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Integrated Practical Solutions

Report on
Stage 1 – Investigation and Contamination Assessment

Bundwalls at
Lot 40, Deposited Plan 738126 Patons Lane
Orchard Hills

Prepared for
Dellara Pty Ltd

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		6 February 2012
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Executive Summary

This report describes the methodology and results of a Stage 1 - Investigation and Contamination Assessment (the Assessment) undertaken by Douglas Partners Pty Ltd (DP) on the bundwalls at Lot 40, in Deposited Plan 738126, located on Patons Lane, Orchard Hills. The assessment was commissioned by Dellara Pty Ltd. The assessment has been undertaken as part of the application to develop the Orchard Hills Waste and Resource Management Facility at the property.

For the purposes of this assessment, the site is considered to comprise the footprint area of the bundwalls (referred to herein as the Site), whilst the property in which the bundwalls are located (i.e. Lot 40, in Deposited Plan 738126) is referred to herein as the Property.

The objective of the Assessment is to obtain and review available information on the Site relating to the contamination potential and to assess the risk of contamination. The Assessment aims to identify the contaminants of concern and to make recommendations on the need for further works in relation to contamination issues. A preliminary intrusive investigation was also previously undertaken which provides field and analytical results for bundwall materials at the Site. The Assessment also evaluates the potential for contamination at the Site to pose a significant threat to human health or the environment.

The Assessment comprised a review of available information relevant to contamination impacts for the Site (including history information), site inspection and review of previous data from intrusive investigation of the bund walls by drilling, test pitting, sampling and analysis. *The Assessment is retrospective and is largely based on investigative reports (including sampling) prepared in 2009 and 2010 and submitted as part of the project application*. Some additional information, mainly in respect to the site history, was obtained for this Assessment to meet the requirements of a Stage 1 – Investigation and Contamination Assessment as set out in 'Managing Land Contamination Planning Guidelines SEPP 55 - Remediation of Land' (1998).

The available information indicates that the Site was likely to have been used for grazing from the time of European settlement followed by development of the Property as a quarry for extraction of clay and shale circa 1982. Since quarrying operations ceased circa 2008 the site has been unoccupied (disused quarry).

The historical information indicates that the bundwalls were constructed between approximately 2002 and 2008. In 2007 and 2008 the then Property owner received notices regarding the illegal importation of materials in breach of Licence and DA conditions from the EPA and Penrith City Council respectively. In this regard EPA officers reportedly observed imported filling comprising virgin excavated natural materials, soil and construction and demolition (C&D) wastes.

Investigations by DP have identified the presence of C&D wastes at the Site in Bundwalls 1 and 4. Asbestos has been identified in the central portion of Bundwall 4, and traces of asbestos have also been identified in other sample locations from Bundwalls 1 and 4. No C&D wastes or asbestos have been identified in Bundwalls 2 or 3. All chemical contaminants were found to be within the site assessment criteria taking into account statistical assessment of the results. The bundwalls are to be largely removed as part of the preliminary works for the proposed redevelopment of the Property under the Further Modified Preferred Project Report (FMPPR).

Previous surface water sampling from the Property did not find any indication of contamination, indicating that the Site is not impacting surface water at the Property, including in Blaxland Creek. Previous geological and groundwater investigations found shale to be present at the Property to depths of up to approximately 90 m with the shale being of low permeability and containing only low quantities (not suitable for beneficial use) of saline groundwater.

Based on the site history information discussed herein it is considered that the primary issue of contamination concern for the Site is imported filling of unknown origin. No other potential contamination sources were identified at the Site, or on adjacent lands with the potential to impact the Site. The filling is noted to contain C&D waste in some areas and to be contaminated by asbestos in some locations.

During the early stages of redevelopment of the Property and as part of the bundwall deconstruction programme, careful management of all imported filling of unknown origin will be required, including management of the identified asbestos contaminated materials. It is considered that the identified contaminants do not preclude the proposed development, and moreover that the contaminants identified can be managed during re-development works to mitigate any potential risks to site users, neighbours and the environment. It is further noted that whilst the volumes of different waste types [particularly Special Waste (asbestos)] have not been confirmed, it is considered that the wastes can be managed by on-site containment [include Special Waste (asbestos)] or, where required, off-site disposal to a suitably licenced waste facility. As such it is not considered that the lack of certainty regarding the estimated waste volumes will render the Site unsuitable for the proposed re-development.

Based on the findings of the Stage 1 - Investigation and Contamination Assessment the following works are recommended:

- Capping of any exposed C&D waste impacted filling with clean soil pending further testing/ management to minimise the risk of asbestos being exposed at the surface.
- Preparation of a bundwall deconstruction management plan for the proposed deconstruction process, including a detailed assessment programme to further characterise the materials (waste classification). The assessment is required to confirm that the bundwall materials are suitable to be retained on-site or, if not, to determine suitable management and waste disposal strategy for the filling identified to contain contaminated materials and which are unsuitable to remain within the proposed landfill (redevelopment). In this regard DP considers that it is not practically feasible to undertake detailed testing of the filling *in situ* due to the depth of the waste, the large volume of material in the bundwalls, and the expected heterogeneity and sporadic nature of contamination by the main contaminant of concern (i.e. asbestos)[1]. Accordingly the detailed assessment of the filling will be required to be undertaken during deconstruction of the bundwalls and will include visual inspection, sorting and laboratory testing, and this is not feasible for filling materials located at depth within the Site without large scale disturbance (deconstruction) of the bundwalls. It is envisaged that the bundwalls will be removed in small panels such that testing, classification, removal and redirection of the excavated materials can be undertaken in a progressive and sequential manner in order to minimise any potential impacts. Accordingly the plan should also describe the requirements to manage any potential impacts to site users, neighbours and the environment.

[1] DP note that EPA are of a similar view (as indicated in EPA's letter dated 16 November 2011)

- Implementation of the (proposed) bundwall deconstruction management plan during bund deconstruction.
- Management of identified contaminated filling, comprising either on-site (landfill) containment, or off-site disposal to a suitably licenced waste facility.
- Preparation of a report by an appropriately qualified professional recording the bundwall deconstruction management works undertaken, waste classification and validation assessment results and the placement/ disposal locations of all filling removed from the bundwalls.

It is considered that implementation of the above recommendations will appropriately manage contamination issues during the early stages of re-development works and ongoing operations of the proposed Orchard Hills Waste and Resource Management Facility under the FMPPR.

Glossary of Terms

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environmental & Conservation Council
BDMP	Bundwall Deconstruction Management Plan
bgl	below ground level
BTEX	benzene, toluene, ethyl benzene, total xylenes (monocyclic aromatic hydrocarbons)
°C	degrees Celcius
C&D	construction and demolition
C&I	commercial and industrial
CLM Act	Contaminated Land Management Act 1997
COD	chemical oxygen demand
C_6–C_9	light hydrocarbon chain groups
C_{10}–C_{14}	medium hydrocarbon chain groups
C_{15}–C_{28}	heavy hydrocarbon chain groups
C_{29}–C_{36}	heavy hydrocarbon chain groups
DA	development application
DEC	NSW Department of Environment and Conservation (now EPA/OEH)
DECC	NSW Department of Environment and Climate Change (now EPA/OEH)
DECCW	NSW Department of Environment, Climate Change and Water (now EPA/OEH)
DIPNR	NSW Department of Infrastructure, Planning and Natural Resources (now OEH or DPI)
DP	Douglas Partners Pty Ltd
D.P.	deposited plan
DPI	NSW Department of Primary Industries
EPA	NSW Environmental Protection Authority
FMPPR	Further Modified Preferred Project Report
ha	hectares
HIL	NSW DEC Contaminated Sites: *Guidelines for the NSW Site Auditors Scheme (2nd edition), 2006*. Health-based investigation levels (Columns 1 to 4)
km	kilometre
L/s	litres per second
m	metre
mm	millimetre
m^2	square metre
m^3	cubic metre
mg/kg	milligrams per kilogram (or parts per million)
mg/L	milligrams per litre

NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NOW	NSW Office of Water
NSW	New South Wales
OCP	organochlorine pesticides
OEH	Office of Environment and Heritage NSW
OPP	organophosphate pesticides
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyls
pH	unit measure of acidity/ alkalinity
PID	photoionisation detector
POEO Act	Protection of the Environment Operations Act 1997
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
SAC	site assessment criteria
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land.
TDS	total dissolved solids
TKN	total kjeldahl nitrogen
TRH	total recoverable hydrocarbons
TPH	total petroleum hydrocarbons
TSS	total suspended solids
UCL	upper confidence limit of data set
VENM	virgin excavated natural material
VHC	volatile halogenated compound
WIL	water investigation level
%	percent
<	less than
>	greater than

Note: All acronyms listed above may not have been used in the report

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Appendices

Report on Stage 1 – Investigation and Contamination Assessment Bundwalls at Lot 40, in Deposited Plan 738126, Patons Lane, Orchard Hills

1. Introduction

This report describes the methodology and results of a Stage 1 - Investigation and Contamination Assessment (the Assessment) undertaken by Douglas Partners Pty Ltd (DP) on the bundwalls at Lot 40, in Deposited Plan 738126, located on Patons Lane, Orchard Hills. The Assessment was commissioned by Dellara Pty Ltd. The Assessment has been undertaken as part of the application to develop the Orchard Hills Waste and Resource Management Facility at the property.

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The Assessment comprised a review of available information relevant to contamination impacts for the Site (including history information), site inspection and review of previous data from intrusive investigation of the bund walls by drilling, test pitting, sampling and analysis. *The Assessment is retrospective and is largely based on investigative reports (including sampling) prepared in 2009 and 2010 and submitted as part of the project application*. Some additional information, mainly in respect to the site history, was obtained for this Assessment to meet the requirements of a Stage 1 – Investigation and Contamination Assessment as set out in 'Managing Land Contamination Planning Guidelines SEPP 55 - Remediation of Land' (1998).

2. Scope of Works

The Assessment comprised the following:

- Review previous reports and written advice regarding the site history and proposed development and inclusion of relevant information herein;
- Review information regarding the proposed landuse and development plans to determine the future contaminant exposure scenario(s);
- Review published information on topography, geology, soil and hydrogeology;

- Search the current land title and historic titles and Deposited Plans to identify previous owners and land uses that may indicate a potentially contaminating activities;
- Search the historic aerial photographs to identify past land uses and changes in the land use that may indicate potential for contamination;
- Search the Contaminated Land Register for Notices issued under the *Contaminated Land Management Act* 1997;
- Search public register of licences and records under Section 308 of the *Protection of the Environment Operations Act 1997* (POEO Act);
- Search WorkCover database records for any Dangerous Goods Licence or other approvals that may indicate contaminating activities;
- Search of the licensed Groundwater Bore database for the area of the Site;
- Review the Section 149 (2&5) Planning Certificate;
- Obtain file records from Penrith City Council that may include past development consents, site inspection notes or complaints;
- Discussions with the person(s) associated with the Property regarding their knowledge of previous activities or other information relevant to contamination;
- Inspect the site to gain an understanding of the site layout, operations and observe any indicators of contamination or potentially contaminating activities;
- Prepare this Stage 1 - Investigation and Contamination Assessment report in accordance with the Office of Environment and Heritage NSW (OEH) (now the Environmental Protection Authority - EPA) *Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites* (reprinted 2011).

3. Site Identification

The land containing the Site is identified as Lot 40, in Deposited Plan 738126 in the Parish of Claremont and the County of Cumberland. The Property covers an area of approximately 60 ha and is located at 123-179 Patons Lane, Orchard Hills in the local government area of Penrith City Council (Drawings 1, Appendix A).

The Site comprises four bundwalls located around the Property boundaries, referred to as Bundwall 1 to Bundwall 4, as shown on Drawing 2, Appendix A. The Site covers an area of under 15 ha, as described in Table 1.

Table 1: Details of Bundwalls [1]

Bundwall ID	Location	Estimated Area (m^2)	Estimated Volume (m^3)
Bundwall 1	South west	62,200	394,400
Bundwall 2	North west	18,164	77,000
Bundwall 3	North west	5,319	3,700
Bundwall 4	North east and east	64,045	251,500
Total		149,842	726,600

1. Based on information provided by Matthew Freeburn Land, Engineering & Mining Surveyors and GHD.

4. Proposed Development and Relevant Assessment Criteria

4.1 Proposed Development

The proposed development is set out in the Further Modified Preferred Project Report (FMPPR) prepared by RW Corkery & Co Pty Ltd in conjunction with GHD Pty Ltd, dated September 2011. It is noted that the currently proposed development, as set out in the FMPPR, differs from the previously proposed development as discussed below.

The proposed development as set out in the FMPPR comprises a Waste and Resource Management Facility at the Property. The development proposal involves a number of components designed to collectively underpin an environmentally responsible facility able to provide an important resource management service and the ultimate reinstatement of productive rural grazing land in an area zoned for ongoing agricultural production. The principal activities would include the following:

- Construction/establishment and operation of a materials recycling facility for construction and demolition (C&D) and commercial and industrial (C&I) waste;
- Resumption of clay/shale extraction (particularly light-firing clay/shale) to recover raw materials for use by the brick industry and other clay/shale materials as optimal cover material for the onsite waste emplacement and final capping;
- Development and operation of staged waste emplacement cells to contain all residual wastes from the recycling and re-processing facility, other imported wastes (unable to be re-processed) and selected C&D wastes recovered from the existing on-site perimeter bund walls;
- Refurbishment of the former weighbridges and offices together with the construction of a range of on-site infrastructure including a site office for the recycling and re-processing facility, truck wheel wash, site workshop and water management structures; and
- Selective removal and on-site disposal of material from the existing perimeter bund walls including disposal of waste materials previously illegally imported to site and incorporated into the bund walls in contravention of the requirements of the *Protection of the Environment Operations Act 1997* and the existing development consent for the site.

The proposed development is understood to include the following general works on the bunds (based on information provided by GHD on 25 January and 2 February 2012):

1. Bund Deconstruction Process

Initial site establishment works

- Bund material from the north western corner would be removed from the area adjacent to the creek.
- An area of asbestos contamination around borehole 12 would be removed and this material placed into the on-site landfill.
- The existing north eastern and northern bund walls (including the asbestos area mentioned above) would be capped with clean soil and have their heights increased. This would aim to create an even northern face with a maximum elevation of 53 m Australian Height Datum (AHD), and a more gentle northerly slope than currently exists. The north eastern bund would be raised to 56-57 m AHD, as shown on the staging plans (provided in Appendix A).
- The existing southern and south western bund walls would be reduced in height to between 57 and 58 m AHD, and the bund walls would be capped with clean material.
- The existing eastern bund walls would also be similarly modified. An area of the eastern bund where asbestos was detected during site investigations (near borehole 12) would also be rehabilitated at this time.

During the life of the project

- A noise mound would be constructed adjacent to the contingency stockpile area, when the stockpiles are sufficiently high to warrant it. This would be removed at the end of the project.
- The existing north eastern and north western bund walls would be progressively removed, as shown in the staging plans. The final levels of the site where the bunds currently stand would match those of the adjacent capped landfill areas.
- At the end of the project, the south western and southern bund walls would be deconstructed.
- The noise mounds around the recycling and reprocessing area would be removed at the end of the project, as part of the process of decommissioning the recycling area and filling it with soil.

2. Estimated Quantities

The timing of the various bund removal activities and estimated quantities are shown in the annotated Staging Plans which form part of the FMPPR, as follows:

- Stage 1 – Site Establishment activities that occurred prior to Stage 1 are shown on this plan. Approximately 205,000 m3 of the south western and southern bund material and 48,800 m3 of north western corner bund material (total of 253,800 m3) would be used to build up the northern and north eastern bund heights (94,800 m3), and create the Recycling and Reprocessing Area noise mound (63,100 m3) and Contingency Stockpile noise mound (25,800 m3). Excess material would be used for capping the rest of the northern and north eastern bunds and for daily covering of waste.
- Stage 2 – The first section of the northern bund would be removed, after landfilling is completed in Cell 1. This material (68,600 m3) would be used as daily cover for landfilling. Material

comprising mainly waste in the north eastern corner of the existing quarry (26,600 m^3) would be landfilled on site.

- Stage 5 – The second section of the northern bund would be removed, after landfilling is completed in much of Cell 2. This material (61,800 m3) would be used for daily cover.
- Stage 6 – The remaining section of the northern bund would be removed, along with the first section of the north eastern bund. This material (86,200 m3) would be used for daily cover.
- Stage 8 – Another section of the north eastern bund would be removed, and this material (23,300 m3) would be used for daily cover.
- Stage 10 – After completion of the final section of Cell 3, the last section of the north eastern bund would be removed (68,000 m3), along with the south western bund (160,000 m3), and the bunds around the Recycling and Reprocessing Area and the Contingency Stockpile area. This material would be used to fill the void left after the Recycling and Reprocessing Area is decommissioned, which is approximately 310,000 m3 in volume. Any excess material remaining after the Contingency Stockpile area is reprofiled would be disposed of off-site.

Based on the above it is anticipated that a total of approximately 626,900 m^3 of material will be removed from the bundwalls during the life of the Waste and Resource Management Facility.

3. Bund heights

The original bund heights are shown in the on the survey plan (Appendix A). The heights of the bunds after the establishment period are shown on the various staging plans. The final heights of the various areas once the bunds are removed are also shown on the staging plans.

It is understood that following deconstruction of the bundwalls any residual filling materials which are not sourced from natural materials would be covered with a 1 m cap plus a 0.5 m thick revegetation layer.

The FMPPR includes the following modifications from previous proposals for the Project:

1. Reduction in height of the final landform:
   - a reduction in the finished level of the northern face from 55 m AHD to approximately 44 m AHD, 3 to 4 m above the pre-existing ground levels (the interim acoustic mound would be at 53 m AHD for acoustic purposes);
   - a reduction in the elevation of the northern face to a 5% slope profile to integrate more closely with the existing ground level; and
   - the substantial removal of the south western, southern and eastern bund walls and the forming of part of the final landform during the course of the project, to reduce visual impacts.

2. Increased extraction of clay/shale resources (as outlined in the Alternate Draft Conditions in Reply - Shale/Clay Resources filed with the Court):
   - extraction of additional clay/shale resources in Cell 2 by increasing the level of extraction from 37 m AHD to 28 m AHD; and
   - no emplacement of waste in the final cell. The final cell is to be backfilled with clay/shale.

3. Contingency stockpile:
   - a new contingency stockpiling area, which would be located in the south eastern corner of the Property, enabling stockpiles of clay and shale destined for export to be stored as far from residents as possible; and
   - consequential relocation of the site office and light vehicle parking area.

