



REPORT

Soil and Water Management Plan
Erskine Park Landfill

Submitted to:

Enviroguard Pty Ltd

Quarry Road
Erskine Park
NSW, 2759

Submitted by:

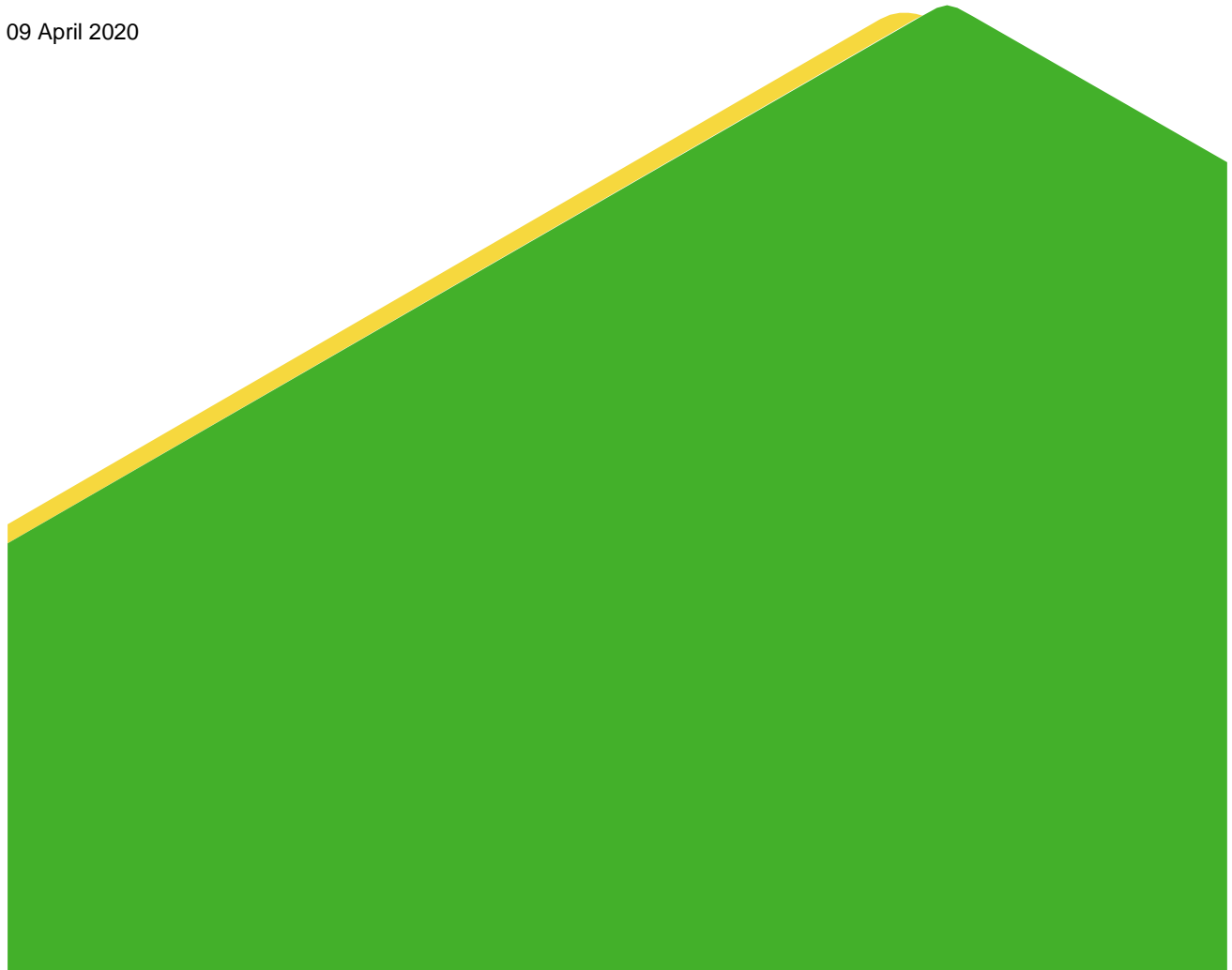
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19135652-020-R-Rev0

