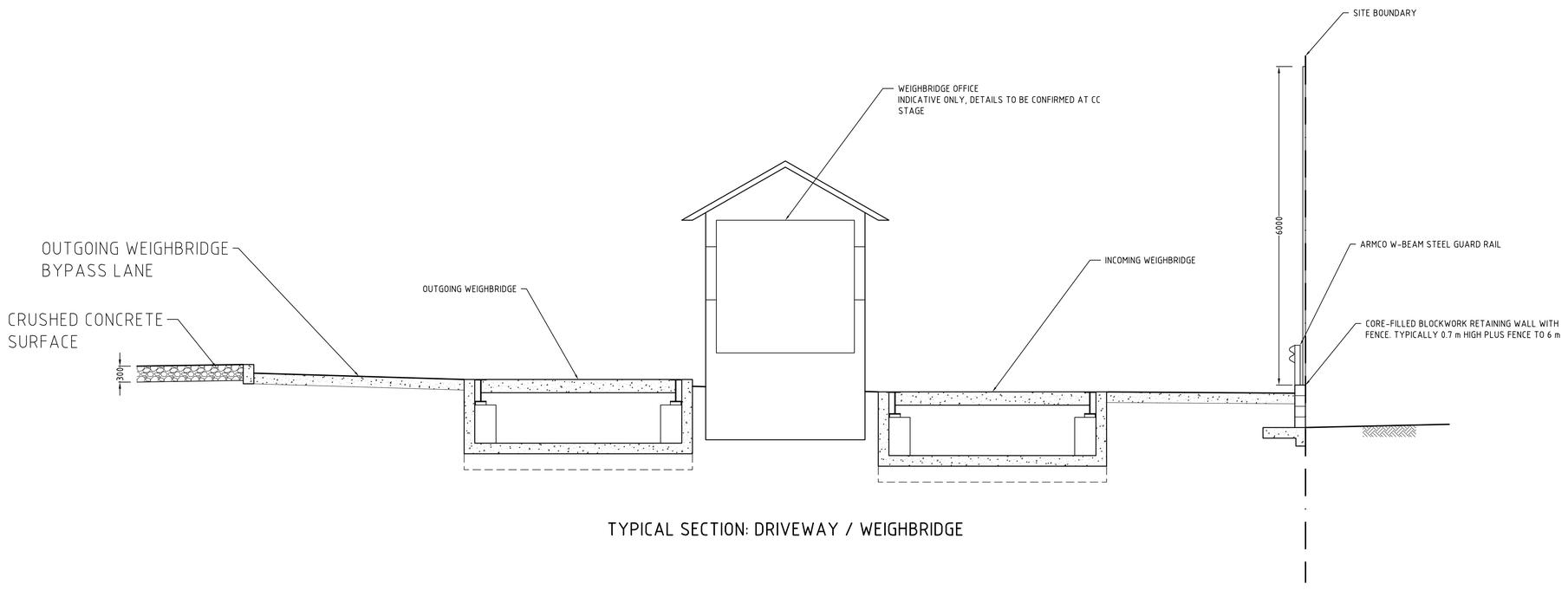
A1 / A3 LANDSCAPE (A1LC_v02.0.01)
DRAWING ID: P1203464-PS02-R12-F101



TYPICAL PROPERTY BOUNDARY SECTION, EASTERN BOUNDARY



TYPICAL SECTION: DRIVEWAY / WEIGHBRIDGE

NOTES:
- RETAINING WALL & FENCE SUBJECT TO DETAILED DESIGN.

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**JCF**	**TH**	**TH**
D	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
C	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
B	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 METRES
A1 (A3) 1:50 (1:100)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

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MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
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DRAWING TITLE
DRIVEWAY CROSS SECTION

