



Mirvac Construction Pty Ltd
Waste Management Plan

Locomotive Workshop
Australian Technology Park, Eveleigh, NSW

7 February 2019

51142/120518 Rev 2

JBS&G Australia Pty Ltd

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1. Introduction

1.1 Introduction and Purpose

JBS&G Australia Pty Ltd (JBS&G) has been engaged by Mirvac Construction Pty Ltd (MCPL, the client) for the provision of environmental consultancy services associated with redevelopment of the Locomotive Workshop building within the Australian Technology Park (ATP) located at 2 Locomotive Street, Eveleigh, NSW 2015 (the Site, as shown on **Figures 1** and **2**). The site is legally identified as Lot 4000 in Deposited Plan (DP) 1194309 and occupies an area of approximately 2.7 hectares (ha).

As part of JBS&G's engagement, MCPL has requested that JBS&G prepare a Waste Management Plan (WMP) for the Site.

1.2 Purpose

The WMP is primarily concerned with the management of waste materials during the construction works phase and does not specifically address issues associated with any specific remediation works which are addressed in the Remedial Action Plan (RAP) and Occupational Hygiene Management Plan (OHMP) for the broader ATP Site.

With regard to stockpiling, sediment and erosion controls, this WMP outlines the following;

- Designated locations of contaminated and non-contaminated stockpiles, including segregation of Acid Sulphate Soils (ASS) and site fill materials (including building and demolition waste (refer **Figure 3**);
- Requirements for storage of stockpiled material; and
- Details of materials movement throughout the site during development works.

It is noted that all materials excavated during site development works will be managed in accordance with the RAP and/or the in-situ waste classification completed at the site.

Contingency measures have also been included in this WMP in the event that observed soil physical properties of materials excavated during site development works are materially different from those previously observed.

2. Legislation

2.1 State Legislation

Key legislation relevant to waste management in NSW include:

- *Dangerous Goods (Road and Rail Transport) Act 2008;*
- *Environmental Planning and Assessment Regulation 2000;*
- *Environmental Planning and Assessment Act 1979;*
- *Environmentally Hazardous Chemical Act 1985;*
- *Protection of the Environment Operations Act 1997;*
- *Water Management Act 2000;*
- *Protection of the Environment Operations (General) Regulation 2009;*
- *Protection of the Environment Operations (Waste) Regulation 2014;* and
- *Waste Avoidance and Resource Recovery Act 2014.*

2.2 The Council of the City of Sydney

The objectives of the Council of the City of Sydney (Council) Policy for Waste Minimisation in New Development include:

- Maximising re-use and recycling of building/construction materials,
- Assisting in achieving Federal and State Government waste minimisation targets;
- Minimising the overall environmental impact of waste;
- Providing advice to applicants on waste related matters;
- Requiring source separation which complement waste collection and management services offered by Council and private providers; and
- Encouraging building design and construction techniques which will reduce/minimise future waste generation.

2.3 Waste Classifications Guidelines

NSW Environment Protection Authority (EPA) *Waste Classifications Guidelines (2014)* provides guidance in relation to requirements for the classification of waste, as well as the storage, handling and disposal requirements for certain waste types.

3. Overarching Waste Management Strategy

3.1 The Waste Hierarchy

The waste hierarchy is a waste management approach that is aimed at ensuring the most efficient use of resources to reduce environmental harm and to provide for continual reduction in waste generation, in line with the projects principles of environmental sustainable development (ESD).

The hierarchy sets out the following order of priority for managing waste, from most desirable to least desirable:

- Avoidance (avoid unnecessary resource consumption).
- Recover Resources (including reuse, reprocessing, recycling and energy recovery).
- Disposal (the last resort).

3.2 Waste Management Approach

The waste management approach addressed in this WMP is as follows:

- MCPL will undertake appropriate planning and design protocols to ensure production of waste is minimised via ordering only appropriate quantities of materials and minimising in ground works as achievable;
- Demolition and construction activities will maximise the recycling of demolition waste and reuse of building materials where possible;
- Waste material generated on Site will be managed so that the volume of waste transported to landfill is minimised;
- Waste will be containerised, characterised and properly disposed of in order to minimise the potential for impact to the environment;
- Liquid waste, such as contaminated surface water/groundwater (if encountered) will be managed on-site to the greatest extent practicable to minimise off-site disposal requirements in accordance with the Stormwater and Wastewater Management Plan prepared for the Site; and
- The volume and methods for disposal of soil / aggregate products brought onto Site will be listed, tracked and report in accordance with the Materials Tracking Plan(s) for the Site.

4. Waste Management

The Principal Contractor, or Principal Contractor's agent shall be responsible for safely handling, segregating and temporarily storing wastes on the Site. Designated waste storage area(s) will be established at the commencement of works and will be maintained until completion of the contract.

4.1 Waste Stream

The major waste streams that are expected from the development include the following:

- Building, construction and demolition waste;
- Hazardous materials;
- Fill materials (contaminated);
- Green waste;
- Waste water and surface water;
- Groundwater resultant from localised dewatering associated with construction of subsurface structures;
- Waste oil, fuel, grease, oil; and
- General refuse and sanitary waste.

4.2 General Refuse (incl. Building and Demolition Waste)

All workers on the Site will receive appropriate instruction and training during Site inductions in relation to methods and procedures for waste segregation. The responsibility for correct waste management practices will be shared by all site personnel. A dedicated segregation system will be used to manage general waste (putrescible and non-putrescible). Building and demolition wastes will be sorted and separated into appropriately labelled bins and/or larger segregation areas, e.g. building timbers, metals, plastics, food wastes, etc. Waste material will be collected, transported and re-processed/recycled/disposed of, as soon as practicable.

Demolition materials will be sorted, segregated and loaded into trucks and transported offsite for processing. Wastes generated during later stages of construction will be placed into skip bins for period collection. A weekly collection service is recommended initially. The frequency of the collection services will be adjusted as works progress, subject to the volumes of waste being generated. The Principal Contractor or Principal Contractor's agent will engage a suitability licensed transport and disposal subcontractor to manage the collection of the contents of all bins. The appointed subcontractor will manage the supply, delivery, removal and certified disposal (as required) of all general wastes generated at the Site.

Toilet waste shall be disposed of via approved sewerage system to an approved sewerage treatment plant or otherwise as approved by Sydney Water. Appropriate licenses for discharge to sewer should be obtained from Sydney Water by the Principal Contractor or Principal Contractors agent prior to Site establishment. Sanitary facilities shall not be located where a spillage could cause direct pollution of a water body.

4.3 Hazardous Materials Summary

A hazardous materials survey (HMS) conducted by JBS&G in July / August 2017 (JBS&G 2017¹) identified the presence of asbestos containing materials (ACMs), lead based paints, elevated levels of lead in accumulated dust and synthetic mineral fibre (SMF) based materials within the building.

¹ Mirvac Projects Pty Ltd, Hazardous Materials Survey, Locomotive Workshop Building, Australian Technology Park, 2 Locomotive Street, Eveleigh, NSW. JBS&G Australia Pty Ltd, 9 August 2016, Rev A, Ref: 51142-110236. (JBS&G 2017)

All ACMs identified within the Locomotive Workshop are associated with heritage overhead travelling cranes, smaller items of heritage equipment in the old Blacksmithing Workshops of Bays 1 and 2 or the heritage machinery display area in Bay 10. It is understood that these ACMs will not be disturbed as part of the redevelopment works. SMF based ceiling tiles, insulation batts, air-conditioning duct and pipe insulation materials requiring removal, will be removed in a controlled manner and disposed of with other building waste in accordance with this WMP. No potential polychlorinated biphenyl (PCB) based light fitting components have been identified in the building.

Lead based paints and lead contaminated dusts were identified during the HMS, some of which will be impacted during redevelopment of the building. As a result, lead based materials to be potentially disturbed will need to be removed and/or remediated during initial stages of the project. To ensure the safe removal and lawful disposal of lead waste materials, a Lead Removal Plan is to be prepared by JBS&G prior to any demolition or construction activities.

