Central Darling Shire Council



Draft Ivanhoe Waste Facility Long Term Plan of Management



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1.0 Overview

The Ivanhoe Waste Facility is described as lot 40 DP 754687, is located about two kilometres from the township of Ivanhoe off the Ivanhoe to Cobar Road and serves a district population of around 200 residents. It utilises an excavation and fill method for waste disposal, together with stockpile areas for the recovery of green waste and scrap metal. Asbestos is accepted at the facility for disposal in a separate excavation and there is provision to accommodate deceased animals. The facility occupies around 10 hectares of land and has been in operation for many years. There is no means of accurately measuring the quantity of waste being received, but going by the resident population together with transient population, it could be expected the facility would receive between 200 tonnes to 250 tonnes of waste material per annum

The site is not supervised, that is, there is no Council presence to oversee the operation of the facility or to collect fees nor is the site controlled, that is gates are not shut to limit access to defined times. Previous Council endeavours to supervise and control the site have been discontinued primarily because of resourcing constraints. Uncontrolled and unsupervised sites are difficult to manage effectively and rely on good signage and user cooperation to control indiscriminate waste placement, dumping of prohibited wastes and contamination of recoverable materials. Regular attendances at the site by Council staff with suitable plant to push up waste and separate contamination from stockpiles of recoverable .materials should form part of the future management protocols for the waste facility.

It is difficult to determine what proportion of the site has been previously trenched and filled, though the disturbed and waste covered nature of the overall site indicates above ground disposal of inert material may have been a common practice in the past and that the ground beneath has not been trenched and filled. A defined area of the site has recently been closed and partially rehabilitated under a Waste Less, Recycle More grant. Other improvement works have seen previous stockpiles of wood waste, mattresses and waste concrete landfilled and the areas rehabilitated and litter fences extended. Litter remains an issue and the procurement and use of mobile litter fences that are positioned near to the active tipping area and the regular removal of the collected litter should be undertaken

The current excavation contains a quantity of leachate that is being generated from an up gradient catchment where surface water is directed to the landfill. Much of the waste mass within the landfill is not covered and the application of cover seems to be at irregular intervals. The quantity of waste being placed for disposal seems excessive for the small local population. Geotechnical engineer, Robert Amaral, has provided concept designs and notes (see Appendices 1 and 2) that demonstrate how the leachate is to be removed and treated, the up gradient catchment diverted, the existing waste mass re-shaped and capping applied. At present, green waste and concrete are being stockpiled, though these should be landfilled if there is no re-use potential for these materials. A CAT 950 rubber tyre loader (FEL) is used to push up the waste which achieves minimal compaction. The resulting shape of the waste mass is poor, compaction is negligible and the waste remains uncovered. An improved means of placing the waste material appears in Appendix 4 which should be adopted together with more frequent attendances of the FEL plant at the facility.

Scrap metal is separated and placed in a stockpile to be taken off site by a collection contractor. Recovered materials should be removed or processed routinely so that the stockpile is maintained at a manageable size. Given the site is not supervised, controlling contamination of the metals stockpile is difficult and Council staff should endeavour to remove contamination routinely whenever attending the site. Fluctuations in the market value of scrap steel have an effect on the frequency of the removal of this material from site.

Changes to current practices have been identified and together with the Amaral concept design filling plans and final landform designs, provide the guidance for the long term management of the waste facility.

2.0 Background

Central Darling Shire Council has determined to undertake a review of the operations of its waste facilities in order to identify how the residual life of the landfill can be maximised, how improvements to current practices could be introduced, where efficiencies may be gained and risks mitigated. Council's aim is to achieve sustainable management of the waste facility that is commensurate with available resources.

Council has prepared a scope of works and engaged Robert Bailey Consulting and Robert Amaral Geotechnical (Landfill) Engineer to prepare a long term plan of management for the Ivanhoe Waste Facility that will provide a final landform design, filling/staging plans and procedures to improve operational performance and to mitigate risks.