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F103	E

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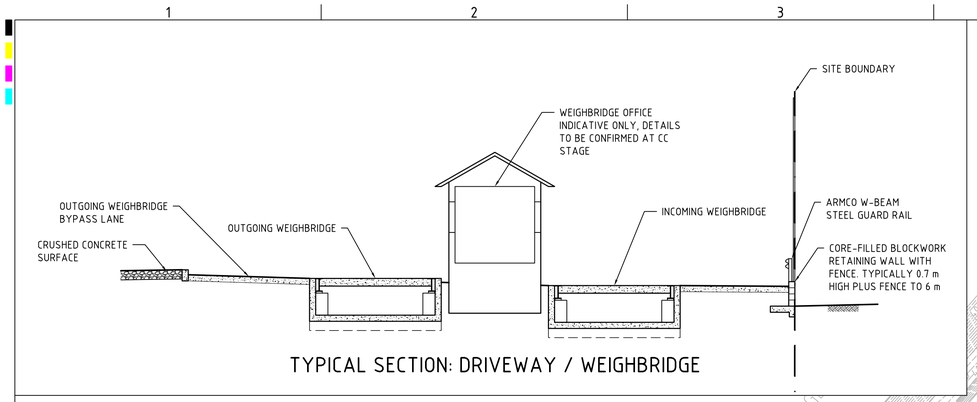
A1 / A3 LANDSCAPE (A1LC__v02.0.01)
DRAWING ID: P1203464-PS02-R12-F103



TYPICAL SECTION: DRIVEWAY / WEIGHBRIDGE

MONTORE ROAD

DRIVEWAY BLOCKWORK RETAINING WALL
MAX. HEIGHT 1.5 m

WEIGHBRIDGE AREA

EASTERN BLOCKWORK RETAINING WALL
MAX. HEIGHT 0.72 m

SOUTHERN BLOCKWORK RETAINING WALL
MAX. HEIGHT 1.8 m

TOW 44.100 BOW 42.584
TOW 42.372 BOW 42.335
CH 0.000
CH 15
CH 30
CH 45
TOW 44.100 BOW 43.788
TOW 43.334 BOW 42.754
CH 60
TOW 44.100 BOW 44.035
CH 75
CH 90
TOW 44.100 BOW 43.387
CH 105
CREST 115.000
CH 120
CH 135
CH 150
CH 165
CH 176.150
TOW 44.100 BOW 43.505
BOW 42.264 TOW 44.100
TOW 44.100 BOW 42.649
EASEMENT TO DRAIN WATER 1 WIDE
OPEN DRAINAGE
DP 68900
DP 196741

NOTE:
- FINAL SURFACE CONTOURS ARE BASED ON PROPOSED, EXISTING AND LIDAR SURFACES.

KEY

FINAL SURFACE CONTOURS ——72.0——

EDGE OF RETAINING WALL

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
G	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**CG/JCF**	**TH**	**TH**
F	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
E	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
D	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
C	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	MAHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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DRAWING TITLE
RETAINING WALL PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F200	G

