University of Sydney

Abercrombie Precinct Redevelopment Project

Soil and Water Management Plan

July 2013

Contents

Appendices

1. Introduction

The Soil and Water Management Plan (SWMP) outlines how soil and water issues are to be identified, planned, managed and monitored during the construction period. The SWMP addresses erosion, sedimentation, water pollution, fuel and chemical storage management and outlines measures to minimise adverse impact on the environment.

This Soil and Water Management Plan shall be read in conjunction with the Erosion and Sediment Control Plan (ESCP) included in Appendix A.

The plan should be updated by the Contractor and incorporated into the Contractor's Environmental Management Plan (CEMP).

2. Purpose and Objectives

The primary purpose of the SWMP is to integrate management processes in order to minimise erosion, control movement of sediments and other contaminants and limit the impact of construction activities on the environment adjacent to and downstream of the works.

The key objectives of the plan are:

- Identification of activities that may contribute to erosion, sedimentation and water quality impacts;
- Minimisation of adverse water quality and sedimentation impacts by the construction operations on the riparian environment adjacent to and downstream of the works through the implementation of industry best management practices; and
- Provision of organised, integrated and systematic processes that effectively manage erosion, sedimentation and water quality during the term of the project.

3. Reference Documents

The following documents shall be referred to and complied with during the construction within the Abercrombie precinct:

- NSW Department of Housing: Managing Urban Stormwater: Soils and Construction (2004) (Blue Book)
- NSW Department of Conservation and Land Management: Urban Erosion and Sediment Control (1992) Hunt, J.S. (ed.)
- City of Sydney Council
- ANZECC (2000): Water Quality Guidelines
- EPA Bunding and Spill Management Guidelines
- AS/NZS5667-1998: Water Quality Sampling Guidelines
- AS1940-2004: The Storage and Handling of Flammable and Combustible Liquids.
- AS2430-2004: Classification of Hazardous Areas
- AS3773-1990: Bulk Solids Containers
- AS3780-1994: The Storage and Handling of Corrosive Substances
- AS4084-1993: Steel Storage Racking
- AS4332-2004: The Storage and Handling of Gases In Cylinders
- AS4452-1997: The Storage and Handling of Toxic Substances
- AS2601-1991: The Demolition of Structures

4. Project Issues

4.1 Sources of Pollution

The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods;
- Work areas that have not been stabilised;
- Clearing of vegetation and the methods adopted, particularly in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Demolition of existing buildings;
- Bulk earthworks and construction of buildings and pavements;
- Works within drainage channels, including depressions and overland flow paths;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals;
- Maintenance of plant and equipment;
- Ineffective implementation of erosion and sediment control measures;
- Inadequate maintenance of environmental control measures; and
- Time taken for the rehabilitation/ revegetation of disturbed areas.

4.2 Potential Impacts

The major potential impacts on the riparian environment relate to erosion of disturbed areas or stockpiles and sediment transportation. Potential adverse impacts from erosion and sediment transportation can include:

- Loss of topsoil;
- Increased water turbidity;
- Decreased levels of dissolved oxygen;
- Changed salinity levels;
- Changed pH levels;
- Increased maintenance costs; and
- Decrease in drainage network capacity leading to increased flood levels and durations.

Furthermore there is potential for contamination from the storage, transfer and use of oils, fuels, fertilisers and chemicals with impacts that can include:

- Discharge of toxic substances to waterways leading to death of flora and fauna; and
- Increased nutrient levels leading to algal growth.

Infiltration from spillage of oils, fuels and chemicals can lead to groundwater pollution.

5. General Erosion and Sedimentation Control Strategy

The clearing of vegetation leaves the land surface susceptible to increased erosion. The eroded particles can be transported off site and into the drainage system causing siltation, loss of hydraulic capacity and environmental stress. The ESCP aims to minimise the extent of erosion of the site, restrict movement of soil particles and mitigate the impacts of the works on the riparian environment.