3.0 Purpose

The purpose of this Long Term Plan of Management (LTPoM) is to provide a process with the highest probability of achieving the defined project aims. The LTPoM would address long term planning and the future design of the Ivanhoe Waste Facility in considering the final landform, activity area interrelationships, existing and future infrastructure, plant utilisation, complying with the EPA Environment Guidelines: Solid Waste Landfills (2nd edition 2016), valuing responsible environmental performance, improving existing landfill management practices and recognising resource recovery opportunities.

The primary aims of the project are:

- To put measures in place that will maximise the residual life of the landfill
- To identify improvements to existing practices that will translate into cost efficiencies and provide for the realisation of these opportunities.
- To develop plans for the coordinated development of the facility over the longer term.
- To engage practices that will ensure responsible environmental performance is achieved
- To comply with the requirements of the EPA Environment Guidelines: Solid Waste Landfills (2nd edition 2016) together with other relevant legislation, regulations and codes where applicable

- To address risk
- To contribute to the development of an overarching strategic plan for Council's waste facilities including the preparation of a financial model that will predict future incomes and expenditures and will provide for the managed development of the facility over the longer term.

4.0 Operations

- 4.1 Current operations for the general waste active tipping area general waste, including self haul and kerbside collected waste, is deposited at the edge of the excavation and there are no measures in place to contain the size of the active tipping area. The site is not supervised, therefore signage is the principal means of controlling the disposal area. The waste material is pushed up occasionally (perhaps once a week) using a backhoe or front end loader (FEL) and the waste material is not compacted. Windblown litter is an issue as a consequence of these practices. A large up gradient catchment directs surface water into the excavation.
- 4.2 Proposed improvements to the operation of the general waste tipping area - Geotechnical engineer Robert Amaral (Amaral) has prepared concept designs for the future operation of the current general waste disposal area that includes sequencing and concept designs for staging and final landform. The first step will be to shape the up gradient catchment away from the landfill and then prepare an evaporation area and pump out the leachate for disposal. (see Appendices 1 and 2). Using an excavator with a long reach, or similar suitable plant, pull back the deposited waste to concentrated area within the landfill and develop a shape suitable for capping. Track compact the waste and apply the final capping. Develop the tipping platform for future waste placement. Capping material can be sourced from the windrows of ENM located near to the landfill. Place bollards or barricades to control the size of the active tipping area. Suitable mobile litter fences could be used to limit the size of the tipping area. (an example of a suitable litter fence is shown in Appendix 6) Continue landfilling in accordance with the Amaral concept designs (see Appendices 1 and 2).
- **4.3** Existing landfill plant a front end loader (FEL)
- **4.4 Proposed improvement to landfill plant utilisation** Appendix 4 provides guidance on the placement and partial compaction of the deposited waste using the FEL and keeping the depth of waste to about 2.0 metres. The ongoing use of the FEL will be a compromise between avoiding the purchase cost of a more suitable item of plant (eg traxcavator) and the accelerated consumption void space and cover material
- **4.5 Current site control and supervision –** the site is not supervised that is there is no Council presence to oversee the operation of the facility or to collect fees nor is the site controlled, that is gates are not shut to limit access to defined times. Previous Council endeavours to supervise and control the site have been discontinued primarily because of resourcing constraints.

Improved signage and the use of bollards or mobile litter fences will be required to better manage traffic and to identify where waste is to be deposited.

