



THE LEADER IN RESOURCE RECOVERY

TECHNICAL SPECIFICATION INFRASTRUCTURE - ALLAWUNA FARM LANDFILL

This document describes the standards, materials and engineering requirements for Earthworks for the site infrastructure and the associated Quality Assurance requirements.

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Prepared By



Environmental Engineering Consultants
Waste Management Specialists
www.bowmanassociates.com.au

DOCUMENT

This Technical Specification has been provided for submission as a supporting document to the Works Approval Amendment application being made by SITA Australia (Principal). Upon issuing of a Works Approval this Infrastructure Technical Specification and Golder Associates Landfill Technical Specification will be amended to comply with any conditions set forth in the Works Approval and updated to reflect any minor improvements to the design or auxiliary features requested by the Principal.

No significant changes that affect the environmental performance of the facility will be made.

All minor amendments will be documented and included in the Construction Quality Assurance (CQA) report, to be supplied to the Department of Environment Regulation upon completion of the Works, in accordance with the general conditions of the Works Approval.

Drawing numbers are likely to be updated as further details are incorporated into the design prior to construction.



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ACRONYMS

AS	Australian Standard
ASTM	ASTM International (Formerly the American Society for Testing and Materials)
CBR	Californian Bearing Ratio
DFES	Department of Fire and Emergency Services
EP Act	The Environmental Protection Act 1986
DA	Development Approval
DER	Department of Environment Regulation
HDPE	High Density Polyethylene
ISO	International Organisation for Standardisation
NATA	National Association of Testing Authorities
PE	Polyethylene
PPE	Personal Protective Equipment
RCBC	Reinforced Concrete Box Culvert
UV	Ultraviolet
WA	Western Australia



UNITS OF MEASUREMENT

%	Percent
°C	Degrees Celsius
g/m ²	Grams per Square Metre
kg	Kilogram
kN/m	Kilonewtons per metre
m	Metre
mm	Millimetre
m ²	Square Metre
m ³	Cubic Metre
m/s	Metres per Second
MPa	Megapascal
N	Newton
N/m	Newtons per Metre



1 SPECIFICATION PRELIMINARIES

1.1 INTRODUCTION

SITA Australia (SITA, Principal) proposes to establish the Allawuna Farm Landfill in the Shire of York (Shire). The site is located on Lots 4869, 5931, 9926 & 26934 Great Southern Highway, Saint Ronans, Shire of York as shown on **Drawing ALLA-001**.

The site would be a licensed Category 64 premises, receiving up to 250,000 tonnes per annum of Class II waste from the Perth Metropolitan area. The Allawuna Farm Landfill is proposed as a replacement to SITA's Shale Road Landfill at South Cardup which is nearing capacity.

SITA is currently applying for a Works Approval from the Department of Environment Regulation (DER) to establish the Allawuna Farm Landfill.

The site requires establishment of site infrastructure including entrance access roads, internal access roads, hardstands, weighbridge, car and truck parking, security fencing, underground services, leachate transfer pipework and landfill related infrastructure such as a new landfill cells (Cell 1 and 2) leachate pond, retention pond, sedimentation dam, stormwater dam and associated infrastructure.

1.2 TECHNICAL SPECIFICATION - INFRASTRUCTURE

This document prepared by Bowman & Associates provides the Technical Specifications and the standard of construction to be followed for the construction activities associated with the infrastructure developments at the Allawuna Farm Landfill.

This includes the following infrastructure facilities:

- Entrance Road from Great Southern Highway to landfill site,
- Internal access roads and turnaround areas,
- Creek crossing over 13 Mile Brook,
- Road and drainage culverts,
- Road and drainage swales,
- Stormwater diversion bunds,
- Road signage and road marking,
- Site perimeter rural and security fencing including gates,
- Perimeter security fence and gates for ponds,
- Facility security fencing and gates,
- Vehicle and truck parking,
- Four bay vehicle carport,
- Truck mud shaker,
- Hardstands for site office, power generator, water tanks, and weighbridge,
- 100,000 L and 150,000 L water tanks,



- Leachate loading concrete pad,
- Hardstand for infrastructure and laydown area,
- Underground power, water, and data transfer conduit,
- Weighbridge (supplied by Mettler Toledo commissioned by SITA),
- Leachate transfer pipework (from Cell 1 sump to leachate pond), and
- Subsurface transfer pipework (from subsurface drainage sump to retention pond).

The locations of these facilities have been provided on the Drawings. This Specification also describes testing procedures to be employed to validate the quality of the constructed Works.

1.3 TECHNICAL SPECIFICATION - LANDFILL

The Golder Associates Pty Ltd document (reference 147645033-016-R *Technical Specification for the Construction of Cell 1, Cell 2 and ancillary works*) provides the technical specifications and the standard of construction to be followed for the construction activities associated with the development of the landfill related facilities at the Allawuna Farm Landfill.

The Specification and associated Design Drawings for the landfill will be provided by Golder.

Landfill works includes the following landfill infrastructure facilities:

- Landfill Cell 1 and Cell 2- excavation and construction
- Landfill perimeter bunds,
- Cell 1 and 2 - sump and riser pipework,
- Cell 1 and 2 - geosynthetic baseliner system,
- Cell 1 and 2 - leachate drainage layer and collection pipework,
- Leachate pond,
- Retention pond,
- Stormwater dam,
- Sediment management structure,
- Stormwater management drain,
- Subsurface drainage system and subsurface drainage sump, and
- Cell 1 and 2 sump pipework.

The locations of these facilities have been provided on the Drawings.

1.4 SUPPORTING DOCUMENTS

This Technical Specification is intended to be read in conjunction with the following documents. Should any of the listed information sources be in contradiction, the document listed first shall take precedence. For technical queries, clarification may be sought from the Superintendent or the Designers Representative.



- Tender response schedules and Special Conditions of Contract,
- AS 4000 General Conditions of Contract,
- Technical Specification - Infrastructure (this document),
- Technical Specification - Landfill (prepared by Golder),
- Construction Quality Assurance Plan (prepared by Golder),
- Design Drawings - Infrastructure (Works Approval),
- Design Drawings - Landfill (Works Approval), and
- Bill of Quantities,

1.5 BACKGROUND

1.5.1 PRINCIPAL

The Principal is a leading multinational waste, recycling and resource recovery service provider. The Principal has 100 operations across Australia including composting facilities, resource recovery facilities, materials recycling facilities, depots, transfer stations and nine landfills.