During the lead removal works, the following waste management protocols will apply at all times for solid and liquid waste considered to comprise lead contaminated materials. All waste certificates documenting appropriate disposal of the lead contaminated waste must be retained by the Principal Contractor or Principal Contractors agent.

4.3.1 Solid Waste (Lead Impacted)

All solid waste (paint flakes, dusts, used rags, equipment, etc.) will be contained in plastic sheet, drums or 200µm polythene bags, adequately sealed and marked as lead containing waste within the lead removal works area. All sealed waste within the lead removal area will be cleaned free of dust prior to removal from the works area to a secondary controlled waste storage area (a skip bin etc).

In accordance with the NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste*, solid lead waste and associated used equipment and decontamination waste, is pre-classified as “hazardous waste” being waste contaminated with lead arising from premises other than residential premises or educational or childcare institutions.

4.3.2 Waste Water (Lead Impacted)

Water used for dust suppression and cleaning during the lead removal works will be collected within the lead removal zone using sumps, pumps, wet HEPA vacuum cleaners, etc. Given the potential for elevated lead concentrations in this water, the water cannot be discharged via standard stormwater/sewer systems without prior laboratory analysis to confirm the water is suitable for discharge. Alternatively, the water may be collected for off-site disposal as liquid waste via an appropriately licenced contractor in accordance with the requirements of the NSW EPA (2014).

Collected water should be placed in suitable water storage drums and/or a small settlement tanks for the temporary storage of collected waste water during site works. Where limited quantities of water are generated, these will be placed in waste storage drums, sealed and assigned a waste classification in accordance with NSW EPA (2014) for off-site disposal by a licenced contractor.

Alternatively, a settlement tank system may be used, whereby one is filled with waste water generated during works, following which a flocculating agent (alum, polymer agent, etc) is applied that will result in settlement of the majority of suspended material including the lead particulates to the base of the tank. The water could then be tested via laboratory analysis and demonstrated to be suitable for either reuse and/or alternatively disposal to sewer/stormwater, pending the appropriate regulatory approvals. The sediment at the base of the tank could then be dewatered and disposed of as lead containing waste under the above pre-classification. A second tank would be required to be used for storage of waste water generated during the flocculation/testing process.

4.4 Green Waste

Due to the absence of significant vegetation at the Site, limited green waste will be generated during the redevelopment works. Any green waste will be kept separate from all other wastes and disposed of off-site to a suitable green waste recycling facility where it will be shredded and/or mulched for re-use. Root systems and vegetation with attached soil will not be treated as green waste. This material will be stockpiled and managed with associated soil/fill material from areas of disturbance.

4.5 Contaminated Soil/Fill

The building footprint of the Locomotive Workshop covers almost the entire Site. Although extensive testing and characterisation of soils and fill materials representative of the broader ATP has previously been undertaken, very limited testing and characterisation of the soil/fill materials underlying the Locomotive Workshop Site has been completed. As a result, all materials surplus to Site construction requirement and beneficial re-use within the broader ATP, must be classified in accordance with NSW EPA (2014) Waste Classification Guidelines prior to disposal to a facility lawfully able to accept the material. Where foreseen, Mirvac should notify the environmental consultant to undertake in-situ testing, assessment and classification of surplus waste soils/fill materials to minimise stockpiling and double handling. All waste classification results and reports must be retained for the life of the project to demonstrate compliance with NSW EPA (2014).

Excavated fill materials requiring stockpiling, will be stockpiled based on their waste classification. Fill materials will be relocated to a designated temporary stockpile storage area within the Site (refer **Figure 3**) pending beneficial re-use within the broader ATP or off-site disposal. It is noted that all fill/soil materials requiring off-site disposal will be classified in accordance with the waste classification completed for the site, and EPA (2014).

Appropriate sediment controls (**Section 5**) will be put in place and the material covered in accordance with the requirements of the Remedial Action Plan (RAP) prepared for the ATP.

In the unlikely event acid sulfate soils (ASS) are encountered during Site development, procedures in the Acid Sulfate Soil Management Plan (ASSMP) for the ATP will be implemented.

4.6 Waste Water

Waste waters (groundwater, decontamination wastewaters and surface water) generated during Site redevelopment works is anticipated to be minimal. Waste waters generated during the works will be managed in accordance with the Stormwater and Wastewater Management Plan prepared for the ATP.

4.7 Waste Oil, Grease, Fuel

Minor amounts of waste oil, grease, lubricants etc. are expected to be generated from maintenance of plant and machinery during Site redevelopment works. The Principal Contractor or Principal Contractor's agents will store these goods, as required, within containers in designated bunded areas for later off-site recycling by an appropriate licensed waste recycling or disposal facility. These temporary storage areas will be maintained in accordance with the requirements for hazardous materials, including signage, security etc.

5. Sediment and Erosion Control Measures

5.1 Management of Activities

Site redevelopment activities have the potential to result in disturbance of the Site's soils resulting in erosion and water quality impacts. Management controls and mitigation measures are required to be implemented by the Principal Contractor or Principal Contractor's agent to minimise potential impacts. Management controls and mitigation measures are summarised in **Table 5.1** below. Specific location of management controls and mitigation measures will be dependent on the construction activity and work phase. An example of management controls and mitigation measures that could be implemented during the Site preparation works and construction phase is provided on **Figure 3**.

Table 5.1 Construction Activities and Management Controls

Site Preparation	<p>Prior to ground disturbance, erosion and sedimentation control measures must be in place. Where practicable, runoff from undisturbed areas is required to be diverted around the construction areas via diversion drains/swales to discharge. Diversion drains are to be installed and adequately constructed before the adjacent ground is disturbed.</p> <p>All runoff from disturbed areas is to be captured and treated for removal of sediment prior to discharge in accordance with the Stormwater and Wastewater Management Plan prepared for the ATP.</p>
Exposure of Soils	<p>Removal of the Site's hardstand ground cover shall be delayed as long as possible and undertaken within a staged manner.</p> <p>Removal of hardstand ground coverings shall not be undertaken unless preceded by the installation of adequate drainage and sediment control measures.</p>
Sedimentation Basins	<p>Temporary sedimentation basins, if required, are to be constructed.</p> <p>Controlled discharge from sediment basins is not permitted without prior water quality testing to confirm stored water meets the specified water quality targets as established in the Stormwater and Wastewater Management Plan prepared for the ATP.</p> <p>Any planned off-site discharge events are to occur only after assessment by a suitably trained and experienced environmental consultant and approvals from appropriate regulatory authorities.</p>
Site Maintenance	<p>Ensure that all drains are operating effectively and make any necessary repairs.</p> <p>Remove any spilled material from areas subject to runoff or concentrated surface water flow.</p> <p>Remove accumulated sediment from sediment traps, ensuring sediment traps are always greater than 90% capacity.</p> <p>Inspect sediment basins after each rainfall event and/or weekly.</p> <p>Construct additional erosion or sediment control works as necessary to ensure protection of downslope land.</p> <p>Maintain erosion and sediment control measures in a fully functioning condition at all times until construction works are finalised and the ground surface has been stabilised.</p> <p>Ensure groundcover is undisturbed, where possible, and kept in good condition.</p>
Site Access and Vehicle Movements	<p>Restrict vehicle movement as much as possible in accordance with a Traffic Management Plan for the Site.</p> <p>Site exit points (Figure 3) will be appropriately managed to ensure vehicles leaving the premises are sufficiently free from dirt, aggregate or other such materials such that materials are not transported onto public roads (e.g. rumble grids or stabilised access).</p> <p>Site entry/exit point is shown on Figure 3.</p> <p>Storm water runoff from access roads and stabilised entry/exit points must be drained to an appropriate sediment control storage area.</p> <p>Any material spilled on the road is to be cleaned up prior to cessation of same days' works and/or commencement of any rain event.</p> <p>Cover loads and avoid overloading which may lead to spillage.</p>
Stockpiles / Disturbed Areas	<p>The stockpiling of materials and disturbed areas should be kept to a minimum.</p> <p>Ensure stockpiles are free draining at all times.</p> <p>All stockpiles will be located at least 5 m from areas of concentrated flows (i.e. storm water drains), roads and steep slopes.</p> <p>Sediment fences shall be established down slope of stockpiles or disturbed areas to prevent off-site transport of sediment.</p> <p>Disturbed areas/stockpiles shall be stabilised if they are going to remain for extend periods via the use of mulch, plastic, grass-seeding etc.</p>

