Appendix A

DEVELOPMENT APPLICATION DRAWINGS

Appendix B

RAIL CONCEPT PLAN

Appendix C

AIRCRAFT NOISE INTRUSION ASSESSMENT

Appendix D-1

ACID SULFATE SOILS MANAGEMENT PLAN (ASSMP)

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CONTAMINATION MANAGEMENT PLAN (CMP)

Appendix E

CASA APPROVAL LETTER

Appendix F

AMENDED NSW PORTS GREEN PORTS CHECKLIST

Green Port Checklist

Purpose of the Checklist

NSW Ports is committed to managing and developing the port land and port-related infrastructure in an environmentally responsible manner. The Green Port Checklist (the Checklist) has been created by NSW Ports to facilitate the implementation of environmentally sustainable measures as part of new developments at Port Botany, Port Kembla and the Cooks River and Enfield Intermodal Terminals. Often as part of carrying out a development, environmental and sustainable management measures are included in Construction Environmental Management Plans (CEMPs) with these plans focusing on the short term and temporary construction impacts. The Checklist focuses on the longer term measures that should be considered for implementation during the design and operational stages of a project or development.

When to Use the Checklist

All new developments are to consider the environmental sustainable measures listed within the Checklist as part of designing and scoping out the development proposal. The Checklist is to be completed and submitted to NSW Ports for review as part of considering whether the proposed development should proceed or as part of a development application.

How to Use the Checklist

The Checklist identifies eight environmental and sustainability aspects that concern most port and intermodal terminal operations and facilities:

1. Sustainable Environmental Management
2. Materials Selection
3. Waste Management
4. Water Use and Quality
5. Energy Use and Greenhouse Gas Emissions
6. Green Buildings and Indoor Environments
7. Outdoor Environment/Landscaping
8. Amenity (noise, light, odour)

The "Identification of Environmental Aspects" table should be filled out first to indicate which environmental and sustainability aspects are applicable to the design and/or operation of the proposed development and therefore identify which sections of the Checklist need to be completed.

The Checklist includes a list of suggested measures that can be utilised to achieve the objectives of each Environmental Aspect. The relevant boxes should be selected in the Checklist to indicate those measures which will be included as part of the development. Should the suggested measures not be applicable to the proposed development, the Checklist allows for the inclusion of alternative or innovative measures to be specified for the development in order to achieve the environmental objectives included in the Checklist.

NSW Ports

Green Port Checklist

Development Details	
Name and Position:	Steven Hartas
Company:	Material Container Services (MCS)
Phone:	
Email:	
Address of Development:	20 Canal Road, St Peters
Description of the proposed development:	The proposal is a container loading and unloading facility and grain silo storage.

Identification of Environmental Issues

Environmental Issue	When it applies	Applicable (Yes / No)
1. Sustainable Environmental Management	As part of the project/development design and operation	Yes
2. Materials Selection	As part of the project/development design and operation	Yes
3. Waste Management	As part of the project/development design and operation	Yes
4. Water Use and Quality	As part of the project/development design and operation	Yes
5. Energy Use and Greenhouse Gas Emissions	As part of the project/development design and operation	No
6. Green Buildings and Indoor Environments	As part of the project/development design and operation	No
7. Outdoor environment/landscaping	As part of the project/development design and operation	Yes
8. Amenity (noise, light, odour)	As part of the project/development design and operation	Yes

PLEASE COMPLETE CHECKLIST - CLICK TO ACCESS

NSW Ports

Green Port Checklist

Environmental Aspect	Objective	Measures	Yes/No
1. Sustainable Environmental Management	**Implement and promote a triple bottom line approach to sustainability**	**To achieve this objective, the following measures will be included in the project/development:**	
		A written policy committed to managing negative environmental, social and economic impacts	
		Identified and reportable sustainability targets for the project/development	
		Public notification of sustainability commitments, policies and targets	
		Preparation or incorporation of an Environmental Management System (EMS) compliant with ISO 14001	Yes
PLEASE COMPLETE SECTION		Certification of the EMS to ISO 14001	
		A stakeholder engagement strategy to proactively engage stakeholders and encourage feedback regarding the project	Yes
		A formal public complaints procedure	
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	The construction contractor (Ahrens) will be compliant to ISO 14001.	
2. Materials Selection	**Decrease the carbon footprint of the development and the ongoing maintenance/replacement of materials/equipment**	**To achieve this objective, the following measures will be included in the project/development:**	
		Set targets to reduce material use (such as % of recycled materials used)	Yes
		Reuse of the existing building/facility components	Yes
		A green procurement policy, including purchasing re-used or recycled furniture and other items	
		Low maintenance and durable materials	Yes
		A Life Cycle Assessment of materials to be used	Yes
		Specification and procurement of locally sourced materials	
PLEASE COMPLETE SECTION		Replacement of Portland cement with supplementary cementitious material	
		Low-emission and low-irritant materials, including low-TVOC paints, carpets and sealants/adhesives and low formaldehyde wall and floor coverings	
		Refridgerants and/or insulants with an Ozone Depleting Potential (ODP) of zero and/or a Global Warming Potential (GWP) of 10 or less	
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	Waste being removed from the construction process will be crushed and used as fill mateiral. Steel silos can be deconstructed and recycled.	
3. Waste Management	**Reduce total operational waste consumption**	**To achieve this objective, the following measures will be included in the project/development:**	
		A waste management plan which identifies opportunities to reduce the amount of waste sent to landfill	Yes
		A policy to instruct contractors and suppliers to select materials with less packaging	Yes
		Adequate storage areas for recycling of all materials, including likely future increases	Yes
PLEASE COMPLETE SECTION		Monitoring of the quantity (volume and weight) of waste disposal and recovery	Yes
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	Waste concrete will be crushed and re-used. Waste management to be in accordance with existing MCS procedures and the measures provided in the SEE.	
4. Water Use and Quality	**Reduce total operational water consumption and minimise the impact on local water quality**	**To achieve this objective, the following measures will be included in the project/development:**	
		Water efficient fixtures, fittings and appliances (AAA rating system and above)	Yes
		Water sub-meters for all major uses, such as cooling towers, irrigation, hot water systems and for separate tenancies.	
		Onsite rainwater and or recycled water for landscaping and other uses	
		A water efficient irrigation system, including subsoil drip systems and automatic timers	
		A rainwater harvesting system, e.g. Rainwater tanks	
		Greywater collection and treatment system for water reuse	
		Blackwater collection and treatment system for water reuse	

PLEASE COMPLETE SECTION		Water sensitive urban design measures such as permeable surfaces, swales and wetlands	
		Best practice stormwater drainage and treatment systems including first flush, oil separators and a water quality monitoring system	
		A flood risk and/or potential water table risk assessment and implementation of recommendations	Yes
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)		
6. Energy Use and Greenhouse Gas Emissions	**Minimise the total amount of greenhouse gas emissions of the development**	**To achieve this objective, the following measures will be included in the project/development:**	
SECTION NOT APPLICABLE		Low energy and energy efficient terminal and operational equipment (such as retrofits for diesel oxidation catalysts)	
		Low energy and energy efficient lighting on timers for non-critical areas	Yes
		Low energy and energy efficient appliances	Yes
		Separate electrical and gas sub-meters for energy uses (such as car parks, lifts, common area lighting) and for separate tenancies	
		Renewable energy generated onsite and excess returned to the grid (such as solar power or gas-fired co and tri generation)	
		Purchase of renewable or green energy such as 100% accredited GreenPower	
		Alternative cleaner and less greenhouse intensive fuels for operations	
		Ship to shore power connection options	
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	Use of rail rather than truck transport to move containers to Port Botany for the export of grain. Reduce the number of containers expected to arrive on site empty, which in turns improves efficiency of transport and reduces Greenhosue Gas emissions.	
8. Green Buildings and Indoor Environments	**Improve the quality of the indoor environment and the environmental performance of buildings**	**To achieve this objective, the following measures will be included in the project/development:**	
SECTION NOT APPLICABLE		Minimum 4 Star Green Rating (or the equivalent) for Buildings	
		Certification of the Green Star Rating for Buildings	
		A facilities or building guide and training for occupants/management team on minimising environmental impacts	
		Passive solar and microclimate design through orientation, shading, natural lighting, ventilation and insulation	
		Outside air inflow rates in excess of the requirements of AS 1668.2-1991 for mechanical ventilation	
		Natural ventilation in accordance with AS1668.2-2002	
		Options for external green walls (e.g. Facade planting/landscaping)	
		Maximisation of natural lighting through the design and location of windows, glazed doors and skylights, and blinds/screens	
		Refridgerant and/or vapour leak detection and recovery systems	
		Cyclist paths and facilities including secure storage, showers and change facilities	
		A Hazardous Materials Survey including asbestos, lead and polychlorinated biphenyles (PCBs) identification, and removal where possible	
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)		
7. Outdoor environment	**Enhance the visual and ecological amenity of the Port**	**To achieve this objective, the following measures will be included in the project/development:**	
		Preparation and implementation of a Landscape Management Plan	
		Local provenance native species used in the landscaping areas	
		Ecological offsets and/or biobanking to offset the impact of the development	
		Incorporation of exisiting vegetation into the development	

PLEASE COMPLETE SECTION		Removal and control any noxious weeds on site	
		Non-chemical/poison control measures for weeds and pests	Yes
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	A procedure will be developed for the management of vermin and other pest species once the facility is operational.	
8. Amenity	**Minimise the impact of the development on sensitive receivers and other Port users**	**To achieve this objective, the following measures will be included in the project/development:**	
		Isolation of noisy equipment/systems with insulation and/or sound absorbing materials	
		Emission stacks and outlets located away from sensitive receivers and other port users	
		Air pollution control measures such as scrubbers	Yes
		No reversing beepers on vehicles, plant and equipment (owned and leased)	
		Turning off vehicles/plant/equipment when not in use	Yes
		Installation of noise walls	
PLEASE COMPLETE SECTION		The location of activities, plant and equipment should optimise attenuation effects through measures such as topography, natural and purpose built barriers.	Yes
		Enclosed light fittings and positioning to reduce light spill	
	If none of the suggested measures apply, how will the project/development achieve this objective? (include any innovation measures)	The Best availability Technology will be utilised which has been demonstrated in the acoustic assessment to be within acceptable limits for noise disturbance. Dust exhaust systems will also be employed during operation which will control fugitive dust emissions.	

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Appendix G

PRELIMINARY HAZARD ANALYSIS

Appendix H-1

MARRICKVILLE LEP 2011 PROVISIONS

Appendix H-1
Marrickville LEP 2011 Provisions

Marrickville Local Environment Plan 2011 Provisions

Table H1 provides the relevant details of the Zone objectives and Land Use category for the proposal.

Table H1 Land Use Categories for IN1 – General Industrial Zone

Clause (Excerpt)	Compliance
Clause 1 – Zone No. IN1 – General Industrial *The objectives of Zone No. IN1 are:* • *To provide a wide range of industrial and warehouse land uses.* • *To encourage employment opportunities.* • *To minimise any adverse effect of industry on other land uses.* • *To support and protect industrial land for industrial uses.* • *To protect industrial land in proximity to Sydney Airport and Port Botany.* *To enable a purpose built dwelling house to be used in certain circumstances as a dwelling house.*	Complies – The Proposal would support and complement the existing site operations of shipping container storage and rail freight terminal. It would be compatible with the existing land use and on-site operations.
Clause 2 – Development not requiring consent *Home occupations.*	N/A
Clause 3 – development requiring consent Agricultural produce industries; Depots; Dwelling houses; Freight transport facilities; General industries; Industrial training facilities; Intensive plant agriculture; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres. Any other development not specified in Category 2 or 4.	Development requires consent as an addition or alteration to a freight transport facility (rail freight terminal).
Clause 4 – Development that is prohibited *Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Community facilities; Correctional centres; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Highway service centres; Home occupations (sex services); Information and education facilities; Jetties; Marinas; Mooring pens; Moorings; Offensive industries; Open cut mining; Passenger transport facilities; Places of public worship; Port facilities; Public administration buildings; Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Respite day care centres; Restricted premises; Rural industries; Tourist and visitor accommodation; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems; Wholesale supplies.*	N/A

Part 6 of the LEP includes a number of additional local provisions that apply to development. The following provisions set out in Table 3 – A2 are relevant to the Proposal for industrial purposes and the location.

Table 3-A2 Part 6 Additional Local Provisions

Assessment Provision		Response
Acid Sulfate Soils (Section 6.1)		
(1) The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.		Noted
(2) Development consent is required for the carrying out of works described in the Table to this subclause on land shown on the Acid Sulfate Soils Map as being of the class specified for those works.		A Development Consent is required as the Acid Sulfate Soils Mapping identifies that the majority of the site is Class 2 with a section along the north western boundary included in Class 5.
Class of Land	**Works**	
1	Any works.	N/A
2	Works below the natural ground surface. Works by which the watertable is likely to be lowered.	The majority of the site involves Class 2 land
3	Works more than 1 metre below the natural ground surface.	N/A
4	Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface. Works more than 2 metres below the natural ground surface. Works by which the water table is likely to be lowered more than 2 metres below the natural ground surface.	N/A
5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.	Class 5 land is identified along the north western boundary of the site.
(3) Development consent must not be granted under this clause for the carrying out of works unless an acid sulphate soils management plan has been prepared for the proposed works in accordance with the *Acid Sulfate Soils Manual* and has been provided to the consent authority.		An ASSMP has been prepared by KBR for the Proposal and included in Appendix D. The ASSMP identifies the potential ASS risks associate with construction works and proposes appropriate management measures to minimise these risks.
(4) Despite subclause (2), development consent is not required under this clause for the carrying out of works if: (a) A preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works. (b) The preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.		An ASSMP for the construction works has been prepared for the proposal and is included in Appendix D.

Assessment Provision	Response
(5) Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power): (a) Emergency work, being the repair or replacement of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety. (b) Routine maintenance work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil). (c) Minor work, being work that costs less than $20,000 (other than drainage work).	N/A
(5) Despite subclause (2), development consent is not required under this clause to carry out any works if: (a) The works involve the disturbance of less than 1 tonne of soil, such as occurs in carrying out agriculture, the construction or maintenance of drains, extractive industries, dredging, the construction of artificial water bodies (including canals, dams and detention basins), foundations or flood mitigation works, or (b) The works are not likely to lower the watertable.	N/A
Earthworks (Section 6.2)	
(1) The objectives of this clause are as follows: (a) To ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land. (b) To allow earthworks of a minor nature without requiring separate development consent.	Noted
(2) Development consent is required for earthworks unless: (a) The work is exempt development under this Plan or another applicable environmental planning instrument, or (b) The work is ancillary to other development for which development consent has been given.	The earthworks are ancillary actions to the primary development being additions or alterations to a rail terminal facility for which consent is currently being sought.
(3) Before granting development consent for earthworks, the consent authority must consider the following matters: (a) The likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality. (b) The effect of the proposed development on the likely future use or redevelopment of the land. (c) The quality of the fill or the soil to be excavated, or both. (d) The effect of the proposed development on the existing and likely amenity of adjoining properties. (e) The source of any fill material and the destination of any excavated material. (f) The likelihood of disturbing relics.	The proposed construction methodology is provided in the application details including the Scope of Works sections of the respective KBR Site CMP and ASSMP documents are included in Appendix D. The methodology to be applied addresses the relevant issues identified in the LEP in terms of for example, drainage pattern impacts, soil conditions and excavation work controls.

Assessment Provision	Response
(g) The proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area.	
Flood Planning (Section 6.3)	
(1) The objectives of this clause are as follows: (a) To minimise the flood risk to life and property associated with the use of land. (b) To allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change. (c) To avoid significant adverse impacts on flood behaviour and the environment.	Noted
(2) This clause applies to: (a) Land that is shown as 'Flood planning area' on the Flood Planning Map. (b) Other land at or below the flood planning level.	Noted
(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development: (a) Is compatible with the flood hazard of the land. (b) Is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties. (c) Incorporates appropriate measures to manage risk to life from flood. (d) Is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses. (e) Is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.	Appendix I and Section 4.5 discusses the floodplain risk management plan. It was determined that the drainage system for the subject land has approximately a 1 year ARI capacity, where well-maintained or not obstructed. Relevantly frequent exposure and nuisance flooding from local and upstream catchment run-off events is likely. This is due to the relatively small capacity of the drainage system combined with the flat and low-lying ground levels. Parts of the land are also subject to backwater flooding from the Alexandra Canal in the 100 year ARI event. It was identified that flood depths are expected to be shallow and the flood risk posed by the location and nature of the drainage system is within acceptable limits. This is provided the strategies outlined in the floodplain risk management plan are adopted and followed. Section 4.5.3 of this SEE discusses the recommendations relevant to the current Proposal.
(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0), published in 2005 by the NSW Government, unless it is otherwise defined in this clause.	Noted
(5) In this clause, flood planning level means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.	Noted
Development in Areas affected by Aircraft Noise (Section 6.5)	
(1) The objectives of this clause are as follows: (a) To prevent certain noise sensitive developments from being located near the Kingsford Smith Airport and its flight paths. (b) To assist in minimising the impact of aircraft noise from that airport and its flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings. (c) To ensure that land use and development in the vicinity of that airport do not hinder or have any other adverse impacts on the ongoing, safe and efficient operation of that airport.	Noted

Assessment Provision	Response
(2) This clause applies to development that: (a) Is on land that: (i) Is near the Kingsford Smith Airport (ii) Is in an ANEF contour of 20 or greater (b) The consent authority considers is likely to be adversely affected by aircraft noise.	The proposed office is located within the area bounded by the 25 ANEF contour. The proposed office would be constructed in accordance with the recommendations of the Aircraft Noise Intrusion Report prepared by Acoustic Logic and included in Appendix C.
(3) Before determining a development application for development to which this clause applies, the consent authority: (a) Must consider whether the development will result in an increase in the number of dwellings or people affected by aircraft noise. (b) Must consider the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021—2000. (c) Must be satisfied the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021—2000.	Refer to the assessment provided in Appendix C – Aircraft Noise Intrusion Report.
(4) In this clause: ***ANEF contour*** means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for the Kingsford Smith Airport prepared by the Department of the Commonwealth responsible for airports. ***AS 2021—2000*** means AS 2021—2000, *Acoustics—Aircraft noise intrusion—Building siting and construction.*	Noted
Airspace operations (Section 6.6)	
(1) The objectives of this clause are as follows: (a) To provide for the effective and ongoing operation of the Kingsford Smith Airport by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport. (b) To protect the community from undue risk from that operation.	Noted
(2) If a development application is received and the consent authority is satisfied that the proposed development will penetrate the Limitation or Operations Surface, the consent authority must not grant development consent unless it has consulted with the relevant Commonwealth body about the application.	Noted
(3) The consent authority may grant development consent for the development if the relevant Commonwealth body advises that: (a) The development will penetrate the Limitation or Airservices Operations Surface but it has no objection to its construction, or (b) The development will not penetrate the limitation or operations surface.	An assessment of the proposed impacts on airspace operation was submitted separately to CASA and SACL. An approval for the proposed grain silo structures has been subsequently obtained by the applicant as per letter dated 18 June 2014. Temporary structure approvals such as for construction cranes may require approval separately, if in excess of the approved height as advised in the letter from CASA.
(4) The consent authority must not grant development consent for the development if the relevant Commonwealth body advises that the development will penetrate the Limitation or Operations Surface and should not be constructed.	As per the letter dated 18 June 2014, CASA has granted an approval for the height of the proposed permanent structures. Further approval for temporary structures such as cranes for the installation of the silos is progressing and would be finalised after the consent is granted for the Proposal.

Assessment Provision	Response
(5) In this clause: ***Limitation or Operations Surface*** means the Obstacle Limitation Surface or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the Kingsford Smith Airport. ***Relevant Commonwealth body*** means the body, under Commonwealth legislation, that is responsible for development approvals for development that penetrates the Limitation or Operations Surface for the Kingsford Smith Airport.	Noted

Appendix H-2

MARRICKVILLE DCP 2011 PROVISIONS

Appendix H-2

Marrickville DCP 2011 Provisions

Marrickville Development Control Plan 2011 Provisions

The following Table H2 has included those sections of the DCP that are of relevance to the Proposal.

Table H2 Compliance with Development Control Plan 2011

DCP Section and Criteria	Response
Site area and frontage Development must provide adequate area so that all operations can be conducted on-site and that any impacts are contained to the site.	Complies – As shown on the Proposal plans, the development is intended to be positioned upon a large parcel of land of sufficient area to allow operations to be undertaken and contain any potential impacts on-site.
C6 – Allotments to be developed for industrial purposes other than light industries must have a minimum frontage of 20 m.	Complies – the subject land has a frontage over 20 metres and meets the minimum frontage.
C7 – Frontages of allotments to be developed for light industrial purposes (in zones where light industry is a permissible land use under MLEP 2011) will be assessed on factors such as location of the site, access to the site, streetscape and surrounding development.	N/A
C8 – Detailed site plans for development for any industrial purposes must demonstrate how the proposed industry, including parking, landscaping and other ancillary facilities, will be wholly accommodated within the site boundaries.	Complies – Refer to Site Proposal Plans in Appendix A showing compliance with the requirements of this criterion for parking, landscaping and other facilities as it relates to the Proposal and is within the subject land.
Site layout and amenities The site must provide for a functional, efficient and attractive working environment.	Complies – Existing MCS site operations meet relevant workplace and building standards.
C9 – A site and context analysis plan must be submitted with the development application in accordance with Section 2.3 (Site and Context Analysis) of this DCP.	Complies – A site and context analysis plan has been prepared and is included in Appendix A.
C10 – The layout of the site must: i. Consider the site's context, constraints and opportunities. ii. Provide for all the operations of a use wholly on the site. iii. Include landscaped pockets at suitable locations to break any large span of paved surfaces and driveways to improve the aesthetic amenity of the site and streetscape. iv. Prevent emission of odour and noise to adjoining properties. v. Adopt energy efficiency principles. vi. Consider the width of the road reserve and scale and location of adjoining building forms.	Complies – The plans submitted show that the proposal layout as an additional use to the existing site operations meets the criterion as relevant to the proposal and site.
C11 – Industrial buildings must have an adequate number of openings at each level to allow natural light and ventilation.	Complies – The existing built form meets this criterion. The office proposed is also compliant as it includes provision of windows to allow natural light and ventilation on all four sides of the structure.

DCP Section and Criteria	Response
C12 – Each industrial unit within an industrial complex must have a reasonable size window at each level to allow natural light and ventilation.	Complies – As per the details shown in the elevation drawings and plans, the windows to be included for the office building are of a reasonable size to allow natural light and ventilation.
C13 – Each industrial building must provide for basic amenities including a designated staff room or area that is: i. Of a reasonable area depending on the size, nature and staffing level of the proposed industry. ii. Adequately furnished for staff. iii. Provided with attached kitchen/kitchenette with a fridge, microwave, sink and tea/coffee making facilities.	Complies – Appendix A shows that the proposed office building includes kitchenette facilities for staff intended that are of a reasonable floor area and comprise appropriate facilities and common area.
Building height Building height plays an important role in the streetscape and can ensure infill development enhances the streetscape.	Noted
C14 – The maximum height of an industrial building must be consistent with the height of other industrial buildings in the immediate vicinity.	Complies – The silos and bucket elevators are proposed to be between 16–28 m above ground level. This is similar to the approved height for container stacking (i.e. 15 m and the adjacent raised industrial lots provide significant screening of the development structures to the Princes Highway and residential areas located mainly further west of the land zoned for industrial purposes.
C15 – The maximum height of an industrial building must comply with other controls in this DCP relating to urban design, solar access, privacy and residential to industrial interface.	Complies –The highest structures (grain silos) are of a specific design to meet the purposes of storage and do not create an appearance to affect the industrial amenity and character of the locality. The proposed works are located within the extent of current development. The adjoining properties include industrial estates off Bellevue Street and Canal Road, and the Sydenham to Botany Goods Rail Line. Shadow diagrams have been prepared by URS and show there is no impact on neighbouring lots except for the 3 pm July 2014 model which shows a short shadow cast on the adjoining Sydney Airport land which is currently unused. This adjoining site is overshadowed currently when containers are stored along the boundary. No significant impact is created for the neighbouring site.
C16 – Marrickville Local Government Area (LGA) is affected by obstacles limitation surface (OLS) restrictions as imposed by Air Services Australia. Any development or part of a development which has a height inconsistent with the height of adjoining buildings or where Council is of the opinion that proposed height would interfere with the OLS restrictions must be referred to Air Services Australia. The applicant may choose to directly contact Air Services Australia for their opinion prior to lodging a development application.	Complies – The Proposal has been referred to the Civil Aviation Safety Authority (CASA) and Sydney Airport Corporation Limited (SACL) for consideration of the proposed height of the structures. By letter dated 18 June 2014, approval has been received for the proposed height subject to conditions. Further approval for temporary structures such as cranes for the installation of the silos is progressing and will be finalised after the consent is given to the Proposal.
C17 – Where the overall heights (including any rooftop or exposed structures in excess of 1.5 m) of a proposed development are higher than surrounding development, a submission must be lodged with the development application supporting the proposed height. Unless proper planning reasons are presented, heights above those existing in the locality will not be supported by Council.	Complies – The silos and bucket elevators are proposed to be between 16–28 m above ground level. This is similar to the approved height for container stacking (i.e. 15 m and the adjacent raised industrial lots provide significant screening of the development structures to the Princes Highway. The highest structures (grain silos) are proposed to be of a specific design to meet the purposes of storage, requiring elevation to integrate with rail operations at ground level.

DCP Section and Criteria	Response
	The Proposal is positioned within a much larger industrial zoned area and is appropriate for the proposed use to be conducted.
C18 – All rooftop or exposed structures including lift motor rooms, plant rooms, air-conditioning, ventilation or exhaust systems must be suitably screened and integrated with the building. If the site adjoins a residential premises the facilities must be located away from the residential boundary.	The proposed structure is purpose built for storage silos. Rooftop structures shown on the drawings are required as the grain enters the silo via a top mounted conveyor. The Proposal does not adjoin a residential boundary.
Building design and appearance The types of businesses operating within the industrial areas of Marrickville LGA have undergone significant change in recent years, with a decrease in traditional industries such as manufacturing, and an increase in the advanced professional services sector, such as wholesale trades and transport and storage industries. It is essential to modernise older industrial built stock for wider uses, as spatial needs change. Much of the industrial land in the LGA requires renewal and revitalisation to adequately respond to current trends. Newer buildings should be of superior architectural quality, introducing contemporary design that utilises a variety of materials and decorative colours and finishes. However, where an existing building has significant heritage or character the period industrial building guidelines will apply. Refer to Section 6.7.	N/A
C19 – Major interventions in the scale and form of warehouses or factories identified as having a high level of heritage significance are not permitted.	N/A
C20 – All development applications involving external building works must be accompanied by a schedule of finishes and a detailed colour scheme for all external walls.	N/A
C21 – New buildings must be designed to: i. Address the street and highlight any non-industrial aspects (such as the office section) of the development. ii. Avoid long blank walls of warehouse units facing the street and long continuous roof lines. iii. Provide regular modulation to the facade or division of massing. iv. Architecturally express the structure of the building by variation and minimal use of reflective glass. v. Visually reinforce entrances, office components and stair wells of units to create rhythm on long facades and reduce perceived scale. vi. Introduce variation in unit design within building works. vii. Introduce solid surfaces, preferably masonry, and incorporate horizontal and vertical modulation including windows in appropriate proportions and configurations. viii. Address the street to which it presents, with suitable architectural elements. ix. Avoid long expanses of roofs. x. Avoid bulky roof forms or extensive blank facades in a single material or colour.	This criterion is more relevant to the design and appearance of industrial premises that are proposed in other industrial settings than is the case for the proposed site. The proposed main structures are designed and purpose built for storage silo facility and will be of a standard shape, elevation and building bulk. The silos are an addition to the existing industrial operations conducted on the land for rail freight purposes. The proposed structures require to be constructed of materials such as concrete and metal to be structurally sound. The silos are elevated to enable the storage of a large quantity of grain that would be received by and transferred to rail or other transport modes in current operation on the site.
C22 – Where blank walls on street frontages are unavoidable in new construction they must be screened by landscaping or treated as sculptural elements incorporating murals reflecting modern architectural design. They must be finished to a high standard and minimise the potential for graffiti or other vandalism.	N/A

DCP Section and Criteria	Response
C23 – External finishes must be robust and graffiti resistant. An anti-graffiti coating may be required where buildings adjoins a public place or accessible from an open area that is not secured by fences.	N/A
C24 – New development on corner sites must address both street frontages in terms of facade treatment and articulation of elevations.	N/A
C25 – Consideration must be given to the likely impacts of proposed height and configuration of buildings on adjacent sites. Sensitivity to the resultant character of the street must be addressed at the design stage of proposed development and addressed in the site and context analysis plan. Refer to Section 2.3 (Site and Context Analysis) of this DCP for more details.	The Proposal has been considered in terms of the land use intended as an addition to the rail freight terminal operations and the adjoining land uses. As the Proposal is central on the land and the zone supports the activity, there is no significant conflict with other uses on the land or on neighbouring properties.
C26 – Walls of new development must make use of non-reflective colours and materials to avoid glare.	Noted – The exterior of the structure will be designed to minimise the incidence of reflection and glare impacts arising.
C27 – Where industrial development adjoins any land zoned for residential purposes or any premises used for residential purposes, the external walls abutting such development must be constructed in 230 mm or 280 mm cavity brickwork. Where such walls adjoin land zoned for residential purposes, construction must be in face brickwork.	N/A
C28 – All elevations of a building fronting a public place, or visible from a rail line, public place or proposed road, must be constructed of face brickwork or other decorative facade treatment to Council's satisfaction. Consideration must be given to installing windows or false windows in the facade to enable surveillance of the adjoining area or to engender a feeling that it is being overlooked.	N/A
C29 – All external walls, where located less than 900 mm from a side boundary, must be of masonry construction.	N/A
C30 – No service plumbing pipes, other than downpipes for the conveyance of roof water, must be external to the building or visible to any public place.	N/A
Setbacks Setback defines the overall footprint of a building and the outer extremities of that building in relation to the front, side and rear boundaries. Setbacks enable landscaping and buffers to be provided.	
C31 – Front setbacks must be consistent with: i. Predominant front setbacks of adjoining industrial buildings. ii. Where a predominant front setback of adjoining industrial buildings cannot be established, 3 m from the front boundary; or iii. On corner lots, a minimum 1.5 m setback must be maintained along the secondary frontage.	N/A
C32 – Setbacks on corner blocks must enable sufficient sightlines for traffic in accordance with relevant Australian Standards.	N/A

DCP Section and Criteria	Response
C33 – Where an industrial lot adjoins residential building(s), Council encourages the following design principles to be incorporated into the design of the building: i. A reasonable buffer zone is required between the proposed industrial building and adjoining residential properties. Such a buffer zone may be used for non-trafficable landscaped area or other passive uses where it will not compromise the residential amenity of adjoining properties. ii. Any setbacks between the development and adjoining residential properties must be proportionately increased relative to the height of the development to reduce bulk and any overbearance on the adjoining properties. iii. The internal layout of the buildings must encourage, where possible, noisy activities to be located away from residential properties.	N/A
C34 – Setbacks for creative industries and residential uses in specified employment areas (live/work) must respond to the specific site context and the streetscape. In general there will be no setback to the primary street frontage to encourage active ground floor uses. Adaptive reuse of buildings will typically retain existing setbacks; however, where there is a mix of residential buildings with front setbacks there may be a case to setback new development.	N/A
6.1.3 Site facilities Site facilities include mailboxes, waste storage and garbage collection areas, general storage areas, gatehouses, substations, staff recreational facilities, telecommunications, fire hydrants or booster valves and water storage or recycling tanks.	Noted
C35 – New site facilities must be designed and/or sited to enhance the development.	Complies – The Proposal would have facilities that are appropriate for the nature of the proposed use. Details of facilities supporting the Proposal are included in the Site Drawings in Appendix A.
C36 – New site facilities must be situated to allow satisfactory vehicular access.	Complies – Vehicle access is provided for the site as shown in the Site Drawings in Appendix A.
C37 – Development must not be carried out until arrangements satisfactory to Sydney Water have been made for the provision of water and sewerage services.	N/A
C38 – New utility services associated with the development of the site - such as fire hydrant booster valves, substations, water storage tanks and so on - must not be incorporated into proposed landscaping works.	Complies – Utility services are provided for the development outside of any required landscape buffer strips.
C39 – Any open storage areas must be delineated to be screened effectively, harmonise with existing or proposed landscaping and prevent the land being viewed from a public road, nearby public reserve or adjoining residential property. Specific details of the materials to be stored external to the building must be lodged with the development application. The storage areas must not be located within the landscaped areas.	N/A

DCP Section and Criteria	Response
6.2 Industrial/Residential Interface The Marrickville LGA contains a variety of land uses. In some cases, the historical development of land has led to residential and industrial uses occurring in close proximity to each other. Assessing the impacts of industrial activities on nearby residential land uses in the Marrickville LGA forms an essential part of Council's consideration of any development applications for industrial development. Failure to identify and mitigate potential amenity impacts can lead to ongoing conflict between industrial and residential land users. Interface amenity controls are important for the operational aspects of industrial developments. They apply to all new development and impose a high standard of control to protect the amenity of residential and other sensitive land uses. Council will need to consider and assess the following it considers industrial development may impact on nearby residential amenity: • Proposed hours of operation. • Type of uses proposed on-site to enable an assessment of the potential of the development to cause noise, vibration or pollution which may affect residential areas, and any mitigation measures proposed. • Traffic movements to and from the proposed development site, including all proposed deliveries. • Proposed use of parking areas, for example for customers and staff, to ensure the proposed development does not unduly impact on off-street parking demand in nearby residential areas. • Proposed measures for garbage collection, including location of bins, frequency of collection and timing of collection. • Security and safety measures for example, in the case of an emergency on-site. Details will need to be provided within a Plan of Management (POM) required for any premises which have the potential to negatively impact on the amenity of nearby residential properties. More detail regarding POMs is provided below.	Noted
6.2.1 Plan of management For the purpose of this DCP, a Plan of Management is a written document which describes how the ongoing operation of industrial premises will be managed to reduce its impact upon the amenity of surrounding properties. A POM is generally required for premises that, if poorly managed, may have an unacceptably adverse impact upon the amenity of surrounding properties. A POM allows Council to exercise control over the ongoing operation of a premises by requiring, as a condition of consent, that the premises operate in accordance with the POM. A condition of consent may require that a POM be regularly revised and submitted to Council. Additional information on potential amenity issues for industrial land uses can be found in the following sections.	N/A
C40 – A POM will be required when an industrial activity, other than light industry, is proposed in proximity of a residential land use.	N/A

DCP Section and Criteria	Response
C41 – A POM must provide all details relevant to the operation of the premises. As a minimum the following must be a included in a POM: i. Title. ii. Objectives. iii. Operational details. iv. Hours of operation. v. Staffing details. vi. Guidelines for staff for using the site facilities and equipment. vii. Deliveries and loading/unloading. viii. Managing customers or patrons. ix. Security details. x. Complaint recording and handling process. xi. Clean-up procedures, and proposed training for staff in procedures, for situations where pollutants may escape from site for industries likely to handle significant quantities of potential pollutants. xii. The review process to continuously improve the POM. xiii. Any other matters specified by Council.	N/A
C42 – The traffic movements, hours of deliveries, use of parking areas and garbage collection must be managed through the POM where industrial sites are close to residential premises.	N/A
C43 – Loading and unloading must not to detract from the amenity of nearby residential areas or residentially zoned land. Where loading and unloading movements are likely to affect residential areas or residentially zoned land, schedules of vehicle movements and their routes must be provided in the POM and may be regulated through conditions of consent.	N/A
6.2.2 Noise and vibration generation The quality of life enjoyed by residents and people engaged in business and community pursuits must not be hampered by excessively noisy activities.	Complies – An acoustic report (refer to Appendix J) has been prepared for the proposed additions and recommendations contained in that report will be incorporated into the development construction and operational phases.
Logical design of efficient business premises can minimise the use of equipment, movements per site and number of vehicle movements per site per day. Developments can incorporate sound proofing for machinery or activities considered likely to create a noise nuisance during the design of the development. The noise and vibration impact of transport operations can be ameliorated by using appropriate paving or track mounting and installing acoustic barriers as required to meet the EPA standards on neighbouring uses.	Complies – An acoustic report (refer to Appendix J) has been prepared for the proposed additions and recommendations contained in that report will be incorporated into the development construction and operational phases.
C44 – All development must comply with the relevant noise control guidelines.	Complies – An acoustic report (refer to Appendix J) has been prepared for the proposed additions and recommendations contained in that report will be incorporated into the development construction and operational phases.
C45 – New development must be designed so that noise producing activity is remote from the interface boundary.	Complies – The proposal is positioned within the larger expanse of industrial development land zoned for this purpose, surrounded by rail and road corridors. The proposal is not located on the interface boundary.