1.5.2 SUPERINTENDENT

The Superintendent will be the Principal, or the Principal's appropriately skilled and qualified representative, responsible for representing the Principal's interest during the execution of the Works by the selected Contractor.

1.5.3 INFRASTRUCTURE DESIGNER

The site infrastructure and supporting infrastructure (as outlined above) for the Allawuna Farm Landfill has been designed and specified by Bowman & Associates Pty Ltd. Any technical queries regarding the Works shall be referred to the person nominated by the Principal.

Risk assessments for the construction and operational activities at the site have been prepared by Bowman & Associates and are provided as part of the Works Approval documentation. These risk assessments relates to specific safety and performance engineering design features considered during the design phase for the construction and operational phases of the landfill.

1.5.4 LANDFILL DESIGNER

The landfill site infrastructure (As outlined above) for the Allawuna Farm Landfill has been designed and specified by Golder Associates Pty Ltd. Any technical queries regarding the landfill part of the Works shall be referred to the person nominated by the Principal.

Risk assessment to specific safety and performance engineering design features considered during the design phase has been included in this document.

A Construction Quality Assurance Plan for the works has been prepared by Golder Associates.

1.5.5 REGULATOR

The Department of Environment Regulation (DER).



1.6 DEFINITIONS

The following terminology shall apply in this Technical Specification:

Bill of Quantities	A table supplied by the designer describing the estimated volumes, lengths, areas and other quantities of materials and effort required to complete the Works.
Design Drawings - Infrastructure	Series of drawings setting out the lines and dimensions of the construction Works for the Infrastructure components (prepared by Bowman & Associates).
Design Drawings - Landfill	Series of drawings setting out the lines and dimensions of the construction Works for the Landfill components (prepared by Golder Associates).
Technical Specification - Infrastructure	Description of the requirements of the infrastructure construction Works. This Document.
Technical Specification - Landfill	Description of the requirements of the construction Works for the Landfill components (prepared by Golder Associates)
Contract	Legally binding agreement between the Principal and the Contractor for the provision of the Works.
Contractor	Organisation or individual commissioned by the Principal to undertake the Works subject to the Specifications and associated Contract conditions as provided by the Principal.
Infrastructure Designer	Bowman & Associates Pty Ltd.
Landfill Designer	Golder Associates Pty Ltd.
Landfill Footprint	The area within the site used for waste placement.
Principal	SITA Australia Pty Limited.
Regulator	Department of Environment Regulation.
Schedule of Rates	A table supplied by the Contractor and accepted by the Principal that described the cost per quantity for each item identified in the Bill of Quantities.
Site	Lots 4869, 5931, 9926 & 26934 Great Southern Highway, Saint Ronans, Shire of York.
Superintendent	The Principal or the Principals Representative.
Third Party Quality Assurance Observer	An independent company supplied by the Principal who will observe and report on all lining operations.
Works	All activities undertaken by the Contractor for the execution of the Allawuna Farm Landfill construction Contract.
Works Approval	Approval issued by the Department of Environment Regulation authorising the Principal to proceed with the Works.



1.7 SITE LOCATION

Allawuna Farm is located on the southern side of Great Southern Highway approximately 80 km by road from Perth and 20 km by road from York. The site is identified as Lots 4869, 5931, 9926 & 26934 Great Southern Highway, Saint Ronans in the Shire of York. The site area totals 1,500 hectares (ha) and is currently used as a broad acre cereal cropping farm.

1.8 WORKS AREA

The Works Approval area has been provided on **Drawings ALLA-002**. The Works included in this Technical Specification covers a 3.1 km long entrance road corridor, 1.5 km of internal roads and approximately 10 ha affected by the construction of site infrastructure.

The proposed landfill footprint will be approximately 36 ha.

1.9 DESCRIPTION OF WORKS

The Works includes, but is not limited to, the provision of all equipment, labour, operations, management, supervision, quality control and all other works required for the completion of the construction of (Site infrastructure and landfill cells) as described in the Technical Specifications and in accordance with the Design Drawings provided. Any additional works or variations from the Technical Specification ordered by the Superintendent is to be included as part of the Contract and subject to additional payment.

1.10 SCOPE OF WORKS - INFRASTRUCTURE

The Works, as defined in the Contract, this Technical Specification and the Drawings includes the following:

- Survey and setting out,
- Mobilisation and demobilisation of plant and equipment,
- Payment of Building and Construction Industry Training Fund Levy,
- Supply of equipment, construction materials, labour and supervision,
- Earthworks and filling for site infrastructure,
- Construction quality control and assurance,
- Construction of the site entrance road, including pavement basecourse and sealing selected areas along the route,
- Construction of creek crossing over 13 Mile Brook,
- Construction of road culverts,
- Construction of drainage swales and bunds,
- Construction of internal access roads and turnaround areas, including pavement basecourse and sealing selected area,



- Construction of hardstands for office building, generator, water tanks, weighbridge, vehicle parking, infrastructure area.
- Installation of services (power, data, water, leachate transfer) as required,
- Installation of security fences and gates,
- Installation of road signage,
- Construction of 4 bay carport,
- Construction of truck mud shaker,
- Installation of 100,000 L and 150,00 L water tanks,
- Construction of leachate loafing concrete pad,
- Installation of leachate pipework from Cell 1 and Cell 2 to leachate pond,
- Installation of pipework from subsurface well to retention pond,

The scope of works for construction associated with the landfill has been provided in the Golder Technical Specification.

1.11 WORKING HOURS

The normal working hours and working days shall be no earlier than 0700 hours and no later than 1530 hours Monday to Saturday, excluding public holidays. Work outside of these hours will be subject to approval by the Principal. The Contractor shall be liable for any additional cost or any claims incurred by the Principal as a result of working outside normal hours.

1.12 DISRUPTION TO FARM ACTIVITIES

As far as practicable, the Contractor shall limit its disturbance of land outside the Works area and accommodate any access requirements of the farm lessee. Contractor vehicles and equipment shall remain on designated roads and tracks and shall not traffic over cropping areas.

1.13 CONTRACT MANAGEMENT

1.13.1 PROJECT PROGRAM & SCHEDULING

The Contractor shall submit a detailed program of works (in MS Project format or similar) based on the outlined scope of works and hold points within two (2) weeks from the date of acceptance of the tender or at least seven (7) days prior to the works commencing.