DRAWING ID: P1203464-PS02-R12-F200

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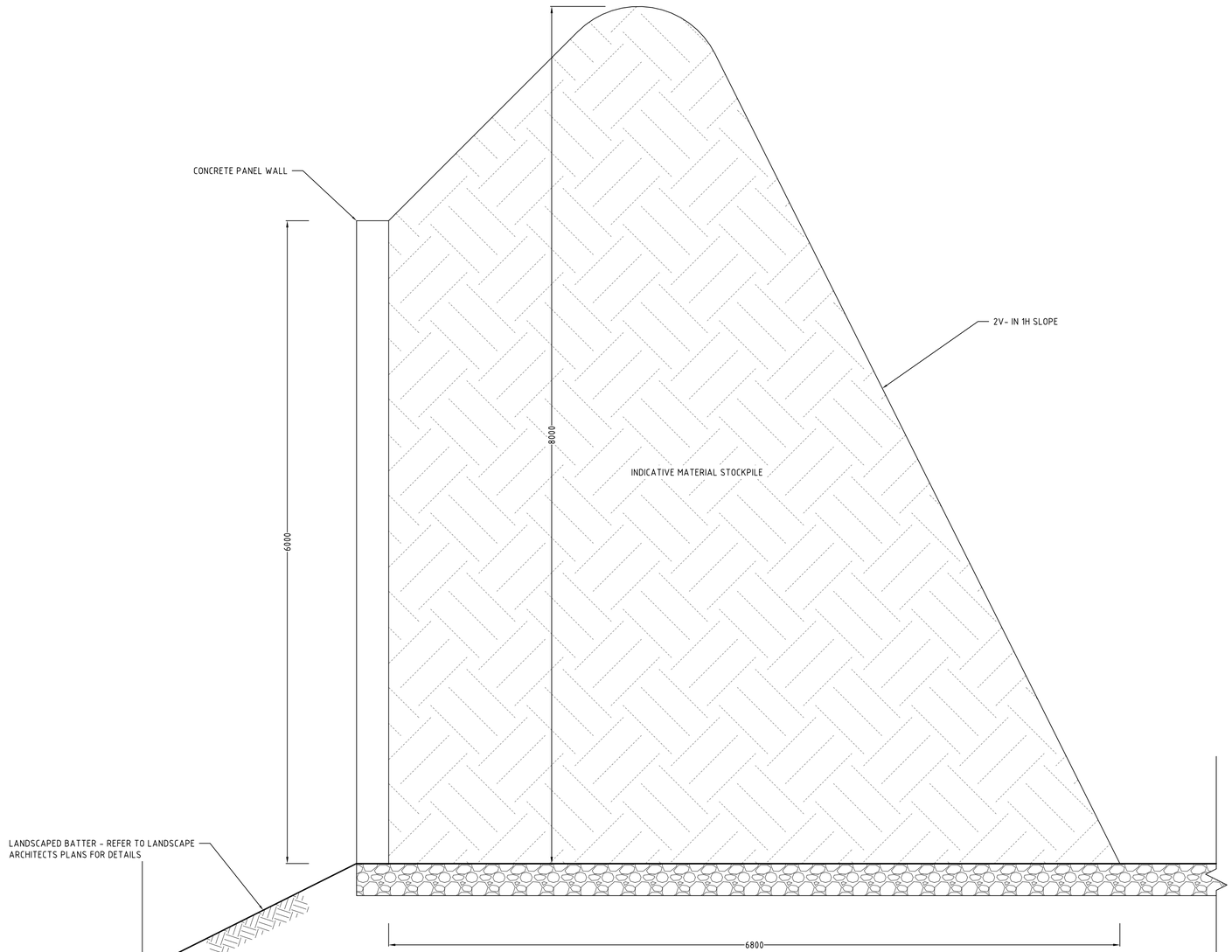