DCP Section and Criteria	Response
C46 – Where sites adjoin a residential area, the number of hours and times at which mechanical plant and equipment is used should be limited in conjunction with sound proofing measures.	N/A
C47 – Other sources of noise such as garbage collection, deliveries, parking areas and air-conditioning plants are to be sited away from adjoining properties, where practicable, and be screened by walls or other acoustic treatment if necessary.	N/A
C48 – Sites with a road frontage to residential areas should locate any new offices to the residential areas with restricted access points onto the residential fronted road. Similarly, the warehouse/factory functions of the new development must be located away from residential areas.	N/A
C49 – All applications for noise generating uses adjacent to or located in a building containing a residential use must be accompanied by documentation from a qualified acoustic engineer certifying that the acoustic standards can be met.	N/A
C50 – Where significant amounts of traffic are likely to be generated which could affect residential areas or residential zoned land, schedules of vehicle movements and their routes must be provided and may be regulated in any conditions of consent.	N/A
6.2.3 Environmental protection This section addresses the potential for pollution (including odour) from development and seeks to minimise any adverse environmental effects of development. Council seeks to reduce industrial pollution through best practice in developing processes and the use of machinery that minimises it. Restricting the hours of operation may assist in reducing emissions to an acceptable level.	Noted
C51 – All development must comply with the provisions of the relevant air quality acts and regulations.	Complies – The proposed use will include industrial standard dust extractors to minimise adverse impacts on surrounding land use and sensitive receptors.
C52 – Industrial developments likely to emit air pollutants (including odour) must demonstrate the best practicable means of control of air pollutants (and odour) that will be applied to the proposed development. The applicant must outline the type, quantity and quality of air pollutants likely to be emitted, the collection and treatment proposed prior to discharge and methods to be employed to minimise fugitive emissions.	Noted
C53 – Industrial land uses that may handle significant quantities of potential pollutants are to develop clean-up procedures in case the materials escape from the site.	N/A
C54 – Operators and occupiers are to train staff in clean-up procedures.	Noted
C55 – Machinery and operations are to be designed to minimise the emission of air impurities, including minimising vehicular movements to and from the site.	Noted

DCP Section and Criteria	Response
6.2.4 Hours of operation Where residential and industrial uses are located in close proximity, there is potential for activities associated with the industrial and business uses to have a detrimental impact on the amenity of the neighbouring residents. The determination of suitable hours of operation will depend on the type of uses proposed, its location in relation to residential properties and the impact of operating hours on the occupiers of those properties. Council will seek to ensure that the hours of operation of businesses, places of work, commercial premises and industrial premises are compatible with the type of activities carried out on the premises and the relationship with neighbouring residential occupiers.	Noted
C56 – Hours of operation for the use of a site will be restricted by Council if it is likely that the use will cause an impact on any nearby residential or other sensitive use.	N/A
C57 – All excavation, demolition, construction and deliveries to the site necessary for the carrying out of the development is to be restricted to between 7 am to 5.30 pm Mondays to Saturdays, excluding Public Holidays. Notwithstanding the above no work is to be carried out on any Saturday that falls adjacent to a Public Holiday.	The Proposal would operate 24 hours, 7 days a week in accordance with the existing approved operating hours for the MCS Cooks River Terminal.
6.4 Controls for specific land uses In addition to the generic controls in this DCP, the following land use based controls are applicable to specific land uses.	Noted
6.4.2 Freight transport facilities	
C73 – The details submitted with a development application for a container terminals must include: i. Areas clearly marked for storage of containers, vehicular circulation areas, loading/unloading zones, administration areas and other site facilities. ii. The number of containers to be stacked on top of each other including maximum height above finished surface level. iii. Details of surface treatment. iv. A site management plan describing means for suppression of dust and noise and protection of all paved areas. **NB** *All driveways and storage areas must be sealed.* **C74** – A traffic report must accompany all applications for container terminals and must include full details of the proposed operation, proposed vehicular access, parking, vehicular movement and manoeuvrability, truck routes to and from the site, and the effects on traffic and the road system.	The areas for vehicle circulation, loading/unloading zones, administration and other site facilities relevant to the GSCP facility are shown on Site Drawings in Appendix A. Apart from the structures for the proposed use, all areas will be sealed as hardstand pavement to assist in drainage and pollutant control such as dust. Refer to Appendix K for a traffic report prepared for the proposed additional use to the rail freight terminal. Figures from the traffic report conclude that truck movements associated with the introduction of the use to the location will be within the approved limits for the site and as such would not have an effect upon the safety of local roads.

Appendix I

FLOODPLAIN RISK ASSESSMENT

Appendix J

NOISE EMISSIONS ASSESSMENT

Appendix K

TRAFFIC IMPACT ASSESSMENT

Appendix L

REVIEW OF ENVIRONMENTAL EFFECTS OF PROPOSED LIGHTING AT NEW GRAIN HANDLING FACILITY FOR MCS ST PETERS

SEE450-TD-EV-REP-0001 Rev 0
8 October 2014

STATEMENT OF ENVIRONMENTAL EFFECTS

Maritime Container Services Grain Storage and Container Packing Facility – 20 Canal Road, St Peters

Prepared for:

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8 October 2014

SEN405-TD-EV-REP-0001 Rev 0

Acknowledgments

NSW Ports, MCS Pty Ltd, Ahrens Group Pty Ltd, Maskiell Consulting

Limitations Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to conduct a Statement of Environmental Effects in accordance with the scope of services set out in the contract between KBR and MCS Pty Ltd ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

KBR derived the data in this report primarily from visual inspections, information provided by the client and environmental database searches. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, KBR has relied upon and presumed accurate certain information (or absence thereof) relative to the site provided by government officials and authorities, the Client and others identified herein. Except as otherwise stated in the report, KBR has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed by KBR in this report are not, and should not be considered, an opinion concerning other related or unrelated projects within the Port Botany or St Peters area. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon site conditions and information provided by the client, Ahrens Group and NSW Ports in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between KBR and the Client. KBR accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Revision History

Revision	Date	Comment	Signatures		
			Originated by	Checked by	Approved by
A	02.10.2014	Issued for review and comment	L Mottee	D Shooter	L Mottee
0	08.10.2014	Issued for Approval	L Mottee	D Shooter	L Mottee

CONTENTS

Terms

Acronym	Definition
ADG	Australian Dangerous Goods Code
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ARI	Average Recurrence Interval
ARTC	Australian Rail Track Corporation
ASS	Acid Sulfate Soils
ASSMAC	Acid Sulfate Soils Management Advisory Committee
DA	Development Application
DCP	Development Control Plan
DP	Deposited Plan
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CIV	Capital Investment Value
CLM Act	*Contaminated Land Management Act 1997*
CO	Carbon monoxide
dB(A)	Decibels
DECC	Department of Environment and Climate Change NSW
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EC	Electrical Conductivity
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning & Assessment Regulation 2000*
EPA	Environment Protection Authority (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ft	Feet
FCT	Full Container Terminal
GSCP Facility	Grain Silo and Container Packing Facility
ha	Hectare
HAZOP	Hazard Operability Study
IN1	General Industrial
JRPP	Joint Regional Planning Panel
km	Kilometres
kL	Kilolitre
LEP	Local Environmental Plan
MCS	Material Container Services
m	Metres

Acronym	Definition
mbgl	metres below ground level
mg/L	Milligram per litre
mm	Millimetres
ML	Megalitre
MNES	Matters of national environmental significance
NEPM	National Environment Protection Measures
NO_2	Nitrogen dioxide
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	Office of Environment and Heritage
OHS Act	*Occupational Health and Safety Act 2000*
OLS	Obstacle Limitation Surface (OLS)
O_3	Ozone
PAH	Polycylic Aromatic Hydrocarbons
PM_{10}	Particles
PIRMP	Pollution Incident Response Management Plan
PHA	Preliminary Hazard Analysis
POEO Act	Protection of the Environment Operations Act
Roads and Maritime	Roads and Maritime Service
RTA	Roads and Traffic Authority
SACL	Sydney Airport Corporation Limited
SEE	Statement of Environmental Effects
SEPP (Infrastructure)	State Environmental Planning Policy (Infrastructure) 2007
SEPP 33	State Environmental Planning Policy No. 33 Hazardous and Offensive Development
SEPP 55	State Environmental Planning Policy No.55 Remediation of Land
SO_2	Sulfur Dioxide
SoHI	Statement of Heritage Impact
SP2	Special Purpose 2
t	Tonne
TEU	Twenty-foot equivalent unit
TKN	Total Kjehldahl Nitrogen - total organic nitrogen and ammonia nitrogen
TPH	Total Petroleum Hydrocarbons
µS/cm	Microseconds per centimetre
TSC Act	*Threatened Species Conservation Act 1995*
WM Act	*Water Management Act 2000*

Summary

This Statement of Environmental Effects (SEE) has been prepared as part of a revised Development Application (DA201400196) submission to Marrickville Council seeking approval to construct and operate a Grain Storage and Container Packing (GSCP) facility within the existing MCS Cooks River Terminal. It broadly seeks to:

- Summarise the outcomes of environmental investigation reports submitted to Marrickville Council to date under DA201400196.
- Ensure the required environmental mitigation measures to ameliorate potential impacts previously identified are documented.
- Address the requirements of the NSW Planning system.

The GSCP facility is proposed to receive grain (predominately wheat grain) from South-West country NSW utilising train or truck transport. The grain would be stored temporarily and then packed into 20 foot containers that have been prepared as suitable for food quality. Containers would be sent via the Metropolitan Goods Line to Port Botany, located approximately 8 kilometres by rail to the south of the Terminal. It is envisaged that in the first year of operation that over 300,000 tonnes of various grains would be packed. The GSCP facility would be located on part of Lot 22 on DP 1069118 and comprise nine silos, a hopper and enclosed shed, a series of elevators and conveyors, and invertors to facilitate loading into containers.

The approval pathway for the Proposal is for development consent under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The Proposal is to be referred to the Joint Regional Planning Panel (JRPP) as per the requirements of Schedule 4A of the EP&A Act, which states that rail infrastructure facilities having a capital investment value (CIV) of more than $5 million is considered development for which regional panels may be authorised to exercise consent authority functions of Councils. This means the JRPP will take the place of Marrickville Council as the consent authority for assessment and determination of the DA. .

Key issues investigated in this SEE related to both the construction and operation of the GSCP facility at the MCS Cooks River Terminal and included:

- The potential hazards associated with the operation of the facility and the safety of workers during construction and operation.
- The presence and management of contaminated soils and Acid Sulfate Soils.

- Management of contaminated groundwater during excavation.
- The potential impacts of flooding risk to property and employees.
- Off-site water quality impacts affecting biodiversity.
- Noise and air quality (dust) emissions from the construction and operation of the Proposal.
- The location and protection of heritage items on site and the heritage value of the Terminal.
- Traffic and accessibility impacts.
- Local amenity and visual amenity impacts.
- Waste management throughout all phases of works.

The assessment considered the existing environment in relation to each of these key environmental issues, the potential for likely impacts and the significance of any impacts based on consequence and likelihood of those impacts occurring. A Preliminary Hazard Analysis (PHA) was also completed to address the potential hazards and risks of the Proposal. The assessment determined that the potential environmental impacts identified are minor and of low significance and considered manageable with the environmental mitigation measures proposed in this SEE.

The Proposal is anticipated to have a broader beneficial effect to encourage the use of Port Botany to transport grain and reduce the transport of grain by road and rail outside of NSW for loading into containers and shipping.

Once constructed, the Proposal would support the grain industry regionally and strengthen the intermodal capacity of the MCS Cooks River Terminal as a metropolitan freight terminal as per Action 2E of the *NSW Freight and Port Strategy November 2013*. The Proposal would not result in any significant adverse impacts upon the surrounding environment provided the environmental mitigation measures proposed in this SEE are effectively implemented.

1 Introduction

1.1 PROJECT BACKGROUND

Maritime Container Services Pty Ltd (MCS) is Sydney's oldest independently owned Container Storage and Transport company. They operate from two sites, MCS Port Botany and MCS Cooks River. MCS Cooks River is located at the Cooks River Container Terminal at 20 Canal Road in St Peters and has operated for over 37 years at this location. The company is involved in handling and moving one third of Sydney's container traffic and provides additional services in road transport, rail servicing, Full Container Terminal (FCT) storage and handling (General, Under-bond and Dangerous Goods), container repairs and container sales.

This Statement of Environmental Effects (SEE) has been prepared as part of a revised Development Application (DA201400196) submission to Marrickville Council seeking development consent approval to construct and operate a Grain Storage and Container Packing (GSCP) facility (the Proposal) within the existing MCS Cooks River Terminal. The approval pathway for the Proposal is for a development consent under Part 4 of the EP&A Act. The Proposal is to be referred to the Joint Regional Planning Panel (JRPP) as per the requirements of Schedule 4A of the EP&A Act, which state that rail infrastructure facilities having a capital investment value (CIV) of more than $5 million is considered *development for which regional panels may be authorised to exercise consent authority functions of Councils.* This means the JRPP will take the place of Marrickville Council as the consent authority for assessment and determination of the DA.

The GSCP facility is proposed to receive grain (predominately wheat grain) from South-West and Central-West country New South Wales (NSW) utilising train or truck transport. At the initial start-up, approximately three trains per week would run from the grain regions to the site. The grain would be stored temporarily and then packed into 20 ft containers that have been prepared as suitable for food quality. Containers would be sent via the Metropolitan Goods Line to Port Botany, located approximately 8 km by rail to the south of the Cooks River Terminal. It is envisaged that in the first year of operation that over 300,000 tonnes of various grains would be packed. The GSCP facility would be entirely located within Lot 22 DP 1069118 and comprise nine silos, a hopper and enclosed shed, a series of elevators and conveyors, and invertors to facilitate loading into containers.

Prior to MCS operating the site, the Cooks River Terminal was established as a rail and good storage yard in the 1940s, due to its proximity to Port Botany and state roads, such as the Princes Highway. The Cooks River Terminal is considered a key metropolitan intermodal terminal in Sydney in the NSW Government's *NSW Freight and Port Strategy November 2013*. The Proposal is aligned with the strategic intent of this strategy through expansion of the Cooks River Container Terminal metropolitan terminal to facilitate import container trade.

1.1.1 Existing approvals at MCS Cooks River Terminal

Various approvals have been granted for development and building works that related to different parts of the Terminal in recent years. In November 2007, the Sydney Ports Corporation (now NSW Ports) sought to consolidate the various consents that related to the Cooks River Terminal into one application for the site under a Part 5 of the EP&A Act.

Planning consent was granted by Marrickville Council in 2008 for a grain facility development, however, the consent has since lapsed.

In September 2011, MCS obtained development consent (DA201100204) to reconfigure rail sidings, minor building works, and increase container stacking to six high on parts of the site. This consent was modified in January 2012 to include pavement repair, eight high mast light towers and rail and landscaping works. In February 2013 MCS obtained consent (DA201200548) to consolidate offices including the construction of one new office and the demolition of two old offices.

1.2 SEE OBJECTIVES

In completing this assessment, this SEE will identify the significance of potential impacts arising from the construction and operation of the GSCP facility and identify the mitigation measures required to avoid or minimise potential impacts.

The key objectives of this SEE are to:

- Describe the Proposal and construction works required to deliver the project.
- Describe the surrounding local environment in order to quantify and qualify the predicted impacts.
- Identify the likely impacts to be generated during the construction and operational phases of the Proposal and then determine the significance of those impacts upon the local environment.
- Propose measures to mitigate significant impacts in line with relevant planning policy, legislation and MCS' environmental management practices.
- Consolidate the specialist studies and additional environmental investigations prepared to date relating to DA201400196 and provide a revised consolidated SEE.
- Provide an assessment of the Proposal against the relevant statutes within NSW Planning system.

1.2.1 Assessment methodology

As this SEE was requested by Marrickville Council in order consolidate the environmental investigations and studies to date, this assessment was prepared based upon:

- A desktop of review of existing reports pertaining to the Proposal and the site.
- Previous SEE documents prepared.

- Publically available sources of information relating to the general environment A brief field inspection was also undertaken.

The proposed scope of construction and operational works, potential effects and impacts to the local environment were identified in consultation with MCS and the design and construct contractor, Ahrens Group, following a review of publicly available databases and environmental investigation reports. Information contained in this SEE was also taken directly from the SEE prepared by Maskiell Consulting in March 2014 and revised in June 2014.

2 Proposal Description

2.1 SITE DESCRIPTION

The MCS Cooks River Terminal (the Terminal) is located at 20 Canal Road, St Peters, which is an inner western suburb of Sydney, approximately 5 km south-west of Sydney CBD. The site within which the Proposal is located consists of nine allotments as follows:

- Lot 1 DP621047
- Lot 2 DP454156
- Lot 1 DP533013
- Lot 1 DP554157
- Lot 1 DP544030
- Lot 2 DP627409,
- Lot 1 DP1048243
- Lot A DP118682
- Lot 22 DP1069118.

The Proposal is to be established on part of Lot 22 on Plan DP1069118.

The Terminal is on land zoned as industrial (general industrial) under the Marrickville Local Environmental Plan (LEP) 2011 and is accessible by road and rail. The site is bound by Canal Road to the north east, Bellevue Street in the north-west, the Metropolitan Goods Rail Line in the south-west, and adjoins industrial development to the north-west and Sydney Airport Corporation industrial land to the south-east. The location of the site is shown in Figure 2.1 and in the drawings in Appendix A. Road access into the Terminal is via Canal Road and Talbot Street.

The site is divided by railway lines that commence from the Metropolitan Goods line or the Sydenham to Botany Goods Rail Line in the west, and then split into eight separate parallel sidings that run towards the north-eastern edge, near Canal Road. The existing site use consists of MCS operations, including administration buildings, car parking, light towers, self-bunded refuelling container, workshops for repairs and preparation, container storage and transfer via truck and rail transport. The majority of the site is paved with asphalt and concrete. The rail sidings that segregate the site create operational areas for loading and unloading containers for road and rail transport.

2.2 SURROUNDING LAND USE

The primary categories of land use in the vicinity of the site are commercial and industrial. A small strip of residential properties are located on Bellevue Street approximately 100 m west of the MCS Cooks River Terminal site boundary and these are the closest residential dwellings. These properties are located approximately 300 m from the site of the Proposal. A larger residential area is located on the other side of Princes Highway, which separates the different types of land use.

The Alexandria landfill is located on the other side of Canal Road to the north east of the site. Sydney's international and domestic airports are also located directly south-east of the site.

Port Botany is located approximately 8 km south-west of the Cooks River Terminal via rail. The port is considered the major NSW port for the handling of containers, bulk liquids and petrochemicals.

2.3 NEED FOR THE PROPOSAL

The purpose of the GSCP facility is to receive bulk grain (predominantly wheat) for export in container via Port Botany. The GSCP facility would be initially targeting the grain which is harvested in the Murrumbidgee Irrigation Area (MIA). This grain is presently transported by road or rail to Melbourne and Geelong for export packing.

The Cooks River Terminal is considered a key metropolitan intermodal terminal for Sydney in the NSW Government's NSW Freight and Port Strategy November 2013. Strategic Action 2E of the strategy is to 'Foster intermodal terminal network development' and specifically includes supporting 'the development of sustainable facilities that create capacity' in metropolitan areas (NSW Government 2013, p 121). The Proposal is aligned with the strategic intent of this action and supports the function of metropolitan terminals to facilitate import container trade.

This facility would build the intermodal capacity of the MCS Cooks River Terminal by allowing users to transfer bulk grain to containers for export.

Figure 2.1 - MCS COOKS RIVER TERMINAL AND SURROUNDING ENVIRONMENT

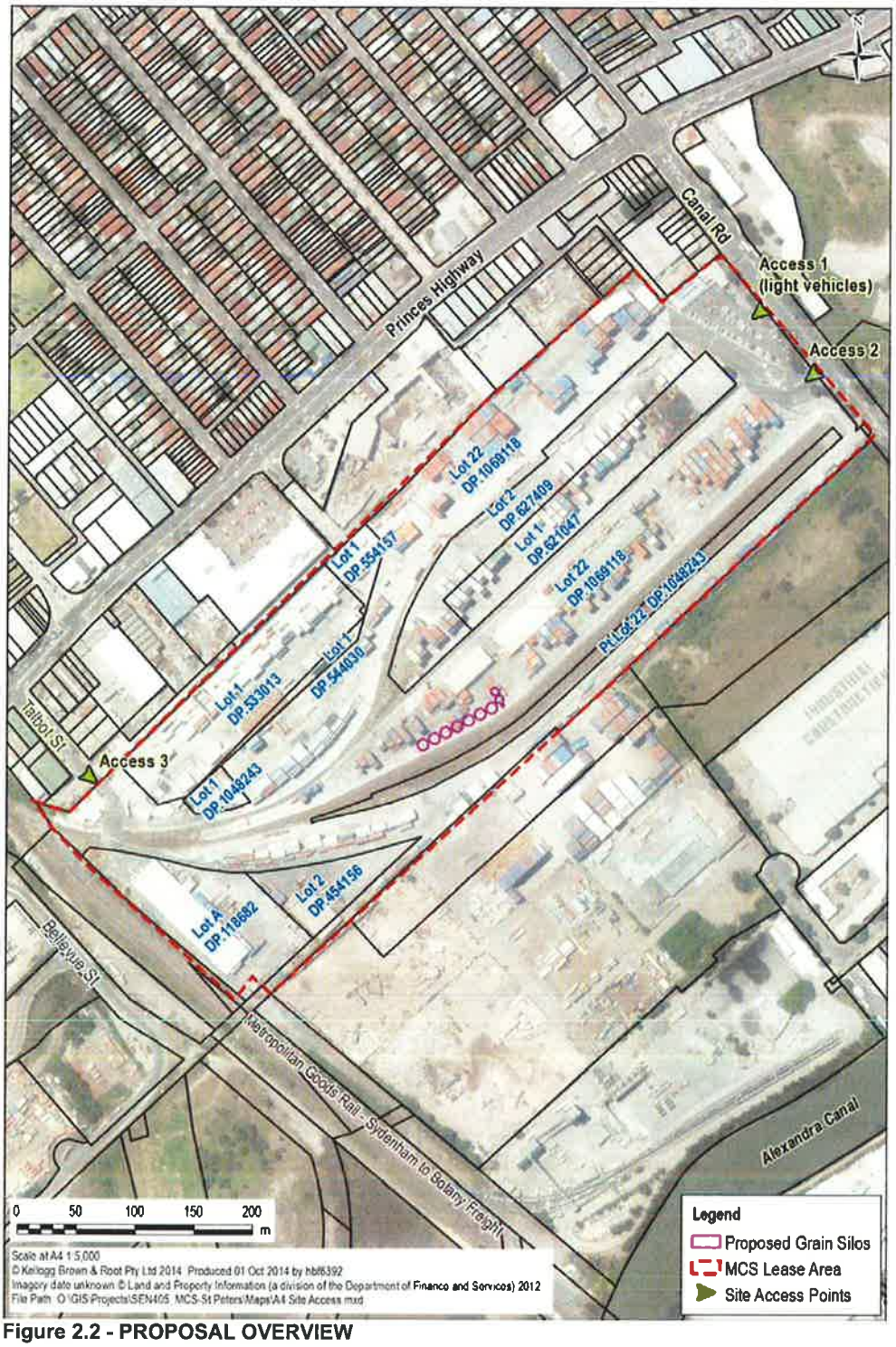

Figure 2.2 - PROPOSAL OVERVIEW

2.3.1 Alternatives

The options considered for the project are described below. No further design options were considered for the Proposal due to the requirement for co-location adjacent to the rail sidings and small design scope for the GSCP facility.

The MCS Cooks River Terminal was considered the only suitable location in the available MCS lease areas, due to limited facilities and available area at the MCS Port Botany site.

Option 1 – Do Nothing

At present the majority of grain from the MIA region is loaded into shipping containers outside of NSW. Although grain is harvested within southern NSW in this region, the grain is sent to Melbourne and Geelong to goods facilities which have the capacity to load grain into containers.

Without this Proposal, grain would be continued to be transported out of state without the benefit of the efficiencies of bulk rail transport. The higher costs of transport interstate and the continued environmental impacts associated with the transport of grain over longer distances would persist and would become unsustainable into the future.

Option 2 – Build the Grain Loading Facility at the MCS Cooks River Terminal

The GSCP facility is proposed at MCS to provide a loading capability in NSW at an existing facility. MCS operations at St Peters have existing facilities to repair/upgrade empty shipping containers for food quality to meet export standards. The Cooks River Terminal has been a rail yard and goods storage facility providing access to Port Botany via the Metropolitan Goods Rail Line for many years. As such, the addition of the GSCP facility the MCS Cooks River Terminal would be a complementary land use and would minimise transport impacts on the environment due to proximity of the Port.

Furthermore, the MCS Cooks River Terminal is the only facility in Sydney that is able to accommodate bulk rail wagons, which are the most efficient way to transport grain.

This was considered to be the preferred option for siting the facility.

2.4 SCOPE OF WORKS

The proposed GSCP facility consists of the following key components:

- Seven storage silos, (approximately 18 m high, including the gantry and handrail, with a capacity of 600 t).
- Two smaller loading silos (approximately 16 m high, including the gantry and handrail).
- A pair of bucket elevators and a tower and chute (approximately 24 m high, the highest structure in the facility).
- A conveyor system on which grain is transported between the silos and hopper.

- A shed over rail siding 6 and concrete hopper underneath the rail siding for grain unloading.

Key components of the proposed GSCP facility are shown on the drawings provided in Appendix A and figures showing the Proposal relative to the existing environment are shown in Figures 2.1 and 2.2.

It is proposed that the GSCP facility would operate 24 hours a day as per the existing site arrangements and containers would be received by road and rail transport. In the first year of operation, it is envisaged that over 300,000 t of various grains from the MIA region which is currently being exported out of Victoria, would be packed at a rate of up to 60 containers per day.

As part of the Proposal, the existing site would reduce in capacity for storage of 1000 Twenty-foot Equivalent Units (TEUs)[1]. This would be a reduction of 10 per cent of the current site storage.

A further description of the Proposal is provided in the following sections.

2.4.1 Weighbridge

MCS have submitted a separate proposal to council for a new, aboveground commercial weighbridge of approximately 35 m wide by 28 m long. This would be required to weigh trucks upon entering the terminal for gross weight calculation purposes.

Upon departure, the trucks would be reweighed to confirm the net weight. MCS Transport would also use the facility for their trucks instead of a public weighbridge.

2.4.2 The Grain Storage and Container Packing Facility

The GSCP facility would have five components which include:

- Rail Receival.
- Road Receival.
- Silo Storage.
- Container Packing.
- Administration.

These components are discussed in more detail below.

Rail receival

Grain would be delivered to the MCS Cooks River Terminal via a bulk train entering the site from the freight line. The grain would then be bottom discharged from the rail wagons into the hopper which is to be installed under the existing rail siding line 6 (refer to the drawings in Appendix A and Figure 2.2). The hopper and rail line would be enclosed within a rail shed. The rail shed and system would be fitted with three separate bag filter units to ensure that any dust generated during the process is captured.

[1] a TEU is the equivalent of a 20 foot shipping container.

A series of conveyors and the main bucket elevator would transfer the grain to the silo storage. The unloading process for a 675 m long train would take approximately 10 hours.

A rail concept plan which provides details for the movement of bulk trains from south-west NSW to MCS Cooks River Terminal is included in Appendix B. It is anticipated that three trains per week would run from grain regions in south-west or central-west NSW to the Terminal each week. MCS has consulted with the Australian Rail Track Corporation (ARTC) with regard to the rail concept plan and they have been supportive of the Proposal.

Road receival

The GSCP facility would receive grain by truck via the same hopper than the rail wagons discharge into. This would be located adjacent to the rail hopper in the same enclosed shed. Trucks would drive over the hopper and discharge grain utilising a tipper. The conveyor would transfer grain from the hopper to the main bucket elevator for silo storage. The grain trucks would be allocated a time slot to ensure that they arrive at MCS Cooks River Terminal when there is no grain train.

Silo storage

A series of nine (two 283 t and seven 656 t) steel grain silos are proposed with a total grain storage capacity of approximately 5158 t. The silos have been designed as fully sealed and to be raised off the ground with concrete footings and steel support legs. Grain would be loaded into the silos for storage through a top mounted conveyor.

The conveyors and gates would be electronically controlled in the administration office to be constructed as part of the Proposal.

Container packing

The container packing equipment would consist of two smaller silos and a pair of 20 ft container inverters. Grain would be drawn from the main silos utilising conveyors and stored in the smaller silos for packing.

Containers are fitted with a false bulk head and loaded onto an inverter by forklift. The inverter then raises the open end of the container until the container is approximately 45 degrees above the horizontal. A funnel chute is lowered into one open door of the container and the container is filled with grain by also moving the grain using conveyors and bucket elevators. Industrial standard dust extraction equipment is used to prevent dust escaping during this process. The loaded container is then stored on site before being transported to Port Botany by rail.

Administration

The GSCP facility would be operated by a team of two to three staff. The facility could operate 24 hours 7 days a week in accordance with the existing approved operating hours for the MCS Cooks River Terminal.

Staff would be accommodated in an administration office with kitchenette, toilets offices and grain sampling equipment. The office would be fitted with the acoustic

treatments as recommended in the Aircraft Noise Intrusion Assessment provided by Acoustic Logic (refer to Appendix C).

2.5 CONSTRUCTION WORK METHOD

2.5.1 Work methodology

MCS has appointed Ahrens Group as the design and construct contractor for the Proposal. Ahrens Group has provided the following work methodology for the construction phase of the Proposal:

1. Remove containers in the works area and designate construction zone from operational works zone.
2. Install environmental controls as required.
3. Excavation and preparation of site.
4. Remove the existing rail line.
5. Dig excavation pit for hopper.
6. Build formwork for pit walls.
7. Pour concrete for pit.
8. Replace the railing siding removed.
9. Prepare silo footings base.
10. Set up and pour footings.
11. Prepare and construct silos.
12. Construct support structures.
13. Build office.
14. Assemble conveyors and bucket elevators.
15. Install electrics.
16. Commission.
17. Demobilise site and remove environmental controls.

2.5.2 Excavation works

The proposed initial excavation works associated with the GSCP facility would include the following construction works:

- Excavation of a pit to allow the installation of a below ground hopper.
- Removal of existing concrete and installation of a new concrete slab as foundations for the silos and associated structures/buildings.
- Augmented stormwater infrastructure.
- Stockpiling of material (discussed in Section 2.6.3).

A drawing showing the extent of the new slab, the location of the proposed silos, stormwater infrastructure and associated structures/buildings is included in Appendix A. A full description of excavation works is also included in the ASSMP and CMP in Appendix D.

The below ground hopper would be installed in an excavated pit (beneath the existing rail track), of approximately 13 m length by 9 m wide and 3.2 m in depth. Excavation of the pit would be undertaken by an excavator. The excavation methodology would be as follows:

- At a pre-determined spacing around the perimeter of the excavation, holes would be drilled for the purposes of installing groundwater spears.
- The spears would be used to drawdown groundwater either side of where sheet piles would be installed and below the target excavation depth.
- During the excavation works, bunding would be installed around the perimeter of the 'pit' to protect against water ingress from overland flows.
- Once the target depth has been achieved across the base of the excavation, a concrete base would be installed.
- This would be followed by installation of the concrete walls which would be cast on-site.
- Material excavated from the pit would then be used to backfill the cavity between the sheet piles and the concrete walls.
- Following compaction of this material, the sheet piles would then be removed.

The installation of the stormwater infrastructure, above ground grain storage silos and associated structures/buildings would require the removal of the existing concrete areas. The approximate area of existing concrete that has been identified for removal for subsequent installation of the silo slab is around 960 m^2 (i.e. 80 m long by 12 m wide). Areas of existing slab would be removed utilising an excavator and vibratory hammer.

Stormwater drainage infrastructure would be installed within the proposed slab. The stormwater drainage infrastructure that is proposed to be installed beneath the new slab comprises around 18 stormwater pipes ranging from 150 mm to 900 mm in diameter. The works also involve the installation of approximately 17 stormwater connection pits.

The concrete which is recovered during these works would be taken to the concrete recycling plant immediately adjacent to the site.

2.6 SITE MANAGEMENT

2.6.1 Compound and storage

The Proposal construction would require a maximum of 10 staff on site. As the site is an operating container terminal, provisions exist on site for utilising the existing toilets around the site and administration building for lunchroom and other office facilities.

If required, additional space may be allocated for 'portaloos' and parking on site in an area allocated immediately adjacent to the proposed works.

Sufficient space is also available adjacent to the works site for the storage of any tools, materials and equipment.

Two workshops are located at the site which could be utilised to access water and the refuelling of equipment for the proposed works as required.

2.6.2 Site access

The MCS Cooks River Terminal is accessible via two entries on Canal Road in St Peters and Talbot Street off the Princes Highway. Large truck (B-Doubles) access for the site is situated on Canal Road (refer to Figure 2.2). The silos, materials, machinery and equipment would arrive on site in semi-trailers and all of the handling equipment would be in containers.

A traffic management plan exists for the operation of the site. The traffic arrangement arrangements for construction would abide by this plan and would be determined prior to the commencement of construction.

2.6.3 Stockpiles

Material recovered during excavation of the pit would be stockpiled nearby. The stockpiles would be protected by bunding which would reduce sediment transport from stormwater run-off, and would also be covered by plastic sheeting to further reduce material loss. If bare ground is identified for material placement, impervious plastic sheeting would be firstly laid beneath the stockpile.

During the pit excavation, the concrete and crushed gravel (i.e. fill) in the upper profile would be stockpiled separately to the other material. Similarly, should any distinctly different material be encountered during the excavation, it would be stockpiled separately.

Concrete recovered as a result of the removal of the existing slab would be stockpiled nearby in a controlled location, for transportation to the concrete recycling plant, immediately adjacent to the site. Fill and soil material recovered from the deeper excavations required for select stormwater connection pits would be managed using the same methods described above for pit excavations.

2.7 EQUIPMENT AND MATERIALS

Construction vehicles and equipment required on-site during the construction period are likely to include;

- Delivery trucks (including semi-trailers).
- Excavator.
- 4 t Telehandler.
- 25 t Crane.
- 100 t Crane (for night work).
- Hand tools.

- Personnel vehicles.
- Cement mixer and concrete casting equipment.

Key materials to be used during construction would include the steel silos, steel, conveyor belts, bolts, silicon based sealants and cement.

2.8 CONSTRUCTION PROGRAM

The construction program is anticipated to be completed in nine months. The excavation works would be short-term over a five week period initially to complete the pit and prepare the site.

Due to the proximity of the airport, works which require the use of the 100 t crane, including the final installation of silos, would be undertaken outside of airport hours (11:00 pm to 6:00 am) to avoid conflicts with aircraft. These works would be short-term, requiring approximately 15 nights of work and restricted to two to three consecutive nights at a time to minimise disturbance on the local environment.

2.8.1 Hours of operation

The majority of construction works are proposed to be undertaken in the hours from 6:00 am to 6:00 pm Monday to Friday and Weekends 8:00 am to 4:00 pm, however, as the MCS Cooks River Terminal can operate 24 hours seven days a week, works may be undertaken outside of these hours. This includes but is not limited to works with the 100 t crane.

Excavation works that generate high levels of noise impact are to be scheduled during standard construction hours as per the Environment Protection Authority (EPA) *Interim Construction Noise Guideline* (DECC 2009) between 7:00 am to 6:00 pm Monday to Friday and Saturday 8:00 am to 1:00 pm to minimise disturbance to the surrounding environment.

3 Planning and Legislative Framework

This section provides a review of the Proposal against the relevant Commonwealth, State and Local government legislative framework and identifies any approvals or requirements that apply.

3.1 LEGISLATIVE FRAMEWORK

The Commonwealth government has an approval role in the assessment of structures that exceed the minimum height of the Obstacle Limitation Surface (OLS) in relation to aviation safety. The Proposal requires approval from both the Civil Aviation Safety Authority (CASA) and the Sydney Airport Corporation Limited (SACL) for the equipment and machinery (including temporary ones) that may exceed the OLS to be used in construction of the Proposal.

At State government level, development consent is required for an addition to a rail freight terminal under Part 4 of the EP&A Act. Further, as the capital investment value (CIV) exceeds $5 million, it has been referred by the Marrickville Council to the JRPP. This referral is required under Schedule 4A of the EP&A Act, to enable the JRPP to exercise their consent authority role.

The proposed development is neither a designated development requiring an EIS, nor is it considered an integrated development as it does not require other approvals listed under Section 91(1) of the EP&A Act.

It is noted that Marrickville Council has referred the DA to the Department of Primary Industries (DPI) Office of Water as integrated development due to the groundwater extraction required as part of the proposed works. However, as discussed in Section 3.3.4 and Section 4.3 of this SEE, the low volume of groundwater anticipated (approximately 1 ML) is likely to be considered of minimal impact and as such would not require any further approvals. The final determination on this matter would be subject to assessment by the DPI Office of Water.

The Marrickville Council Local Environmental Plan 2011 (Marrickville LEP) requires consent to be given prior to the use being undertaken on the site. The proposed land use involves additions to the existing rail freight terminal operations. Assessment would involve the relevant provisions of the Marrickville LEP, including any development control plan matters.

3.2 COMMONWEALTH LEGISLATION

3.2.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, an action will require approval from the Commonwealth Environment Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance (MNES).

The nine MNES listed in the EPBC Act are:

- World heritage properties.
- National heritage places.
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed).
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

An action that will have, or is likely to have, a significant impact on a MNES must be referred to the Minister for a decision on whether an assessment and approval as a controlled action is required under EPBC Act.

A search of the protected matters search tool was conducted on 17 September 2014 of a one km buffer surrounding the MCS Cooks River Terminal site.