	Given the confined nature of the Site, a designated stockpiling location has not been prescribed. Stockpiling of spoil should be kept to a minimum, no greater than 4 m in height and appropriate sediment and erosion controls put in place.
Site Drainage	Install diversion drains before the removal of topsoil and commencement of earthworks. Promptly complete all permanent and temporary drainage works, once commenced, to minimise the period of exposure of disturbed areas. Site drainage works shall be installed to convey stormwater from undisturbed catchments safely around (or through) the site, without mixing with potential contaminated runoff from the site. Diversion drains shall be stabilised. Maintain water velocities with diversion drains below a level which causes erosion through maintaining low gradients, providing check dams (if required).
Utility Installation	Trench widths and depths will be kept to the minimum necessary. Divert surface water away from trench opening. Where trenches run across grade, excavated soil to be placed upslope and clear of trench, sediment fence to be placed down slope. Where trenches run up/down gradient, measures should be employed to capture sediment laden water, including trench stops (i.e. sandbags). Complete and close trenches as soon as possible. Avoid creating excavations when heavy rains are expected/likely. Organise service installation to enable progressive backfilling. Water capture within trenches/excavations should be pumped out and stored on-site or alternatively used in construction (dust suppression, if appropriate) and must not be discharged off-site. The requirements for off-site discharge are outlined below.
Surface water, Groundwater and Dewatering	All surface water, ground waste, decontamination waste and construction dewatering activities are required to be undertaken in accordance with RAP prepared for the ATP and Stormwater and Waste Water Management Plan.

5.2 Mitigation Measure Requirements

During Site redevelopment activities the minimum mitigation measures must comprise the following:

- Sediment fences;
- Diversion drains; and
- Temporary sediment basins.

5.2.1 Design Requirements

Sediment Fences

Sediment fences will be implemented to prevent sediment being transferred throughout the Site.

Diversion Drains

Diversion drains will be implemented to direct water from within the Site to temporary sediment basins.

Temporary Sediment Basins

Temporary sediment basins will be implemented to collect all stormwater runoff from disturbed areas within the Site. Temporary sediment basins shall be designed and constructed in accordance with guidance provided in “*Managing Urban Stormwater: Soils and Construction (Landcom 2004)*” provided in **Appendix A**.

5.3 Concrete Crushing

It is not proposed to pre-process building and demolition waste such as concrete and brick on Site. Should such opportunities arise in the future, a management plan for such works will be prepared.

6. Monitoring and Reporting

6.1 Auditing

Regular environmental compliance audits shall be undertaken to review the effectiveness and implementation of this plan. The Principal Contractor or Principal Contractor's agent shall record the findings of the audit. Should deficiencies be noted as a result of the auditing process, the auditing frequency shall be revised.

6.2 Monitoring

Daily monitoring will be undertaken by the Principal Contractor or Principal Contractor's agent to confirm that waste management procedures are being undertaken and that environmental controls are well maintained. The outcomes of these inspections will be recorded.

6.3 Contingency Plans

The possibility exists for impacted material that has not been identified to date to be present within fill materials or underlying pavements/building on the site. The nature of hazards which may be present and which may be discovered at the site are generally detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable asbestos materials (visible) as opposed to minor occurrences of fragments or fibre bundles in soil;
- Excessive quantities of Construction/Demolition Waste (visible);
- Hydrocarbon impacted materials (visible/odorous);
- Drums, waste pits, former pipework or underground storage tanks (USTs) (visible);
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous); and
- Tarry like impacted soil/fill material (visible/odorous).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be identified, procedures as outlined in the Remediation Environmental Management Plan (REMP, JBS&G 2018²) should be followed.

6.4 Corrective Action

If unacceptable procedures are identified, the associated activities will be temporarily suspended and rectification measures will be implemented. The rectification measures shall be undertaken and continue until cleared by the Principal Contractor or Principal Contractor's agent and the appointed environmental consultant.

6.5 Waste Register

All waste dockets/receipts/manifests will be retained for waste tracking to record the dates of waste removal, volume removed and to identify the waste transport contractor and destination / receipt facility for the waste. All waste transportation and disposal details and documents must be retained for the life of the project.

All waste is to be disposed of to a facility lawfully licensed to accept it.

² Mirvac Projects Pty Ltd, During Construction Remediation Environmental Management Plan, Locomotive Workshop Building, Australian Technology Park, 2 Locomotive Street, Eveleigh, NSW. JBS&G Australia Pty Ltd, 5 December 2018, Rev 0, Ref: 51142-119401. (JBS&G 2018)

All materials movement is required to be tracked in accordance with the Materials Tracking Plan prepared for the ATP Site.

6.6 Reporting

Copies of all tipping/disposal documentation will be maintained for inclusion in the validation report to be prepared for the Site.

The Principal Contractor or Principal Contractor's agent will be responsible for maintaining records of recycling and waste management including the following:

- Number and size of bins/containers/stockpiles on Site (tonnage and volumes in litres for liquids and m³ for solids);
- Waste types collected and managed on Site;
- Total tonnage and volume of waste material generated during the works, tonnage and volumes in litres for liquids and tonnage and m³ for solids); and
- The final destination of the waste material.

7. Roles and Responsibilities

The Principal Contractor or Principal Contractor's agent is responsible for:

- Implementation of this plan and ensuring that appropriate management controls are implemented and maintained on Site;
- Conducting Site inductions for all workers and visitors, including discussion of the requirements of this plan; and
- Ensuring compliance with all applicable legislation and contract obligations.

8. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

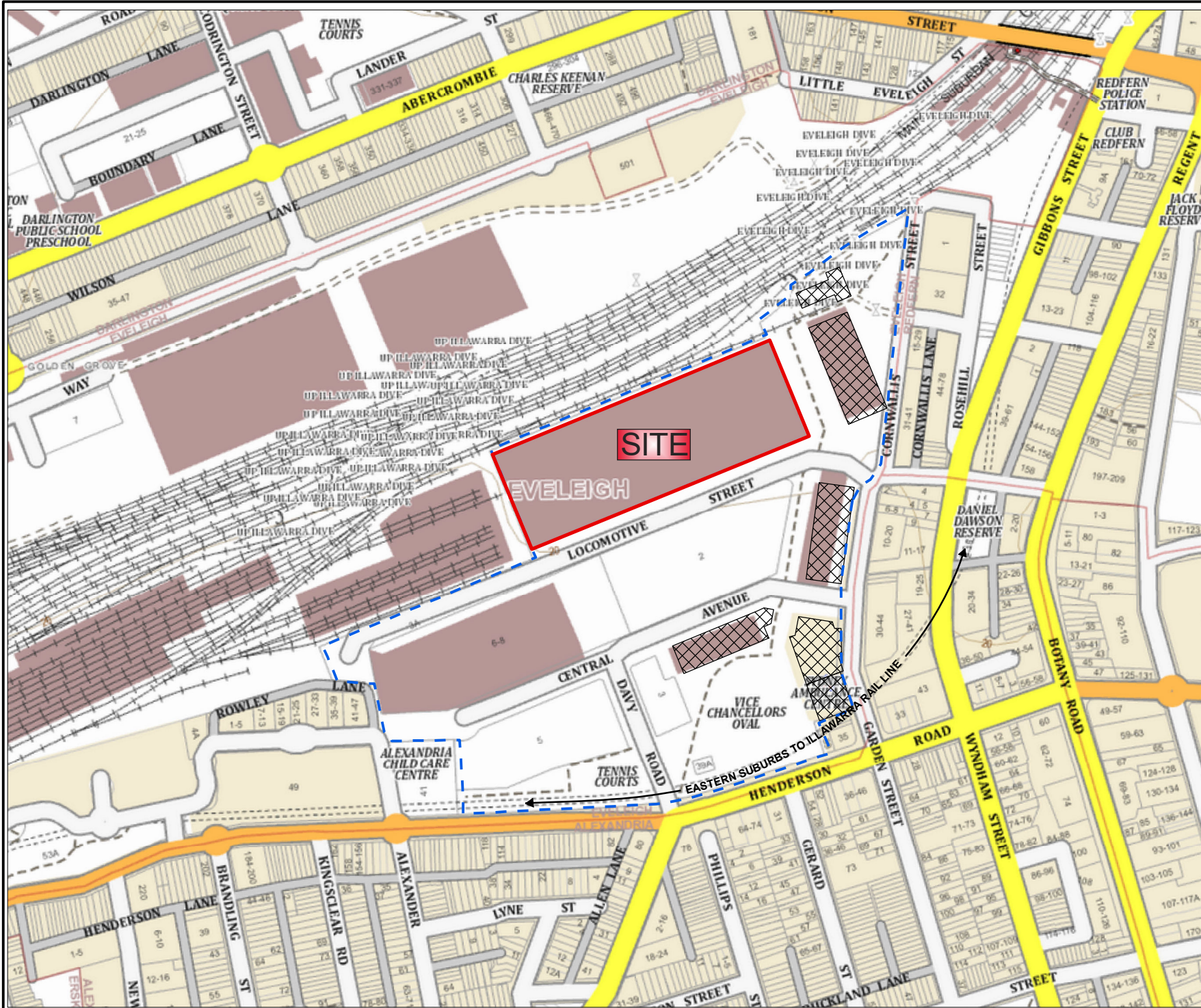
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend:

- └─┘ Approximate Boundary - ATP
- Approximate Site Boundary - "The Site"
- Existing Building Footprint Excluded from "The Site"



Job No: 51142

Client: Mirvac

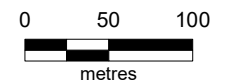
Version: R27 Rev 2

Date: 07-Feb-2019

Drawn By: RF

Checked By: AS

Scale 1:4,500



Coor. Sys. GDA 1994 MGA Zone 56

Locomotive Workshop
Australia Technology Park
Eveleigh, NSW

SITE LOCATION

FIGURE 1



Legend:

- Approximate Boundary - ATP Site
- Approximate Site Boundary - "The Site"
- Cadastral Boundaries
- Existing Building Footprint Excluded from "The Site"



Job No: 51142

Client: Mirvac

Version: R27 Rev 2

Date: 07-Feb-2019

Drawn By: RF

Checked By: AS

Scale 1:1,600



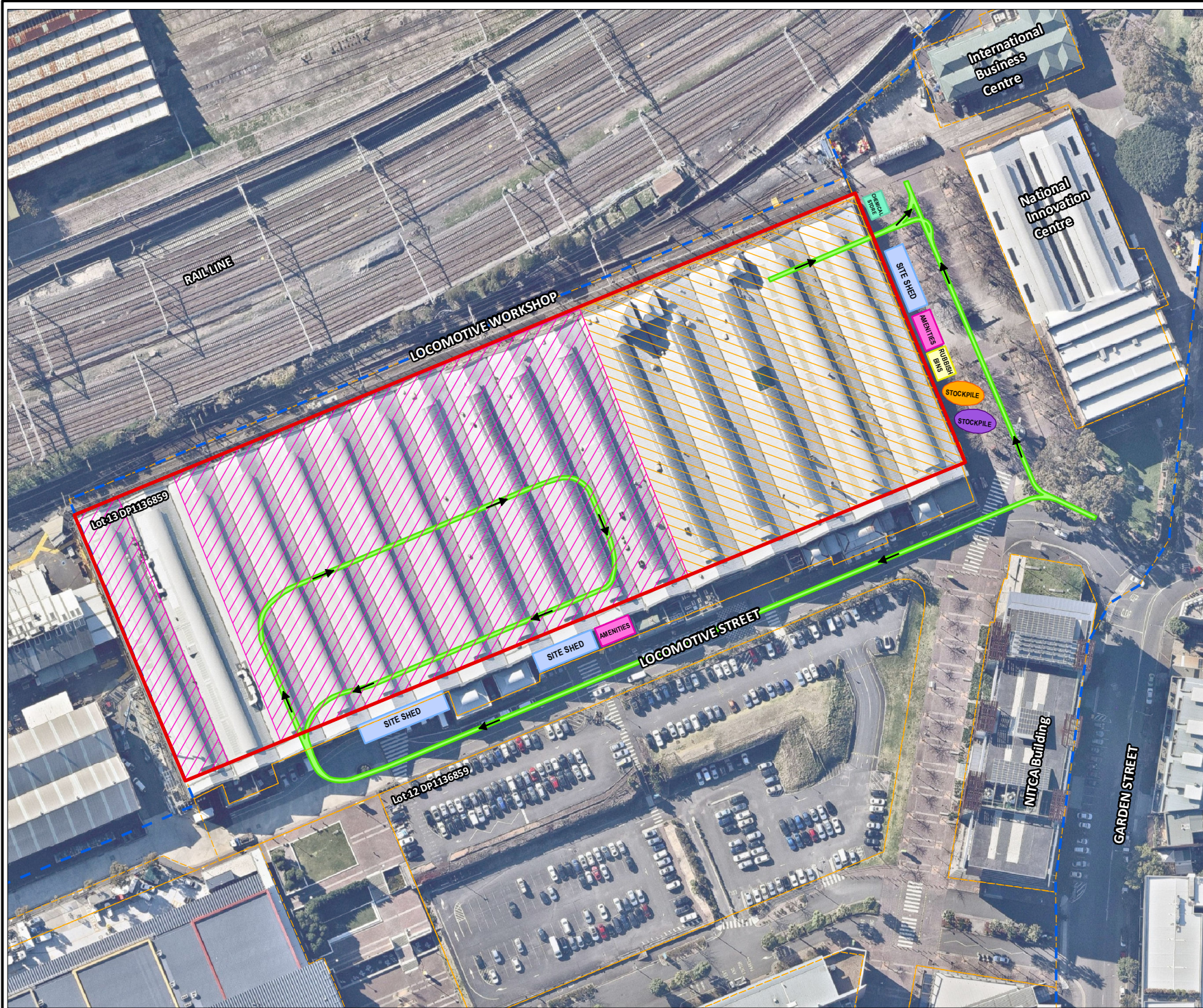
0 10 20
metres

Coor. Sys. GDA 1994 MGA Zone 56

Locomotive Workshop
Australia Technology Park
Eveleigh, NSW

SITE LAYOUT

FIGURE 2



- Legend:**
- Approximate Site Boundary - "The Site"
 - Approximate Boundary - ATP Site
 - Cadastral Boundaries
- Locomotive Workshop - Site Features**
- Stage 1
 - Stage 2
 - Site Sheds
 - Amenities
 - Rubbish Bins
 - Chemical Storage
 - Road Reserve
 - Contaminated Stockpile
 - Non-Contaminated Stockpile