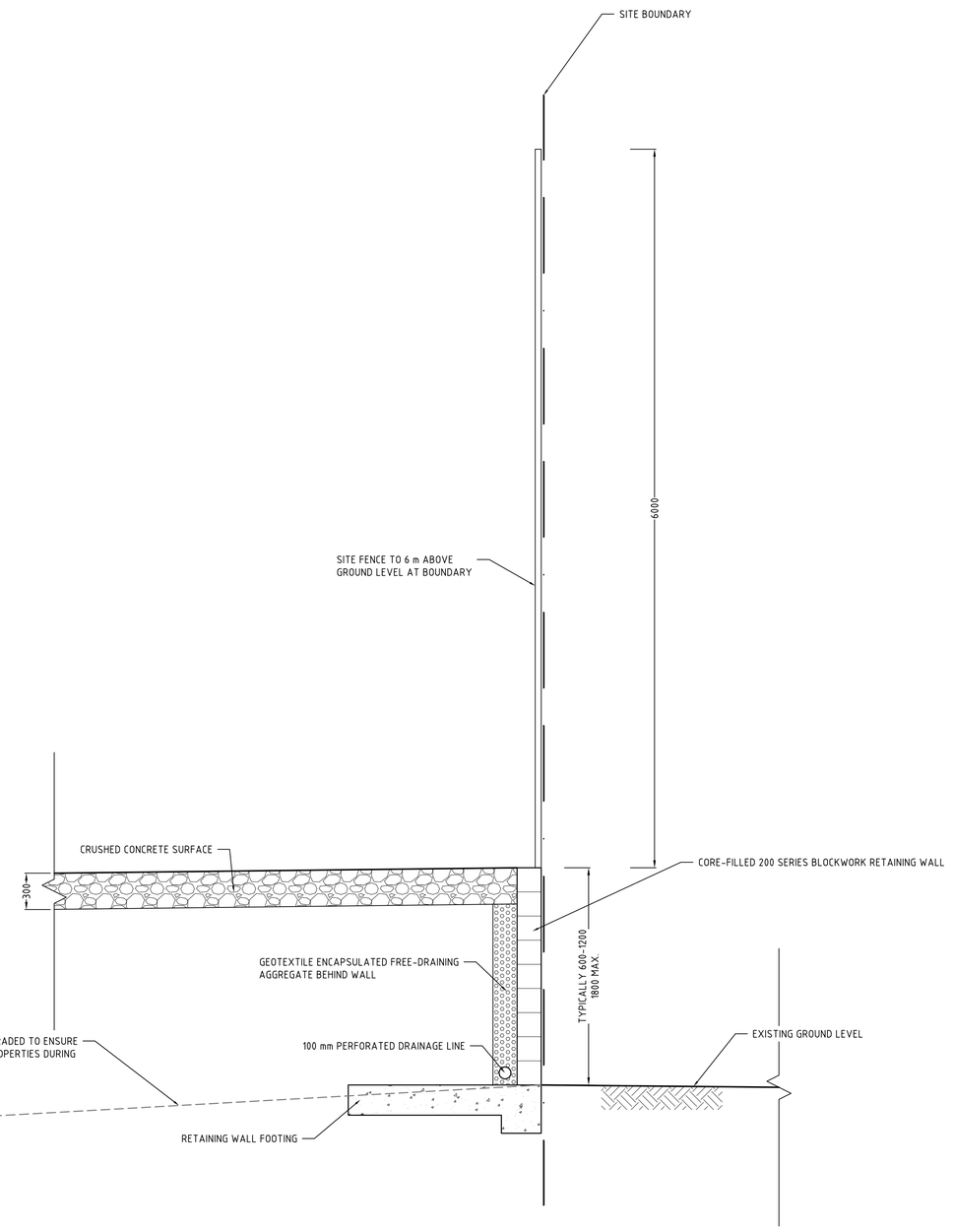

NOTE:
- CONCEPT DESIGN ONLY. SUBJECT TO DETAILED DESIGN.

TYPICAL PROPERTY BOUNDARY SECTIONS: EASTERN, SOUTHERN AND WESTERN BOUNDARIES

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
E	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**JCF**	**TH**	**TH**
D	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
C	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
B	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 METRES
A1 (A3) 1:20 (1:40)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
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SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

martens & Associates Pty Ltd
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Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
RETAINING WALL DETAILS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F201	E

DRAWING ID: P1203464-PS02-R12-F201

PRINTED: --- (USER LID)
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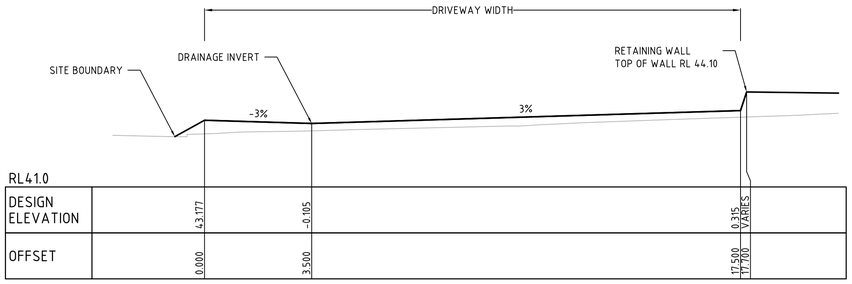
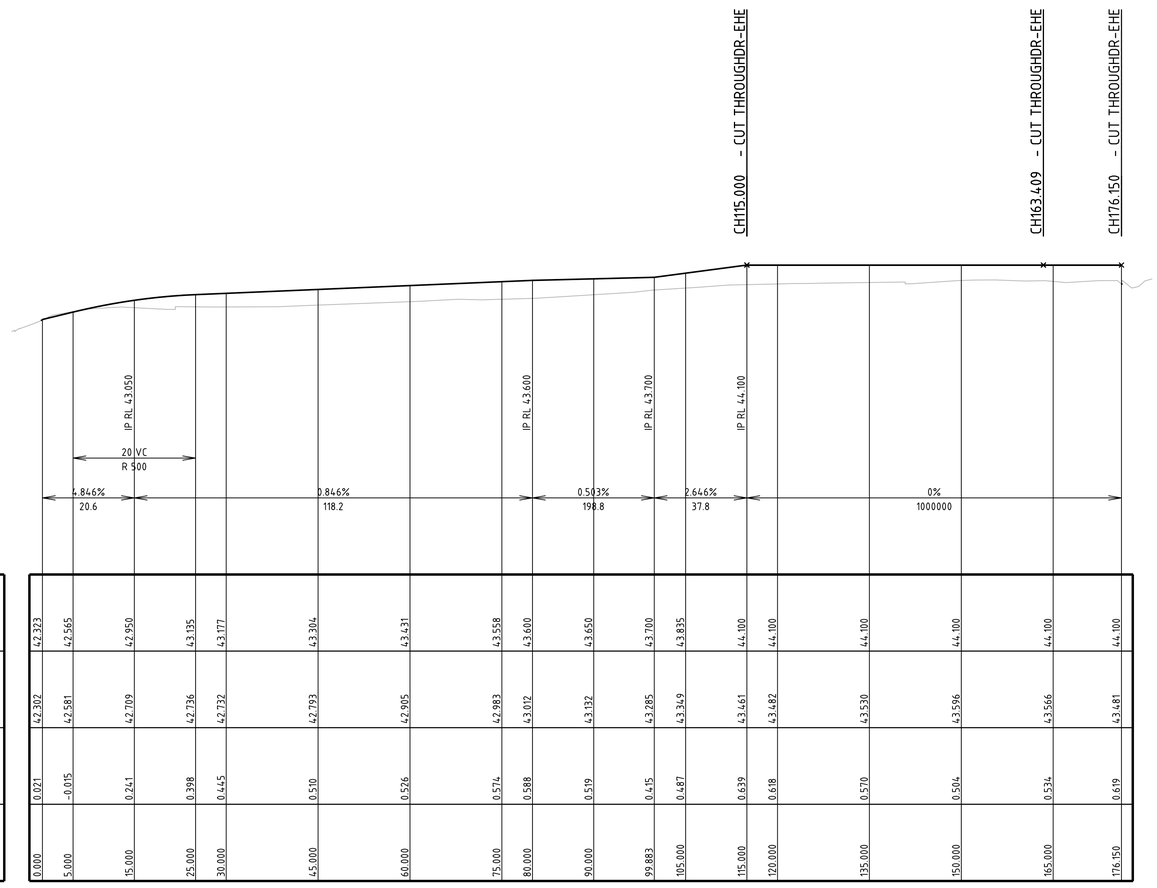