The search returned one wetland of international importance, Towra Point Reserve, however, it was noted that the proximity of this wetland was within 10 km of the site, adjacent to Botany Bay. One Threatened Ecological Community, 24 threatened species and 12 migratory species were returned as known to or potentially occurring in the area.

No suitable habitat for terrestrial or aquatic flora and fauna is located within the proposed works area, however, migratory species may fly over the work site. The search also identified the Sydney (Kingsford Smith) Airport Group as Commonwealth Land with heritage significance nearby to the south of the Proposal.

Overall the Proposal is considered to have low potential to impact MNES values.

It is not anticipated that a referral under the EPBC Act would be required as the works do not affect any area containing known MNES.

3.2.2 Airports Act 1996 (Cth)

Under Section 182 of Part 12 of the *Airports Act, 1996* (Cth) (Airports Act), activities that result in or are proposed to intrude into prescribed airspace of the Sydney Airport are 'controlled activities'. Examples include constructing a building or other structure such as a crane, operating a plant that reflects sunlight or emits smoke that exceeds stated thresholds under a regulation.

Section 183 states that these controlled activities cannot be undertaken without prior approval. The approval framework is provided under the regulations made under the Airports Act, including the *Airports (Protection of Airspace) Regulations 1996, Civil Aviation (Building Controls) Regulations 1988*, Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 – Aerodromes.

These regulations and standards are administered by the CASA and the Sydney Airport Corporation Limited (SACL) to control the impact of development on airports, aviation and aerodromes. Details of the proposed silos and bucket elevators were submitted to CASA and SACL for their approval.

In a letter dated 18 June 2014, approval from an authorised assessor of CASA the Airfield Design Manager at Sydney Airport,(CASA Instrument Number CASA 229/11) has been received and is attached as Appendix E. The height approved includes items such as all lift over-runs, vents, chimneys, aerials, television antennas and construction cranes.

It was advised that temporary structures such as cranes require further approval under the Airports (Protection of Airspace) Regulations and would be refused where proposed at a height significantly greater in elevation than the proposed controlled activity. As such it is proposed that construction works requiring cranes would be undertaken at night, outside of airport hours (refer to Section 2.8) and no other works are proposed which would utilise temporary structures or cranes significantly greater in elevation than the approved controlled activity.

Further, the authorised assessor was satisfied the Proposal would not be an attractant of wildlife which would affect the adjoining Sydney Airport operations. A condition was included in the approval letter requiring this to be monitored, and if found to be attracting flocks of birds to the area, a wildlife management plan would be required to be submitted by the operator. Other appropriate landscaping treatments and site-related measures would also be required to minimise bird attraction.

3.3 STATE LEGISLATION

NSW has in effect legislation that regulates development, land use planning and environmental assessment. In addition to the legislation there are environmental planning instruments including State Environmental Planning Policies (SEPPs) which provide further requirements of the NSW government on a range of planning and environment-related issues. The following section provides an assessment of the Proposal against the relevant legislation and environmental planning instruments.

3.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the primary legislation for planning, development and environmental assessments within NSW.

There are two key pathways for obtaining a consent under the EP&A Act:

- Approvals under Part 4.
- Approvals under Part 5.

The following outlines the relevant matters for each of these assessment pathways, with particular focus to Part 4 as the Proposal would require approval under this section of the EP&A Act:

- Part 4: development requiring consent under an environmental planning instrument (typically a Local Environmental Plan (LEP), a SEPP or from the Minister for Planning). There are three main types of development for this part (referred to as the *threefold classification*):

- development that does not need consent (exempt).
- development that needs consent (consent).
- development that is prohibited (prohibited).

Division 2 of Part 4 sets out the procedures for development requiring consent. There are sub-categories of classifications that may apply to a development which include for example, designated development (under Section 77A) and integrated development (under Section 91) of the EP&A Act.

- Part 5: activities that are permissible without development consent under an environmental planning instrument being required. The majority of developments undertaken by public authorities are assessed under Part 5 of the EP&A Act. A number of significant infrastructure activities undertaken by public authorities such as transport infrastructure require environmental assessment of their impacts and determination by the Minister for Planning. These activities fall under Part 5.1 and are assessed by the State government, through the Department of Planning and Environment (DPE).

The Development Approval for the Proposal falls under Part 4of the EP&A Act as it requires development consent and is proposed to be undertaken by a private entity. In addition, the Proposal requires referral to the JRPP for determination as the consent authority as the CIV exceeds $5 million. This referral is required under Schedule 4A of the EP&A Act. This is discussed further below.

3.3.2 Environmental Planning and Assessment Regulation 2000

The *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) operates under the EP&A Act framework. The EP&A Regulation provides additional rules and requirements including for the preparation, consultation, referral and determination of DAs requiring consent and environmental assessments.

In particular, Part 6 of the EP&A Regulation provides procedures and requirements for EP&A Act Part 4 Development Approval, including for example, those requiring the need for concurrence from State agencies as part of the Development Approval process and for those classified as being integrated development or designated development.

Rail Freight Terminals – Designated Development

Schedule 3 of the EP&A Regulation defines the broader activity of "Railway freight terminals" as a designated development as per clause:

28 Railway freight terminals

Railway freight terminals (including any associated spur lines, freight handling facilities, truck or container loading or unloading facilities, container storage, packaging or repackaging facilities):

(a) that involve more than 250 truck movements per day, or

(b) that involve the clearing of more than 20 hectares of native vegetation, or

(c) that are located:

(i) within 40 metres of a natural water body, wetland or environmentally sensitive area, or

(ii) within 500 metres of a residential zone or dwelling not associated with the development and, in the opinion of the consent authority, having regard to topography and local meteorological conditions, are likely to significantly affect the amenity of the neighbourhood by reason of noise, odour, dust, lights, traffic or waste.

Further to the above definition, under Clause 35 of Schedule 3 of the EP&A Regulation, there is an exemption for the activity to not be a designated development for the purposes of the EP&A Act. This is where in the opinion of the consent authority, the alterations or additions do not significantly increase the environmental impacts of the total development (being, the development together with the additions or alterations) compared to the existing or approved development.

Criteria are provided for the consent authority to consider in terms of assessment of the significance of the alterations or additions. These criteria are as follows:

35(a) the impact of the existing development having regard to factors including:

(i) previous environmental management performance, including compliance with the conditions of any consents, licences, leases or authorisations by a public authority and compliance with any relevant codes of practice.

(ii) rehabilitation or restoration of any disturbed land.

(iii) the number and nature of all past changes and their cumulative effects.

(b) the likely impact of the proposed alterations or additions having regard to factors including:

(i) the scale, character or nature of the proposal in relation to the development.

(ii) the existing vegetation, air, noise and water quality, scenic character and special features of the land on which the development is or is to be carried out and the surrounding locality.

(iii) the degree to which the potential environmental impacts can be predicted with adequate certainty.

(iv) the capacity of the receiving environment to accommodate changes in environmental impacts.

(c) any proposals:

(i) to mitigate the environmental impacts and manage any residual risk.

(ii) to facilitate compliance with relevant standards, codes of practice or guidelines published by the Department or other public authorities.

As a consequence of an information request from Marrickville Council to the applicant on 24 June 2014 and an earlier prelodgement meeting in October 2013, this was a matter to resolve as the proposal potentially involved designated development.

An email dated 27 August 2014 from Marrickville Council to the applicant provided an excerpt of a briefing note prepared by the assessment officer for the Council about the proposal. Council considered this additional information provided by the applicant that the impacts of the existing development and likely impact of the proposed GSCP facility were not significant.

According to this advice, Council agrees with the position of the applicant, that the proposal would not significantly increase the environmental impacts of the existing MCS operations on-site and should not be classified as being a designated development. Accordingly, on the basis of this advice received, there is no requirement for further actions under Division 2 of the EP&A Act. An Environmental Impact Statement (EIS) is not required to be prepared and instead, a SEE is to be submitted with the DA.

Joint Regional Planning Panel as Consent Authority

The originating DA was lodged to Marrickville Council as consent authority under Part 4 of the EP&A Act in February 2014 and subsequently updated in April and July 2014.

According to Schedule 4A of the EP&A Act, development involving private infrastructure and community facilities for Item 6 – "rail infrastructure facilities" having a capital investment value (CIV) of more than $5 million is considered development for which regional panels may be authorised to exercise consent authority functions of Councils.

The Proposal is categorised as "rail infrastructure facilities" under the State Environmental Planning Policy (SEPP) (Infrastructure) 2007, as item "(j) - rail freight terminals, sidings and freight intermodal facilities". Under Section 81 of the SEPP (Infrastructure) 2007, "railway infrastructure facilities" are permitted with consent.

As the Proposal has a CIV of greater than $5 million ($9.23 million) and is defined as being rail infrastructure facilities, the application has been referred by Marrickville Council to the Sydney East JRPP as the consent authority.

Referral of the Development Application to State Agencies

Marrickville Council considered the Proposal and according to the email advice to the applicant had referred or otherwise recorded referral of the earlier version of the DA to other State agencies as per Table 3.1.

Table 3.1 Referral of DA to Agencies for Comment

State Agency	Reason for Referral	Legislation	Comments Provided
Sydney Airport Corporation Limited (SACL)	Obstacle Limitation Surface (OLS) penetrated by temporary or permanent structures	*Airports Act 1996* (Cth) and Airports (Protection of Airspace) Regulation 1996	Yes, approval letter dated 18 June 2014
Civil Aviation Safety Authority (CASA)	Obstacle (OLS) Limitation Surface penetrated by temporary or permanent structures	*Airports Act 1996* (Cth) and Airports (Protection of Airspace) Regulation 1996	Yes, approval letter dated 18 June 2014
Department of Primary Industries (DPI) - Office of Water	Aquifer interference approval trigger	*Water Management Act 2000*, Section 91	No
Transport for NSW (Sydney Trains) and Australian Rail Track Corporation (ARTC)	Development adjacent to rail corridors	SEPP Infrastructure – Clause 85	No
	Excavation in, above or adjacent to rail corridors	SEPP (Infrastructure) 2007 – Clause 86	No
Roads and Maritime Services (Roads and Maritime)	Traffic generating development	SEPP (Infrastructure) 2007 – Clause 101	Yes
Regional Traffic Committee	Traffic generating development	SEPP (Infrastructure) 2007 – Clause 104	Yes

Assessment of a Development Application Requiring Consent

Under Section 79C of the EP&A Act, in determining a DA, the consent authority must take into consideration the following and therefore these are to be included in a SEE:

'(1) (a) The provisions of:

(i) any environmental planning instrument.

(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved).

(iii) any development control plan.

(iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F.

(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph).

(v) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979), that apply to the land to which the development application relates.

(b) The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.

(c) The suitability of the site for the development.

(d) Any submissions made in accordance with this Act or the regulations.

(e) The public interest.'

Section 3 and 4 of the SEE provides responses to the relevant provisions of these environmental planning instruments and other listed considerations.

Landowner Consent

The land on which the Proposal is to be undertaken forms part of land under a lease from the Port Lessor to NSW Ports, as the land manager. The submission of this DA requires the applicant to obtain written consent from the landowner, the Port Lessor which is NSW Treasury. In a letter from the Ahrens Group dated 15 July 2014, the Marrickville Council planning officer was advised that written landowner consent from NSW Treasury had been obtained and subsequently provided to the Council.

NSW Ports also requires that the leaseholder complete the Green Ports Checklist (the Checklist) as part of the development application. The Checklist was designed by NSW Ports to facilitate the implementation of environmentally sustainable measures as part of new developments at Port Botany, Port Kembla and the Cooks River and Enfield Intermodal Terminal. An updated version of the Checklist has been provided in Appendix F.

Prelodgement Meeting

The applicant consulted with Marrickville Council about the proposal in October 2013. Discussion outcomes of the meeting were recorded and adjustments made to the Proposal prior to formal lodgement.

3.3.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the primary law in NSW regulating water, air and noise pollution. The Act is administered by the NSW Environment Minister through the Environment Protection Authority (EPA). Schedule 1 lists 'scheduled activities' which are to be referred to the EPA for comment during DA stage. Scheduled activities also require licensing under the POEO Act.

The storage and handling of bulk grain as proposed for the site is not listed or included under any scheduled activity. An approval or licence under the POEO Act is not required for this proposal.

3.3.4 Water Management Act 2000

The *Water Management Act, 2000* (WM Act) addresses the management of, and interference with, surface and groundwater in NSW. Under Division 1 of the WM Act, there are three approval types.

Section 89 provides for water use approvals that confer a right to use water for a certain purpose at a particular location.

Section 90 provides for water management work approvals involving water supply work, drainage work and flood work approvals.

Section 91 refers to activity approvals for controlled activity and aquifer interference. For the proposal, an aquifer interference approval is potentially triggered as a consequence of the necessary nature and scale of excavation works affecting groundwater.

According to Section 3.3 of the NSW Aquifer Interference Policy published by the Department of Primary Industries (DPI) – Office of Water in September 2012, activities such as building and work pads are defined as having minimal impact on water dependent assets. Assessment criteria in the form of minimal impact considerations are provided in the Policy. Criteria include the need for consideration of impacts on water table levels, water pressure levels and water quality in different types of groundwater systems, impacts on connected alluvial aquifers and surface water systems as well as impacts on other water-dependent assets.

The operator would need to implement site based management plans and closely monitor the work. The Aquifer Interference Policy provides guidelines on the licensing and assessment of aquifer interference activities for the applicant to follow in this regard.

In addition to the Policy, it is understand from past practice and interpretation of the WM Act that a threshold is applied to determine if there is a trigger. Where the proposed activity intercepts or extracts 3 ML or more of water, then a Section 91(F) approval for aquifer interference would be required. Given the relatively short duration of groundwater drawdown and volume involved, it is estimated that the activity would result in approximately 1 ML of extraction of groundwater and be of minimal impact to the aquifer to not trigger an integrated development. The impact of the Proposal upon groundwater is discussed further in Section 4.3.

3.3.5 Heritage Act 1977

Under Section 57 of the *Heritage Act, 1977* (Heritage Act), an applicant would need an approval if the proposed development involves a place, building, work or relic that has an interim heritage order or listing on the NSW State Heritage Register.

In addition, under Sections 139 and 140 of the Heritage Act, an excavation permit is required for the disturbance or excavation of any relic. Any deposit, object or material evidence relating to the settlement of NSW, not being Aboriginal settlement, that is over 50 years old is classified as a relic under the Act.

A search of the Heritage schedule of the Marrickville LEP, the Aboriginal Heritage Information Management System (AHIMS) and the Australian heritage database was undertaken as part of this assessment. There are no known Aboriginal cultural heritage sites or declared places within 200 m of the proposed pipeline route (AHIMS, 2014).

There are also no known European heritage sites listed on the State Heritage Register within 500 m of the Proposal. Five heritage items of local heritage significance listed under Schedule 6 of the Marrickville LEP are located within 500 m of the Proposal. However, none of these items or associated land, buildings or structures are within proximity to the MCS Cooks River Terminal.

The Australian Heritage Database also lists Alexandra Canal on the Interim List and the Sydney (Kingsford Smith) Airport Group.

In May 2006, Conybeare Morrison International (Conybeare) prepared a Heritage Impact Statement for NSW Ports on their land. A number of items were identified to have heritage significance on the overall Terminal site. The construction contractor would be made aware of these site features and their significance. However, none of these items are located near the proposed works and unlikely to be affected by the works. Section 4.9 discusses heritage in relation to the Proposal in further detail.

3.3.6 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act, 1995* (TSC Act) lists threatened species, populations and ecological communities in NSW. If a threatened species, population or ecological community or its habitat is likely to occur in any area which may be affected by a development proposal, then a 'seven-part test' in accordance with Section 5A of the EP&A Act (as amended by the TSC Act) must be conducted to determine whether the proposal would have a significant impact.

As discussed in Section 4.6, the site is cleared, heavily modified and in a previously disturbed industrial location. There has been no evidence of any listed threatened species, populations or ecological communities at the proposed work site. The TSC Act would not apply to this Proposal.

3.3.7 Contaminated Land Management Act 1997

The management of contaminated land is shared by the EPA, Department of Planning and Environment (DPE) and relevant local government authorities.

Under the *Contaminated Land Management Act, 1997* (CLM Act), the EPA regulates contaminated sites where the contamination is significant enough to warrant regulation. Contaminated sites that are not regulated by the EPA are managed by local councils through land use planning processes.

A Contaminated Land Management Plan has been prepared for the Proposal by KBR and is included in Appendix D. The CMP provides the intended methodology and management measures to address the potential for contaminated land during construction.

3.3.8 Roads Act 1993

Referral has been made by the Marrickville Council to the Road and Maritime Service (Roads and Maritime) for this Development Approval. This is due to the development being a traffic generator and frontage to a 'classified road' as defined under Section 49 of the Roads Act. Consent would be required under Section 138 of the Roads Act from Roads and Maritime:

- Erecting a structure or carrying out work in, on or over a public road.
- Dig up, disturb the surface of a public road.
- Remove or interfere with a structure, work or tree on a public road.
- Pump water into a public road from any land adjoining the road.
- Connect a road (whether private or public) to a classified road.

The Minister may, by order published in the Gazette, declare to be a controlled access road:

(a) Any main road that is designed to facilitate the movement of motor traffic.

(b) Any road that joins a main road referred to in paragraph (a).

Section 61 of the Roads Act states that it is exclusively the function of Roads and Maritime to make decisions as to what road work is to be carried out:

(a) On any freeway, highway or metropolitan main road, or

(b) On any other classified road in respect of which the carrying out of that kind of road work is, by virtue of an agreement or direction under this Division, the responsibility of RMS.

Section 70 of the Roads Act states that:

(a) A person to not construct any means of access to or from a freeway, transit way or controlled access road otherwise than in accordance with the consent of Roads and Maritime.

(b) Must not enter or leave a freeway, transit way or controlled access road except by a means of access or a route provided for that purpose.

Works and structures on a public road are also prohibited unless consent from Roads and Maritime is obtained.

The Proposal does not seek to obtain an additional access point from Canal Road or is proposing increased traffic movements beyond the existing approved limits for the MCS Cooks River Terminal site, as discussed in Section 4.10. While Marrickville Council has referred the application to the Roads and Maritime from comment, no separate approval is considered necessary from the Roads and Maritime for this proposal in terms of the classified road or traffic generating triggers.

3.3.9 Waste Avoidance and Resource Recovery Act 2001

The waste hierarchy, established under the *Waste Avoidance and Resource Recovery Act, 2001*, is one that ensures that resource management options are considered against the following priorities:

- **Avoidance** including action to reduce the amount of waste generated by households, industry and all levels of government.
- **Resource recovery** including reuse, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources.
- **Disposal** including management of all disposal options in the most environmentally responsible manner.

Marrickville Council sought further information from the applicant in relation to the measures proposed for management of waste on the site. In reply, the applicant informed the assessing officer that for the proposed additional use component, the level of waste generated was low level and did not warrant a waste management plan. Nevertheless, Section 4.12 documents the waste management practices and environmental mitigation measures which would be adopted during the course of the Proposal.

3.4 STATE ENVIRONMENTAL PLANNING POLICIES

The Proposal is required to be considered against a number of SEPPs that are in force for the State. The following provides a description of the relevant provisions of the SEPPs.

3.4.1 SEPP (Infrastructure) 2007

The SEPP provides a consistent planning regime for infrastructure and the provision of services including for rail and road corridors in NSW. In addition to the SEPP, reference should also be made to the NSW Department of Planning – Development near rail corridors and busy roads – Interim Guideline, 2008.

The SEPP defines "rail infrastructure facilities" and under Clause 81 considers "rail infrastructure facilities" to be development permissible with consent.

Rail – Division 15

Clause 85 requires development immediately adjacent to rail corridors to be referred to the rail authority, which in this case is the Transport for NSW (Sydney Trains) and the ARTC. Referral is required where there is likely to be an adverse effect on rail safety, there is a metal finish on a structure and the rail corridor involves electric trains or the Proposal involves use of a crane in airspace above any rail corridor.

Clause 86 required a referral to the rail authority of the proposal where there is to be excavation in, above or adjacent to rail corridors. Excavation is to be referred where it involves a depth of at least 2 m within 25 m of a rail corridor.

As such, the Proposal has been referred by Marrickville Council to the ARTC for comment.

Roads – Division 17

Clause 101 requires that a proposal involving land with a frontage to a classified road, requires assessment to ensure that it does not compromise the effective and ongoing operation and function or prevent or reduce the potential of traffic noise and vehicle emissions on development adjacent to a classified road. The consent authority must in turn satisfy itself the proposal can be approved such that:

- Where practicable, vehicle access is provided other than from a classified road.
- The safety and efficiency of the classified road is not adversely affected.
- The development is of a type that is not sensitive to traffic noise and vehicle emissions or is appropriately located and design or have measures in place to address these impacts.

Clause 104 requires that a traffic generating development be assessed by the Roads and Traffic Authority (RTA) (now Roads and Maritime) for the region.

As such, the Proposal has been referred by Marrickville Council to Roads and Maritime for comment.

3.4.2 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

This SEPP provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must carefully consider the specifics of the case, the location and the way in which the proposed activity is to be carried out.

The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA). The policy does not change the role of councils as consent authorities, land zoning, or the designated development provisions of the EP&A Act.

The SEPP 33 principles also apply to the modification of existing facilities, the construction of new facilities, or the commencement of new uses. If the proposed works are considered potentially hazardous or potentially offensive in their own right, then SEPP 33 requirements apply.

SEPP 33 would also apply if the proposed works are not potentially hazardous in themselves, but interact with the existing facility in such a way that cumulative hazards (or offence) from the existing facility may be significantly increased. This may be subject to the judgement of the consent authority.

Whilst, the proposed works do not fall directly into the above definition, the principles of the SEPP 33 have been applied to the works.

The Preliminary Hazard Analysis (PHA) prepared for the Proposal is attached in Appendix G and summarised in Section 4.1. The assessment demonstrated that the SEPP 33 threshold screening value for dangerous goods is not exceeded by the proposed plant as no new chemicals would be introduced to the site and wheat storage by itself does not constitute any form of hazard when stored in silos. The plant would not require new chemicals to be introduced to the site, and so the transportation screening thresholds are not exceeded.

As a result, the proposed development is not potentially hazardous with respect to dangerous goods, and these aspects do not require further assessment.

3.4.3 State Environmental Planning Policy No 55 – Remediation of Land

This SEPP introduces State-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

The land is to remain industrial in terms of zoning and land use and is suitable for the purposes of the GSCP facility. While there are no known areas of contamination on the MCS site, there is a small risk that contaminated soil may be excavated during the construction program.

A Site Contamination Management Plan was prepared by KBR for the proposal and is included in Appendix D. The Plan outlines the requirements to effectively manage and address this issue during construction.

3.5 LOCAL PLANNING INSTRUMENTS

The Marrickville LEP is a local environmental planning instrument for the purposes of the EP&A Act. The key aim of the plan is to make local environmental planning provisions for land in Marrickville.

Part 2 of the LEP provides the details of the relevant zoning for the local government area. Zone objectives and land use table information are provided for each zone. Land use is categorised into uses that may be carried out without consent, with consent or prohibited in the zone. Zone objectives for development that the consent authority must consider in their assessment are also provided.

Zoning of Land

Figure 3.1 shows that the site is included primarily within the General Industrial (IN1) zone with a narrow strip of the full width of the north-eastern frontage to Canal Road included within the Special Purpose (SP2) – Infrastructure zone. This small portion of the land forms part of a Classified Road and triggers referral under the Roads Act.

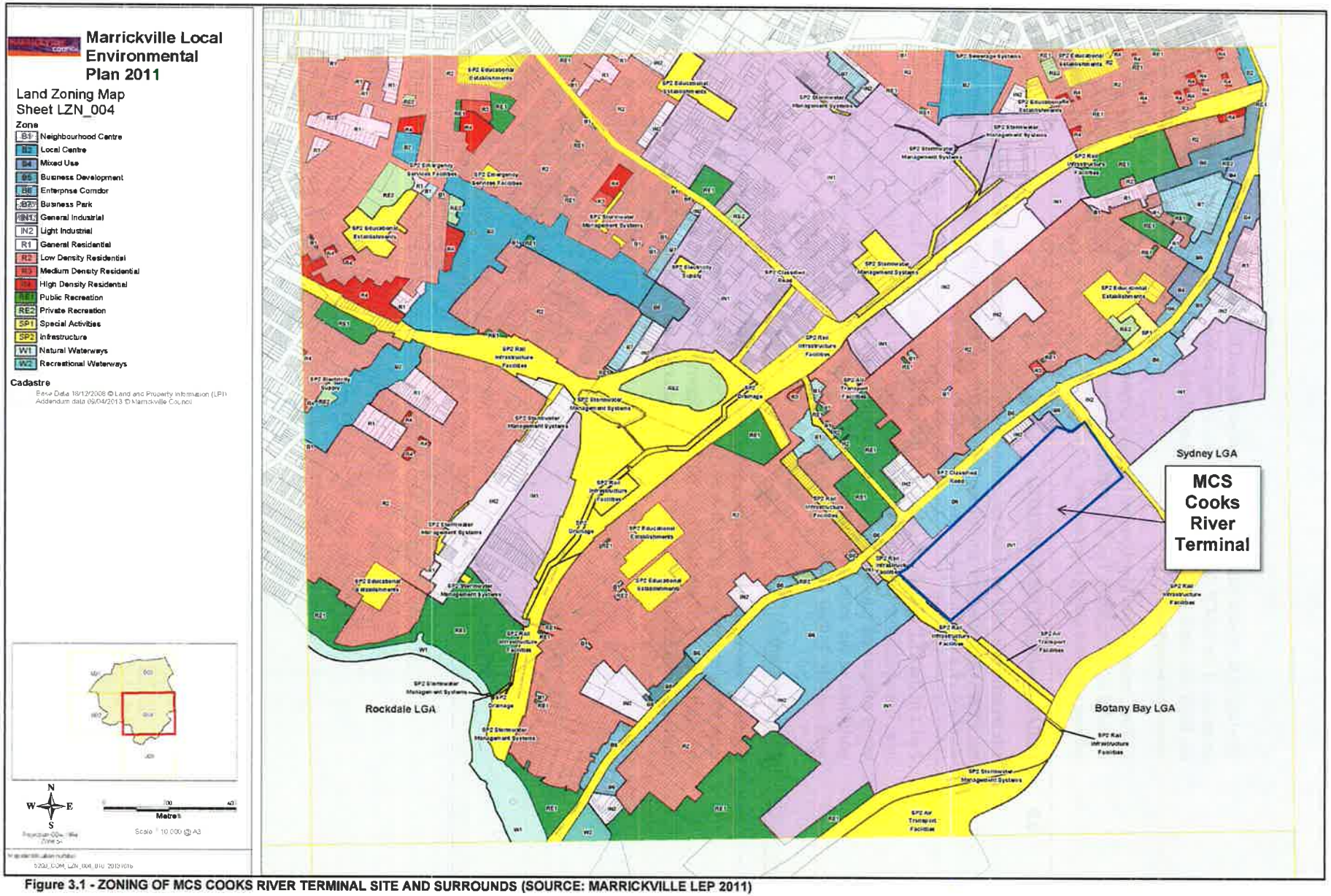

Figure 3.1 - ZONING OF MCS COOKS RIVER TERMINAL SITE AND SURROUNDS (SOURCE: MARRICKVILLE LEP 2011)

The proposal does not involve the SP2 zoned land for any other purpose than as road. While the application has been referred to Roads and Maritime for comment, no approval is expected to be required. A review of the proposal concludes that the points of access/egress to the site remain adequate to support the intended vehicle movements by road.

LEP Land Use Category

The LEP categorises land uses into those that do not require consent, those that require consent and those that are prohibited development in the IN1 zone. An assessment of the Proposal against the objectives and land use categories is provided in Appendix H-1.

LEP Provisions

There are several parts of the LEP that are required to be considered in assessment of the proposal. Part 6 of the LEP includes a number of 'additional local provisions' that apply to development. An assessment of the relevant provisions of the LEP is provided in Appendix H-1. Having considered the relevant provisions, the proposal is consistent with requirements of the Marrickville Council LEP. More specific assessment of criteria is also required to be undertaken for industrial related matters under Part 6 of the Marrickville Development Control Plan (DCP).

Marrickville Council Development Control Plan 2011

The DCP sets out a number of items that need to be addressed for a range of industrial development within the local government area. As stated in the DCP, development applications for a change of use or for alterations and additions to existing buildings may not comply with all the requirements of Part 6 and requirements elsewhere in this DCP. These development applications will be considered by the consent authority on their merits. An assessment of the proposal against the relevant provisions of the DCP is provided in Appendix H-2.

4 Environmental impact assessment

4.1 PRELIMINARY HAZARD ASSESSMENT

A Site Preliminary Hazard Analysis (PHA) was undertaken for the GSCP facility by Ahrens Group in August 2014 and is included in Appendix F.

A summary of the details, findings and actions arising from the study is provided below.

4.1.1 Methodology

The PHA was prepared in accordance with the NSW DPE publications *Hazardous Industry Planning Advisory Paper (HIPAP) No 6, Hazard Analysis* (DPI 2011) and DPE Multi Level Risk Assessment (2011). The purpose of the assessment is to ensure that the requirements of SEPP 33 are considered and that all risks associated with the development in terms of accidental loss scenarios and their potential for hazardous incidents are considered.

The main objective of the PHA is to show that the residual risk levels are acceptable in relation to the surrounding land use, and that risk would be appropriately managed. The following steps were undertaken as part of the PHA:

1. Preliminary Risk Screening.
2. Risk Classification and Prioritisation using the *Manual for Classification of Risk due to Major Accidents in Process and Related Industries* (IAEA, Rev 1 1996).
3. Analysis and Assessment of levels of risk, using a qualitative assessment.
4. Risk assessment of the level of risks identified in step 3.
5. Risk treatment, identifying a range of safeguards.
6. Development of ongoing monitoring and review measures.

The methodology is proposed to demonstrate that the GSCP facility can operate within acceptable risk levels in relation to its surroundings.

4.1.2 Assessment of Impact

A number of hazard scenarios were identified as discussed in Appendix G, Table 6.1. The hazard scenarios identified included:

- Deflagration in the wheat storage silo resulting in the ignition of wheat dust.
- Deflagration of the bag houses/filter system resulting in the ignition of wheat dust.
- Loss of power to the plant control system resulting plant shutdown.
- In the bucket elevators, deflagration resulting in a belt slip, generating friction leading to an explosion.

- Natural hazards, including storm events and lightning resulting in water contacting wheat in the silo causing spontaneous combustion and/or the ignition of wheat resulting in fire.

Each scenario was evaluated in terms of consequence and likelihood and a qualitative resultant risk. Based on the results of the qualitative assessment, a further quantitative analysis would not be required.

The qualitative risk assessment/hazard identification study identified a number of possible hazard scenarios of *high* initial risk due to unacceptable potential consequences and/or possible likelihoods that may result in impacts to surrounding land use without mitigation action.

These included:

- Deflagration of wheat dust in storage silo.
- Deflagration of wheat dust in bucket elevators.
- Deflagration of wheat dust in dust collector bag houses.

The location of the GSCP facility at a distance of least 300m to the site boundary, however, reduces the likelihood of off-site impacts. In a deflagration scenario, it is considered more likely that the silo would peel open and provide pressure relief. Additionally, considerable physical preventative engineering controls have been designed into the GSCP facility, to ensure the risk of wheat dust deflagration is minimised and as such is considered extremely unlikely to occur. The low dust hazard rating for wheat dust also suggests that in the unlikely scenario of an explosion, it would be unlikely to have any effect off-site.

None of the other hazard scenarios identified had the potential to present an unacceptable risk to the surrounding land users.

Adequate safeguards are required to ensure the hazard scenarios that were identified with potential off site impacts are contained and/or controlled to an acceptable level. The overall risk assessment determined the final risk for all hazard scenarios would be considered low with the implementation of the safeguards proposed as per Section 4.1.3 of this SEE.

4.1.3 Recommendations

The following recommendations were made for procedures and design considerations to be implemented that would mitigate risk scenarios as follows:

- Minimising build-up of combustible materials onsite.
- Minimising dust cloud formation.
- Ensuring all silos are electrically earthed.
- Fitting silos and dust collection systems and bucket elevators with explosion relief.
- Using antistatic bags in the bag houses.
- Providing dust protection to all electricity supply.
- Zoning areas appropriately to limit ignition sources associated with electricity supply (zone 20, 21 and 22 according to Australian Standards).

- Designing the plant to prevent dust explosions.
- Implementing a monitoring and maintenance program.
- Development of a comprehensive Safety Management System for the GSCP facility operation.
- Development of emergency management procedures for response to fire and explosion that may be initiated from either onsite or offsite sources.
- A hazard and operability study (HAZOP) is to be undertaken to assess further the risk posed by deflagration of wheat dust on site. The outcome of the assessment is to be incorporated in the design.
- Any additional measures listed in Appendix F, Table 6.1.

In addition to the above, the following is recommended:

- Emergency Response Training is to be provided to all staff in relation to the updated Emergency Response Plan and how to response to an emergency situation relating to the new pipeline operation.
- Any existing development conditions which apply to the site relating to health, safety and emergence response should be adhered to.

4.2 GEOLOGY, SOILS AND LANDFORMS

4.2.1 Existing Environment

The Cooks River rail terminal is located in St Peters, Sydney, and is bound by Alexandra Canal on one side. The topography of the Site and surrounding area is generally flat and low-lying, ground elevations are generally <5 mAHD, and gently undulating, with relief toward the Alexandra Canal watercourse which is situated approximately 400 m to the south-east of the site as shown on Figure 2.1. Alexandra Canal receives run-off from the local industrial catchment and flows in a south-west direction passed the Sydney Domestic and International Airport before entering Cooks River, and the greater Botany Bay.

The underlying geology of the Site is described in Environmental investigations (2007) report and can be summarised as follows:

The regional sub-surface conditions are described in the *Geology of the Sydney 1:100 000 Sheet 9130* (DMR, 1983) as a formation comprised of peat, sandy peat and mud. This formation is traditionally consistent with swampy low lying areas. The underlying geology of the site has been highly disturbed by human activity (Chapman and Murphy, 2002) this includes complete disturbance of the underlying soils at the site and large-scale fill importation. The fill is comprised of dredged estuarine sand and mud, demolition rubble, various quantities of ashy/coke material and other industrial waste including rocks, railway ballast and local soil materials (URS, 2006 and EI, 2007).

Acid Sulfate Soils

According to the 1:25,000 *Botany Bay Acid Sulfate Soil Risk Map* the site is located within an area identified as 'disturbed terrain' for which the presence of Acid Sulfate Soils (ASS) is unknown. Given that the site is situated on a landform with an elevation

of <5 mAHD, there is considered to be some risk that ASS may be present in the underlying soils. Previous investigations have indicated the presence of soils which have the potential to generate acid upon oxidation in the area of the proposed excavation works.

Contaminated Land

A search of the Office of Environment (OEH) contaminated land register returned only one result in the St Peters area, a site located approximately 1 km from the site at the corner of Campbell Road and Barrow Park Road. Despite this, the industrial nature of the site and the industry in the St Peters area, which includes a landfill, contaminated soil has been previously encountered at the Site. As noted in Appendix D-2, previous investigations across the site have detected elevated concentrations of Polycylic aromatic hydrocarbons (PAH)'s, Total Petroleum Hydrocarbons (TPH) and heavy metals at a number of locations (EI, 2007).

4.2.2 Assessment of Impact

Soil Impacts during Construction

Acid Sulfate Soils

The presence and exposure of ASS to the environment is another construction related soil impact. The potential for exposure of ASS is based on previous investigations summarised in the ASSMP (KBR, 2014b) (refer Appendix D-1). While there may be some soil types which have the potential to generate acid upon oxidation, the magnitude of the disturbance reduces the amount of material exposed. By employing the mitigation and management strategies described in the ASSMP, the exposure of ASS would be considered minor and low risk to the environment.

Contaminated Land

The proposed works are not considered to be of a scale which could have a significant permanent impact upon the soils or geology of the region. The excavation would only extend to approximately 3 mbgl and is likely to be limited to a small area and volume of approximately 400 m^3.. The proposed stormwater alignment may include some excavations to ~1.5/2 mbgl, these works, however, would not be undertaken at a scale which is considered significant. Impacts to soils would be restricted to the construction works associated with the pit and the stormwater realignment works. The excavated soils are likely to be characterised as unconsolidated sand deposits. The key risks are likely to be caused by the excavation works and exposure of contaminated soils with elevated concentrations of PAH's, TPH and heavy metals.

The exposure of contaminated soil can potentially lead to further contamination of the environment and indirect impacts on human health and biota. However, the potential for exposure of contaminated soil is limited to the excavation works and is considered of low to moderate potential to occur based on the data available. Furthermore, the excavation of contaminated soil could be managed through the implementation of standard best practice construction management. Mitigation and management of this impact is proposed utilising in the measures detailed in the CMP (KBR, 2014a), (refer to Appendix D-2) which if implemented effectively would minimise potential impacts to human health and the environment.

Soil Impacts during operation

Potential impacts during operation include leakages from the stormwater infrastructure to the surrounding soil, or a spill event which impacts soil onsite. The likelihood of a leakage occurring from stormwater infrastructure is rare and the consequence is considered minor, therefore impact significance is low. Similarly the likelihood of a spill impacting soil is rare as most of the site is covered with concrete and the consequence is considered minor, therefore impact significance is low.

