Narrandera Shire Council

Narrandera Waste Facility
Long Term Plan of Management

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1.0 Overview

Narrandera Shire Council controls and operates the Narrandera Waste Facility which is located at 16 Redhill Rd, Narrandera (Lot 340 / DP 821540 and Lot 311 / DP 751719), approximately 2.5 km north east of the Narrandera township. Residents of the serviced areas of Narrandera, Barellan, Pinehill, Nallabooma and Grong Grong are provided with a weekly general waste collection service as undertaken by Tomra Cleanaway where all of the collected waste is transported to the Narrandera Waste Facility for disposal. . The Facility also accepts self haul domestic general waste and commercial and industrial wastes and has been in operation as a landfill for approximately 40 years. The day to day activities are performed by Council staff where free disposal is offered for domestic general waste and for sorted waste. The Facility is open to the public for defined hours on Saturdays, Sundays, Tuesdays, Wednesdays and Fridays.

There is no weighbridge to calculate the quantity of waste materials delivered to the site, however based on the size of the local population of around 3,700, it is likely that about 4,000 tonnes per annum is received. The facility is not required to be licensed by the Environment Protection Authority (EPA) but nonetheless is operated under a number of legislative controls, including the EPA Environmental Guidelines: Solid Waste Landfills (2nd 2016) and the Protection of the Environment Operations Act (1997) and Regulations made there under.

Household waste is currently being deposited in a dedicated disposal area with other separate active tipping areas provided for inert waste, street sweepings, deceased animals, asbestos, some hydrated sludges and sewage screenings. The aggregation of these diverse tipping areas would improve operating efficiencies.

Stockpile areas are provided for green waste, wood waste, used tyres, leaf litter, drumMuster, scrap metal and mattresses. A ‘’return and earn” reverse vending machine has recently been installed at the entrance to the facility and a Community Recycling Centre (CRC) constructed within the facility for the receival of household problem wastes. The separation of e-waste for off-site recycling has recently been discontinued.

Overtopping of part of the landfill footprint is being undertaken at the existing general waste disposal area and inert waste disposal is being conducted in a separate area across virgin ground. A new excavation has been completed for the future landfilling of general waste with capacity for up to 10 years. However, the overall waste disposal processes are not particularly efficient and improvements can be made.

Preserving existing stockpiles of soil (large soil bunds) and identifying sources of additional soil for cover material will be important considerations with overtopping operations in the future. Council should be mindful that overtopping is construction work that requires skilled plant operators, correct plant, an understanding of grades, reduced levels, waste placement, covering and compaction. Greater emphasis would need to be directed to litter management with overtopping.

Although overtopping is already proceeding, there is no final landform design or filling (staging) plans nor excavation plans to guide the development of the final shape. This long term plan of management (LTPoM) addresses these matters.

The facility is operated by Council's staff and the principal item of plant is an early series Cat 936E front end loader that has been adapted for landfill work by adding compactor wheels and a trash rack. The landfill compactor (modified FEL) should achieve compaction rates of around 800 kilograms per cubic metre if waste material is placed in layers and a compaction pattern applied. Good compaction will maximise the effective life of the active tipping area and minimise void space consumption.

The landfill compactor (modified FEL) is suitable for pushing waste and for compacting but not ideal for constructing shallow diversion berms, nor trimming, nor shaping, nor loading trucks. The landfill compactor can be destructive when working on a tipping platform or access roads and tracks. Council staff will need to adapt the available plant to undertake all of the tasks associated with the operation of a waste facility and accept that compromises may be necessary as overtopping proceeds. A review of the plant requirements forms part of this LTPoM..

Windblown litter is an issue both within and outside of the waste facility. Litter is generally not being well controlled. Litter should be collected routinely and become part of the facility's standard operating procedures.

Incoming loads of household waste are being pushed up/compacted and partially covered with shredded green waste. The shape currently being achieved is not in keeping with what the final landform will look like and the shredded green waste that has been applied will need to be removed, the shape corrected, additional waste added, capping applied and then the shredded green waste placed on top to act as the re-vegetation medium as part of the final cap.

2.0 Background

Narrandera Shire Council has determined to undertake a review of the operations of the Narrandera Waste Facility in order to identify how the residual life of the landfill can be extended, how improvements to current practices could be introduced, where efficiencies may be gained and risks mitigated.

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 Narrandera Waste Facility that will provide a final landform design, filling/staging plans, site master plan and procedures to improve operational performance and to mitigate risks.

3.0 Purpose

The purpose of this Long Term Plan of Management 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 Narrandera Waste Facility in considering the final landform, activity area interrelationships, existing and future infrastructure, plant replacement, the application of fees and charges, 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 develop 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

A site master plan has been prepared that shows the location of a proposed domestic waste drop off area, buy back centre, small vehicle waste transfer station, other activity areas together with existing infrastructure. The master plan is included as Appendix 6.

General Principles

Weighbridge and gatehouse - the location of a future weighbridge has been added although this is unlikely to be constructed in the near term. When positioning a weighbridge and gatehouse it will be important to understand some general principles that should be observed for a weighbridge/gatehouse location and these are -

- Approaches to the weighbridge should be direct, have flat gradients, have good line of sight and provide sufficient space for vehicles to wait without interfering with passing traffic
- There should be a clear line of sight to observe approaching vehicles from the gatehouse
- Have an un-tarping area at the ingress approach to the weighbridge so that loads can be inspected at the weighbridge
- The gatehouse should be located to allow the operator clear line of sight for approaching vehicles, to enable loads to be inspected (elevated CCTV and manually), to allow the operator to communicate effectively with customers and to enable the exchange of payments/receipts

- Be located where the gatehouse attendant can generally observe activity areas within the waste facility
- Accept that compromises may need to be made

Buyback Centre – Buyback centres can play an important role in Council's overall waste management strategy by providing the local community with the opportunity of donating or purchasing re-purposed goods and materials. Buyback centres can provide employment and on the job training avenues and help support other community enterprises. It is not necessarily just about waste diversion. The following are some features to consider when establishing a buyback centre –

- Should be located outside of the waste facility, but near to the entrance. Those wishing to access the buyback centre do not need to enter the waste facility
- Should be generally under cover and suitably sized to enable goods to be displayed and for customers to have easy access to goods and materials (need to consider landfill gas in enclosed spaces)
- Have professional signage that identifies and promotes the buyback centre and signage that clearly defines what goods and materials may be accepted and those that will not be accepted
- How the buyback centre will be operated, that is, by social enterprise, not-for-profit group, contractor or Council staff
- How suitable goods can be recovered from incoming waste loads
- Site security (chain link fence, CCTV, back to base monitoring)

The successful operation of a buyback centre relies on sound marketing principles including the following –

- The operator has organisational aims and objectives that demonstrate their purpose in operating the buyback centre. This may include being a social enterprise
- The operator has a staff training policy which includes customer service, personal development, and monitors staff performance
- Staff are noticeably polite, have a positive attitude and are keen to make the business successful
- The operator has a stock turnover policy.
- The operator has a policy on acceptable and unacceptable items.
- The operator has a system to move stock so as to prevent excessive shelf life.
- The operator has a method of presenting stock which is appealing and avoids clutter.
- The operator has guidelines on the set out of shelves and passageways.
- The operator has an effective marketing plan

Small Vehicle Waste Transfer Station – the purpose of a small vehicle waste transfer station (transfer station) is to restrict domestic self haul vehicles from accessing the active tipping area, where plant can be operating and large commercial vehicle manoeuvring and unloading. When determining the location, design and construction of a transfer station, the following matters should be considered –

- Geo technical survey (to ensure sound foundations)
- Transfer station design and engineering drawings
- Approvals process (DA/CC) - is a SEE required
- Community engagement
- The gradient and cross fall of where the transfer station may be located
- Surface water catchment and surface water management
- All weather access
- Risk assessment
- Likely throughput
- Level tipping platform
- Budget
- Security (CCTV linked to the gatehouse)
- The type of transfer receptacle(s) to be used and how it will be serviced
- Access and manoeuvring
- Traffic control
- Signage
- Fall protection
- Management of spilt or windblown materials (including use of chain link fences)
- Weather protection
- Vehicle protection (wheel stops, location of stanchions, line marking, concrete kerb or upstand)
- Emergency response
- Located at the end of a loop where recoverable materials can be dropped before accessing the transfer station (including household recyclables, mattresses)
- Staff training and staff resources
- The number of vehicles to be accommodated at any one time
- Update any existing WH&S Management systems and SOPs
- Suitable signage warning of potential hazards

4.1 **Current operations for the general waste active tipping area –** general waste, including self haul and kerbside collected waste, is deposited at the active tipping area and is pushed up daily using the Cat 936E front end loader (FEL) that has been adapted for landfill work. The tipping platform is located at the base of the waste mass and is suitably sized. The deposited waste material is progressively loaded into the FEL bucket and transported to the top of the waste mass where it is placed and compacted. This is not a particularly efficient method of waste management.

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 and expansion into the newly excavated cell and for future stages. A top to bottom approach should be adopted for waste placement where an access road will be developed at the current filling area so that trucks can haul their

wastes to the top of the current landform and off load on a tipping platform. Waste will be progressively pushed onto the tipping face and compacted (see Appendix 8) and figure 13 Appendix 2. Waste will continue to be deposited in this manner until the designed landform shape has been achieved for the current tipping area before moving to the newly excavated stage (see Appendix 2. Domestic self haul vehicles will continue to drop off wastes at the base of the current tipping area waste mass until a waste transfer station is constructed. Once the transfer station is in use, all waste material, including commercial and industrial wastes will be deposited at the one active tipping area and the current inert and bulky waste active tipping area will be closed and the site rehabilitated.

4.3 **Current operations at the active tipping area for inert waste**.- inert commercial/industrial wastes and bulky wastes are deposited in a dedicated area separate from the general waste disposal area. Some of these waste types are bulky, irregular in shape and can be difficult to manage at the tipping area. This operation simply places the waste material over virgin ground and is an inefficient use of landfill space and has sterilised potential sources of cover material. Operating multiple waste disposal areas is not considered good practice as it adds to the cost of disposal and consumes resources unnecessarily.

4.4 **Proposed improvements to the operation of the active tipping area for inert and bulky waste –** Amaral concept designs (Appendix 2) show the proposed re-location of the inert and bulky waste activity to the general waste disposal area as stage 1 or stage 2, depending on Council's adopted timeframe Top to bottom approach is proposed Figure 13 (Appendix 2) provides guidance as to how the waste materials would be placed as the landform progresses.. Waste types considered difficult to handle and to compact should have fees applied reflective of the cost of disposal. Existing areas of inert and bulky wastes external to the proposed four stages of filling should be shaped, covered and re-habilitated using suitable plant. A risk assessment should be completed before any further work in undertaken on these exposed bulky waste areas

4.5 **Existing landfill plant -** a Cat 936E front end loader (FEL) that has been adapted for landfill work by adding compactor wheels and a trash rack above the bucket is the only item of plant dedicated for use at the landfill. The modified FEL/compactor can perform a range of tasks including the placement of daily cover, spreading shredded green waste as a revegetation medium, pushing waste onto the active tipping face and compacting the waste material. Its use is generally restricted to the active tipping area. If used on other parts of the waste facility, the compactor wheels can be destructive on hardstands, internal roadways and rehabilitated surfaces. It would not be ideal on external batters where final capping is to be placed and compacted on gradients of 1 vertical to 3 horizontal.

4.6 **Proposed improvement to landfill plant** – for landfills where relatively small quantities of waste are received, that is less than 5000 tonnes per annum, a universal item of plant suitable to manage these wastes would be a traxcavator (crawler loader), such as a Cat 953 K

A traxcavator with a four in one bucket could be used to place and spread the waste at the active tipping area in shallow layers and to “track” compact the waste until a uniform surface is created. Compaction rates of 700 kilograms per cubic metre could be achieved and a more uniform finish maintained that would require a minimum of daily cover material. Well compacted waste would be less likely to generate windblown litter and would have reduced post closure settlement

The traxcavator could be used to construct stormwater diversion berms, pre-strip the landfill floor, shape and grade the intermediate cover, push up the green waste/metals stockpiles, load trucks/trailers, construct drying beds for sludges and a range of other activities in addition to placing and compacting waste

It is important for the waste to be placed and compacted in keeping with accepted best practice in landfill management regardless as to what type of plant is being used. Waste should be placed in layers up to one metre on a face having a gradient of around 1vertical to 4 horizontal. Lifts should be 2 to 2.5 metres high and compacted until a uniform even surface is achieved.

Council should undertake its own investigations into what item of plant would be best suited to the proposed operations at the Narrandera landfill, taking into account the types of work envisaged, the residual life of the existing machine, purchase of either new or second hand (any plant with more than 10,000 hours should be considered carefully – 5000 hours preferred) capacity (willingness) to pay, potential internal plant hire rate, local servicing, international exchange rates, warranty. Short term hire of various items of plant (wet hire and dry hire) and consulting with other facility operators on their choice of plant may be options in order to gain confidence before making a decision to purchase an expensive item of plant.

4.7 **Current site control and supervision –** site supervision and landfill activities are undertaken by a single member of Narrandera Shire Council. The position requires the operative to manage the gatehouse where loads are inspected, fees applied to commercial loads and instructions given. After closing time, the operative attends to various site activity areas, predominately pushing up and compacting the deposited waste materials.

4.8 **Proposed improvement to site control and supervision –** it is proposed that an additional 0.5 full time equivalent person be employed to be stationed at the gatehouse and to undertake duties and tasks associated with that position (see position statement Appendix 4) including the assessment all incoming loads, applying fees, providing instructions and to supervise the areas located near to the gatehouse. The existing operative will focus on the landfill activities, including stockpile management, placement and compacting wastes, application of daily (weekly) cover, placement of final capping, winning/transporting of cover material, berm construction, hydrated sludge management, servicing the transfer station, supervising the CRC.