6. Construction Methodology

The following construction methodology will be followed to minimise the risk of erosion and sediment export from the site:

- Install silt fencing;
- Install straw bale sediment traps across existing drainage paths;
- Install all other erosion and sediment controls as indicated on the ESCP and in accordance with the contractors CEMP;
- Carry out construction;
- Rehabilitate areas immediately on completion of works; and
- Remove silt fence and straw bales only when disturbed areas have been fully stabilised.

7. Site Inspection and Maintenance

7.1 Site Inspection and Maintenance Requirements

The ESCP outlines the erosion and sediment control measures that are required to be in place for the construction works within the Abercrombie precinct. The inspection and maintenance requirements outlined in this section will need to be carried out as long as either bulk earthworks operation is being conducted and all areas re-established.

The Contractor's site Superintendent will inspect the site after every rainfall event and at least weekly, and will:

- Inspect and assess the effectiveness of the ESCP and identify any inadequacies that may arise during normal work activities or from a revised construction methodology. Construct additional erosion and sediment control works as necessary to ensure the desired protection is given to downstream lands and waterways;
- Ensure that drains operate properly and to effect any repairs;
- Remove spilled sand or other materials from hazard areas, including lands closer than 5 metres from areas of likely concentrated or high velocity flows especially trunk drainage and paved areas;
- Remove trapped sediment whenever less than design capacity remains within the structure;
- Ensure rehabilitated lands have effectively reduced the erosion hazard and to initiate upgrading or repair as appropriate;
- Maintain erosion and sediment control measures in a fully functioning condition until all construction activity is completed and the site has been rehabilitated; and
- Remove temporary soil conservation structures as the last activity in the rehabilitation program.

7.2 Inspection and Auditing

The CEMP shall detail the ESCP inspection and auditing procedures to be implemented on the project.

To ensure effective implementation of the soil and water controls and management procedures, the CEMP shall include an Inspection and Test Plan for management of the soil and water controls.

8. Environmental Control

The Contractor shall implement the following in order to minimise the impact of the works on the downstream ecosystems in the vicinity of the project.

- Measures that minimise the impacts of the clearing of vegetation;
- Measures to minimise the area of disturbed ground that is exposed to erosion and that retain vegetation until earthworks operations require its removal;
- Measures that ensure that topsoil is correctly stored and reused;
- Measures to ensure that erosion minimisation and sediment controls works are installed prior to commencement of construction and that these controls are adequate for the continued protection of the downstream waterways;
- Measures to ensure that temporary drainage are routinely installed so as to minimise erosion, sedimentation and water quality impacts;
- Measures to encourage prompt topsoiling and revegetation of completed works areas; and
- Measures to locate compounds, access tracks, stockpile sites, temporary work areas and stage work so as to minimise erosion, sedimentation and water quality impacts.

9. Materials Handling, Transfer and Storage

The CEMP shall include method statements and procedures for all activities that involve the handling, transfer and storage of materials including operational by-products, plant wash-down, fine particulates/dust and waste.

Materials storage areas shall not be located within 50 metres of any drainage path, waterway or flood-prone land.

Materials storage procedures shall comply with any EPA and Workcover requirements and relevant Australian Standards, including the current issues of:

- AS1940 The Storage and Handling of Flammable and Combustible Liquids.
- AS2430 Classification of Hazardous Areas
- AS3773 Bulk Solids Containers
- AS3780 The Storage and Handling of Corrosive Substances
- AS4084 Steel Storage Racking
- AS4332 The Storage and Handling of Gases In Cylinders
- AS4452 The Storage and Handling of Toxic Substances

Materials Safety Data Sheets for all chemicals stored on-site shall be kept at the site office, made available to the staff who manage the storage of materials and be readily available to site personnel.

The CEMP shall contain procedures for the management of curing compounds and bitumen tacking to ensure that runoff containing these products is prevented from entering any drainage path or waterway. It shall also contain precautions to be taken during paving operations to minimise wash-off from bitumen following rain.

Storage areas for fuels, oils and other liquid chemicals shall be surrounded by impervious bund walls. The retained volume shall be no less than 120% of the volume of the largest container within the bunded area. There shall be no pipes and valves in the bund. The storage area shall slope to one corner to allow for clean up.