4.2.3 Environmental mitigation measures

A number of mitigation measures have been included in the ASSMP and CMP in Appendix D1 and D-2 which should be implemented to minimise the potential for soil impacts during construction. The plans make reference to the following guidelines:

- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC).
- National Environment Protection (Assessment of Site Contamination) Measures 1999 (NEPM).
- Guidelines for consultants reporting on contaminated sites 1997.
- Acid Sulfate Soils Assessment Guidelines 1998 (ASSMAC 1998).
- Queensland Acid Sulfate Soil Technical Manual 2002 (Soil Management Guidelines).

The management and mitigation measures include stockpiling excavated spoil and characterisation on the site, to determine the concentration of any ASS or contaminants in the soil and the required disposal method. The CMP and ASSMP include stockpile management measures in line with the recommendations found in the Blue Book (Landcom 2004).

A construction management plan for the works should be prepared which includes the detail of a soil management strategy in line with the recommendations of the ASSMP and CMP. The details how excavated spoil would be managed on the site, including stockpile locations, the procedure for constructed bunding, and management of any run off that may contain sediment.

4.3 GROUNDWATER

4.3.1 Existing environment

The data available for the site indicates that there is a single aquifer system present under the MCS site. The aquifer is likely to be an unconfined aquifer within the regional Botany Sands formation which is likely to be shallow, only a few metres below ground level. The aquifer is described as being dominated by saline water and heavily influenced by tidal action (DPI 2013).

Due to the permeability of the sands and generally shallow water table, the aquifer has been impacted by historic contamination and the NSW government strictly monitors use. The proposed works are all to be completed within the site which is located within Zone 2 of the established management zones for the aquifer (DPI 2013).

A Groundwater Extraction Exclusion Area (Zone 1), known to be contaminated with chlorinated hydrocarbons, lies to the south east of the site. This area is actively managed by Orica and has not affected the groundwater conditions at the Site.

Previous investigations of the groundwater quality at the site have determined that the local groundwater contains elevated concentrations of Total Petroleum Hydrocarbons (TPH), nutrients (including Total Kjehldahl Nitrogen (TKN)), and ammonia (as N). Water levels at the site were reported between 1.6 and 2.0 mbgl, based on the topography of the site the groundwater level appears to be approximately 0 mAHD.

A majority of the soil analysed as part of the targeted Acid Sulfate Soil investigation returned low Electrical Conductivity (EC) values (typically 400 µS/cm) and alkaline pH, so it is not considered likely that the groundwater will be affected by ASS.

4.3.2 Assessment of Impact

Groundwater impacts during construction

The proposed works require the extraction of groundwater from the excavation for the below ground grain hopper. Preliminary modelling shows that the groundwater level is unlikely to fall more than 1.2 m at the site of the excavation, and <0.5 m at a radius of 40 m from the excavation. The stormwater works in places may intercept the Botany sands aquifer, but are unlikely to require significant dewatering during construction works. Overall, it is estimated that approximately 1 ML of water would be extracted during the five week construction period for the grain hopper at a rate of approximately 30 kL/day. It is anticipated that the drawdown of groundwater would have minimal impact upon the availability of groundwater and function of the aquifer.

Groundwater extraction in the area may lead to the oxidation of soils which may generate acid as a result of the disturbance. Based on the results of targeted acid sulfate soil analysis in the area did indicate the presence of these soils, however most of the soil in the area typically returned low EC values (typically 400 µS/cm) and alkaline pH, so it is not considered likely that the groundwater will be affected by ASS.

Key potential impacts from the interception of the aquifer include mismanagement of dewatering potentially resulting in release of contaminated water to the environment. The consequence of mismanaging extracted groundwater is dependent on the concentration of any contaminants. From groundwater investigations undertaken at the Site, it is understood that the key contaminants of concern are hydrocarbons (TPH) and nutrients (ammonia and TKN) (URS 2006). The release of groundwater with elevated concentrations of ammonia and TPH to the surrounding environment is considered to be of moderate consequence, and moderate likelihood; therefore the significance of the impact is considered medium. In order to reduce the significance of the potential impacts, it is necessary to consider appropriate dewatering management actions which would reduce the likelihood of release to the environment. By implementing dewatering management strategies outlined in the CMP (refer to

Appendix D-2), the likelihood of the release of contaminated groundwater can be reduced to rare and the significance of the impact to low.

A spill during the excavation works has the potential to impact the local groundwater. The consequence of the impact would be related to the nature and concentration of the contaminant spilled. However, given that the local aquifer is located within an existing groundwater management zone, it is considered that most spills would only be of minor consequence and the likelihood of a spill reaching groundwater would be unlikely. The significance of this impact is therefore low.

Groundwater impacts during operation

Impacts to groundwater quality during operation could occur as a result of leakages of stormwater into the surrounding soil, and ultimately the local aquifer. The nature and concentration of the contaminant would not be known, and thus the toxicity to flora, fauna or soil organisms would also be unknown. If the contaminant is able to bio-accumulate, it has potential to cause long term effects in the aquatic environment, however the likelihood and consequence of this impact is considered unlikely and minor respectively primarily as the existing aquifer is located in an established groundwater management zone. Significance of the impact is considered to be low.

4.3.3 Environmental mitigation measures

Based on the existing groundwater quality information (URS 2006) it is known that the issues in the groundwater include elevated levels of ammonia and TKN and some hydrocarbons. Mitigation measures to reduce environmental and human health impacts associated with groundwater extraction are included in the CMP and ASSMP in Appendix D-1 and D-2. The mitigation measures are summarised below:

The following measures should be implemented to minimise the potential for groundwater impacts:

- Follow the guidelines of the CMP and ASSMP which outline acceptable groundwater discharge criteria for a range of discharge scenarios.
- A groundwater management plan is to be implemented to manage any dewatering works in accordance with the CMP. The plan is to include suitable control measures for the collection, storage, treatment (as necessary) and disposal of contaminated groundwater that may be pumped from excavations during construction.
- Groundwater quality is also to be protected from further contamination which may occur during construction activity. For this reason a spill kit to be kept on site to manage any unexpected spills which may occur in the vicinity of any excavation.
- The CEMP is to include measures for managing spills during the excavation works to ensure they do not reach the groundwater.

4.4 SURFACE WATER

4.4.1 Existing environment

The closest watercourse to the site to be considered for discharge is Alexandra Canal. The Alexandra Canal feeds into the Cook River, which flows towards Botany Bay. Water quality within Botany Bay is heavily influenced by the tidal regime and the flow of freshwater into the bay, especially after large rainfall events.

The MCS Cooks River Terminal site receives external catchment flows from the Princes Highway and industrial sites to the north-west (refer to Appendix I, Figure 1). Two main drainage lines traverse the site in a north to south direction draining both upstream catchment flow and runoff from with the container depot:

- Line 1 drains a catchment area of approximately 3.9 ha upstream of the site, draining two recycling depots located immediately north-west of the container depot.
- Line 2 drains a catchment area of approximately 7.5 ha upstream of the site, including flow from the Princes Highway and Talbot Street.

Overflows from Line 2 arriving at the site boundary near Talbot Street predominantly flow toward Line 1 due to topography. A small portion of the site (less than 0.2 ha) drains towards Canal Road to the north-east of the site.

The remaining 17.1 ha drains southwards towards the Sydney Airport Corporation Limited (SACL), before eventually discharging into Alexandra Canal 350 m to the south.

Alexandra Canal is located in an industrial area and receives runoff from all stormwater drains in the area. Publically available reports have suggested that a number of toxicants, heavy metals and organochlorine compounds have been identified in elevated concentrations along with high concentrations of oil, grease and PAH's (PPK Environment and Infrastructure Pty Ltd, and Webb, McKeown and Associates Pty Ltd 1999). This report describes Alexandra Canal as having one of the poorest water qualities in the Cooks River catchment.

The Cooks River itself is reported to have an elevated concentration of nutrients, with sources of phosphorus and nitrogen found in sewage discharge and stormwater. Water quality reports also indicated that records of > 20 mg/L of chlorophyll-a had been observed within the collected samples, along with faecal coliforms noted in the river (SKM 2005).

4.4.2 Assessment of impact

Surface water impacts during construction

The proposed works includes changing the configuration of overland flow at the site, but the final destination would remain the Alexandra Canal for a majority of the stormwater shed from the site. The construction activity includes the stockpiling of excavated material, and general movement of soil on site which has the potential to impact surface quality water on the site. Potential avenues for degraded surface water quality during construction include:

- Sediment laden stormwater run-off from stockpiles (including contaminated spoil), exposed earthworks or sediment on paved surfaces and groundwater dewatering.
- Uncontained cement, chemical or diesel/fuel spills.
- Discharge of untreated extracted groundwater to stormwater system.

Sediment-laden or contaminated run-off releases into the local environment in particular have the potential to degrade the water quality of the receiving environment. These impacts are likely be localised and it is not anticipated they would have a significant impact on sensitive habitats/communities in the region with the effective implementation of best practice site management. Management measures as discussed in Section 4.4.3, would reduce the likelihood off run-off from the construction site and reduce the potential for impact upon water quality to low. The impact of releasing contaminated groundwater to the environment may impact receiving waters such as Alexandra Canal. This impact is discussed further in Section 4.3.2.

Where refuelling is required for construction equipment on site, this would occur at the existing MCS refuelling area located on the site, which is self-bunded. As such, the potential for spills during refuelling is considered low. Provided existing management practices are continued during construction, the significance of the risk is considered low.

With the presence of construction works, there is an increased potential for cement, fuel or chemical spills to enter the waterway from the MCS Cooks River Terminal site. The effective implementation of mitigation measures for the storage of chemicals and construction site and spill management, would adequately manage this potential impact and the subsequent likelihood of off-site impacts upon water quality from spills is considered low.

Surface water impacts during operation

The operation is not anticipated to result in an impact to surface water quality in Alexandra Canal outside of the existing operations at the site. However, activities associated with the movement of grain and general operations have the potential to generate spills if grains and chemicals are not appropriately managed, stored and contained during the operation of the GSCP facility. Spills have the potential to enter into the stormwater system for the GSCP facility and may result in potential off-site impacts upon water quality. In the event of any spill that may pose a potential pollution hazard, vigilant spill mitigation measures would be employed in accordance with the existing MCS operational management plans.

4.4.3 Environmental mitigation measures

Best practice measures for the management of run-off from the site should be put in place as part of standard site management as follows:

- Systems are to be put into place (if not already existing) during construction and operation to prevent pollution of waters. This should include procedures for handling, transport and storage of liquids.
- Appropriate stockpile locations and management procedures in line with the *Blue Book* (Landcom, 2004) should be outlined in the construction management plan.

- All machinery and equipment to be checked daily and maintained to ensure there are no oil, fuel or other liquids leaking.
- A spill kit to be kept on site to manage any unexpected spills at all times.
- Refuelling should only occur in the designated MCS refuelling area
- Tracked mud/sediment is to be controlled and cleaned up on site.

During the operation of the GSCP facility, the following should be implemented:

- Strict procedures should be put in place for the management of any grain spills within the system to ensure that grain does not enter the stormwater system.
- Existing procedures for spill management should be continued on site.

4.5 FLOODPLAIN RISK

A floodplain risk assessment was completed for the MCS Cooks River Terminal in 2010 prepared by WMA Water and is provided in Appendix I. The following sections are a summary of this report relevant to the Proposal.

4.5.1 Existing Environment

The MCS Cooks River Terminal site is relatively flat, with the majority of ground levels being between 2.0 m Australian Height Datum (AHD) and 3.5 m AHD. The majority of the site is covered by hardstand areas with bitumen roads skirted by concrete aprons for container storage. Many of the inlet pits that receive runoff from the eastern part of the Terminal lie along the railway lines, and connect to drainage pipes running under the hardstand areas of the site. At several locations on site, the placement of containers along drainage paths or above inlet pits is unavoidable.

A description of the surface water behaviour at MCS Cooks River is provided in Section 4.4.1.

The modelled performance of the stormwater system on site suggests that it has a 1 year Average Recurrence Interval (ARI) capacity and that significant overflows result from the upstream catchment for events larger than the 1 year ARI.

Furthermore, due to the flat nature of the site and its proximity to the Alexandra Canal, the site drainage system is influenced by the tail water conditions in the Canal during a 1 in 100 year ARI event. Elevated water levels in the Alexandra Canal are caused by flooding or high tide or ocean levels. The estimated flood level during the 100 year event would be between 2.4 and 2.6 m AHD. Areas of the southern portion of MCS Cooks River Terminal would be inundated and the time that stormwater remains ponded on site would increase.

Ponding occurs at the low spots along the main branch of Line 1, at Pits 7 and 77 (refer to Appendix I, Figure 1), during all modelled stormwater events and as confirmed on site by MCS staff. Flooding is reported by council to occur on Canal Road. However, this is not contributed to greatly by run-off from the Terminal.

4.5.2 Assessment of Impact

The RISK Hydraulic modelling of the site drainage system indicates that the risk of floodwaters ponding to a depth greater than 0.5 m occurs in various parts of the site approximately once per year on average.

During construction, health and safety issues such as to personnel, damage to buildings, plant and equipment and disruption of works and existing operations on site would require management. Potential health and environmental risks would occur through wading through flood waters resulting in personal injury or death and contamination of surface water through chemicals, toxins or mobilised sediment mixing with flood waters. Although the consequences could potentially be severe if not managed effectively, the likelihood of them occurring is considered relatively low.

The risk of flooding on site also has the potential to damage tools and equipment located at ground level and machinery, mobile plant, trucks and cars utilised on site for construction. However, considering that flooding would generally be shallow and slow-moving, it is unlikely there would be any risk of damage to large plant, trucks and machinery. Measures to prevent the ingress of flood waters into construction areas would also be required for active areas. Flood mitigation measures would be required to prevent damage to cars, materials and tools as proposed in Section 4.5.3.

The flood assessment also identified that there is a risk that containers may become buoyant on site and may pose a risk to people working nearby. As the Terminal would remain active during construction, the construction team should adhere to any procedures adopted for flood mitigation and cease work during heavy rain and/or wind.

Floodplain risk Impacts during Operation

The GSCP facility is located adjacent to the main site trunk drainage line where flooding occurs. The Assessment identifies that this area may be subject to flooding of approximately 0.4 m during a 5 year ARI storm event. The facility is designed to ensure the free flow of overland flows in this area and to ensure that all electrical work and expensive equipment is located a minimum of 0.5 m above the flood level.

A stormwater drainage system has been designed to capture and manage stormwater generated by the GSCP facility in accordance with council and best practice stormwater management requirements. It is not anticipated that the proposal would have an additional impact upon floodplain risk at the MCS Cooks River Terminal site.

The existing Floodplain Risk would apply to the site as per the existing MCS Operations and as such, the equivalent risk to personal safety, operations and property would remain during the operation of the GSCP facility as per the current situation. Provided the mitigation measures presented in Section 4.5.3 are implemented, the resulting risk to property, operations and worker safety would remain low during operation.

4.5.3 Environmental Mitigation Measures

The following measures are proposed to minimise impacts from flooding on site during the construction and operation the Proposal:

- MCS and construction team should adhere to the recommendations outlined in the Floodplain risk Management Plan, in particular to the following strategy proposed in the Plan for managing flood risk:
  - Ensure that adequate information of the potential risks is provided during site induction.
  - Implement video surveillance of known flood problem areas so that flood hazards can be identified in real time.
  - Provide adequate warning systems (such as sirens or loudspeakers) to communicate flood hazard to site personnel, and signal work stoppage and/or evacuation if required.
  - Avoid circumstances whereby wading or driving through ponded water is required.
- Implement a 'One-Stop' shutdown in severe weather conditions. The level of flooding at which operations should cease is at the discretion of MCS management, but should prioritise staff safety. If at any time staff cannot perform their duties without being subject to flood hazard, shutdown should be considered.
- Where possible, critical or expensive equipment should be placed above the expected 100 year ARI flood level plus 0.5 m freeboard. For buildings onsite (with the exception of the building adjacent to Pit 77) a level of 1.0 m above ground level is recommended for such equipment.
- Electrical circuits should either be placed above the flood planning level as for critical equipment above (preferred), or should be installed in such a way that it is fail-safe when inundated (i.e. such that there is risk of electrocution due to inundation is minimised). Electrical circuits should be certified as meeting these requirements by a suitably qualified electrician.
  - Car parking should be discouraged or prevented in areas where flooding is known to occur to a depth greater than 0.3 m on a regular basis (more than once per year). If carparking is permitted in such areas, signs should be shown prominently, warning of the possibility of flood damages occurring and of the liable party for such damages.
  - Implement floodwater protections / diversions around active construction areas to ensure that floodwaters do not encroach on construction works.

4.6 BIODIVERSITY

4.6.1 Existing environment

The proposed works are located on an existing land which is industrialised. Some landscaping exists on the site, which consists of a small number of planted trees along Canal Road.

The natural vegetation has been removed entirely from the site for urban construction. Although vegetation is present on land nearby to the Proposal site it is highly degraded as the locality is highly disturbed by industry and airport. The nearest parkland to the site is Sydenham Green, located 500 m north-east of the site and an area of unnamed open space located 50 m south of Sydenham Green.

Some planted native vegetation exists along the Alexandra Canal, located less than 500 m south of the Proposal and along the Metropolitan Goods Line corridor. The ecological health of the Alexandra Canal, which drains into the Cooks River is reported by Marrickville Council (2012) as poor, with low diversity and abundance of ecosystems compared to other estuarine systems in the Sydney region.

The EPBC Act Protected Matters Search conducted (refer to Section 3.2), recorded 49 invasive species within one kilometre of the Proposal. 20 weed species of national significance (WoNS) were noted, along with other introduced plants. The search also noted feral animals such as Red Fox, Cat, Rabbit, Mouse, Rat and Cane Toad and 13 invasive bird species. Threats to biodiversity noted in the *Marrickville Council Biodiversity Strategy 2011 -2021* include exotic pests and companion animals, illegal land management practices, poor water quality and predation by cats and foxes (Marrickville Council 2012).

A search of the NSW DPI (Primary Industries) register of noxious weeds undertaken in September 2014, also returned over 100 weed species, including those which are recognised as WoNS.

4.6.2 Assessment of impact

Biodiversity impacts during construction

No impacts upon the local biodiversity are anticipated during the construction and operation phases of the Proposal as the immediate works area does not contain any vegetation that requires removal.

Potential impacts of the proposal to generate off-site impacts upon water quality through erosion and sedimentation of potentially contaminated and acidic soils are discussed in Section 4.2 to Section 4.4. These impacts have the potential to cause impacts upon the receiving water biodiversity through surface water run-off and groundwater contamination and contribute to the poor quality health of the Cooks River. These impacts are considered low to negligible risk provided the mitigation measures proposed in Section 4.2.3, 4.3.3 and 4.4.3 are effectively implemented.

Biodiversity impacts during operation

Correspondence received by Marrickville Council from the SACL (refer to Section 3.2.2), identified the potential for the new GSCP facility to attract birds and other wildlife to the area as a safety concern. This consideration is identified with respect to protection of wildlife, the safe operation of aircraft and facility itself. Wildlife and feral animals may be attracted to the facility due to the presence of a potential food source.

The design of the Proposal has been developed as a predominately enclosed facility to avoid the facility becoming an attractant to wildlife. Nevertheless, mitigation measures are recommended for operation to ensure that this risk to wildlife and safe operation of the GSCP facility and aviation safety would be minimised.

4.6.3 Environmental mitigation measures

Management of site run-off and protection of groundwater would be in accordance with standard mitigation measures as detailed in Sections 4.2.3, 4.3.3 and 4.4.3 and would minimise risk to biodiversity.

The following measures are proposed to avoid biodiversity impacts during the operation of the Proposal:

- Strict procedures should be put in place for the management of any grain spills within the system and waste grain product to ensure that wildlife and pest animals are not attracted to the GSCP facility and grain does not enter the stormwater system.
- In the event that flocks of birds or other wildlife are attracted to the area which may impact upon aviation safety or the safe operation of the GSCP facility, a Wildlife Management Plan (WMP) is to be developed by a specialist in wildlife management.

4.7 AIR QUALITY AND ENERGY USE

4.7.1 Existing environment

The air quality in the surrounding area is subject to frequent fluctuations, heavily influenced by a number of key sources, including the industry in the area, high volume of local road traffic on the Princes Highway and the proximity of the airport.

The Regional Air Quality Index (RAQI) for the Marrickville LGA is covered by the Sydney East Regional data (Marrickville Council 2012). The RAQI is based upon data for Nitrogen dioxide (NO_2), Sulfur dioxide (SO_2), Ozone (O_3), Particles (PM_{10}), Carbon monoxide (CO), and visibility. A review of the records from 2007–2011 showed that the air quality index has generally been improving since 2008, although the index remains steady around 50–70, which is a rating of 'Good' to 'Fair'. In the 2010/2011 period, the rating was 'Good' throughout the year, and fewer air quality complaints were received by council during this period (Marrickville Council 2012).

The nearest sensitive receivers, including commercial with outdoor seating and residential areas are located approximately 300 m away to the north-east of the Proposal on Bellevue Street and on the Princes Highway, 500 m away to the north as shown on Figure 2.1.

4.7.2 Assessment of Impact

Air quality and energy impacts during construction

An increase in airborne particulate matter from either dust or vehicle emissions may arise during the construction stage. This is likely to be particularly during periods of low rainfall and periods of high winds (greater than 30 km per hour), which are predominately from the south and in the afternoon (BOM 2014). Dust generation is likely to be negligible if properly managed and localised given that access to and from the site is along bitumen roads and the excavation activities that expose soil would be relatively minor and short-term. Dust would also require management for any temporary spoil stockpiles that would be used to store excavated soil.

Diesel fuel is likely to be the primary fuel used in construction equipment and greenhouse gas emissions during construction are likely to be produced from the direct combustion of diesel fuel in vehicles during the transportation of materials and personnel to the site and from machinery used during works.

The majority of tools on site would be powered by battery, with diesel generators potentially to be utilised for equipment such as lighting for works at night. Machinery to be employed, such cranes and excavators would be a mixture of fuels and would generate emissions from the combustion of fuels. The transportation of materials and personnel to site would contribute negligible emissions upon the existing air quality. Furthermore, the construction works are unlikely to create a significant short-term demand for energy due to the types of equipment and machinery selected and finite construction period.

An increase in construction traffic and plant in the general area would contribute to a localised increase in diesel emissions but is unlikely to significantly impact any nearby sensitive receivers. Given the limited scale of the proposed works, in context of the overall emissions in the area, distance to sensitive receivers and the presence of adjacent land use (container storage), the consequence of any impact is considered minor.

Air quality and energy use impacts during operation

The Proposal is unlikely to generate any air quality impacts on the surrounding environment during operation. The hopper would be permanently enclosed and fitted with three separate bag filter units to ensure that any dust generated during the process is captured. All filters installed would be made to comply with Australian Standards and the system designed to shut down in the event of failure to ensure that there would be no adverse effects upon the environment.

Dust suppression equipment would also be employed during the transfer of grain from the packing silos to the 20 ft containers to be loaded. The Proposal is also anticipated to generate a reduction in truck movements (refer to Section 4.10) for the MCS Cooks River Terminal site, which would have an indirect minor improvement in air emissions. As such the MCS operation is unlikely to generate any additional air quality impacts as a result of the new GSCP facility.

The GSCP facility would generate a greater demand for electricity. MCS has identified this and are consolidating and upgrading the electricity supply through Talbot Street which has been undertaken as part of a separate assessment and scope of works. Currently there are two supply points, one of which is underground and the other aboveground both at Talbot Street. The proposed upgrade would replace both these supply points with a single underground supply point drawn from the high voltage network on Talbot Street. A new substation which is under detailed design will be located within the MCS Cooks River Terminal.

4.7.3 Environmental Mitigation Measures

The following measures should be implemented to minimise the potential for air quality impacts:

- Best practice dust management practices to be included in the construction management documentation. These should include procedures for stockpile management and dust management during excavation, particularly during dry and windy weather conditions.
- Vehicles to be maintained and operated efficiently, be serviced according to the manufacturer's specifications and be fitted with emission control devices complying with Australian Design Standards so as to minimise air emissions (including greenhouse gases).
- Work machinery to be turned off when not in use and not left running or idling.
- Vehicles moving on exposed soils should be monitored for dust generation.
- Any sediment tracked onto sealed surfaces should be removed as soon as possible to minimise the potential for dust generation.
- Dust suppression equipment complying to Australian Standards should be installed in to the GSCP facility.

4.8 NOISE AND VIBRATION

A noise emission assessment and aircraft noise intrusion assessment for the operation of the Proposal has been completed by Acoustic Logic and are included in Appendix C and Appendix J. The following is a summary of the assessment.

4.8.1 Existing Environment

The MCS Cooks River Terminal is located in a predominately mixed use industrial and commercial area, bounded in the east by residential properties. The nearest sensitive noise receptor are the residences located on Bellevue Street, 300 m north-west of the Proposal, as shown on Figure 2.1.

Unattended noise monitoring was undertaken at the closest point to the residential receivers, in the north- western corner of the site as shown on Figure 2.1. An Acoustic Research Laboratories Pty Ltd noise logger was utilised to monitor noise levels over 15 minute intervals from 3 July 2014 to 10 July 2014. The full records are provided in Appendix J. Table 4.1 shows the calculated rated background noise levels at the noise monitoring location. The assessment shows that the background noise levels are typical of an urban / commercial area and night-time levels reflect the absence of businesses which operate during day periods.

Table 4.1 Rated Background Levels

Time Period	Day Period 7 am to 6 pm – dB(A) (L_{90})	Evening Period 6 pm to 10 pm – dB(A) (L_{90})	Night Period 10 pm to 7 am – dB(A) (L_{90})
Background Noise Levels dB(A) L_{90}	54	51	46

4.8.2 Assessment of Impact

Noise and vibration impacts during construction

The construction phase of the Proposal may generate additional noise and vibration due to the following activities:

- Movement and operation of work trucks, supply vehicles and workers vehicles to and from the site.
- Use of generators and compressors.
- Breaking and cutting of existing concrete hardstand (using electrical saws / hammers) prior to excavation works.
- Excavation works (including the use of excavators and hand digging machinery).

The activities most likely to generate the highest amount of noise or vibration impacts are during the concrete breaking and excavation works. The concrete-breaking and cutting works in particular, have the potential to generate disturbance upon the residences in the local area in the short-term. However, given the short-term duration of concrete breaking and subsequent excavation works, the disturbance is likely to be of low significance and could be managed in accordance with the standard measures proposed in the EPA (formerly DECC) *Interim Construction Noise Guideline* (DECC, 2009). In order to minimise impacts upon nearby residential receivers it is proposed that the concrete breaking and excavation works would be undertaken during week days and during standard construction hours.

Vibration from the excavation works is not anticipated to be a significant issue due to sufficient distance between sensitive receivers. MCS would also consider the proximity of containers and any impacts to the stability of containers stacked nearby as part of the operational planning, although the small scope of works are unlikely to have any adverse effects.

In order to undertake works utilising the 100 t crane, works would be required to be undertaken outside of airport hours as the work would breach the OLS, which is protected by the Commonwealth from intrusion and interference. These hours are between 11.00 pm and 6.00 am. Works planned to be undertaken during this time would be low noise-generating activity, including the use of the crane and installation of the silos. Works would be limited to two to three consecutive nights and would require 15 nights of work. Provided the mitigation measures detailed in Section 4.8.3 are implemented, it is not anticipated that these activities would generate a significant disturbance upon the nearest sensitive receivers.

Noise and vibration impacts during operation

Noise impact assessment

Several noise criteria were adopted to assess the potential impact of noise the Proposal upon the surrounding environment during operation. Vibration was not considered an issue because the operation of the Proposal is unlikely to generate any noticeable levels of vibration.

Noise criteria were derived from NSW *Environment Protection Authority – Industrial Noise Policy (EPA-INP)*, as referenced by the *Marrickville DCP 2008*. The two criteria to be addressed under the EPA-INP were the intrusive criteria and the amenity criteria. The intrusive noise criterion requires that predicted noise emissions measured using $L_{eq(period)}$ descriptor do not exceed the background level by more than 5 db(A) at the nearest residential receiver(s). The amenity criteria selected is based on the category of residential receiver, which for this Proposal is considered urban and is also measured using the $L_{eq(period)}$ descriptor. Appendix J, Table 3 shows the amenity noise goals set during Day, Evening and Night periods in residential areas and commercial/industrial when in use.

A further criterion was assessed, which was sleep arousal, as the GSCP facility is proposed to operate 24 hours. The EPA-INP has a two-step process for the assessment, with the first step setting an emergence level that is set as no more than 15 db(A) above the rated background level outside a residential bedroom between 10.00 pm and 7.00 am. As the rated background noise level between 10pm and 7 am at potentially affected residential properties is 46 db(A) (refer to Table 4.1), this emergence level is set at 61 db (A) $L_{1(1min)}$.

The second step in the EPA-INP is to set a maximum internal noise goal in the event that noise events could exceed the emergence level. This is derived from Appendix B of the *EPA Environmental Criteria for Road Traffic noise* (EPA 1999). Appendix B states that maximum internal noise levels below 50-55 dBA are unlikely to cause awakening reactions and that one or two noise events per night with maximum internal noise levels of 65- 70 dBA are not likely to affect health and wellbeing significantly. For the purposes of this Proposal assessment, the maximum internal noise goal is set at 55 db (A).

Operational noise measurements were based upon a similar facility in Elmore, Victoria. The most noticeable noise sources were the diesel generator of the conveyor belt and the use of a front loader. The *predicted* noise levels (measured in $LA_{eq(period)}$ units as stipulated in the EPA-INP) at receivers were calculated for the 'worst case scenario' with both the front loader and diesel generator being utilised together and are shown in Table 4.2. The criterion selected is for the conservative 'night-time' criteria scenario (10.00 pm to 7.00 am) and shows that the predicted noise levels from the GSCP facility measured are predicted to fall within the EPA-INP criteria.

Table 4.2 Predicted Noise Levels at the conservative 'night-time' criteria scenario (10:00 pm to 7:00 am period)

Location	Predicted Noise Level dB(A) $L_{eq(Period)}$	Amenity Criteria dB(A) $L_{eq(Period)}$	Intrusiveness Criteria db(A) $L_{eq\ (15\ min)}$	Predicted to be within criteria
Residential Receiver 1 Bellevue Street	40	45	51	Yes
Commercial Receivers Northern Boundary	51	65	N/A	Yes
Industrial Receiver Southern Boundary	63	70	N/A	Yes

The emergence test was also undertaken to determine potential sleep disturbance at the nearest residential receiver. The loudest typical peak noise event is the truck braking system, which is likely to generate a noise level of 110db (A)$L_{1(1min)}$. Table 4.3 shows that all peak noise events associated with the operation of the GSCP facility would comply with the sleep arousal acoustic goals.

Table 4.3 Sleep Arousal Emergence Test

Receiver Location	Noise Source	Predicted Noise level	Emergence Acoustic Criteria	Predicted to be within criteria
Bellevue Street	Brake Air release valve from truck at GSCP facility	52 dB(A) $L_{1(1min)}$	61 dB(A) $L_{1(1min)}$	Yes

As such, no acoustic treatment is required at the GSCP facility or at the residential receiver to mitigate noise generated by the facility.

Aircraft Noise Intrusion Assessment

An aircraft noise intrusion assessment (refer Appendix C) was undertaken for the Proposal as the GSCP facility would be located within the Australian Noise Exposure Forecast System (ANEF) contours, between 25 and 40 based on the Sydney Airport ANEF 2029 contour map. The assessment as undertaken in accordance with the Australian Standard AS *2021–2000 Aircraft Noise Intrusion – Building Siting and Construction.*

A number of acoustic treatments were recommended for compliance with indoor noise level recommendations in the AS 2021-2000 and these are discussed in Section 4.8.3.

4.8.3 Environmental mitigation measures

The following measures should be implemented to minimise the potential for noise and vibration impacts during construction:

- The NSW EPA *Interim Construction Noise Guideline* (DECC, 2009) to be used to inform the management of construction noise. Safeguards recommended in the guide should be incorporated into the construction management documentation.
- The noisiest activities are to be scheduled during recommended standard hours (DECC, 2009) of 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 1:00 pm on Saturday.
- Nearby commercial and industrial properties to be notified of works.
- Noise generated by work equipment to comply with noise control standard AS 1055.
- Works involving noise-generating machinery should be undertaken within the shortest possible timeframe, with minimum delays. All efforts should be made to schedule the noisier work activities during the daytime on week days.
- Noise treatment strategies should be nominated in the construction management document for night-time works. This should be implemented on site where appropriate and may include:

- Equipping all machinery and vehicles with silencers.
- Minimising loud verbal communication and noisy radio use.
- Minimising metal to metal impacts.
- Construction vehicles should be allocated designated routes, parking locations and delivery hours in a manner that minimises noise disturbance to the local community.

In order to ensure the GSCP facility complies with AS2021 (refer to Appendix C for more detail), the following must be implemented as part of the design:

- Glazed windows and (glassed) doors must be applied with acoustic seals of thickness and STC rating in accordance with AS 2021.
- No vents are to be places on the internal skin of external walls and all penetrations should be acoustically sealed. The light-weight wall construction recommended is shown in Appendix C.
- Construction Penetrations in ceilings (such as for light fittings, etc.) must be sealed gap free with a flexible sealant. Any ventilation openings in the ceilings are to be acoustically treated to maintain the acoustic performance of the ceiling construction. The recommended roof/ceiling construction for office space is shown in Appendix C.
- An alternative outside air supply system or air conditioning system in accordance with council noise requirements is to be installed.

4.9 HERITAGE

4.9.1 Existing environment

A search of the Heritage schedule of the Marrickville LEP 2011, the Aboriginal Heritage Information Management System (AHIMS) and the Australian heritage database was undertaken as part of this assessment. There are no known Aboriginal cultural heritage sites or declared places within 200 m of the proposed pipeline route (AHIMS, 2014).

There are also no known European heritage sites listed on the State Heritage Register within 500 m of the Proposal. Five heritage items of local heritage significance listed under Schedule 6 of the Marrickville LEP 2011 are located within 500 m of the Proposal, however, none of these items or associated land, buildings or structures are within close proximity to the MCS Cooks River Terminal.

The Australian Heritage Database also lists Alexandra Canal on the Interim List and the Sydney (Kingsford Smith) Airport Group.

There are no local heritage conservation areas identified near the Proposal.

In May 2006 Conybeare Morrison International (Conybeare) prepared a Heritage Impact Statement for NSW Ports. A number of items were identified to have heritage significance on the site, including:

- Cooks River Container Terminal.
- Pre-cast Concrete Hut 1.

- Pre-cast Concrete Hut 2.
- Former Station Masters Office.
- MCS HR&T Site Administration Building.
- Lay down points lever.
- Electric Overhead Travelling Crane.
- Self-propelled Travelling Crane.
- Remnant Signage.

The following items are listed on NSW Ports Section 170 Heritage Register:

- Cooks River Container Terminal (the entire MCS site).
- Pre-cast Concrete Hut 1 (located near the Canal Road boundary fence).
- Pre-cast Concrete Hut 2, (located near the Canal Road boundary fence).
- MCS HR&T Site Administration Building, (adjacent to the current administration building).
- Lay down points lever (located on one of the rail sidings).
- Electric Overhead Travelling Crane (located above the southern-most rail siding).

The report by Conybeare Morrison (2006) also noted that the Cooks River Terminal has Aboriginal archaeological potential below the 1.0–4.4 m fill layer and European archaeological potential due to its variety of past use since 1804, including farming, army, residential, wool storage and goods yard.

4.9.2 Assessment of impact

The Proposal site is located at the Cooks River Terminal, which was first established in 1947 as a goods yard. It is considered an integral part of the Sydney Goods Rail System and a number of items on the site are of heritage significance as noted in Section 4.9.1 (Conybeare Morrison 2006).

The Proposal is complementary to the existing use as a goods storage and rail yard and would not disturb the overall heritage significance of the site. Accordingly, NSW Ports determined that as Statement of Heritage Impact (SoHI) would not be required for the Proposal.

The items identified on site including the two concrete huts, administration building, laydown points level and Electrical Overhead Travelling Crane would be avoided for the proposed construction works. In order to ensure the works would not result in any accidental damage upon these items, the construction team would be made aware of their location and no-go zones established around these items for the duration of works.

Works utilising a crane could have the potential to damage the Electrical Overhead Travelling Crane if the appropriate controls are not in place during the works. Standard Health and Safety best practice measures to establish exclusion zones would ensure the potential for damage is avoided during crane use.

Items which are listed on the Marrickville LEP 2011 within 500 m, but not located on the Proposal site, would not be impacted by the proposed works are they are confined to the balance land for the MCS Cooks River Terminal.

The works would involve excavation for the establishment of the hopper and hardstand area. Given the highly disturbed nature of the site and the disturbance involved with the construction of the goods yard, the presence of unknown Aboriginal or European artefacts that could be disturbed during works is considered low. Nevertheless, measures to manage unexpected discovery of artefacts would be incorporated in the construction documentation for the project.