- **4.6 Proposed improvement to site control and supervision –** no changes are proposed to site control and supervision other than to provide improved signage and measures to control the size of the tipping platform.
- **4.7 Current Green Waste Management –** there is a separate area remote from the active waste disposal area where self haul green waste and wood waste are stockpiled, pushed up and can be shredded as part of a service contract. Contamination is significant where plastics and metals are evident. The stockpile also includes materials such as MDF(medium density fibreboard), treated pine, particle board and laminated timber. Shredding can be expensive and the contaminated product has little re-use value other than for cover material or placement over disturbed areas to control dust and erosion.
- **4.8 Proposed improvements to green waste management** although no change is proposed to the manner in which green waste is stockpiled, the location may shift to be closer to the general waste disposal area. The existing stockpile of green waste is contaminated and should be landfilled. For the current stockpile and for the future management of green waste, as an alternative to shredding and to save costs, when suitable plant is available, that is larger plant with tracks such as dozer or excavator, the stockpiled green waste can be spread, larger items of contamination removed and the green waste broken up using a number of passes of the track machine. The broken up green waste can then be landfilled or placed on top of capped surfaces, depending on the quality of the finished product to control dust and erosion. It may also be used as cover as a substitute to ENM.
- **4.9** Current scrap metal management self haul scrap metal is stockpiled and on sold to a service contractor whereby the material is taken off site on a routine basis. The scrap metal stockpile is pushed up from time to time using the Council FEL
- **4.10 Proposed scrap metal management –** an effort should be made to ensure the scrap metal is contained to one controlled stockpile area and not allowed to spread or multiple stockpile areas develop. Contamination remains an issue and some effort should be made to better manage the contamination. This may require contamination to be removed routinely. A collection contractor should be engaged to remove the accumulated scrap metal on a regular basis
- **4.11 Current and proposed waste concrete management –** Historically waste concrete and other inert materials were placed over previously trenched and filled areas or over virgin areas of the site. A recent Waste Less, Recycle More grant has seen some of above ground waste concrete combined and covered and contaminated green waste and contaminated scrap metal landfilled. Currently, receivals of waste concrete are being stockpiled within the site, however the retained concrete and future loads of waste concrete

should be confined to the general waste disposal area. Suitable waste concrete can be utilised to form internal berms at the general waste disposal area or on access tracks where such use is appropriate

4.12 Deceased animals and asbestos disposal- the issue confronting Council with difficult wastes such as asbestos is that the waste facility is not controlled nor supervised. Therefore Council relies on those wanting to dispose of asbestos to act responsibly. The information contained on Council's website states "Any wastes containing or potentially containing asbestos are classified as asbestos waste and must be disposed of properly, according to NSW legislation and relevant guidelines. There are significant penalties that apply if legislation isn't adhered to, including illegal dumping of asbestos and placing into kerbside bins. Furthermore, improper handling and disposal of this material can put you, others and the environment at risk". There is a download on the website that provides guidance on the correct means of disposing of asbestos. The Waste Regulations require final depth of soil above the asbestos should be 1 metre as prescribed in the Waste Regulations (2014) (see Appendix 5) and cover applied at the end of each day to a depth of at least 0.5 metres. Council should develop an asbestos policy and require advanced notice of a person's intention to dispose of asbestos in order that plant can be on site to assist with the correct means of unloading asbestos and to apply the ENM cover in accordance with the Waste Regulations. Equally Council should develop a procedure for the management of deceased animals.

4.13 Litter- litter fences have been established in the vicinity of the active tipping area and retain much of the windblown litter coming from the active tipping area. The litter is contained against the litter fencing and continues to accumulate. Mobile litter fences should be procured and positioned near to the active tipping area to prevent the spread of windblown litter. (see Appendix 6) A program should be established whereby the accumulated litter is collected routinely and then landfilled

5.0 Landform Concept Design

Final landform design and filling/staging plans have been prepared for the future development of the Ivanhoe waste facility and these appear as –

- Notes to Accompany Design Drawings in Appendix 1,
- Guide to Site Capacity in Appendix 1,
- Concept Designs in Appendix 2

This suite of documents provides information on the development of the landfill for future decades and offers guidance for the orderly progression of the landfilling operations. Each sub stage is essentially a building block that in total combination will deliver the final landform. It will be most important that the design is followed in order to deliver the desired outcomes. This may require periodical examination by an external party (surveyor, geotechnical engineer) to confirm the landfilling works are progressing in keeping with the adopted designs.

Council should also be aware that operating a landfill effectively and in keeping with the EPA Guidelines requires skilled plant operators, correct plant, an understanding of grades, reduced levels, waste placement, surface water management, covering and compaction. Council staff who have been given the responsibility to oversee the operation of the facility and contractors who may be engaged to perform specific tasks should be trained accordingly and be familiar with the designs and the principles supporting those designs

6.0 Acts and Policies Associated with the Project

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Waste) Regulation 2014
- EPA Environmental Guidelines: Solid Waste Landfills (2nd edition 2016)
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Regulation 2000
- Infrastructure SEPP 2007

7.0 Delivery

Desired Outcomes - Ivanhoe waste facility will be developed in a planned and co-ordinated manner.