Job No: 51142

Client: Mirvac

Version: R27 Rev 2

Date: 07-Feb-2019

Drawn By: RF

Checked By: JL

Scale 1:1,600



0 10 20
metres

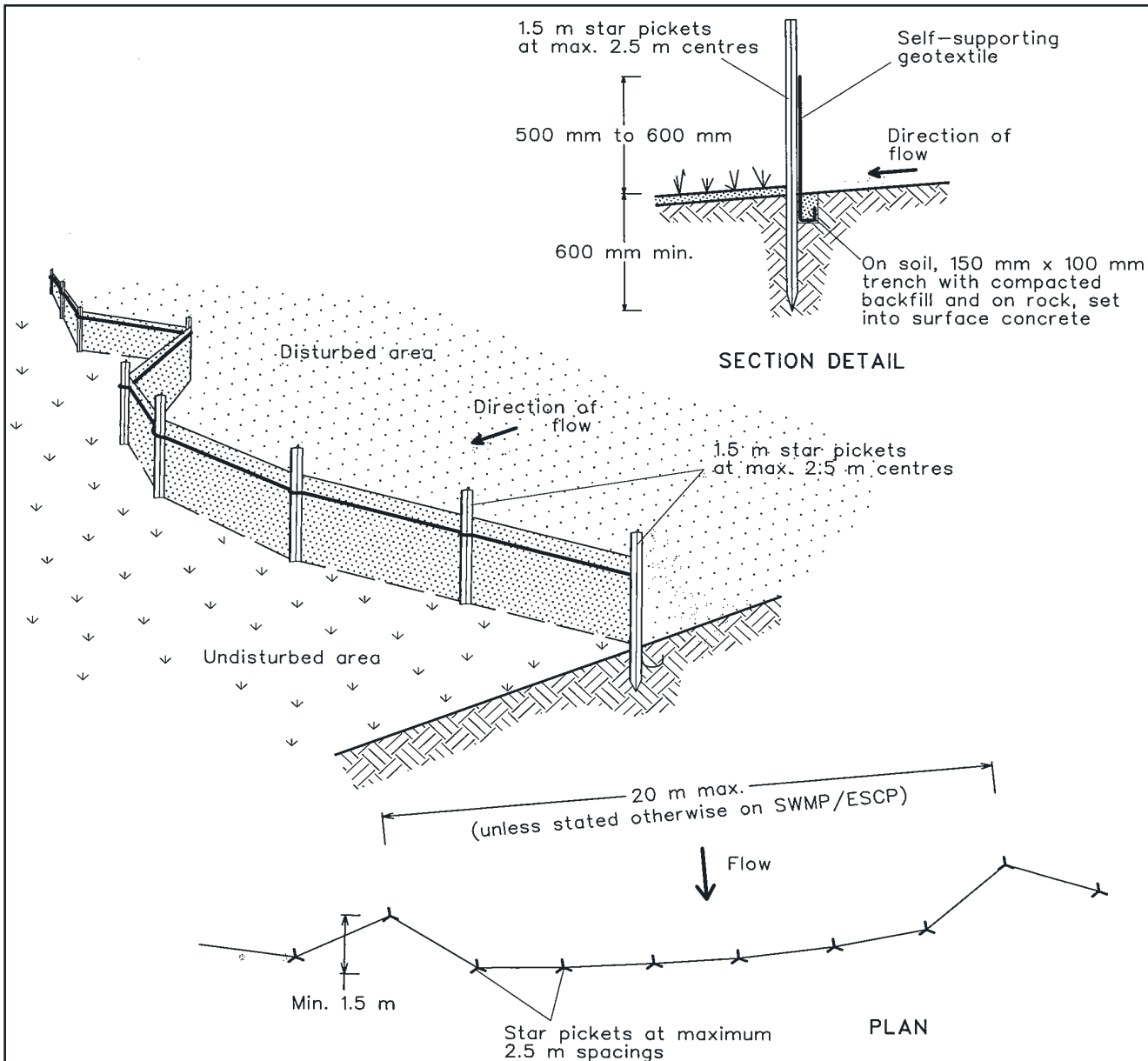
Coor. Sys. GDA 1994 MGA Zone 56

Locomotive Workshop
Australia Technology Park
Eveleigh, NSW

MANAGEMENT CONTROLS
AND MITIGATION MEASURES

FIGURE 3

Appendix A Sediment and Erosion Control Devices (Landcom 2004)