4.9.3 Environmental Mitigation Measures

The following measures should be implemented to minimise the potential for heritage impacts:

- In the event that Aboriginal or European artefacts are discovered during works, all works should cease in the vicinity of the find and the construction team should notify MCS and NSW Ports for further advice.
- MCS should advise the construction contractor of the location of European Heritage items on site.
- Construction works, machinery and access tracks should be restricted to the delineated work boundaries.
- The worker project induction should include information regarding the heritage significance of the site and identify the exclusion zones surrounding the heritage items on site.
- Exclusion zones must be adhered to at all times.

4.10 TRAFFIC AND TRANSPORT

A traffic impact assessment for the Proposal has been completed as is included in Appendix K. The following is a summary of the assessment.

4.10.1 Existing Environment

The MCS Cooks River Terminal site is accessible from three locations as follows:

- Signalised intersection which caters for all movements to and from Canal Road.
- A left in/left out access approximately 50 m north of the signalised access on Canal Road.
- Access from Talbot Street which leads to a signalised intersection with Princes Highway.

The site and access locations are shown in Figure 2.2. Access 1 and 2 are provided from Canal Road which is under the care, control and management of Roads and Maritime. Access 3 is from Talbot Street for which Marrickville Council is the road authority.

Existing site movements

Appendix K, Table 2.1 shows the site vehicle movements from a previous survey data of the site in 2010, calculated over a period of 24 hours. In 2010, the site generated a total of 2,047 vehicles over a 24-hour period which included 486 light vehicles and 1,561 heavy vehicles.

Detailed data on the total monthly containers moved by road was also provided by MCS from November 2010 to September 2013. Total data (ins and outs) is summarised in Appendix K, Figure 2.2. Between November 2010 and the end of September 2013, the total container traffic moved by road increased by 2.9%.

Although total container traffic has increased, information provided by MCS indicates that the percentage of larger capacity B-Double trucks (which can carry 3 TEUs compared to semi-trailers which typically carry 2 TEUs) servicing the site increased from approximately 10% in 2011 to approximately 30% in 2013. As such a greater number of containers can be moved by fewer trucks. Therefore, it can be assumed that the daily vehicle movements associated with the site are approximately equivalent to 2010, that is, 1,561 truck movements per day (in and out) and 2047, total movements (in and out).

Car parking is provided on-site, with a total of 197 spaces provided in these areas for staff and visitors. A maximum of 173 staff are on site at any one time. Bicycle parking is provided near the administration building as well as shower facilities.

An existing traffic management approval is in place for MCS Cooks River Terminal site, as noted in the *Traffic & Car Parking Assessments for Cooks River Freight Terminal Canal Road, St Peters, June 2007*, (Transport & Urban Planning 2007). This approval states that 'the Traffic Management Plan is approved for a maximum of 2,500 commercial movements (600 trucks, 800 each way) and private vehicle movements based upon the internal layout and access arrangements to and from the site'. It further states that, 'the approved employee capacity is 272 persons'.

4.10.2 Assessment of impact

Traffic and transport impacts during construction

During construction it is not anticipated that traffic impacts would exceed the existing approved vehicle movement limit in place for the site. Trucks would be utilised to bring materials and machinery on site and it is anticipated that on average 5 to 10 trucks would visit the site each day. It is anticipated that the construction workforce would peak at around 30 people, with a maximum of 10 on site at any one time. Nevertheless, it is recommended that vehicle movements and the transport of materials and equipment is undertaken outside of peak periods and deliveries avoided during night-time periods, to minimise disturbance on nearby residences.

Sufficient space on site exists for an additional designated area for temporary parking for construction workers.

As the MCS Cooks River site is frequented by trucks and vehicles as part of usual operations, access would maintained through the existing entrances and as such would not result in any adverse impact upon the surrounding road network.

Traffic and transport impacts during operation

As some areas of rural NSW are not accessible rail, some grain would arrive on site via truck. The GSCP facility would generate an average of an additional 8 truck movements per day, 4-in and 4-out as a result of this activity. The small number of additional staff required (2 to 3 per shift), with ultimately 3 shifts per day, are expected to generate a limited number of movements of up to 24 per day. Overall, the total increase in vehicle movements is expected to result in a post development vehicle generation of 510 light vehicle and 1,589 truck movements. As such, this not expected to result in the site exceeding its current approved limit of 2,500 vehicle movements per day, including 1,600 truck movements per day (in and out). The increase in movements is considered minor and would not result in a noticeable change in the safe movement of traffic on the surrounding network.

Furthermore, the majority of grain would be delivered to site by a dedicated rail service and loaded containers would be taken to Port Botany via rail, thus minimising potential impacts upon local traffic as a result of the GSCP facility.

Four car parking spaces would be provided at the GSCP facility, with provision for up to six car parking spaces as required, which would be sufficient for the two to three staff required per shift during operation and accommodate a shift changeover.

Measures have also been developed by MCS for the occurrence of a failure of the rail system when containers are due to be loaded or in the event of a shut down for maintenance. A failure of the rail system has not occurred in the history of the site. However, when shut down for maintenance is required, it is scheduled well in advance. In the event that containers are required to be moved on a rail shutdown time, this would likely occur on a weekend, when truck movements associated with MCS operations are significantly lower.

Where trucks are required to travel to Port Botany, MCS propose to utilise an existing empty container truck, which would usually be moving between MCS and Port Botany. Approximately 60% of trucks per day that leave the MCS Cooks River Terminal are empty that are headed to Port Botany. Thus it is not anticipated that this would exceed the existing approved conditions for the site and as such would not impact upon the function or safety of the surrounding road network.

4.10.3 Environmental mitigation measures

The following measures should be implemented to minimise the potential for traffic and transport impacts during construction:

- The provisions of the existing *Cooks River Container Terminal St Peters Traffic Management Plan (GTA 2011)* and development approval must be adhered to at all times.
- An additional area is to be designated by MCS for the provision of car parking for construction personnel.
- All vehicles should be parked on site at the MCS Cooks River Terminal.
- All work sites and any compound established should be secured when not in use to ensure the safety workers and maintain security of materials and equipment.

- Where practicable, transportation and movement of work vehicles, equipment and materials should be carried out outside of peak hour traffic periods (i.e. avoiding 6.00–10.00 am and 3.00–7.00 pm weekdays). Deliveries at night-time should be minimised.

The following measures should be implemented to minimise the potential for traffic and transport impacts during operation:

- The provisions of the existing *Cooks River Container Terminal St Peters Traffic Management Plan (GTA 2011)* and development approval must be adhered to at all times.
- Additional bicycle facilities are to be provided on a needs basis by MCS Management.
- As a backup, for example, if there was a train derailment or another issue which prevented train operation, grain would temporarily be taken to port by road. To minimise impacts upon the local road network, MCS should load an empty truck that was already headed to Port Botany.

4.11 SOCIAL AND VISUAL AMENITY

4.11.1 Existing environment

The MCS Cooks River Terminal site is located in an area in which the immediately adjacent neighbours are of mixed use, predominately commercial and industrial as shown in Figure 2.1. As noted previously, the site is bounded by arterial roads which experience high volumes of traffic. The proximity of the airport, affects the amenity of the Terminal and surrounds, and as such the amenity is subject to fluctuations in noise and air quality. The amenity of the area is also influenced by the Metropolitan Goods Line which connects the MCS Cooks River site to Port Botany in the South and the western suburbs of Sydney and to other freight lines beyond to the North.

The surrounding suburbs of Tempe and Sydenham and the pockets of the suburb St Peters are also of mixed use, with a growing number of dwellings (refer to Figure 2.1). Dwellings in St Peters increased in particular from 1036 to 1349 in the past ten years (ABS 2011, 2001). Demographic changes and social trends have resulted in changes in household composition and age, population employment from manufacturing workers to office workers and encouraged regeneration of Marrickville LGA more broadly (Marrickville Council 2007). The nearest residences to the Proposal are located 300 m to the North-West (100 m from the Terminal boundary) and have a direct line of sight to the Terminal as shown on Figure 2.1.

The local setting of the site is screened from Canal Road by landscaping with large trees. However, the site is visible from Talbot Street and surrounds. The topography of the land places MCS at a slightly lower elevation, such that it is not visible from the Princes Highway and is obscured by the buildings situated along the highway.

Businesses and industrial uses on Talbot Street and the Princes Highway also can view the site. The Terminal can also be seen from Bellevue Street beyond the Metropolitan Goods line, as well as, the airport and industrial setting of the buildings surrounding the Terminal. Currently, containers are permitted to be stacked up to 11.6 m (four-high) in the north-western section of the Terminal near Canal Road, 14.5 m (five-high) in the centre of the Terminal and up to 17.4 m (six-high) in the eastern section of the terminal near the freight line.

As the Terminal can operate 24 hours seven days, there is permanent lighting established. The Terminal is the only industrial operation in the area that works both day and night, excluding the airport.

4.11.2 Assessment of Impact

Socio-economic and visual amenity Impacts during Construction

Potential local amenity impacts generated by the Proposal construction are considered minimal, due to the relatively short-term nature of the construction activities most likely to generate disturbance. As noted in Sections 4.2, 4.7 and 4.8, the initial excavation works, particularly the concrete-breaking required for the construction of the hopper and hardstand areas, would be completed within five weeks and have the potential to generate air emissions and noise disturbance. Once these activities are complete, it is not anticipated that there would be any further noticeable disturbance upon the local amenity of the neighbourhood.

Although works are proposed during night-time, these works are not anticipated to generate high volumes of noise, as works would not require heavy machinery, only the use of a crane and welding/sealing equipment. Temporary portable diesel powered lighting may be required. However, these lighting units could be positioned such that they would not create a disturbance upon the nearest residences.

Provided the mitigation measures proposed in Sections 4.2.3, 4.7.3 and 4.8.3 are effectively implemented potential adverse disturbances to local amenity would be minimised.

Socio-economic and visual amenity Impacts during operation

During operation, the Proposal is not anticipated to have significant adverse impacts upon the local amenity of the surrounding neighbourhood. As discussed in Section 4.7, the Proposal is unlikely to generate dust emissions which cannot be mitigated through the best available dust suppression technology. Furthermore, as concluded in Section 4.8, the predicted noise levels from operating GSCP facility are within allowable limits and are unlikely to result in significant disturbance upon local amenity.

The new GSCP facility would be visible from Talbot Street and Bellevue Street however, the new structure would be consistent with the appearance and form of the surrounding industrial use and would not significantly alter the landscape. Furthermore, the new silo structures would be very similar in height to the existing container limits, with only the pair of bucket elevators reaching approximately 5 m above the existing levels.

The silo structures would be constructed of galvanised steel which appears shiny initially and would dull over time. Consultation was undertaken by Ahrens Group with SACL regarding the potential for reflection impacting upon aircraft, which determined that the material was similar to other roofing present in the area and is unlikely to cause an issue. As such, it is not anticipated that this would cause any adverse reflections upon residences or industrial uses in the area nor interfere with airport operations. The silo structures and their reflections would also be partially obscured by containers stacked adjacent in the western section of the Cooks River Terminal. However, should a complaint be received from a pilot relating to safety via SACL, this would need to be assessed and the silos may need to be painted to minimise potential for reflection.

Shadow diagrams were produced by URS and were provided to council with the original application. Maskiell Consulting noted in the previous SEE that these drawings demonstrated that there would be no adverse impact upon neighbouring lots, with the exception of the 3.00 pm July 2014 model, which shows a short shadow, cast on the adjoining Sydney Airport land which is currently unused. At present when containers are stored along the boundary this adjoining site is overshadowed.

Due to the requirement for 24 hour operation, lighting would be required to enable people to safely work around the equipment. A lighting effects assessment (refer to Appendix L) reviewed the lighting requirements and associated potential impacts upon the surrounding environment, including upon airport operations. Lighting would be required at the top of the walkway gantry over the silos and internal to the buildings for the train and container unloading areas.

The lighting proposed for the silo structures would be an illuminant or indirect lighting, which reaches no further than 60 degrees from the light fixture. At a height of 20 m, this gives indirect lighting for a maximum distance of 35 m away from the light. As such, it is not anticipated that the lighting would have any effect beyond the boundaries of the MCS Cooks River Terminal. Furthermore, the lighting would have zero light transmitted beyond the horizontal plane, which would satisfy airport safety requirements.

The lighting would be visible from the nearest residences on Bellevue Street. However, the assessment determined that the potential disturbance from lighting is considered negligible, given the selection of low intensity lighting which is angled downward due to airport requirements and the elevated manner of properties such that they look down upon the lighting. As such, no additional mitigation measures are required to further mitigate the effects of lighting.

4.11.3 Environmental mitigation measures

The following measures should be implemented to minimise socio-economic and visual amenity impacts generated by the works:

- Public information signs should be supplied by Ahrens Group and be displayed while the work is in progress. The signs should be maintained in a serviceable order.
- The nearest residences and businesses should be advised of the proposed works including the construction hours and duration of works. A contact name and number should be provided for enquiries regarding the proposed works.

- The works sites and equipment should be maintained in an orderly manner. Site equipment should be entirely stored within designated areas and made secure when not in operation.
- Flood lighting should be directed towards the worksite whilst avoiding direct lighting of residential properties.
- Turn off all unnecessary lighting equipment when not required.
- In the unlikely event that a safety concern is raised by a pilot from SACL, this would need to be assessed and the silos may need to be painted to minimise potential for reflection upon the surrounding environment.

4.12 WASTE MANAGEMENT

4.12.1 Assessment of Impact

Waste Impacts during Construction

The waste generating aspects of the construction phase are likely to include:

- Small amounts of office waste/general refuse generated by the workers on site.
- Steel off-cuts from the footing construction.
- Construction material packaging.
- Residual cement and waste water from concrete works.
- Crushed concrete removed from existing hardstand areas.
- Leftover chemicals, including fuels/oils, sealants.
- Leftover spoil from the excavation for the pit.
- Groundwater/surface water collected during dewatering activities.

Risks for the construction of the Proposal regarding waste management on site include potential off-site impacts of the improper disposal of waste into the environment. Poor waste management containment and improper disposal on site may result in contaminants or hazardous materials entering the stormwater system and/or transported off-site from contaminated soil, groundwater/surface water, acidic soils, chemicals and fuels. Provided the mitigation measures in Sections 4.2.3, 4.3.3 and 4.4.3 are effectively implemented it is unlikely these impacts would be adequately mitigated.

Waste management on site would be in accordance with existing MCS Environmental policy and Ahrens Group waste policy as discussed in Section 4.12.3. All waste streams on site would be segregated in appropriate receptacles and covered as required to ensure proper disposal and avoid cross-contamination. Furthermore, waste concrete removed from the existing hardstand would be crushed and recycled at a nearby concrete recycling facility. Overall the Proposal is unlikely to generate a significant amount of waste due to the relatively minor requirement for excavation, the majority of pre-fabricated materials required for the scope of works and minor nature of the construction period.

Waste Impacts during operation

It is anticipated that once the GSCP facility is operational very minor amounts of waste would be generated. The major waste generating aspects of the GSCP facility are likely to include:

- Small amounts of office waste/general refuse generated by administration building.
- Contaminated, spilt or spoiled grain.
- Disused filters and parts.
- Oils/lubricants utilised for maintenance.
- Waste water run-off during cleaning and maintenance.

The small amounts of waste generated by the administration building would be managed in line with the other waste management practices in place for the existing MCS site, the majority of which would be paper for recycling. Waste product may also be produced from contaminated, spilt or spoiled grain which would be unsuitable for export. This product would be stored initially in the silo system and isolated for collection to be sent to an animal feed manufacturer or an EPA licensed facility for use with green waste where it can be composted.

Maintenance of the GSCP facility is unlikely to generate any regular significant waste product and would be managed in accordance with existing MCS waste management practices on site.

4.12.2 Environmental mitigation measures

The following measures should be implemented to manage construction waste generated by the works:

- The provisions of the *Protection of the Environment Operations (Waste) Regulation 2005* should be adopted for the management, storage and transportation of waste.
- Waste management arrangements to include waste minimisation, containment, segregation and appropriate reuse, recycling, treatment and disposal in accordance with Ahrens Group and MCS existing waste policy.
- A sufficient number of suitable receptacles should be provided for the disposal of general waste material and litter. The number of waste receptacles provided should allow for separation of waste streams, in particular separation of general waste from contaminated or hazardous waste, and separation of recyclable and non-recyclable material.
- Where possible, non-contaminated waste products should be reused on site or disposed of at a suitable recycling facility. Concrete should be crushed and disposed of at the nearby concrete recycling facility.
- All waste material generated by the proposed work should be kept on-site within a contained area until its re-use or removal.
- Waste should be classified as per the EPA (DECC 2009a) guidelines, waste disposed of by a licenced contractor at an EPA licensed facility. Waste certificates should be kept of all waste disposed.

- Suspected contaminated spoil should be collected in a skip bin or on plastic sheeting. Sediment fences should be installed around the stockpile and it should be covered with plastic sheeting. The suspect spoil should be tested as soon as possible to determine the appropriate disposal method.
- Suspected contaminants should be stockpiled away from stormwater drains.
- In the event of spillage of hazardous or non-hazardous material, spill kits to be utilised and disposal of material undertaken in line with EPA guidelines (DECC 2009a).
- A regular schedule of maintenance for cleaning of stormwater devices and removal of captured waste product should be implemented.

The following measures should be implemented to manage waste generated during the operation of the GSCP facility:

- The provisions of the Protection of the Environment Operations (Waste) Regulation 2005 should be adopted for the management, storage and transportation of waste.
- Waste management arrangements to include waste minimisation, containment, segregation and appropriate reuse, recycling, treatment and disposal in accordance with MCS existing waste policy.
- Measures are to be included in the operational environmental management plan for the collection, storage and appropriate disposal of contaminated, spilt or spoiled grain product.
- All waste should be disposed of at an EPA licensed facility and the appropriate waste disposal records kept.
- Strict procedures should be put in place for the regular clean-up and management of any grain spills within the system and waste grain product. These procedures should also apply to any other solid waste products.
- A regular schedule of maintenance for cleaning of stormwater devices and removal of captured waste product should be implemented.

4.13 PUBLIC AND WORKER SAFETY

As the MCS Cooks River Terminal would remain operational during the construction of the Proposal, mitigation measures for worker and visitor safety would also be implemented. These measures would be identified and specified separately in the operational Incident and Health and Safety Work Plans, to be developed by MCS in consultation with Ahrens Group and the other stakeholders who operate at the Cooks River Terminal. At a minimum, work areas would be barricaded from container handling operations by temporary fencing to ensure the safety of construction staff and staff working in the rail yard.

5 Environmental management

5.1 IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES

The environmental safeguards listed in Table 5.1 and where relevant from the Green Ports Checklist (Appendix L) will be incorporated into the construction management documentation for the project.

It is recommended that a Construction Environmental Management Plan (CEMP) is prepared for the construction phase of the project to document the safeguards in one consolidated document.

This plan should be prepared prior to construction and in addition to the measures listed in Table 5.1 include the following:

- Acid Sulfate Soil Management Plan.
- Contamination Management Plan.
- Erosion and Sediment management.
- Incident Management Plan.
- Complaints Management procedure.

Measures which have been developed as part of the PHA would be incorporated into the Safety Management Plan and design documents as applicable.

Where required by this SEE, measures would also be incorporated into the Operational procedures for the MCS site.

Table 5.1 Summary of Environmental Mitigation Measures

Environmental Issue	Mitigation Measure	Timing
Geology, Soils and Landforms	A number of mitigation measures have been included in the CMP and ASSMP and should be implemented to minimise the potential for soil impacts during construction. The plans make reference to the following guidelines: • Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC) • National Environment Protection (Assessment of Site Contamination) Measures 1999 (NEPM) • Guidelines for consultants reporting on contaminated sites 1997 • Acid Sulfate Soils Assessment Guidelines 1998 (ASSMAC 1998) • Queensland Acid Sulfate Soil Technical Manual 2002 (Soil Management Guidelines). The management and mitigation measures include stockpiling excavated spoil and characterisation on the site, to determine the concentration of any ASS or contaminants in the soil and the required disposal method. The CMP and ASSMP include stockpile management measures in line with the recommendations found in the Blue Book (Landcom 2004).	Prior to and During Construction

Environmental Issue	Mitigation Measure	Timing
	A construction management plan for the works should be prepared which includes the detail of a soil management strategy in line with the recommendations of the ASSMP and CMP. The details how excavated spoil would be managed on the site, including stockpile locations, the procedure for constructed bunding, and management of any run off that may contain sediment.	
Groundwater	Based on the existing groundwater quality information (URS 2006) it is known that the issues in the groundwater include elevated levels of ammonia and TKN and some hydrocarbons. Mitigation measures to reduce environmental and human health impacts associated with groundwater extraction are included in the CMP and ASSMP in Appendix D-1 and D-2. The mitigation measures are summarised below: • Follow the guidelines of the CMP and ASSMP which outline acceptable groundwater discharge criteria for a range of discharge scenarios. • A groundwater management plan is to be implemented to manage any dewatering works in accordance with the CMP. The plan is to include suitable control measures for the collection, storage, treatment (as necessary) and disposal of contaminated groundwater that may be pumped from excavations during construction. • Groundwater quality is also to be protected from further contamination which may occur during construction activity. For this reason a spill kit to be kept on site to manage any unexpected spills which may occur in the vicinity of any excavation. • The CEMP is to include measures for managing spills during the excavation works to ensure they do not reach the groundwater.	Prior to and During Construction
Surface Water	Best practice measures for the management of run-off from the site should be put in place as part of standard site management as follows: • Systems are to be put into place (if not already existing) during construction and operation to prevent pollution of waters. This should include procedures for handling, transport and storage of liquids. • Appropriate stockpile locations and management procedures in line with the Blue Book (Landcom, 2004) should be outlined in the construction management plan. • All machinery and equipment to be checked daily and maintained to ensure there are no oil, fuel or other liquids leaking. • A spill kit to be kept on site to manage any unexpected spills at all times. • Refuelling should only occur in the designated MCS refuelling area. • Tracked mud/sediment is to be controlled and cleaned up on site. During the operation of the GSCP facility, the following should be implemented: • Strict procedures should be put in place for the management of any grain spills within the system to ensure that grain does not enter the stormwater system. • Existing procedures for spill management should be continued on site.	During Construction and Operation
Floodplain Risk	The following measures are proposed to minimise impacts from flooding on site during the construction and operation the Proposal: • MCS and construction team should adhere to the recommendations outlined in the Floodplain risk Management Plan, in particular to the following strategy proposed in the Plan for managing flood risk: – Ensure that adequate information of the potential risks is provided during site induction.	During Construction and Operation

Environmental Issue	Mitigation Measure	Timing
	– Implement video surveillance of known flood problem areas so that flood hazards can be identified in real time. – Provide adequate warning systems (such as sirens or loudspeakers) to communicate flood hazard to site personnel, and signal work stoppage and/or evacuation if required. – Avoid circumstances whereby wading or driving through ponded water is required. • Implement a 'One-Stop' shutdown in severe weather conditions. The level of flooding at which operations should cease is at the discretion of MCS management, but should prioritise staff safety. If at any time staff cannot perform their duties without being subject to flood hazard, shutdown should be considered. • Where possible, critical or expensive equipment should be placed above the expected 100 year ARI flood level plus 0.5 m freeboard. For buildings onsite (with the exception of the building adjacent to Pit 77) a level of 1.0 m above ground level is recommended for such equipment. • Electrical circuits should either be placed above the flood planning level as for critical equipment above (preferred), or should be installed in such a way that it is fail-safe when inundated (i.e. such that there is risk of electrocution due to inundation is minimised). Electrical circuits should be certified as meeting these requirements by a suitably qualified electrician. • Car parking should be discouraged or prevented in areas where flooding is known to occur to a depth greater than 0.3 m on a regular basis (more than once per year). If carparking is permitted in such areas, signs should be shown prominently, warning of the possibility of flood damages occurring and of the liable party for such damages. • Implement floodwater protections / diversions around active construction areas to ensure that floodwaters do not encroach on construction works.	
Biodiversity	Management of site run-off and protection of groundwater would be in accordance with standard mitigation measures as detailed in Sections 4.2.3, 4.3.3 and 4.4.3 would minimise risk to biodiversity during construction. The following measures are proposed to avoid biodiversity impacts during the operation of the Proposal: • Strict procedures should be put in place for the management of any grain spills within the system and waste grain product to ensure that wildlife and pest animals are not attracted to the GSCP facility and grain does not enter the stormwater system. • In the event that flocks of birds or other wildlife are attracted to the area which may impact upon aviation safety or the safe operation of the GSCP facility, a Wildlife Management Plan (WMP) is to be developed by a specialist in wildlife management.	During Operation
Air quality and Energy Use	The following measures should be implemented to minimise the potential for air quality impacts: • Best practice dust management practices to be included in the construction management documentation. These should include procedures for stockpile management and dust management during excavation, particularly during dry and windy weather conditions. • Vehicles to be maintained and operated efficiently, be serviced according to the manufacturer's specifications and be fitted with emission control devices complying with Australian Design Standards so as to minimise air emissions (including greenhouse gases).	During Construction and Operation

Environmental Issue	Mitigation Measure	Timing
	• Work machinery to be turned off when not in use and not left running or idling. • Vehicles moving on exposed soils should be monitored for dust generation. • Any sediment tracked onto sealed surfaces should be removed as soon as possible to minimise the potential for dust generation. • Dust suppression equipment complying to Australian Standards should be installed in to the GSCP facility.	
Noise and vibration	The following measures should be implemented to minimise the potential for noise and vibration impacts during construction: • The NSW EPA Interim Construction Noise Guideline (DECC, 2009) to be used to inform the management of construction noise. Safeguards recommended in the guide should be incorporated into the construction management documentation. • The noisiest activities are to be scheduled during recommended standard hours (DECC, 2009) of 7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm on Saturday. • Nearby commercial and industrial properties to be notified of works. • Noise generated by work equipment to comply with noise control standard AS 1055. • Works involving noise-generating machinery should be undertaken within the shortest possible timeframe, with minimum delays. All efforts should be made to schedule the noisier work activities during the daytime on week days. • Noise treatment strategies should be nominated in the construction management document for night-time works. This should be implemented on site where appropriate and may include: • Equipping all machinery and vehicles with silencers. • Minimising loud verbal communication and noisy radio use. • Minimising metal to metal impacts. • Construction vehicles should be allocated designated routes, parking locations and delivery hours in a manner that minimises noise disturbance to the local community. In order to ensure the GSCP facility complies with AS2021 (refer to Appendix C for more detail), the following must be implemented as part of the design: • Glazed windows and (glassed) doors must be applied with acoustic seals of thickness and STC rating in accordance with AS 2021. • No vents are to be places on the internal skin of external walls and all penetrations should be acoustically sealed. The light-weight wall construction recommended is shown in Appendix C. • Construction Penetrations in ceilings (such as for light fittings, etc.) must be sealed gap free with a flexible sealant. Any ventilation openings in the ceilings are to be acoustically treated to maintain the acoustic performance of the ceiling construction. The recommended roof/ceiling construction for office space is shown in Appendix C. • An alternative outside air supply system or air conditioning system in accordance with council noise requirements is to be installed.	During Construction and Operation

Environmental Issue	Mitigation Measure	Timing
Heritage	The following measures should be implemented to minimise the potential for heritage impacts: • In the event that Aboriginal or European artefacts are discovered during works, all works should cease in the vicinity of the find and the construction team should notify MCS and NSW Ports for further advice. • MCS should advise the construction contractor of the location of European Heritage items on site. • Construction works, machinery and access tracks should be restricted to the delineated work boundaries. • The worker project induction should include information regarding the heritage significance of the site and identify the exclusion zones surrounding the heritage items on site. • Exclusion zones must be adhered to at all times.	During Construction and Operation
Traffic and Transport	The following measures should be implemented to minimise the potential for traffic and transport impacts during construction: • The provisions of the existing *Cooks River Container Terminal St Peters Traffic Management Plan* (GTA 2011) and development approval must be adhered to at all times. • An additional area is to be designated by MCS for the provision of car parking for construction personnel. • All vehicles should be parked on site at the MCS Cooks River Terminal. • All work sites and any compound established should be secured when not in use to ensure the safety workers and maintain security of materials and equipment. • Where practicable, transportation and movement of work vehicles, equipment and materials should be carried out outside of peak hour traffic periods (i.e. avoiding. 6–10 am and 3–7 pm weekdays). Deliveries at night-time should be minimised. The following measures should be implemented to minimise the potential for traffic and transport impacts during operation: • The provisions of the existing *Cooks River Container Terminal St Peters Traffic Management Plan* (GTA 2011) and development approval must be adhered to at all times. • Additional bicycle facilities are to be provided on a needs basis by MCS Management. • As a backup, for example, if there was a train derailment or another issue which prevented train operation, grain would temporarily be taken to port by road. To minimise impacts upon the local road network, MCS should load an empty truck that was already headed to Port Botany.	During Construction and Operation

Environmental Issue	Mitigation Measure	Timing
Social and Visual Amenity	The following measures should be implemented to minimise socio-economic and visual amenity impacts generated by the works: • Public information signs should be supplied by Ahrens Group and be displayed while the work is in progress. The signs should be maintained in a serviceable order. • The nearest residences and businesses should be advised of the proposed works including the construction hours and duration of works. A contact name and number should be provided for enquiries regarding the proposed works. • The works sites and equipment should be maintained in an orderly manner. Site equipment should be entirely stored within designated areas and made secure when not in operation. • Flood lighting should be directed towards the worksite whilst avoiding direct lighting of residential properties. • Turn off all unnecessary lighting equipment when not required. • In the unlikely event that a safety concern is raised by a pilot from SACL, this would need to be assessed and the silos may need to be painted to minimise potential for reflection upon the surrounding environment.	During Construction, and Operation.
Waste Management	The following measures should be implemented to manage construction waste generated by the works: • The provisions of the *Protection of the Environment Operations (Waste) Regulation 2005* should be adopted for the management, storage and transportation of waste. • Waste management arrangements to include waste minimisation, containment, segregation and appropriate reuse, recycling, treatment and disposal in accordance with Ahrens Group and MCS existing waste policy. • A sufficient number of suitable receptacles should be provided for the disposal of general waste material and litter. The number of waste receptacles provided should allow for separation of waste streams, in particular separation of general waste from contaminated or hazardous waste, and separation of recyclable and non-recyclable material. • Where possible, non-contaminated waste products should be reused on site or disposed of at a suitable recycling facility. Concrete should be crushed and disposed of at the nearby concrete recycling facility. • All waste material generated by the proposed work should be kept on-site within a contained area until its re-use or removal. • Waste should be classified as per the EPA (DECC 2009a) guidelines, waste disposed of by a licenced contractor at an EPA licensed facility. Waste certificates should be kept of all waste disposed. • Suspected contaminated spoil should be collected in a skip bin or on plastic sheeting. Sediment fences should be installed around the stockpile and it should be covered with plastic sheeting. The suspect spoil should be tested as soon as possible to determine the appropriate disposal method. • Suspected contaminants should be stockpiled away from stormwater drains. • In the event of spillage of hazardous or non-hazardous material, spill kits to be utilised and disposal of material undertaken in line with EPA guidelines (DECC 2009a). • A regular schedule of maintenance for cleaning of stormwater devices and removal of captured waste product should be implemented.	

Environmental Issue	Mitigation Measure	Timing
	The following measures should be implemented to manage waste generated during the operation of the GSCP facility: • The provisions of the *Protection of the Environment Operations (Waste) Regulation 2005* should be adopted for the management, storage and transportation of waste. • Waste management arrangements to include waste minimisation, containment, segregation and appropriate reuse, recycling, treatment and disposal in accordance with MCS existing waste policy. • Measures are to be included in the operational environmental management plan for the collection, storage and appropriate disposal of contaminated, spilt or spoiled grain product. • All waste should be disposed of at an EPA licensed facility and the appropriate waste disposal records kept. • Strict procedures should be put in place for the regular clean-up and management of any grain spills within the system and waste grain product. These procedures should also apply to any other solid waste products. • A regular schedule of maintenance for cleaning of stormwater devices and removal of captured waste product should be implemented.	

6 Conclusions

This SEE assesses the potential impacts of the construction and operation of a GSCP facility at the MCS Cooks River Terminal in St Peters. The principle findings of this SEE are as follows:

- The PHA undertaken for the Proposal determined initial high risk scenarios with potential off-site potential to the surrounding environment which were unacceptable in the absence of mitigation. However, the final risks assessment determined that the final risks could be reduced to low with the appropriate mitigation. Furthermore, any residual risk from the key initial high risk of scenario of wheat dust deflagration would be managed through the HAZOP study and design process.
- Due to previous disturbances at the site, there is potential for contaminated soil to be excavated during excavation. Contaminated soils would be managed in accordance with the CMP prepared for the Proposal and potential impact to the environment would be avoided.
- Contaminated groundwater to be extracted during excavation is expected to be minimal and is likely to have minimal effect on the Botany Bay Sands Aquifer.
- The potential for ASS has been identified in the area proposed for excavation. Soils would be managed in accordance with the ASSMP prepared for the Proposal and as such would not pose risk to the environment.
- A number of heritage items are located on site which are listed on the NSW Ports S.170 Heritage Register and would be avoided by the works.
- The impact of the Proposal during construction and operation upon the local amenity, relating to noise, air quality and visual amenity is anticipated to be minor or negligible.
    - The GSCP facility is not predicted to generate noise disturbance at the nearest residences beyond allowable limits.
    - The best available technology dust and air quality management system would be employed during the operation of the GSCP facility to ensure potential impacts upon air quality are minimised.
- No vegetation would be removed as part of the Proposal and potential off-site impacts upon terrestrial and aquatic biodiversity would be avoided utilising best practice environmental measures and spill management procedures.
- The operation of Proposal would generate an increase of 8 vehicle movements per day due to the delivery of grain by road from some rural areas. This increase is considered minor and would not result in any noticeable impact upon local roads. This potential impact of the operation of the Proposal upon local traffic is minimised due to the delivery and export of grain product by rail.

- Localised ponding and flooding on site has been identified as an issue for the MCS Cooks River Terminal, however, the Proposal has been designed to ensure that it would be protected from floodwaters and would not adversely contribute to the current situation. Potential for flood risk would also need to be managed during construction to ensure floodwaters do not impact upon construction works.
- The GSCP facility is consistent the appearance and form of the surrounding commercial and industrial use and the existing use of the MCS Cooks River Rail Terminal as a goods storage and rail yard.

The environmental impact of the GSCP facility during construction is of low significance and can be managed with best practice construction site management, as well as, the site specific measures proposed in Section 5 of this SEE.

During the operation of the GSCP facility the environmental impact is also considered to be of low significance, with the implementation of best available technology and mitigation measures proposed in Section 5 of this SEE, to ensure the facility does not result in any adverse environmental impacts.

The Proposal would also have a broader beneficial effect to encourage the use of Port Botany to transport grain and reduce the transport of grain by road and rail outside of NSW for loading into containers and shipping.

Once constructed, the Proposal would support the grain industry regionally and strengthen the intermodal capacity of the MCS Cooks River Terminal as a metropolitan freight terminal as per Action 2E of the *NSW Freight and Port Strategy November 2013*. The Proposal would not result in any significant adverse impacts upon the surrounding environment provided the environmental mitigation measures proposed in this SEE are effectively implemented.

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Site Preliminary Hazard Analysis

MCS COOKS RIVER PROPOSED GRAIN HANDLING AND STORAGE FACILITY

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1. INTRODUCTION

MCS Pty Ltd. is proposing to construct and operate a Grain handling terminal within their existing 20 Canal Rd St Peters plant to receive grain via train or truck, store the grain and then pack it into 20ft containers.

The proposed location for the facility is all contained within the existing MCS Cooks River site within the Marrickville Council region.

The grain will generally be wheat and will be mostly delivered by train from country NSW

Ahrens has been engaged to prepare a Preliminary Hazard Analysis (PHA) for the proposal. This PHA is intended for inclusion to be used to demonstrate that under "State Environmental Planning Policy No.33 (SEPP33)", this grain handling facility can be proven to not be classed as a "hazardous" development.

The report establishes a comprehensive test by way of a preliminary hazard analysis (PHA) to determine the risk to people, property and the environment at the proposed location and in the presence of controls. Should the report have shown that such risk exceed the criteria of acceptability, the development could be classified as 'hazardous industry' and may not be permissible within most industrial zonings in NSW.

This report was prepared with background information, terms of reference and assumptions supplied and agreed with MCS. The report is not intended for use by any other individual or organisation and as such, Ahrens cannot accept liability for use of the information contained in this report, except for the purpose for which it was intended at the time of writing.

1.1 Objectives

The PHA objectives are:

- To demonstrate the risks identified during and after the proposed development are acceptable in relation to the surrounding land use;
- That any residual risk will be appropriately managed;
- To advise risk reduction strategies where unacceptable risks are identified

1.2 Scope

This PHA uses the screening methods of SEPP 33 to identify dangerous goods, a qualitative assessment and where required, subsequent quantitative risk assessment that reviews:

- Input/output materials storage,
- Processing and handling;
- Primary items of the process; and
- Natural disasters

2. STATUTORY REQUIREMENTS

The current structure for project assessment is established under NSW "Environmental Planning and Assessment Regulation 2000"

Although this project is not considered to be "Designated Development" under the conditions of these regulations, the risk of dust explosion when handling grains means the project may be considered as "hazardous" under SEPP33 and as such a PHA is required.

A PHA broadly examines the likely potential hazards that may occur as a result of a hazardous or offensive development.