Chemical drums shall not be left open either inside or outside of bunded areas.

A copy of the EPA Bunding and Spill Management Guidelines shall be kept at the project site office, made available to the staff that manage the storage of materials and routinely implemented.

Old drums used as temporary works markers shall not contain chemical or hydrocarbon residues.

9.1 Transfer, Refuelling and Maintenance

The transfer, the refuelling/maintenance of equipment, the mixing of cutting oil with bitumen or any other activity that may result in a spillage of any fuel, oil or chemical shall not be permitted within 20 metres of any drainage path or waterway.

A responsible person shall remain present to observe all transfer, refuelling and maintenance operations.

In the event that equipment, plant or vehicles require refuelling or maintenance and cannot be moved away from a drainage path or waterway, a temporary bund or spillage trays shall be used to contain all potential contaminants.

All equipment, plant and vehicles shall be routinely maintained to prevent leakage from tanks, hoses and sumps.

9.2 Emergency Action Plan

The Contractor shall develop an Emergency Action Plan to deal with uncontrolled spillage or discharge of fuels, oils and chemicals. The plan shall include response procedures aimed at protecting the soils and water, that:

- Contain and control environmental emergency incidents;
- Safeguard people on-site and off-site;
- Protect drainage paths and waterways;
- Minimise damage to the environment and property;
- Identify appropriate disposal techniques for contaminated soils and water; and
- Facilitate remediation of the environment.

Contingency plans shall be prepared for implementation in the event of a major spill or discharge.

Adequate quantities of suitable containment and clean-up materials shall be maintained within easy and quick access. Containment and clean-up materials storage areas shall be clearly sign-posted and shall include materials usage instructions. Used materials shall be promptly replaced.

10. Rehabilitation and Revegetation

All disturbed areas and batters shall be restored and revegetated as quickly as possible to reduce protect against erosion, to minimise sediment transportation and to limit ongoing impacts on water quality.

All disturbed areas shall be rehabilitated and revegetated in accordance with the drawings and the Specification.

Rehabilitation and revegetation shall be undertaken immediately the disturbed work areas are no longer required for construction purposes.

11. Site Management, Responsibility and Resources

11.1 Site Management Plan

A project specific Site Management Plan shall be developed by the Contractor, which shall allocate responsibilities and the resources necessary to implement the environmental controls and procedures. It shall include a flow chart that clearly presents the chain of responsibility for implementing the erosion, sedimentation and pollution controls.

11.2 Allocation of Responsibilities

Responsibility for the implementation of the various controls should be covered in the CEMP and its referenced documents.

11.3 Allocation of Resources

Resources and materials shall be allocated to enable the timely implementation of the ESCP, reduce impacts and protect the environment. Resources and materials shall also be allocated for the routine and emergency maintenance of environmental protection works.

11.4 Induction and Environmental Awareness Training

11.4.1 Site Induction

Environmental matters shall be highlighted in the site induction for all personnel including subcontractors. The site induction shall include issues relating to erosion minimisation, sediment control and water quality. Staff shall be made aware of their responsibilities under relevant environmental legislation.

11.4.2 Toolbox Meetings

Informal training on erosion, sedimentation and water quality issues shall be undertaken during toolbox meetings with site personnel.

Appendix A

Erosion and Sediment Control Plan

EROSION & SEDIMENTATION CONTROL NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SOIL AND WATER MANAGEMENT PLAN.

ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH THE DEPARTMENT OF HOUSING MANAGING URBAN STORMWATER EDITION 2004 AND CITY OF SYDNEY SPECIFICATION.

WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
1 INSTALL ALL SILT FENCING.
2 CONSTRUCT BASIN.
3 CONSTRUCT CATCH DRAINS, DIVERSION DRAINS AND STRAW BALES.
4 INSTALL OTHER EROSION AND SEDIMENT CONTROLS.
5 DECOMMISSION AND DEWATER EXISTING SEDIMENTATION BASINS.
6 STRIP AND STOCKPILE TOPSOIL AND CARRY OUT BULK EARTHWORKS
7 TOPSOIL AND REHABILITATE BULK EARTHWORK AREAS IMMEDIATELY UPON COMPLETION.
8 UNDERTAKE REMAINING SITE WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS.
9 REHABILITATE THE REMAINING SITE.
10 REMOVE SOIL AND WATER MANAGEMENT WORKS ONCE UPSTREAM SURFACES ARE STABILISED TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.