The program of works shall include a list of Subcontractors, resource allocation and time frames for each task and hold points. This will be subjected to review by the Superintendent during progress meetings and will be updated on a fortnightly basis showing the percentage of work completed to form the approved project schedule and release of hold points



1.13.2 PROGRESS MEETINGS

Progress meetings will be held on site or at other agreed locations throughout the period of the Works on a weekly basis or more frequent if required. The meetings will be attended by the Principal, Contractor or Contractor's representative, Landfill Site Supervisor and the Superintendent.

Minutes detailing attendees, discussion topics, resolutions, actions required and responsible parties shall be recorded at all meetings and distributed to all attendees. Previous meeting minutes shall be tabled and confirmed at the following meeting.

1.13.3 WORKS PROGRESS REPORTING

The Contractor shall prepare and submit progress reports based on the previous progress meeting to the Superintendent. The format of these reports shall be to the satisfaction of the Superintendent and will include the following as a minimum:

- Progress in Works, percentage of tasks completed, achievement of milestones,
- Delay in achieving expected completion of tasks and valid comments stating the reason,
- Updated and approved project schedule as per the previous project meeting,
- Updated list of tasks and actions considered from the outcome of the previous meeting and the anticipated dates of completion,
- List of upcoming milestone events and the tasks required to complete them,
- Completed hold points, and
- Details of Works completed for invoicing.

1.14 HOLD POINTS

The following hold points are minimum requirements only, and additional inspections during the construction phase may be required at the Superintendent's discretion. Hold points include but are not limited to the following:

- Following earthworks set out,
- When soft ground is encountered,
- When hard ground is encountered and may need specialist machinery,
- Following preparation of all subgrade earthworks and following construction of the basecourse layer. The Superintendent shall inspect the finished surface and the test reports for compliance with the requirements of the Technical Specification,
- Prior to placement of any road seal,
- Prior to the construction of culverts,
- Prior to any concrete pours,
- At hold points to be nominated by the Superintendent based on the Contractor's proposed construction plan, and
- All other hold points defined in the Technical Specification or as directed by the Superintendent.



The Contractor is to provide the Superintendent with 48 hours written notice of an impending hold point. If a Contractor proceeds to construct beyond the designated hold point without the Superintendents inspection and/or without the Superintendents approval then the Superintendent may direct the Contractor to uncover and remediate the Works to the hold point, at the Contractor's expense.

The Contractor shall be deemed to have allowed for all time delays and costs associated with the hold points during the Works.

1.15 SETTING OUT AND SURVEY CONTROL

The Contractor shall be responsible for setting out the Works and for ongoing survey control, including alignment of surface water drains and construction of the liners to the grades, levels and locations shown on the Drawings.

The term "survey mark" used in this clause means a survey peg, bench mark, reference mark, signal, alignment, level mark or any other mark used or intended to be used for the purpose of setting out, checking or measuring the work under the Contract.

Unless otherwise required by the Contract, the Contractor shall preserve and maintain in their true positions the survey marks provided by the Principal or by the Superintendent in accordance with the Contract.

Should any survey mark be disturbed or obliterated, the Contractor shall immediately notify the Superintendent and shall, unless the Superintendent otherwise determines, rectify such disturbance or obliteration to the satisfaction of the Superintendent. Unless the disturbance or obliteration has been caused by the Principal, his employees or agents, the cost of rectification shall be borne by the Contractor.

Details of survey control for the Works is available upon request from the Principal's licensed surveyor.

1.16 ERRORS IN SETTING OUT

If at any time during the progress of the Works, any error is discovered in the position, level, dimensions or alignment of any part of the Works, the Contractor shall immediately notify the Superintendent. The Contractor shall, unless the Superintendent otherwise directs, rectify the error. Unless the error has been caused by incorrect data issued by the Principal, the cost of rectification shall be borne by the Contractor.

The Superintendent may check the setting out of the work under the Contract by the Contractor but the fact that the Superintendent may have carried out such checks shall not relieve the Contractor of any responsibility for the correct setting out of the work.



1.17 SITE SURVEY, AREA AND VOLUME CALCULATIONS

The Contractor shall engage a licensed surveyor to carry out survey control during the execution of the Works. Survey shall allow accurate calculation of all items in the Bill of Quantities.

Survey shall include, but not be limited to:

- Earthworks survey on a maximum 10 m grid over the affected area, at suitable points, including changes in grade, embankment breaklines, changes in material, levels and alignments to define earthworks volumes and areas,
- Limits and alignments of all constructed roads,
- The location and invert levels of all drainage infrastructure,
- Location and alignment of all services,
- Location and alignment of all leachate and water transfer pipework,
- Location and volume of all concrete structures,
- Survey of all soil test locations for the geotechnical quality control testing program,
- Survey of constructed pavements showing extent and thickness,
- Survey of all hardstands,
- Location of all fences and gates as installed, and
- Any other disturbance, rectification or alteration to the site undertaken by the Contractor.

The results of the site survey shall be supplied to the Superintendent as Drawings at an appropriately legible scale. Survey shall be provided on paper and in 3D AutoCAD (.dwg or .dxf) format with locations and levels to an accuracy of ± 100 mm horizontally and ± 20 mm vertically. Contours shall be shown at a 0.2 m interval (or as determined by the Superintendent), with the triangulated surface(s) used to determine any contours included in the digital model. Survey shall be supplied to the Superintendent within five (5) working days of the survey being undertaken.

Where claims for payment are based on the Schedule of Rates, quantities shall be calculated from the survey for the items shown in the Schedule of Rates. Claims for payment must be substantiated by relevant survey information and quantity calculations performed by a licensed surveyor.

Should the survey data be deemed to be inaccurate or contain discrepancies, the Principal shall appoint an alternative licensed surveyor to check the survey or quantities. The Contractor will be liable for all costs associated with any survey checks that indicate errors in the Contractor's original survey data.

1.18 AS CONSTRUCTED DRAWINGS

The Contractor shall supply a set of As Constructed drawings in digital format. The As Constructed drawings will show the true position of the completed Works in MGA94 format with AHD datum. Any variations from the 'Issue For Construction' drawings will be clearly annotated on the As Constructed drawings.

The Principal shall not issue a Certificate of Practical Completion until As Constructed drawings to an accurate and acceptable standard have been supplied by the Contractor.