SEPP 33 requires developments that are potentially hazardous to be the subject of a PHA to determine the risk to people, property and the environment at the proposed location and in the presence of controls.

Should such risk exceed the criteria of acceptability, the development is classified as 'hazardous industry' and may not be permissible within most industrial zones in NSW

This PHA was prepared applying SEPP 33, and generally in accordance with the NSW Department of Planning (DoP) (formerly Department of Urban Affairs and Planning) publications Hazardous Industry Planning Advisory Paper No. 6 Guidelines for Hazard Analysis (2011) (HIPAP 6) [2] and DoP Multi Level Risk Assessment (2011) [3]

This PHA considers risks associated with the development in terms of accidental loss scenarios and their potential for hazardous incidents.

The primary objectives of a PHA are to:

- Identify potential hazards associated with the proposal;
- Analyse the consequences of significant hazards on people and the environment, and the likelihood or frequency of these hazards occurring;
- Estimate the resultant risk to the surrounding land uses and environment; and
- Analyse the safeguards to ensure they are adequate, and therefore demonstrate that the operation can operate within acceptable risk levels to its surroundings.

3. METHODOLOGY

3.1. General

A PHA is to provide sufficient information and assessment of risks to show that a project satisfies the risk management requirements of the proponent company and the relevant public authorities.

Within this brief, the main objective of the PHA is to show that the residual risk levels are acceptable in relation to the surrounding land use, and that risk will be appropriately managed. This is done by systematically:

- Identifying intrinsic hazards and abnormal operating conditions that could give rise to hazards
- Identifying the range of safeguards
- Assessing the risks by determining the probability (likelihood) and consequence (effects) of hazardous events for people, the surrounding land uses and environment; and
- Identifying approaches to reduce the risks by elimination, minimisation and/or incorporation of additional protective measures.

With proper application, this method will demonstrate that the proposed plant can operate within acceptable risk levels in relation to its surroundings.

The PHA needs to be carefully and clearly documented with the assumptions and uncertainties of final design and operation defined.

3.2. Preliminary Risk Screening

The need for a PHA under SEPP 33 is determined by a preliminary risk screening of the proposed development. The preliminary screening methodology concentrates on the storage of specific dangerous goods classes that have the potential for significant off site effects. Specifically the assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with an indication of storage depot locations. Details of the methodology are described in Section 7 of DoP's Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (2011) [1]. This can be used to assess the initial quantity of materials, however in the case of risks of dust explosions in grain, the criteria in this section are only met specifically when grain is being moved and dust is created. Under normal storage conditions there is no dust and hence the risk is in fact zero.

However, in Appendix 4 of this document is a section which discusses "Examples of Risk factors beyond those covered by the risk screening method of Applying SEPP 33"
In the appendix "Dust Explosions" are specifically discussed in Example 4 and it says "Proposals for the storage and handling of dusts and other finely divided materials should be carefully scrutinised to consider whether they should be considered potentially hazardous industry due to dust explosion factors",

3.3. Risk Classification and Prioritisation

DoP document Multi Level Risk Assessment (2011) [3] suggests the use of preliminary analysis of the risks related to a proposed development, to enable the selection of the most appropriate level of risk analysis in the PHA.

The preliminary analysis, detailed in Section 6, includes risk classification and prioritisation using a technique adapted from the "Manual for Classification of Risk due to Major Accidents in Process and Related Industries (IAEA, Rev 1 1996) [5].

3.4. Analysis and Assessment Levels

The hazard analysis and quantified risk assessment regime promoted in NSW relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of offsite risks to assess risk tolerability and land use safety implications.

Two key objectives are emphasised in the implementation of this process:

- The systematic and analytical nature of the assessment process enables the nature of the hazards, risks, leading risk contributors and events to be identified and understood from design, operational and organisational viewpoints.

- The quantification of offsite risks, where applicable, enables judgements to be made on location safety implications with regard to people, the biophysical environments and other land uses.

Preliminary Hazard Analysis MultiLevel Risk Assessment (2011) [3] prescribes three levels of risk assessment that can be undertaken. The choice of an appropriate technique is based on the results of preliminary screening, risk classification and prioritisation and the potential for significant offsite consequences arising from hazards identified for the proposed development.

Level 1 This is a qualitative assessment using word descriptions to approximately assess and rank risks. This is used when risk screening, classification and prioritisation indicate

no major offsite consequences, adequate controls exist, and surrounding land uses are not sensitive to the hazards posed.

Level 2 A semi-quantitative assessment that utilises the hazards identified in Level 1 and provides a focused quantification of key potential offsite risk contributors to demonstrate that risk criteria will be met.

Level 3 This involves a full quantitative risk assessment and is undertaken whenever the scale and nature of an activity creates a significant risk of a major accident. A fullscale analysis should also be carried out if partial quantification cannot sufficiently demonstrate that relevant criteria will be met.

The rationale for the multilevel risk assessment approach is that:

- Preliminary analyses that indicate minor land use safety outcomes may only require qualitative assessment (Level 1). The emphasis in such instances should be on the identification of key risk elements and optimising safety management controls, therefore fulfilling objectives of Level 1 above.
- Preliminary hazard analyses that indicate significant potential risk impacts to surrounding land uses should be subjected to a more detailed level of analysis including partial or total quantification (Levels 2 and 3). For such cases there should be increased emphasis on objectives of level 2 above, relating to land use safety and risk tolerability.

3.5. Qualitative Analysis

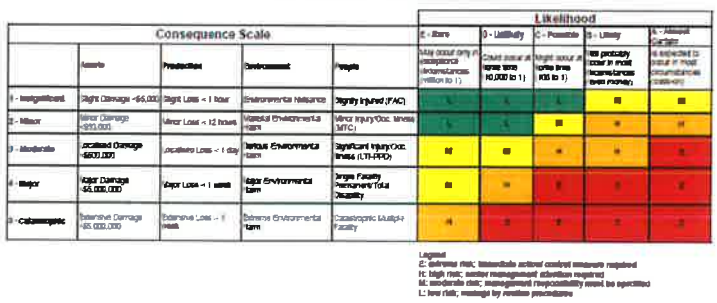
Qualitative analysis uses words and descriptive scales to determine the likelihood of each identified hazard and its consequences.

This provides an estimate of the likely rate of occurrence of hazardous events and their severity, from which a measure of the risk may be obtained through a simple matrix format of the equation:

Risk = Likelihood x Consequence

The risk associated with a proposed development is determined by combining the likelihood of the potentially hazardous events and the magnitude of their consequences. This is illustrated in Table 3.1, which has been adapted from Australian/New Zealand Standard 4360:2004 Risk Management [6]. The process of combining consequences and frequencies gives appropriate weight to the range between small consequence events (which are relatively frequent) and events of major consequence (which are very infrequent).

Table 3.1 - Consequence and Likelihood[6]



Adapted from AS/NZS 4360:2004 - Risk Management and Mineral Resources MDG 1010

3.6. Quantitative Analysis

Quantitative analysis is conducted using numerical data values for both likelihood and consequences.

This data has been gathered from a variety of sources including mathematical risk modelling, extrapolation from experimental studies or past data. A quantitative analysis can be used to estimate:

- Thermal radiation distances;
- Explosion overpressure;
- Fatality risk levels.

3.7. Risk Assessment

Risk assessment involves comparing the level of risk found during the qualitative and quantitative analyses to previously established risk criteria, thereby ascertaining if that level of risk can be accepted or not.

Such decisions take into account the wider context of the risk and include consideration of the tolerability of the risks borne by external parties.

Low and acceptable moderate risks can be allowed with minimal further treatment; however, they should be monitored and periodically reviewed to ensure they remain at this level.

Higher level risks should be treated using safeguards (see Section 3.8).

3.8. Risk Treatment

A complete range of safeguards should be incorporated into the design and operation of the proposed development as prevention or protection measures for higher level risks.

These measures may include plant design features, organisational safety controls, emergency and counter disaster principles and approval processes.

Options should be evaluated on the basis of the extent of risk reduction and the extent of benefits or opportunities they create.

In general, the cost of managing risks should be commensurate with the benefits obtained.

3.9. Monitoring and Review

Risks and the effectiveness of control measures need to be continually monitored to ensure changing circumstances do not alter risk priorities.

Factors that may affect the likelihood and consequences of an outcome may change, as may the factors that affect suitability or cost of various treatment options.

Ongoing review is, therefore essential to ensure that risk management activities remain relevant.

4. FACILITY DESCRIPTION

4.1. Location and Surrounding Land Uses

The Cooks River Terminal is located at 20 Canal Road, St Peters and consists of nine allotments, namely;

- Lot 1 DP621047,
- Lot 1 DP533013,
- Lot 1 DP544030,
- Lot 1 DP1048243,
- Lot A DP118682,
- Lot 2 DP454156,
- Lot 1 DP554157,
- Lot 2 DP627409,
- Lot 22 DP1069118,

The Grain Storage and Container Packing Facility is located wholly within Lot 22 DP1069118. The land is owned by NSW Ports. Maritime Container Services operate the site as container storage, transfer and repair facility.

The site is bound by Canal Road to the north east, Bellevue St to the North West, the Sydenham to Botany Goods Rail Line to the south west, and adjoins industrial development to the North West and south east.

The nearest residential properties are located on Bellevue St and are approximately 500m in a direct line from the proposed new facility.

Fig 4.1 Site Location

4.2. Site Process Description and Layout

The intent of the new facility is to receive grain mainly from trains and occasionally by truck. The grain is tipped into an in ground hopper and then transferred by conveying and using bucket elevators to go to one of 9 silos. Each silo can hold approximately 600T of grain.

At all transfer points, dust extraction is used to prevent any escape of dust. All the equipment used has been specifically fabricated to work in areas at risk of dust explosion.

The grain is then stored in the silos for a short period to monitor grades and condition of the product.

20' containers are then prepared and placed on a unit that inverts then at 45deg. A chute is lowered into one open door of the container and the container is filled with grain by also moving the grain using conveyors and bucket elevators. Again suitable rated dust extraction equipment is used to prevent the escape of dust.

The proposal would be powered by electrical energy and would not require any additional gas supply. Compressed air would be used only for instrument use and to pulse clean the dust collector bags.

The containers are then delivered to the Port of Botany either by train or truck

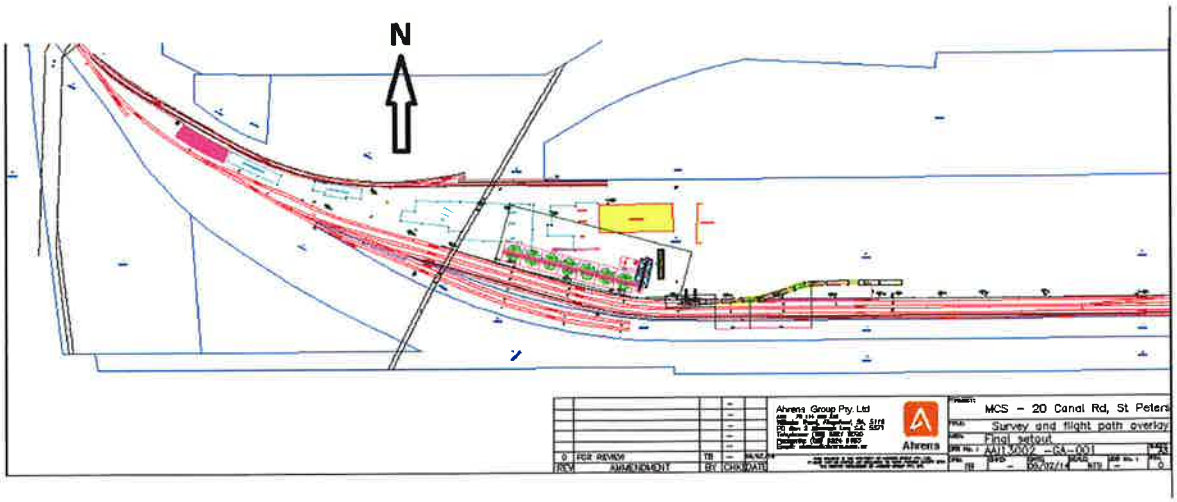


Fig 4.2 New Silos and Plant Layout and location

5. PRELIMINARY RISK SCREENING

5.1. Dangerous Goods Storage Screening

A preliminary screening of the proposed development is required by SEPP 33, to determine if there is a need for a PHA. The methodology is described in DoP's Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (2011) [1].

The site proposes to store wheat in up to 9 x 600T silos. Wheat or any similar grain is not rated in any of the classes of dangerous goods. As such there is no limit on the amount of grain to be stored.

5.2. Level of Risk Assessment

According to SEPP 33, if any of the screening thresholds are exceeded then the proposed development should be considered potentially hazardous and a PHA is required to be submitted with the development application.

Also, if the quantities are close to the screening threshold values and the development site is near a sensitive receiver then the proposed development is also considered to be potentially hazardous and a PHA is required.

Based on the above assessment the proposed development does not exceed the storage threshold or transport threshold for any substances and hence is not considered as potentially hazardous.

Therefore a PHA is not required for the storage of wheat on site.

6. HAZARD IDENTIFCATION

6.1. General

The only other requirement identified that would necessitate the production of a PHA for the job would be to discuss any hazards that may pose any risk to people or the environment.

Hazard identification represents a Level 1 or qualitative risk assessment and involves documenting all possible events that could lead to a hazardous incident.

It is a systematic process listing potential causes and consequences (in qualitative terms). Reference is also made to proposed operational and organisational safeguards (and their basis) that would prevent such hazardous events from occurring, or should they occur, that would mitigate the impact on the plant, its equipment, people and the surrounding environment.

This process enables the establishment, at least in principle, of the adequacy and relevancy of proposed safeguards.

The aim of the hazard identification study process is to highlight any residual risks associated with the interaction of the facility (as a whole) with the surrounding environment.

A range of possible hazard scenarios were developed and ranked in terms of consequence and likelihood in consultation with other Ahrens material handling engineers with many years of experience working with grain handling facilities.

6.2. Hazard Identification Tables

The hazard scenarios identified are presented in Table 6.1. Each hazard scenario was evaluated in terms of consequence and likelihood using the scoring methodology from Table 3.1.

A qualitative assessment of the resultant risk was then made, again using Table 3.1. The hazards identified are a result of deviation from normal operations and the qualitative risk assigned to each scenario takes into account the inherent and proposed physical, operational and organisational safeguards designed to reduce the consequence and likelihood of these hazards.

It is important to understand that the selection of the qualitative consequence score (Table 3.1) for each hazard identified is based on the most likely consequence given the existing physical safeguards only.

It does not consider the soft barriers such as control systems, training or standard operating procedures.

The likelihood score (Table 3.1) is an estimation of the likelihood of the nominated consequence occurring.

Alternatively, the likelihood score may be considered as an estimation of the effectiveness of the inherent and proposed physical, operational and organisational safeguards.

6.3. Assumptions

In undertaking the Hazard Identification Study a number of assumptions were made.

These include:

- Wheat grain has a Kst value of 112 bar.m/sec and is consequently rated as an St1 dust hazard class (weak explosion);
- All electrical equipment within the plant is dust protected – zoned according to appropriate Australian Standards (Zone 20, 21 & 22 as required);
- All plant and equipment is installed and operated in accordance with appropriate Australian Standards, codes and guidelines;
- Dangerous goods quantities and locations are as notified to Ahrens Group Pty Ltd. It is our belief that no dangerous goods are to be associated with this plant.
- All equipment and systems are designed to be inherently safe.

TABLE 6.1 – HAZARD IDENTIFICATION

Plant Unit	Hazard	Scenario	Consequence	Controls	Initial Risk			Action	Final Risk		
					C	L	R		C	L	R
Wheat Storage Silo	Deflagration	Ignition of wheat dust	Possible deflagration of wheat dust & consequently ignition of wheat	Electrically earthed silo Regular maintenance program to limit ingress of water into silos Explosion venting to VDI standard 3673.	3	C	H	Potential off site risk if explosion happened and was contained.	3	E	L
Bag houses/filter system	Deflagration	Ignition of wheat dust	Possible deflagration of wheat dust	Antistatic bags in bag houses Regular system maintenance Bag monitoring procedure and maintenance program Explosion venting to VDI standard 3673.	3	C	H	Potential off site risk if explosion happened and was contained.	3	E	L
Plant Control System	Loss of Power	Plant Shut down	Plant Shutdown	Electrical Controls housed in switch room and electrical cabinets built to appropriate AS and installed by licenced electricians	1	D	L	No on or off site risk identified(incl damage, fatality or injury)	1	D	L

Plant Unit	Hazard	Scenario	Consequence	Controls	Initial Risk			Action	Final Risk		
					C	L	R		C	L	R
Bucket elevators	Deflagration and ignition source	Belt slip, generate friction. Multiple electronic sensors.	Possible deflagration of wheat dust & consequently explosion	Belt slip detected automatically by control system. Elevator will automatically shut down. All electrical components rated for appropriate dust zone. All electrical wiring done by licenced hazardous areas electrician. Explosion venting to VDI standard 3673.	2	C	M	Risk to operators.	2	E	L
Natural Hazards	Storm	Water contacting wheat in silo to develop scenario for spontaneous combustion	Spontaneous Combustion(Over time)	Regular maintenance program Silos designed for high wind rating High turnover rate of wheat	3	E	M	No on or off site risk identified(incl damage, fatality or injury)	1	E	L
	Lightning	Ignition of wheat	Possible fire	Buildings and silos earthed	3	D	M	Possible on site injury, mitigated by earthing	1	D	L

7. Detailed Analysis

Many of the scenarios identified in the hazard identification do not have a risk of offsite, or even onsite damage, fatality or injury.

The following scenarios may have the potential for offsite impacts:

- Deflagration of wheat dust in storage silo;
- Deflagration of wheat dust in dust collectors/bag houses; and
- Deflagration of wheat dust in bucket elevators

There were no plausible scenarios found for offsite events having potential onsite impacts.

7.1. Qualitative Risk analysis

The scenario of a deflagration of the wheat dust present within the wheat storage silos, bucket elevators or dust collector bag house could conceivably occur if the correct air to dust ratio were present in combination with an ignition source.

Due to the location of the new plant being at least 300m to the site boundary, in the unlikely event of a major deflagration, it is virtually impossible to result in off site effects.

It is more likely to peel open the silo and provide pressure relief.

Given that there are considerable physical preventative controls designed into the plant, this scenario is considered extremely unlikely to occur.

Examples of the preventative controls, as outline in Table 6.1, include:

- Elevators and dust collection system are fitted with explosion relief;
- Silos and all plant and equipment are electrically earthed;
- Antistatic bags are used in the bag houses;
- All electricity supply is dust protected;
- Areas are zoned appropriately to limit ignition sources associated with electricity supply (zone 20, 21 and 22 according to Australian Standards);
- Plant is designed of sufficient quality in a way so as to prevent dust explosions;
- After construction there will be a detailed monitoring and maintenance program;
- Detailed housekeeping plan

Furthermore the wheat has a dust hazard rating of St1 (Kst <200), which, according to the Health Safety Executive (HSE), implies there is limited explosion capacity.

Deflagration of the wheat dust will only occur with the correct dust to air ratio, which is approximately 56g of dust per cubic metre of air, in conjunction with an ignition source.

Incorporating all these factors suggests there is limited potential for offsite impact (damage, injury, and fatality) caused by wheat dust deflagration. However, due to the extent of engineering controls in place, the likely occurrence of such a scenario is considered to be very low.

7.2. Quantitative Risk Analysis

Based on the results of the Qualitative Risk Assessment, the deflagration of wheat dust scenario has been identified as having limited potential for an offsite effect.

Due to the degree of engineering controls incorporated into the design of the plant, in conjunction with the relatively weak explosion capacity of wheat dust, the occurrence of a deflagration is not considered likely.

Due to the significant distance of the plant to the site boundary decreasing the potential for offsite effects, it has not been considered necessary to conduct a Quantitative Risk Assessment due to the limited likelihood of deflagration occurring and the ability of the storage vessel to provide pressure relief.

8. RISK ASSESSMENT

The relative significance of quantified risk estimates can be assessed by comparison with other risks that people experience in everyday life. In setting risk criteria, the underlying principle is that people should not involuntarily be subject to risk from a development that is significant in relation to the background risk associated with the surrounding land use area classification.

8.1. Risk Evaluation – Qualitative Criteria

The methodology used to review the risks associated with the proposed plant addressed the following qualitative criteria:

- All identified risks have been avoided and remaining risks have been reduced to as low as practicable. The qualitative risk analysis has sought to identify all avoidable risks. Table 6.1 summarises how the design and installation of the proposed facility mitigates the risks through appropriate safeguards and barriers.
- Consequences of the more likely hazardous events are, wherever possible, contained within site boundaries.
- Where there is an existing high risk, then the additional hazardous development does not add significantly to the risk.

The risk assessment process demonstrates that the proposed plant has the potential to increase the risk offsite, however the scenario identified to increase the risk off site is considered not likely to occur, and if it did occur, the low explosion rating of wheat dust is such that the area affected could never reach a site boundary.

8.2. Risk Evaluation – Quantitative Criteria

Due to the extent of engineering controls incorporated into the design of the plant, a quantitative risk analysis was not considered to be necessary.

For future reference, the assessment criteria for individual fatality risk recommended by DoP are summarised in Table 8.1. The criteria have been set on the basis that they represent very low risks compared to other everyday risks associated with the various land uses. The criteria for the proposed plant is not to increase the risk associated to surrounding land users, as defined by HIPAP 4 and reproduced in Table 8.1 and Table 8.2. It is assumed that the nearest land users to the plant mill would be residential housing on Bellevue St approx. 500m from the plant. The risk in table 1 is shown a 1:1,000,000 for residential. The size of an explosion created in the extremely unlikely event of a dust explosion would have an impact area of less than 10m.

Table 8.1 - NSW Individual Fatality Risk Criteria[4]

Land Use	Acceptable Criteria (risk in millions per year)
Hospitals, schools, childcare facilities, old age housing	0.5
Residential, hotel, motels, tourist resorts	1
Commercial developments	5
Sporting complexes and active open space	10
Industrial	50

Table 8.2 - Effects of Heat Radiation[4]

Heat Flux (kW/m^2)	Effect
1.2	Received from the sun at noon in summer
2.1	Minimum to cause pain after 1 minute
4.7	Will cause pain in 15-20 seconds and injury after 30 seconds exposure (at least 2nd degree burns will occur)
12.6	Significant chance of fatality for extended exposure (10%, Technica, 1988) High chance of injury Thin steel may reach a thermal stress level high enough to cause structural failure
23	Likely fatality for extended exposure and chance of fatality for instantaneous exposure Unprotected steel will reach thermal stress temperatures that can cause failure.
35	Significant chance of fatality for people exposed instantaneously

It must be noted that if future quantitative analysis is carried out on the plant, the above HIPAP 4 criteria must be taken into consideration and complied with as appropriate.

8.3. Management of Residual Risk

The qualitative risk assessment identified control measures, safeguards and procedures that will be put in place, as well as recommending additional actions to reduce the level of risk associated with the installation of the proposed plant. These actions are summarised in the Hazard Identification in Table 6.1.

In addition a Hazard and Operability Study (HAZOP) will be conducted on the proposed plant prior to construction so as to review the hazards, controls and associated risks in greater detail.

The quantitative risk assessment has identified residual risk associated with the plant.

One of the most effective means of ensuring the ongoing safe operation of a facility is through implementing a comprehensive Safety Management System. Such a system will ensure that hazards associated with the site are identified and managed, so that all activities are undertaken in a safe manner.

9. CONCLUSIONS AND RECOMMENDATIONS

The proposed plant will receive wheat from trains and trucks, store it in 9x 600T silos and send it out in 20ft containers either by train or truck.

The SEPP 33 threshold screening value for dangerous goods is not exceeded by the proposed plant as no new chemicals would be introduced to the site and wheat storage by itself does not constitute any form of hazard when simply stored in silos as proposed.

The plant would not require new chemicals to be introduced to the site, and so the transportation screening thresholds are not exceeded.

As a result, the proposed development is not potentially hazardous with respect to dangerous goods, and these aspects do not require a PHA.

The qualitative risk assessment/hazard identification study identified a number of possible hazard scenarios of high risk due to unacceptable potential consequences and/or possible likelihoods that may result in impacts to surrounding land users.

These included:

- Deflagration of wheat dust in storage silo;
- Deflagration of wheat dust in bucket elevators;
- Deflagration of wheat dust in dust collector bag houses

The likelihood of the above hazards causing harm to adjacent land users is also dependant on the size of a deflagration event being able to effect residents approximately 500m away, which due to the low dust hazard rating for wheat dust of St1, the size of an unlikely explosion would be too small to have any effect.

None of the other hazard scenarios identified had the potential to present an unacceptable risk to the surrounding land users.

Adequate safeguards are required to ensure the high and medium risk scenarios that were identified with potential off site impact are contained or at least controlled to an acceptable level.

Based on the results of the qualitative risk assessment, particularly the limited potential for the deflagration scenario to occur, it was found that all objectives of Level 1 of the MultiLevel Risk Assessment (2011)[3] were met and that conducting a quantitative analysis (Levels 2 and 3) would not be necessary.

It is concluded that although there exists a potential for deflagration to cause offsite effects, the scenario of wheat dust deflagration is considered to be unlikely due to the design incorporating sufficient engineering controls to adequately minimise its low probability of occurrence.

Additionally, the occurrence of such a scenario would have no impact on adjacent land users due to possible size of the deflagration being too small to have an impact.

It is recommended that all possible safeguards be employed to ensure that the potential for deflagration of wheat dust is minimised. There are three strategies for reducing risk:

- Elimination;
- Management; and
- Mitigation.

The complete elimination of the potential scenario is not an option considered for this development, as wheat is the key input and output respectively for the process. Therefore risk management and mitigation procedures need to be employed.

It is recommended that management procedures and design considerations be implemented to incorporate practices that would prevent risk scenarios occurring through:

- Minimising buildup of combustible materials onsite;
- Minimising dust cloud formation;
- Ensuring all silos are electrically earthed;
- Fitting silos and dust collection systems and bucket elevators with explosion relief;
- Using antistatic bags in the bag houses;
- Providing dust protection to all electricity supply;
- Zoning areas appropriately to limit ignition sources associated with electricity supply (zone 20, 21 and 22 according to Australian Standards);
- Designing the plant to prevent dust explosions;
- Implementing a monitoring and maintenance program;

Mitigation measures are practices that control the impact after a risk scenario has occurred. It is recommended that emergency management procedures be developed for response to fire and explosion that may be initiated from either onsite or offsite sources.

The risks posed by the deflagration of wheat dust poses an onsite risk.

This will be examined in more detail during the design and construction phase of the project and will be allowed for in the design and after the HAZOP.

10. REFERENCES

1. *Applying SEPP 33: Hazardous and Offensive Development Application Guidelines*, D.o. Planning, 2011, Editor: NSW Government
2. *Hazardous Industry Planning Advisory Paper No. 6: Guidelines for Hazard Analysis*, D.o. Planning, 2011, Editor: NSW Government.
3. *MultiLevel Risk Assessment*, D.o. Planning 2011, Editor: NSW Government.
4. *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*, D.o. Planning, 2011, Editor: NSW Government.
5. *IAEA, Manual for the Classification and Prioritisation of Risks Due to Major Accidents in Process and Related Industries, in IAEATECHDOC727.* 1993, International Atomic Energy Agency: Austria.
6. *Risk Management, in AS/NZS 4360. 2004,* Standards Australia / Standards New Zealand.

APPENDIX 1
AUTHOR'S BIOGRAPHY

Professional Summary

Ahrens

Tony Linkson
Materials Handling Engineer

Tony Linkson, Materials Handling Engineer, is a Degree Qualified Chemical Engineer, who has spent over 30 years working in Process and Control Engineering, manufacturing and construction. He has had three years involved in design, construction and operation of Aluminium smelters. Twenty years in R&D, design, construction and operation of global operations for manufacture of synthetic plastics and highly explosive chemical catalyst for the plastics. Tony also has seven years involved in design and construction of grain handling storage facilities and grain processing feedmills.

Qualifications & Recognition

Bachelor of Engineering(Chemical) - University of Adelaide, SA, 1982

Honours Thesis Heat and Mass Transfer with Simultaneous Chemical Reaction - University of Adelaide, South Australia, 1982

Career Summary

Period	Company	Position	Location
2007 – Current	Ahrens Group Pty Ltd	Project Manager and Engineer	Various
2004 - 2007	Campbell-Arnotts	Technical Engineer	Marleston SA
1984 - 2004	Sola Optical / Carl Zeiss	Technical Engineer	Worldwide
1984 - 1982	Comalco / Boyne Smelters	Technical Engineer & Operations foreman	Gladstone QLD

Project Experience

Project Name	Description	Year	Location	Value
Holcim Quarries	Design and Construct structures over 5 crushing plants and train loading facilities	2013	Marulan NSW	$3M
Boral Quarries	Design and construct series of aggregate silos for storage or raw materials	2013	Marulan NSW	$3M
Adelaide Brighton Cement	Project Engineering for construction and installation of new cement mill within existing plant.	2012	Birkenhead SA	$8M
Water World	Design and construct water slide and admin buildings	2011	Tea Tree Gully SA	$2M

Professional Summary

Ahrens

Project Experience continued

Project	Description	Year	Location	Value
Blue Lake Milling	Design and Construct of new oats hulling and oats storage facility	2011	Bordertown SA	$2M
Hanson Quarry	Rebuild of old gravel storage facility after old one was burnt down	2010	Magill SA	$2M
OZ Minerals	Design and construct buildings to cover the raw			
StorageCovers	copper concentrate storage and loading areas	2009	Prominent Hill SA	$3M
Parchem Construction Grouts	Rework and upgrade of all material handling systems	2008	Wyong NSW	$1M
Reid Feedmills	Design and construct new Dairy feedmill	2008	Cobden VIC	$4M
Laucke Feedmill	Major rebuild and upgrade of grain handling feedmill	2007	Daveyston SA	$4M

Career Highlights

Year	Highlight / Achievement
2012	Worked on all engineering aspects of new cement mill
2011	Built new oats hulling facility in Bordertown SA
2008	Built new dairy feedmill in Cobden Victoria
2008	Completed the upgrade of Laucke feedmill
2003	Managed installation of major robotic packing lines from Germany for Arnotts
1999	Rebuilt an old manufacturing plant in Petropolis Brasil incorporating full clean room facilities
1999	Redeployed and redesigned operating equipment from Ray Ban in Rochester to NY to Brasil and Mexico
1999	Managed and operated high vacuum coating and manufacturing plant in Miami USA to service clients such as Nike, Ray Ban and Arnette
1999	Completed the design and construct of plastics manufacturing facility in Guangzhou China. This included all of the building works, and the operating plant and the storage systems for handling highly explosive chemicals

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20 CANAL ROAD, ST PETERS PROPOSED GRAIN STORAGE AND CONTAINER PACKING FACILITY

Acid Sulfate Soil Management Plan

20 CANAL ROAD, ST PETERS PROPOSED GRAIN STORAGE AND CONTAINER PACKING FACILITY

Acid Sulfate Soil Management Plan

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16 September 2014

SEN405-TD-EV-PLN-0002 Rev. 0

Acknowledgments

Limitations Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to prepare an Acid Sulfate Soil Management Plan for the proposed grain storage and container packing facility at the existing Cooks River Terminal in accordance with the scope of services set out in the contract between KBR and Maritime Container Services ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

KBR derived the data in this report primarily from reports and information provided by the Client and an examination of records in the public domain. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, KBR has relied upon and presumed accurate certain information (or absence thereof) relative to the site provided by government officials and authorities, the Client and others identified herein. Except as otherwise stated in the report, KBR has not attempted to verify the accuracy or completeness of any such information.

No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon information and data supplied by the Client in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between KBR and the Client. KBR accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Revision History

Revision	Date	Comment	Signatures		
			Originated by	Checked by	Approved by
0	16/9/14	Issued for Use	B. Nichol	C. Gimber	C. Gimber

CONTENTS

1 Introduction

Kellogg Brown & Root Pty Ltd (KBR) has been commissioned by Maritime Container Services Pty Ltd (MCS) to prepare an Acid Sulfate Soil Management Plan (ASSMP) for the proposed construction of a grain storage and container packing facility at the Cooks River Terminal in St Peters NSW.

This document presents the ASSMP, which has been prepared specifically for the proposed works.

1.1 BACKGROUND

MCS lease and operate the Cooks River Terminal (herein referred to as the 'site'), which is located in the suburb of St Peters, inner western Sydney. The site is leased from NSW Ports who own the industrial site. The site includes the MCS lease area as well as rail slidings that service rural NSW and Port Botany Terminals, moving import and export containers by rail. The site also includes a cargo container storage facility and operates as a base for goods to be transported onward. This facility includes a large rail sliding, which enables the unloading and loading of rail freight.

MCS propose to construct a grain storage and container packing facility at the site. The proposal includes construction of a below ground grain hopper and nine above ground silos for grain storage, including seven larger silos and two smaller silos. Other features such as a conveyor, steelwork, a redesigned surface water drainage network and associated buildings are also part of the proposal.

A development application (DA201400196) and supporting information has been submitted to Marrickville Council for the proposed works. Following the review of the application and information, Council identified the need to provide additional information on acid sulfate soils (ASS) and site contamination.

1.2 PURPOSE

The purpose of this ASSMP is to identify the potential ASS risks associated with the proposed construction works and to propose appropriate management measures to minimise these risks.

This ASSMP aims to support the development application and supporting information already submitted to Marrickville Council.

Key guidance documents with regards to ASS management in NSW and more broadly Australia, have been used in the production of this management plan. Specifically, these documents include:

- Acid Sulfate Soils Assessment Guidelines (Ahern et al, 1998)
- Soil Management Guidelines in Queensland Acid Sulfate Soil Technical Manual (Dear et al, 2002).

2 Site description

2.1 LOCATION

The MCS Cooks River Terminal is located in St Peters, which is an inner western suburb of Sydney, approximately 5 km south west of Sydney CBD. The site is further identified as Lot 22 on Plan DP1069118, with a physical address of 20 Canal Road. The location of the site is shown in Figure 2.1.

The primary categories of land use in the vicinity of the site are commercial and industrial. A small strip of residential properties west of the site on Bellevue Street are the closest residential receptors. A larger residential area is located on the other side of Princes Highway, which separates the different types of land use. A landfill is located on the other side of Canal Road to the north east of the site.

2.2 TOPOGRAPHY AND LOCAL FEATURES

The topography of the general area is low-lying with ground elevations <5 mAHD, and gently undulating, with relief toward the Alexandra Canal watercourse which is situated approximately 400 m to the south east of the site. Alexandra Canal discharges into Botany Bay via Cooks River. Alexandra Canal receives stormwater run-off from the local industrial catchment.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

A description of the regional geology, hydrogeology and soil at the site is included in EI (2007) and is summarised below:

- the site overlies a formation of peat, sandy peat and mud (DMR, 1983)
- the site overlies 'disturbed terrain' which is a landscape type that has been modified through human activity and may include the complete disturbance, removal or burial of soils (Chapman and Murphy, 1989)
- extensive filling comprised of dredged estuarine sand and marine clays, demolition rubble, industrial and household waste, rocks and local soil materials was used to reclaim the land at the site from a historic swamp (EI 2007 and URS 2006).

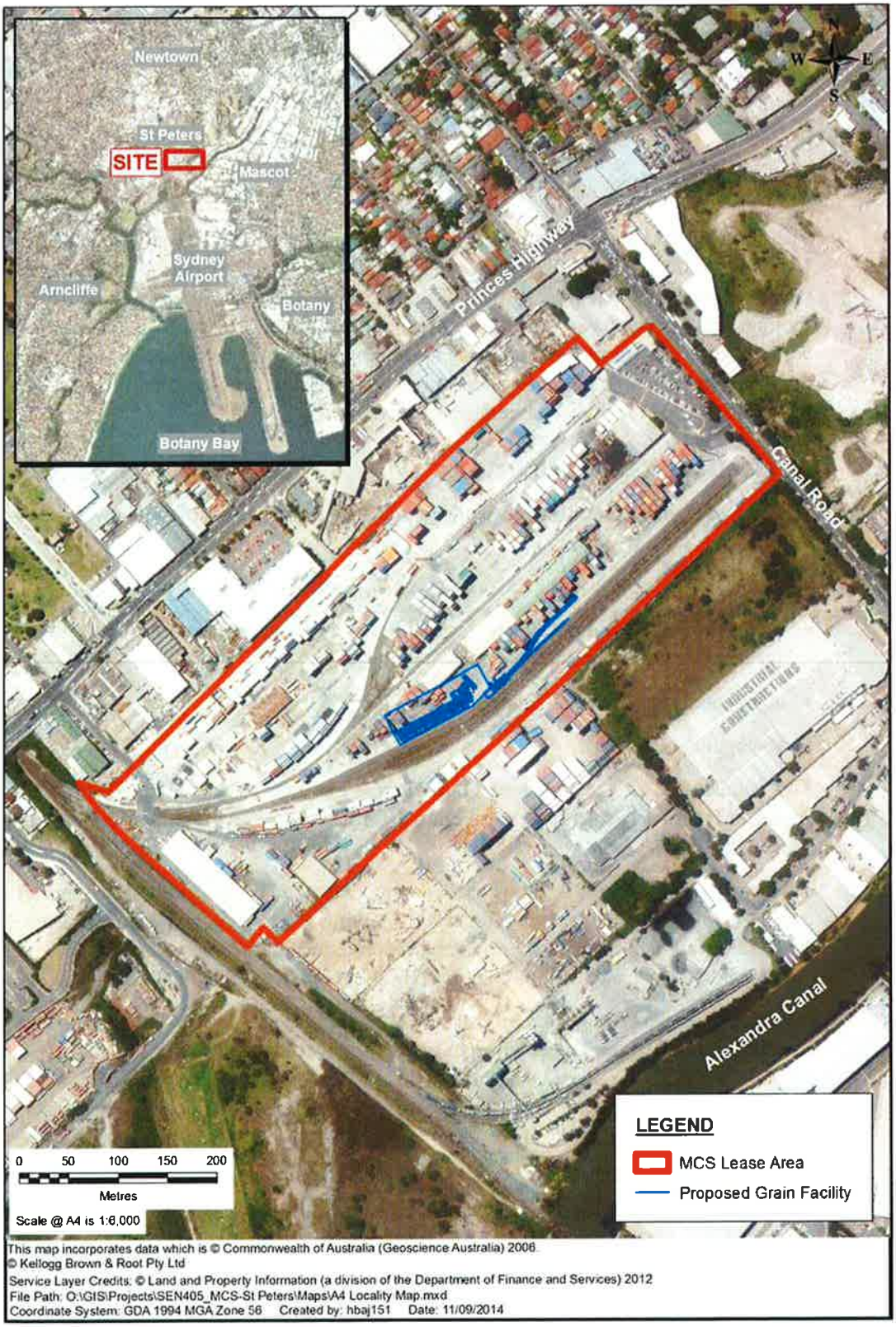

Figure 2.1
SITE LOCATION IN RELATION TO KEY FEATURES

3 Description of proposed works

The construction works described below are part of the grain storage and container packing facility which MCS are proposing to construct within the site. The construction works described as part of this ASSMP focus on the preparation of the footings and excavations works, which are the initial stages of construction associated with the grain storage area and silo erection. Components of construction to which this management plan will not apply (i.e. the erection of silos, construction of buildings etc.) have not been included in the description of works.