THIS ORDER MAY BE CHANGED SUBJECT TO FIELD CONDITIONS BUT ANY SUCH CHANGE MUST ACHIEVE ALL ENVIRONMENTAL AND CONSTRUCTION GOALS.

CONTROLS AFFECTED BY WORKS ARE TO BE RE-ESTABLISHED PRIOR TO THE COMPLETION OF EACH DAYS WORK.

THE CONTRACTOR SHALL PROVIDE SHAKER GRIDS AT ALL SITE ACCESS / EGRESS POINTS.

STRIP TOPSOIL OVER THE SITE TO A MINIMUM DEPTH OF 150mm UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT. TOP SOIL STOCKPILES SHALL NOT EXCEED 2m IN HEIGHT AND BATTER SLOPES TO BE 3H:1V MAXIMUM.

THE CONTRACTOR IS TO STABILISE TOPSOIL STOCKPILES AND ALL DISTURBED AREAS AS SOON AS THEY REACH FINAL LEVELS. STABILISATION TO BE BY HYDROSEEDING OR OTHER METHOD APPROVED BY SUPERINTENDENT AND COUNCIL ENGINEER. ALL SEEDED AREAS TO BE WATERED TWICE WEEKLY UNTIL GRASS IS ESTABLISHED OR COVERED WITH BITUMEN HAY MULCH.
A RECOMMENDED LIST OF PLANT SPECIES FOR TEMPORARY COVER IS:
- JAPANESE MILLET 25kg/ha (SPRING)
- OATS (RYECORN) 25kg/ha (SUMMER)
- JAPANESE MILLET 10kg/ha (AUTUMN)
- OATS (RYECORN) 30kg/ha (WINTER)

GYPSUM AND MULTIGROW/ ENRICH FERTILISER AT RATES TO BE DETERMINED BY SUBSOIL AND TOPSOIL TESTING.
PERMANENT GRASSING TO BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.

WHERE SURFACE SLOPES ARE STEEPER THAN 6H:1V BITUMEN STRAW MULCH SHALL BE APPLIED AFTER SEEDING AT THE FOLLOWING RATES, OR AS DIRECTED.
- MULCH 0.5kg/m²
- BITUMEN EMULSION 0.25 l/m² (50% WATER, 50% SLOW BREAKING ANIONIC EMULSION MIX).

TOPSOIL SHALL BE RE SPREAD AND STABILISED AS SOON AS POSSIBLE. DISTURBED AREAS SHALL BE LEFT WITH A SCARIFIED SURFACE TO ENCOURAGE WATER INFILTRATION AND ASSIST KEYING IN TOPSOIL.

DUST CONTROL MEASURES SHALL BE IMPLEMENTED CONTINUOUSLY DURING CONSTRUCTION WORKS TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.

THE CONTRACTOR SHALL TEMPORARILY REHABILITATE ANY DISTURBED AREAS WITHIN 20 DAYS. WHERE FINAL SHAPING HAS OCCURRED THE CONTRACTOR SHALL PROVIDE FINAL REHABILITATION WITHIN 10 DAYS.

DURING EARTHWORKS, TEMPORARY DIVERSION BANKS SHOULD BE CONSTRUCTED TO LIMIT SLOPE LENGTH, WHERE POSSIBLE, IN ACCORDANCE WITH THE FOLLOWING:

RECOMMENDED MAXIMUM SPACING BETWEEN CROSS BANKS ON ALL ROADS.

SLOPE	MAXIMUM SPACING (m)
0 TO 1%	150
1 TO 3%	100
3 TO 5%	70
5 TO 10%	50
10 TO 17%	16

ALL STORMWATER PITS TO BE COVERED OR DROP INLET SEDIMENT TRAPS SHALL BE PROVIDED. KERB INLET TRAPS ARE TO BE INSTALLED AFTER COMPLETION OF PAVING.