09 April 2020



ABBREVIATIONS LIST

AHD	Australian Height Datum
AMG	Australian Map Grid
ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Average reoccurrence interval
CBD	Central Business District
CES	Consulting Earth Scientists
DUAP	Department of Urban Affairs and Planning
EPA NSW	Environmental Protection Authority of New South Wales
H:V	Horizontal – Vertical
LEMP	Landfill Environmental Management Plan
NECS	National Environmental Consulting Services
NFR	Non-Filterable Residue
Q	Discharge or flow rate
REF	Review of Environmental Effects
SEE	Statement of Environmental Effects
SWMP	Soil and Water Management Plan
tpa	tonnes per annum
tc	Time of concentration
TSS	Total Suspended solids
WMC	Waste Management Centre

Table of Contents

1.0 INTRODUCTION	1
2.0 SITE CONDITIONS	2
2.1 Site Operations.....	2
3.0 EXISTING SURFACE WATER AND SOILS MANAGEMENT SYSTEM	3
4.0 SURFACE WATER AND SOIL MANAGEMENT PLAN: FILLING WORKS ABOVE R.L 55M AHD (QUARRY RIM) & POSTCLOSURE PHASE	3
4.1 Surface Water and Soil Management Principles	3
4.2 Management Infrastructure	3
4.2.1 Stormwater Collection and Transport	4
4.2.2 Sedimentation Dams.....	4
4.2.3 Treatment of Stored Runoff	4
4.2.4 Design Calculations	5
4.3 Erosion Controls.....	5
4.4 Monitoring and Reporting Requirements	6
5.0 REFERENCES	6

APPENDICES

APPENDIX A

Figures

APPENDIX B

Important Information

1.0 INTRODUCTION

This document presents an update to the Erskine Park Landfill Soil and Water Management Plan prepared by Consulting Earth Scientists dated 14 August 2007 (reference: CES000102-EDG-156-01-F).

Version	Updates	Date Approved
Consulting Earth Sciences, Soil and Water Management Plan, Erskine Park Landfill, prepared for Enviroguard Pty Ltd, 2001 Report CES010408-EGD-01-F.	Original	Unknown
Consulting Earth Scientists dated 14 August 2007 (reference: CES000102-EDG-156-01-F)	Updated for the Stormwater Management Report, Enviroguard Landfill Erskine Park Report, prepared by Brown Consulting (NSW) Pty Ltd (2007).	Unknown
Soil and Water Management Plan, Golder, 2020 ref: 19135652-020-R	Updated for the MSE Wall Application and Stormwater Management Report, Golder, 2020	Submitted to support the MSE Wall Application

Enviroguard Pty Ltd (Enviroguard) operates a Solid Waste Class 2 (non-putrescible) landfill on Quarry Road at Erskine Park. The landfill occupies an area of approximately 17 ha and is located wholly within a former quarry void formed through the mining of breccia from the Erskine Park diatreme. Volcanic breccia was extracted from an original hill (87 mAHD) to a level of -40 mAHD at the base of the void prior to filling. Overburden was stockpiled mainly around the rim of the void upon establishment of the quarry. Stockpiles are currently stabilised with grass and mature trees.

Consulting Earth Scientists Pty Ltd (CES) produced a Soil and Water Management Plan for the landfill in 2001, in accordance with the initial 1992 development consent for the site, which is documented in the CES report 'Soil and Water Management Plan, Erskine Park Landfill, prepared for Enviroguard Pty Ltd' Report CES010408-EGD-01-F.

A development consent was issued for the site on 25 May 2006 to allow the continuation of filling in the void to a level of 92 mAHD, expected to settle to 87 mAHD. Accordingly, the final form for the completed landfill was revised and a new stormwater management plan was documented in the report *Stormwater Management Report, Enviroguard Landfill Erskine Park Report*, prepared by Brown Consulting (NSW) Pty Ltd (2007). Consulting Earth Scientists dated 14 August 2007 (reference: CES000102-EDG-156-01-F) updated the Soil and Water Management Plan and incorporated the recommendations made in the Brown (2007) report and updated the report to satisfy the requirements of these guidelines Landcom 'Managing Urban Stormwater, Volume 1: Soils and Construction, 4th Edition' (2004).