1.19 CONSTRUCTION QUALITY ASSURANCE DOCUMENTATION

As per the Construction Quality Assurance Plan (prepared by Golder), prior to Practical Completion, the Contractor must provide a comprehensive Construction Quality Assurance documentation that meets the required of this document.

The documentation shall be professionally bound and shall be appropriately labelled. The documentation shall also be supplied in a digital format.

1.20 ENVIRONMENTAL PERFORMANCE

1.20.1 EQUIPMENT

The equipment to be used on site shall have appropriate emission control devices and will be maintained regularly to achieve optimum performance.

1.20.2 CONTAMINATION OF SITE

All refuelling of mobile plant will be undertaken in a designated area of the site nominated by the Contractor and approved by the Superintendent. Any fuel tank(s) stored onsite during construction shall be adequately contained and bunded to avoid spillage and contamination of soil. On occurrence of spillage events, the contaminated soil shall be removed from the site to an appropriate licensed facility at the Contractor's sole expense.

1.20.3 STORMWATER MANAGEMENT AND WATER DISCHARGE

Water management in the Works area will be the responsibility of the Contractor. Water in the Works area that is generated by rain may be pumped and discharged as stormwater on another part of the site, as directed by the Superintendent. The Contractor shall not discharge any water containing levels of salt, organic matter, hydrocarbons or other contaminants which are incompatible with the receiving water body without prior treatment and approval from the Superintendent. Each discharge request shall contain data on levels of contamination for analysis by the Superintendent at least ten (10) days prior to discharge.

1.20.4 FIRE PREVENTION

As per the *Fire Management Plan* (Revision C dated March 2015) prepared by Bowman & Associates. The Contractor shall ensure that no fires are set alight without the written approval of the Superintendent. Flammable or explosive products will be stored on site in accordance with the *Dangerous Goods Safety Act 2004* or any other relevant regulation.

The Contractor shall obtain all the necessary permits and licences to store and use such materials and pay all relevant fees and charges. . The contractors shall observe the *WA Bushfires Act*, Local Authority regulations, DFES requirements and any regulations in respect to fire prevention. To minimise the risk of fire, smoking shall only be permitted in authorised areas. The Superintendent shall instruct the Contractor on the locations where smoking is and is not permitted.

As part of the design, SITA has provided adequate fire fighting equipment on site including a 150,000 L fire fighting water tank and a 100,000 L non potable water tank.



1.21 ENVIRONMENTAL OBLIGATIONS

1.21.1 DUST CONTROL

The Contractor shall implement all reasonable and practical measures to prevent or minimise the generation of windborne particles during all tasks at all times of the Works. The Contractor shall be bound to the Department of Environment, 1996, *A Guideline for the Prevention of Dust and Smoke Pollution from Land Development Sites in Western Australia (November 1996)*.

The Contractor shall provide a Dust Management Plan for the Works at least seven (7) days prior to commencing the Works. This will be subjected to review and approval by the Superintendent.

1.21.2 NOISE

The Contractor shall comply with the Environmental Protection Authority, *Environmental Protection (Noise) Regulation 1997* (EP Noise). The Contractor shall provide a Noise Management Plan for the Works at least seven (7) days prior to commencing the Works. This will be subjected to review and approval by the Superintendent prior to the start of the Works.

1.21.3 WORKS APPROVAL COMPLIANCE

The Contractor shall, during the period of construction, comply with the terms and conditions specified in the Works Approval issued by the DER. A copy of the Works Approval will be provided to the Contractor upon request.

1.21.4 SOIL EROSION

The Contractor shall take all proper precautions to prevent soil erosion from any land used or occupied by the Contractor in the execution of the Works.

1.21.5 DUST, DIRT, WATER AND FUMES

The Contractor shall prevent any nuisance occurring through the discharge of dust dirt, water, fumes and the like.

1.21.6 REFUSE DISPOSAL

All Site refuse (including foodstuffs) shall be handled and disposed of in accordance with the requirements of relevant statutes to the satisfaction of the Superintendent.

1.22 OCCUPATIONAL HEALTH AND SAFETY

Site safety when undertaking the Works shall be the responsibility of the Contractor. The Contractor shall determine appropriate safe working procedures and methodologies to construct the Works as specified. The Contractor shall provide regular updates on site safety performance to the Superintendent during the Works. Minimum Personal Protective Equipment (PPE) requirements for all visitors to site are: Protective footwear, high visibility clothing (vest or jacket), long sleeved shirt, and full length trousers or as directed by the Principal.



2 STANDARDS

The standards described in **Table 1** shall apply to all Works undertaken by the Contractor.

Table 1: Table of Standards

Standard	Description
Australian Standards	
AS 1289.0	Methods of testing soils for engineering purposes
AS 1289.6.1.1	Methods of testing soils for engineering purposes – Soils strength and consolidation tests – Determination of the California Bearing Ratio of a soil
AS 2001.2.3.1	Methods of test for textiles - Physical tests - Determination of maximum force and elongation at maximum force using the strip method
AS 2033	Installation of polyethylene pipe systems
AS 3500	National Plumbing and Drainage Code (As amended 2010)
AS 3600	Concrete structures
AS 3610	Formwork for concrete structures
AS 3705	Geotextiles - Identification, marking and general data
AS 3706.1	Geotextiles - Methods of Test
AS 3706.3	Geotextiles - Methods of test - Determination of tearing strength - Trapezoidal method
AS 3706.4	Geotextiles - Methods of test - Determination of burst strength - California bearing ratio (CBR) - Plunger Method
AS 3706.9	Geotextiles - Methods of test - Determination of permittivity, permeability and flow rate
AS 3798	Guidelines on earthworks for commercial and residential developments
AS 4671	Steel reinforcing materials
ASTM International Standards	
ASTM D4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
ISO Standards	
ISO 11414	Plastics pipes and fittings -- Preparation of polyethylene (PE) pipe/pipe or pipe/fitting test piece assemblies by butt fusion
Main Roads WA Specifications	
Specification 501	Pavements
Specification 503	Bituminous Surfacing
Specification 504	Asphalt Wearing Course
Drawing 2003311-107	Chainwire fence - gate and assembly details
Drawing 200331 - 109	Chainwire Fence - Strainer and Post Details

Plus any other standard drawings that have been provided on **Drawing ALLA-002**.