4.9 **Current Green Waste Management –** there are two separate areas where self haul green waste/wood waste are stockpiled, pushed up regularly and shredded routinely as part of a service contract. The first is near to the

general waste disposal area and is the larger of the two stockpiles. Contamination is significant where plastics and metals are evident. The stockpile also includes materials such as MDF(medium density fibreboard), treated pine, particle board, laminated timber, furniture and palm trunks. These make for a very poor shredded product of little value, especially where the shredding gauge appears to be 90 mm plus. The second stockpile is located towards the inert waste disposal area and appears to be made up principally of tree leaves and some tree branches/trunks that have been finely shredded. This is a better quality product. The shredded materials from both stockpiles are retained on site and have potential beneficial re-use applications.

4.10 **Proposed improvements to green waste management –** although no change is proposed to the manner in which green waste is stockpiled, the location will be changed and included into the self haul drop off area near to the proposed transfer station. Incoming loads will be inspected at the gatehouse to improve contamination management and materials such as MDF, particleboard, laminated timber, furniture, pallets, that is, anything other than green waste is directed to landfill. The existing poorer quality shredded green/wood waste could be used as the base layer for the re-vegetation medium as part of the final capping and then topped with better quality material which is more likely to break down and support a vegetative cover. It can also be used for internal berms. As the overall quality of the shredded material is improved, it can be used as placement over existing disturbed or covered surfaces to reduce dust and erosion, for sedimentation control and as the re-vegetation medium above intermediate cover and final capping

4.11 **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 regularly using the Council compactor (modified FEL)

4.12 **Proposed scrap metal management –**the scrap metal stockpile area will be re-located to the drop off area near to the proposed transfer station. All incoming loads of waste material will be inspected at the gatehouse and facility users required to take suitable scrap metal to the scrap metal pile.

4.13 **Current and proposed waste concrete management –** waste concrete is currently being landfilled within the inert and bulky waste disposal area and covered with ENM (excavated natural material) Once the proposed transfer station is constructed, waste concrete will be landfill within the general waste disposal area. Suitable waste concrete can be utilised to form internal berms at the general waste disposal area where such use is appropriate

4.14 **Deceased animals and asbestos disposal-** asbestos is currently disposed of within a dedicated disposal trench. This practice is acceptable however the final depth of soil above the asbestos should be 1 metre as prescribed in the Waste Regulations (2014) (see Appendix 5) and applied at the end of each day to a depth of 0.5 metres. A key feature of the long term plan of management is to rationalise the number of waste disposal activity areas and to concentrate the operations rather than have them spread throughout the facility. Both deceased animals and asbestos are currently deposited into

separate trenches but can be placed at the toe of the advancing face of the general waste disposal area and covered with excavated natural material (ENM) then overtopped with general waste. The depth of soil cover for deceased animals is not prescribed in the Waste Regulations (2014) and therefore can be at a depth determined by the on-site plant operator or supervisor. Once the proposed transfer station is constructed and domestic self haul vehicles prohibited from the general waste disposal area, asbestos and deceased animals could be deposited in the general waste disposal area.

4.15 **Hydrated sludges-** sludges from the off-site truck wash containing animal faeces and other sludges containing fats are currently poured over open ground near to the inert waste disposal area. Although the quantities are not significant, nonetheless there are better ways of disposing of these materials. Shallow drying beds formed from shredded green waste with perimeter berms of ENM would be preferable. Once dried, the beds could be added to the stockpiles of shredded green waste and used as the re-vegetation medium as part of the final capping.

4.16 **Street sweeping**s - street sweepings are currently deposited in a separate area near to the inert waste disposal area. The street sweepings are made up largely of gravel, dirt and some organic matter and would be suitable to be used as daily cover or for internal service roads. Operating an additional waste disposal area for street sweepings is not ideal

4.17 **Sewage screenings** – small quantities of sewage screenings consisting mainly of rags are deposited in a separate trench near to the general waste disposal area. . Operating this additional waste disposal area is not efficient and once domestic self haul vehicles are excluded from the general waste area, the sewage screenings should be deposited in that location

4.18 **Housekeeping** – it is not uncommon with larger sites that activity areas and storage of materials is spread widely throughout a site. The Narrandera Waste Facility sits within this description. The LTPoM proposes a **rationalisation of activity areas** where inert waste, street sweepings, sewage waste, asbestos and wood waste that are currently in separate locations are all included into the general waste disposal area. The proposed domestic self haul drop off area will concentrate green waste, scrap metal, mattresses, household recyclables, e-waste and drumMuster around the transfer station. This will improve supervision and deliver efficiencies in site management.

There are many **small stockpiles of gravel**, dirt, ENM and asphalt scattered throughout the site that should be aggregated and used as future cover material and all weather access tracks over waste. Once the domestic self haul drop off area/transfer station has been established and is operating, all cover material should be stockpiled in the current green/wood waste area, including these existing small stockpiles of gravel, dirt, ENM and asphalt.

The practice of shredding **mattresses** has seen a proliferation of mattress flock about the site near to the current mattress stockpile. This material should be collected and deposited at the general waste disposal area. It can act as a litter control measure. The proposed domestic self haul drop off area

will include cages for the acceptance of mattresses which will be transported of site for recycling.

In the past, **e-waste** has been placed into stillages and transported off site for recycling. This activity has recently been discontinued and some damaged stillages remain on site. These damaged stillages should be taken to the general waste disposal area and landfilled.

There is an accumulation of **waste oil** drums located near to the general waste disposal area, many of which contain waste oil. Waste oil should be stored within a bunded area or on bunded pallets and placed under cover. The existing CRC (community recycling centre).is the correct location for waste oil and the current accumulation of drums should be re-located to the CRC and stored on bunded pallets. Bunds should have a 110% capacity of the volume of the liquid materials stored thereon.

The area identified as **Amaral stage 3** is undulating and several sink holes are evident in the dispersive soil through which water in percolating and likely developing into leachate in the sub soil. This area should be graded towards the south east to shed surface water off site and a berm created on the northern face to divert run-off water from the up gradient catchment.

The operation of the facility is deficient in that it does not have an up to date **fire management plan** nor a **traffic management plan** and site **signage is inadequate.** These plans and improved signage should be developed and introduced as part of the delivery of the LTPoM.

5.0 Landform Concept Design

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

- Notes to Accompany Design Drawings in Appendix 1,
- Guide to Site Capacity in Appendix 1,
- Concept Designs in Appendix 2 and
- Design Principles 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 overtopping is construction work that requires skilled plant operators, correct plant, an understanding of grades, reduced levels, waste placement, surface water management, covering and compaction. Site personnel and supervisors 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 -

- The Narrandera Waste facility will be developed in a planned and co-ordinated manner.
- The project will deliver the stated aims
- Risk will be managed
- Stakeholder consultation results in broad support for the project.
- 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

Sequencing – broadly speaking, continue with current practices until the general waste disposal area (Amaral stage1) is completed and final capping applied. Concurrently, develop the domestic self haul drop off area and transfer station and have this completed before Amaral stage 1 landfilling achieves the final landform design. Make a determination on suitable plant. Establish service contracts for scrap metal removal, shredding of green waste, mattress removal and e-waste. Begin operating the domestic self haul drop off area and transfer station prior to commence landfilling of Amaral stage 2. Direct all general waste to Amaral stage 2, including commercial waste, asbestos waste, deceased animals, concrete waste and wood waste. Program "housekeeping" works. Buyback centre and weighbridge to be developed in time frames as determined.

1. Milestone 1 – Complete landfilling of the current general waste disposal area (Amaral stage 1) to achieve the final landform design and undertake the final capping

Key Tasks

- Construct vehicular access to the top of the existing waste mass
- Establish height pegs/markers that align with the Amaral stage 1 final landform RLs. Consider depth of final capping when determining RL for finished waste height
- Shape final batters on the western and southern sides to the stage 1 design (includes the filling of the catch drain on the western boundary)
- Work from west to east with the waste placement
- Identify sources of suitable final capping material
- Apply compacted final capping progressively as the design RLs are achieved

2. Milestone 2 - Make a determination on the most suitable item of plant. Undertake procurement if necessary

Key Tasks

- Consider the range of tasks required of plant in order to deliver the transition to the LTPoM
- Enquire with other operators of waste facilities of a similar size to Narrandera as to the type of plant used at their facilities and assess the performance
- Consider the residual life of the current FEL and how it might manage the identified tasks. Can it be retained and work in with a traxcavator?
- A new Cat 953 K traxcavator is likely to cost in the order of $485,000. Second hand with less than 5,000 hours is likely to cost $240,000. New Chinese manufactured landfill compactors could be as cheap as $200,000
- A determination should be made on plant before final capping is to be applied. Consider wet hire for job lots as an alternative approach.

3. Milestone 3 – Develop the domestic self haul drop off area and construct the transfer station

Key Tasks

- Determine the area to be used for domestic self haul drop off and waste transfer
- Confirm the master plan suitability
- Undertake civil works to prepare the identified site for the proposed uses
- Undertake geotechnical surveys where structures are intended to be built
- Prepare structural engineering designs and architectural designs for all proposed buildings and structures
- Determine if DA, CC and SEE are required. Make applications as necessary
- Call RFT or RFQ or engage Council staff for construction works and civil works
- Engage contractor or Council staff and undertake civil works

- Appoint contractor(s) or engage Council staff and undertake construction works
- Confirm suitability of the location of the drumMuster compound
- Procure waste transfer vehicle and recycling receptacles (mattress cages, 240 litre MGBs, e-waste stillages)
- Commission works
- Appoint depot attendant (permanent part time)

4. Milestone 4 – Design, construct and operate the Buyback Centre

Key Tasks

- Prepare documentation and call expressions of interest (EOI) to operate a buyback centre
- Consider submissions and appoint an operator
- Engage with the operator in the design of the buyback centre
- Undertake a geotechnical survey of the proposed location for the buyback centre
- Engage a structural engineer and architect to prepare plans and specifications for the buyback centre building.
- Consider potential landfill gas implications for building design and construction
- Prepare and submit DA/CC
- Call RFT or RFQ to construct the buyback centre building
- Consider submissions and appoint a contractor
- Undertake construction works
- Fit out and commission
- Commence operations

5. Milestone 5 – Commence landfilling - Amaral stage 2

Key Tasks

- Recover ENM by square cutting internal side batters (as advised by the geotechnical engineer) and stockpile for future use as cover material
- Recover ENM from the external side batters as landfilling progresses (as advised by the geotechnical engineer) and stockpile for future use as cover material
- Cut vehicular access and prepare a tipping platform and tipping face for the first filling pass

6. Milestone 6 – Rationalise waste disposal areas once the transfer station becomes operational and the public denied access to the general waste disposal area (Amaral stage 2)

Key Tasks

- Fill in the existing asbestos disposal trench and place all future asbestos inputs in the general waste disposal area in accordance with Protection of the Environment Operations Waste Regulations 2014 – Part 80 (see Appendix 5)
- Fill in the existing deceased animal disposal trench and place all future deceased animals in the general waste disposal area at the toe of the advancing tipping face
- Prepare shallow drying beds formed from shredded green waste with perimeter berms of ENM for the acceptance of truck wash sludges and fatty sludges. Once dried, blend the sludge encrusted green waste with the shredded green waste stockpile for use as the final capping re-vegetation medium
- Close the existing inert waste disposal area and re-direct all commercial and inert waste to the general waste disposal area (Amaral stage 2). Program site rehabilitation
- Fill in the existing sewage screenings waste disposal trench and re-direct all commercial and inert waste to the general waste disposal area (Amaral stage 2)
- Recover the existing small piles of street sweepings and together with all future street sweepings, place at the cover material stockpile area

7. Milestone 7 – Complete housekeeping

Key Tasks

- Prepare a Fire Management Plan
- Prepare a Traffic Management Plan
- Review, rationalise, formalise and update/replace all site signage
- Landfill all damaged e-waste stillages
- Establish waste oil storage at the CRC
- Shred and landfill the existing mattress stockpile together with existing mattress flock. Arrange a mattress collection contract and have mattress cages located at the domestic self haul drop off area
- Arrange scrap metal collection and green waste shredding contracts where by servicing can be undertaken on a regular to ensure stockpile sizes are kept to a manageable size
- Grade and shape Amaral stage 3 area towards the south east to shed surface water off site and form a berm on the northern face to divert run-off water from the up gradient catchment (see Figure 11 noted as part 3A in Appendix 2)
- Rehabilitate the inert waste disposal area

Assumptions

Generally, the information provided by Council in the development of the baseline financial model is accurate, relevant, complete and up to date.