TEMPORARY KERB INLET SEDIMENT TRAPS TO BE PROVIDED TO ALL EXISTING KERB INLETS IN THE VICINITY OF THE WORKS DURING CONSTRUCTION.

SEDIMENT TRAPS AND BASINS ARE TO BE MAINTAINED SUCH THAT:
(A) SEDIMENT IS REMOVED SUCH THAT NO LESS THAN 70% OF THE DESIGN CAPACITY REMAINS AT ANY ONE TIME.
(B) MATERIALS ARE REPLACED OR REPAIRED AS REQUIRED TO ENSURE SERVICEABILITY OF BOTH THE ELEMENT AND THE TRAP OR BASIN.

PERMANENT DRAINAGE STRUCTURES INCLUDING: PIPES, PITS ARE TO BE HANDED OVER IN A CLEAN CONDITION AT THE COMPLETION OF THE CONTRACT MAINTENANCE PERIOD.

FOLLOWING COMPLETION AND RESTORATION OF SITE: REMOVE ALL MATERIALS AND FILL DIVERSION DRAINS, WATERWAYS, SEDIMENT TRAPS, AND SEDIMENT BASINS AND COMPACT IN ACCORDANCE WITH THE SPECIFICATION TO MATCH FINAL LEVELS OF THE WORKS. PROVIDE 100mm TOPSOIL AND HYDROSEED.

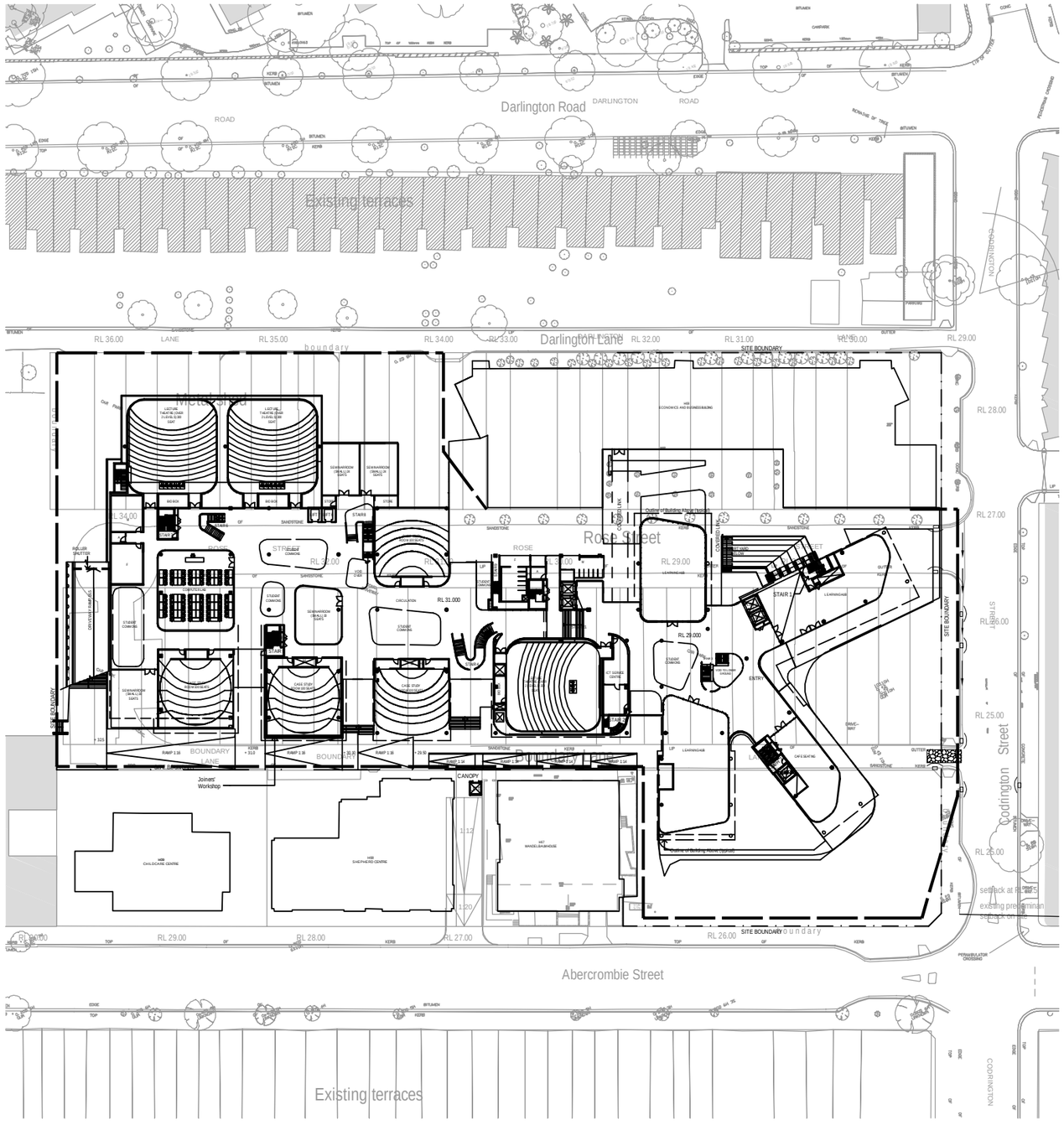
ACCESS POINT TO ALLOW MACHINE ENTRY / EXIT ARE TO INCLUDE A ROUNDED DIVERSION BANK 0.3m HIGH WITH 10H:1V BATTERS TO DIVERT RUNOFF TO SEDIMENT FENCES EITHER SIDE OF ENTRY.