4. The modifications of which the Court granted leave to the Proponent to rely upon on 19 July 2011 as outlined in the Overview of the Amendments to the Modified Preferred Project) dated July 2011.

In summary, notable changes introduced to the project design include a reduction in waste receipts from 7.8 million tonnes to 4.3 million tonnes (leave to this modification was granted on 19 July 2011) and reduction of the final landform height from 65 m AHD to 57 m AHD to a level assessed to be appropriate by the independent visual assessment of the project.

Of particular relevance it is noted that the FMPPR includes a significant reduction in final levels of the northern face of the bundwalls (approximately 11 m lower than previously proposed) as well as substantial removal of the other bundwalls. This change in proposed development has occurred subsequent to the preparation of previous reports by DP at the site (refer to Section 5.7).

4.2 Correspondence Regarding Proposed Development

Various correspondence have been prepared for the proposed development of the Property, with the following document considered to be particularly relevant to the assessment of the bundwall materials.

- EPA *Review of Orchard Hills Waste Project (Project Application MP 09_{)074) Exhibition of Further Modified Preferred Project Report September 2011* (reference DOC11/52564, dated 16 November 2011)

A copy of the letter is provided in Appendix B. The EPA note that any material containing asbestos is classifiable as Special Waste.

The EPA further make the following comments regarding testing of the bundwall materials: “Sampling and testing should be undertaken for all noise bunds as they are reshaped and / or decommissioned. Works should:

- Be undertaken progressively to ensure the waste through and across the noise bunds is well characterised. Given the noise bunds are up to 15 m deep in some areas it would be difficult to accurately characterise and classify the waste prior to disturbing the bunds.
- Include stockpile management procedures to ensure waste can be separated and avoid cross contamination of stockpiles.
- Ensure all wastes containing asbestos are further chemically classified to establish whether they are also restricted or hazardous waste.
- Any restricted or hazardous waste must not be disposed of onsite. This waste must be sent off site for disposal to a facility that can lawfully receive that waste.

- Special wastes must be directly landfilled either onsite within the approved waste cell or sent offsite to a lawful facility.
- Any waste classified as General Solid Wastes suitable for recovery or recycling must meet the contaminant levels stipulated by the Environment Protection Licence. These levels are generally lower than the General Solid Waste levels of contamination."

The EPA stated that "prior to the commencement of construction or operational activities at the site the proponent must engage a suitably qualified expert to prepare and submit to the EPA for approval a detailed Sampling and Testing Regime for the excavation of wastes (including Excavated Natural Material) within the bund walls around the perimeter of the site. Given the presence of some asbestos waste within the bund walls, any works resulting in disturbance of the bund walls must be undertaken in accordance with an appropriate Asbestos Management Plan."

4.3 Relevant Assessment Criteria

The current and proposed land uses are considered to be commercial/industrial in nature, and as such the relevant soil investigation levels for contamination assessment purposes are considered to be:

- NSW Department of Environment and Conservation (DEC) *Contaminated Sites: Guidelines for the NSW Site Auditors Scheme 2nd edition,* 2006 [DEC (2006)]. Appendix II, Soil investigation levels for urban development sites in NSW, Health-based investigation levels: commercial or industrial (Column 4); and
- NSW Environmental Protection Agency (EPA) *Contaminated Sites Guidelines for Assessing Service Station Sites* (1994) [EPA (1994)] (referenced in the absence of comprehensive guidelines for petroleum hydrocarbons in DEC (2006).

The above soil investigation levels for contamination assessment at the site are collectively referred to as the Health-based investigation levels (the HILs).

The HILs are applied to the dataset using appropriate statistical analysis in accordance with the National Environment Protection Council (NEPC), 1999 *National Environment Protection (Assessment of Site Contamination) Measure* Schedule B(7a) Guidelines on Health-based Investigation Levels [NEPC (1999)] and endorsed by the EPA. As such, soils will be considered to meet the Site Assessment Criteria (SAC) indicating no unacceptable impacts when either all results are within the HIL, or when statistical analysis shows that:

- The concentration of each contaminant is less than 2.5 times the HIL. Any concentrations more than 2.5 times the HIL are classified as a 'hotspot', requiring further assessment/ management; and
- For a dataset of like material the calculated 95% Upper Confidence Limit (UCL) of average concentrations (excluding any 'hotspot' concentrations) is within the HIL; and
- The standard deviation of the results is less than 50% of the HIL.

5. Site History

A review of historical information pertinent to the past activities within the Site was undertaken to gain an understanding of the potential for and distribution of any area(s) of environmental concern which may be present. The review was conducted on information obtained from various sources as discussed below.

5.1 Aerial Photograph Record

Aerial photographs taken in 1947, 1961, 1970, 1982, 1965, 1991, 2002, 2004, 2005, 2006, 2007 and 2009 were obtained from the NSW Department of Lands Office or Google Earth, copies are provided in Appendix C.

These aerial photos were reviewed to determine, where possible, the past land uses of the Site. Observations made from an examination of the aerial photographs are summarised below. It should be noted that image resolution and scale can obscure features and therefore impact on the detail of information that can be interpreted.

1947 – The Property and surrounding area were largely cleared and grass covered with scattered trees and two large stands of thicker vegetation/ trees within the Property and along Blaxland Creek. A small dam was located in the south east of the Property and minor markings, possibly cattle tracks, were also present in the south east of the Property. A small vehicular track is present along the approximate alignment of Patons Lane. From the 1947 photograph there are no signs of excavation or filling at the Property at that time.

1961 – The Property and surrounding area were largely unchanged from the 1947 photograph. Two small dams had been constructed to the east of the north east and south east corners of the Property. Tree/shrub cover at the Property and surrounding lands had increased since the 1947 photograph.

1970 – The Property has been almost completely cleared with only the occasional tree remaining. Two additional small dams have been constructed, one adjacent to the previously constructed dam in the south east of the Property and one in the central western portion of the Property. Some photo lineaments across the Property may be fence lines dividing the Property into paddocks. There are no signs of excavation or filling at the Property in the photograph. Some rural development had occurred on nearby lands, with lines, possibly fence lines, dividing the adjacent property to the south west into paddocks. Further to the south east a property appears to have been developed with a small race track and many individual areas, possibly animal (dog?) enclosures. Some rural residential buildings, including houses, have been built to the east of the Property.

1982 – Quarrying had commenced in the north western portion of the Property with excavations and spoil stockpiles present in this area. The access road to the quarry area entered the Property from the north. No other significant changes are observable at the Property or on the surrounding lands in the photograph.

1991 – The quarry had expanded by 1991, but was still limited to the north-western portion of the Property. Surface water can be observed in an excavation pit, internal access roads were evident and

some vehicles were present. The remainder of the Property is grassed other than an access road in the centre of the Property which enters from the northern boundary, but did not extend to the southern boundary. Some concentric markings can be observed on the grass, and may relate to lawn mowing or reflect some form of ground disturbance.

2002 (March) – The quarry had expanded, but was still limited to the north western portion of the Property. Some disturbance (possibly clearing/ excavation/ filling) had occurred along the southern portion of the western boundary and the eastern portion of the northern boundary. Two additional dams had been constructed in the south of the Property. Various buildings and a compound or vehicle parking area were located near the central portion of the northern boundary. A recent housing development can be observed approximately 500 m north of the Property (i.e. The Vines).

2002 (July) – The quarry workings had expanded slightly since March 2002 and whilst excavation was still generally limited to the north western portion of the Property, stockpiling areas were present in the central portion of the Property and bundwalls had been constructed along the eastern and western portions of the northern boundary. The northern sections of the eastern and western boundaries (i.e. Bundwalls 2 and 3 and part of Bundwall 4) appear to have been constructed / partially constructed. A bundwall may also have been present in the central portion of the western boundary (i.e. part of Bundwall 1), although this is not clear in the photograph. Additional internal roads had been constructed, including what appears to be a new main access road entering the Property from the south east. No significant changes had occurred on surrounding lands.

2004 – The quarry had expanded over the majority of the Property, although development in the south east appeared to be limited to roads, a large dam, a smaller dam and buildings and a vehicle compound or parking area. A structure had been constructed on the internal road in the south eastern corner, and is considered to be consistent with a weighbridge. No significant changes had occurred on surrounding lands. Bundwall 1 appears to have been constructed and Bundwall 4 has been expanded. The dam/ ponded water previously observed in the north west of the Property had expanded by 2004 and appeared to be a large dam. Two further dams, one in the central portion of the property and one in the north had been constructed. No significant changes had occurred on surrounding lands.

2005 – The Property appears to have the same general layout as in 2004, however some works were being undertaken on the north eastern section of Bundwall 4, which appears to have been benched with a number of small piles of spoil. No significant changes had occurred on surrounding lands.

2006 – The Property and surrounding lands appear to have had generally the same layout as in the 2005 photograph.

2007 – The Property and surrounding lands appear to have had generally the same layout as in the 2006 photograph with the exception of Bundwall 4, which had been extended to the south.

2009 – The Property and surrounding lands appear to have had generally the same layout as in the 2007 photograph, however there are no signs that the Property is operational. Some of the stockpiled soil had been removed and vegetation had grown on Bundwalls 1 and 4.

5.2 Historical Title Deeds Search

A historical title deeds search was undertaken to obtain ownership or occupancy information on the property, including company names and the occupations of individual proprietors. The title information can assist in the identification of previous land uses and can therefore assist in establishing whether there were potentially contaminating activities occurring at the time.

The title deed search results are summarised in Table 2, below, with further results (including copies of selected deeds) provided in Appendix D. In establishing the possible use of the site, information has also been drawn from other sources discussed in this report.

Table 2: Summary of Historical Title Deed Record

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Inferred Possible Land Use(s)
17.05.1912 (1912 to 1912)	Fitzwilliam Wentworth (Gentleman)	grazing/ undeveloped rural
18.06.1912 (1912 to 1920)	William Vanstone (Grazier)	grazing/ undeveloped rural
22.04.1920 (1920 to 1927)	William Davies (Grazier)	grazing/ undeveloped rural
14.12.1927 (1927 to 1945)	Elymra Lillias Newton (Married Woman)	grazing/ undeveloped rural
08.10.1945 (1945 to 1959)	Colin Paterson (Grazier)	grazing/ undeveloped rural
24.10.1959 (1959 to 1963)	John Arthur Atkinson (Dairy Man)	grazing/ undeveloped rural
22.03.1963 (1963 to 1966)	J.A. Atkinson Pty Limited	grazing/ undeveloped rural
26.10.1966 (1966 to 2002)	Vacik Pty Limited	grazing/ undeveloped rural becoming (circa 1982) quarry (clay and shale extraction)
18.01.2002 (2002 to 2008)	Orchard Holdings (NSW) Pty Limited	Erskine Park Quarry (clay and shale extraction)
21.08.2008 (2008 to date)	# Dellara Pty Limited	unoccupied (disused quarry)

# Denotes Current Registered Proprietor

5.3 Regulatory Notices Search

The EPA publishes records of contaminated sites under Section 58 of the *Contaminated Land Management Act 1997* (CLM Act) on a public database accessed on the OEH website. The Notices relate to investigation and/or remediation of contaminated sites considered to be significantly contaminated under the definition in the CLM Act. More specifically, the Notices cover the following:

- actions taken by the EPA under Section 15, 17, 19, 231, 23, 26 or 28 of the CLM Act;

- actions taken by the EPA under Section 35 or 36 of the Environmentally Hazardous Chemicals Act 1985;
- site audit statements provided to the EPA under Section 52 of the CLM Act on sites subject to an in-force declaration or order.

A search of the public database on 17 January 2012 revealed that the Site (or Property) is not listed. In addition no properties in the near vicinity of the Site were listed or had been notified to the EPA under Section 60 of the CLM Act.

The EPA also issues environmental protection licences to the owners or operators of various industrial premises under the *Protection of the Environment Operations* Act 1997 (POEO Act). Licence conditions relate to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice.

The EPA has made available a public register of licences under Section 308 of the POEO Act. The register contains:

- environment protection licences;
- applications for new licences and to transfer or vary existing licences;
- environment protection and noise control notices;
- convictions in prosecutions under the POEO Act;
- the results of civil proceedings;
- licence review information;
- exemptions from the provisions of the POEO Act or Regulations;
- approvals granted under clause 9 of the POEO (Control of Burning) Regulation; and
- approvals granted under clause 7A of the POEO (Clean Air) Regulation.

A search of the public register under the POEO Act on 17 January 2012 located the following listing for the site.

- 123-179 Patons Lane, Orchard Hills, licences held between 2003 and 2011.
  - 18-Sep-2004 to 17-Sep-2005 Annual Return: Erskine Park Quarry (NSW) Pty Ltd, Other Land-Based Extraction (37) > 50000 - 100000 tonnes obtained
  - 06-Oct-2005 Licence Variation: Erskine Park Quarry (NSW) Pty Ltd, including addition of noise limits
  - 14 Dec 2006: licence transfer application received, variation approved
  - 07-Aug-2007 Licence Variation: Orchard Holdings (NSW) Pty Ltd, increase in extraction, up to 130,000 tonnes per annum.
  - 18-Sep-2010 to 17-Sep-2011 Annual Return: Orchard Holdings (NSW) Pty Ltd (C/- Condon Associates - Liquidators) Land-based extractive activity > 100,000.00 - 500,000.00 T extracted, processed or stored

In addition the following site(s) in Orchard Hills and/ or near the Site had listings under the POEO Act:

- Mulgoa Quarries, Lot 1 Bradley Street, Orchard Hills (Other Land-Based Extraction, surrendered 2005).

5.4 WorkCover NSW Dangerous Goods Database

WorkCover NSW was requested to undertake a search of the Stored Chemical Information Database. The search, undertaken by WorkCover on 17 January 2012, did not locate any records pertaining to the Property. A copy of the WorkCover letter is provided in Appendix E.

5.5 Council Section 149 (2&5) Planning Certificates

The Section 149 (2&5) Certificate dated 18/01/2012 was reviewed, with relevant information detailed below. The copy of the Certificate is provided in Appendix F.

The following zones apply to the Property:

- E2 Environmental Conservation (Penrith Local Environmental Plan 2010); and
- RU2 Rural Landscape (Penrith Local Environmental Plan 2010);

The Certificate states that:

- the Property is not recorded as including or comprising critical habitat; a conservation area; or an environmental heritage item.
- "the land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961".
- "The land is not affected by a policy adopted by the Council that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding and the item noted below.)

  Note: Council has adopted by resolution a policy on contaminated land which may restrict the development of land. This Policy, Part 2.1 of Penrith Development Control Plan 2006 and Section 4.4 of Penrith Development Control Plan 2010, is implemented when zoning or land use changes are proposed on lands which have previously been used for certain purposes. Consideration of Council's adopted policy and the application of provisions under relevant State legislation is warranted."

The Certificate does not provide any information on potentially contaminating activities at the site, previous contamination reports for the site or any notices or orders issued under the CLM Act.

5.6 Council Records Search

Penrith City Council records had not been made available for review by Council at the time of reporting.

Some Council records have been provided by the client and are included in Appendix F, with relevant documents discussed below.

- EPA (as part of the DEC) *Notice of Clean-Up Action*, (Notice Number 1067129, dated 17 January 2007)

  The Clean-Up notice was issued to Orchard Holdings (NSW) Pty Ltd following observation by EPA Authorised Officers of waste at the Property and trucks importing waste onto the Property on 3 August 2006 and 9 November 2006. The waste reportedly comprised mixed soil, bricks, broken timber, plastic and broken tiles; building and demolition waste; Virgin Excavated Natural Material (VENM); and topsoil with a small amount of demolition waste.

  The Clean-Up notice required the Property to cease receiving waste and removal of all waste received or transported to the Property by Orchard Holdings (NSW) Pty Ltd.

- Penrith City Council *Order 15 Environmental Planning and Assessment Act, 1979 Section 121(b)* (reference JH, dated 28 April 2008)

  The Notice was issued to Orchard Holdings (NSW) Pty Ltd relating to importing fill in excess of the Development Application (DA) conditions. The DA was for construction of a bundwall to an approximate height of 3 m and width of 12-15 m. At the time of the Notice the bundwall was noted to be 12-15 m high and of 30-40 m width at its base.

  The works required by the Notice included:

  - Cease importing fill material for the construction of the bundwalls on the premises;
  - Submission of survey plans to Council at intervals of 3 months showing site surface levels in accordance with DA condition (noted that none received in the last three months);
  - Waste classification of all fill material existing in the bund walls by an appropriately qualified person and provision of the Classification to Council;
  - Provision to Council information on the dimensions and volume of material in each bundwall prepared by an appropriately qualified person; and
  - Provision to Council of a plan for removal of excess material in the bund walls, including volume to be removed and proposed disposal location.

- NSW Department of Environment and Climate Change (DECC) *Re: Orchard Holdings (NSW) Pty Ltd - Clean-Up Notice No. 1067129 dated 17 January 2007* (dated 5 May 2008)

  The letter confirms that the DECC had evidence that there had been compliance with the requirements of paragraphs 1(a), (b), (c) and (d) of the Clean-Up Notice and that the EPA did not intend to take any further regulatory action in relation to the notice at that stage.

- Penrith City Council *Clay and Shale extraction – Lot 40 DP 738126 – Patons Lane, Orchard Hills BA 116/80* (dated 3 June 2010)

  The letter states that breaches of the previous development consent notice 116/80 dated 23 November 1981 have occurred at the Property, including:

  - Rehabilitation not having been conducted in required timeframes;
  - Survey plans of site levels had not been submitted at three monthly intervals;
  - The bundwalls were observed by Council to be about 10 m high, rather than the proposed 3 m high and 12-15 m width at base; and
  - Excavation outside of the approved area.

- NSW Department of Environment, Climate Change and Water (DECCW) *123-179 Patons Lane Orchard Hills – Proposed Waste Recycling and Management Facility* (reference DOC10/25495, dated 9 June 2010).

  The letter states that DECCW received a complaint on 1 June 2010 of stormwater discharge from the Property and excavation of waste within the Site and inspected the property on the same day.

  The letter states that Dellara informed DECCW that:

  - the discharged water had been tested in accordance with Penrith City Council requirements; and
  - The excavation works comprised investigative test pitting by consultants to assess the nature of waste in the mounds in response to concern from Council about the estimated quantity of asbestos contaminated waste in the mound.

  The letter states that Penrith City Council informed DECCW that they had not approved the works.