3 CONTRACTORS SERVICES AND AMENITIES

3.1 CONTRACTORS SITE OFFICE

The Contractor shall provide and maintain suitable site office as it deems necessary for the execution of the Works. The Contractor will obtain any required building licenses at its own expense. The Contractor shall clean and maintain this office during the Works.

Upon completion of the Works the Contractor shall remove the temporary site office and restore the area to the same condition as before the commencement of Works.

3.2 WATER

Water for construction shall be the responsibility of the Contractor and with the approval of the Principal can be sourced from farm dams located across the property. It is the Contractors responsibility to determine the availability of construction water and if deemed not to be adequate the Contractor is responsible for providing alternate supply of water at its own expense.

Groundwater extraction and/or extraction of water from 13 Mile Brook will not be permitted during the Works.

3.3 POWER

Supply of electricity during the Works will be the responsibility of the Contractor.

3.4 ABLUTION FACILITIES

The Contractor will be responsible for providing temporary ablution facilities during the Works.

3.5 UNDERGROUND SERVICES

The Contractor must determine the location of any services in the Works area by contacting 'dial before you dig' and location of onsite services prior to commencing Works.

3.6 TRAFFIC MANAGEMENT

The site is privately owned property and not subject to public through traffic. Where disruption to traffic along Great Southern Highway is necessary to complete the Works or bring large equipment to site, the Contractor shall arrange for appropriate traffic management at its own expense.

3.7 PLANT LAY DOWN AND STORAGE AREA

An area for the lay down of Contractor plant and storage of construction materials is to be designated by the Contractor and approved by the Superintendent.



4 CLEARING AND STRIPPING

The Contractor shall remove vegetation as required to complete the Works. Clearing is required for a strip of bushland near the site entry and various isolated trees in the primary Works area.

Topsoil to a depth of 200 mm shall be removed from the entire area of Works by the Contractor or as defined on the drawings and stockpiled in a location approved by the Superintendent for future use. The Contractor shall separately stockpile soil from cropping and non-cropping areas. Top soil will be deposited in rows no higher than 3 m and no wider than 15 m to aid the preservation of soil microbes.



5 EARTHWORKS

5.1 GENERAL REQUIREMENTS

The site is to be graded to the alignments, slopes and gradients as shown on the Drawings. Generally earthworks will be required to shape the entrance road, internal access roads and Infrastructure Area.

The earthworks associated with the excavation and construction of the landfill cells, leachate pond, retention pond, sedimentation dam and stormwater dam has been incorporated in the Golder Technical Specification.

5.2 EXCAVATION

The Contractor shall carry out all earthworks on the site. The Contractor shall perform excavation in every type of material encountered within the limits of the Works to the lines, grades and elevations shown on the Drawings. All suitable excavated material will be used as fill in the Works area. Excavated materials that are unsuitable for placement as fill will be stockpiled separately in areas designated by Superintendent.

It is the responsibility of the Contractor to determine the appropriate equipment to undertake the task after conducting assessment of the soil/rock type on the site. The foundation level cut to the design level shall be brought to the attention of the Superintendent for inspection. Excavations not classified as "Hard Rock" shall be classed as common excavation and the Contractor shall not be entitled to any variation or extension of time due to failure to meet the approved project schedule.

5.2.1 HARD ROCK

Hard Rock refers to the excavation of in-situ material that cannot be ripped and excavated with a track dozer in good condition with matching hydraulic single shank ripper of combined mass not less than 52 tonnes (e.g. Caterpillar D10R or its equivalent) at a rate in excess of 90 m³ (solid) per hour. Isolated boulders each greater than 0.8 m³ in volume shall be defined as rock excavation.

Hard Rock encountered during excavation shall be removed by a methodology, and subject to additional payment, as agreed upon by the Contractor and the Superintendent.

5.2.2 SOFT GROUND

Soft ground encountered below the design cut levels shall be removed after gaining approval from the Superintendent and disposed of at a location nominated by the Superintendent. The soft ground stockpile shall be protected from erosion using appropriate slopes. If soft ground is encountered the subgrade is to be shaped by cutting into natural material or engineered using locally sourced clayey material.

5.2.3 UNDERGROUND SPRINGS AND SEEPAGE

Groundwater seepage and/or springs encountered during excavation shall be brought to the attention of the Superintendent. The Superintendent shall instruct the Contractor should groundwater relief drainage be required.



5.3 GROUNDWATER MANAGEMENT

The Contractor shall be aware of the anticipated groundwater conditions and excavations shall be dewatered as necessary. The dewatered materials shall provide stable foundation for the fill materials in order to permit construction work to take place on a firm subgrade.

5.4 FILLING

All suitable excavated materials shall be used as fill material. Unsuitable materials are defined under AS 3798, *Guidelines on Earthworks for Commercial and Residential Developments*. Fill material maybe be sourced from excavated materials, existing stockpiles, or future landfill areas located near the Works area.

5.4.1 FILL PLACEMENT

Areas that have been over excavated, removed as soft ground, removed as waste or require filling to meet design levels shall be filled using similar materials to those of the subgrade. Fill material is to appropriately moisture conditioned and be placed in layers of not more than 200 mm compacted thickness using a vibrating pad foot roller (12 tonne or greater) or similar compaction effort.

The Contractor shall perform survey as part of its Quality Assurance Plan to demonstrate that the compacted layer thickness and the completed liner thickness comply with the requirements of this Specification.

Prior to subsequent lifts of fill being placed the surface of the preceding lift shall be tined to provide an interlocking bond between layers.

The characteristics of the fill material to be considered are:

- Percentage passing the 0.075 mm sieve not less than 25%,
- Moisture content on placement to be between 3% dry and 2% wet of optimum moisture content (using a standard compactive effort), and
- A minimum standard compaction during placement of 95%.

5.4.2 FILL COMPACTION QUALITY ASSURANCE

The fill shall be compacted to a dry density of not less than 95% of standard dry density as given in AS 1289 *Methods for Testing Soils* or by alternate method as approved by the Superintendent. The Contractor shall conduct tests on compacted fill as per the testing frequency specified. The criteria that will be assessed to a minimum standard are:

- Standard compaction,
- *In-situ* density, and
- Moisture content.

The frequency of field density tests shall comply with Table 8.1 of AS 3798, as summarised in **Table 2** below.