Figures provided are cost estimates only and may well vary depending on a range of circumstances. The purpose of the model is to provide guidance on the likely cost implications of undertaking the proposed scope of works

Milestone 1

Capital

Construct vehicular access to the top of the waste mass

7 hrs FEL/compactor plant hire @ $ 85 /hr = **$595**

7 hrs tipper hire @ $130 /hr = **$910**

150 m3 gravel @ $ 30/m3 = **$4,500**

TOTAL $6,005

Apply final capping (2 x 300 mm ENM and 1 x 400 mm shredded green waste)

3,000 square metres @ $7/m2 = **$21,000**

Fill in catch drain 40 linear metres @ $15/lm = **$600**

TOTAL $27,705 ($9,235 pa over 3 years)

Milestone 2

Capital

A new Cat 953 K traxcavator $**485,000**.plus hourly plant hire rate **$110** working 15 hours per week ($110 x 15hrs x 52.2 wks =$86,130)

Second hand Cat 953 K with less than 5,000 hours **$240,000** plus hourly plant hire rate **$85** working 15 hours per week

New 40 tonne Cat landfill compactor **$680,000** plus hourly plant hire rate **$127** working 15 hours per week

Milestone 3

Operational

Additional Staff Costs
Mon – Fri wages 21 hours @normal time ($29/hr plus 40% on costs =$40.60/hr)
= $852.60 per week

$852.60 per week x 52.2 weeks = **$44,504 pa**

If required, Sat – Sun wages (Sat time and a half for the first two hours and double time thereafter – Sun double time – no “on cost” with overtime)

Service transfer station – included in plant operator duties

Mattress collection – PS **$15.000** pa

Scrap metal - cost benefit (included in “waste management sundry revenues”)

Household recycling drop off collection – **$5,000**

Capital

civil works to prepare the identified site – **PS $30,000** (compactor, tipper, grader drum roller)

geotechnical surveys **PS $5,000**

structural engineering designs and architectural designs **PS $15,000**

DA, CC - **$3,000**

construct buildings and structures (transfer station, retaining wall, fall protection) **PS $200,000**

establish hardstand areas, purchase tip truck (waste transfer) **PS $45,000**

TOTAL CAPITAL $298,000

Milestone 4

Capital

geotechnical survey **$5,000**

structural engineer and architect plans and specifications **PS $30,000**

DA/CC **$3,000**

Construct building, pathways, parking, provide services, fencing amenities **PS $250,000**

TOTAL $288,000

Milestone 5

Capital

Cut vehicular access and prepare a tipping platform **PS $8,000**

TOTAL $8,000

Milestone 6

Operational

Prepare shallow drying beds and treat sludges **$5,000 pa**

Capital

Fill in redundant trenches (asbestos, deceased animals, sewer waste) **PS $3,000**

Milestone 7

Capital

Prepare a Fire Management Plan **-$5,000**

Prepare a Traffic Management Plan **$5,000**

Review, rationalise, formalise and update/replace all site signage (provisional sum) PS **$10,000**

Establish waste oil storage at the CRC – 2 x bunded pallets @ **$2,000**

Rehabilitate the inert waste disposal area (provisional sum) PS **$15,000**

TOTAL $37,000

Plant hire (new landfill compactor) The existing FEL cost is already included in the current budget. New landfill compactor $127 per hour x 15 hours per week x 52.2 weeks = **$99,441 per annum.** Alternative, new traxcavator **$86130 pa**

Additional depot attendant 21 hours per week - Mon to Fri @ $40.60 x 15 x 52.2 = **$44,505 pa**

Financial Model 1 (adjusted) – residual life of stage 1 is about 3 years (14,000 cubic metres void space remaining and being consumed at 5,000 cubic metres per annum)

Milestone 1- Capital program - construct access track to head of existing landform in year 1. Apply final capping progressively over 3 years

Milestone 2 – Capital program - purchase new traxcavator year1

Operational program - apply plant hire rate annually from year 1

Milestone 3 – Capital program over years 2 and 3 -

Operational program - additional staff from year 1, mattress collection from year 2 and ongoing, service transfer station from year 3, scrap metal recycling collection annually, household recyclables serviced fortnightly from year 2

Milestone 4 – Capital program year 4

Milestone 5 – Capital program year 4

Milestone 6 – Capital program year 2, Operational program year 2

Milestone 7 – Capital program years 1 and 2

Narrandera Council - Waste Management Adjusted Model 1

GL		New Items Amount	New Items Year	2019/20 Actual	2020/21 Budget	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
	Income Increase				0	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
	Expenditure % Increase				0	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Operational Income																
0512-1038	Waste Management User Fees			10,483	9,200	9,384	9,572	9,763	9,958	10,158	10,361	10,568	10,779	10,995	11,215	11,439
0512.1067	Domestic Waste Collection Revenues			750,147	770,126	785,529	801,239	817,264	833,609	850,281	867,287	884,633	902,325	920,372	938,779	957,555
0512.1068	Non DW Collection Revenues			116,267	118,390	120,758	123,173	125,636	128,149	130,712	133,326	135,993	138,713	141,487	144,317	147,203
0512.1077	Interest on Investments - Non Current			70,855	43,200	44,064	44,945	45,844	46,761	47,696	48,650	49,623	50,616	51,628	52,661	53,714
0512.1078	Interest on Internal Loans			0	24,817	25,313	25,820	26,336	26,863	27,400	27,948	28,507	29,077	29,659	30,252	30,857
0512.1089	Waste Management Sundry Revenues			33,315	25,000	25,500	26,010	26,530	27,061	27,602	28,154	28,717	29,291	29,877	30,475	31,084
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL OPERATIONAL INCOME			**981,068**	**990,733**	**1,010,548**	**1,030,759**	**1,051,374**	**1,072,401**	**1,093,849**	**1,115,726**	**1,138,041**	**1,160,802**	**1,184,018**	**1,207,698**	**1,231,852**
Operational Expenditure																
0512.2001	Conference Expenses			753	0	0	0	0	0	0	0	0	0	0	0	0
0512.2002	Waste Collection Expenses			334,859	398,329	406,296	414,421	422,710	431,164	439,787	448,583	457,555	466,706	476,040	485,561	495,272
0512.2013	Travelling Expenses			48	500	510	520	531	541	552	563	574	586	598	609	622
0512.2100	Narrandera Landfill Expenses			244,728	196,819	200,755	204,770	208,866	213,043	217,304	221,650	226,083	230,605	235,217	239,921	244,720
0512.2101	Barellan Landfill Expenses			15,072	21,571	22,002	22,442	22,891	23,349	23,816	24,292	24,778	25,274	25,779	26,295	26,821
0512.2102	Compactor Running Costs			37,394	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902	24,380	24,867
0512.2103	Leaf Collection			38,630	26,000	26,520	27,050	27,591	28,143	28,706	29,280	29,866	30,463	31,072	31,694	32,328
0512.2112	Waste Legal Expenses			1,086	0	0	0	0	0	0	0	0	0	0	0	0
0512.2115	Waste Insurance Expenses			116	200	204	208	212	216	221	225	230	234	239	244	249
0512.2119	Telephone Expenses			1,405	1,450	1,479	1,509	1,539	1,570	1,601	1,633	1,666	1,699	1,733	1,768	1,803
0512.2600	Landfill Rates			3,818	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975	6,095	6,217
					0	0	0	0	0	0	0	0	0	0	0	0
	Milestone 2 - Traxcavator plant hire				0	86,130	87,853	89,610	91,402	93,230	95,094	96,996	98,936	100,915	102,933	104,992
	Milestone 3 0.5 FTE Staff				0	44,504	45,394	46,302	47,228	48,173	49,136	50,119	51,121	52,144	53,186	54,250
	Milestone 3 - recoverables recycling				0	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902	24,380
	Milestone 6 - drying beds				0	5,000	5,100	5,202	5,306	5,412	5,520	5,631	5,743	5,858	5,975	6,095
					0	0	0	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL OPERATIONAL EXPENDTIURE			**677,908**	**669,869**	**838,900**	**855,678**	**872,792**	**890,248**	**908,053**	**926,214**	**944,738**	**963,633**	**982,905**	**1,002,564**	**1,022,615**
0512.2700	Waste Management Internal Charges			132,098	138,844	141,621	144,453	147,342	150,289	153,295	156,361	159,488	162,678	165,931	169,250	172,635
0512.2800	Depreciation - Plant & Equipment			12,392	13,500	13,770	14,045	14,326	14,613	14,905	15,203	15,507	15,817	16,134	16,456	16,786
0512.2806	Depreciation - Other Structures			0	800	816	832	849	866	883	901	919	937	956	975	995
0512.2808	Depreciation - Specialised Buildings			0	830	847	864	881	898	916	935	953	972	992	1,012	1,032
	Total Miscellaneous Expenses			144,490	153,974	157,053	160,195	163,398	166,666	170,000	173,400	176,868	180,405	184,013	187,693	191,447
	TOTAL EXPENDTIURE			**822,398**	**823,843**	**995,954**	**1,015,873**	**1,036,190**	**1,056,914**	**1,078,052**	**1,099,614**	**1,121,606**	**1,144,038**	**1,166,919**	**1,190,257**	**1,214,062**
	OPERATIONAL RESULT			**158,670**	**166,890**	**14,594**	**14,886**	**15,183**	**15,487**	**15,797**	**16,113**	**16,435**	**16,764**	**17,099**	**17,441**	**17,790**

Narrandera Council - Waste Management Adjusted Model 1

	New Items Amount	New Items Year	2019/20 Actual	2020/21 Budget	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
Capital Income															
				0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CAPITAL INCOME			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Capital Expenses															
Milestone 1 - access track				0	6,005	0	0	0	0	0	0	0	0	0	0
Milestone 1 apply final capping				0	9,235	9,235	9,235	0	0	0	0	0	0	0	0
Milestone 2 - purchase traxcavator				0	485,000	0	0	0	0	0	0	0	0	0	0
Milestone 3 - self haul drop off/transfer station				0	0	98,000	200,000	0	0	0	0	0	0	0	0
Milestone 4 - buy back centre				0	0	0		288,000	0	0	0	0	0	0	0
Milestone 5 - stage 2 filling access				0	0	0	8000		0	0	0	0	0	0	0
Milestone 6 - rehabilitate redundant trenches				0	0	3,000	0	0	0	0	0	0	0	0	0
Milestone 7 - management plans/signage/oil				0	22,000	0	0	0	0	0	0	0	0	0	0
Milestone 7 - rehabilitate closed inert disposal				0		0	0	0	15,000	0	0	0	0	0	0
				0	0	0	0	0		0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CAPITAL EXPENDITURE			**0**	**0**	**522,240**	**110,235**	**217,235**	**288,000**	**15,000**	**0**	**0**	**0**	**0**	**0**	**0**
CAPITAL RESULT			**0**	**0**	**-522,240**	**-110,235**	**-217,235**	**-288,000**	**-15,000**	**0**	**0**	**0**	**0**	**0**	**0**
Cash Balance of Reserve 1 July			511,000	682,062	864,082	371,868	292,260	106,264	-149,871	-132,370	-99,218	-65,404	-30,913	4,268	40,152
Transfer to Reserve - Operating Result			158,670	166,890	14,594	14,886	15,183	15,487	15,797	16,113	16,435	16,764	17,099	17,441	17,790
Add Back: Non Cash Depreciation			12,392	15,130	15,433	15,741	16,056	16,377	16,705	17,039	17,380	17,727	18,082	18,443	18,812
Transfer from Reserve - Capital Expenditure			0	0	-522,240	-110,235	-217,235	-288,000	-15,000	0	0	0	0	0	0
Movements in the year			171,062	182,020	-492,214	-79,608	-185,996	-256,136	17,502	33,152	33,815	34,491	35,181	35,884	36,602
Balance of Reserve 30 June			682,062	864,082	371,868	292,260	106,264	-149,871	-132,370	-99,218	-65,404	-30,913	4,268	40,152	76,754

What Financial Model 1 reveals –

1. Reserves exhausted by year 4 and do not recover and accumulate until year 10 with current income streams
2. The purchase of a second hand traxcavator instead of a new machine would provide a small budget surplus and transfer to reserves. The same outcome is likely if job lots for traxcavator type work is contracted out
3. Unless income streams were increased there would be minimal transfer to reserves
4. Other Council ambitions (organics collection/processing) will have a financial impact

8.0 Procurement Management

Item to be Procured	Procurement Method
Services of consultants, landfill engineers, surveyors	By negotiation and RFQ – scope of works to be priced by service providers
Civil works	By RFQ or by Council staff based on design specification
Buyback centre and transfer station design	RFQ and based on scope of works
Buyback centre and transfer station construction	RFT/RFQ and based plans and specifications
Landfill plant	By tender and based on performance specification
Weighbridge and gatehouse	By RFT
Plant hire	By RFQ or existing service agreements
DA/CC	By Council staff or private certifier
SEE	RFQ - by consultant

9.0 Appendices

Appendix 1- Notes to Accompany Design Drawings

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NOTES TO ACCOMPANY FIGURES 1 – 13

20206 NARRANDERA WASTE FACILITY 05.11.2020

Figure 1
Figure 1 , Site Plan , was derived from Narrandera Shire Council Drawing Number 125 entitled " Landfill Masterplan , Focus View " dated 06.10.2020 and represents the proposed landfill development area as it existed in October , 2020.

The selected landfill footprint is based on on site discussions with NSC Officers , includes a 5m wide access track around the base of the proposed landfill landform and sufficient room on the northern side of the footprint to allow access to the proposed transfer facility at its current location.

Figure 2
This figure illustrates a " Final Landform " which extends to RL 22 , has 3H:1V external perimeter batters and a capping area with a gradient of 7% to allow for inevitable long term settlement and a resultant post – settlement gradient of at least 5%.

Although noted as being a " Final " landform , it is the case that , if necessary , it could be raised / overtopped to a higher level and achieve additional capacity. Similarly , it could be reduced in height to achieve a lower capacity. A decision to raise or otherwise need not be made at this stage and may be left to the future as there is substantial existing capacity using this design and there is no impediment to deciding on increasing or decreasing its capacity at a later date.

As a guide the total capacity of this landform by raising it to RL 22 with no further excavations is approximately 158,000m3. Assuming a cover usage rate of 20% , the volume of soil cover required will be approximately 32,000m3 , leaving a net void space capacity of approximately 126.000m3.

It is highly unlikely that the required volume of soil needed to complete this landform is available unless it can be obtained from using the existing very large bunding placed around the deep excavation adjoining the current landfilling area.

The option of using this bunding and / or extending the excavation of the proposed Stage 2 filling area is explored below.