DRIVEWAY (21-MSL01) TYPICAL SECTION

SCALE: 1:100



21-MSL01 LONG. SECTION (ON ROAD ALIGNMENT)

SCALE: HORIZONTAL - 1:500
VERTICAL - 1:100

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	MINOR AMENDMENTS	28/09/2018	JCF/LZ/PB	CG/JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	CG/JCF	TH	
A	BALANCE SITE EARTHWORKS	07/11/2017	CG	CG	TH	

SCALE
A1 (A3) 1:500 (1:1,000) 0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:100 (1:200) 0 1 2 3 4 5 6 7 8 9 10 METRES

GRID	DATUM	PROJECT MANAGER
---	MAHD	TH

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CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
7 MONTORE ROAD, MINTO NSW 2566
LOT 52 DP 618900

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DRAWING TITLE
DRIVEWAY LONGITUDINAL AND TYPICAL CROSS SECTIONS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-F400	C

DRAWING ID: P1203464-PS02-R12-F400

PRINTED: --- - USER: LUU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

KEY:

- ASPHALT DRIVEWAY
- ASPHALT CARPARKING AREA
- CONCRETE PAVEMENT
- CRUSHED CONCRETE PAVEMENT TYPICALLY 300 mm THICK
- VEGETATED BATTERS TO LANDSCAPE ARCHITECT DETAIL

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
F	**MINOR AMENDMENTS**	**28/09/2018**	**JCF/LZ/PB**	**JCF**	**TH**	**TH**
E	CLIENT REQUESTED AMENDMENTS	12/09/2018	JCF/LZ	JCF		
D	CLIENT REQUESTED AMENDMENTS	03/08/2018	LZ	JCF	TH	TH
C	UPDATED AS PER CLIENT REQUEST	06/06/2018	RK/JCF	JCF	TH	TH
B	CLIENT REQUESTED AMENDMENTS	21/03/2018	KW/JCF	JCF	TH	
A	CLIENT REQUESTED AMENDMENTS	09/03/2018	KW	JCF	TH	

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	m AHD	TH

CLIENT
CONCRETE RECYCLERS (GROUP) PTY LTD

PROJECT NAME/PLANSET TITLE
MINTO CONCRETE RECYCLERS
SITE EARTHWORKS
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Email: mail@martens.com.au Internet: www.martens.com.au