WHERE FLOCCULATION OF BASINS IS REQUIRED UNLESS OTHERWISE SPECIFIED THE RECOMMENDED INITIAL DOSING IS 0.32KG OF GYPSUM PER CUBIC METRES OF BASIN VOLUME. THE CONTRACTOR MAY VARY THIS RATE SUBJECT TO TESTING OF PREVIOUS WATER SAMPLES AND THE ACHIEVEMENTS OF THE REQUIRED WATER QUALITY STANDARDS. FLOCCULATION TO TAKE PLACE WITHIN 48 HOURS OF AN EVENT.

THE CONTRACTOR SHALL MAINTAIN A LOG BOOK DETAILING
- RECORDS OF ALL RAINFALL
- CONDITION OF SOIL AND WATER MANAGEMENT STRUCTURES
- ANY APPLICATION OF FLOCCULATING AGENTS TO SEDIMENT BASIN
- VOLUMES OF ALL WATER DISCHARGED FROM SEDIMENT BASINS - ANY ADDITIONAL REMEDIAL WORKS REQUIRED

THE LOG BOOK SHALL BE MAINTAINED ON A WEEKLY BASIS AND BE MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. THE ORIGINAL LOG BOOK SHALL BE ISSUED TO THE PROJECT MANAGER AT THE COMPLETION OF THE WORKS.

THE CONTRACTOR SHALL AT ALL TIMES RESTRICT CONSTRUCTION EQUIPMENT MOVEMENT TO THE ESSENTIAL CONSTRUCTION AREAS. THE CONTRACTOR SHALL NOT EXTEND LAND DISTURBANCE BEYOND 2m FROM THE EDGE OF ANY ESSENTIAL CONSTRUCTION ACTIVITY.



0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

LEGEND

- TEMPORARY SEDIMENT FENCE
- FILTER SOCK
- TEMPORARY STABILISED SITE ACCESS

rev	description	app'd	date
E	SILT FENCE ADJUSTED	CM*	31.07.13
D	BUILDING OUTLINES UPDATED	CM*	15.07.12

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scale 1:1000 for A3 | job no. 21-19950
date JULY 2013 | rev no. E

approved (PD) SK001

Plot Date: 31 July 2013 - 9:36 AM Plotted by: Steve Atkins Cad File No: G:\21\22411\Temp Abercrombie directory\CADD\Drawings\21-19950-SK001.dwg

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