  DECCW advised that it was concerned that disturbance of the waste within the bundwalls had the potential to expose waste that may contain asbestos and generate leachate that may not be effectively controlled on the site. DECCW requested no further work be undertaken at the Property until a determination has been made by the Department of Planning in relation to the proposal, unless the works were being undertaken with the approval of an appropriate consent authority. DECCW also requested that any exposed wastes were covered with VENM from the Property.

- Rick Miller *Orchard Hills Recycling and Management Facility Site Inspection 1 June 2010* (dated 10 June 2010)

  This email states that:

  - The discharged water was done with the permission of NSW Water in July last year and that the discharge happened in Aug-Nov 2009 following chemical testing;
  - The excavation works comprised asbestos investigation under the supervision of Douglas Partners and at the request of Graham Liehr a senior environmental officer at Penrith Council.
  - No further work will be undertaken at the Property; and

- Exposed waste at the site will be immediately covered with VENM.

5.7 Previous Reports

The following relevant reports have previously been prepared for the Property:

- DP *Surface Water Sampling And Analysis, Erskine Park Quarry, Orchard Hills* (Project 71005 Rev 1, 2 March 2009) [DP (2009a)];
- DP *Report on Preliminary In Situ Waste Classification Assessment, Erskine Park Quarry Patons Lane Orchard Hills* (Project 71102 Rev 1, 7 August 2009) [DP (2009b)];
- DP *Report on Asbestos Management Plan Orchard Hills Waste And Resource Management Facility, Patons Lane Orchard Hills* (Project 71102.01, 20 May 2010) [DP (2010a)];
- DP *Factual Letter Report Supplementary Asbestos Assessment Waste And Resource Management Facility Orchard Hills* (Project 71102.02, 19 July 2010) [DP (2010b)];
- GSS Environmental & BMT WBM Pty Ltd *Surface Water Assessment Orchard Hills Waste and Resource Management Facility* (Report No. 582/04, February 2010) [GSS&BMT (2010)]; and
- Aquaterra Consulting Pty Ltd *Cell Design and Groundwater Assessment Orchard Hills Waste and Resource Management Facility* (Report No. 582/04, March 2010) [Aquaterra (2010)].

DP (2009a) presented the results of surface water testing undertaken at the Property, including one sample from Blaxland Creek (S3) and four samples from on-site dams/ ponded water (S1, S2, S4 and S5). No water samples were collected from the Site (bundwalls), as there are no surface water bodies on the bundwalls. The sample locations are considered to be receiving bodies for runoff from the Site. There was no visual evidence of petroleum contamination (sheen or odour) detected in the surface water samples collected.

All recorded concentrations in the surface water samples for cadmium, chromium, lead, mercury, benzene, toluene, ethyl benzene, total xylenes (BTEX), polycyclic aromatic hydrocarbon (PAH), total petroleum hydrocarbons (TPH), Volatile Halogenated Compound (VHC), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphate pesticides (OPP), phosphate, total cyanide, nitrite and ammonia were equal to or below the practical quantitation limits (PQL). Low concentrations (below the adopted water investigation levels - WILs[2]) of arsenic, copper, nickel, zinc, phenols, nitrate, fluoride, total kjeldahl nitrogen (TKN) and sulphate were detected in all samples, with the exception of the nitrate concentration detected in S3 (1 mg/L) and the sulphate concentration in S5 (130 mg/L), marginally exceeding the nitrate WIL of 0.7 mg/L and the sulphate WIL of 100 mg/L. Elevated concentrations of calcium, potassium, sodium, magnesium and chloride were detected in all samples analysed. However, it was considered that the elevated concentrations do not represent significant contamination risk and moreover are likely to be representative of the background concentrations of the area and typical of waters flowing over land through the local shale rocks. The pH results indicate that the surface water analysed is alkaline, which is consistent with the high total

[2] Derived from the The Australian and New Zealand Environment Conservation Council (ANZECC), 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* [ANZECC (2000)] Section 3.4.2, Table 3.4.1 trigger values at alternate levels of protection, Trigger values for freshwater 95% Level of protection (% species) where available, or other published national or international thresholds where none published in ANZECC (2000)

alkalinity values detected. The high concentrations of total dissolved solids (TDS) correspond to the elevated chemical oxygen demand (COD) values detected. The total suspended solids (TSS) results for samples S2 and S3 collected from the existing quarry void and Blaxland Creek, respectively, were below the PQL of 5 mg/L.

DP (2009b) comprised a preliminary waste classification of materials in bundwalls. Information provided by R.W.Corkery & Co Pty Limited during the assessment indicated that the northern section of Bundwall 4 comprised "backfill likely containing C&D waste" whilst the remaining bundwalls were described as "clean backfill with brick 'capping' ". The classification assessment involved sampling from twenty (20 no.) borehole locations (Bores 1 to 20) drilled to depths of between 2.3 and 15 m below the bundwall surface. A drawing showing the sample locations and borehole logs are provided in Appendix G.

A review of the field methods and records, sample collection and handling, analytical laboratory used and QA/QC assessment for the DP (2009b) report was undertaken. Based on this review it is considered that there are appropriate records of sample locations, field observations, sampled materials and chain of custody documentation. The analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory with internal QA/QC assessment. DP undertook a QA/QC assessment including analysis of 10% replicate samples. Whilst trip blanks and spikes were not assessed, this is not considered to be of concern due to volatiles not being a prime contaminant of concern. On this basis it is considered that the data collected in DP (2009b) is reliable and appropriate for use in characterising the bundwall materials assessed.

Fourteen (14 no.) of the bores encountered natural *in situ* materials, five encountered refusal in the filling, and one bore was discontinued at 15 m in clay filling. C&D waste was observed in all bores in Bundwalls 1 and 4. No C&D waste was observed in the bores in Bundwalls 2 or 3. Asbestos cement material (fibro) was not visually identified in any of the bores during fieldwork. Hydrocarbon/organic odour was detected in Bundwall 4 (Bore 7 at 0.8 m, Bore 9 at 8.5 m, Bore 12 at 9.5 m and Bore 13 at 7.7 m).

Sixty (60 no.) primary soil samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAH, TRH, BTEX, and asbestos and twenty (20 no.) primary samples were analysed for PCB, OCP and phenols. In addition six QA/QC samples were analysed.

All results for chemical contaminants were within the HILs with the exception of minor exceedances in two samples, namely:

- Sample 8/4.7-5 recorded 102.3 mg/kg of PAH (relative to the SAC of 100 mg/kg) and 1,440 mg/kg of TRH C_{10}-C_{36} (compared to the corresponding TPH C_{10}-C_{36} SAC of 1,000 mg/kg)
- Sample 11/6.8-7 recorded 5.6 mg/kg of benzo(a)pyrene (relative to the SAC of 5 mg/kg) and 1,030 mg/kg of TRH C_{10}-C_{36}.

Statistical analysis of the dataset in accordance with EPA endorsed guidelines indicated that these minor exceedances were not significant, and therefore do not impact the suitability of the site for the proposed commercial/industrial landuse. As such all chemical contaminant results recorded for the Site are considered to be within the SAC.

Chrysotile asbestos was recorded in plaster fragments in Sample 12/0-0.3, however no respirable fibres were recorded in this sample. Asbestos was detected below the detection limit of 0.1 g asbestos/kg soil in Bores 6, 7, 8, 9, 17 and 18.

DP (2009b) indicated that based on the results obtained filling from the bundwalls was classifiable as either General Waste (non-putrescible) or Special Waste (asbestos).

DP (2010a) comprises an Asbestos Management Plan (AMP) prepared specifically to address asbestos containing materials at the Site. DP (2010a) is based on the, then preferred, bundwall management strategy for the identified asbestos contaminated materials and comprised capping on-site in a purpose built containment cell located at the toe of the active cell's batter.

DP (2010a) included details of the proposed works, contingency measures, occupational health and safety requirements and validation and record keeping requirements. DP (2010a) was prepared for the previously proposed development, which has been modified as discussed in Section 4.1. As the FMPPR involves removal of significantly larger volumes of spoil from the bunds it is considered that DP (2010a) is no longer applicable to the currently proposed development.

DP (2010b) comprises a factual letter report on eight "step out" test pits excavated around the area of Bore 12 (where asbestos was detected). The test pits (Pits 1 to 8) were excavated to a depth of 1.5 m and all pits encountered C&D waste mixed with naturally derived clay and shale. Fibre cement fragments (possibly containing asbestos) were observed in Pits 2 to 8. One of the fibre cement fragments was analysed and was found to contain chrysotile asbestos. In addition fourteen soil samples (one or two per pit) and one ceramic tile sample were analysed; asbestos was detected in five of the soil samples. Three of these five samples had detectable asbestos fibres. It was therefore concluded that filling in Pits 2 to 8 contained asbestos. No asbestos containing materials were observed or detected in Pit 1.

The findings of GSS&BMT (2010) are discussed in the climate and surface water sections of this report.

The findings of Aquaterra (2010) are discussed in the geology and hydrogeology sections of this report.

6. Site Condition and Surrounding Environment

6.1 Topography

The Site is located on, and near the bottom of, a south west to north east running ridge between two creeks, with the northern creek (Blaxland Creek) crossing the property boundary in the north western corner. The two creeks, which flow north east, are tributaries of South Creek, which they join to the north east of the Site. The natural topography in the area of the Site is generally downwards towards the junction of the Creeks in the north east, with slopes downwards towards both Creeks (i.e. to the north and north west towards Blaxland Creek and to the east and south east towards the unnamed creek).

The Site itself has been formed from placement of soil, and comprises four bundwalls with steep sides (in the order of 75% in some areas) and flat to gently sloping tops (in the order of 6% in some areas).

6.2 Site Condition

Photographs of the Site are provided in Appendix H.

The Property is occupied by the infrastructure remaining from the former Erskine Park Quarry. A range of demountable office buildings and equipment facilities are situated at the south-eastern and north-western sections of the Property respectively. No signs of chemical storage such as drums or staining were observed.

The Site comprises bundwalls with approximate total length of 1,800 m and approximate heights of 9 to 19 m which are located around the perimeter of the Property. The bundwalls appeared to be manmade structures. Vegetation at the Site appeared to be healthy with no signs of stress potentially caused by contamination. No chemical odours were noted at the Site during inspection.

6.3 Surrounding Landuse

The Site is located within a rural area surrounded by grazing land, pockets of established tree canopy and low density housing. To the west of the Site is land owned by the Commonwealth which is used by the Australian Defence Force. To the north and east of the Site is open grazing land and rural housing. Blaxland Creek passes through the north-west boundary of the Site. The land south-west of the Site is occupied by facilities associated with an existing horse stud.

The Vines residential area is located approximately 500 m to the north of the Site.

7. Geology and Hydrogeology

7.1 Geology

Reference to the Penrith 1:100,000 Geology Sheet indicates that the Site is underlain by Bringelly Shale of the Wianamatta Group, dated to the Middle Triassic. Bringelly Shale comprises shale, carbonaceous claystone, claystone, laminite, fine to medium-grained lithic sandstone, rare coal and tuff.

Quaternary fluvial sediments are mapped in river beds to the north, east and south of the Site, comprising fine-grained sand, silt and clay.

Aquaterra (2010)[3] states that intrusive investigations at the Property have identified the geology to generally comprise up to 89 m of Bringelly Shale overlying Hawkesbury Sandstone with occasional and thin carbonaceous lenses of limited extent and connectivity existing in horizontal planes.

7.2 Soils

The Penrith 1:100,000 Soils Landscape Sheet maps the Site as being part of the Blacktown soil landscape. This is a residual soil landscape with gently undulating rises and local relief to 30 m with slopes usually <5%. Soils are generally shallow to moderately deep red and brown podzolic soil on crests, upper slopes and in well drained areas with deep yellow podzolic soils on lower slopes and in poorly drained areas. Limitations comprise moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.

Review of the map *Salinity Potential in Western Sydney*, 2002, NSW Department of Infrastructure, Planning and Natural Resources (DIPNR) (now administered by the OEH) indicated that the majority of the Site is mapped as having a "Moderate Salinity Potential". Soils along the nearby creeks are mapped as having a "High Salinity Potential" with a minor area of "Known Salinity" occurring along the unnamed creek east of the Site.

Review of the *Soil and Land Resources of the Hawkesbury-Nepean Catchment digital data set* DECC (now administered by the OEH) 2008 indicates that steep slopes, mass movement hazards, permanent waterlogging and flood hazards were not observed in the soil landscape away from creeks. Some localised seasonal waterlogging, foundation hazards, salinity hazards and low fertility were observed. Along the creeks steep slopes and mass movement hazards were not observed in the soil landscape. Some localised permanent waterlogging and flood hazards and widespread seasonal waterlogging, foundation hazards, salinity hazards and low fertility were observed in the soil landscape near creeks.

Digital data supplied by DECC (now administered by the OEH) in 2008 based on published 1:25,000 Acid Sulfate Soils Risk Mapping, 1994-1998 was reviewed and the Site is not in an area mapped to have a risk of Acid Sulphate Soils.

7.3 Surface Water and Hydrogeology

7.3.1 Surface Water

The Property is located between two north east flowing Creeks, both tributaries of South Creek. An approximately 100 m length section of Blaxland Creek crosses the Property boundary in the north western corner. The second stream, a small unnamed tributary of South Creek, is located to the south and east of the Property.

[3] Aquaterra Consulting Pty Ltd *Cell Design and Groundwater Assessment Orchard Hills Waste and Resource Management Facility* (Report No. 582/04, March 2010)

Various dams and ponded surface water (in the former quarry void) are present at the Property, although none of these are located at the Site. Surface water runoff from the Property generally flows in a north easterly direction towards Blaxland Creek, although one sub-area drains to the south eastern stream [GSS&BMT (2010)[4]].

The South Creek catchment covers approximately 30% of the Sydney region (620 square kilometres)[5] mainly in the Cumberland Plain and is part of the larger Hawkesbury Nepean catchment. The majority of the streams in the catchment have "meandering vertical" river channels[6]. South Creek catchment is degraded with hydrological and sediment regimes which have been dramatically altered by land clearing and urbanisation[6]. South Creek water quality is poor with discharges into the system from major Sewerage Treatment Plants and stormwater runoff[6].

7.3.2 Groundwater Bore Search

A groundwater bore search of the NSW Office of Water website database (previously held by the Department of Natural Resources) was conducted on 17 January 2012. Five bores were located within an approximate 2 kilometre radius of the Site, which includes three bores located within the Property boundaries.

Figure 1, below, shows the locations of the Registered Bores, and Work Summary sheets for each are provided in Appendix I.

The three bores within the Property include two monitoring bores and one industrial bore, all drilled by Intertech Drilling. The monitoring bores were drilled to depths of 30.3 and 44.4 m below ground level (bgl), and encountered clay to a depth of 4 – 5 m bgl underlain by shale with water bearing zones at depths of between 11.5 and 22 m bgl. One of the bores recorded groundwater data, including a standing water level of 6.3 m bgl; salinity of 10,000 mg/L; and a yield of 1.4 L/s. The industrial bore was drilled to a depth of 210 m bgl and encountered clay to a depth of 3 m underlain by shale to a depth of 119 m underlain by sandstone, with one thin shale horizon. This industrial well had a recorded standing water level of 46 m bgl; salinity of 3,050 mg/L; and yield of 0.5 L/s.

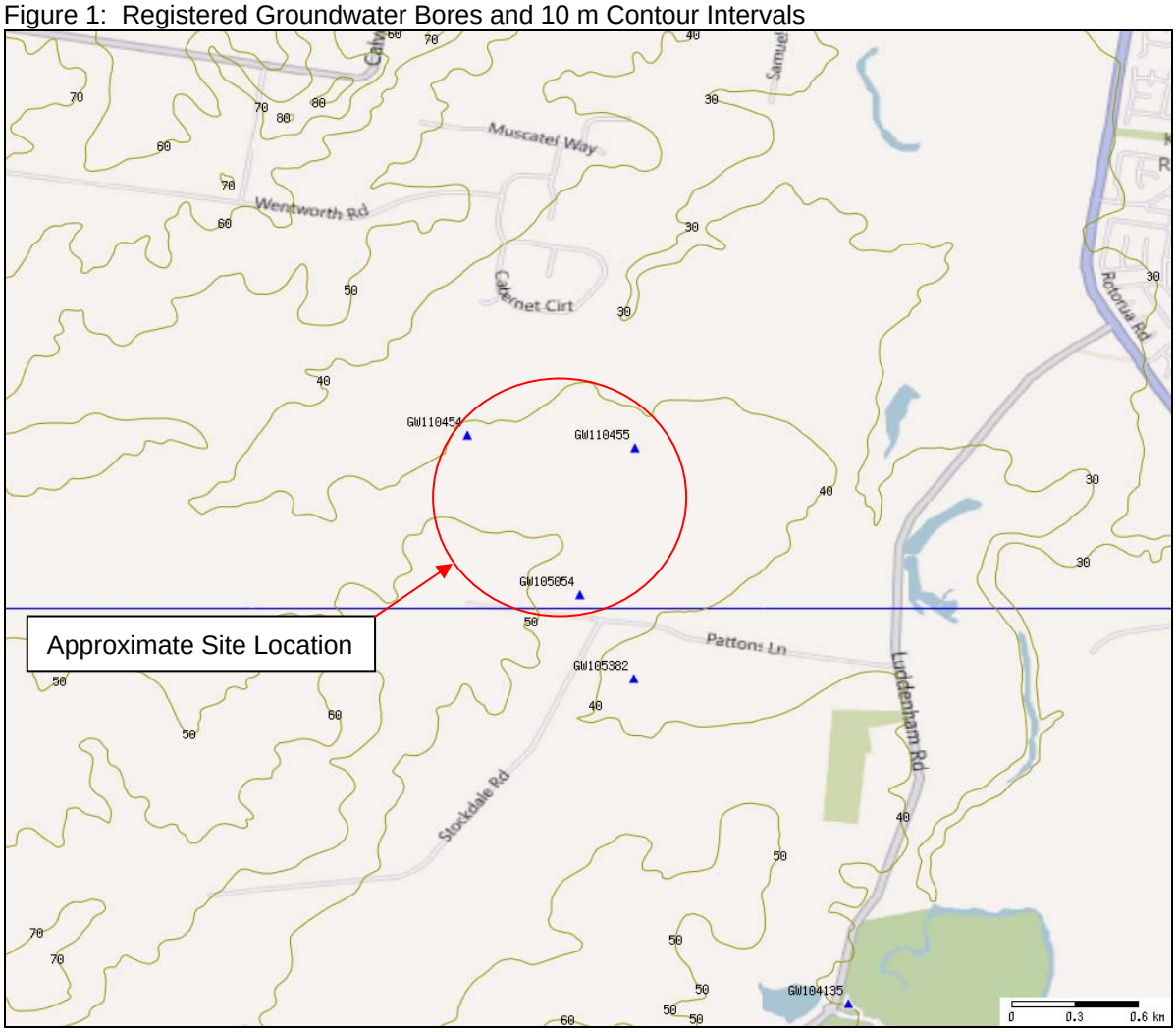
The remaining two bores both located to the south east of the Property comprised one bore registered for industrial purposes (approximately 500 m from the Property) and one bore registered as a test bore (approximately 2 km from the Property). The industrial bore was drilled to 252 m through clay, shale and sandstone and had a recorded standing water level of 24 m, salinity of 2,500 mg/L; and a yield of 1.1 L/s. The test bore was drilled to a depth of 366 m through clay, shale and sandstone standing water level of 12 m recorded, with water bearing zones recorded between 231 and 317 m.