Figure 3
The proposed Stage 1 filling plan is provided in this figure.

It illustrates the Stage1 filling area raised to final height , commencing at the existing RL 15 contour level.

The external , final perimeter batters are shown at 3H:1V gradients. A method of achieving this final gradient is illustrated on **Figure 12** and has the advantage of developing the final soil cover of at least 600mm during this construction process.

An alternative construction process such as placing the waste on a 3H:1V gradient as the advancing fill face reaches the perimeter of the filling area can be used but lacks the advantage of always filling behind pre-placed soil bunds , thus helping to contain any excess rainfall runoff from waste.

The internal , temporary batters are are shown at 1:1 gradients. The method of achieving this temporary internal gradient is also illustrated on **Figure 12.**

At a later date when adjoining waste placement occurs during later stages of landfilling these internal soil batters should , as far as is practicable , be removed to provide waste to waste contact.

Similarly , as progressive layers of waste are applied the previously placed soil cover should also be removed to some degree to allow vertical contact of waste to waste.

The approximate capacity of this raising is about 18,000m3 , requiring a soil cover volume of some 3,600m3 , leaving a net air space of about 14,400m3.

Figure 4
This figure illustrates the Stage 2 landform at completion , with 3H:1V final external batters and a 1:1 temporary internal batter.

The approximate capacity of Stage 2 filling area (leaving the existing soil batters in place is 50,000m3 , requiring a soil cover volume of 10,000m3 , leaving a net air space of 40,000m3.

At this point in time the entire western one half or so of the landfill landform will have been completed with its final cover already in place.

By this stage of course the preparation for the Stage 3 filling area would have already commenced.

Figures 5 and 6
The Stage 3 and Stage 4 filling areas at completion are illustrated on these figures.

The combined capacity of these 2 stages (assuming no excavation beneath either stage) is approximately 90,000m3 , requiring about 18,000m3 of soil cover , leaving a net air space for waste of about 72,000m3.

At this point of time the approximate total air space available , the total soil cover requirement and the net air space available for waste will be as shown on Table 1 below:

TABLE 1

Stage	Total air space (m3)	Total required soil cover (m3)	Net air space (m3)
1	18,000	3,600	14,400
2	50,000	10,000	40,000
3&4	90,000	18,000	72,000
Total	158,000	31,600	126,400

Assuming an annual incoming waste stream of 5,000m3 (4,000 tonnes / 0.8 tonnes per m3), this would equate to a life span of about 25 years.

It is highly unlikely that the volume of soil cover required to develop this landfill landform is available on site without further excavations beneath the landfill footprint.

Figure 7
This figure illustrates 2 potential alternatives to securing additional soil cover from within the proposed Stage 2 filling area.

The Stage 2A excavation would involve the removal of the existing very large soil bunds around the western and northern sides of the existing excavation and extending the base of the existing excavation as shown.

The Stage 2B excavation would also involve the removal of the existing very large soil bunds around the western and northern sides of the existing excavation and extending the base of the existing excavation to larger extent than the Stage 2A proposal.

The Stage 2A excavation will provide an additional approximate 3,500m3 of potential soil cover.

The Stage 2B excavation will provide an additional approximate 9,600m3 of potential soil cover.

The removal of the western and northern very large soil bunds down to original ground surface (RL 13) will provide an additional approximate 7,200m3 of soil cover.

The total potential soil cover which can be recovered from both excavation Stages 2A and 2B and the existing soil bunds is approximately 20,000m3 which would go a long way towards meeting the necessary 31,600m3 to complete the landform.

These excavations will also provide additional net air space of about 16,000m3 and a further 3 years of life for the landfill.

The soil excavated from these areas should be temporarily stockpiled across the proposed Stage 4 filling area for later use.

Figure 8
This figure depicts sub-stage 2A filling up to RL14 and subsequent sub-stages 2B , 2C and 2D to a similar level.

The temporary internal soil batters are shown at 1:1 and should be raised in 1m increments as shown on **Figure 12.** Following completion of sub-stage 2A to RL 14 , the central soil bund should be extended to the western excavation batter in 1m lifts.

In the event of heavy rainfall occurring during the filling of these sub-stages , any water that collects in open sub-stages can be pumped to the environment.

Once sub-stages 2A , 2B ,2C and 2D have been completed , similar sized sub-stages should proceed above ground surface within appropriate internal and perimeter soil bunds to final height.

Figure 9
Figure 9 illustrates the " squaring up " of the Stage 1 filling area to a uniform level at RL 17.

As discussed on site the access to this level should be by means of a ramp developed from waste and surfaced with sufficient gravel , broken asphalt , bricks , tiles or similar material to provide suitable truck access.

Figure 10
This figure illustrates an ideal excavation beneath the proposed Stage 3 filling area , with a base grading downwards uniformly from RL 11 in the west to RL 10 in the east which would yield approximately 12,000m3 of soil cover.

From discussions on site however it is likely the case that much of this area is underlain by old waste.

In lieu of the " ideal " excavation , this area should be divided into 2x50m wide segments running north - south and each surface area excavated until waste is encountered or to an RL ranging from 11 to 10 depending on the segment's location whichever is higher.

The soil for bunding these segments should be obtained from the segment excavation itself with excess soil being temporarily stockpiled across the Stage 4 filling area.

Figure 11
Figure 11 depicts the completion of the sub-stage 3A filling carried out in the same way as the Stage 2A filling process , followed by the adjacent Sub-stage 3B until the Stage 3 filling area has been raised to RL 13.

Overtopping of this area should then proceed within soil bunded areas / segments to final grade using soil cover from the stockpile across the Stage 4 filling area.

This exercise would be repeated for the Stage 4 filling area until the final design height is reached.

Figure 12
Soil batter construction techniques for both final external batters and temporary internal batters are illustrated on this figure.

Figure 13
As much as practicable of the daily soil cover should be removed in advance of overtopping with subsequent waste lifts to allow vertical migration of any leachate that may develop as shown on this figure.

Follow-up site visit / review with staff
A wide range of activities and landfill construction methodologies have been covered during our recent site visit and in these Figures which would be best addressed with relevant NSC staff members at a follow-up meeting.