This current document updates the CES 2007 Soil and Water Management Plan for the Mechanical Stabilised Earth (MSE) Wall Project. The Stormwater Management Plan prepared by Browns (2007) has been updated with a *Stormwater Management Report for Erskine Park Landfill by Golder Associates Pty Ltd, 2020*

(Golder, 2020a) to reflect the developed of the Mechanical Stabilised Earth (MSE) Wall Project, this document incorporates recommendations from this report.

The site operates in accordance with the requirements of Development Consent (DA 05/1740) and as amended on 9 August 2019 (DA 05/1740.01) and Environment Protection Licence (EPL) No 4865 issued by the NSW Environmental Protection Authority (EPA). As per the DA 05/1740.01 Condition 8 a *Soil and Water Management Plan (SWMP) approved by the Department of Natural Resources (DNR) is to be provided to Council prior to the commencement of the development.*

This report presents the Soil and Water Management for the site during operations and post closure. This references and summarises information in the following documentation:

- Brown Consulting (NSW) Pty Ltd (2007) Stormwater Management Report, Enviroguard Landfill Erskine Park Report W03033.35-01 B
- Golder (2020a) Stormwater Management Report, Golder Associates Pty Ltd, 2020 Report number: 19135652-007-R-Rev 0
- Golder (2020b), Final Capping and Rehabilitation, Landfill Closure Plan, Golder Associates Pty Ltd, 2020 Report number: 19135652-018-R-Rev0
- Golder (2020c), Landfill Environmental Management Plan prepared by Golder Associates Pty Ltd, 2020 Report number: 19135652-020-R-Rev0
- Tonkin (2019) Proposed Restoration of the Erskine Park Landfill, Detailed Landscape Plan, prepared by Tonkin Consulting Pty Ltd dated 19 December 2019

2.0 SITE CONDITIONS

Erskine Park Landfill is located along Quarry Road in Erskine Park within the Penrith Local Government Area (LGA) and approximately 40 km west of the Sydney Central Business District (CBD) (Figure 1).

The site is located on the former CSR quarry that mined breccia from the Erskine Park diatreme. Landfilling is contained within the void created by the mining operations. Volcanic breccia was extracted from an original hill (87 mAHD) to a level of -40 mAHD at the base of the void prior to filling. Overburden was stockpiled mainly around the rim of the void upon establishment of the quarry. Overburden stockpiles are currently stabilised with grass and mature trees.

The floor of the void has been progressively landfilled. The rim of the landfill is located at an altitude of approximately 55 m above Australian Height Datum (AHD).

The landfill is located in the catchment of South Creek which flows into the Hawkesbury River at Windsor.

2.1 Site Operations

The landfill is managed by Enviroguard, under environmental protection licence 4865 issued by the NSW EPA under the *Protection of the Environment Operations Act 1997*. Under this licence the site is currently licensed to accept inert and solid waste (Class 2). The area in which Enviroguard operates is defined as Lot 4 - DP 1094504.

A site layout is presents in Figure 2.

3.0 EXISTING SURFACE WATER AND SOILS MANAGEMENT SYSTEM

The soil and water management infrastructure currently in place at the site is documented in the Stormwater Management Report, Golder, 2020 (Golder, 2020a) Stormwater Management Report.

The surface water management system is designed for the final profile. The final landform design is presented in the Post Closure and Rehabilitation Plan, Golder, 2020 (Golder, 2020b) and features a finished level with an elevation comparable to the original pre-quarry topography. The final landform elevation will be 87m AHD, achieved by finishing the landfill at RL 92 m AHD and allowing for 5 m of settlement over time.

There are two existing stormwater/sedimentation basins operating on the site. These are located in the north west and south east corners of the site. The water management strategy and infrastructure has been developed and sized based on what is considered to be the worst case scenario which is once the final form of the landfill is completed but before it is fully revegetated. Infrastructure consists of combined sedimentation and stormwater detention basins, with water being collected at the base of the landform and transported to the basins via swales.