- The project will deliver the stated aims
- Risk will be managed
- Regulatory agencies gain confidence in Council's management processes
- Succession planning is achieved
- Landfill void space will be maximised
- Residual life of the landfill will be optimised
- Long term planning prevents re-work resulting in corresponding savings
- Budgets can be developed for the capital works and programmed for delivery in a measured way and for optimum benefit

Key Actions to deliver the desired outcomes

Milestone 1 – Re-instate the landfill (Amaral Appendices 1 and 2)

Key Tasks

• Re-shape the up gradient catchment to divert surface water away from the landfill

- Prepare an evaporation pond or suitable surfacer irrigation area and pump leachate from the landfill to the pond or irrigation area
- Use an excavator with a long reach, or similar plant to pull back the deposited waste to a concentrated area within the landfill and develop a shape suitable for capping. Council's FEL may be suitable if an excavator is not available.
- Track compact the waste and apply the final capping.
- Develop the tipping platform where lifts of placed waste will not exceed 2.0 metres or thereabouts or as required by the Amaral concepts RLs.(Appendix 2)
- Procure and position litter fencing near to the active tipping area
- Continue landfilling until the current excavation achieves the final design landform

Milestone 2 – recommence landfilling at the newly developed active tipping area

- Crush and landfill the existing stockpile of green waste
- Re-establish the green waste stockpile area near to the landfill
- Landfill the existing stockpile of waste concrete
- Provide barricades to control the depositing of waste to ensure materials are confined to the active tipping area
- Push up waste in accordance with the "waste placement technique" (Appendix 4)
- Apply cover routinely from the established stockpile of ENM
- Collect litter regularly where it has accumulated at the litter fencing and place into the landfill

Milestone 3 – prepare an asbestos management policy

- Review the asbestos information currently contained on Council's website
- Develop protocols for advanced notice for the disposal of asbestos
- Train Council staff who may be required to deal with incoming loads of asbestos in the correct management of asbestos

Cost Estimates - Figures provided below for the likely cost of works required to achieve the milestones are cost estimates only and may well vary depending on a range of circumstances. The purpose of the estimates is to provide inputs for the financial model that has been developed in the overarching Strategic Plan. The Strategic Plan has been prepared to provide guidance for the future management of all of Council's waste facilities.

Milestone 1

Re-instate the landfill Year 1 \$40,000 (capital cost)

Procure and position mobile litter fencing (10 x 3 mere long panels @ \$900) **\$9,000**

Milestone 2

Recommence landfilling at the reinstated active tipping area **Year 2 \$10,000** (capital cost) Increase the operational budget by 30% to enable more regular landfill servicing

Milestone 3

Prepare an asbestos management policy (in house- no direct cost)

9.0 Appendices

Appendix 1- Notes to Accompany Design Drawings

NOTES FOR INCLUSION WITH LANDFILL DESIGN DRAWINGS 20205i

GENERAL

There are a number of issues / circumstances which have an impact on the design of the Ivanhoe Landfill as discussed in detail by Bob Bailey in the main text of this LTPOM :

- * very small size of the waste source community
- * remote location
- * unlimited access to an unmanned site
- * limited access to purpose built landfill equipment
- * advantageous low permeability geologic soil profile
- * advantageous evaporation to rainfall ratio (at least 6:1)
- * extensive volume of scattered waste (largely inert)

Some of these issues have no ready solution due to cost restraints.

The following design details attempt to take account of these issues and do not always follow the NSW EPA Guidelines for Landfills but can be technically supported / defended because of the advantageous geological nature of the site and its very favourable climatic environment.

In particular, the usual major environmental issue for landfills is the generation and potential movement off site of leachate which, at lvanhoe, is essentially non-existent.

FIGURE 1 SITE SURVEY PLAN (DECEMBER 2020)

Central Darling Shire Council has provided an up to date 0.5m contour plan of the site which is reproduced herein as Figure 1.

FIGURE 2 SITE PLAN

The area of interest of the entire property is noted on **Figure 1** and has been redrawn herein as **Figure 2** with simplified contours, excluding local stockpiles and the like.