Appendix 2 – Design Concept Figures 1 to 13

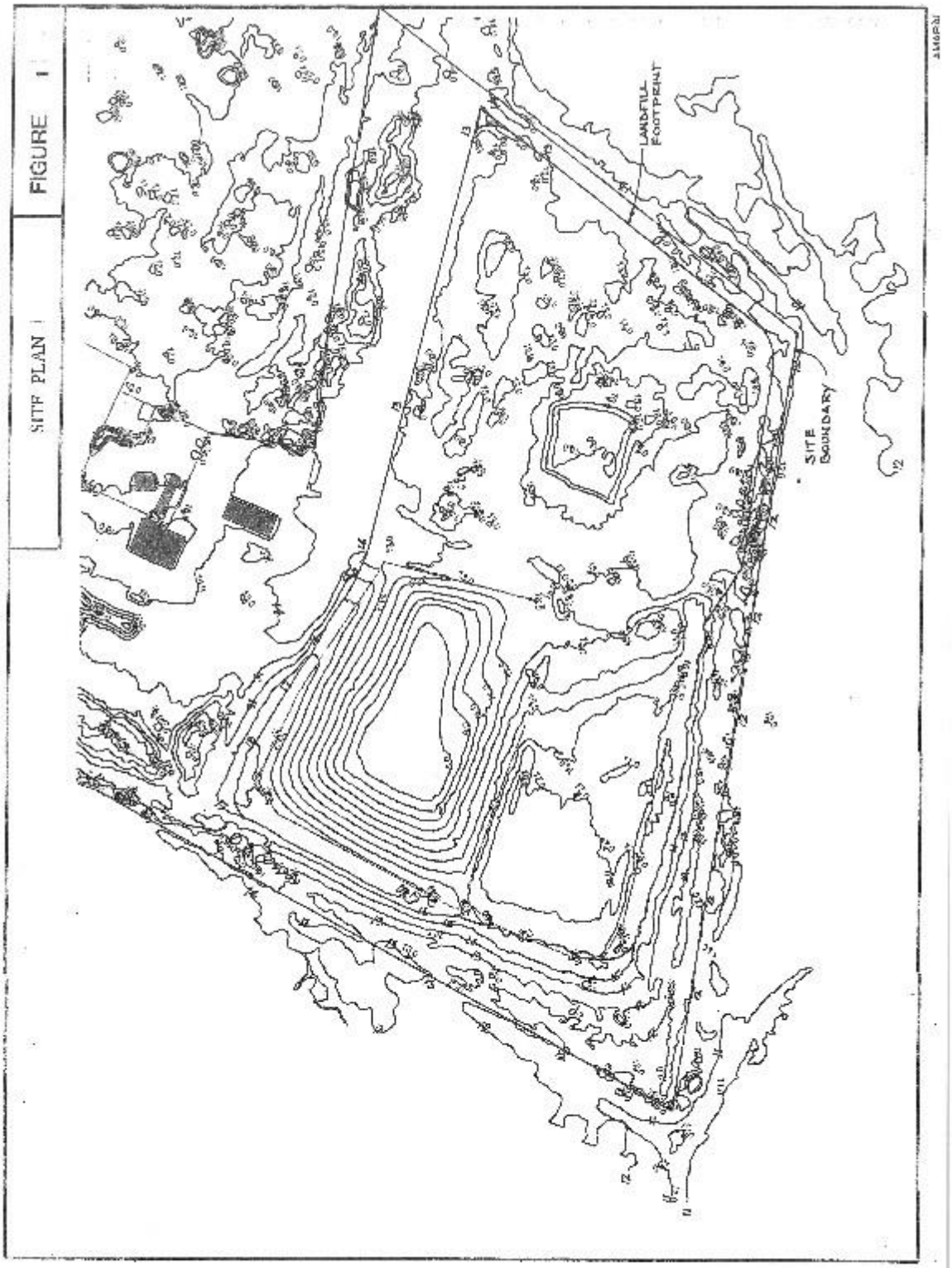


FIGURE 2
FINAL LANDFORM
0m
50m
100m
150m
200m

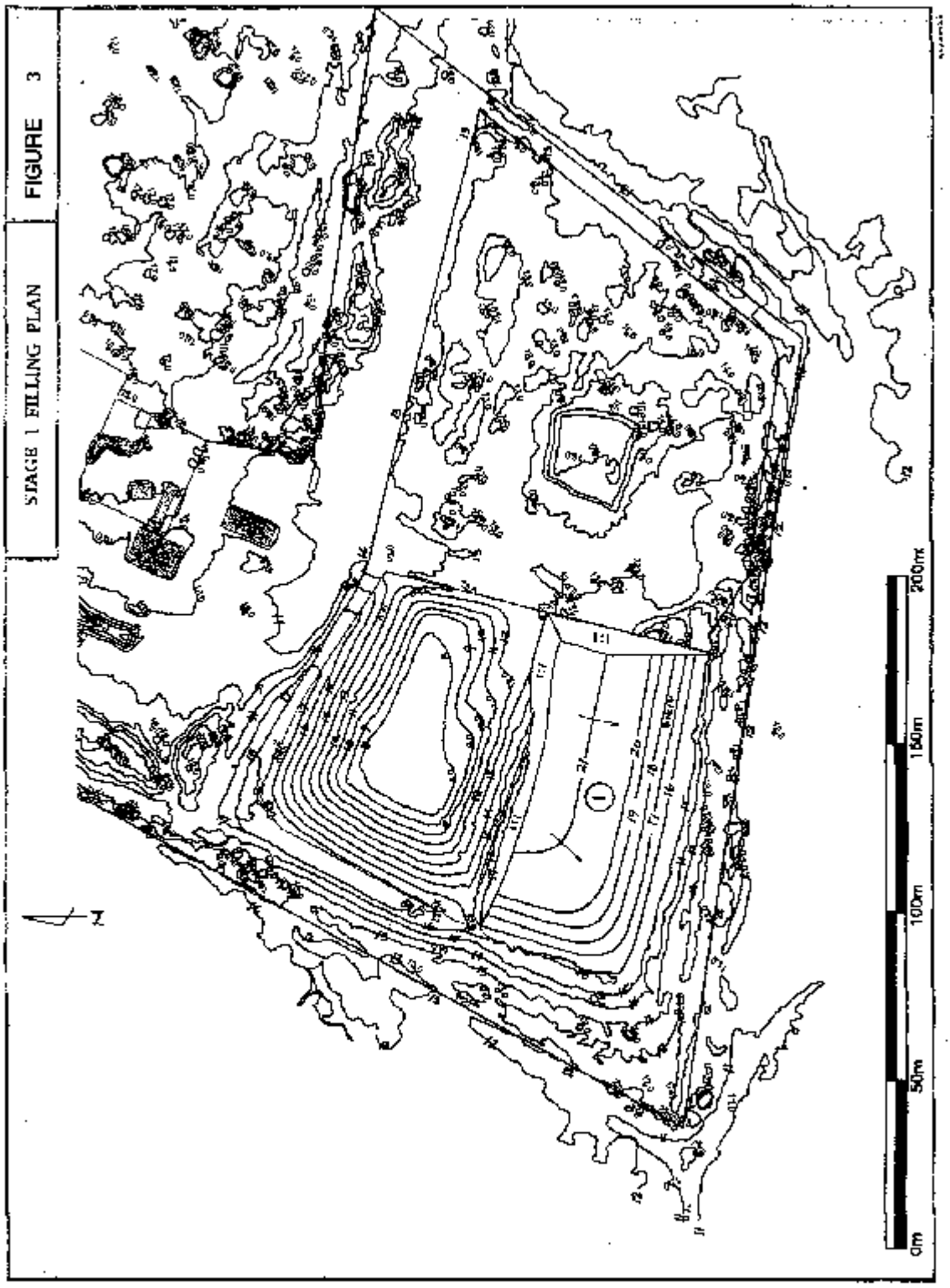


FIGURE 3
STAGE 1 FILLING PLAN
0m
50m
100m
150m
200m

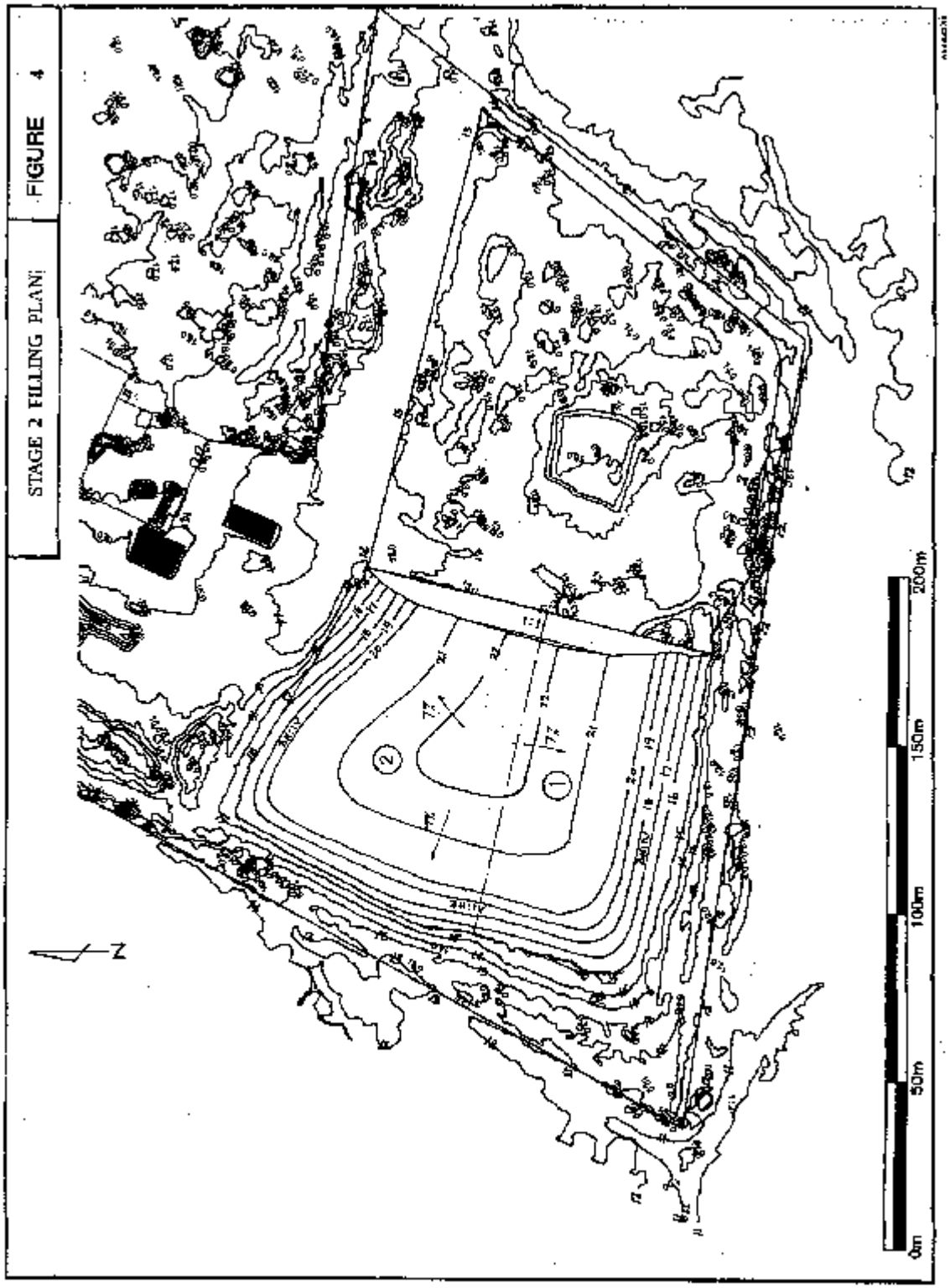