Table 2: Required Frequency of Field Density Testing

Type of Earthworks	Frequency of Tests
Type 1 Large scale operations (greater than 1500 m ²)	Not less than: <ul style="list-style-type: none"> • 1 test per layer per material type per 2,500 m², or • 1 test per 500 m³ distributed reasonably evenly throughout full depth and area, or • 3 tests per Lot, whichever requires the most tests.
Type 2 Small scale operations (500 m ² to 1500 m ²)	Not less than: <ul style="list-style-type: none"> • 1 test per layer per 1,000 m², or • 1 test per 200 m³ distributed reasonably evenly throughout full depth and area, or • 1 test per Lot per layer, whichever requires the most tests.
Type 3 Concentrated operations (less than 500 m ²)	Not less than: <ul style="list-style-type: none"> • 1 test per layer per 500 m², • 1 test per 100 m³ distributed reasonably evenly throughout full depth and area, or • 3 tests per visit, whichever requires the most tests.
Type 4 Confined operations	1 test per 2 layers per 50 m ²
Trenches	1 test per 2 layers per 40 linear metres

Note: A Lot is defined as an area of work that is essentially homogeneous in relation to material type, moisture content and compaction effort.

5.5 PROOF ROLLING

The subgrade prepared for the construction of the pavement layers shall be proof rolled prior to construction.

Proof rolling shall be carried out in the presence of the Superintendent and the following methodology will be followed:

- The surface of the subgrade is to be kept moist at all times to prevent cracking, and
- Subgrade is to be proof rolled using a smooth drum roller of 12 tonne capacity or greater or a fully laden dump truck using a minimum of six (6) passes over the entire prepared surface.

The Superintendent shall inspect and approve the prepared subgrade surface prior to placement of the pavement layers. The Contractor will be required to give 48 hours notice for inspection of the prepared subgrade.



6 PAVEMENTS

A combination of compacted granular basecourse and bitumen seal will be required for the construction of entrance access road from the intersection with the highway to the infrastructure area, internal access roads and turnaround areas and areas of the hardstands at the site.

The entrance access road has been aligned to minimise disruption to cropping, minimise the removal of remnant vegetation, maintain a safe geometry for truck movements and align with an existing creek crossing. The access roads will be fenced to keep livestock and other fauna off the road. The access roads fence will have emergency access gates installed periodically along its length as shown on the Drawings.

As shown on **Drawings ALLA-005**, the road pavements for the entrance road will either consist of: -

- 8 m wide pavement, with a 7.0 m wide bitumen seal and 0.5 m shoulders, or
- 8 m wide pavement, with a 4.0m wide bitumen seal and 2.0 m shoulders.

As shown on **Drawing ALLA-010**, the road pavements for the internal access road and turnaround areas, will consist of 5.0 m wide pavements (unsealed).

6.1.1 PAVEMENT PLACEMENT

For construction of the pavement layer, the minimum completed thickness shall be 260 mm and be constructed in at least 2 layers each of not more than 200 mm compacted thickness. The basecourse material shall be mixed and moisture conditioned prior to compaction. The mixing and moisture conditioning must be carried out to achieve a uniform composition and moisture condition throughout each layer of placed material. The material shall be uniformly compacted using a padfoot roller in near horizontal layers not exceeding 200 mm thickness after compaction.

Prior to subsequent lifts of basecourse being placed the surface of the preceding lift shall be tined to provide an interlocking bond between layers.

The Contractor shall perform survey as part of its Quality Assurance Plan to demonstrate that the compacted layer thickness and the completed liner thickness comply with the requirements of this Specification.

The characteristics of the basecourse material to be considered are:

- Meet MRWA Specification 501 requirements for basecourse,
- Moisture content on placement to be between 2% dry and 3% wet of optimum moisture content (using a standard compactive effort), and
- A minimum standard compaction during placement of 98% for all granular materials.

6.1.2 BASECOURSE COMPACTION QUALITY ASSURANCE

The basecourse shall be compacted to a dry density of not less than 98% of standard dry density as given in AS 1289 *Methods for Testing Soils* or by alternate method as approved by the Superintendent. The Contractor shall conduct tests on compacted basecourse as per the testing frequency specified.



The criteria that will be assessed to a minimum standard are:

- Standard compaction,
- *In-situ* density, and
- Moisture content.

The frequency of field density tests shall comply with Table 8.1 of AS 3798, as summarised in **Table 2**.

6.2 GRANULAR PAVEMENT

Compacted granular pavements will be required for all the road networks, hardstand areas, office pad, water tank pad, generator pad and under the weighbridge, mud shakers, and leachate loading pad. The minimum thickness of the compacted pavement basecourse layer shall be 260 mm for all road networks. The thickness of the basecourse layer for the non traffic areas is shown on the drawings. The material shall be placed and compacted in accordance with the requirements set out in this Specification.

The pavement materials and pavements shall be compliant with the relevant Main Roads Western Australia (MRWA) specification 501 and details on the Drawings. The Contractor shall install the pavements in accordance with the details provided on the Drawings and as per the specified details provided on **Drawing ALLA-005**.

6.3 BITUMEN SEAL

The bitumen seal shall be compliant with the relevant Main Roads Western Australia (MRWA) specification document (Specification 503) and details on the Drawings. The extent of the areas to be sealed along the entrance access road, internal access roads, infrastructure area and hardstand areas has been provided on **Drawings ALLA-006 to ALLA-011**.

Final design of all seals shall be provided by the Contractor and approved by the Superintendent.

6.3.1 SUBGRADE IMPROVEMENT

As indicated in **Drawings ALLA-005** a portion of Road 2 (internal access road) from Chainage 600 to the end of the turnaround area will require subgrade improvement. The Contractor shall excavate this area and place the subgrade improvement materials and overlying basecourse layer in accordance with this Specification and the Drawings.

The Contractor shall supply and place the subgrade improvement materials, which shall consist of coarse gravel and should have a CBR greater than 15% when compacted. The Superintendent shall approve the Contractors proposed subgrade improvement material and placement methodology prior to placement.

6.3.2 SIGN POSTS

Road signage shall be compliant with the requirements setout on **Drawing ALLA-006**.

6.3.3 LINE MARKING

Line marking shall be compliant with the requirements setout on the Drawings.



7 CONCRETE

All concrete Works are to be compliant with the following Australian Standards:

- AS 3600 *Concrete Structures*
- AS 3610 *Formwork for Concrete*
- AS 4671 *Steel Reinforcing Materials*

Formwork shall be constructed to a ± 25 mm tolerance on an appropriately prepared subgrade or basecourse layer. All mesh and bar reinforcement used in the Works shall have a minimum yield strength of 500 MPa. Concrete cover shall generally be minimum 50 mm. All mesh overlaps shall cover at least 2 transverse bars on each sheet.