[4] GSS Environmental & BMT WBM Pty Ltd *Surface Water Assessment Orchard Hills Waste and Resource Management Facility* (Report No. 582/04, February 2010)

[5] http://www.environment.nsw.gov.au/stormwater/casestudies/keepsoil.htm

[6] Hawkesbury Nepean Catchment Management Authority Hawkesbury, *Nepean River Health Strategy* available from http://www.hn.cma.nsw.gov.au/multiversions/3384/FileName/Vol2_South%20Creek%2069-72.pdf

Figure 1: Registered Groundwater Bores and 10 m Contour Intervals



7.3.3 Groundwater Hydrogeology

McNally (2005)[7] describes some general features of the hydrogeology of Western Sydney which are relevant to the Site. The shale terrain of much of Western Sydney is known for saline groundwater, resulting either from the release of connate salt in shales of marine origin or from the accumulation of windblown sea salt. Seasonal groundwater level changes of 1 – 2 m can occur in a shallow regolith aquifer or a deeper shale aquifer due to natural influences.

Groundwater investigations undertaken by DP in the Western Sydney area and previous studies of areas underlain by the Wianamatta Group indicate that:

- the shales have a very low intrinsic permeability, hence groundwater flow is likely to be dominated by fracture flow with resultant low yields (typically < 1 L/s) in bores;

[7] McNally, G. 2005. *Investigation of urban salinity – case studies from western Sydney*. UrbanSalt 2005 Conference Paper, Parramatta.

- the groundwater in the Wianamatta Group is typically brackish to saline with total dissolved solids (TDS) in the range 4,000 – 5,000 mg/L (but with cases of TDS up to 31,750 mg/L being reported). The dominant ions are typically sodium and chloride and the water being generally unsuitable for livestock or irrigation.

Review of the NSW Natural Resource Atlas website[8] indicated that groundwater in the area of the Site is saline and that the groundwater resource is considered to be of low to moderately vulnerability, with some moderately high vulnerability areas along South Creek.

Aquaterra (2010) measured groundwater in the shale at depth of approximately 4 – 5 m below the undisturbed ground surface, with groundwater levels in the underlying Hawkesbury Sandstone being at least 12 – 13 m lower than in the shale. Aquaterra (2010) expected that groundwater within the Bringelly Shale would follow the form of the topography and flow in a north westerly direction.

Aquaterra (2010) did not consider the shale horizon to be an aquifer due to its high salinity and insufficient quantities for beneficial extraction. The shale is considered to be an aquitard with very low hydraulic conductivity (permeability) restricting the recharge of the underlying Hawkesbury Sandstone aquifer. Aquaterra (2010) interpreted site data to indicate that there was negligible recharge of the Hawkesbury Sandstone from the shale.

Aquaterra (2010) did not identify an hydraulic connection between Blaxland Creek and groundwater in the adjacent north west piezometer. The measured horizontal permeability of the shale was very low, with discontinuous zones of higher permeability. Aquaterra (2010) stated that vertical permeability is typically many times lower than horizontal permeability within laminar shale deposits such as those that occur on the Site.

Testing by Aquaterra (2010) did not record OCP or PAH in water at the Property. Low levels of TPH detected in one well (mainly toluene and xylenes) were considered likely to be sourced from the drilling equipment. The concentrations of aluminium, zinc, copper, cadmium and ammonia whilst present above the ANZECC (2000) thresholds for Freshwater Ecosystem Protection, were considered to be within background concentrations for Bringelly Shale.

7.4 Climate

The OEH website was reviewed with respect to the climate of Sydney. The Sydney Basin has a temperate climate characterised by warm summers with no dry season. Rainfall can occur throughout the year, but varies across the region in relation to altitude and distance from the coast, with wetter areas being closer to the coast or in higher altitudes. Temperature varies across the region, with areas of higher temperature occurring along the coast. Mean annual temperatures across the region generally range from 10 to 17°C, with average minimum and maximum temperatures ranging between -1.4 and 31.9°C. Mean annual rainfall ranges between 522 and 2,395 mm, with minimum and maximum average monthly rainfalls ranging between 26 and 245 mm across the region.[9]

[8] http://www.nratlas.nsw.gov.au
[9] http://www.environment.nsw.gov.au/bioregions/SydneyBasin-Climate.htm

GSS&BMT (2010)[10] found the climate in the area of the Property to be characterised by warm to hot days during summer and cool to cold mornings followed by cool sunny days in winter. GSS&BMT (2010) found that rainfall tends to peak during the summer months, with thunderstorms common in the region.

GSS&BMT (2010) reviewed data from the closest long term rainfall data station (Bureau of Meteorology Station 067084 at Orchard Hills Treatment Works located approximately 3km to the west of the Property). They found a mean annual rainfall of 802 mm (1970 to 2009) with rainfall generally being highest during late Spring and early Autumn period.

8. Results and Site Characterisation

The available site history information indicates that the Site was likely to have been used for grazing from the time of European settlement until development of the Property as a quarry for extraction of clay and shale circa 1982. Since quarrying operations ceased circa 2008 the site has been unoccupied (disused quarry).

The historic information indicates that the bundwalls which form the Site were constructed between approximately 2002 and 2008. In 2007 and 2008 the then Property owner received notices regarding importing of materials in breach of Licence and DA conditions from the EPA (or its forerunners) and Penrith City Council. It would appear that at least some of the filling materials on the Site were imported illegally. EPA officers observed imported filling comprising VENM, soil and C&D wastes. Information obtained by R.W.Corkery & Co Pty Limited during a previous waste classification by DP at the Site indicated that backfill with C&D wastes was likely to be limited to the northern and north eastern section of Bundwall 4.

Investigation of the bundwalls in 2009 and 2010 by DP has identified the presence of C&D wastes at the Site in Bundwalls 1 and 4. Asbestos has been identified in the central portion of Bundwall 4 (in Bore 12 and targeted “step out” test pits 2 to 8), and traces of asbestos have also been identified in sample locations from Bundwalls 1 and 4 (Bores 6, 7, 8, 9, 17 and 18). Asbestos has only been detected in locations where C&D wastes are also present. No asbestos or C&D waste was recorded in Bundwalls 2 and 3. Asbestos has been detected at the Site in the form of fibre cement fragments and fibres in soil. Whilst fibre cement is more readily identifiable in the field, fibre cement fragments which are well bonded generally present a lower risk to human health than unbonded asbestos fibres, which are more difficult to identify in the field.

All chemical contaminants were found to be within the SAC taking into account statistical assessment of the results.

Surface water sampling from the Property did not find any indication of contamination, indicating that the Site is not impacting surface water at the Property, including in Blaxland Creek.

It is considered that the site history data obtained provides suitable coverage of the previous land use and development of the Site, with no significant data gaps in landuse since settlement of the area. A

[10] GSS Environmental & BMT WBM Pty Ltd *Surface Water Assessment Orchard Hills Waste and Resource Management Facility* (Report No. 582/04, February 2010)

complete record of the origin and nature of materials in the bundwalls is not available, and is unlikely to exist and accordingly a preliminary assessment of the material has be conducted to provide the required characterisation of the material. The site history information and subsequent reporting of preliminary investigation results are considered to be in accordance with OEH (now EPA) *Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites* (reprinted 2011) and with State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) and the Department of Urban Affairs and Planning / Environment Protection Authority *Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land* (1998).

Based on the information reviewed herein the Site is not considered to pose a potentially significant threat to human health or the environment.

9. Further Assessment and Management Works

A Bundwall Deconstruction Management Plan (BDMP) will be prepared detailing the works to be undertaken in assessing and managing the materials in the bundwalls. This plan will incorporate and update the provisions of the Asbestos Management Plan (DP2010b) and it is envisaged that the plan will include provisions for further assessment and classification of materials during bundwall deconstruction and will include *inter alia*:

- Full time supervision of deconstruction works by a suitably qualified environmental consultant;
- Progressive deconstruction of the bundwalls in sections or “panels” to minimise generation of dust and allow management of materials awaiting assessment/ classification results;
- Sorting of materials based on visual observations (e.g. presence/ absence of C&D wastes, any signs of contamination concern);
- Stockpiling of sorted materials for testing and awaiting laboratory assessment results;
- *Ex situ* testing of the sorted stockpiled materials at a suitable sampling frequency;
- Assessment of the waste classification and landuse suitability of the sorted stockpiled materials;

The BDMP will also provide:

- Management requirements for materials based on the assessment results;
- Final capping requirements for any wastes remaining in the bundwalls following deconstruction to design levels;
- Occupational health and safety requirements to be implemented during all works disturbing the bunds; and
- Requirements to manage potential impacts on site users, neighbours and the environment.

Further details will be provided in the BDMP which should be read in conjunction with this report.

10. Conclusions and Recommendations

Based on the site history information and sampling data discussed herein it is considered that the primary issue of contamination concern for the Site is imported filling materials of unknown origin used to form some of the bund walls. It is noted that much of material in the bundwalls is understood to be sourced from natural materials excavated from the Property. No other contamination sources were identified at the Site, or on adjacent lands with the potential to impact the Site. The filling in Bundwalls 1 and 4 is noted to contain C&D waste in some areas and to be contaminated by asbestos containing materials in some locations. No C&D wastes or asbestos have been identified in Bundwalls 2 or 3.

It is further noted that the proposed development (quarrying, recycling and landfilling) is not sensitive in nature, and does not comprise a more sensitive landuse that the previous landuse (quarrying).

During the early stages of redevelopment of the Property and as part of the bundwall deconstruction programme, careful management of all imported filling of unknown origin will be required, including management of the identified asbestos contaminated materials. It is considered that the identified contaminants do not preclude the proposed development, and moreover that the contaminants identified can be managed during re-development works to mitigate any potential risks to site users, neighbours and the environment. It is further noted that whilst the volumes of different waste types [particularly Special Waste (asbestos)] have not been confirmed, it is considered that the wastes can be managed by on-site containment [include Special Waste (asbestos)] or, where required, off-site disposal to a suitably licenced waste facility. As such it is not considered that the lack of certainty regarding the estimated waste volumes will render the Site unsuitable for the proposed re-development.

Based on the findings of the Stage 1 - Investigation and Contamination Assessment the following works are recommended:

- Capping of any exposed C&D waste impacted filling with clean soil pending further testing/ management to minimise the risk of asbestos being exposed at the surface.
- Preparation of a bundwall deconstruction management plan for the proposed deconstruction process, including a detailed assessment programme to further characterise the materials (waste classification). The assessment is required to confirm that the bundwall materials are suitable to be retained on-site or, if not, to determine suitable management and waste disposal strategy for the filling identified to contain contaminated materials and which are unsuitable to remain within the proposed landfill (redevelopment). In this regard DP considers that it is not practically feasible to undertake detailed testing of the filling *in situ* due to the depth of the waste, the large volume of material in the bundwalls, and the expected heterogeneity and sporadic nature of contamination by the main contaminant of concern (i.e. asbestos)[11]. Accordingly the detailed assessment of the filling will be required to be undertaken during deconstruction of the bundwalls and will include visual inspection, sorting and laboratory testing, and this is not feasible for filling materials located at depth within the Site without large scale disturbance (deconstruction) of the bundwalls. It is envisaged that the bundwalls will be removed in small panels such that testing, classification, removal and redirection of the excavated materials can be undertaken in a progressive and sequential manner in order to minimise any potential impacts. Accordingly the plan should also describe the requirements to manage any potential impacts to site users, neighbours and the environment.

[11] DP note that EPA are of a similar view (as indicated in EPA's letter dated 16 November 2011)

- Implementation of the (proposed) bundwall deconstruction management plan during bund deconstruction.
- Management of identified contaminated filling, comprising either on-site (landfill) containment, or off-site disposal to a suitably licenced waste facility.
- Preparation of a report by an appropriately qualified professional recording the bundwall deconstruction management works undertaken, waste classification and validation assessment results and the placement/ disposal locations of all filling removed from the bundwalls.

It is considered that implementation of the above recommendations will appropriately manage contamination issues during the re-development works and ongoing operations as set out in the FMPPR.

11. Limitations

Douglas Partners (DP) has prepared this report for the Site, being the Bundwalls at Lot 40, in Deposited Plan 738126, the Orchard Hills Waste and Resource Management Facility, Patons Lane, Orchard Hills, NSW in accordance with DP's proposal SYD120019 dated 11 January 2012 and acceptance received from Mr Rick Miller of Dellara Pty Ltd on 13 January 2012. The report is provided for the exclusive use of Dellara Pty Ltd for the site only and for the purpose(s) described in the report. It should not be relied on by other projects or by a third party without the prior approval of DP. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

DPs assessment is based upon the result of a historical review, review of available information and inspection which was set out in the proposal. DP cannot provide unqualified warranties in regards to contamination nor does DP assume any liability for conditions not observed or accessible during the time of the investigation.

Despite all reasonable care and diligence site characteristics may change over time due to activities, such as spillages of contaminating substances. These changes may occur subsequent to DP's investigations and assessment.

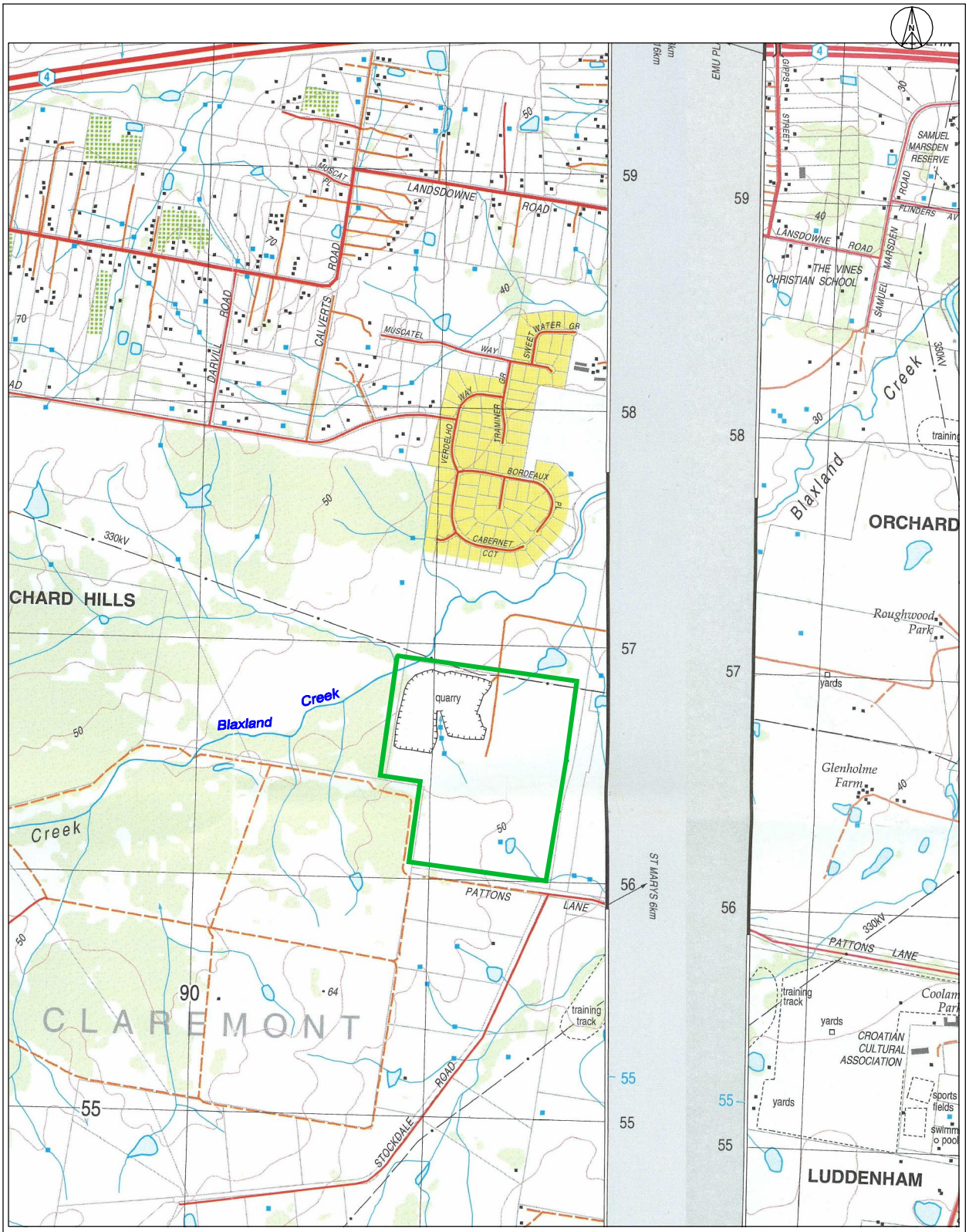
This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion given in this report.