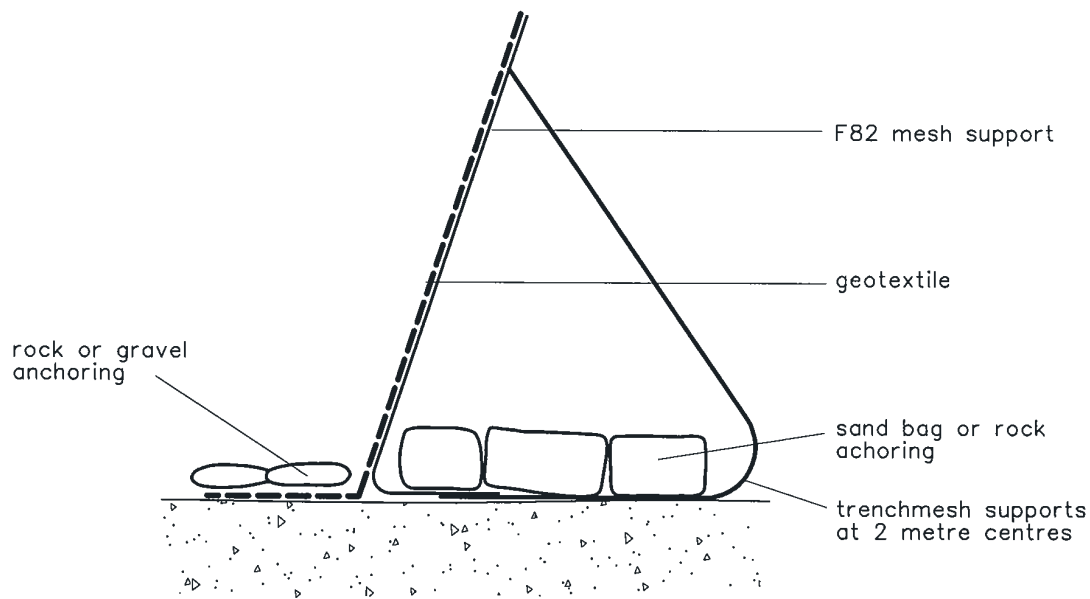


Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

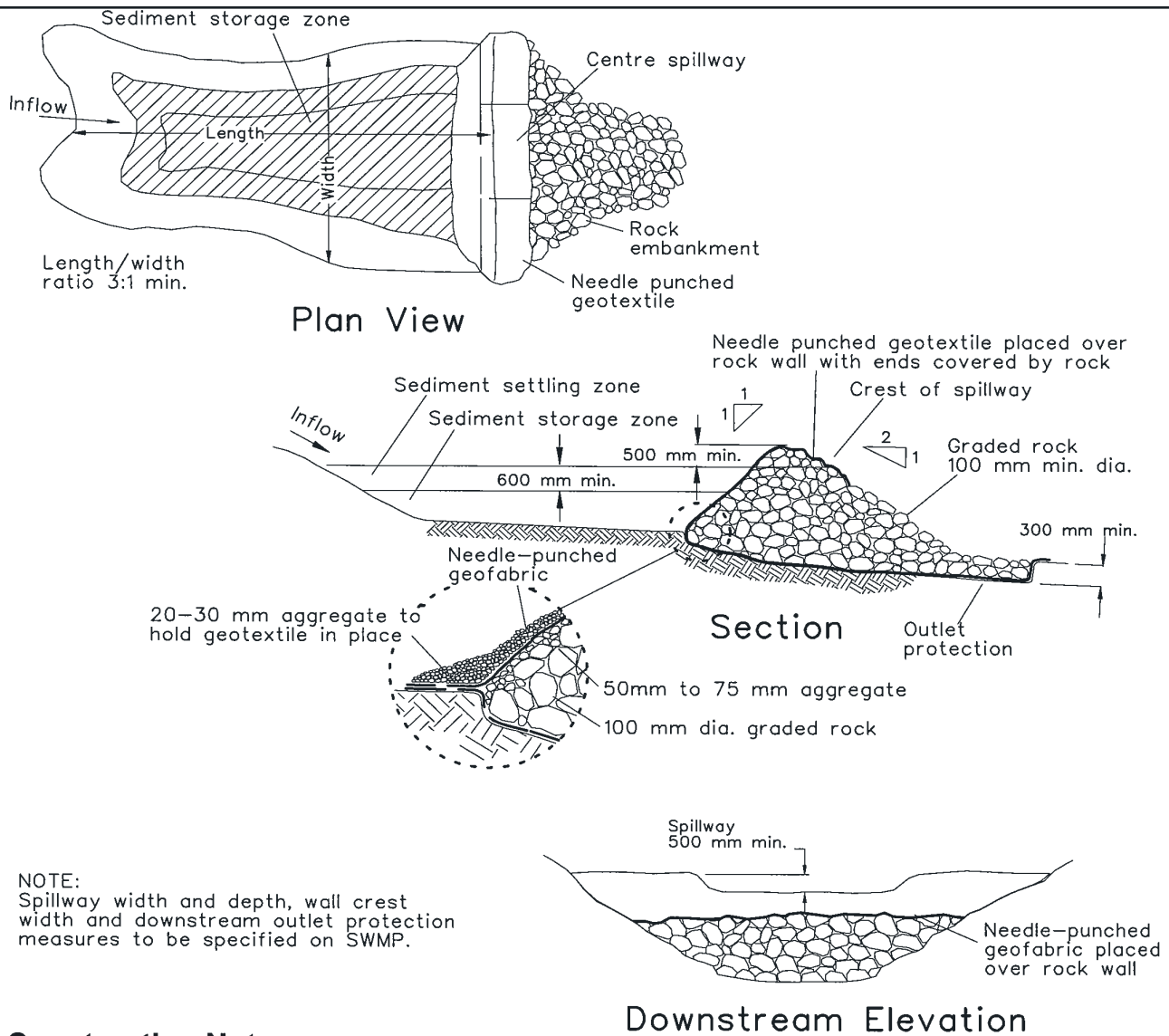
SEDIMENT FENCE

SD 6-8



Construction Notes

1. Install this type of sediment fence when use of support posts is not desirable or not possible. Such conditions might apply, for example, where approval is granted from the appropriate authorities to place these fences in highly sensitive estuarine areas.
2. Use bent trench mesh to support the F82 welded mesh facing as shown on the drawing above. Attach the geotextile to the welded mesh facing using UV resistant cable ties.
3. Stabilise the whole structure with sandbag or rock anchoring over the trench mesh and the leading edge of the geotextile. The anchoring should be sufficiently large to ensure stability of the structure in the design storm event, usually the 10 year event.



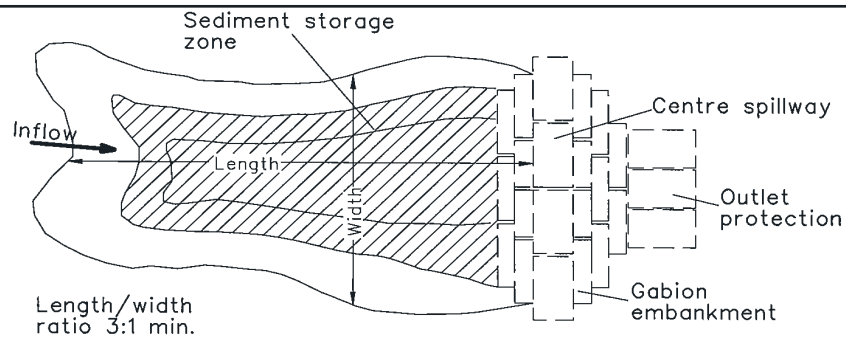
Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Excavate to 300 mm depth for base of the dam wall.
3. Line the excavation with a needle-punched geotextile allowing sufficient to line below the wall, and over the upstream rock and the spillway to 500 mm below the spillway exit on the downstream face.
4. Make up the wall profile and outlet protection with 100 mm (min.) diameter graded rock. Spread a layer of 50 mm to 75 mm diameter aggregate over the upstream batter for a more even surface, and add 100 mm to 150 mm of 20 mm to 30 mm gravel over the 50 mm to 75 mm diameter aggregate.
5. Lay geotextile over the upstream batter and through the spillway, fixing in place with 100 mm rock.
6. Place a "Full of Sediment" marker to show when less than design capacity occurs and sediment removal is required.
7. Replace the upstream geotextile layer each time sediment is removed

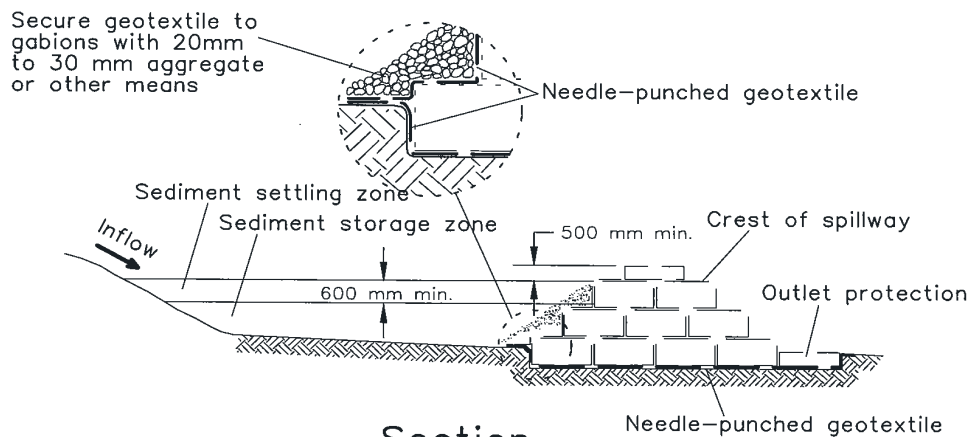
ROCK SEDIMENT BASIN

(APPLIES TO 'TYPE C' SOILS ONLY)

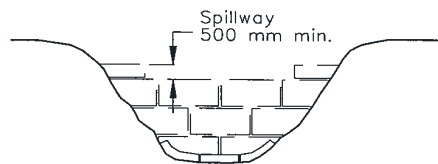
SD 6-1



Plan View



Section



Downstream Elevation

NOTE: Spillway width and depth, wall crest width and downstream outlet protection measures to be specified on SWMP.