All concrete used in the Works, unless otherwise specified on the Drawings shall be N32 grade with 80 mm slump and 20 mm maximum aggregate size. All concrete shall be vibrated when poured. All concrete shall be cured by keeping the exposed surface continuously wetted down for 7 days following pouring or covered with an approved curing method/agent immediately following placement. Trafficable concrete surfaces shall be broom finished.



8 STRUCTURES

The following structures are proposed for the site, with the locations shown on **Drawing ALLA-010**.

The structures that will form part of the contactors scope include:

- Weighbridge (pad only),
- Truck mud shaker,
- Vehicle carport shelter,
- Leachate loading pad,
- Generator pad, and
- Water tanks (2) for non-potable water.

8.1 PRINCIPAL SUPPLIED ITEMS

The Principal will commission the supply and installation of:

- Site office,
- Ablutions and septic system,
- Potable water tank,
- Weighbridge and associated concrete infrastructure,
- 150 Kva generator, and
- Portable 5 Kva generator.

8.2 WEIGHBRIDGE

The construction details for the weighbridge area have been provided on **Drawing ALLA-023**.

8.3 TRUCK MUD SHAKER

The construction details for the mud shaker have been provided on **Drawings ALLA-024 / ALLA-025**.

8.4 VEHICLE CARPORT SHELTER

The construction details for the carport shelter have been provided on **Drawing ALLA-026**.

8.5 LEACHATE LOADING PAD

The construction details for the leachate loading pad have been provided on **Drawing ALLA-027**.

8.6 WATER TANKS

The Contractor shall supply and install one 100,000 L and one 150,000 L water tank at the proposed locations within the infrastructure area as shown on **Drawing ALLA-020**. The 100,000 L tank will be used for storing non potable water for general site use. The 150,000 L tank will be reserved for fire fighting use. Both tanks will be equipped by the Contractor with British Instant Coupling outlets, compatible with Local Fire Brigade equipment.



9 STORMWATER CONTROL STRUCTURES

9.1 WATER DAMS

A stormwater and sedimentation dam and retention pond will be installed along the southern boundary of the landfill footprint area. The design and construction aspects of these water holding structures has been provided in the Golder Technical Specification.

9.2 VALLEY DRAINS AND CULVERTS

Drainage around the site will be managed by a network of drains, culverts and sedimentation control features, as identified in **Drawings ALLA-006 to ALLA-011** and **Drawings ALLA-018 and ALLA-019**.

9.3 CREEK CROSSING

A dual lane creek crossing will be installed across 13 Mile Brook to enable all weather vehicle access to the landfill. The Contractor shall install a 17 RCBC and link slab culvert structure at the location of an existing ford of 13 Mile Brook. Construction of the crossing shall generally be compliant with the Main Roads WA standard drawings for small box culverts as described on **Drawing ALLA-002**.

Drawings ALLA-019 provides the design details of the creek crossing culvert.

Construction of the creek crossing shall be compliant with the Department of Water permit to interfere with bed and banks. This permit will be issued after the Works are completed.

9.4 SEDIMENT CONTROL

The Contractor shall monitor all Works areas for erosion during construction. The Contractor shall be responsible for maintaining any completed portion of the Works until the Works are complete. Any erosion of finished surfaces must be repaired by the Contractor at the Contractors sole expense.

The Contractor shall appropriately manage erosion on site to prevent any sediment escaping the Works area and entering 13 Mile Brook.



10 SERVICES

10.1 ELECTRICITY

It is proposed that the 240V transmission line from the Great Southern Highway will be extended from the farm house, along the entrance road to the site. A current works application has been submitted to Western Power for this work.

The proposed Western Power dome will be located to the south of the infrastructure area.

10.2 CONDUITS / DATA

At key points around the site under-road crossing conduits are required to accommodate the various services.

Specialist plumbing company Overflow Industrial has undertaken the design of the underground services and control panels. The proposed electrical schematic for the site and site facilities is provided on **Drawings ALLA-50, Drawings ALLA-10 and ALLA-011** which show the proposed location of the underground services.

10.3 LEACHATE TRANSFER PIPES

The proposed locations of the leachate transfer pipes from the Cell 1 and Cell 2 sump to the leachate pond are shown on Drawings **ALL-10 and ALLA-011**. The details of these pipes have been provided on the Overflow Industrial Drawings.

10.4 SUBSURFACE SUMP TRANSFER PIPE

The proposed location of the subsurface transfer pipes from the sump to the retention pond is shown on **Drawing ALLA-011**. The details of these pipes have been provided on the Overflow Industrial Drawings.

10.5 POTABLE WATER

Potable water for use during construction will be provided by the Contractor.

10.6 NON-POTABLE WATER

Non potable water for fire fighting and general purposes during construction will be supplied by the Contractor.

The supply of water from the farm dams for use by the Contractor during the construction phase of the Works has been assessed by Golder Associates.



11 LANDFILL AND POND LINING SYSTEM

The earthworks and construction requirements for the development of the baseliner for the landfill cells (Cells 1 and 2), stormwater dam, sedimentation management structure, subsurface drainage system and subsurface drainage sump, leachate and retention ponds and ancillary infrastructure has been specified in the Golder Specification.

The landfill cells, leachate pond and retention pond will be lined with synthetic materials. The stormwater dam and sediment management structure will be constructed from local clay based materials.



12 PIPES

The Contractor is to carry out the pipework installation as indicated on the Drawings.

12.1 PIPE INSTALLATION

The following measures and placement methodology shall be adopted:

- PE pipes shall be stored, handled and transported in accordance with AS 2033 *Installation of polyethylene pipe systems*,
- Pipes will be handled carefully to avoid distortion, buckling or other damage,
- The joining of pipes shall be by electro-fusion coupling or butt welding,
- All joining procedures will be carried out according to the manufacturer's specification,
- Butt welding or electro-fusion welding will be carried out by a qualified technician,
- All swarf from drilling shall be removed prior to installation of pipes,
- All cut edges and welded joints shall be neat and smooth,
- Pipes shall be clean internally and free from mud, dirt and other debris,
- Each pipe shall be positioned accurately and placed directly the prepared surface,
- Backfill material shall be carefully spread around and over the pipe and appropriately compacted, and
- Pipes extending above the ground surface shall be supported so that no bending or deformation of the pipe occurs.