Douglas Partners Pty Ltd

Appendix A

Drawings

Notes About this Report



0 600 800 1000 1500m

1:25000 @ A4

LEGEND

Property Boundary

Douglas Partners

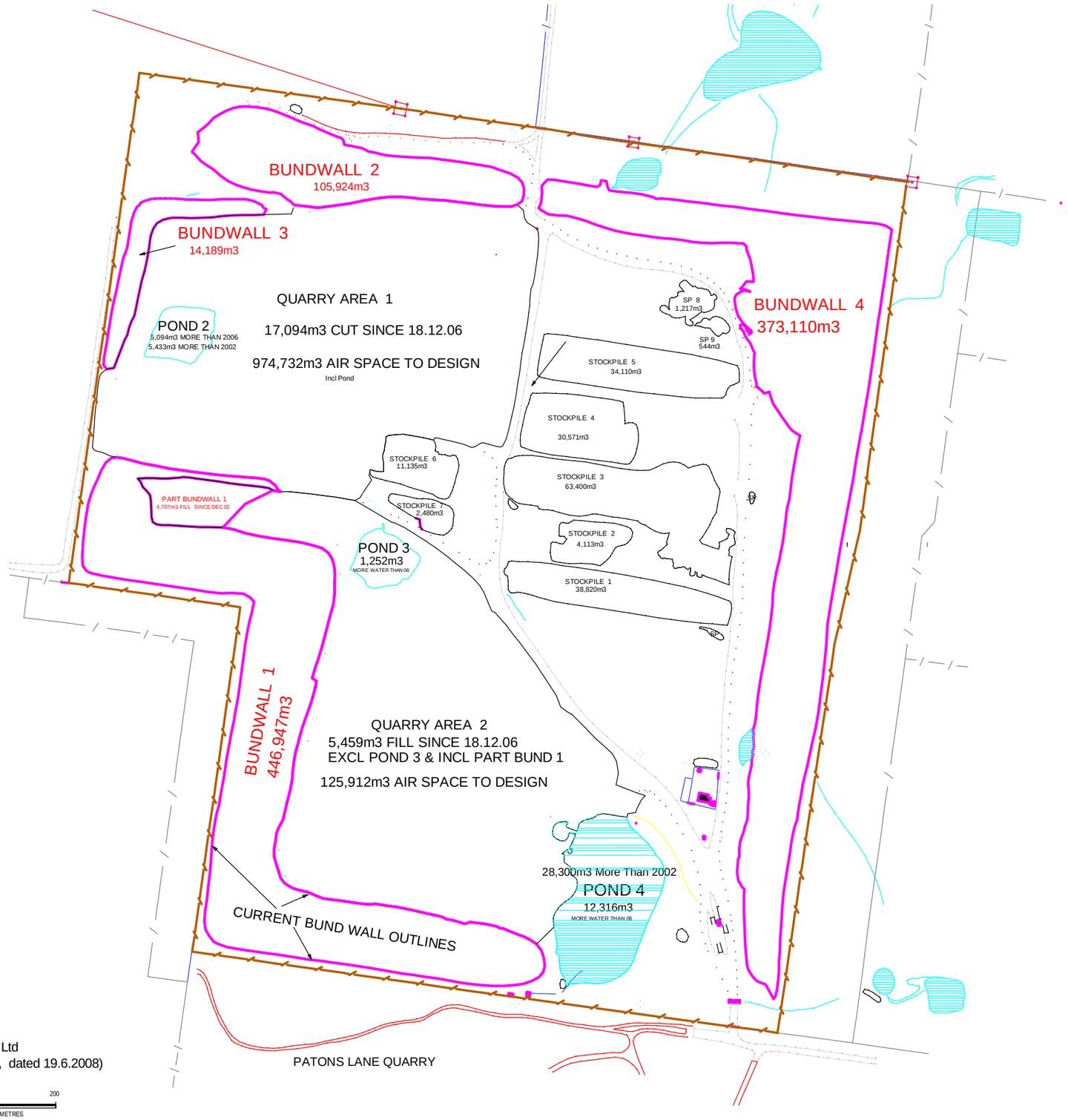
Geotechnics, Environment, Groundwater

Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Canberra

Campbelltown, Townsville, Wollongong, Darwin, Cairns Gold Coast, Sunshine Coast

TITLE: **Locality Plan. Phase 1 Contamination Assessment**
Lot 40, Deposited Plan 738126, Patons Lane, ORCHARD HILLS

CLIENT: Dellara Pty Ltd			OFFICE: SYDNEY
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 71102.05-1	DRAWING No: 1
APPROVED BY:		DATE: 19.1.2012	



NOTE:
Base drawing from Matthew Freeburn Pty Ltd
(Ref: 27750-TOP-DWG-TOP SURFACE, dated 19.6.2008)

CONTOUR INTERVAL 1 METRE
SCALE 1:2,000
100 0 100 200
METRES
AERIAL PHOTOGRAPHY FLOWN
BY GEO-SPECTRUM (AUSTRALIA) PTY. LIMITED

LEGEND

- Property Boundaries
- Site Boundaries

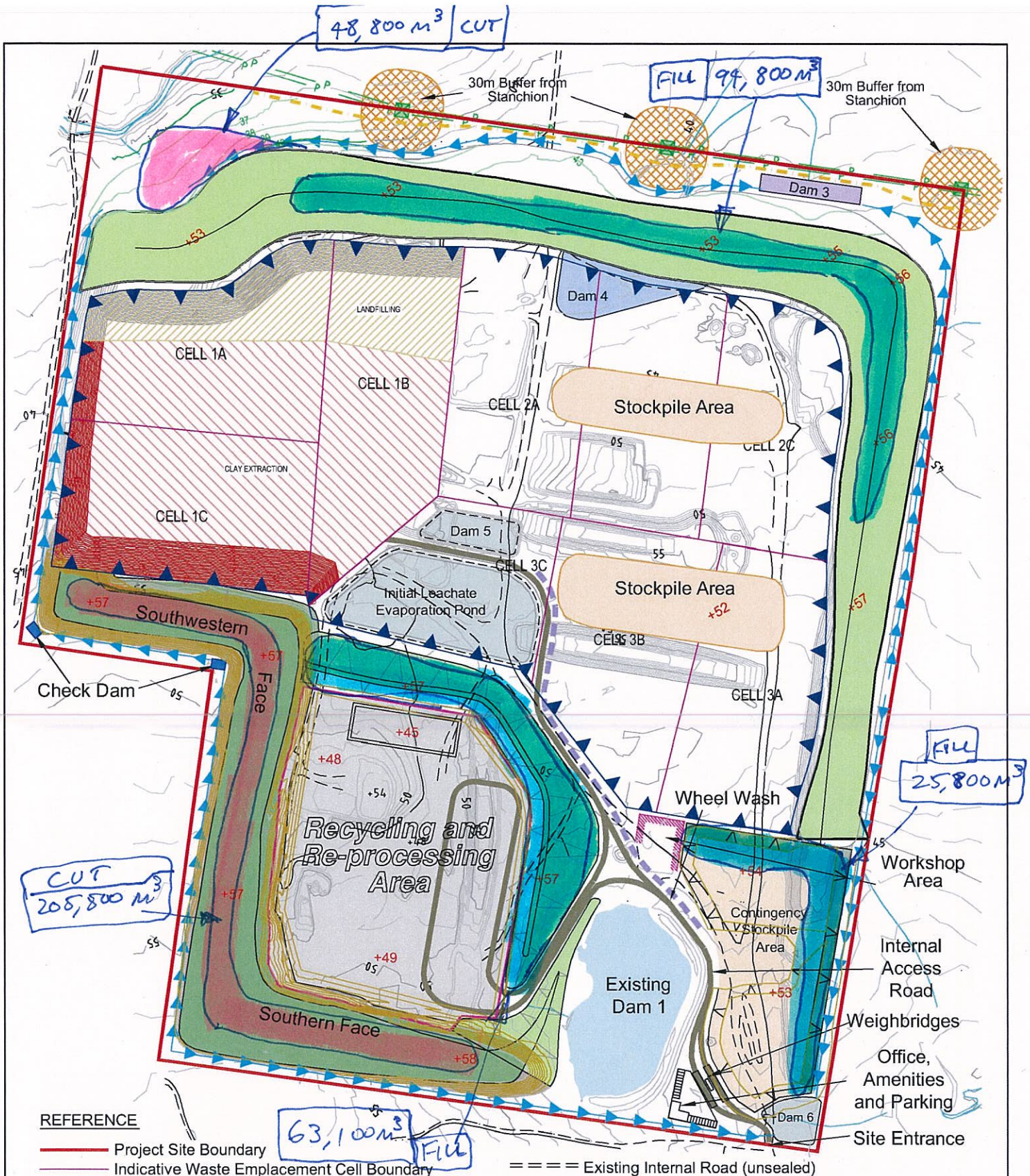
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Dellara Pty Ltd		TITLE: **Site Location & Boundaries**
OFFICE: Sydney	DRAWN BY: PSCH	**Phase 1 Contamination Assessment**
SCALE: As shown	DATE: 19.1.2012	**Lot 40 Deposited Plan 738126, Pattons Lane, ORCHARD HILLS**

N

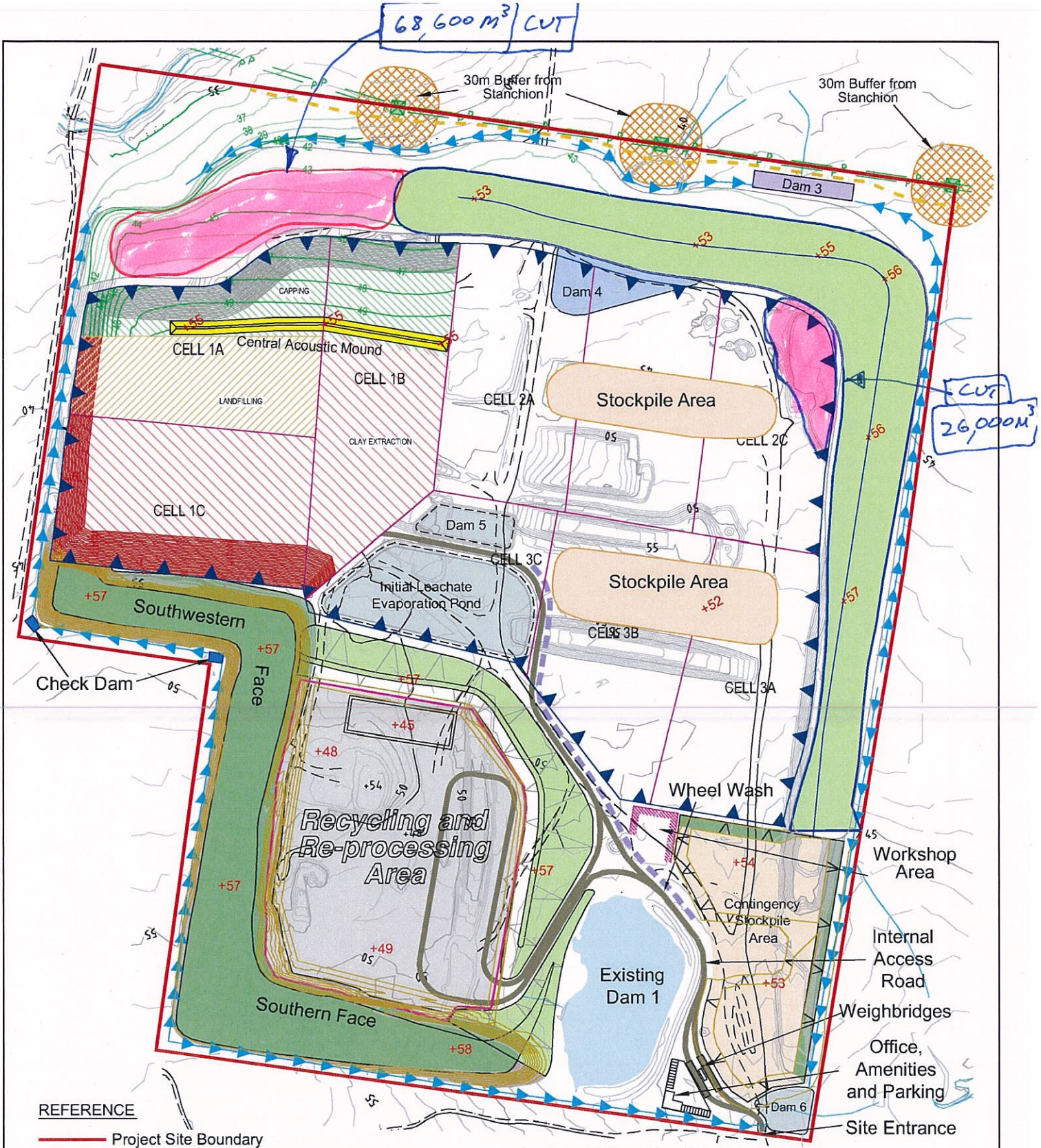
PROJECT No:	71102.05-1
DRAWING No:	2
REVISION:	-

P:\71102.05 ORCHARD HILLS, Phase 1 Contamination_Proposed Waste and Recycling Facility JMN\Drawings\71102.05-2.dwg



Note: The base contours used for this figure reflect existing topography

Figure 2.10a
STAGE 0 OPERATIONS (AMENDED)



REFERENCE

- Project Site Boundary
- Indicative Waste Emplacement Cell Boundary
- Proposed Limit of Extraction (Clay/Shale)
- Proposed Limit of Recycling and Re-processing Area
- 55 Existing Contour (m AHD)(Interval = 1m)
- 55 Proposed Contour (m AHD)(Interval = 1m)
- +57 Existing Elevation Spot Height (m AHD)
- +57 Proposed Elevation Spot Height (m AHD)
- Dam 1 Existing Dam (N°)
- Proposed / Enlarged Dam
- Cutting / Acoustic Mound 3m Effective Height
- Proposed Clay Extraction
- Proposed Filling
- Proposed Cap
- Existing Internal Road (unsealed)
- Proposed Internal Road (sealed)
- Proposed Internal Road (unsealed)
- Proposed Face Treatment
- Proposed Acoustic Earth Mound
- Contingency Stockpile Area
- B Leachate Riser (and Reference) (approximate only)
- Boundary of Workshop Area
- 330kV Power Line (and Staunchion)
- Drain / Check Dam
- Track for Transgrid Access
- Temporary Acoustic Mounds

0 30 60 90m

SCALE 1:1500 AT ORIGINAL SIZE (A1)

GHD DRG No. 21-20649-Y002
STAGE 2

Note: The base contours used for this figure reflect existing topography

Figure 2.10b
STAGE 2 OPERATIONS (AMENDED)

REFERENCE

- Project Site Boundary
- Indicative Waste Emplacement Cell Boundary
- Proposed Limit of Extraction (Clay/Shale)
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- 55 Existing Contour (m AHD)(Interval = 1m)
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- Drain / Check Dam
- Track for Transgrid Access
- Temporary Acoustic Mounds

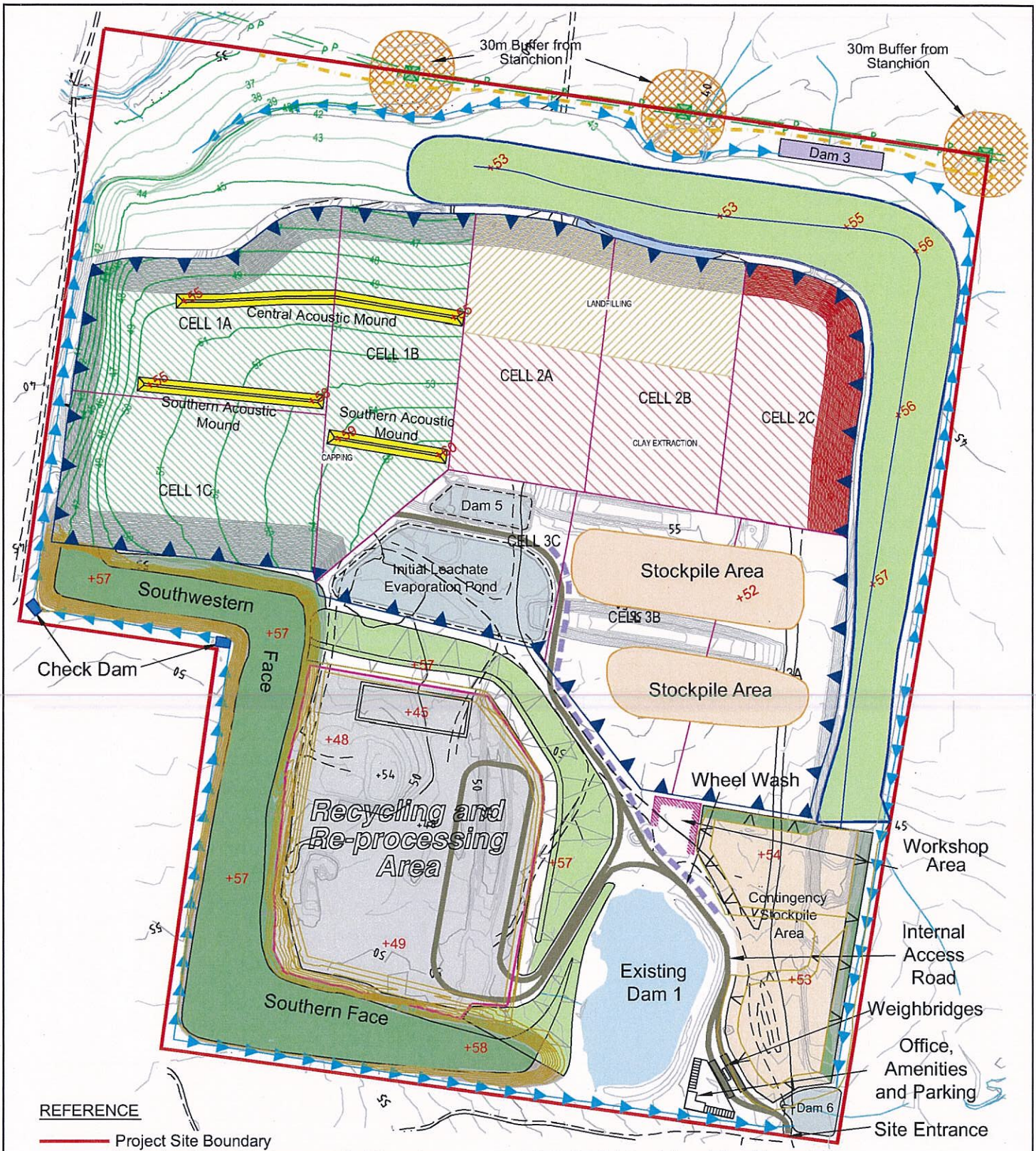
0 30 60 90m

SCALE 1:1500 AT ORIGINAL SIZE (A1)

GHD DRG No. 21-20649-Y003
STAGE 3

Note: The base contours used for this figure reflect existing topography

Figure 2.10c
STAGE 3 OPERATIONS (AMENDED)



REFERENCE

- Project Site Boundary
- Indicative Waste Emplacement Cell Boundary
- Proposed Limit of Extraction (Clay/Shale)
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- Drain / Check Dam
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- Temporary Acoustic Mounds