FIGURE 4
STAGE 2 FILLING PLAN
N
0m
50m
100m
150m
200m

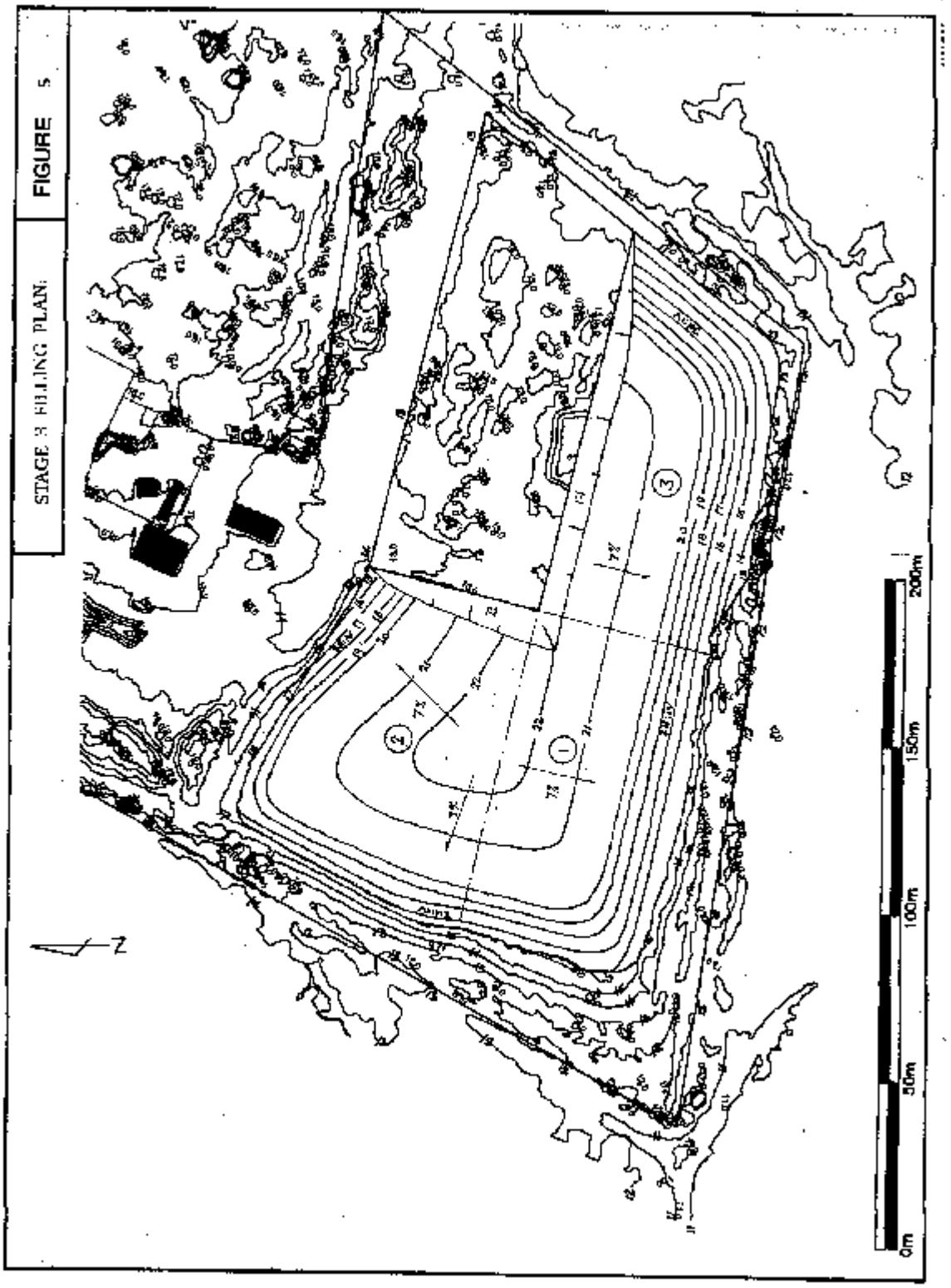
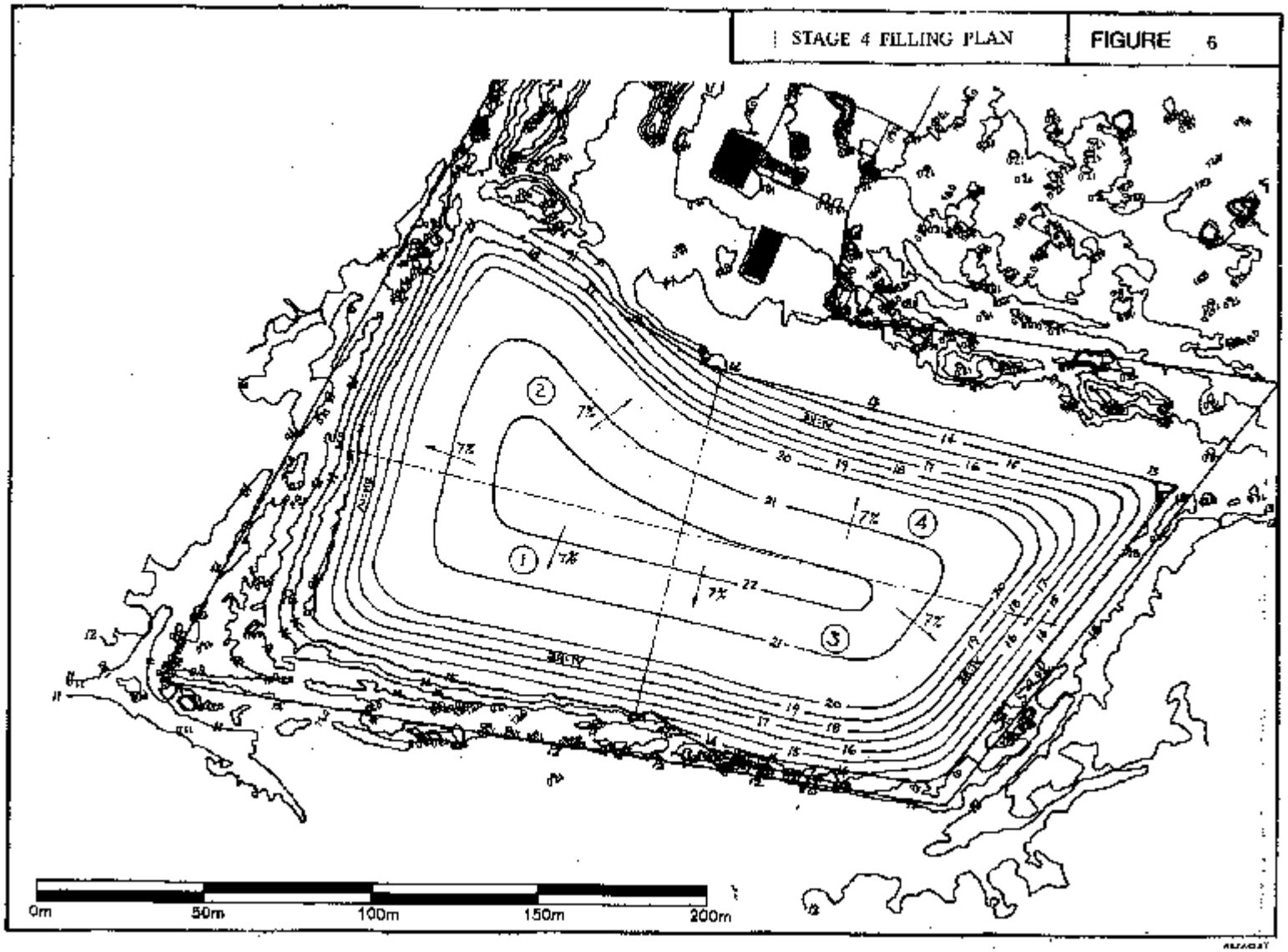
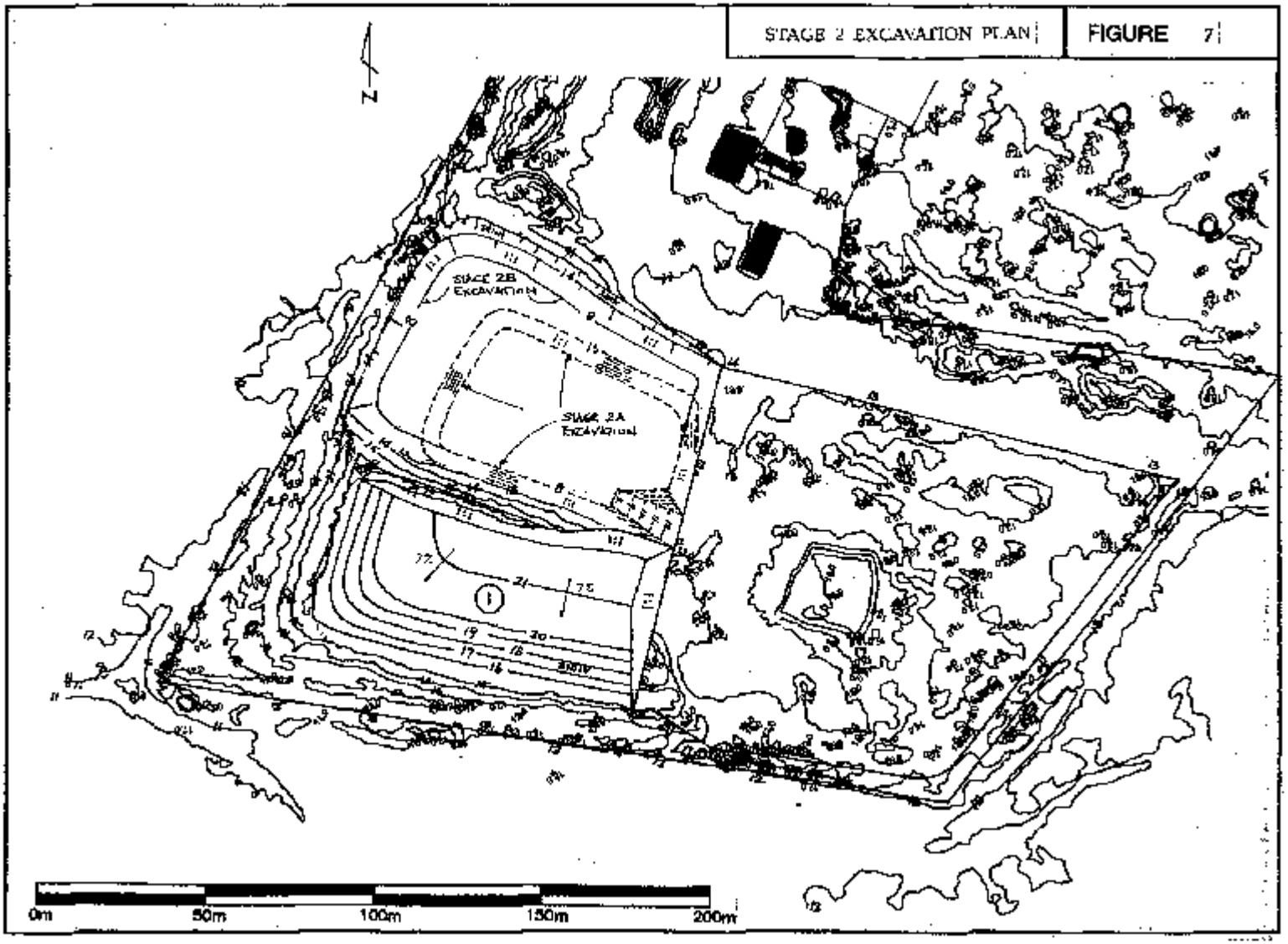
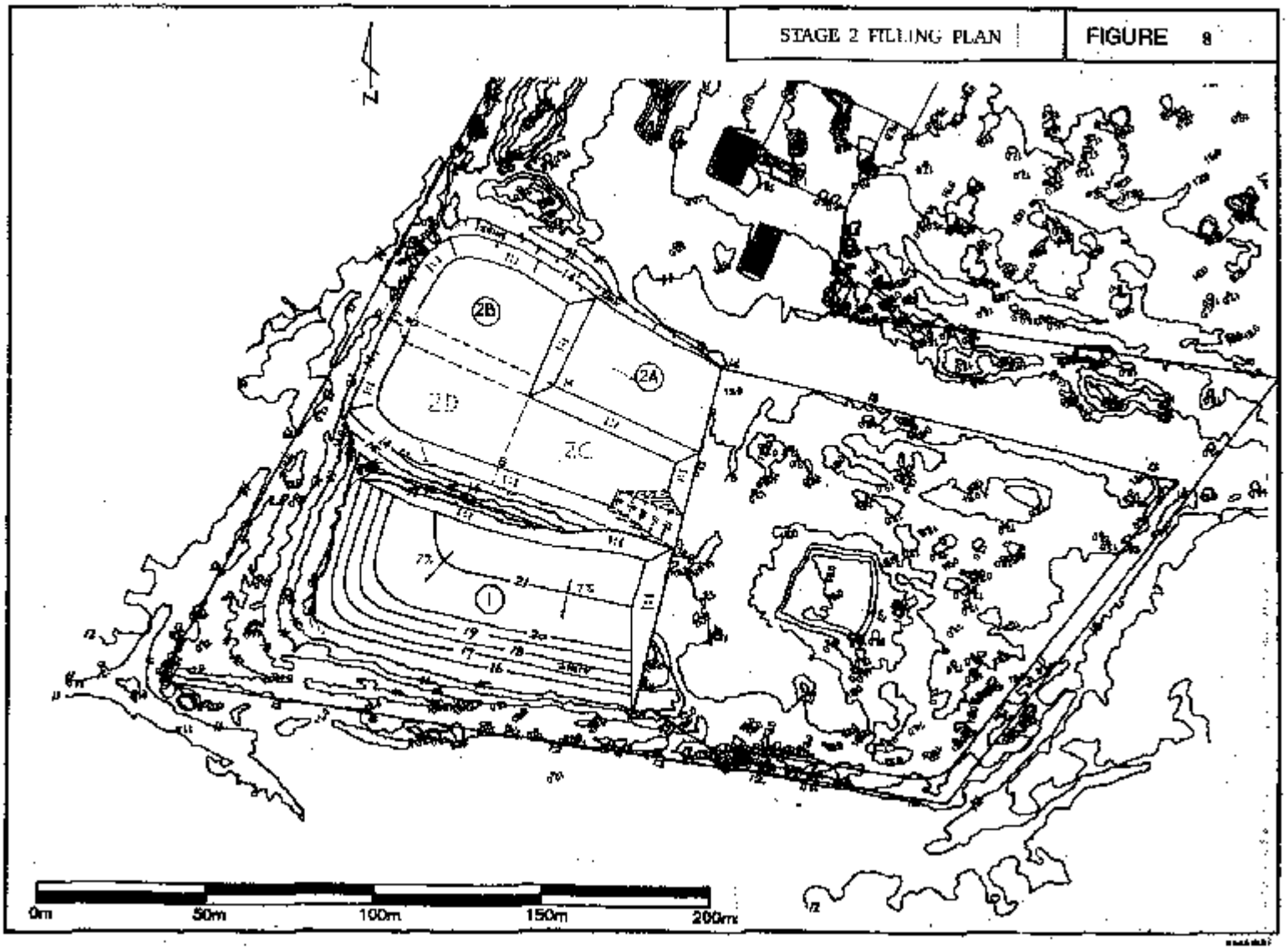
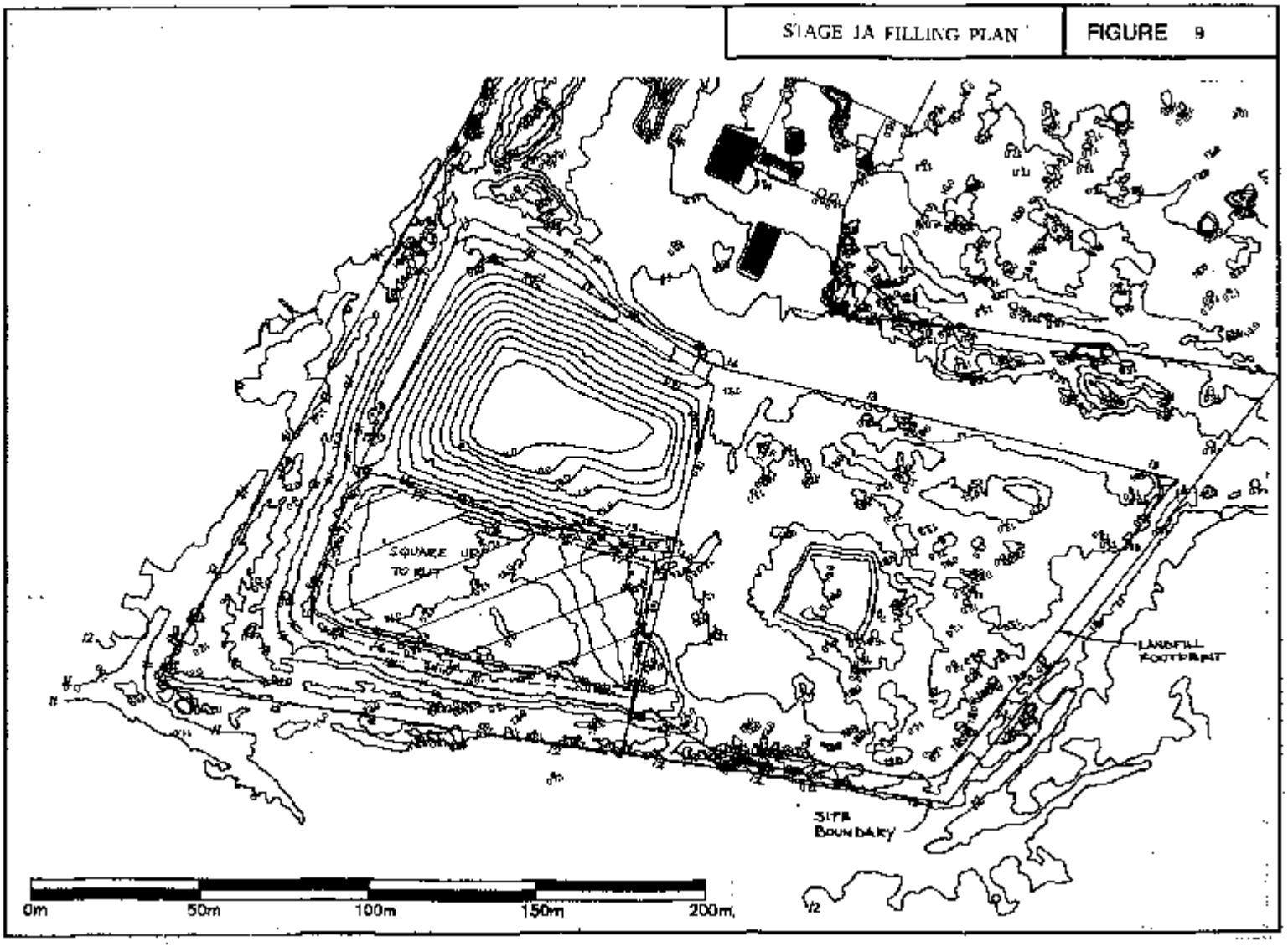