3.1 CONSTRUCTION COMPONENTS

The proposed initial construction works associated with the facility will involve the following:

- excavation of a pit to allow the installation of a below ground hopper
- removal of existing concrete and installation of a new concrete slab as foundations for the silos and associated structures/buildings
- augmented stormwater infrastructure
- stockpiling of material.

Key components of the proposed grain storage and container packing facility are shown in Figure 3.1. Also shown in Figure 3.1 are the indicative locations of the acid sulfate test holes.

The below ground hopper will be installed in an excavated pit beneath an existing rail track. The pit will measure approximately 13 m long x 9 m wide and 3.2 m in depth. This excavation will result in the recovery of approximately 375 m^3 of material. Some of the material excavated will be comprised of the existing rail track ballast.

Installation of the stormwater infrastructure, above ground grain storage silos and associated structures/buildings will require the removal of the existing concrete. Test holes drilled in 2006 indicate that the thickness of the existing concrete in this area is between 0.4 m and 0.9 m (EI 2007). The approximate area of existing concrete that has been identified for removal for installation of the silo slab is around 960 m^2 (i.e. 80 m long x 12 m wide).

Other areas of existing slab will also need to be removed to support the installation of the associated structures/buildings. This area covers approximately 170 m^2. Using an average concrete thickness of 0.7 m, the concrete removal activity over the 1,130 m^2 (i.e. 960 m^2 and 170 m^2) is expected to generate around 790 m^3 of material, which equates to around 1,900 tonnes of concrete using a conservative density value for concrete of 2,400 kg/m^3.

Figure 3.1
KEY COMPONENTS OF THE PROPOSED GRAIN FACILITY

The stormwater drainage infrastructure that is proposed to be installed beneath the new slab comprises around 18 stormwater pipes ranging from 150 mm to 900 mm in diameter. The works also involve the installation of approximately 17 stormwater connection pits. Some of these pits will house larger diameter stormwater pipes. As such, excavations will be required below the concrete slab and into the underlying fill and natural soil. A drawing showing the extent of the new slab, the location of the proposed silos, stormwater infrastructure and associated structures/buildings is included in Appendix A.

3.2 PROPOSED CONSTRUCTION METHOD

The proposed initial construction works associated with the facility are regarded as conventional, therefore standard practices and equipment will likely be employed. Typical machinery items used in the construction works will likely include excavation plant, water/air jets, drop hammers, vibratory hammers and vibratory plate compactors.

The initial stage of works will likely occur over a period of about five weeks. A description of the construction method for the two primary construction activities is provided in the following sections.

3.2.1 Excavation works for installation of below ground grain hopper

Excavation of the pit that will house the grain hopper will be undertaken by an excavator. The rail track ballast will be removed using an excavator before soils are removed from below ground level. The ballast material will be stockpiled separately from the other material excavated from this pit.

At a pre-determined spacing around the perimeter of the excavation, holes will be drilled for the purposes of installing groundwater spears. The spears will be used to drawdown groundwater either side of where sheet piles will be installed and below the target excavation depth.

Sheet piles will be initially installed on the sides of the excavation, before soil is removed from inside the sheet piles. A template or a guide structure will be used to ensure the sheet pilings are placed and driven to the correct alignment. Once the sheet piles are set in place, a jetting machine or driving hammer will be used to start driving the sheet piles. The actual method adopted may vary slightly according to the manufacturer's instruction regarding proper interlocking etc. Any excess sheet pile remaining at the surface, after the target depth has been achieved, will be cut-off and removed.

During the excavation works, bunding will be installed around the perimeter of the 'pit' to protect against water ingress from overland flows. Once the target depth has been achieved across the base of the excavation, a concrete base will be installed. This will be followed by installation of the concrete walls, which will be installed approximately 0.75 m from all edges of the concrete base. The concrete walls will be cast on-site. Material excavated from the pit will then be used to backfill the cavity between the sheet piles and the concrete walls. Care will be taken to ensure that material recovered from ASS horizons are placed below the water table. Following compaction of this material, the sheet piles would then be removed.

3.2.2 Works associated with concrete removal for installation of new slab

The structural integrity of the existing concrete is unknown; therefore the slab will need to be removed to support the silos and associated infrastructure. An excavator will be employed to break up the existing slab. Stormwater drainage infrastructure will be installed within the proposed slab.

An excavator equipped with a vibratory hammer will likely be the primary method of breaking up the existing slab. The concrete which is recovered during these works will be taken to the concrete recycling plant immediately adjacent to the site.

3.3 STOCKPILING OF MATERIAL

During excavation works, any recovered concrete will be separated from the other material and taken to the concrete recycling plant immediately adjacent the site. Soil/fill material recovered during excavation of the pit will be stockpiled nearby. The stockpiles will be protected by bunding which will reduce sediment transport from stormwater run-off, and will also be covered by plastic sheeting to further reduce material loss. If bare ground is identified for material placement, impervious plastic sheeting will be laid underneath the stockpile.

Should material showing visual indicators of ASS such as shell fragments, hydrogen sulfide odour, colouration (pale yellow reflective of jarosite) and staining etc. be detected during excavation, this material will be stockpiled separately.

4 Acid sulfate soil occurrence

4.1 RISK MAPPING

A description on the results of a review of the 1:25,000 *Botany Bay Acid Sulfate Soil Risk Map* is included in EI (2007). The review concluded that the site lies within an area identified as 'disturbed terrain' for which the presence of ASS is unknown. As the site is situated on a landform with an elevation of <5 mAHD, there was considered to be some risk that ASS may be present in naturally occurring soils. Investigations indicate that the spatial and vertical extent of naturally occurring soils at the site is variable.

4.2 LEVELS OF SIGNIFICANCE FOR ASS ANALYSIS DATA

The magnitude and duration of effects that may arise from the oxidation and subsequent leaching of a potential acid sulfate soil are influenced by a range of factors. The critical factors to be considered when interpreting the results of soil analyses are permeability of the soil and the quantity of acid which it would produce on oxidation.

Soil permeability (or hydraulic conductivity) is strongly influenced by grain size and the composition of the soil in terms of relative percent of fine materials (i.e. clay). This information has been obtained for the site through a targeted ASS assessment, with results contained in EI (2007).

The potential for a soil to produce acid on oxidation is best quantified by laboratory analysis to determine the percentage of oxidisable sulfur (i.e. pyrite) or the number of moles of acid generated on oxidation. 'Action Criteria' which define levels above which the acid generating potential of a soil is considered to be significant have been published by the ASS Management Advisory Committee in Ahern et al (1998). The 'Action Criteria' for disturbances of less than 1,000 tonnes of soil are shown in Table 4.1, and take into account both the acid generating potential and the texture of a soil.

Table 4.1 'Action Criteria' of oxidisable sulfur and Total Potential Acidity (TPA) for a range of soil textures for <1,000 tonnes of disturbed soil (Ahern *et al*, 1998)

Texture class (McDonald et al. 1990)	Approximate clay content (<0.002 mm) (%)	Action level oxidisable sulfur %S (oven dry basis)	Action level Total Potential Acidity M H^+/t (oven dry basis)
Coarse texture (sands to loams sands)	≤5	0.03	18
Medium texture (sandy loams to light clays)	5-40	0.06	36
Fine texture (medium to heavy clays and silty clays)	≥40	0.1	62

The targeted ASS assessment documented in EI (2007) provides the results of sub-surface investigations carried out in 2006. The laboratory results included in EI (2007) will be used as the basis for determining the likely presence and distribution of ASS at the site. The results of the field investigations are discussed in Section 4.3.

4.3 PREVIOUS FIELD INVESTIGATIONS

In 2006, Environmental Investigations carried out sub-surface inspections at four test holes across the site. The indicative locations are shown as BH1, BH2, BH3 and BH4 in Figure 3.1. BH1 is within 10 m of the proposed excavation of the pit for the hopper. The investigation involved the examination of soil profiles and the collection of samples for laboratory analysis. The below information is documented in EI (2007).

The four test holes were drilled using a truck mounted drill rig. The drilling depth ranged from 5 mbgl at three of the test holes to 10 mbgl at BH2. Groundwater was observed at all test holes, with the depth of observations ranging from 1.6 mbgl to 2.9 mbgl. Presented in Table 4.2 is a summary of the acid sulfate test holes drilled as a part of the targeted ASS investigation.

Table 4.2 Summary of acid sulfate test holes

Test hole	Depth drilled	Approximate thickness of concrete slab (i.e. first layer)	Approximate thickness of fill (i.e. secondary layer)	Dominant soil types below fill layer
BH1	5.3 mbgl	0.4 m	1.7 m	Clayey silty sand and clayey sand
BH2	10.0 mbgl	0.9 m	1.6 m	Generally clay with sand/silt separated by a band of sand with silt/clay. Clay at depth (i.e. >8.3 mbgl)
BH3	5.0 mbgl	0.5 m	2.6 m	Sand with silt/clay
BH4	5.0 mbgl	0.5 m	3.0 m	Silty sand

During the field investigations, indicators related to ASS were recorded. At all four test hole locations, shell fragments and hydrogen sulfide odour were observed. Jarosite, which is the yellow/brown colouration synonymous with the oxidation of iron sulfides and is used as an indicator to identify ASS, was not observed at any of the test holes.

Laboratory analysis was undertaken on samples collected throughout the soil profile at each test hole. Six samples were collected from BH1, eight samples from BH2, seven samples from BH3 and five samples from BH4.

EC and pH values were determined on selected samples using soil water extracts using a 1:5 soil water ratio. The results of this analysis returned pH values in the alkaline range and low EC values, typically <400 µS/cm. Peroxide pH testing was carried out on eight samples. The results indicate that with the exception of the sample taken from 2.9 mbgl at BH1, the soil tested did not contain any significant acid generating potential. This particular sample returned an oxidised pH value of 2.8, which is marginally below the criteria presented in Ahern *et al* (1998) of pH 3.0.

In the same sample identified previously, total potential acidity (TPA) was recorded above the action criteria (refer Table 4.1) with a value of 140 M H^+/t. Using the action criteria for soil types with a medium texture (i.e. the general soil type present at the site), samples taken from 1.4 mbgl and 2.9 mbgl at BH1 and from 3.2 mbgl and 4.6 mbgl returned acidity values (using the peroxide oxidisable sulfur method) above the action criteria.

The testing results indicate that there are soil types at the site that have the potential to generate acid upon oxidation. In terms of magnitude of disturbance, the proposed excavation activities relating to the works are not expected to generate significant volumes of natural soil material that contain potential ASS.

5 Acid sulfate soil risk

5.1 ASSESSMENT OF RISK

When considering the risk associated with the construction of the grain storage and packing facility, it is necessary to have an understanding and appreciation of the context of the works. The proposed works involves excavation of a 13 m x 9 m pit to approximately 3.2 mbgl. This excavation will result in the recovery of approximately 375 m^3 of material.

As described previously, the excavation works associated with the removal of the existing concrete for silo installation is not likely to result in the disturbance of fill or natural soil below the existing concrete slab. The installation of stormwater infrastructure will likely result in the disturbance of fill/natural soil. The excavation volume associated with the installation of the 17 proposed stormwater connection pits is estimated at around 40 m^3. The excavation volume associated with stormwater pipe installation has not been estimated. This will need to be reviewed prior to excavation activities so that appropriate measures can be put in place.

There are ASS-related risks that need to be managed during the project. These relate to:

- excavation of fill/natural soil associated with construction of the underground hopper and stormwater connection pits
- water accumulated in the pit and excavations below the water table
- water extracted from spears during dewatering works
- leaching/seepage from soil/material stockpiles.

5.1.1 Excavation works and stockpiling

Proposed excavation works into fill/natural soil may result in the disturbance of material with acid generating potential. If not managed appropriately, material recovered as a result of pit and stormwater connection pit excavations can have the potential to cause environmental harm. Therefore, it is proposed to temporarily stockpile excavated material in a controlled location so that acid sulfate screening testing can be carried out to determine the level of risk.

Different material types will be stockpiled separately to facilitate their management. During excavation, visual indicators of ASS will be monitored to determine the stockpiling approach. Typical indicators monitored include soil horizons showing a pale yellow colouration (reflective of jarosite) or iron oxide mottling, sulfurous odour, presence of corroded shell and blue green staining of drainage/seepage water.

The stockpiles will be covered to reduce the potential for soil loss through wind or rain induced erosion. An impermeable membrane will be placed between any stockpiled material and bare earth.

5.1.2 Seepage water/groundwater

As the proposed scope of works will include the excavation of soil below the groundwater level, dewatering will be required during certain period of construction. Seepage water collected in pits and groundwater recovered from the spears is to be appropriately managed. Water extracted from the excavation will be transferred to an appropriate holding facility and tested for key parameters prior to disposal. Should any treatment of the extracted water be required prior to discharge, this will take place on site unless the groundwater is to be removed to a licensed facility.

Groundwater flow rates have been estimated using typical aquifer properties which reflect the soil type at the site in order to estimate the volume of water that will be extracted from the spears during construction. The aquifer gradient flows towards Alexandra Canal, the aquifer is at least 10 m thick and comprised predominantly of sandy clay. The existing water level starts from approximately 1.6 mbgl and the dewatering activity will cause drawdown of around 1.2 m at the pit excavation and decreasing to approximately 0.5 m at a radius of 40 m from the excavation. It is estimated that around 1 ML of water will need to be extracted from the spears during the 5 week dewatering period. This equates to an average extraction rate of around 30 kL/d.

The preferred method of disposal is dependent upon the quality of the groundwater extracted. The most recent groundwater quality data (URS, 2006) suggests that the groundwater may be impacted by elevated concentration of nutrients and may contain traces of hydrocarbons. It is unlikely that the seepage water/groundwater will be of a suitable quality for immediate discharge without treatment. The three potential disposal options for the extracted groundwater include:

- discharge to stormwater
- discharge to trade waste
- immediate disposal to a licenced facility by a licensed contractor (via sucker truck or similar).

It is unlikely that the seepage water/groundwater will be of a suitable quality for discharge to stormwater and will require on-site treatment before disposal. In order to dispose to the stormwater system, the analytical results of the extracted water must comply with all relevant DECCW and ANZECC standards for water quality in accordance with the Marrickville Council DCP (2011).

MCS have an existing trade waste agreement with Sydney water for the discharge of industrial trade waste set to expire on 01/07/2018. This option may be explored in agreement with Sydney Water, based on the agreed characteristics of the trade wastewater.

Disposal by a licensed operator would involve hiring a licensed operator to receive the extracted groundwater directly which would then be transported and treated at a licensed facility for a fee.

6 Acid sulfate soil management strategy

6.1 AIM AND OBJECTIVES

This ASSMP provides the following:

- evidence of practical and achievable plans for the management of ASS that may be disturbed as a result of the proposed construction works to ensure compliance with environmental requirements
- evidence to the community that the proposed construction works are being managed in an environmentally responsible manner.

The objectives of this ASSMP are:

- effective management of any disturbed or excavated soils
- effective management of groundwater and any recovered acid affected waters.

Note that specific measures relating to the management of potentially contaminated material excavated from the site are included in the Contamination Management Plan prepared for the site (KBR 2014). Therefore, material excavated from the site will need to be managed in accordance with this ASSMP as well as the requirements included in KBR (2014).

6.2 MITIGATION STRATEGIES

Various mitigation strategies for ASS have been researched over the years, with Dear *et al* (2002) having previously reviewed a number of these strategies. These strategies are summarised in Table 6.1, with an assessment on whether they are applicable to the proposed construction works.

Table 6.1 Applicability of various management strategies

Strategy	Details	Application to proposed works
Avoidance	Avoid activity in areas containing ASS	No - the design of the below ground hopper and stormwater drainage infrastructure is determined by site constraints.
Minimisation	Re-design the proposed works to minimise disturbance	No - the proposed excavations are not expected to generate significant volumes of material with acid generating potential.
Neutralisation	Neutralisation and removal off-site	**Yes** - excavated material identified as having the potential to generate acid would be neutralised on-site.
Hydraulic separation	Hydraulic separation	No - other management strategies are more appropriate for the works.
Strategic reburial	Burial below the water table	**Yes** - placement of ASS material as backfill below the water table.

Strategy	Details	Application to proposed works
Neutralisation of water	Neutralise and discharge	**Yes** - excavations will capture ASS affected water which will need to be treated.

The management strategies which are most applicable to the management of material with acid generating potential are neutralisation and strategic reburial. These two management options are both reliable and proven methods.

Seepage water collected in pits and groundwater recovered from the spears will be appropriately managed. This will involve either:

- discharge to stormwater
- discharge to trade waste
- immediate disposal to a licenced facility by a licensed contractor (via sucker truck or similar).

6.3 MANAGEMENT STRATEGY

Management actions pertaining to the previously identified management principles (i.e. neutralisation and strategic reburial) along with the treatment and management of soil stockpiles and waters affected by acid sulfate affected soils are included in Table 6.2.

Table 6.2 Acid sulfate soil management measures

Construction activity	ASS management principle	Management actions
Excavation of pit for split hopper installation and other associated excavations	Strategic reburial	Material excavated below the level of the concrete slab and gravel fill is to be either: permanently disposed of by burial below the water table during backfilling of the pit/other excavations or
	Neutralisation and reuse	Test excavated fill/soil material from the temporary stockpile at a rate of one sample for every 50 m^3 of material. Neutralise with lime at the rate specified by the laboratory test (ensure that a safety factor of 1.5 is used in calculations).
Dewatering of excavations	Treatment of captured seepage/run-off water	Seepage water and run-off water shall be managed using one of the options identified in Section 5.1.2.
Water collected from the pumping of groundwater spears	Treatment of groundwater	Seepage water and run-off water shall be managed using one of the options identified in Section 5.1.2.
Stockpiling of soils	Oxidation prevention	Excavated ASS material shall not be stockpiled or left untreated for more than 5 days.
	Minimise potential for cross contamination	Place an impermeable membrane underneath the soil and the ground if stockpile is laid on bare earth.
	Minimise sediment loss	Cover the material stockpile to reduce the potential for sediment loss through water/wind erosion.

6.3.1 ASS treatment

Soils selected for neutralisation and reuse shall be treated with fine agricultural lime or a suitable and approved alternative at the rate specified from the results of laboratory testing to neutralise their equivalent TPA. A procedure for treating acid sulfate soils using lime as a neutralising agent is included below:

- apply lime to the material at the rate specified by the laboratory test (ensure that a safety factor of 1.5 is used in the calculations
- sufficiently mix the lime with the material - this can be done in a hopper/bin or similar using mechanical mixing methods
- sample the treated material at the rate specified in Table 6.4 to determine pH and TPA values
- if lime is effectively mixed (as demonstrated by test results), then the material can be used in other applications.

Any material that has been stockpiled separately due to the observed presence of visual ASS indicators shall be treated prior to material stockpiles that do not show any typical signs of a soil with acid generating potential.

Note that a specific ASS treatment pad, where material is placed in layers over a guard layer neutralised with lime, would normally be employed on projects where large volumes of material are excavated. Given that only a small volume of material with acid generating potential is expected to be recovered, this method is not practical for the proposed works.

6.3.2 Stockpile control

All uncharacterised excavated material (aside from concrete and dry gravel) is to be stored in stockpiles prior to management. Excavated spoil is not to be mixed such that material showing signs of acid generating potential will come into contact with material with no significant acid generating potential. Stockpile controls are to be implemented such as to reduce the impacts of erosion and ensure sediment is not mobilised into the receiving environment. Any temporary drainage measures required are to be managed in accordance with *The Blue Book. - Managing Urban Stormwater: Soils and Construction* (Landcom, 2004).

The following management actions included in Table 6.3 relate to the management of stockpiles associated with the proposed works.

Table 6.3 Stockpile management actions

Activity	Management Action	Timing
Placement of soils with acid generating potential	• All material with acid generating potential should be stockpiled on an impervious surface (concrete), if one is not readily available; the material is to be stockpiled on plastic sheeting.	During construction
	• Any material which is visibly different from other material should be stockpiled separately for classification purposes.	During construction
	• The volume of all stockpiles is to be recorded for management purposes.	As required

Activity	Management Action	Timing
Sediment control /stockpile management	• Constructed bunding should be placed around the stockpile in order to reduce the transport of sediment attributed to any stormwater runoff or overland flow	At all times
	• Any temporary drainage devices to control soil and water movement around the site are to be constructed and managed in accordance with *The Blue Book. - Managing Urban Stormwater: Soils and Construction.*	As required
	• The stockpiles are to be kept suitably moist to reduce sediment transport from wind erosion. Additionally, the stockpiles can be covered by plastic to further reduce the likelihood of impacting nearby sensitive receptors.	As required
	• The bunded area should be designed to minimise potential for impact on nearby receptors. Any leachate generated from the stockpile should be contained within the bunded area and treated using the same principles identified for extracted groundwater/seepage water (refer section 5.1.2).	At all times
	• All stormwater inlets in close proximity to stockpiled material and the excavations are to be appropriately protected from sediment inflows in accordance with *The Blue Book.*	At all times
General operations	• The bunding should act as a general clearance area, and personnel should be advised not to enter the area without adhering to specific safety guidelines.	At all times

6.3.3 Water quality management

Management procedures to be utilised for treatment of waters affected by acid sulfate affected soils will include:

- all external drainage will be directed away from the excavated site to minimise the volume of water within the site that may require treatment
- any water collected within excavations will be treated. Treated water will not be discharged until it meets the release criteria outlined in Table 6.4
- minimise the time the excavation remains open.

6.4 MONITORING REQUIREMENTS

It will be necessary to monitor soil and water issues related to acid sulfate soils. Presented in Table 6.4 are soil and water monitoring tasks with their associated frequency/timing and specific performance criteria.

Table 6.4 Acid sulfate soil monitoring requirements and performance criteria

Issue	Monitoring task	Frequency/timing	Performance criteria
SOIL			
Stockpile management	Visual inspection of stockpiles for evidence of ASS affected seepage shall be conducted. Water to be tested for pH, filtered iron and filtered aluminium.	Daily during works.	No signs of ASS affected seepage from the soil stockpile (e.g. no iron staining, oily films on seepage, very clear or blue green drainage water, tested water meets guideline criteria etc.).

Issue	Monitoring task	Frequency/timing	Performance criteria
Neutralisation of ASS material	Sample treated soil for validation testing by the laboratory	One composite sample (comprised of 6 sub-samples) per every 250 m^3 of treated soil.	pH: >5.5 and TPA: <36 MH^+/t
WATER			
Water collected in pits and from the pumping of groundwater spears	If the adopted management method involves discharge to stormwater, water shall be tested for parameters	Prior to discharge	
	pH		pH: 6.5-8.5#
	DO		DO: 90-110% saturation#
	PAH~		PAH: 0.12 mg/L#
	Ammonia~		Ammonia: 1.7 mg/L#
	TKN~		TKN: 0.12 mg/L#
	Copper~		Copper: 0.008mg/L#
	Lead~		Lead: 0.012 mg/L#
	Zinc~		Zinc: 0.043 mg/L#
	Suspended solids		Suspended solids: 50 mg/L
Water collected in pits and from the pumping of groundwater spears	If the adopted management method involves discharge using trade waste services, water shall be tested for the following parameters:	Prior to discharge	
	pH		pH: 7.0-10.0^
	Suspended solids		Suspended solids: 600 mg/L^
	Grease		Grease: 110 mg/L^
	Sulfate		Sulfate: 2,000 mg/L^
	Temperature		Temperature: ≤ 38°C^
	Maximum flow rate		1.9 L/s^
	Maximum daily discharge		10 kL^
	Average daily discharge		4 kL^
	Other water quality indicators		To be negotiated with Sydney Water Corporation.

^ values taken from Consent to Discharge Industrial Trade Wastewater No. 26463.

 # values have considered the 80th percentile level of protection for marine water provided in ANZECC 2000. These have been adopted since discharge would be into Alexandra Canal, which is highly disturbed receiving water. Guideline values for metals refer to filtered samples.

~ These analytes have been identified as contaminants of concern by the contaminated land investigation (URS 2006).

6.5 REPORTING

The following procedures will:

- ensure that the following documents are readily available to the specific personnel carrying out activities associated with ASS management
  - a copy of the ASSMP
  - copies of relevant work instructions

– copies of permits required under relevant environmental legislation/conditions.

Incident and non-conformance reporting shall be undertaken to ensure that:

- Environmental incidents and non-conformance regarding the management of ASS are identified, investigated and action is taken to mitigate any adverse impact caused.
- Corrective and preventative actions are initiated and completed.
- Identified non-conformances lead to improvements in systems and or/processes.

6.6 RESPONSIBILITIES

Management activities related to ASS are the responsibility of MCS. The implementation of ASS management measures on-site will be undertaken by competent operators.

7 References

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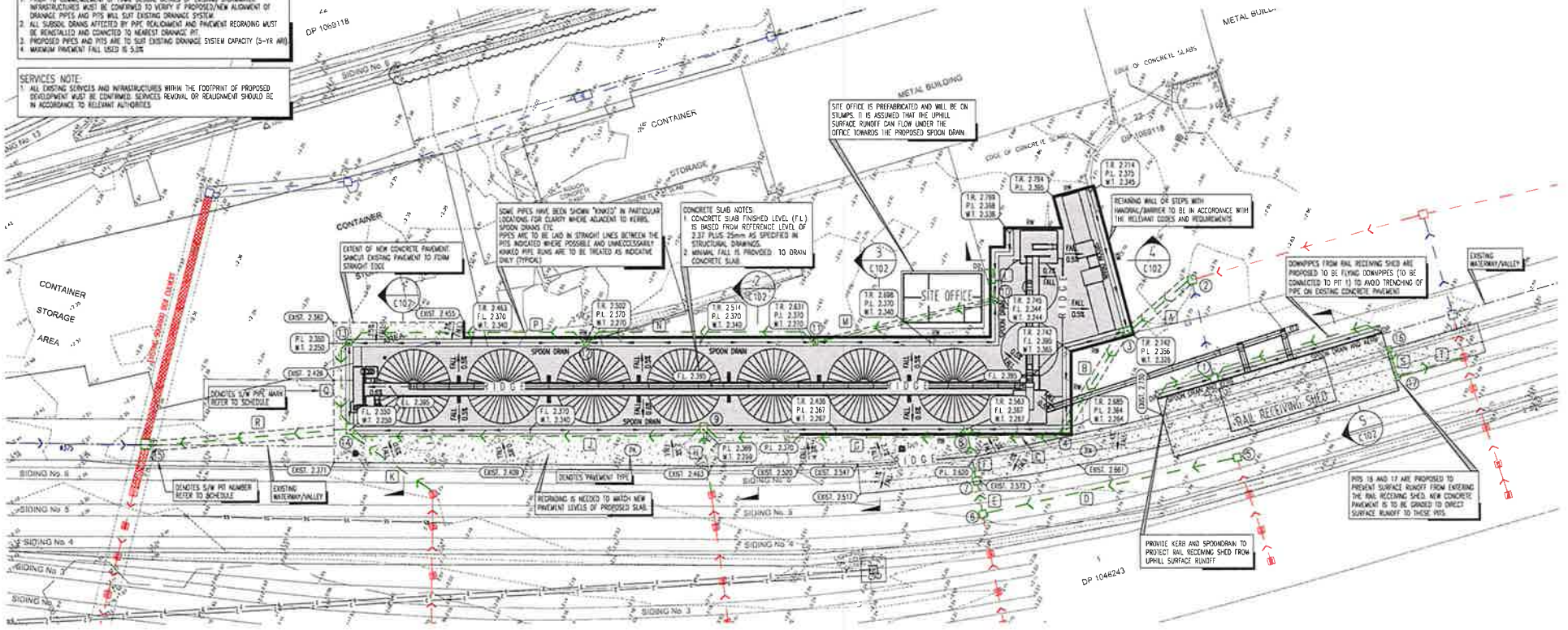
Appendix A

PROPOSED STORMWATER DRAINAGE LAYOUT

REFER TO DRAWING C100 FOR CIVIL NOTES.
REFER TO DRAWING C101 FOR SCHEDULES.

DESIGN NOTES:
1. PRIOR TO COMMENCEMENT OF FINAL DESIGN, DETAILS OF EXISTING STORMWATER INFRASTRUCTURES MUST BE CONFIRMED TO VERIFY IF PROPOSED/NEW ALIGNMENT OF DRAINAGE PIPES AND PITS WILL SUIT EXISTING DRAINAGE SYSTEM.
2. ALL SUBSOIL DRAINS AFFECTED BY RPC REALIGNMENT AND PAVEMENT REGRADING MUST BE REINSTALLED AND CONNECTED TO NEAREST DRAINAGE PIT.
3. PROPOSED PIPES AND PITS ARE TO SUIT EXISTING DRAINAGE SYSTEM CAPACITY (5-YR ARI).
4. MAXIMUM PAVEMENT FALL USED IS 3.0%

SERVICES NOTE:
1. ALL EXISTING SERVICES AND INFRASTRUCTURES WITHIN THE FOOTPRINT OF PROPOSED DEVELOPMENT MUST BE CONFIRMED. SERVICES REMOVAL OR REALIGNMENT SHOULD BE IN ACCORDANCE TO RELEVANT AUTHORITIES



DRAINAGE PLAN

SCALE 1:750

0 2500 5000 7500 10000 12500 25000mm

SCALE 1:250

LEGEND

- CONCRETE SLAB/FOOTING PER STRUCTURAL ENGINEER'S DESIGN
- HEAVY DUTY CONCRETE PAVEMENT (VEHICULAR) TYPE PA
- EXISTING SPOT LEVEL
- EXISTING CONTOUR
- PROPOSED CONTOUR
- SPOON DRAIN
- PROPOSED STORMWATER PIPE
- PROPOSED G.S GRATED SUMP
- NEWLY CONSTRUCTED PIPE BASED FROM AS BUILT DRAWINGS
- NEWLY CONSTRUCTED PIT BASED FROM AS BUILT DRAWINGS
- EXISTING PIPE (PROJECTED FROM DRAWING "LH9497-CRG-300 TO 301")
- EXISTING PIT (PROJECTED FROM DRAWING "LH9497-CRG-300 TO 301")
- SUBSOIL DRAIN
- COMMUNICATIONS CONDUITS
- ELECTRICAL CONDUITS
- (1B) PIT NUMBER
- (J) STORMWATER PIPE MARK
- DP DOWN PIPE CONFIRM WITH ARCH' DWGS
- INSPECTION OPENING (I.O)
- 99.99 DESIGN LEVEL
- T.K. TOP OF KERB
- W.T. WATER TABLE
- P.L. PAVEMENT LEVEL
- I.L. INVERT LEVEL
- T.B. TOP OF BANK
- B.B. BOTTOM OF BANK
- F.L. FINISHED LEVEL
- F.F.L FINISHED FLOOR LEVEL
- B.L BENCH LEVEL
- C.L COVER LEVEL

STORMWATER PIT SCHEDULE

PIT No.	DESCRIPTION	COVER LEVEL (C.L)	INVERT LEVEL (I.L) IN	INVERT LEVEL (I.L) OUT	COVER	PIPE #	IN OUT
1	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
2	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
3	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
4	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
5	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
6	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
7	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
8	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
9	1200x900 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
10	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
11	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
12	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
13	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
14	1200x900 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
15	1200x1200 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
16	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
17	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT

NOTES
1. PIT NUMBER 15 IS TO REPLACE EXISTING "BREAK-IN" PIT TO BOX CULVERT TO SUIT NEW PIPE SIZE AND INVERT LEVEL.
2. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN SHOULD BE INSPECTED AND CLEANED. BUILDER/CONTRACTOR TO NOTIFY THE OWNER/ENGINEER IF ANY PART OF THE EXISTING STORMWATER DRAINAGE SYSTEM IS FOUND DAMAGE AND NEEDS TO BE REPAIRED

STORMWATER PIPE SCHEDULE

MARK	LOCATED BETWEEN PITS	DESCRIPTION SIZE/GRADE	REMARKS
A	2 – 3	ø600 RCP @ 0.50%	
B	3 – 4	ø600 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
C	4 – 8	ø600 RCP @ 0.50%	
D	5 – 6	ø375 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
E	6 – 7	ø450 RCP @ 0.50%	
F	7 – 8	ø450 RCP @ 0.50%	
G	8 – 9	ø600 RCP @ 0.50%	
H	EXIST – 9	ø575 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
J	9 – 14	ø900 RCP @ 0.50%	
K	EXIST – 14	ø375 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
L	DP – 10	ø150 PVC @ 0.50%	
M	10 – 11	ø300 RCP @ 0.50%	

STORMWATER PIPE SCHEDULE

MARK	LOCATED BETWEEN PITS	DESCRIPTION SIZE/GRADE	REMARKS
N	11 – 12	ø300 RCP @ 0.50%	
P	12 – 13	ø375 RCP @ 0.50%	
Q	13 – 14	ø375 RCP @ 0.50%	
R	14 – 15	ø900 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
S	15 – 17	ø300 RCP @ 0.50%	
T	17 – EXIST	ø300 RCP @ 0.50%	

NOTES
1. ALL PIPES SIZES ARE PRELIMINARY ONLY. DETAILS OF EXISTING PIPES (SIZE AND INVERT LEVELS) MUST BE PROVIDED TO THE DESIGNER PRIOR TO FINAL DESIGN OF STORMWATER PIPES AND PITS
2. ALL PIPES 300mm# OR LARGER MUST BE REINFORCED CONCRETE PIPE CLASS "4" APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O
3. EQUIVALENT STRENGTH FRC PIPES MAYBE USED IN LIEU OF REINFORCED CONCRETE PIPES
4. ALL DRAINAGE PIPES LESS THAN OR EQUAL TO 225ø SHALL BE uPVC DWV GRADE CLASS SN8 IN ACCORDANCE WITH AS/NZS 1260:2009 PVC-U PIPES. ALL PVC PIPES ARE TO BE JOINTED WITH SOLVENT WELDS

NOTE:
1. THE CIVIL CONTRACTOR/BUILDER IS TO REFER TO THE SOIL BORELOGS & CLASSIFICATION.
2. THE SOIL BORELOGS MAY INDICATE THAT EXISTING FILLING IS PRESENT ON SITE. IF SO, THE CIVIL CONTRACTOR/BUILDER IS TO REFER TO THE CIVIL COMPACTION NOTES.
3. REFER TO THE CIVIL STORMWATER NOTES FOR FLEXIBLE CONNECTION REQUIREMENTS

WARNING

BEWARE OF UNDERGROUND SERVICES
THE LOCATION OF SERVICES ARE INDICATIVE ONLY AND NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN CONTRACTOR TO VERIFY ALL SERVICES PRIOR TO ANY EXCAVATION

PRELIMINARY ISSUE
NOT TO BE USED FOR CONSTRUCTION PURPOSES

PRELIMINARY ISSUE	29-03-16	LP	B
PRELIMINARY ISSUE	18-02-16	LP	A
DESCRIPTION	DATE	BY	REV.