0 30 60 90m

GHD DRG No. 21-20649-Y004
STAGE 4

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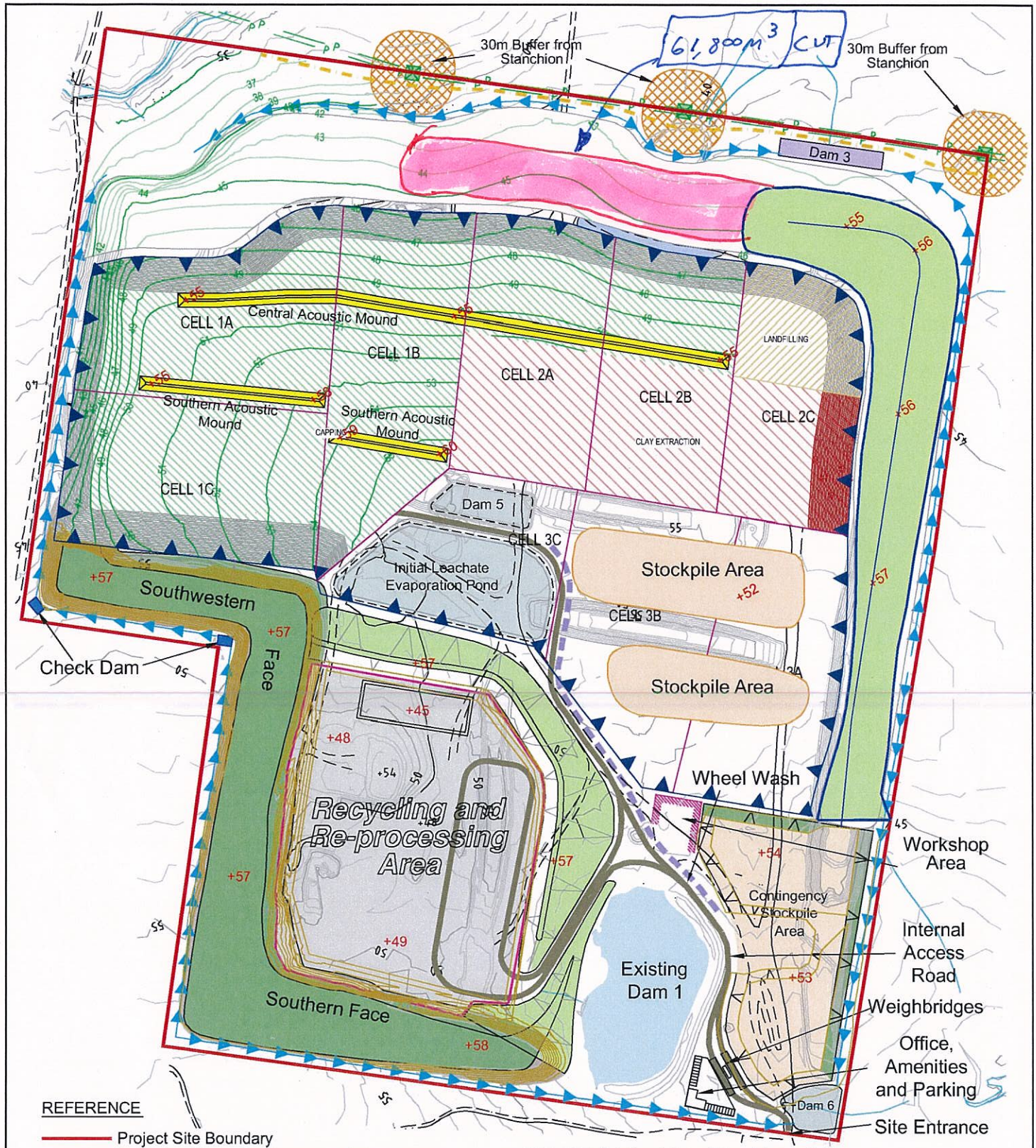
Note: The base contours used for this figure reflect existing topography

Figure 2.11a
STAGE 4 OPERATIONS (AMENDED)



REFERENCE

- Project Site Boundary
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- Proposed Internal Road (sealed)
- Proposed Internal Road (unsealed)
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- Temporary Acoustic Mounds

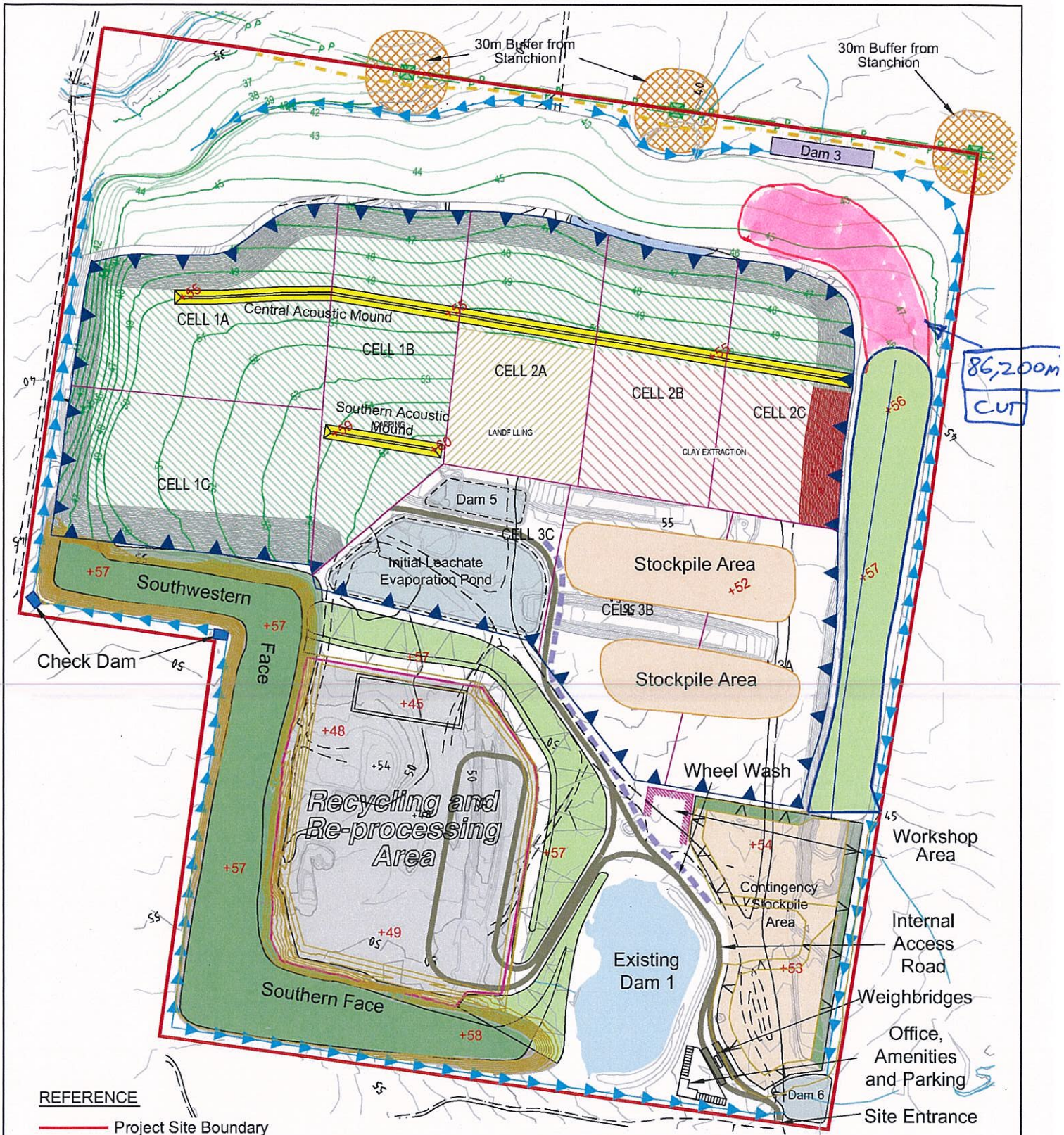
0 30 60 90m

GHD DRG No. 21-20649-Y005
STAGE 5

SCALE 1:1500 AT ORIGINAL SIZE (A1)

Note: The base contours used for this figure reflect existing topography

Figure 2.11b
STAGE 5 OPERATIONS (AMENDED)



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0 30 60 90m

SCALE 1:1500 AT ORIGINAL SIZE (A1)

GHD DRG No. 21-20649-Y006
STAGE 6

Note: The base contours used for this figure reflect existing topography

Figure 2.11c
STAGE 6 OPERATIONS (AMENDED)

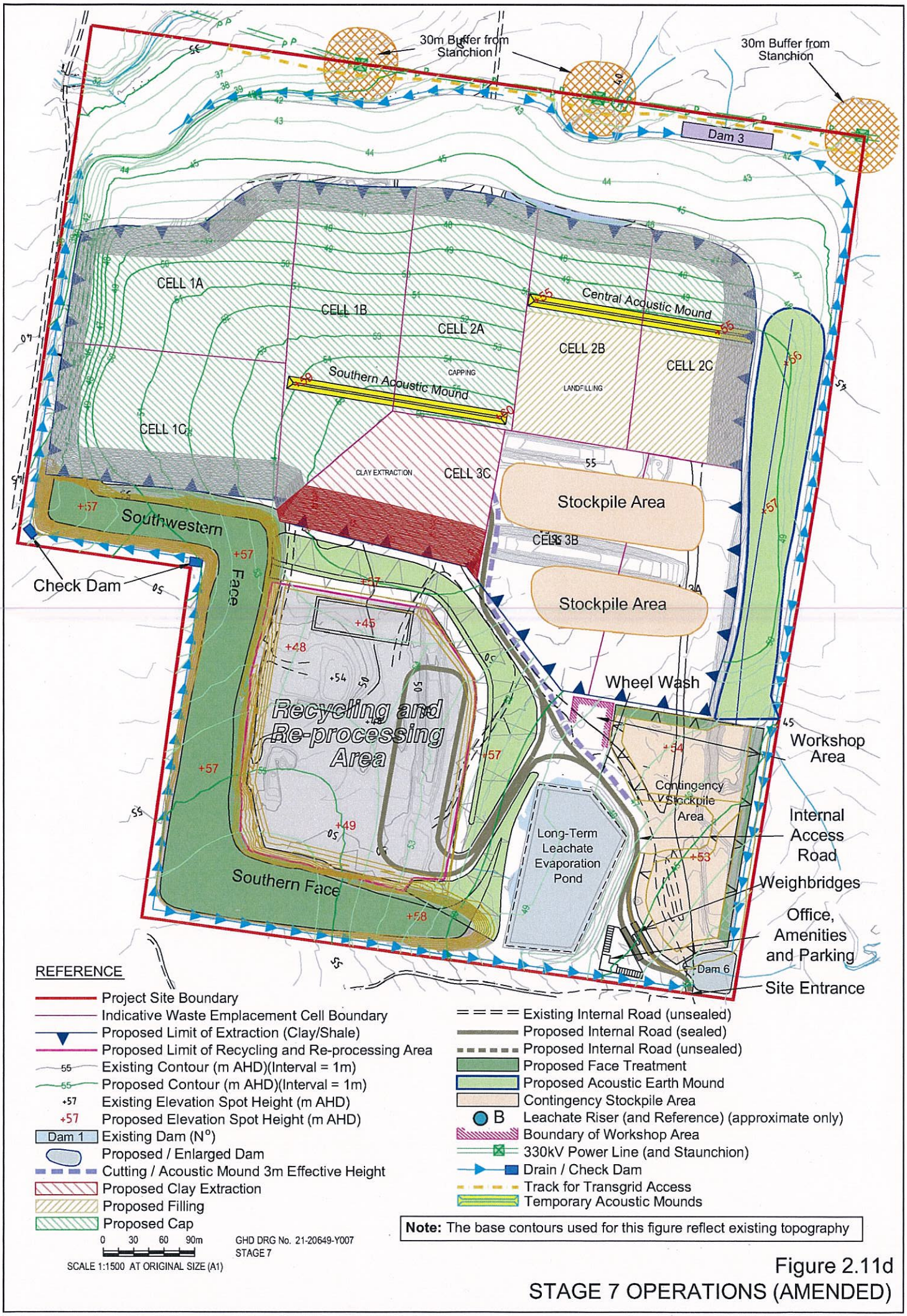

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Figure 2.11d
STAGE 7 OPERATIONS (AMENDED)

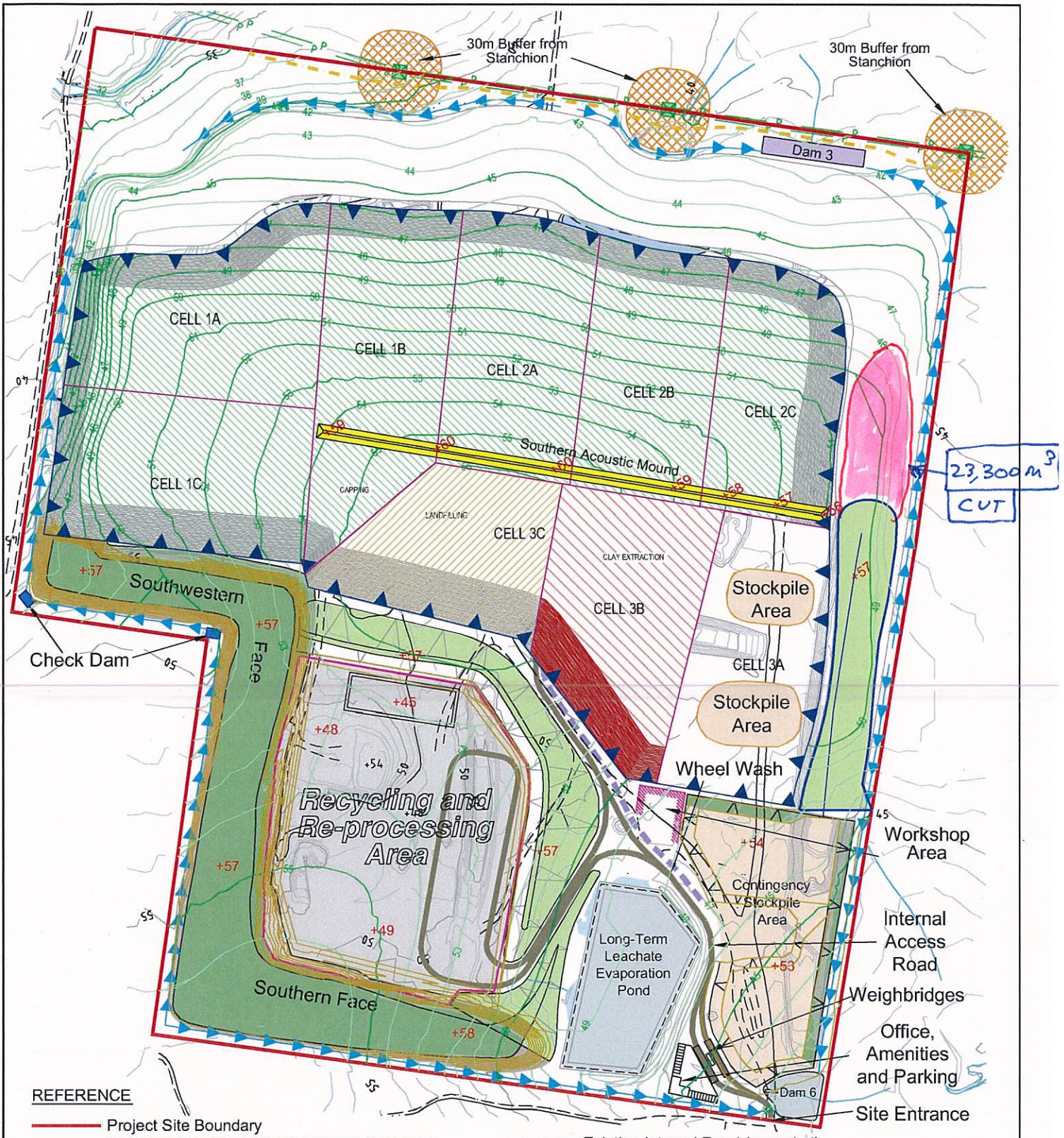

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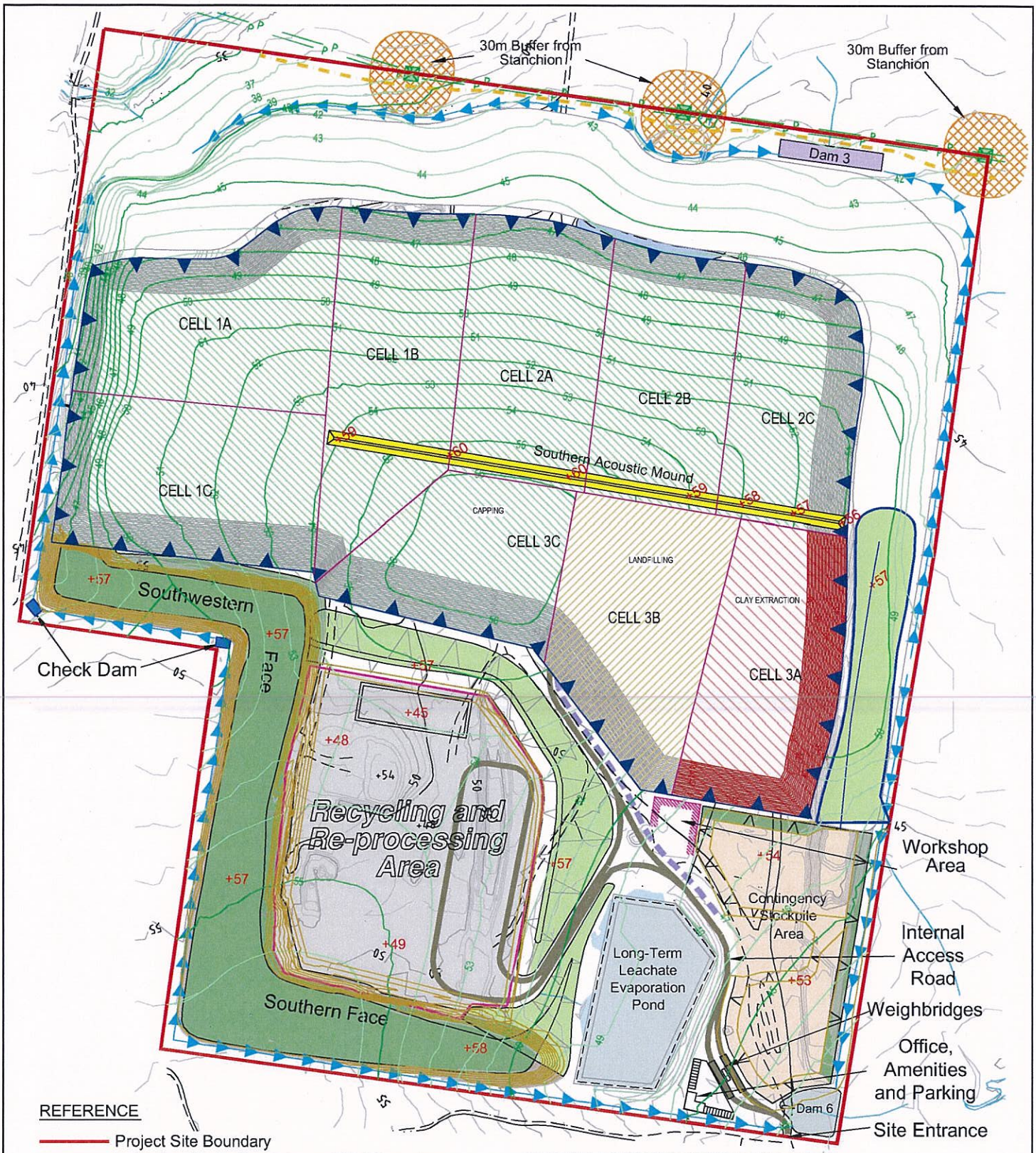
Figure 2.12a
STAGE 8 OPERATIONS (AMENDED)