4.0 SURFACE WATER AND SOIL MANAGEMENT PLAN: FILLING WORKS ABOVE R.L 55M AHD (QUARRY RIM) & POSTCLOSURE PHASE

4.1 Surface Water and Soil Management Principles

The proposed stormwater management strategy for the on-going filling and post-operational phases is described as follows:

- Volume reduction through the diversion of runoff around landfill and hardstand areas;
- Runoff from disturbed areas is directed to the sedimentation dams;
- Reducing erosion of external surfaces through the use of mulch and cover crops as appropriate;
- Reduction in the volume of "sediment-laden" or "dirty" stormwater through the retention of vegetation on exposed surfaces;
- Drainage and sediment control designs are operated and maintained out in accordance with the Stormwater Management Plan Appendix E in accordance with DA 05/1740.01
- Stormwater held in the sedimentation dams may be treated chemically prior to off-site discharge if the retained water fails to meet the specified discharge criteria within 14 days after the cessation of rainfall.
- Reduction in the volume of retained stormwater through on-site re-use.
- Treatment will be minimised by using the poorest quality water acceptable for each task.
- All water that has been in contact with waste is handled and treated as leachate;
- Reuse of water that has been in contact with waste is used for dust suppression on the landfill;

4.2 Management Infrastructure

Infrastructure for soil and water management for the site consists of the items listed below and is presented in Figure 3.

- South-eastern dam to retain surface water runoff from the southern and eastern areas of the finished landfill;

- North-west dam to collect surface water runoff from the northern and western sides of the finished landfill. Channel on the northern end of this dam to transfers the overflow into the South Creek system;
- A ring perimeter drain running along the base of the landfill to collect the surface water runoff the sides of the finished landfill;
- Pipe culverts and drainage lines to transfer flow from the perimeter drains into the north-western dam and south eastern dam; and

The following erosional controls are put in place:

- Silt fences constructed along the base of externally-draining slopes not captured by the MSW Wall and along contours as each lift of waste is placed above grade;
- Silt fences erected around the base of overburden stockpiles prior to re-working as required;
- Mulch or cover crops applied to external landfill batters built to final landform contours in order to minimise erosion; and
- Stockpiles and other exposed externally-draining surfaces stabilised with vegetation or mulch if the area will not be reworked for a period of greater than 120 days.

4.2.1 Stormwater Collection and Transport

The stormwater will be permitted to drain freely down the sides of the landfill into a ring of perimeter drains running along the base of the emerging mound. Hydraulic analysis of the perimeter drains was undertaken as part of the Stormwater Management Report (Golder, 2020a).

Drainage culverts allow flow in the perimeter drains to pass under the adjacent site access road and into drainage lines extending into the sediment basins.

4.2.2 Sedimentation Dams

The south-eastern dam collects surface runoff draining from the southern and eastern areas of the landfill. On-going maintenance work will be required for this dam while filling continues, to ensure that the detention volume within the basin remains. Once the landfill has been filled, it will only be necessary to ensure that the basin inlets and outlets remain functional. No sediment removal will be necessary as this basin is intended for use during the initial post closure phase only (Browns, 2007). During this period, when sediment generation in runoff is expected to be at maximum levels, the basin may fill with sediment and, over time, the sediment may reach the surrounding ground level forming a 'marsh-like' area through which surface runoff can drain, prior to natural discharge to the south of the site.

On-going maintenance will be required for the north-western dam to remove sediment so the basin retains the necessary detention requirements.

Runoff detained in both basins should be reused on site as required for irrigation of rehabilitated areas.

4.2.3 Treatment of Stored Runoff

Stormwater retained in sedimentation dams will be treated prior to off-site discharge if, after physical settling, the retained water fails to meet the specified discharge criteria within 14 days after the cessation of rainfall.

Treatment may involve:

- The addition of a coagulant to the stormwater with pH adjustments as required to remove fine suspended particles; or

- The addition of a flocculent to the stormwater with pH adjustments as required to remove larger suspended solids.

It should be noted that chemical dosing will only be adopted if physical settling is unable to meet the performance objectives.