DEVELOPMENT APPLICATION

DRAWING TITLE
PAVEMENT PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P1203464	PS02	R12	PS02-G100	F

DRAWING ID: P1203464-PS02-R12-G100

PRINTED: ---- - USER: LOU
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

NOTES:

THE PURPOSE OF THIS SURVEY WAS TO OBTAIN TOPOGRAPHICAL DETAIL AS REPRESENTED ON THIS PLAN.IF IT IS INTENDED TO ERECT ADDITIONAL STRUCTURES OR FENCING ON THE SUBJECT PROPERTY, THEN THE BOUNDARIES SHOULD BE MARKED.

REDUCED LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) AND ARE SHOWN THUS ·55.55.

CONTOURS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) AND ARE AT INTERVALS OF 0.5 METRES.

ORIGIN OF LEVELS IS SSM21860, RL43.216, VERTICAL ACCURACY C? AS SUPPLIED BY LAND AND PROPERTY MANAGEMENT AUTHORITY DATED 12.06.2012.

COORDINATES ARE BASED ON THE MAP GRID OF AUSTRALIA (MGA).

A SCALE FACTOR OF 1.000 HAS BEEN USED FOR COORDINATE CALCULATIONS.

ORIGIN OF COORDINATES IS PM52452 E300333.552m N=6232216.354 HORIZONTAL ACCURACY B?, AND SSM21860 E=300351.580 N=6232778.428 HORIZONTAL ACCURACY C? AS SUPPLIED BY LAND AND PROPERTY MANAGEMENT AUTHORITY DATED 12.06.2012.

BOUNDARIES HAVE NOT BEEN DEFINED OR MARKED.

BEARINGS, DIMENSIONS AND AREAS SHOWN HEREON HAVE BEEN COMPILED FROM PUBLIC RECORDS AND ARE SUBJECT TO A BOUNDARY SURVEY.

LOCATION OF UTILITY FEATURES, AS SHOWN HEREON, HAVE BEEN DETERMINED FROM VISIBLE SURFACE INFORMATION AVAILABLE.

BEFORE ANY EXCAVATION COMMENCES ON SITE, THE CONTRACTOR/DESIGNER MUST INVESTIGATE UNDERGROUND UTILITY SERVICES.

DIAL 1100 BEFORE YOU DIG

MGA

CONCRETE HEADWALL INVERT 39.96 PIPE 900 DIA

CONCRETE DRAINAGE CHANNEL

OPEN DRAINAGE CHANNEL

BOTTOM OF BANK

TOP OF BANK

CHORD 107.29
ARC 107.55
RADIUS 428.24
92°49'40"

CHAIN WIRE FENCE

EASEMENT TO DRAIN WATER 4 WIDE

101
DP 818914

STOCKPILE

286°35'45"
38.17

PEMBURY ROAD

EASEMENT TO DRAIN WATER 3 WIDE

EASEMENT TO DRAIN WATER 3.5 WIDE

79
DP 1036540

EASEMENT TO DRAIN WATER 1.5 WIDE

EMBANKMENT

GRASS

GRAVEL

CONCRETE

BITUMEN

PONDS UNDER CONSTRUCTION
NO ACCESS AT TIME OF SURVEY

52
DP 618900
CARPARK

PORTABLE METAL SHEDS

PORTABLE METAL OFFICE

CONCRETE HEADWALL INVERT 39.58 PIPE 1500 DIA

40°01'30"
95.875

176.15
205°42'00"

EASEMENT FOR LANDSCAPING VARIABLE WIDTH

4 WIDE PATHWAY

106°35'50"
84.24

4
DP 1076508

51
DP 618900

KERB & GUTTER

BENCH MARK
NAIL ON KERB
RL 42.095 AHD

157°44'00"
CHORD 21.85
ARC 23.15
RADIUS 20

MONTORE ROAD

- SEWER LAMP HOLE
- SEWER MANHOLE
- RLEV ROOF RIDGE LEVEL
- GLEV ROOF GUTTER LEVEL

DETAIL SURVEY
No.7 MONTORE ROAD
MINTO
IN THE LOCAL GOVERNMENT AREA OF
CAMPBELLTOWN
RE: MR B. LAWSON

RATIO 1:500 @ A1 (5 0 5 10 15 20 25)	SURVEYED MS
LEVEL DATUM AHD	DRAWN MS
DATE 08.06.2012	CAD FILE CH5241A1
SHEET 1 OF 2	REFERENCE CH5241.001