REFERENCE

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0 30 60 90m

SCALE 1:1500 AT ORIGINAL SIZE (A1)

GHD DRG No. 21-20649-Y009
STAGE 9

Note: The base contours used for this figure reflect existing topography

Figure 2.12b
STAGE 9 OPERATIONS (AMENDED)

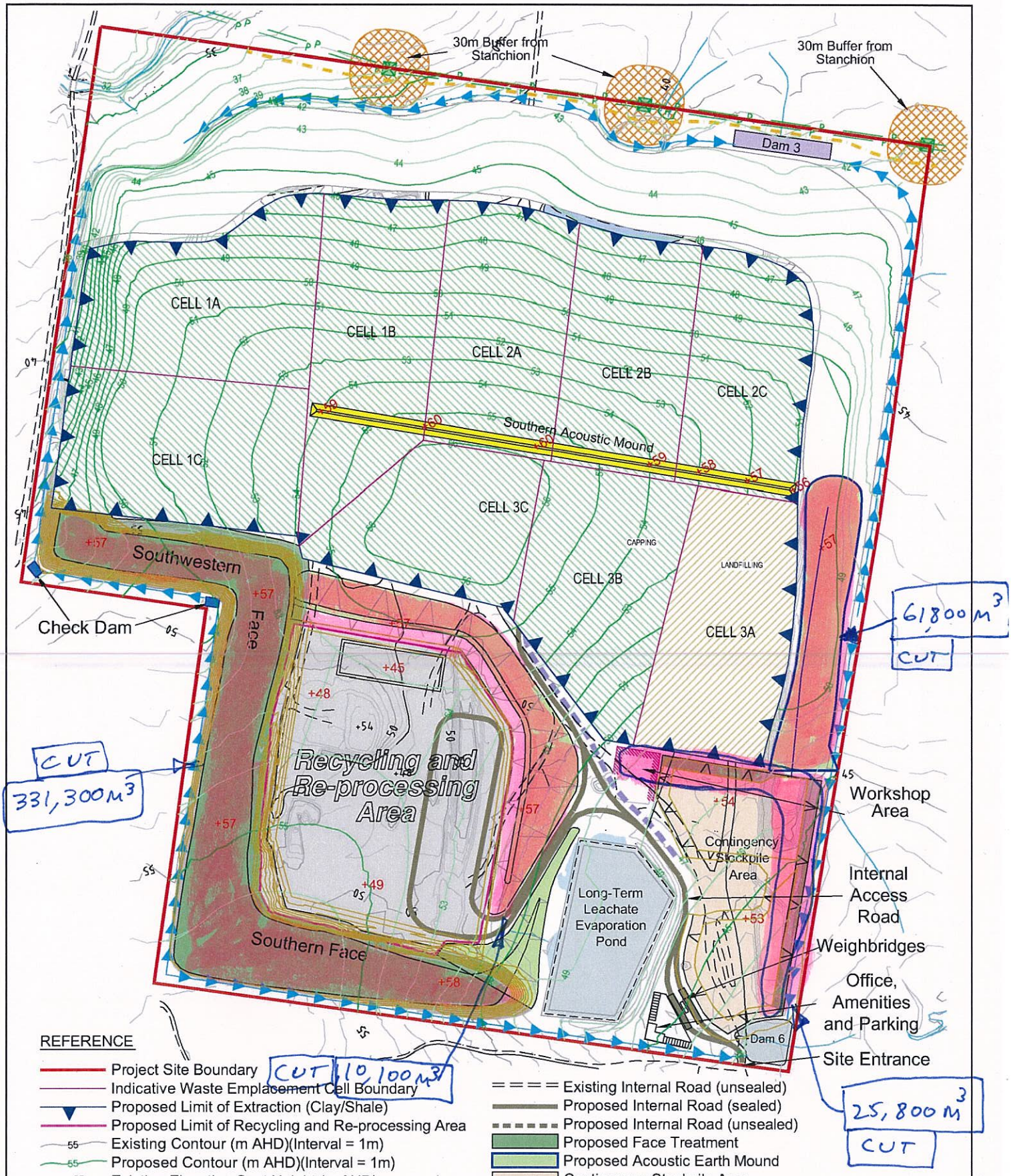


Figure 2.12c
STAGE 10 OPERATIONS (AMENDED)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Letter from the EPA

NSW GOVERNMENT | Environment, Climate Change & Water

Our reference DOC11/52564

PCU028138

Felicity Greenway
Major Development Assessment
NSW Department of Planning
GPO BOX 39
SYDNEY NSW 2001

Attention: David Mooney

Standard Post & Electronic Mail

16 November 2011

Dear Ms Greenway

Review of Orchard Hills Waste Project (Project Application MP 09_0074) Exhibition of Further Modified Preferred Project Report September 2011

I refer to your correspondence sent via electronic mail to the Office of Environment and Heritage ("OEH") on 13 October 2011 regarding the submission to the Court of a Further Modified Preferred Project Report for the proposed construction and operation of the Orchard Hills Waste and Resource Management Facility ("the FMPPR") by Dellara Pty Ltd.

Please note that, although the Environment Protection Authority ("EPA") is now a part of OEH, certain statutory functions and powers continue to be exercised in the name of the EPA.

The proposal is for the construction and operation of a waste disposal and resource recovery facility at lot 40 DP738126 at Patons Lane, Orchard Hills ("the site").

The OEH has reviewed and provided comments to the Department of Planning on the Proposal. On 3 July 2010 in relation to project application MP09_0074 and subsequently on the 23 March 2011 on the Modified Preferred Project submitted to the Land and Environment Court. In both instances, OEH found the Environmental Assessment did not inadequately address all the potential environmental impacts. Further information was required in relation to dust and noise impacts and the management of stockpiles and leachate.

OEH has now undertaken a review of the FMPPR and comments are provided at **Attachment A**. The OEH has included its recommended conditions of approval at **Attachment B.**

As you are aware, should the FMPPR be approved, the proponent would be required to hold an Environment Protection Licence under the *Protection of the Environment Operation Act* 1997 for the scheduled activity of Resource Recovery and Waste Disposal (application to land). As a

condition of licence, the licensee would be required to provide the OEH with a financial assurance, in the form of a bank guarantee, before any licence will be issued. The amount of the financial assurance will be determined at the licensing stage.

If you have any questions please do not hesitate to contact me on (02) 9995 5735.

Yours sincerely,

16/11/11

JULIE CURREY
Unit Head Waste Operations

Attachment A: Comments on the Further Modified Preferred Project
Attachment B: Recommended Conditions of Approval

ATTACHMENT A

OFFICE OF ENVIRONMENT AND HERITAGE
PROPOSED ORCHARD HILLS WASTE AND RESOURCE MANAGEMENT FACILITY
(Project Application No: MP09_0074 & Land Environment Court Case No: 10928 of 2010)

COMMENTS ON THE FURTHER MODIFIED PREFERRED PROJECT REPORT (FMPPR) NOVEMBER 2011

The OEH provides the following comments on the proposed development as described in the "Further *Modified Preferred Project for the Orchard Hills Waste and Resource Management Facility – November 2011*".

Air Emissions

OEH has reviewed the letter from Judith Cox of PAEHolmes to Nicola Gillies of Mallesons Stephens Jacques dated 22 September 2011 and has determined that the letter provides further detail and justification to support the conclusion that the modelled air quality impacts of the proposal remain unchanged. The changes proposed in the FMPPR (including the reduction in height of final landform, increase shale extraction and contingency stockpile) will not significantly change the predicted air quality impacts of the proposal.

The only predicted exceedance of air quality would be during the construction phase when existing background regional air quality levels are elevated, such as during a bushfire. The odour and dust assessments are likely to be worst case scenario and conservatively over estimate odour emission and dust impacts from the proposal.

Noise

The noise modelling conducted by Wilkinson Murray for the FMPPR states that a number of mitigation measures are required to meet the predicted operational noise levels. A number of those measures are as previously recommended in the Modified Preferred Project report and do not appear to be unreasonable. Provided that the proponent commits to implementing the recommended noise mitigation measures (including mitigation to items of plant such as the scraper to achieve the sound power level indicated) the previously recommended conditions of approval are considered applicable to the FMPPR.

The noise mitigation measures assumed in the assessment and required to achieve the calculated noise levels are summarised on pages 4 and 5 of the Wilkinson Murray report dated 7 September 2011. If the FMPPR is approved, these measures could be included as a condition of approval to ensure acceptable noise levels are achieved.

Cell Construction Design

The FMPPR includes changes to the projected waste throughput and staging and to the cell design/leachate management infrastructure. Key aspects include:

Waste throughput and staging. The landfill capacity will be 4.3m tonnes of general solid waste (non-putrescible), down from earlier proposals including 7.8m tonnes in the April 2010 Environmental Assessment.

The maximum annual amount of waste received will be 450,000 tpa of which up to 205,000 tpa will be landfilled. Most of the waste received will be C&D and C&I waste, and up to 100,000 tpa will be soils.

Three waste cells will be constructed instead of four as previously proposed. Each waste cell will be divided into 3 sub-cells. The active life of the landfill remains 25 years.

Cell design/leachate management. The cell design has been enhanced with regards to the cell floor lining and final capping, which were already well-designed in the previous Modified Preferred Project.

There will be increased thickness of clay layers on the cell floors and in the caps. There will be additional HDPE and drainage layers in the capping. Two 30ML leachate ponds are proposed being an 'initial leachate evaporation pond' and a 'permanent leachate evaporation pond'. The initial leachate pond will be decommissioned as the filling progresses and replaced by the permanent pond. The initial leachate pond is proposed to be ready for the first stages of filling.

OEH considers that these further amendments are not problematic and would meet the required environmental performance standards in relation to the cell construction design and management of leachate.

Reshaping and Decommissioning of the Perimeter Noise Bunds

The FMPPR suggests that the material within the perimeter bund walls comprises largely of General Solid Waste (non-putrescible) including soils and general construction demolition rubble. It is also recognised that the testing undertaken to date by Douglas Partners to classify the material within the bunds was preliminary.

It is estimated that approximately 355,000 tonnes of waste, or 40% of the existing bunds, comprise of general builders rubble including concrete and similar materials. Less than 0.01% of the material within the bund walls has been identified as Special Waste.

It is important to note that contrary to the report provided by the proponent referencing "safe" limits for asbestos contaminated materials, NSW does not have an acceptable limit in relation to asbestos. Any waste containing asbestos is classified as "Special Waste" and must be classified, managed and disposed of in accordance with the Waste Classification Guidelines, POEO Act and associated Waste Regulations.

Given the amount of waste known to be contained within the bund walls and the preliminary testing undertaken to date to classifying the waste, it may be expected that the amount and location of both wastes, including Special Waste, within the bunds may not be accurately known.

Given that the current FMPPR proposes a much greater level of reshaping and progressive decommissioning of the bund walls than in previous project proposals, a greater level of progressive testing and classification is required ensure the waste is managed appropriately.

Further, the project FMPPR includes the potential to reprocess or recycle waste unlawfully disposed of at the site by the previous owners and placed within the bund walls. The origins and type of the waste are unknown and therefore cannot be assumed to be General Solids Waste. All waste must be classified in accordance with the DECCW's Waste Classification Guidelines. Further testing is required to identify the extent of Special Waste and ensure wastes are appropriately classified, separated, managed and recycled or disposed of appropriately.

Sampling and testing should be undertaken for all noise bunds as they are reshaped and / or decommissioned. Works should:

- Be undertaken progressively to ensure the waste through and across the noise bunds is well characterised. Given the noise bunds are up to 15m deep in some areas it would be difficult to accurately characterise and classify the waste prior to disturbing the bunds.

- Include stockpile management procedures to ensure waste can be separated and avoid cross contamination of stockpiles.
- Ensure all wastes containing asbestos are further chemically classified to establish whether they are also restricted or hazardous waste.
- Any restricted or hazardous waste must not be disposed of onsite. This waste must be sent off site for disposal to a facility that can lawfully receive that waste.
- Special wastes must be directly landfilled either onsite within the approved waste cell or sent offsite to a lawful facility.
- Any waste classified as General Solid Wastes suitable for recovery or recycling must meet the contaminant levels stipulated by the Environment Protection Licence. These levels are generally lower than the General Solid Waste levels of contamination.

The EPA suggests that the proponent be required to:

- prior to the commencement of construction and with any application for an Environment Protection Licence, engage a suitably qualified and experienced professional to prepare and submit to the EPA, for approval a detailed sampling and testing regime for the excavation of wastes (including Excavated Natural Material) within the bund walls around the perimeter of the site; and
- prepare and undertake any works resulting in disturbance of the bund walls in accordance with an appropriate Asbestos Management Plan.

Contaminated soils

The FMPPR refers to the receipt of contaminated soils with levels of contaminants below the level otherwise considered to be hazardous waste. Only soils below General Solid Waste levels of contamination can be recycled or reused. Restricted Wastes and Hazardous Wastes are only permitted to be received for landfilling and under strict environmental controls. The Orchard Hills Waste Facility must not receive contaminated soils above General Solid Waste levels of contamination or as otherwise stipulated by the Environmental Protection Licence (The EPA would generally further restrict receipt of soils to levels below General Solid Waste for recycling). This seems to be a point of confusion in each modification of the proposed Orchard Hills project and should be made clear.

ATTACHMENT B
OFFICE OF ENVIRONMENT AND HERITAGE
PROPOSED ORCHARD HILLS WASTE AND RESOURCE MANAGEMENT FACILITY
(Project Application No: MP09_0074 & Land Environment Court Case No: 10928 of 2010)

FURTHER MODIFIED PREFERRED PROJECT REPORT (FMPP) - NOVEMBER 2011

RECOMMENDED CONDITIONS IF APPROVED

ADMINISTRATIVE CONDITIONS

Except as expressly provided by these recommended conditions of approval, works and activities must be carried out in accordance with the proposal contained in the documents:

a) "Dellara, Further Modified Preferred Project, Orchard Hills Waste and Resource Management Facility, Project Application No: MP 09_0074, prepared by R.W. Corkery & Co. Pty. Limited, September 2011
b) and associated technical report and documents comprising the project application

The applicant must apply for and receive an Environment Protection Licence from the EPA prior to commencing any significant activity associated with the proposal.

Waste must not be received and/or disposed of at the premises until the EPA has provided the applicant with an Environment Protection Licence which approves those activities.

OPERATING CONDITIONS

Operational Environmental Management Plan
Prior to the issue of an Environment Protection Licence, the proponent must develop, in consultation with the EPA for the approval of the Director General of Planning, an Operational Environmental Management Plan.

Noise
L6.1 Noise from the premises must not exceed the sound pressure level (noise) limits presented in the Table below. Note the limits represent the sound pressure level (noise) contribution from the premises, at the nominated receiver locations in the table.

Noise Limits (dB(A))

Location	Daytime construction limit	Daytime operational limit
	$L_{Aeq.\ (15\ minute)}$ dB(A)	$L_{Aeq.\ (15\ minute)}$ dB(A)
11 Cabernet Court	43	39
3 Chablis Place	41	38
Newham Residence	39	39
210 Luddenham Road	35	38

Note: Assessment locations are as shown in Figure 2.1 of "*Specialist Consultant Studies Compendium Part 4: Noise Assessment*", dated February 2010 and prepared by R.W. Corkery & Co Pty. Ltd for Dellara Pty Ltd.

L6.2 For the purpose of the operational limits in Condition **L6.1**:
- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays

L6.3 Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition **L6.1.**

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy.

The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

L6.4 The noise emission limits identifies in condition L6.1 apply under meteorological conditions of:

- Wind speed up to 3m/s at 10 metres above ground level.

Hours of Construction and Operation

L6.5 All construction work at the premises must be conducted only between 7am and 6pm Monday to Friday and between 8am and 1pm Saturdays and at no time on Sundays and public holidays.

Operational activities (including transport off-site) must be undertaken only from Monday to Friday between 7.00am and 6.00pm and between 8.00am and 2.00pm Saturday and at no time on Sundays and public holidays.

Noise Compliance Monitoring

L6.6 A noise compliance assessment shall be submitted to the EPA within three months of commencement of operations at the premises. The assessment shall be prepared by a suitably qualified and experienced acoustical consultant and shall assess compliance with noise limits presented in L6.1.

Noise Management Plan

L6.7 The proponent must prepare and implement a Noise Management Plan that covers all premises based activities and transport operations. The plan must include but need not be limited to:

a) all measures necessary to satisfy the limits in Table **L6.1** at all times,
b) a system that allows for periodic assessment of Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) that has the potential to minimise noise levels from the facility,
c) Effective implementation of identified BMP and BATEA measures, where considered feasible and reasonable,
d) Measures to monitor noise performance and respond to complaints,
e) Measures for community consultation including site contact details,
f) Noise monitoring and reporting procedures.

L6.8 The proponent must prepare and implement a detailed Construction Noise Management Plan (CNMP), prior to commencement of construction activities, that includes but is not necessarily limited to;

(a) identification of each work area, site compound and access route (both private and public)
(b) identification of the specific activities that will be carried out and associated noise sources at the premises and access routes,
(c) identification of all potentially affected sensitive receivers,
(d) the construction noise and vibration objectives identified in the Environmental Assessment,
(e) assessment of potential noise and vibration from the proposed construction methods (including noise from construction traffic) against the objectives identified in the Environmental Assessment,

(f) where the objectives are predicted to be exceeded an analysis of feasible and reasonable noise mitigation measures that can be implemented to reduce construction noise impacts,
(g) description of management methods and procedures and specific noise mitigation treatments that will be implemented to control noise and vibration during construction, including the early erection of operational noise control barriers,
(h) procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity,
(i) measures to monitor noise performance and respond to complaints.