Construction Notes

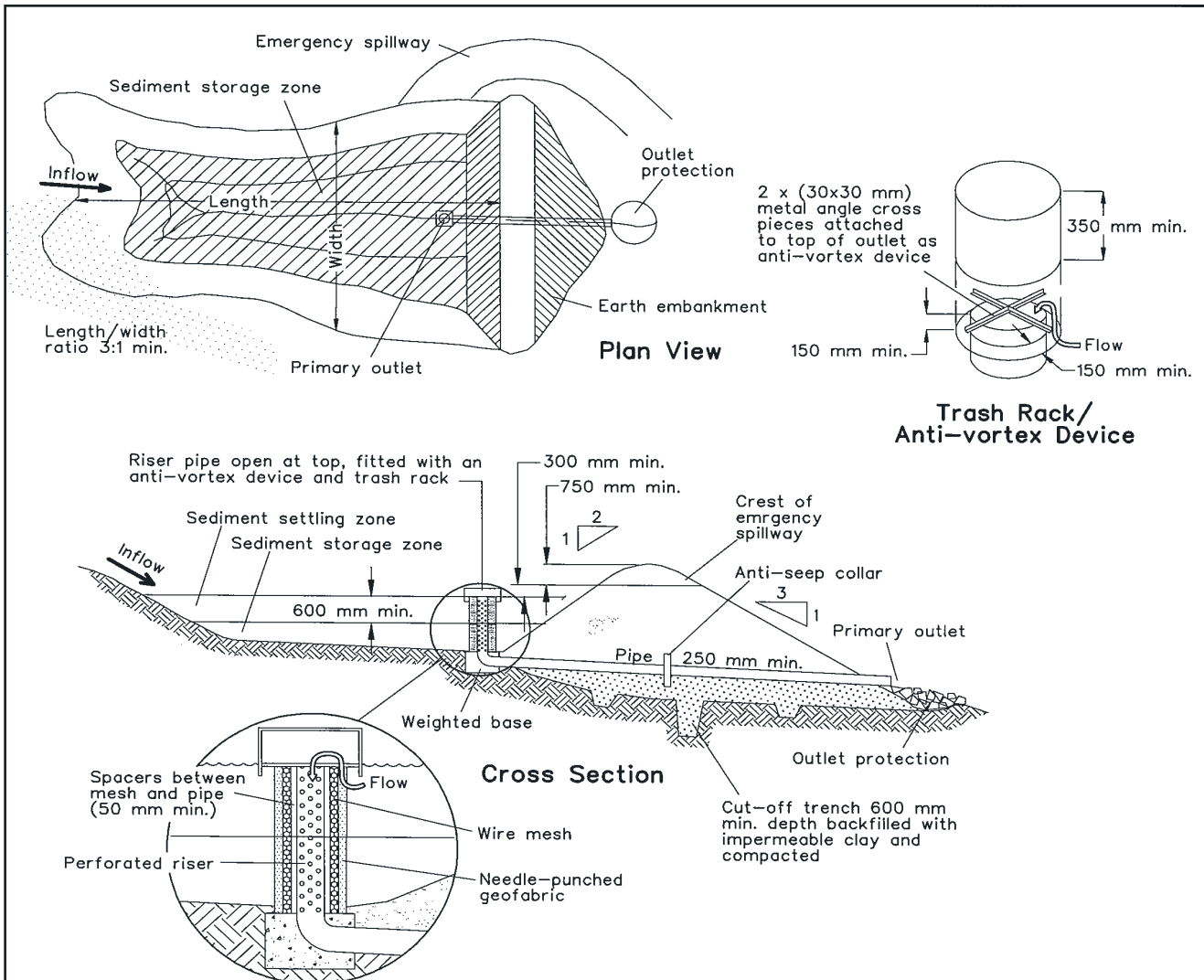
(Applies to Type C soils only)

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Excavate to 300 mm depth for the base of the dam wall and form a level platform for the gabions.
3. Line the excavation with a needle-punched geotextile allowing sufficient to line below the wall, and over the upstream gabions and spillway to 500 mm below the spillway exit on the downstream face.
4. Make up the wall profile and outlet protection with gabion units filled with graded rock as specified on the SWMP.
5. Construct a spillway 500 mm below the crest of the dam and for the width specified on the SWMP.
6. Lap the geotextile over the upstream face and through the spillway and fix it in place with the top row of gabions.
7. Cover the upstream face of the wall with 20 mm to 30 mm gravel and geotextile (Standard Drawing 6-2b)
8. Place a "Full of Sediment" marker to show when less than design capacity occurs and sediment removal is required.
9. Replace the upstream geotextile layer when sediment is removed if a dry basin is required.

GABION SEDIMENT BASIN

(APPLIES TO 'TYPE C' SOILS ONLY)