The operational area of interest essentially varies from RL 88 and RL 89 when local excavations and stockpiles are excluded, with a possible very small gradient downwards towards the southeast.

FIGURE 3 STAGE 1 FILLING PLAN

The first essential order of business is to dewater the existing pond in the middle of the existing landfill so that this area can be accessed by the front end loader (FEL) to remove all existing waste within and to the south of the pond.

This can be done by essentially pumping the water out to the surrounding (on site) environment where it will readily evaporate and remove the key leachate contaminants of ammonia and BOD taking care to use a pump out rate that does not allow any water to leave the site.

In this regard, the existing catchment which feeds the pond needs to be excised from it by soil bunding. The very favourable evaporation to rainfall ratio only works if the area of evaporation (pond) is not overwhelmed by a large external catchment.

Once dewatered, all the existing waste to the south of main waste mass needs to be collected by the FEL and moved into the Stage 1 filling area.

Following the removal of all the waste out of the pond and into the Stage 1 filling area , place a windrow of soil about 1m or so high against the base of the Stage 1 waste southern batter as shown on **Figure 3**.

The FEL can be used to place and tamp this soil bund against the waste face such that any future rainwater that collects in this area can be pumped out as clean water as it will not have contacted any waste.

As shown on **Figure 3** the waste placed in the Stage 1 filling area should be tamped down with the FEL from about RL 89 along its east-west crest line to about RL 88 to the north.

Some form of survey markers should be placed along this crest line to give the FEL operator guidance as to what level he needs to achieve.

In order for this work to be achieved using an FEL, additional soil will need to be used to allow the waste to be pushed up and trafficked.

If necessary (and beneficially) loads of solid (concrete / other) material can be sourced from the many random stockpiles within 200m or so of the operational area to assist in building this Stage 1 shape.

Once developed the Stage 1 area should be covered with 300mm of soil as an Intermediate Cover.

FIGURE 4 SECTION A - A

A cross section through the completed Stage 1 filling area is shown on this figure.

FIGURE 5 STAGE 2 FILLING PLAN

This figure illustrates the completion of the Stage 2 filling program.

Prior to placing any waste, the pond area needs to be divided in two as shown on **Figure 5** by a soil bund.

Once the soil bund is in place, waste filling should commence from the west, moving east.

Access to the south eastern quadrant of the landfill should be restricted by the use of logs or other obstructions to control indiscriminate dumping.

As with the Stage 1 filling program, additional soil and / or local inert concrete pieces or the like can be used to allow the FEL to push up and ride over the waste.

In this regard most of the demolition materials brought to the site should be beneficially used and co-disposed with household waste to develop the various stages.

FIGURE 6 STAGE 3 FILLING PLAN

As shown on this figure, at the completion of the Stage 3 filling program, the entire area below RL 88 will have been filled and provided with a dome shape to divert rainwater off the current filling area.

At this stage the first three filling areas should all be covered with an Intermediate cover of 300mm of soil.

During these first three stages of filling, any necessary soil required to assist the FEL in shaping the Stages can be excavated from the mounded area on the southern side of Stages

1, 2 and 3 as this area will be largely excavated as part of the following excavation / filling stages.

Excavation from this area however should be carried out as a near surface stripping operation (less than 1m deep) such that the newly formed surface sheds surface water away from the landfilling area.

FIGURE 7 STAGE 4 FILLING PLAN

This figure illustrates the Stage 4 excavation and filling program when half completed.

The excavation should be carried out as a single operation with the excavated soil being placed strategically placed for later use.

The excavation should extend to RL 86, an average depth of about 2.5 to 3m.

A low soil bund will need to be placed along the top of the northern excavation face to divert rainwater runoff to the east.

Filling and access should be restricted to the western end so that the filling proceeds to the east over an advancing fill face which will need covering as it proceeds to allow trafficking by the FEL and, progressively, by householders.

Because of the depth of fill being placed during this and the subsequent Stage 5 filling program, the disposal of larger construction and demolition materials (including nearby stockpiled materials) can be beneficially placed to allow trafficking by the FEL.