Recommended inclusions in the Planning Approval
That a Traffic Noise Management Strategy (TNMS) be developed by the proponent, prior to commencement of construction and operation activities, to ensure that feasible and reasonable noise management strategies for vehicle movements associated with the facility are identified and applied, that include but are not necessarily limited to the following;

- driver training to ensure that noisy practices such as the use of compression engine brakes are not unnecessarily used near sensitive receivers,
- best noise practice in the selection and maintenance of vehicle fleets,
- movement scheduling where practicable to reduce impacts during sensitive times of the day,
- communication and management strategies for non licensee/proponent owned and operated vehicles to ensure the provision of the TNMS are implemented,
- a system of audited management practices that identifies non conformances, initiates and monitors corrective and preventative action (including disciplinary action for breaches of noise minimisation procedures) and assesses the implementation and improvement of the TNMS,
- specific procedures for drivers to minimise impacts at identified sensitive receivers,
- clauses in conditions of employment, or in contracts, of drivers that require adherence to the noise minimisation procedures and facilitate effective implementation of the disciplinary actions for breaches of the procedures.

Bund Wall Reshaping and Decommissioning
Prior to the commencement of construction or operational activities at the site the proponent must engage a suitably qualified expert to prepare and submit to the EPA for approval a detailed **Sampling and Testing Regime** for the excavation of wastes (including Excavated Natural Material) within the bund walls around the perimeter of the site.

Given the presence of some asbestos waste within the bund walls, any works resulting in disturbance of the bund walls must be undertaken in accordance with an appropriate Asbestos Management Plan. Prior to the commencement of any construction or operational activities at the site, the proponent shall engage a suitably qualified professional, such as a recognised Occupational Hygienist or EPA accredited site auditor, to prepare an **Asbestos Management Plan** in consultation with Workcover NSW for the approval of the Director General of Planning.

Aboriginal & Cultural Heritage
Should any Aboriginal cultural artefact matter be detected on site, the Proponent must ensure that work cease immediately and the EPA and the Local Aboriginal Land Council be contacted prior to work commencing again.

Stormwater Management
Stormwater from all areas of the site which have the potential to mobilise sediments and other material must be controlled and diverted through appropriate erosion and sediment control/pollution control measures or structures.

Stormwater from all areas of the site which has the potential to interact with waste shall be managed as leachate and directed into the leachate containment dam.

Water Pollution
Except as otherwise expressly provided in any Environment Protection licence Condition for the project, the proponent must comply with section 120 of the *Protection of the Environment Operations Act 1997*. Section 120 of the *Protection of the Environment Operations Act 1997* prohibits the pollution of waters.

Soil, Water and Leachate Management Plan
The Proponent shall prepare and implement a Soil, Water and Leachate Management Plan for the project to the satisfaction of the EPA. This plan must:

a) Be submitted to the EPA for approval prior to construction or preparation of the site commencing;
b) Be prepared by a suitably qualified and experienced expert;
c) Be prepared in consultation with the EPA and;
d) Include:
    - A site water balance;
    - An erosion and sediment control plan;
    - A stormwater management scheme;
    - A surface water, groundwater and leachate monitoring program; and
    - A surface water, groundwater and leachate response plan.

The site water balance must:

a) Identify the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;
b) Include details of all water use on site and any discharges;
c) Describe the measures that would be implemented to minimise water use on site.

The erosion and sediment control plan must:

a) Be consistent with the requirements in the latest version of Managing Urban Stormwater: Soils and Construction (Landcom);
b) Identify the activities on site that could cause soil erosion and generate sediment; and
c) Describe what measures would be implemented to:
    1 Minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures; and
    2 Maintain these structures over time.

The stormwater management scheme:

a) Must be consistent with the guidance in the latest version of Managing Urban Stormwater: Council Handbook (DECCW);
b) Erosion and sediment control works during construction must be consistent with the requirements of Landcom's *Managing Urban Stormwater: Soils and Construction* (2004). Stormwater control dams must have sufficient capacity to cater for the 90th percentile 5 day rainfall event. Any pumped discharges from the dam(s) must have a concentration of less than 50 mg/L (Total Suspended Solids), no discharges should contain water that has come in contact with waste, and total ammonia concentration must be less than 0.9 mg/L at pH 8.
c) Include the detailed plans for the proposed surface water management system.

The surface water, groundwater, and leachate monitoring program must:

a) Be generally consistent with the guidance in DECCW's *EPA Environmental Guidelines for Composting & Related Organics Processing Facilities*; and include:
    - baseline data;
    - details of the proposed monitoring network; and
    - the parameters for testing and respective trigger levels for action under the surface water, groundwater and leachate response plan.

The surface water, groundwater and leachate response plan must:

a) Include a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and
b) Describe the array of measures that could be implemented to respond to any surface or groundwater contamination that may be caused by any development.

Leachate Collection System - Landfill

The application for an Environment Protection Licence by the proponent must also be accompanied by a report providing design details of the proposed leachate collection, conveyance, extraction, storage, treatment and disposal systems including but not limited to:

a) A construction quality assurance (CQA) plan for the collection, conveyance and storage measures;
b) Details of the proposed leachate pre-treatment system, including its capacity;
c) A program for the installation and commissioning of the systems.

No waste may be disposed of in the landfill until the proponent has constructed the proposed leachate collection system to the EPA's satisfaction.

Waste Outputs

Except for the following, the Proponent shall dispose of all outputs produced from the waste processing and/or resource recovery facility on site to the Landfill:

a) Recyclables extracted and delivered off-site for resource recovery purposes;
b) Industrial waste and hazardous wastes extracted from the input waste stream and lawfully disposed of off-site; and
c) Output waste derived materials approved for use under the *Protection of the Environment Operations Act, 1997* and Regulations.

Storage & Handling – Waste and Products

The Proponent shall store all chemicals, fuels and oils used on site in an appropriately designed impervious bunded area that contains 110 percent of the largest container contained within the bund. These bunds shall be designed and installed in accordance with the requirements of all relevant Australian standards, and/or DECCW's Environment Protection Manual *Technical Bulletin Bunding and Spill Management.*

Storage of Unsegregated Commercial and Industrial Waste

Stockpiles of unsegregated "Commercial and Industrial Waste" shall only be stored within the Material Recycling Facility Warehouse.

Litter Control

The proponent shall:

a) Implement suitable measures to prevent unnecessary proliferation of litter both on and off site; and
b) Inspect and clear the site and surrounding area, of litter on a daily basis.

Pest, Vermin & Noxious Weed Management

The Proponent shall:

a) Implement suitable measures to manage pests, vermin and declared noxious weeds on site;
b) Inspect the site on a regular basis to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard, or cause the loss of amenity in the surrounding area; and
c) Perform ongoing monitoring of weed infestation on and adjoining the site.

Note: For the purposes of this condition, noxious weeds are those species subject to an order declared under the Noxious Weeds Act 1993.

Fire Management

The proponent shall:

a) Prepare a Fire Response Plan for the site, which should include but not be limited to mitigation measures, and include the number of days material can be stored on site with the opportunity for the EPA to make comments and recommendations prior to construction commencing and the plan being implemented;
b) Implement suitable measures to minimise the risk of fire on site;
c) Extinguish any fires on site promptly; and
d) Maintain adequate fire-fighting capacity on site.

Odour Emissions

The EPA may require the proponent to conduct assessments or investigations that identify the extent of any potentially offensive odour emissions beyond the boundary of the premises. The scope of such investigations to be agreed to by the EPA and may include revised air dispersion modelling based on actual site emissions data, well designed field investigations according to German standards, and/ or use of field olfactometers, and analysis of detailed complaints records and on-site meteorological data.

Except as otherwise expressly provided in any Environment Protection licence condition for the project, the Proponent must comply with section 129 of the *Protection of the Environment Operations Act 1997*. Section 129 of the *Protection of the Environment Operations Act 1997* provides that the licensee must not cause or permit the emission of any offensive odour from the premises.

Dust & Particulate Matter

The Proponent must maintain the premises in a condition which prevents the emission of dust. All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises. The EPA may require the proponent to conduct dust monitoring to identify the extent and any potential for dust emission beyond the boundary of the Premises.

Monitoring meteorological parameters

The Proponent will be required to install a weather station to monitor parameters in the table below, the proponent must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The applicant must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Parameter	Units of measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm	Continuous	1 hour	AM-4
Wind speed @ 10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Wind direction @ 10 metres	^{0}	Continuous	15 minute	AM-2 & AM-4
Temperature @ 2 metres	^{0}C	Continuous	15 minute	AM-4
Temperature @ 10 metres	^{0}C	Continuous	15 minute	AM-4
Sigma theta @ 10 metres	^{0}	Continuous	15 minute	AM-2 & AM-4
Solar radiation	W/m2	Continuous	15 minute	AM-4
Additional requirements - Siting - Measurement				 AM-1 & AM-4 AM-2 & AM-4

Rehabilitation and Closure

Upon cessation of waste operations, the Proponent shall decommission the project and rehabilitate the site to the satisfaction of the EPA.

The Proponent shall prepare and implement a Rehabilitation and Closure Plan to the satisfaction of the EPA. This plan must:

a) Be prepared in consultation with EPA and Penrith City Council by a suitably qualified and experienced expert;
b) Define the objectives and criteria for rehabilitation and closure;
c) Investigate options for the future use of the site;
d) Describe the measures that would be implemented to achieve the specified objectives and criteria for the rehabilitation and closure; and
e) Calculate the cost of implementing these measures; and describe how the performance of these measures would be monitored over time.

Community Information and Complaints

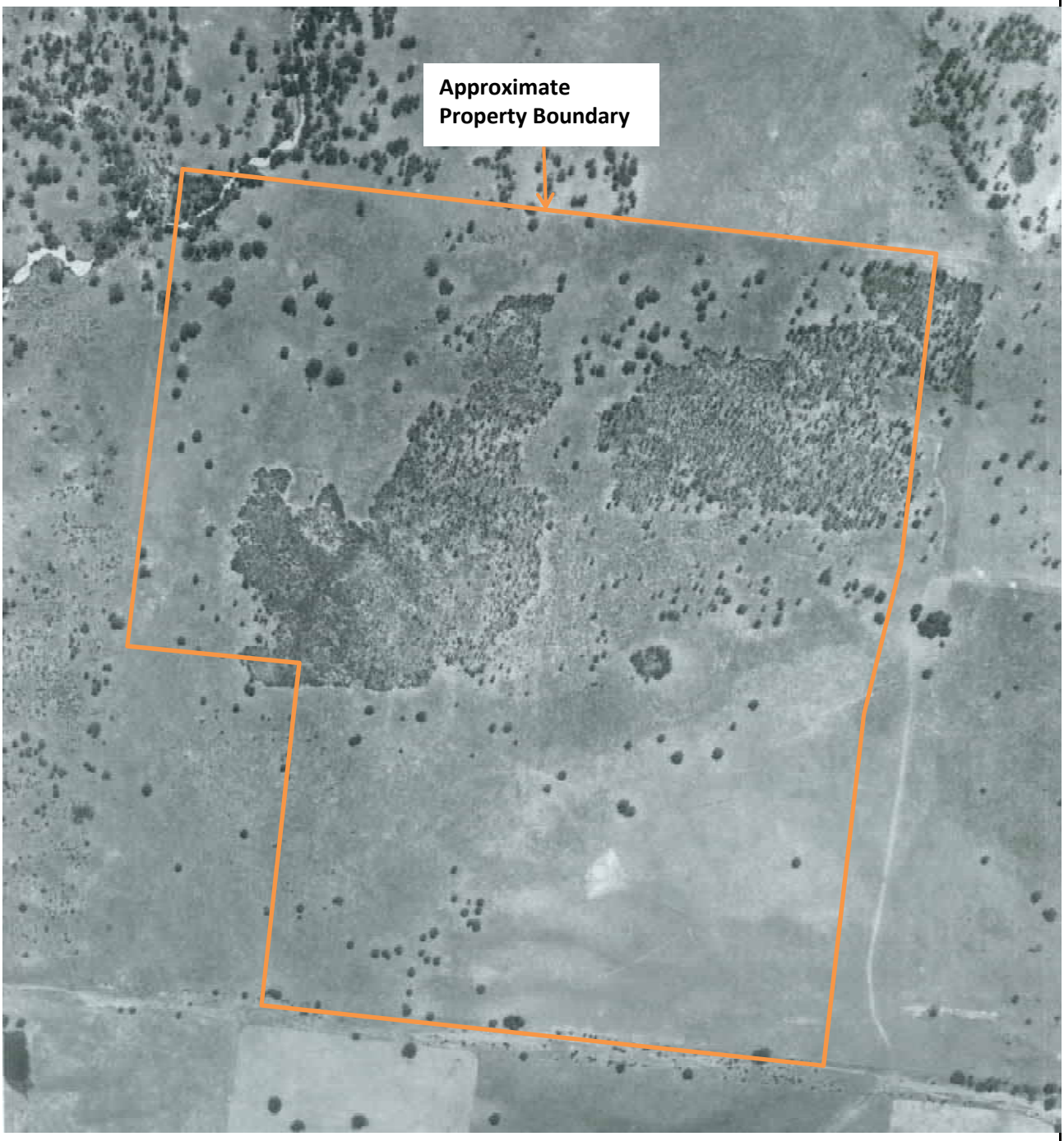
The proponent must operate and maintain a community information and complaints line which is accessible 24 hrs per day.

The development and implementation of a complaints management system that includes the following elements:

a) a hotline for receiving complaints about the development;
b) a commitment by the Applicant to:
c) investigate the source of the odour and/or dust;
d) take immediate action to reduce the odour and/or dust impact(s) to agreed levels; and
e) contact the complainant about the action taken in response to the complaint
f) a record of complaints and Applicants responses or actions, readily accessible to the community and regulatory authorities, and
g) a system for providing feedback to the community

Appendix C

Historical Aerial Photographs



Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**1947 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C1 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

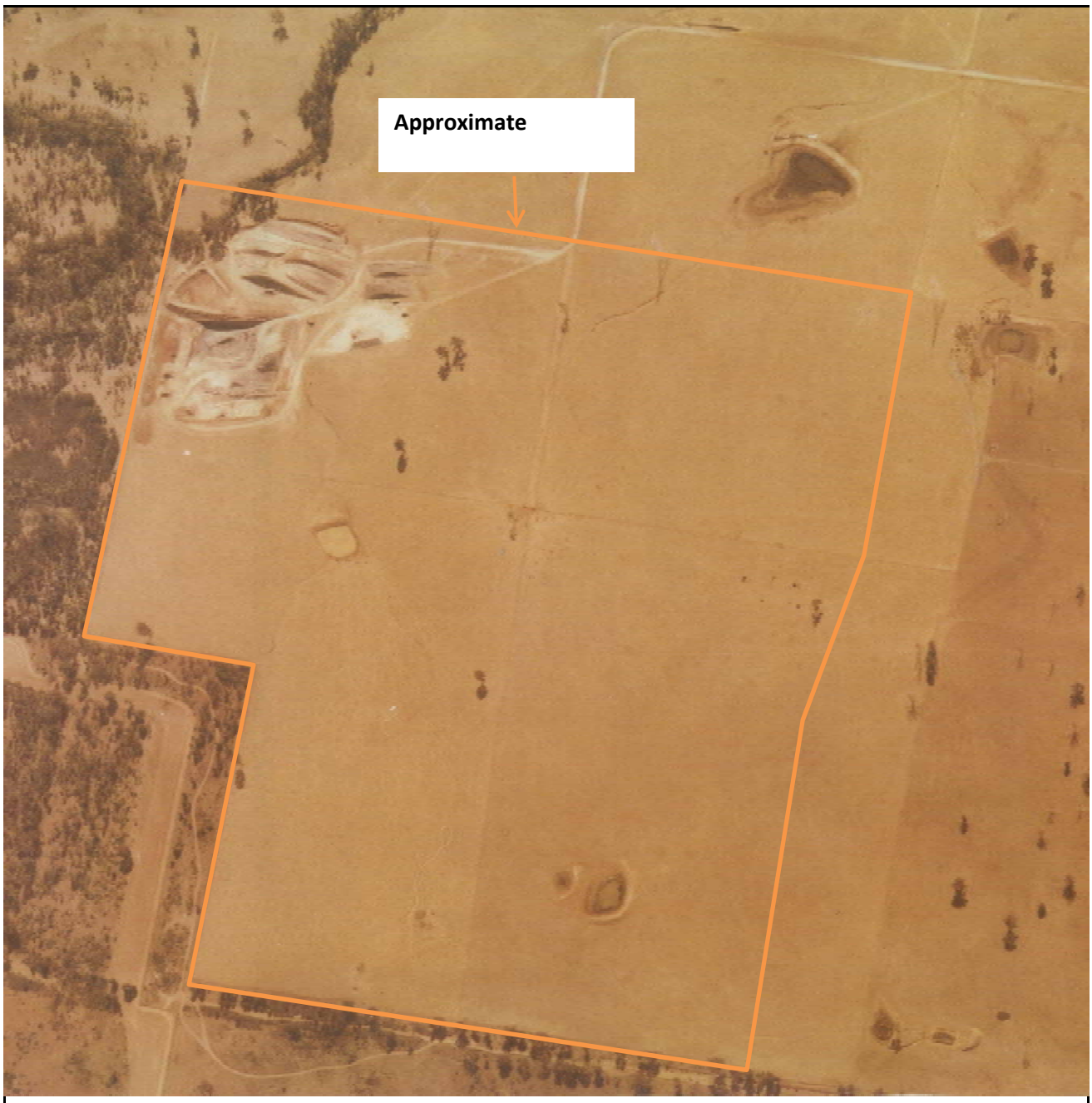
Approximate

Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**1961 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C2 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**1970 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C3 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012



Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**1982 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C4 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**1991 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C5 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: NSW Department of Lands

Douglas Partners Geotechnics / Environment / Groundwater	**2002 Aerial Photograph (March)** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C6 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: google earth

Douglas Partners Geotechnics / Environment / Groundwater	**2002 Aerial Photograph (July)** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C7 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: google earth

Douglas Partners Geotechnics / Environment / Groundwater	**2004 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C8 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: google earth

Douglas Partners Geotechnics / Environment / Groundwater	**2005 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C9 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012

Source: google earth

Douglas Partners Geotechnics / Environment / Groundwater	**2006 Aerial Photograph** **Phase 1 Contamination Assess.** **Patons Lane, Orchard Hills**	PROJECT: 71102.05 PLATE No: C10 REV: A
	CLIENT: Dellara Pty Ltd	DATE: Jan 2012