12.2 PIPE SURVEY

A detailed as constructed survey of the pipe network shall be performed, recording the pipe locations and invert levels to verify compliance with the Drawings. The locations and invert levels of the pipes will be reported to the Superintendent for approval.



13 GEOTEXTILE

A geotextile layer to act as the protection layer between the prepared subgrade and rock protection layer in the stormwater inlet/outlets has been shown on **Drawing ALL-018**.

13.1 LABELLING

Each roll of geotextile cushion layer shall comply with AS 3705 *Geotextile Identification, Marking and General Data* and shall be labelled to provide the following minimum:

- Product name, grade and name of the manufacturer,
- Date of manufacture, batch number, polymer type,
- Manufacture quality control documentation from the manufacturer/supplier,
- Roll number,
- Roll dimensions, and
- Roll weight.

13.2 MATERIAL SPECIFICATION

The geotextile layer will be a non-woven geotextile manufactured from polyamide, polyolefines, polyester and/or polyvinyl materials. The geotextile shall comply with the *GRI-GT12 (a)* standards and satisfy the following typical properties:

Table 3: Geotextile Layer Properties

Property	Unit	Value	Test
Trapezoidal Tear Strength	N	> 390	AS 3706.3
CBR Bust Strength	N	> 2,650	AS 3706.4
Grab Tensile Strength	N	> 1,000	AS 2001.2.3
Pore Size	Microns	> 100	AS 3706.7
Permeability	m/s	> 3.3 x 10 ⁻³	AS 3706.9
UV Resistance	%	> 45	ASTM D4355

13.3 QUALITY ASSURANCE

A quality assurance compliance certificate from the geotextile manufacturer is required for each batch of geotextile delivered. The quality assurance certificate shall contain properties in **Table 3** as a minimum. Geotextiles will be free from any flaws/needles.



13.4 STORAGE AND HANDLING

All delivered geotextile cushion materials will be stored on level ground, free from any water logging or drain paths and not more than three (3) rolls high. Appropriate lifting methodology shall be used to prevent any damage while handling.

13.5 INSTALLATION

Placement of the geotextile cushion layer shall be carried out in accordance with the manufacturer's recommendation, details of which shall be provided to the Superintendent for approval.

The following measures will be adopted during placement:

- Only geotextile cushion rolls inspected and approved by the Superintendent shall be unrolled and used for placement,
- Adjacent geotextile cushioning sheets will have a minimum overlap of 500 mm,
- Joining of sheets shall be conducted by stitching or heat bonding with an approved hot-air device,
- No stapling of adjacent geotextile cushion sheets will be permitted,
- The long joints in the geotextile shall be constructed parallel to the slope gradient,
- All deployed geotextile sheets shall be restrained with sand bags as soon as possible to prevent uplift and dislodgement by wind,
- Placing of the basecourse layer over the geotextile cushion layer shall not create stress or tension in the geotextile and underlying layers, and
- The installation of geotextile shall be carried out by experienced and competent installers.

13.6 GEOTEXTILE REPAIRS

Geotextile repairs shall be carried out in compliance with the methodology below:

- Any repair on the damaged geotextile during installation shall be performed by patching with a new piece of geotextile made from the same material,
- Repairs shall overlap the damaged area by a minimum of 200 mm in all directions,
- Repairs shall be conducted only after cleaning of the area subjected to repair, and
- Any repair patches on a slope shall be double seamed into place.



14 FENCING & GATES

A combination of 1.2 m high farm fencing and 2.3 m high mesh and barbed wire security fencing is to be installed around the site, and around the ponds and dams as shown on **Drawing ALLA-030**.

The fences must be constructed in accordance with the MRWA requirements as outlined on the Drawings.

Emergency access gates are to be installed as shown for access from the surrounding farm.

Each Emergency access gate is to be fitted with two padlocks, each of a matching set to provide access to both the Principal and the Emergency Services. The padlocks are to be provided by the Principal.



15 SPECIFICATION DRAWINGS - INFRASTRUCTURE

Table 4: Table of Specification Drawings - Infrastructure

Drawing No	Revision	Description
ALLA-001	C	Cover Sheet, Locality and Drawing Schedule
ALLA-002	C	Site Plan
ALLA-003	C	Overall Layout Plan - Plan 1 of 2
ALLA-004	C	Overall Layout Plan - Plan 2 of 2
ALLA-005	C	Typical Road Cross Sections
ALLA-006	C	Roadworks and Drainage Layout - Plan 1
ALLA-007	C	Roadworks and Drainage Layout - Plan 2
ALLA-008	C	Roadworks and Drainage Layout - Plan 3
ALLA-009	C	Roadworks and Drainage Layout - Plan 4
ALLA-010	C	Roadworks and Drainage Layout - Plan 5
ALLA-011	C	Roadworks and Drainage Layout - Plan 6
ALLA-012	C	Road No. 1 Long Section - Sheet 1 of 4
ALLA-013	C	Road No. 1 Long Section - Sheet 2 of 4
ALLA-014	C	Road No. 1 Long Section - Sheet 3 of 4
ALLA-015	C	Road No. 1 Long Section -Sheet 4 of 4
ALLA-016	C	Road No. 2 Long Section - Sheet 1 of 2
ALLA-017	C	Road No. 2 Long Section - Sheet 2 of 2
ALLA-018	C	Miscellaneous Details
ALLA-019	C	Culvert No. 1 Layout Plan and Details
ALLA-020	C	Infrastructure Area Layout Plan
ALLA-021	C	Infrastructure Area Setout Plan
ALLA-022	C	Control Line Setout Plan
ALLA-023	C	Weighbridge Layout Plan and Details
ALLA-024	C	Mud Shaker Grid Layout Plan



Drawing No	Revision	Description
ALLA-025	C	Mud Shaker Grid Structural Details
ALLA-026	C	Carport layout Plan and Details
ALLA-027	C	Leachate Loading Pad Details
ALLA-028	C	Concrete and Steel Notes
ALLA-029	C	Services Layout Plan
ALLA-030	C	Fence Layout Plan
ALLA-031	C	Stormwater Catchment Plan and Calculations
ALLA-032	C	Sediment and Erosion Control Layout Plan
ALLA-033	C	Sediment and Erosion Control Details
ALLA-50	0	Electrical Layout