During our site visit it was noted that there is a large volume of scattered small metal items (mainly tin cans and the like) across the immediately adjoining area. These could also be beneficially collected periodically by the FEL and disposed of in the landfill to help fill voids within the waste mass.

FIGURE 8 STAGE 5 FILLING PLAN

This figure illustrates the excavation and filling half way through the Stage 5 filling program.

As with Stage 4, this stage will provide a considerable volume of soil for later use during later overtopping stages.

At the completion of Stages 4 and 5 a final soil cover of 600mm can be applied (including the already placed 300mm Intermediate cover).

It will be the case that as the Stage 4 and 5 surfaces advance from west to east the surface will require local regrading (backblading by the FEL) to maintain a relatively uniform surface for vehicular access which will result in a somewhat deeper final cover.

FIGURE 9 STAGES 6 AND 7 FILLING PLANS

Stages 6 and 7 illustrate the overtopping of the previous stages to marry in Stages 4 and 5 to the south with Stage 1 to the north to form the final, domed landform.

The average depth of these filling programs will be about 2m and will proceed from west to east.

There will be excess soil available from the previous excavations and a direct covering of at least 600mm of soil as the waste face advances should allow ready access for the FEL and private vehicles.

FIGURE 10 STAGES 8 AND 9 FILLING PLAN

This figure illustrates the completed landform after Stages 8 and 9 have been filled and covered.

The sequencing of filling for these stages would be the same as for Stages 4 and 5.

ESTIMATED LIFE OF LANDFILL

Stage	Void	Cover *	Net	Life **
	Capacity (m3)	Required (m3)	Void (m3)	(years)
1	1,500	300	1,200	4
2	1,000	200	800	2.7
3	1,800	360	1,440	4.8
4	5,600	1,120	4,480	14.9
5	4,500	900	3,600	12

6	2,000	400	1,600	5.3
7	1,400	280	1,120	3.7
8	2,200	440	1,760	5.9
9	3,000	600	2,400	8
Totals	23,000	4,600	18,400	61+

* an assumed cover to waste ratio of 20% has been made. Due to the necessary use of additional cover to allow the FEL to push up and ride over the waste at this site, a greater usage ratio is likely.

** an assumed incoming waste stream of 300m3 per year (200 tonnes @ 0.7 +/- tonnes per m3) has been used. The incoming waste stream may be considerably more than this.



Appendix 2 – Design Concept Figures 1 to 10









Appendix 3 - Aerial Site Plan

Appendix 4 – Waste Placement Technique

Note – Tamp down the exposed waste with the FEL bucket from the top and then, if accessible, from the toe area push any loose waste into the leading face. Then tamp in the exposed waste with the FEL bucket. Scatter some soil over the leading face from the top (and from the bottom, if accessible) after tamping is completed. This will save cover material and reduce windblown litter

WASTE PLACEMENT TECHNIQUE USING FEL ONLY

Appendix 5 - Protection of the Environment Operations (Waste) Regulation 2014

80 Disposal of asbestos waste

(cf clause 42(4) of 2005 Reg)

- (1) (Repealed)
- (2) When a person delivers asbestos waste to a landfill site, the person must inform the occupier of the landfill site that the waste contains asbestos.
- (3) The following persons must ensure that when a person unloads or disposes of asbestos waste at a landfill site (regardless of whether the site is subject to an environment protection licence) no dust is generated from the waste—
- (a) the person unloading or disposing of the asbestos waste,
- (b) the occupier of the landfill site.
- (4) Subject to any alternative cover conditions provided in an environment protection licence held by the occupier or approved in writing by the EPA, the occupier of a landfill site must ensure that asbestos waste disposed of at the site is covered with virgin excavated natural material—
- (a) initially (at the time of disposal), to a depth of at least 0.15 metre, and
- (b) at the end of each day's operation, to a depth of at least 0.5 metre, and
- (c) finally, to a depth of at least 1 metre (in the case of bonded asbestos material or asbestos-contaminated soils) or 3 metres (in the case of friable asbestos material) beneath the final land surface of the landfill site.
- (5) In this clause, *landfill site* means a landfill site that can lawfully receive asbestos waste.

Appendix 6 – Example of Suitable Mobile Litter Fencing