SD 6-2

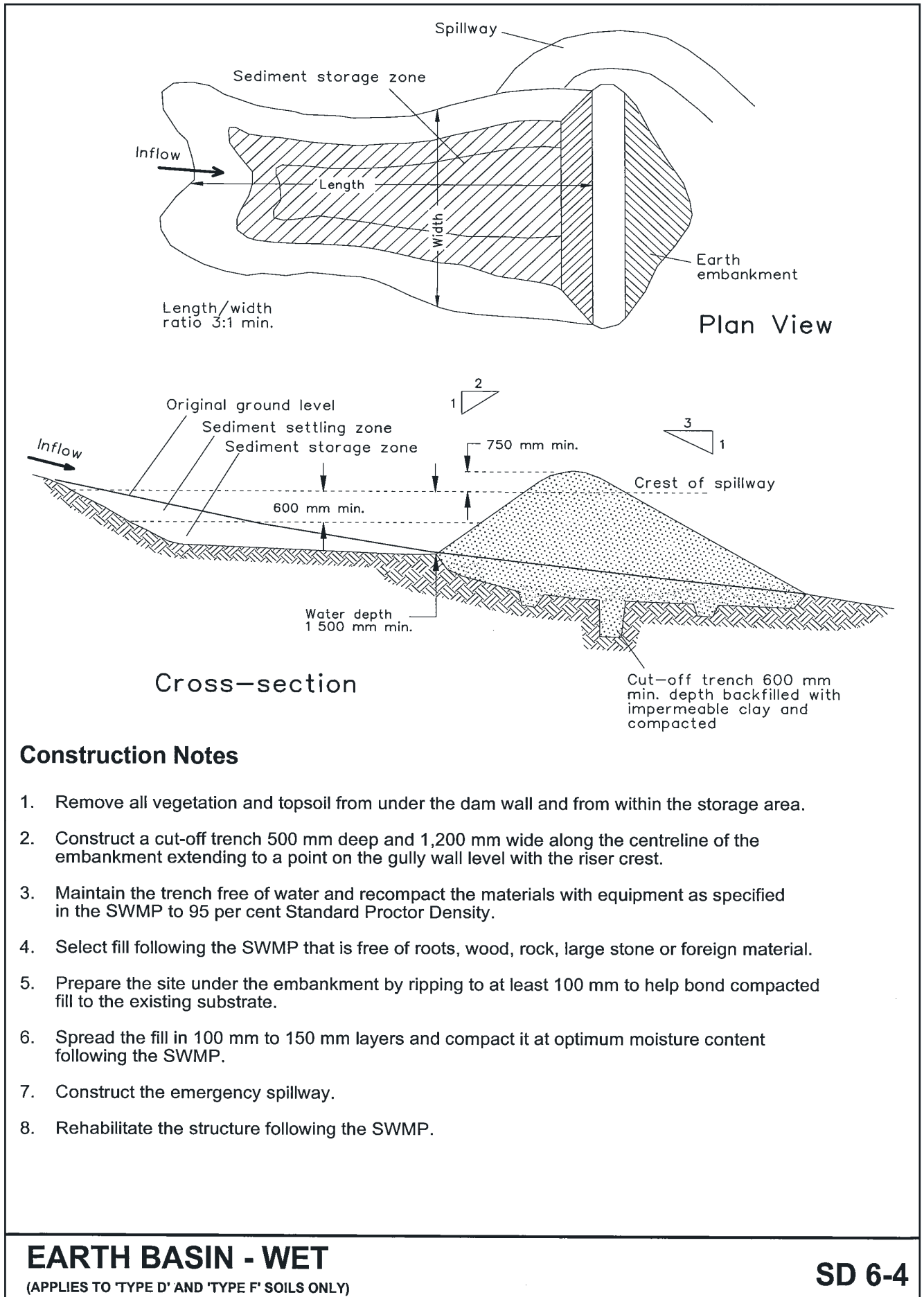


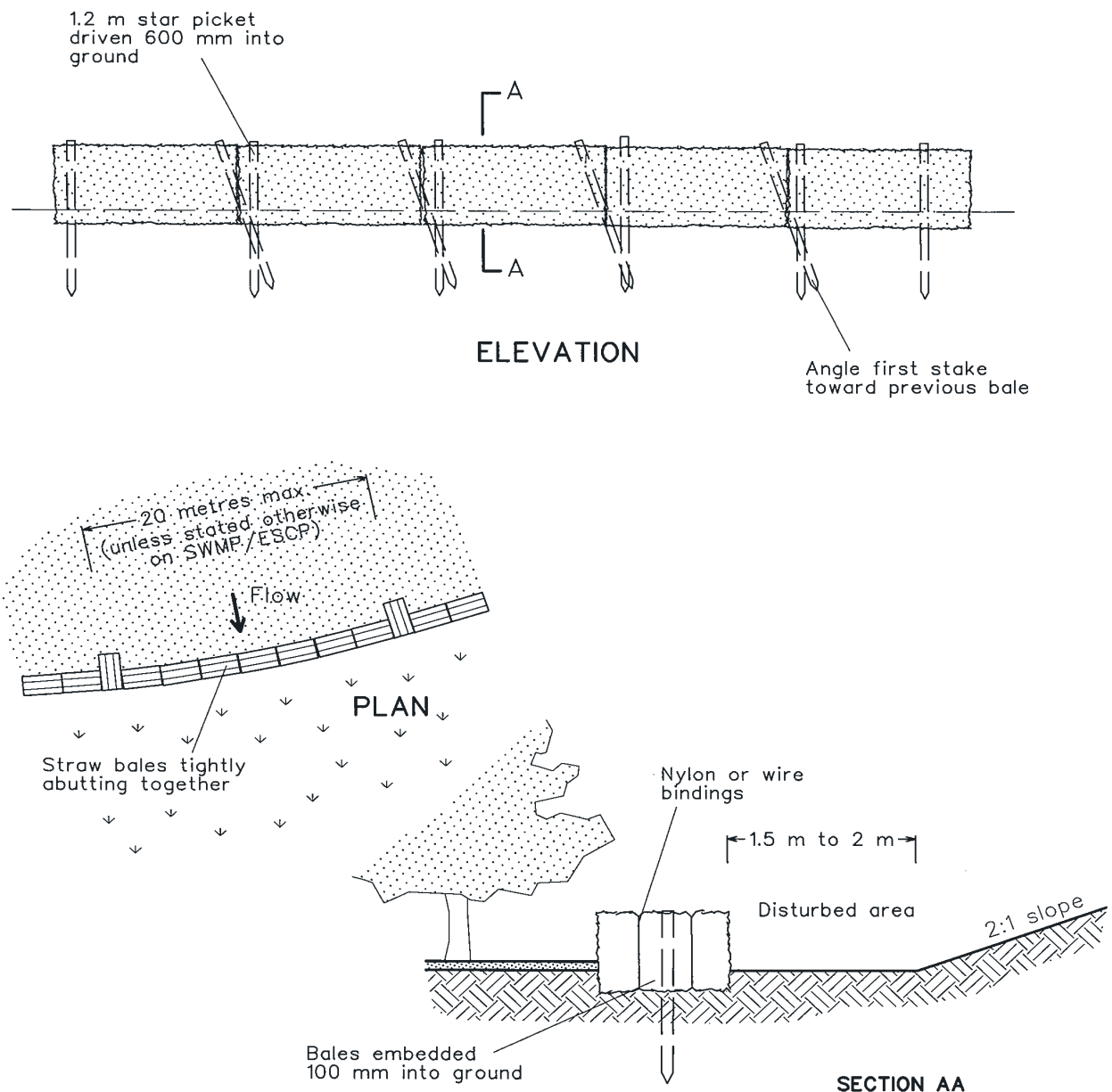
Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Form a cut off trench under the centreline of the embankment 600 mm deep and 1,200 mm wide, extending to a point on the watercourse wall above the riser sill level.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill according to the SWMP that is free from roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond the compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Install the pipe outlet with seepage collars as specified in the SWMP and Standard Drawing 6-3b.
8. Form batter grades at 2(H):1(V) upstream and 3(H):1(V) downstream or as specified in the SWMP.

EARTH BASIN - DRY
(APPLIES TO 'TYPE C' SOILS ONLY)

SD 6-3





Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER

SD 6-7

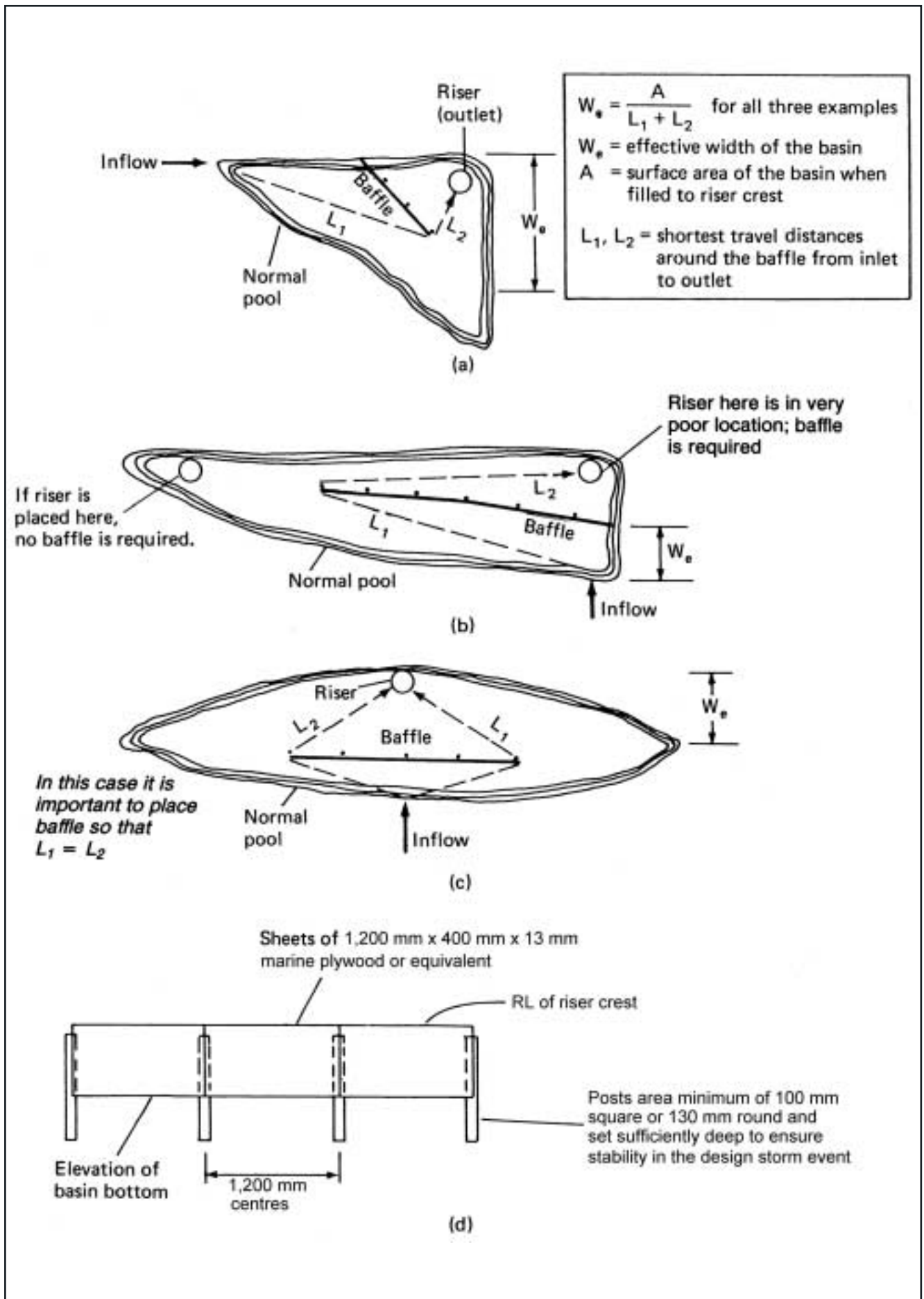


Figure 6.4 (a) to (c) – diagrammatic examples of placement of baffles in sediment basins to increase the ratio of length to width, and (d) – baffle detail, elevation (adapted from USDA, 1975)




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