The design and operation of any chemical treatment system should take into consideration the factors that determine optimum, cost-effective performance. The system should be designed such that:

- The treatment compounds selected specifically target the non-compliant parameters, and are used at an appropriate dosage for the quantity and quality of the stormwater requiring treatment;
- The treatment system must ensure that chemicals are mixed rapidly into the stormwater to ensure proper dispersion;
- If flocculants are to be used to treat stormwater, the system should be designed such that sufficient flocculation occurs in the pipes/conduits leading from the point of chemical addition to the settling or sediment basin; and
- Furthermore, if flocculants are to be used then the system should be designed such that outflow velocities are kept minimal to prevent flow discharge.

4.2.4 Design Calculations

Design calculations for sedimentation dams and drainage channels as specified in the Golder (2020a).

4.3 Erosion Controls

Erosions controls for the finished landfill are centred around minimising the extent of bare earth exposed on the rehabilitated site.

This will be achieved through the placement of vegetation cover over regraded overburden areas and externally draining landfill slopes as soon as possible after completion. At the very least a cover of mulch should be placed over exposed soil after completion of works if immediate placement of the final vegetation cover is not possible.

It is expected that sediment generation will decrease with time as the vegetation cover becomes established, however in the interim to ensure storm events do not de-stabilise the finished surfaces it is recommended that jutes strips, or other stabilising devices, are placed at regular intervals down the final landfill slope.

The jute strips will have the ability to channelise surface runoff down the slope towards the perimeter drains and also trap coarse sediment on the slope. The material should be placed in strips, at least 2 m wide, above the new vegetation cover and pegged in place using starpickets, or some other anchoring device. It is important that the material is adequately anchored to the ground surface to ensure it is capable of remaining in place during storm events and also does not allow sediment laden runoff to pass underneath untreated and into the perimeter drains.

An access road is to be constructed along the perimeter of the rehabilitated area. Erosion control will also require adequate management of the site to ensure that the vehicular traffic on the site remains on the designated access road only, unless absolutely necessary.

- Revegetation in accordance with the Landscape Management Plan (Tonkin, 2019) for the site. The site has been divided into four distinct areas that require different vegetation management approaches. The areas are:

- Zone 1 – Rim of the Quarry; It is noted that in Zone 1, along the alignment of the wall, Cumberland Woodland Mix would not be planted on the wall structure or facing, however would be retained south of the wall.
- Zone 2 – Cap of the Landfill (approximately 17 ha);
- Zone 3 – Peak of the Landfill – Two 1 hectare areas; and
- Zone 4 – Wet areas associated with the sediment basins.

4.4 Monitoring and Reporting Requirements

A quarterly water quality monitoring programme is currently in place at the site as per the EPL. The programme involves monitoring of water in the north-eastern and south-eastern dams. It is recommended that the current programming of monitoring is continued.

Regular inspection of the dams will be undertaken to monitor conditions and sediments levels in the dams and cleaned out as required. Stored sediments will be removed once the storage zone has been filled. Dams will be equipped with markers to indicate when cleaning is required.

5.0 REFERENCES

Arcadis (2019), Annual Environmental Monitoring Report, Erskine Park Landfill, prepared by Arcadis Australia Pacific Pty Limited, Report Number: 10031624_RP01dated 15 May 2019.

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Tonkin (2019) Proposed Restoration of the Erskine Park Landfill, Detailed Landscape Plan, prepared by Tonkin Consulting Pty Ltd dated 19 December 2019.