FIGURE 5
STAGE 3 FILLING PLAN
N
0m
50m
100m
150m
200m


STAGE 4 FILLING PLAN
FIGURE 6
0m
50m
100m
150m
200m


STAGE 2 EXCAVATION PLAN
FIGURE 7
N
STAGE 2B EXCAVATION
STAGE 2A EXCAVATION
0m
50m
100m
150m
200m


STAGE 2 FILLING PLAN
FIGURE 8
N
2B
2A
2D
2C
1
0m
50m
100m
150m
200m


STAGE 1A FILLING PLAN
FIGURE 9
SQUARE UP TO EXIT
LANDFILL FOOTPRINT
SITE BOUNDARY
0m
50m
100m
150m
200m

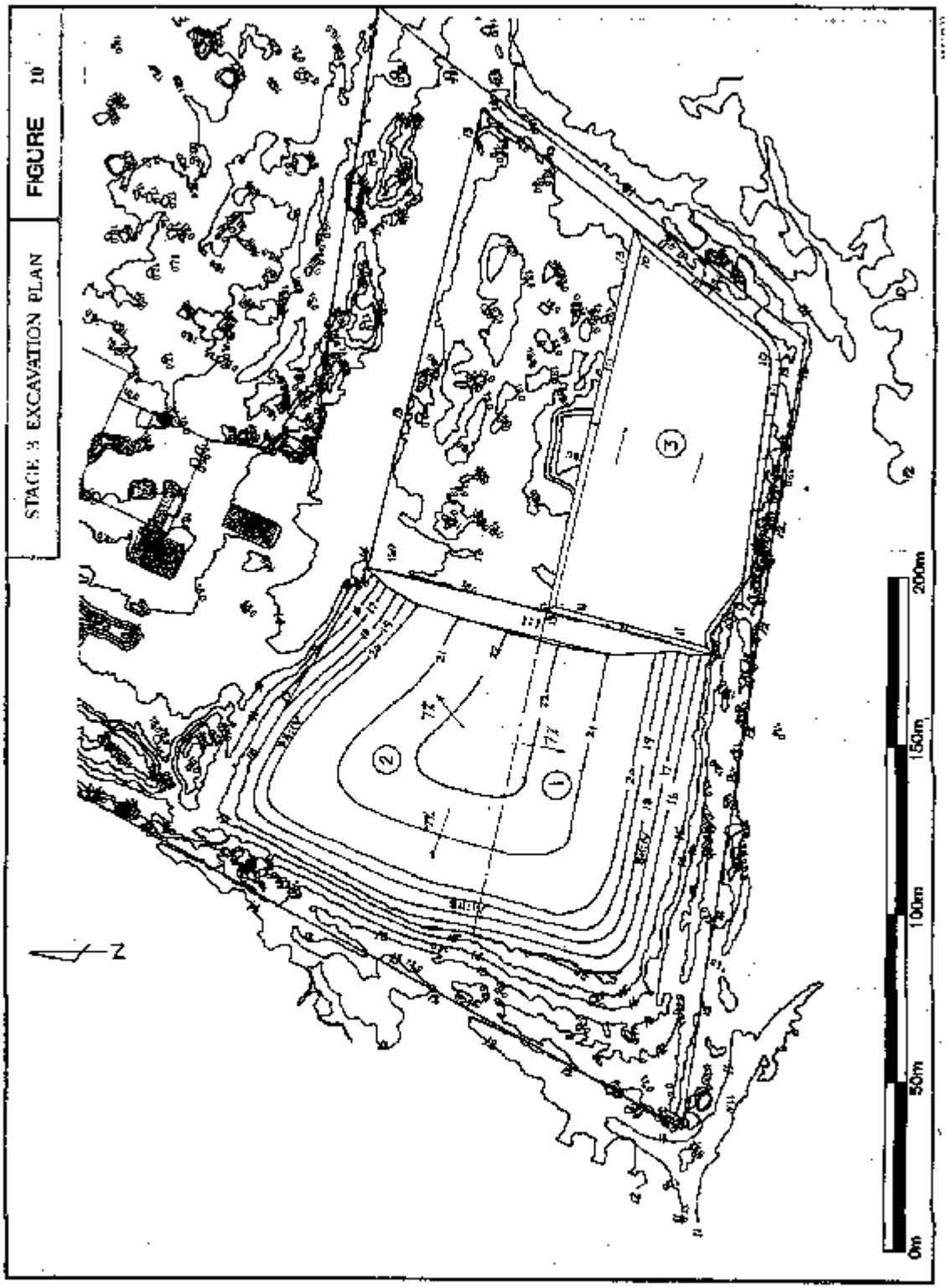
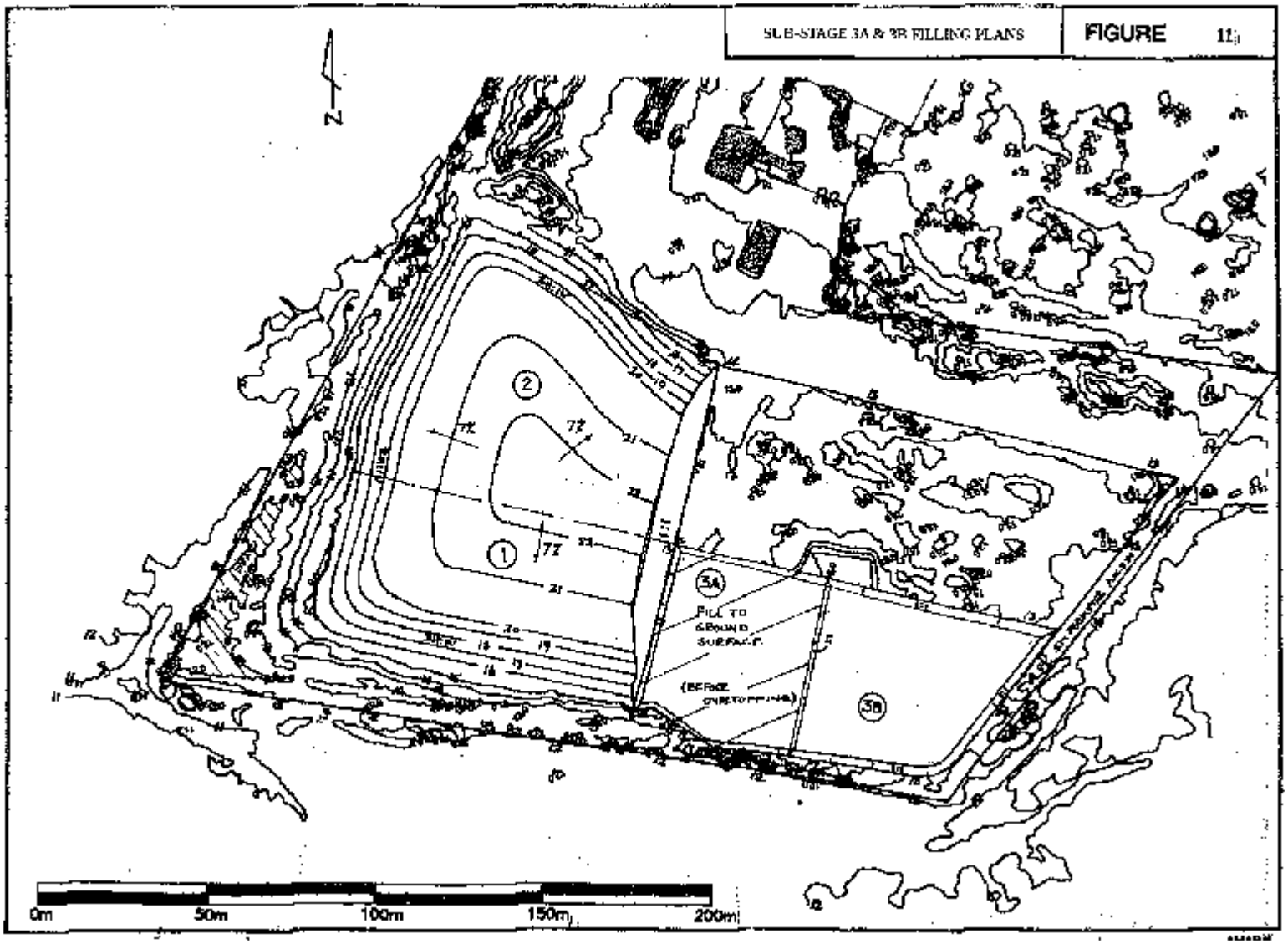
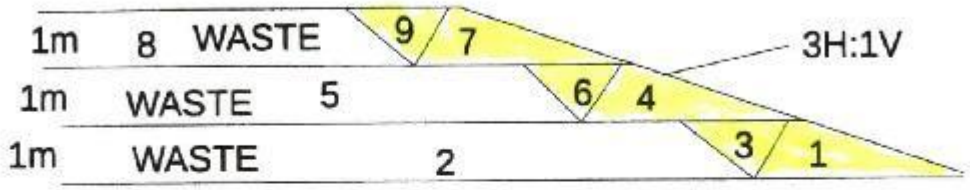


FIGURE 10
STAGE 3 EXCAVATION PLAN
N
0m
50m
100m
150m
200m

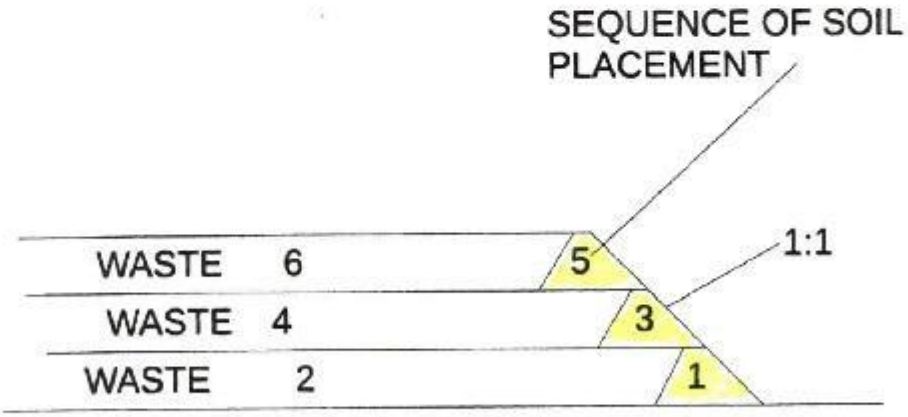

SUB-STAGE 3A & 3B FILLING PLANS
FIGURE 11
N
2
1
3A
FILL TO
GROUND
SURFACE
3B
0m
50m
100m
150m
200m

SOIL BATTER CONSTRUCTION | FIGURE 12

1, 3 , 4 , 6 , 7 AND 9 IN BATTER IS SEQUENCE OF SOIL PLACEMENT



FINAL PERIMETER SOIL BUNDS

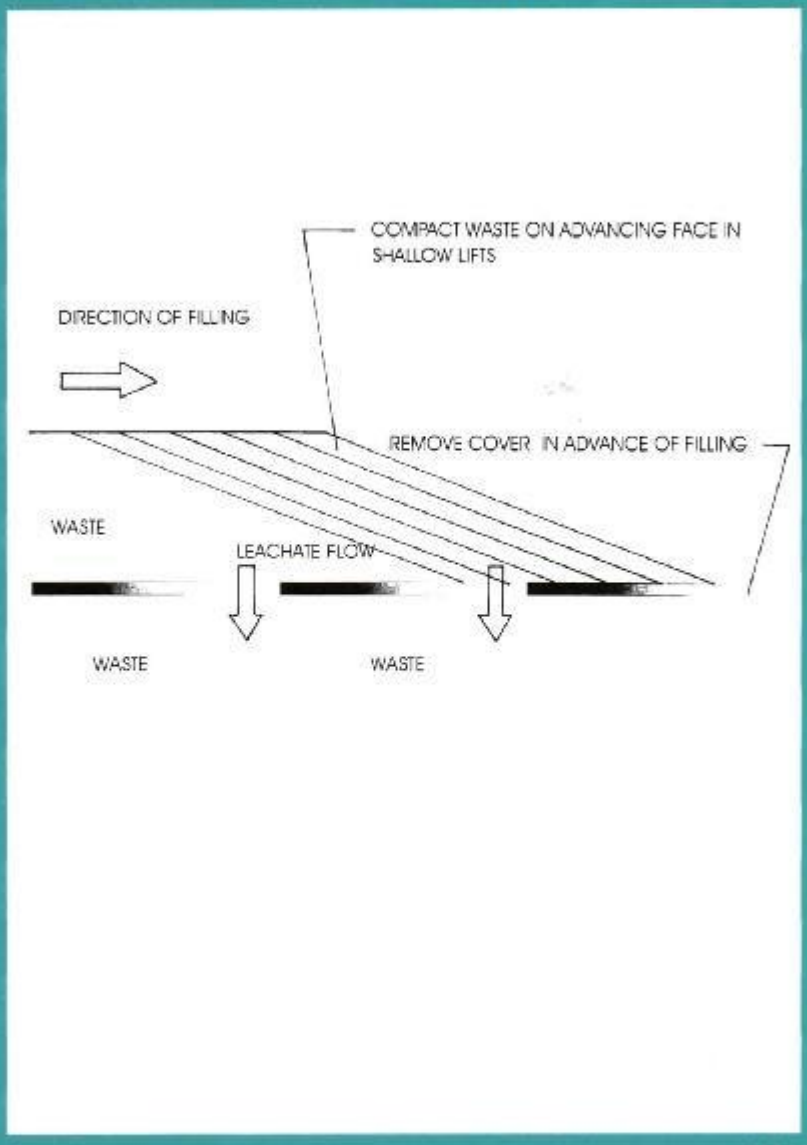


INTERNAL TEMPORARY SOIL BUNDS

AMARAL

FIGURE 13

DAILY COVER (PROGRESSIVE REMOVAL)



AMARAL

Appendix 3 - Aerial Site Plan

Appendix 4 – Position Statement

Narrandera Shire Council

Position Statement

CLASSIFICATION : **Depot Attendant**

DEPARTMENT : **Infrastructure Services**

REPORTS TO : **Manager Development and Environment**

SUPERVISES : **NA**

OCCUPANT : **Vacant**

EMPLOYEE NUNBER : **to be determined**

SALARY GRADE : **Grade 4**

POSITION OVERVIEW

The position is for a **part time** depot attendant to be stationed at the gatehouse at the Narrandera Waste Facility to inspect all incoming vehicles, to make a determination on how materials contained within those vehicles will be best managed and to supervise the use of the domestic self haul drop off area, CRC and transfer station

Council Themes

Our Community

To live in a healthy community and one that demonstrates a positive attitude

To advocate for quality educational and cultural opportunities

To live in an inclusive and tolerant community

To feel connected and safe

Our Environment

To value, care for and protect our natural environment

To effectively manage and beautify our public spaces

To live in a community where there are sustainable practices

Our Economy

To encourage new business and industry that can be sustained

To support local business and industry to grow and prosper

To strongly promote our Shire and to improve its attractiveness

To grow our population

Our Infrastructure

To have an improved and adequately maintained road network

To improve, maintain and value-add to our public and recreational infrastructure

To improve and enhance our water and sewer networks

To have a say when planning for new facilities or refurbishing existing facilities

Our Civic Leadership

To have a Council that demonstrates effective management consistently

To have a progressive Council that communicates and engages well with all of the community and is a role model for inclusivity

To have a community and a Council that works collaboratively with harmony, respect and understanding

BEHAVIOURS

- Courteous interaction with all customers and fellow staff members.
- Timely response to requests.
- Accuracy of information delivery.
- Meeting customer's needs.
- Actively contribute to the delivery of Council's themes.
- Actively participate in team building.
- Support personal training offered by Council in skills and knowledge development

KEY RESPONSIBILITIES

Site Security

- Unlock and open the entrance gate when the Facility is to be made available to the public
- Ensure CCTV cameras and monitors are functioning correctly
- Ensure all visitors to the Facility and contractors sign the attendance register and receive site induction. Visitors and contractors to sign out
- Close and lock the entrance gate when the Facility is to be closed to the public

Examine all loads of incoming waste materials

- Ensure prohibited waste are not accepted
- Enquire if the load contains any problem wastes or hazardous wastes
- Identify and communicate how and where waste types can be segregated for placement at defined locations
- Inspect for contamination in segregated loads, especially green waste
- Provide clear and accurate instructions to facility users

Assess loads where fees are to be applied

- Refer to Council's load assessment guidelines and determine the fee to be applied
- Record all relevant information (customer name, address, vehicle registration, fee applied, waste type, assessed quantity, date/time)
- Refer information to Council's Finance section for invoice preparation

Comply with Council's Work Health and Safety Management System

- Develop a familiarity with the Narrandera Waste Facility WH&S Management System
- Correctly use and maintain PPE
- Undertake all work activities in a safe manner
- Identify risks and hazards and take or recommend corrective actions
- Report and assist in the investigation of all workplace incidents
- Attend safety/tool box meetings and undertake safety training as provided by Council
- Comply with emergency and evacuation procedures
- Ensure the gatehouse is kept clean and tidy

Standard Operating Procedures (SOPs) and Supervision

- Develop a familiarity with the Narrandera Waste Facility SOPs
- Attend workplace training provided by Council as part of its employee training plan
- Record incidents/complaints in the site register
- Generally supervise the use of the domestic self haul drop off area, CRC and transfer station
- Liaise and communicate with the on-site plant operator

SELECTION CRITERIA

- Minimum 2 years relevant working experience.
- Demonstrated customer service skills.
- Sound oral communication and interpersonal skills.
- Demonstrated ability to work effectively independently and in a team environment.
- Basic computer skills.