WILLIAM L. BACKHOUSE Pty. Limited
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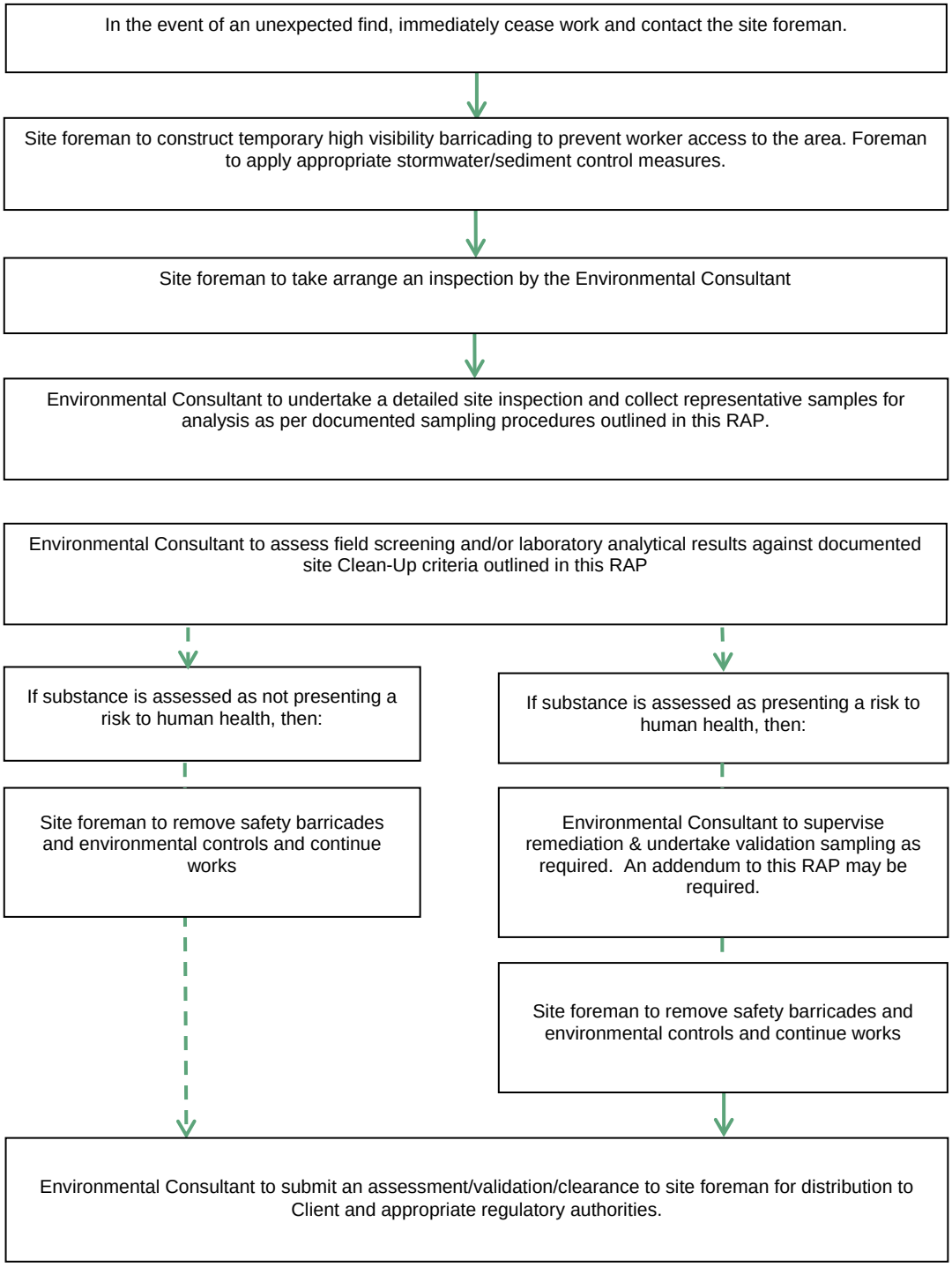
e-mail: wlb@backhouse.com.au

Appendix C – Unexpected Finds Protocol

Unexpected Finds Protocol



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