Signature Page

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APPENDIX A

Figures

Figure 1: Site Location

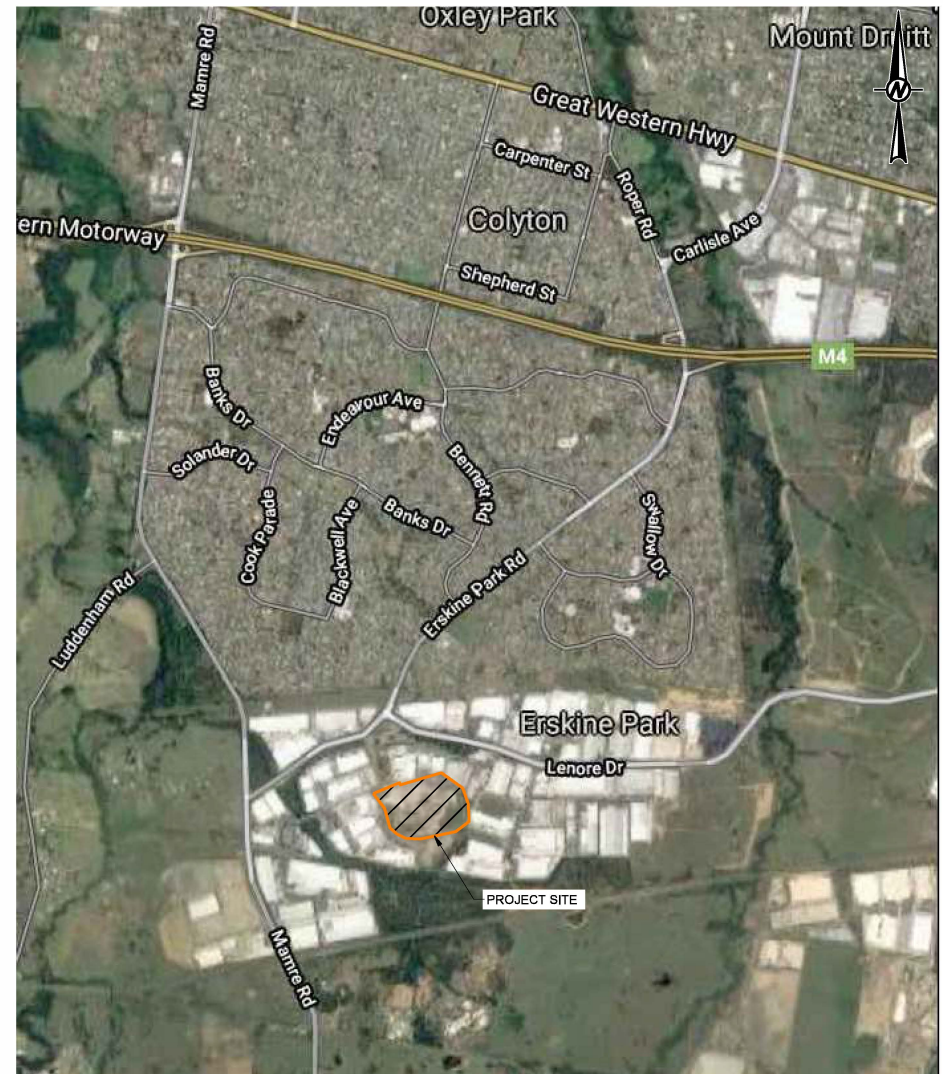
Figure 2: Site Layout

Figure 3: Surface Water Management Infrastructure

REGION



SITE LOCATION



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ENVIROGUARD PTY LTD.