……. …….

Incumbent **Manager Development and Environment**

Date:……. / :……. / :…….

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—

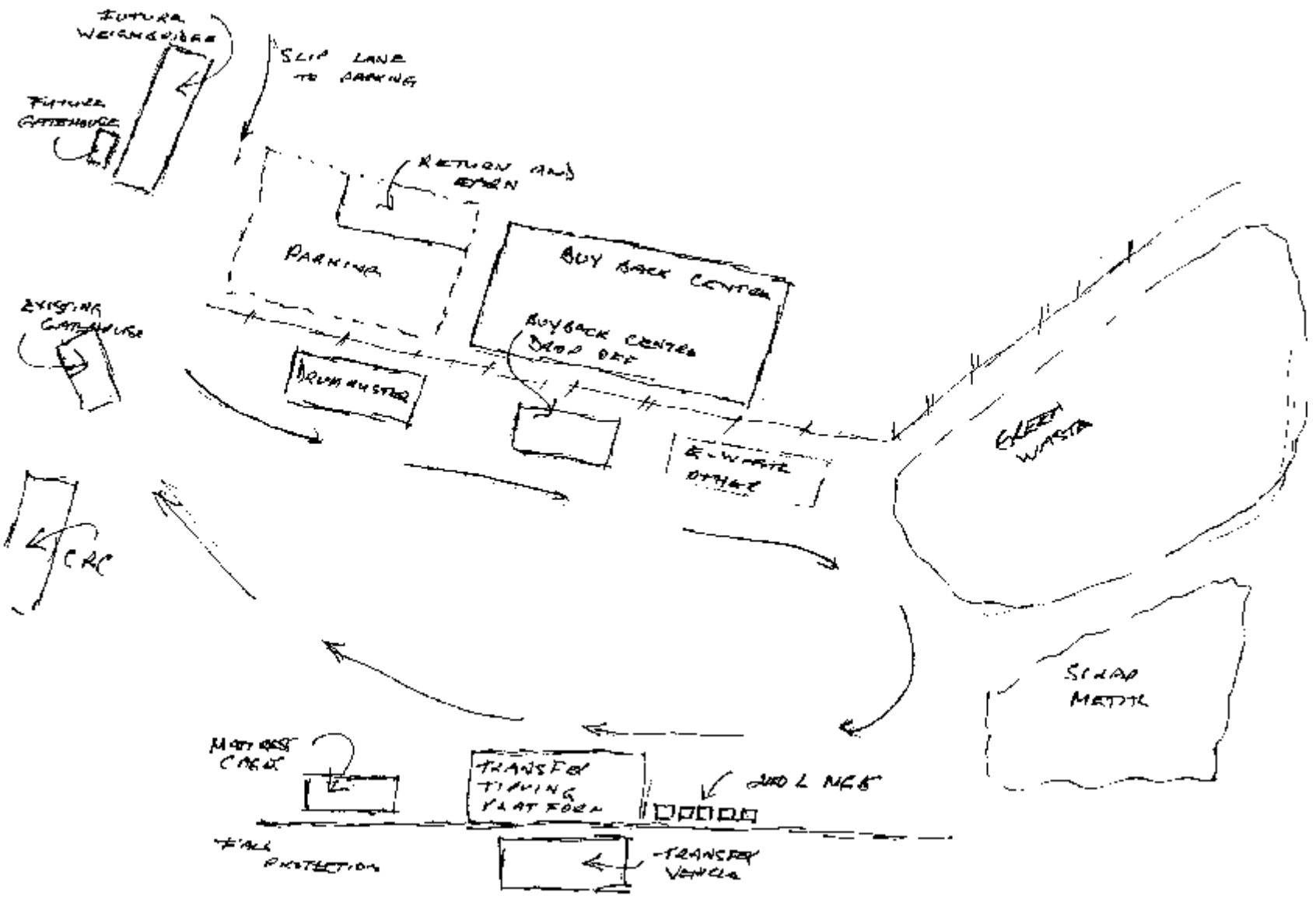
(a) initially (at the time of disposal), to a depth of at least 0.15 metre, and

(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 –Site Master Plan


FUTURE WEIGHBRIDGE
FUTURE GATEHOUSE
SLIP LANE TO PARKING
REVISION AND RETURN
PARKING
BUY BACK CENTRE
BUYBACK CENTRE DROP OFF
DRUM MUSTER
E-WASTE
EXISTING GATEHOUSE
CRC
FLEET WASTE
SCRAP METAL
TRANSFER TIPPING PLATFORM
200 L MGB
FALL PROTECTION
TRANSFER VEHICLE

Appendix 7 - Plant Hire Calculations

Cat 826 K (40 t) Landfill Compactor - Narrandera Shire Council

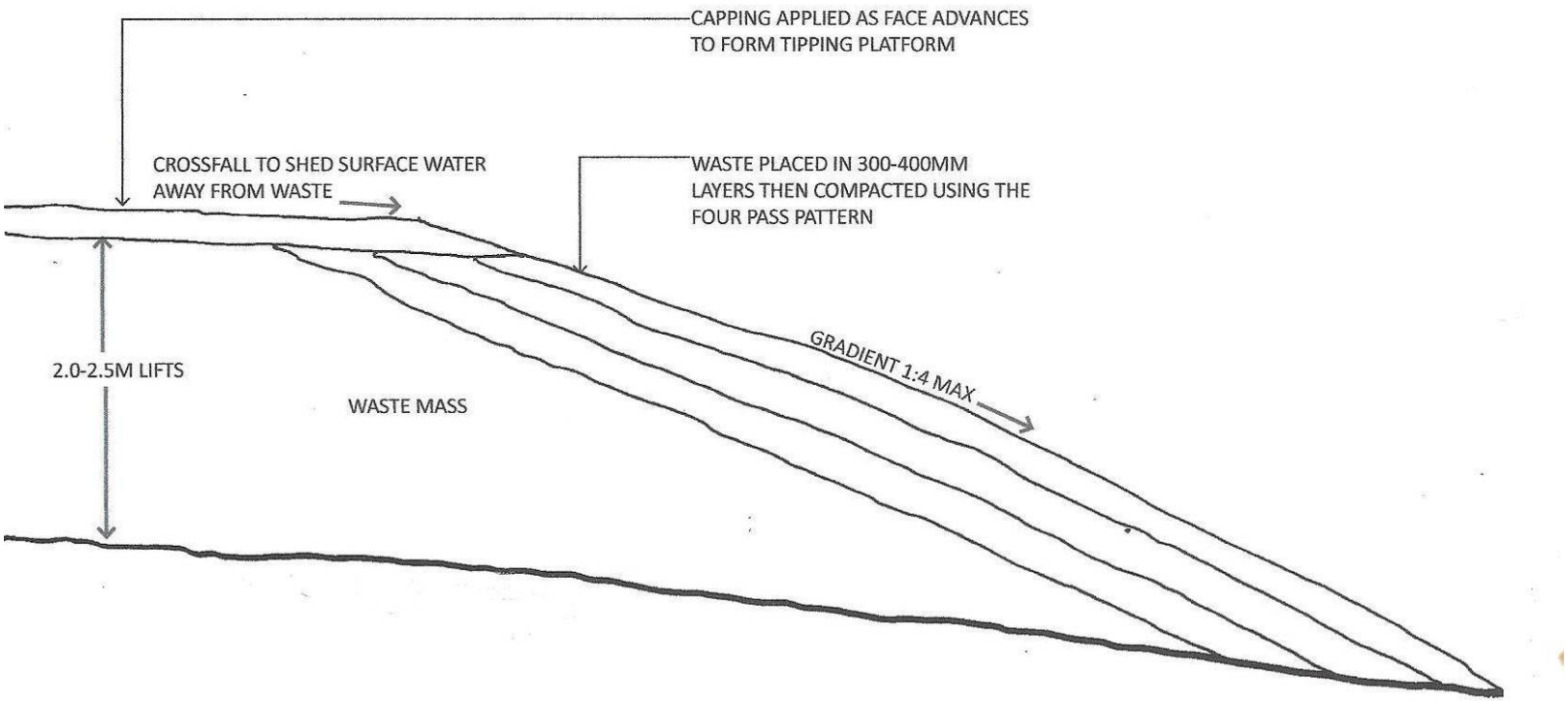
	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30
Purchase Price	680,000	693,600	707,472	721,621	736,054	750,775	765,790	781,106	796,728	812,663
Residual Value	100,000	102,000	104,040	106,121	108,243	110,408	112,616	114,869	117,166	119,509
Depreciable Value	580,000	591,600	603,432	615,501	627,811	640,367	653,174	666,238	679,562	693,154
Hours operated per week	15									
Hours operated per year	780									
Servicing & Repairs per hour	7.00									
Diesel per hour	23	Litres								
Fuel Cost	1.20	Per litre								
CPI	1.02									

	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	Total
Depreciation (straight line)	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	580,000
Fuel	21,528	21,959	22,398	22,846	23,303	23,769	24,244	24,729	25,223	25,728	235,726
Servicing & Maintenance	5,460	5,569	5,681	5,794	5,910	6,028	6,149	6,272	6,397	6,525	59,785
Total Costs	84,988	85,528	86,078	86,640	87,213	87,797	88,393	89,001	89,621	90,253	875,511
Cost of New Machine in addition to depreciation	11,315	11,315	11,315	11,315	11,315	11,315	11,315	11,315	11,315	11,315	113,154
Total Costs	96,303	96,843	97,394	97,955	98,528	99,112	99,708	100,316	100,936	101,569	988,665
Hire rate per hour	126.75	126.75	126.75	126.75	126.75	126.75	126.75	126.75	126.75	126.75	
Total Income collected	98,866	98,866	98,866	98,866	98,866	98,866	98,866	98,866	98,866	98,866	988,665

Check

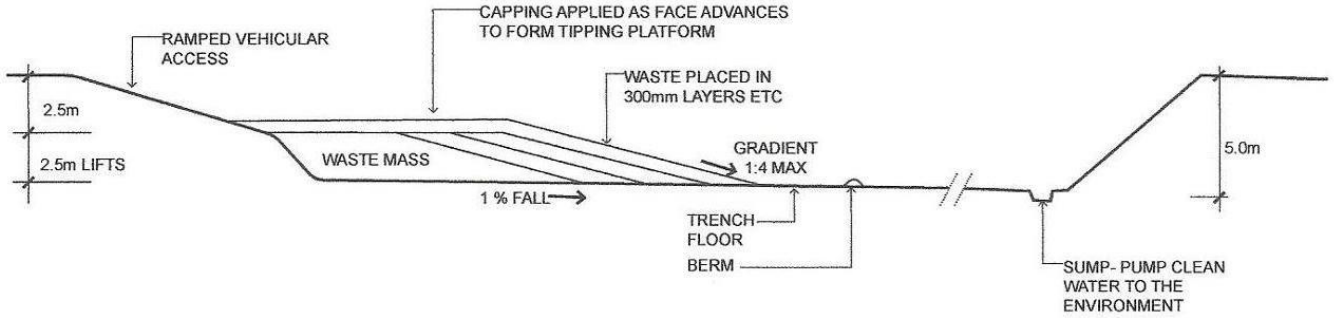
Total Income	988,665
Less Total Costs	875,511
New Machine less Depreciation	113,154
	0

Appendix 8 – General Principle of Waste Placement

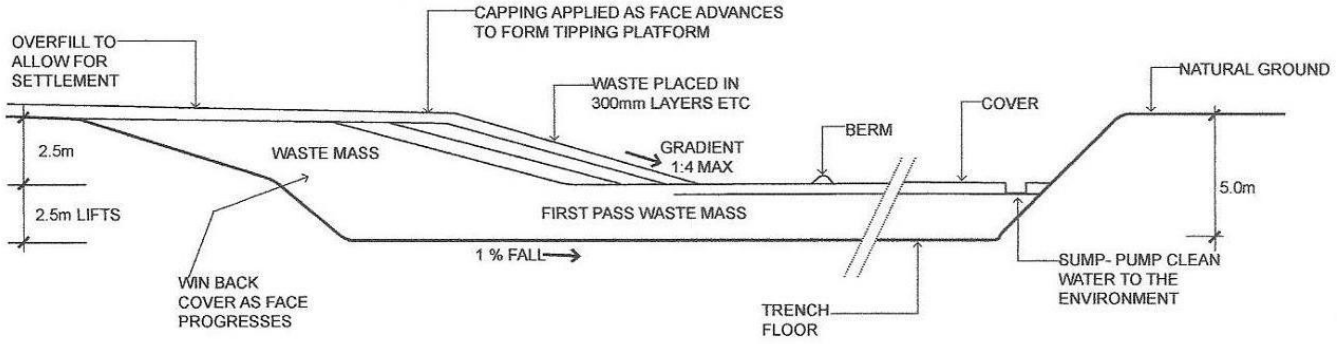


Appendix 9 – Waste Placement , Two Pass Filling

TRENCH WASTE PLACEMENT- FIRST PASS



TRENCH WASTE PLACEMENT- SECOND PASS



Appendix 10 – Document Control Form

Document Control Form		
As a result of the review of the Long Term Plan of Management, the following amendments to the plan have been made. .		
DISTRIBUTION • Master copy • Site copy		**ISSUE DATE**
PAGE NO	**SECTION**	**DESCRIPTION OF CHANGE**
MANAGEMENT AUTHORIZATION…… DATED……..		
I ACKNOWLEDGE RECEIPT OF THE AMENDMENTS TO THIS PLAN AND HAVE INCORPORATED INTO THE DOCUMENT FOR WHICH I AM RESPONSIBLE. ***SIGNED…… DATED……***		