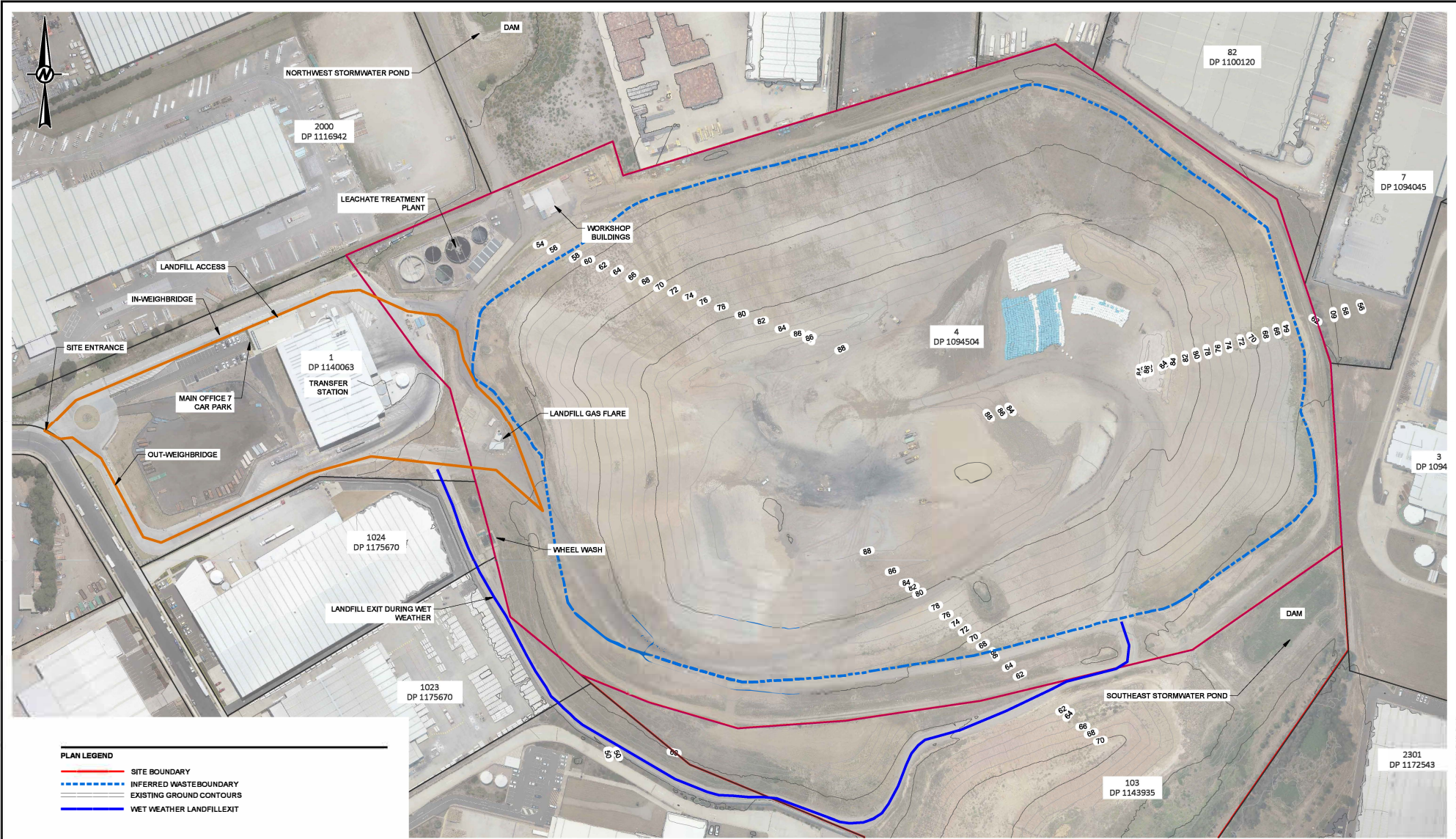
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ERSKINE PARK LANDFILL

CONSULTANT	YYYY-MM-DD	2020-04-08
	DESIGNED	UP
	PREPARED	JF
	REVIEWED	JM
	APPROVED	JM

TITLE
SITE LOCATION

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IF THESE REQUIREMENTS GOVERNMENT MANDATES FOR ERKINE PARK, THE SHEET HAS BEEN MODIFIED FROM THE ORIGINAL



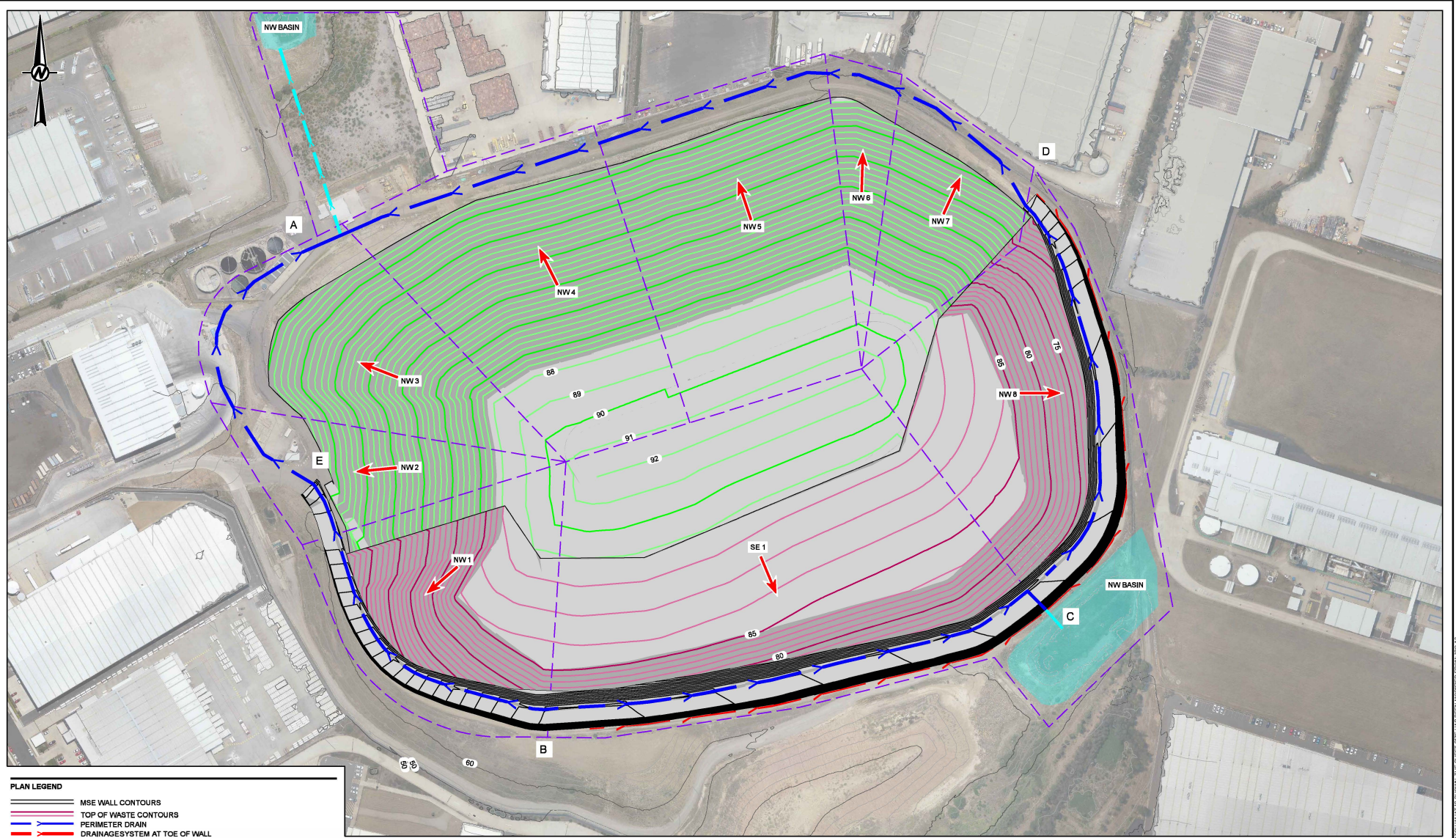
- PLAN LEGEND**
- SITE BOUNDARY
 - - - INFERRED WASTE BOUNDARY
 - EXISTING GROUND CONTOURS
 - WET WEATHER LANDFILL EXIT



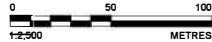
**NOT FOR CONSTRUCTION
DRAFT**

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	PROJECT	ERSKINE PARK LANDFILL			
	TITLE	EXISTING SITE LAYOUT			
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FIGURE		002	



- PLAN LEGEND**
- MSE WALL CONTOURS
 - TOP OF WASTE CONTOURS
 - PERIMETER DRAIN
 - DRAINAGESYSTEM AT TOE OF WALL
 - CATCHMENTS BOUNDARY
 - CULVERT
 - DIRECTION OF FLOW



NOT FOR CONSTRUCTION
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REV.	DATE	DESCRIPTION	JM	BK/SF	JM	JM
0	2020-04-08	DESCRIPTION				

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PROJECT
ERSKINE PARK LANDFILL

TITLE
SURFACE WATER MANAGEMENT PLAN

PROJECT NO. **19135652** CONTROL **020** REV. **0** of FIGURE **F007**

APPENDIX B

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