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SCALES	AS SHOWN
DATE	02.16
DRAWN	LGP
CHECKED	MKD
TITLE	CIVIL DRAINAGE PLAN
ADDRESS	22 CANAL RD, ST PETERS
CLIENT	AHRENS/MCS
PROJECT	MCS-COOKS RIVER-DEVELOPMENT APPLICATION
JOB #	12-631
SHEET #	C101
REV	B

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KBR | We Deliver

20 CANAL ROAD, ST PETERS
PROPOSED GRAIN STORAGE AND CONTAINER PACKING FACILITY

Contamination Management Plan

20 CANAL ROAD, ST PETERS PROPOSED GRAIN STORAGE AND CONTAINER PACKING FACILITY

Contamination Management Plan

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16 September 2014

SEN405-TD-EV-PLN-0001 Rev. 0

Acknowledgments

Limitations Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to prepare an Contamination Management Plan for the proposed grain storage and container packing facility at the existing Cooks River Terminal in accordance with the scope of services set out in the contract between KBR and Maritime Container Services ('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

KBR derived the data in this report primarily from reports and information provided by the Client and an examination of records in the public domain. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site and subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, KBR has relied upon and presumed accurate certain information (or absence thereof) relative to the site provided by government officials and authorities, the Client and others identified herein. Except as otherwise stated in the report, KBR has not attempted to verify the accuracy or completeness of any such information.

No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon information and data supplied by the Client in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between KBR and the Client. KBR accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Revision History

Revision	Date	Comment	Signatures		
			Originated by	Checked by	Approved by
0	16/09/14	Issued for Use	G Ross	B. Nichol	C.Gimber

CONTENTS

1 Introduction

Kellogg Brown & Root Pty Ltd (KBR) has been commissioned by Maritime Container Services Pty Ltd (MCS) to prepare a Contamination Management Plan (CMP) for the proposed construction of a grain storage and container packing facility at the Cooks River Terminal in St Peters, New South Wales (NSW).

This document presents the CMP, which has been prepared specifically for the proposed works.

1.1 BACKGROUND

MCS lease and operate the Cooks River Terminal (herein referred to as the 'site'), which is located in the suburb of St Peters, inner western Sydney. The site is leased from NSW Ports who own the industrial site which includes the MCS lease area as well as rail slidings that service rural NSW and Port Botany Terminals, moving import and export containers by rail. The site includes a cargo container storage facility and operates as a base for goods to be transported onward. The facility includes a large rail sliding, which enables the unloading and loading of rail freight.

MCS propose to construct a grain storage and container packing facility at the Cooks River Terminal. The proposal includes construction of a below ground grain hopper and nine above ground silos for grain storage, including seven larger silos and two smaller silos. Other features such as a conveyor, steelwork, a redesigned surface water drainage network and associated buildings are also part of the proposal.

A development application (DA201400196) and supporting information has been submitted to Marrickville Council for the proposed works. Following the review of the application and information, Council identified the need to provide additional information on acid sulfate soils (ASS) and management of potential soil and groundwater contamination.

1.2 OBJECTIVES

The purpose of this CMP is to identify the potential for contaminated land and groundwater and the risks associated with the proposed construction works and to propose appropriate management measures to minimise these risks.

This CMP aims to support the development application and supporting information already submitted to Marrickville Council. This CMP will also complement the existing CMP prepared in 2006 by URS for the entire Cooks River Rail Terminal for NSW Ports (formerly Sydney Ports Corporation).

Specifically, the objectives of this CMP are:

- to provide appropriate guidelines for the management of potentially contaminated land disturbed by the proposed works
- ensure risks to worker health and safety are appropriately identified and managed
- provide appropriate handling guidelines for potentially contaminated material

2 Site description

2.1 LOCATION

The MCS Cooks River Terminal is located in St Peters, which is an inner western suburb of Sydney, approximately 5 km south-west of Sydney CBD. The site is further identified as Lot 22 on Plan DP1069118, with a physical address of 20 Canal Road. The location of the site is shown in Figure 2.1.

The primary categories of land use in the vicinity of the site are commercial and industrial. A small strip of residential properties west of the site on Bellevue Street are the closest residential dwellings. A larger residential area is located on the other side of Princes Highway, which separates the different types of land use. A landfill is located on the other side of Canal Road to the north east of the site.

2.2 TOPOGRAPHY AND LOCAL FEATURES

The topography of the general area is low-lying with ground elevations <5 mAHD, and gently undulating, with relief toward the Alexandra Canal watercourse which is situated approximately 400 m to the south east of the site. Alexandra Canal discharges into Botany Bay via Cooks River. Alexandra Canal receives stormwater run-off from the local industrial catchment.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

A description of the regional geology, hydrogeology and soil at the site is included in Environmental Investigations (2007) and is summarised below:

- the site overlies a formation of peat, sandy peat and mud (DMR, 1983)
- the site overlies 'disturbed terrain' which is a landscape type that has been modified through human activity and may include the complete disturbance, removal or burial of soils (Chapman and Murphy, 2002)
- extensive filling comprised of dredged estuarine sand and marine clays, demolition rubble, industrial and household waste, rocks and local soil materials was used to reclaim the land at the site from a historic swamp (EI 2007 and URS 2006).

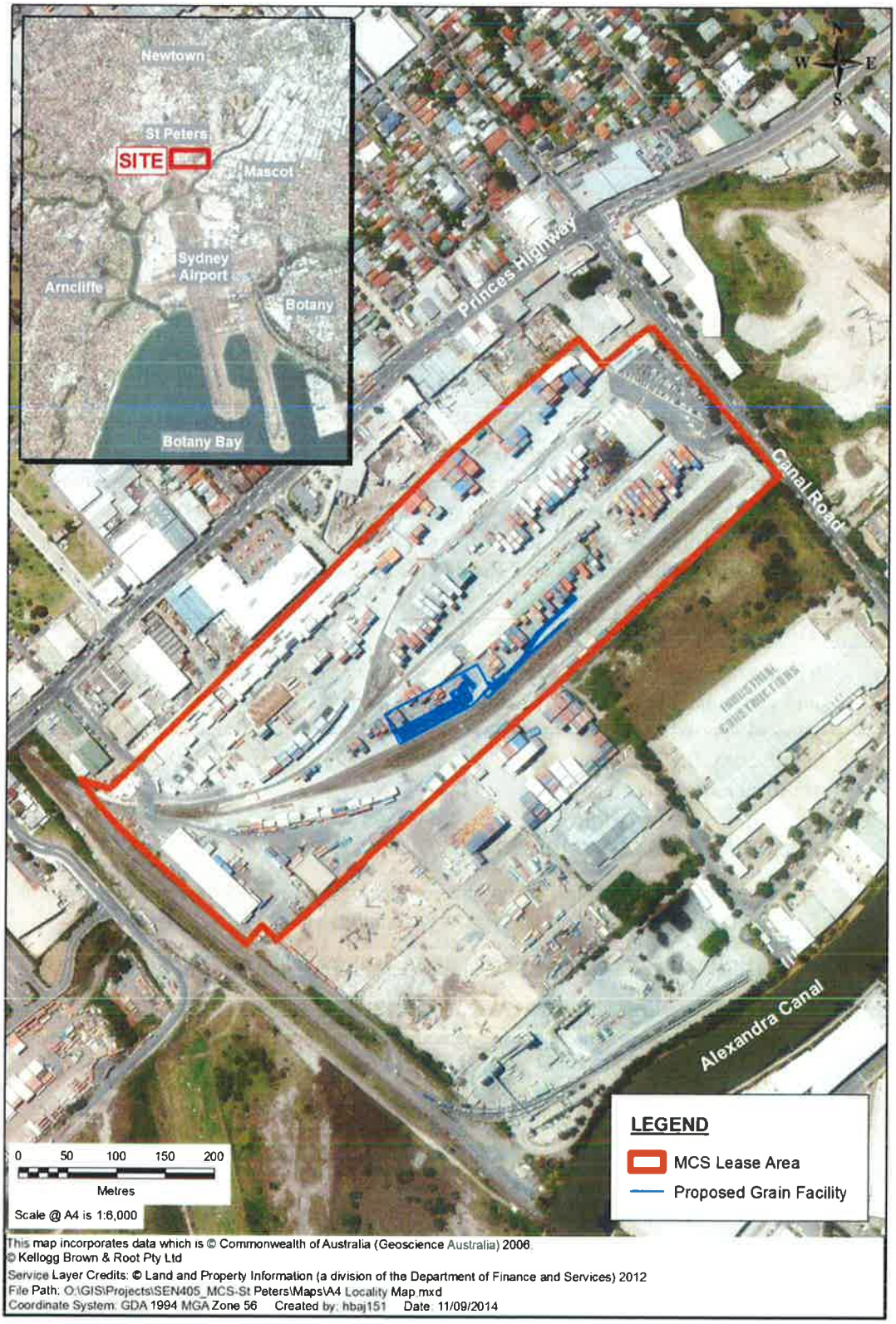


Figure 2.1
SITE LOCATION IN RELATION TO KEY FEATURES

3 Scope of works

The construction works described below are part of the grain storage and container packing facility which MCS are proposing to construct within the Site. The construction works described as part of this CMP focus on the preparation of the footings and excavations works, which are the initial stage construction associated with the grain storage area and silo erection. Components of construction to which this management plan will not apply (i.e. the erection of silos, construction of buildings etc.) have not been included in the description of works.

3.1 CONSTRUCTION COMPONENTS

The proposed initial construction works associated with the facility will include the following construction works:

- excavation of a pit to allow the installation of a below ground hopper
- removal of existing concrete and installation of a new concrete slab as foundations for the silos and associated structures/buildings
- augmented stormwater infrastructure
- stockpiling of material.

Key components of the proposed grain storage and container packing facility are shown in Figure 3.1.

The below ground hopper will be installed in an excavated pit beneath an existing rail track. The pit will measure approximately 13 m long x 9 m wide and 3.2 m in depth. This excavation will result in the recovery of approximately 375 m^3 of material. Some of the material excavated will be comprised of the existing rail track ballast.

Installation of the stormwater infrastructure, above ground grain storage silos and associated structures/buildings will require the removal of the existing concrete. Test holes drilled in 2006 indicate that the thickness of the existing concrete in this area is between 0.4 m and 0.9 m (EI, 2007). The approximate area of existing concrete that has been identified for removal for installation of the silo slab is around 960 m^2 (i.e. 80 m long x 12 m wide).

Other areas of existing slab will also need to be removed to support the installation of the associated structures/buildings. This area covers approximately 170 m^2. Using an average concrete thickness of 0.7 m, the concrete removal activity over the 1,130 m^2 (i.e. 960 m^2 and 170 m^2) is expected to generate around 790 m^3 of material, which equates to around 1,900 t of concrete using a conservative density value for concrete of 2,400 kg/m^3.

Figure 3.1
KEY FEATURES OF PROPOSED WORKS

The stormwater drainage infrastructure that is proposed to be installed beneath the new slab comprises around 18 stormwater pipes ranging from 150 mm to 900 mm in diameter. The works also involve the installation of approximately 17 stormwater connection pits. Some of these pits will house larger diameter stormwater pipes. As such, excavations will be required below the concrete slab and into the underlying fill and natural soil. A drawing showing the extent of the new slab, the location of the proposed silos, stormwater infrastructure and associated structures/buildings is included in Appendix A.

3.2 PROPOSED CONSTRUCTION METHOD

The proposed initial construction works associated with the facility are regarded as conventional, therefore standard practices and equipment will likely be employed. Typical machinery items used in the construction works will likely include excavation plant, water/air jets, drop hammers, vibratory hammers and vibratory plate compactors.

The initial stage of works will likely occur over a period of about five weeks. A description of the construction method for the two primary construction activities is provided in the following sections.

3.2.1 Excavation works for installation of below ground grain hopper

Excavation of the pit that will house the grain hopper will be undertaken by an excavator. The rail track ballast will be removed using an excavator before soils are removed from below ground level. The ballast material will be stockpiled separately from the other material excavated from this pit.

At a pre-determined spacing around the perimeter of the excavation, holes will be drilled for the purposes of installing groundwater spears. The spears will be used to drawdown groundwater either side of where sheet piles will be installed and below the target excavation depth. It is anticipated that groundwater will be extracted from the proposed excavation for no more than 5 weeks.

Sheet piles will be initially installed on the sides of the excavation, before soil is removed from inside the sheet piles. A template or a guide structure will be used to ensure the sheet pilings are placed and driven to the correct alignment. Once the sheet piles are set in place, a jetting machine or driving hammer will be used to start driving the sheet piles. The actual method adopted may vary slightly according to the manufacturer's instruction regarding proper interlocking etc. Any excess sheet pile remaining at the surface, after the target depth has been achieved, will be cut-off and removed.

During the excavation works, bunding will be installed around the perimeter of the 'pit' to protect against water ingress from overland flows. Once the target depth has been achieved across the base of the excavation, a concrete base will be installed. This will be followed by installation of the concrete walls, which will be installed approximately 0.75 m from all edges of the concrete base. The concrete walls are to be cast on-site. Material excavated from the pit will then be used to backfill the cavity between the sheet piles and the concrete walls. Following compaction of this material, the sheet piles would then be removed.

3.2.2 Works associated with concrete removal for installation of new slab

The structural integrity of the existing concrete is unknown; therefore the slab will need to be removed to support the silos and associated infrastructure. An excavator will be employed to break up the existing slab. Stormwater drainage infrastructure will be installed within the proposed slab.

An excavator equipped with a vibratory hammer will likely be the primary method of breaking up the existing slab. The concrete which is recovered during these works will be taken to the concrete recycling plant immediately adjacent to the site.

3.3 STOCKPILING OF MATERIAL

Material recovered during excavation of the pit will be stockpiled nearby. The stockpiles will be protected by bunding which will reduce sediment transport from stormwater run-off, and will also be covered by plastic sheeting to further reduce material loss. If bare ground is identified for material placement, impervious plastic sheeting will be laid underneath the stockpile. During the pit excavation, the concrete and crushed gravel (i.e. fill) in the upper profile will be stockpiled separately to the other material. Similarly, should any distinctly different material be encountered during the excavation, it will be stockpiled separately.

Concrete recovered as a result of the removal of the existing slab will be stockpiled nearby in a controlled location, for transportation to the concrete recycling plant, immediately adjacent to the site. Fill and soil material recovered from the deeper excavations required for select stormwater connection pits will be managed using the same methods described above for pit excavations.

4 Contaminated land

4.1 REGULATORY FRAMEWORK

This CMP has been prepared to provide guidance on the management of potentially contaminated soil and groundwater produced as a result of the proposed works described in Section 3. All site operations are to be carried out by a suitably qualified person in accordance with the requirements of the relevant regulatory guidelines and legislation, including but not limited to:

- *NSW Contaminated Land Management Act (1997)*
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (2013)
- Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australian and New Zealand (ARMCANZ), Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- Guidelines for the Assessment and Management of Groundwater Contamination (2007)
- Guidelines for the NSW Site Auditor Scheme, 2nd edition (2006)
- Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997 (2009)*
- Marrickville Council Development Control Plan (2011)
- NSW EPA Contaminated Sites: Sampling Design Guidelines (1995)
- *NSW Occupational Health and Safety Act (2000)*
- NSW Occupational Health and Safety Regulations (2001)
- *Protection of the Environment Operations Act (2007)*
- Protection of the Environment Operations (General) Regulation (2009)
- Managing Urban Stormwater: Soils and construction Volume 1(Landcom 2004)
- *NSW Water Management Act (2000)*

4.2 PREVIOUS CONTAMINATION INVESTIGATIONS

In 2006, URS carried out an investigation into contaminated land at the Cooks River Rail Terminal. The investigation was prepared for NSW Ports (formerly Sydney Ports Corporation) and included a management plan for the entire Cooks River Rail Terminal Site. The investigation was carried out in two stages which included an

Environmental Site Assessment (completed in 2005) and a groundwater quality report (undertaken in 2006). The Environmental Site Assessment included the installation of 73 boreholes across the 19 ha site, of which, 6 boreholes were within approximately 50 m of the proposed works. Of the 73 boreholes, 19 were converted into groundwater monitoring bores which later informed the groundwater quality monitoring report.

4.2.1 Soil

The underlying soil at the site was described as heterogeneous with varying quantities of ashy/coke material and railway ballast (URS, 2006), no particular contamination 'hot spots' were identified in the report. The investigation identified elevated concentrations of both Poly Aromatic Hydrocarbons (PAH) and heavy fraction total petroleum hydrocarbons (TPH) generally across the site with some instances of elevated heavy metals (copper and lead and zinc) in isolated areas. Table 4.1 below summarises the findings of the analysis and provides comparison against relevant guideline criteria. Contaminated soil guideline criteria are further discussed in Section 5.4.

Table 4.1 Summary of contaminated soil analysis (URS, 2006)

Analyte	Units	Mean concentration	Maximum Concentration	Guideline Value
TOTAL PETROLEUM HYDROCARBONS (TPH)				
TPH C10 - C36	mg/kg	2,315.6	17,162	20,000 (CRC Care: Direct Contact HSL D)
POLY AROMATIC HYDROCARBONS (PAH)				
Benzo(a)pyrene	mg/kg	22.8	129	40 (NEPM: HIL - D)
Total PAHs	mg/kg	344.2	3,892.5	4,000 (NEPM: HIL - D)
INORGANICS				
Arsenic	mg/kg	14.7	204	3,000 (NEPM: HIL - D)
Copper	mg/kg	254.7	12,500	240,000 (NEPM: HIL - D)
Lead	mg/kg	211.8	2,830	1,500 (NEPM: HIL - D)
Nickel	mg/kg	74.5	2,290	6,000 (NEPM: HIL - D)
Zinc	mg/kg	856.7	30,900	400,000 (NEPM: HIL - D)

4.2.2 Groundwater

The groundwater is described as generally displaying elevated concentrations of ammonia and Total Kjeldahl Nitrogen (TKN) (URS, 2006). Records also indicate that TPH and PAH were detected in some of the groundwater samples. Table 4.2 summarises the findings of the groundwater analysis undertaken by URS in 2006 and provides some relevant guideline values. Groundwater guideline criteria are discussed in Section 5.7.

Table 4.2 Summary of contaminated groundwater analysis (URS, 2006)

Analyte	Units	Mean concentration	Maximum Concentration	Guideline Value (ANZECC 2000 80th percentile level of protection for marine water)
POLY AROMATIC HYDROCARBONS (PAH)				
Anthracene	µg/L	2.4	3.9	-
Benzo(a)pyrene	µg/L	2.9	10.3	-
Fluoranthene	µg/L	6.2	23.1	-
Phenanthrene	µg/L	6.9	12.6	-
Total PAHs	µg/L	30.0	115.6	120
INORGANICS				
Arsenic	mg/L	0.011	0.037	0.14#
Copper	mg/L	0.003	0.005	0.008
Lead	mg/L	0.004	0.006	0.012
Zinc	mg/L	0.173	1.46	0.043
Ammonia*	mg/L	4.25	16.6	1.7

** Ammonia results taken from November 2004 monitoring event.*

 # ANZECC freshwater 80th percentile protection limit. As there is no guideline value provided for the protection of marine waters for Ammonia, the freshwater 80th percentile protection limit was included as an indicative guideline value

4.3 POTENTIAL FOR CONTAMINATED LAND

Based on the industrial history of the site and the results presented in the Environmental Site Assessment, it is likely that the proposed works described in Section 3 will encounter the fill material described in URS (2006) as heterogeneous sandy, gravelly fill, with varying amounts of ashy/coke material and railway ballast. It is possible that the material encountered during the works will be contaminated with some elevated concentrations of PAHs and TPH, and possibly some inorganic heavy metals.

Groundwater encountered may also exhibit elevated concentrations of TPH, TKN and ammonia.

5 Management strategy

The management strategies described in this CMP outlines the proposed measures for the handling, assessment and disposal of potentially contaminated soil and groundwater. There is also a number of reporting and notification requirements outlined which have been adopted from the existing CMP (URS, 2006).

5.1 PLANNING INTRUSIVE SITE WORKS

Prior to undertaking any intrusive works on the site, MCS should notify NSW Ports in writing providing details of the proposed activities. It is also necessary that any underground structures in the area are to be located prior to the commencement of intrusive works.

5.2 ENVIRONMENTAL CONTROLS DURING EXTRACTIVE OPERATIONS

Any concrete and dry gravel near the surface of the proposed works should be stockpiled separately as these materials are unlikely to be contaminated. All other excavated material, until such a time as it has been characterised, should be treated as contaminated. No known underground structures have been identified within the proposed works area.

Table 5.1 Extractive operations management actions

Activity	Management Action	Timing
Excavation of potentially contaminated material	• All material (aside from the concrete and dry gravel near surface) is to be treated as potentially contaminated until it has been characterised • The licensed operator of the excavation machinery and other construction staff should not come into direct contact with the potentially contaminated material. • All material is to be placed in separate stockpiles as soon as it has been excavated • visual inspection of the excavated material for signs of contamination to be carried out during all excavation (visual signs include soil staining, visible hydrocarbons, strong odours)	During construction

5.3 STOCKPILE CONTROL

All uncharacterised excavated material (aside from concrete and dry gravel) is to be stored in stockpiles prior to disposal. Excavated spoil is not to be mixed such that clean material will come into contact with potentially contaminated material. Stockpile controls are to be implemented such as to reduce the impacts of erosion and ensure potentially contaminated sediment cannot reach potentially sensitive receptors or the receiving environment. Any temporary drainage measures required are to be

managed in accordance with *The Blue Book. - Managing Urban Stormwater: Soils and Construction* (Landcom, 2004).

The following management actions relate to the management of stockpiles associated with the proposed works.

Table 5.2 Stockpile management actions

Activity	Management Action	Timing
Placement of potentially contaminated material	• All potentially contaminated material should be stockpiled on an impervious surface (concrete), if one is not readily available; the material is to be stockpiled on plastic sheeting.	During construction
	• Any material which is visibly different from other material should be stockpiled separately for classification purposes	During construction
	• The volume of all stockpiles is to be recorded (see Section 5.8)	As required
Visible monitoring of excavated material	• If any instances of notable contamination are encountered (i.e. soil staining, strong odour) the operator should cease all activity and contact an environmental specialist before proceeding.	As required
	• Additional reporting may be required (see Section 5.8)	
Sediment control /stockpile management	• Constructed bunding should be placed around the stockpile in order to reduce the transport of sediment attributed to any stormwater runoff or overland flow	At all times
	• Any temporary drainage devices to control soil and water movement around the site are to be constructed and managed in accordance with *The Blue Book. - Managing Urban Stormwater: Soils and Construction.*	As required
	• The stockpiles are to be kept suitably moist to reduce sediment transport from wind erosion. Additionally, the stockpiles can be covered by plastic to further reduce the likelihood of impacting nearby sensitive receptors.	As required
	• The bunded area should be designed to minimise potential for impact on nearby receptors. Leachate from the stockpile should be contained within the bunded area and treated in accordance with the extracted groundwater (described in section 5.7).	At all times
	• All stormwater inlets in close proximity to stockpiled material and the excavations are to be appropriately protected from sediment inflows in accordance with *The Blue Book.*	At all times
General operations	• The bunding should act as a general clearance area, and personnel should be advised not to enter the area without adhering to specific safety guidelines.	At all times
	• Any personnel likely to come into contact with the excavated material are to wear long pants, long sleeved shirts and a clean, new pair of latex/nitrile gloves. If necessary respirators are to be worn (dependent on fumes from excavated material).	At all times
Tracking potentially contaminated mud and sediment	• Tracked mud and sediment are to be controlled and cleaned up to retain all sediment on site and reduce contamination risk to human health and other receptors.	At all times
	• Inspect vehicles entering and leaving the site for excessive amounts of sediment	At all times
	• Inspection of nearby roads should provide a benchmark for the on-site conditions with regard to sediment tracking	
	• Where possible the egress points around the construction site are to be limited	

Activity	Management Action	Timing
	• Where tracked sediment is noted, it is to be cleaned immediately by sweeping/shovelling or similar mechanical removal methods	At all times
	• Accumulated sediment is not the be flushed into stormwater system by use of hoses or a water truck	At all times

5.4 ASSESSMENT AND DISPOSAL OF SOIL

Classification of the excavated material will determine the most relevant management strategy adopted for the treatment and disposal of the excavated material. Until such a time as the excavated material has been characterised, it should be treated as contaminated and should remain isolated.

The characterisation of the excavated material should be undertaken by an appropriately qualified person in line with the guidelines described in the NEPM (NPEC, 2013), NSW Sampling Design Guidelines (NSW EPA, 1995), and the *NSW Contaminated Land Management Act (1997).* The results of all soil and groundwater testing are to be reported to NSW Ports, and a disposal method is to be agreed prior to being undertaken (see Section 5.8).

Table 5.3 Soil characterisation procedure

Activity	Monitoring Action	Timing
Classification of excavated material	• Excavated material is to be tested ex-situ, after stockpiling. • Samples are to be collected a suitably qualified person • Analytical analysis is to be performed by a NATA accredited laboratory. • The number of samples required per stockpile is shown in Table 5.4. • Tests performed should cover all analysis required in Table 5.6.	As required

The sample collection volumes identified in Table 5.4 have been derived from the NEPM (NPEC, 2013). The samples should be collected in a manner consistent with the requirements of the NSW Sampling Design Guidelines (NSW EPA, 1995).

Table 5.4 Number of samples for collection from stockpiles

Stockpile Volume (m^3)	Number of samples
< 75	3
75 – <100	4
100 – <125	5
125 – <150	6
150 – <175	7
≥ 200	8

The contaminant threshold guideline values for the characterisation of each stockpile are presented in Table 5.5. These guideline values have been derived from the NEPM (NEPC, 2013). The source of each guideline criteria selected is included in Table 5.5. Each guideline criteria has been selected based on the understanding that it will be

used to characterise each stockpile for disposal purposes. As the soil is intended to remain on site in stockpile form, the health based investigation levels were selected for most inorganics and metals (with the exception of aged arsenic, which has a specific environmental investigation level). The maximum 95% upper confidence limit (UCL) of the arithmetic mean for each stockpile should be used to compare against the guideline value. This will provide a 95% confidence level that the true population mean will be less than or equal to the guideline value for each stockpile. No single value should exceed 250% of the relevant guideline value.

Table 5.5 Soil contaminant guideline values

Analyte	Units	Guideline Value	Source of guideline value
METALS AND INORGANICS			
Arsenic	mg/kg	160	Generic EIL for Aged As (Commercial and industrial)
Lead	mg/kg	1500	NEPM (HIL - D) Schedule B1
Copper	mg/kg	240000	NEPM (HIL - D) Schedule B1
Nickel	mg/kg	6000	NEPM (HIL - D) Schedule B1
Zinc	mg/kg	400000	NEPM (HIL - D) Schedule B1
POLYCYCLIC AROMATIC HYDROCARBONS			
Benzo(a)pyrene	mg/kg	40	NEPM (HIL - D) Schedule B1
Total PAH	mg/kg	4,000	NEPM (HIL - D) Schedule B1
Naphthalene	mg/kg	370	Generic EIL (Commercial and industrial). NEPM Schedule B1
BTEX			
Benzene	mg/kg	75	ESL for BTEX in soil (commercial). Schedule B1 NEPM
Toluene	mg/kg	135	ESL for BTEX in soil (commercial). Schedule B1 NEPM
Ethylbenzene	mg/kg	135	ESL for BTEX in soil (commercial). Schedule B1 NEPM
Xylenes	mg/kg	185	ESL for BTEX in soil (commercial). Schedule B1 NEPM
TOTAL PETROLEUM HYDROCARBONS			
C6 - C10	mg/kg	215	ESL for TPH in soil (commercial). Schedule B1 NEPM
>C10 - C16	mg/kg	170	ESL for TPH in soil (commercial). Schedule B1 NEPM
>C16 - C34	mg/kg	1,700	ESL for TPH in soil (commercial). Schedule B1 NEPM
>C34 - C40	mg/kg	3,300	ESL for TPH in soil (commercial). Schedule B1 NEPM

Should any of the stockpiles exceed the guideline values described in Table 5.5, the stockpile is the removed to a licenced facility. Should the material be required to be removed to a licensed facility, waste tracking receipts will be required.

The two closest licensed facilities are

- Alexandria Landfill — 10 Albert Street St Peters (only accepts limited quantities), and

- Genesis Xero Waste Facility — Honeycomb Drive Eastern Creek.

In the case of the results showing uncontrolled disposal is viable, the material is to be stored on site where any stockpile is to be graded and seeded to ensure minimal erosion.

5.5 WASTE TRACKING

Should excess waste be required to be transported to a licensed facility, it is necessary to track the waste to minimise potential harm to the environment and human health. The waste tracking process is to be carried out in compliance with the existing CMP and relevant legislation. A summary of the process is described in Table 5.6

Table 5.6 Waste tracking management

Activity	Management Action	Timing
Waste tracking	• Written consignment authorisation number from and EPA licensed waste disposal or treatment facility	As required
	• A waste data form must be completed and signed by the consigner before waste is dispatched. The waste consignor, the waste transporter and the waste facility are each required keep a copy of the waste data form for up to four years (for auditing purposes)	As required
	• A completed copy of the waste data form must be handed from the waste consignor to the transporter. The transporter us to check that it is complete and then sign it. The driver must carry the waste data form in the vehicle.	As required
	• The transporter must give a completed copy of the waste data form to the waste facility on arrival. The waste facility operator must check the load details on the form. The waste data form must be signed by a representative of the waste facility on receipt of the waste at the destination	As required
	• Written confirmation of the receipt of waste from the waste facility must be sent to the waste consignor within 21 days of dispatch. This must be kept for up to four years for auditing purposes.	As required

Disposal of excess soil requires nomination of the disposal facility in the Permit Application. The facility can be dealt with directly by MCS or through an authorised contractor acting on MCS's behalf.

The waste classification criteria from the NSW Waste Classification Guideline (DECCW, 2009) in Table 5.7 will be required for waste classification purpose prior to disposal at a licensed facility.

Table 5.7 Stockpile contaminant threshold values for waste classification

Contaminant	Maximum values for leachable concentration and specific contaminant concentration when used together			
	General solid waste		Restricted solid waste	
	Leachable concentration	Specific Contaminant concentration	Leachable concentration	Specific contaminant concentration
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)
Benzene	0.5	18	2	72
Benzo(a)pyrene	0.04	10	0.16	23
Ethylbenzene	30	1080	120	4320
Toluene	14.4	518	57.6	2073
Xylenes (total)	50	1800	200	7200
Lead	5	1,500	20	6,000
Arsenic	5.0	500	20	2000
C6-C9 petroleum hydrocarbons	N/A	650	N/A	2600
C10-C36 Petroleum hydrocarbons	N/A	10,000	N/A	40,000

5.6 DEWATERING

As the proposed scope of works will include the excavation of soil below the groundwater level, dewatering will be required during certain period of construction. The proposed dewatering strategy is outlined below.

Seepage water collected in pits and groundwater recovered from the spears is to be appropriately managed. Water extracted from the excavation will be transferred to an appropriate holding facility and tested for key parameters prior to disposal. Should any treatment of the extracted water be required prior to discharge, this will take place on site unless the groundwater is to be removed to a licensed facility.

Groundwater flow rates have been estimated using typical aquifer properties which reflect the soil type at the site in order to estimate the volume of water that will be extracted from the spears during construction. The aquifer gradient flows towards Alexandra Canal, the aquifer is at least 10 m thick and comprised predominantly of sandy clay. The existing water level starts from approximately 1.6 mbgl and the dewatering activity will cause drawdown of around 1.2 m at the pit excavation and decreasing to approximately 0.5 m at a radius of 40 m from the excavation. It is estimated that around 1 ML of water will need to be extracted from the spears during the 5 week dewatering period. This equates to an average extraction rate of around 30 kL/d.

The preferred method of disposal is dependent upon the quality of the groundwater extracted. The most recent groundwater quality data (URS, 2006) suggests that the groundwater may be impacted by elevated concentration of nutrients and may contain traces of hydrocarbons. It is unlikely that the seepage water/groundwater will be of a suitable quality for immediate discharge without treatment. The three potential disposal options for the extracted groundwater include:

- discharge to the stormwater system

- discharge to trade waste
- immediate disposal to a licenced facility by a licensed contractor (via sucker truck or similar).

On-site treatment will likely be required prior to discharge to stormwater. In order to discharge to the stormwater system, the analytical results of the extracted water must comply with all relevant DECCW and ANZECC standards for water quality in accordance with the Marrickville Council DCP (Marrickville Council, 2011).

MCS have an existing trade waste agreement with Sydney Water for the discharge of industrial trade waste that is currently valid until 01/07/2018. This option may be explored in collaboration with Sydney Water, based on the agreed characteristics of the trade waste stream.

Disposal by a licensed operator would involve hiring a licensed operator to receive the extracted groundwater directly which would then be transported and treated at a licensed offsite facility for a fee.

5.7 ASSESSMENT AND DISCHARGE OF EXTRACTED GROUNDWATER

It will be necessary to monitor water extracted from the excavation during the proposed construction works. It should be noted that if the discharge of groundwater is undertaken by a licensed contractor for removal to a treatment facility, no monitoring action will be required.

The following criteria for discharge of groundwater have considered the ANZECC 2000 guidelines in accordance with the Marrickville Council DCP (2011).

Table 5.8 Water quality monitoring requirements

Issue	Monitoring task	Frequency /timing	Performance criteria
Water collected in pits and from the pumping of groundwater spears	If the adopted management method involves discharge to stormwater system, water shall be tested for parameters	Prior to discharge	
	pH		pH: 6.5-8.5#
	DO		DO: 90-110% saturation#
	PAH~		PAH: 0.12 mg/L#
	Ammonia~		Ammonia: 1.7 mg/L#
	TKN~		TKN: 0.12 mg/L#
	Copper~		Copper: 0.008mg/L#
	Lead~		Lead: 0.012 mg/L#
	Zinc~		Zinc: 0.043 mg/L#
	Suspended solids		Suspended solids: 50 mg/L

Issue	Monitoring task	Frequency /timing	Performance criteria
Water collected in pits and from the pumping of groundwater spears	If the adopted management method involves discharge using trade waste services, water shall be tested for the following parameters:	Prior to discharge	
	pH		pH: 7.0-10.0^
	Suspended solids		Suspended solids: 600 mg/L^
	Grease		Grease: 110 mg/L^
	Sulfate		Sulfate: 2,000 mg/L^
	Temperature		Temperature: $\leq$ 38°C^
	Maximum flow rate		1.9 L/s^
	Maximum daily discharge		10 kL^
	Average daily discharge		4 kL^
	Other water quality indicators		To be negotiated with Sydney Water Corporation.

 # values have considered the 80th percentile level of protection for marine water provided in ANZECC 2000. These have been adopted since discharge would be into Alexandra Canal, which is highly disturbed receiving water. Guideline values for metals refer to filtered samples.

~ These analytes have been identified as contaminants of concern by the contaminated land investigation (URS 2006).

^ values taken from Consent to Discharge Industrial Trade Wastewater No. 26463.

5.8 REPORTING

Table 5.9 Reporting Requirements

	Action	Timing
Reporting Requirements	Ensure a copy of the following documents are readily available to specific personnel: • a copy of the CMP • copies of relevant work instructions • copies of permits required under relevant environmental legislation/conditions	Prior to commencement of works
	Records of soil volumes extracted, stock pile volumes and locations to be maintained in an environmental register	As required
	All results from soil and groundwater monitoring shall be maintained and forwarded to NSW Ports	As required
	Waste tracking will be documented with all receipts maintained in an environmental register	As required
	The volume and destination of groundwater extracted to be recorded in an environmental register.	As required
	Incident and non-conformance reporting is also to be undertaken to ensure that: • Environmental incidents and non-conformance regarding the management of contamination is identified, investigated and action is taken to mitigate any adverse impact caused. • Corrective and preventative actions are initiated and completed. • Identified non-conformances lead to improvements in systems and or/processes.	As required

	Action	Timing
OHS Documentation reporting (URS, 2006)	• Results of environmental and personnel monitoring (e.g. air/dust/noise/water quality) are to be documented and reported to NSW Ports	As Required
	• Any health and safety incidents or issues potentially related to site contamination is to be reported to NSW Ports;	As Required
	• A record of the inducted personnel who have completed any relevant OHS training for the proposed works is to be maintained by MCS.	As Required
	• Following completion of the works, the Applicant will be required to submit the following to NSW Ports: • Daily logs documenting the location and quantities of material excavated, reinstated and disposed of off-site. This information should be recorded on a log sheet and completed with an as-built site plan; • Source and verification of imported fill; • Waste tracking receipts and approvals documentation from the licensed facilities to which materials had been disposed; and • Survey plans of the excavation areas and depths which have been surveyed and prepared by registered surveyors	Upon completion of works

5.9 NOTIFICATION PROCEDURES

In the unlikely event of unexpected conditions encountered during the works, or there is a suspected contamination issue not described in this CMP, MCS are to notify NSW Ports. Notwithstanding notification to NSW Ports, MCS shall also notify other relevant authorities such as EPA and Marrickville Council as required.

Unexpected conditions includes, but are not limited to, the identification of potential asbestos fragments, notable hydrocarbon impacted soil or groundwater, location of unknown underground structures or known underground structures impacted by contamination, and a cave in of the excavation.

5.10 RESPONSIBILITIES

Management activities related to contaminated land and groundwater is the responsibility of MCS. The implementation of the CMP management measures on-site is to be undertaken by competent operators and suitably qualified persons.

6 References

ANZECC (2000), *Australian Water Quality Guidelines for Fresh and Marine Waters*, November 2000.

Friebel, E. and Nadebaum, P. 2011, Health screening levels for petroleum hydrocarbons in soil and groundwater - Part 2: Application Document, CRC Care Technical Report no. 10, CRC for Contamination Assessment and remediation of the environment, Adelaide, Australia.

Department of Environment, Climate Change and Water NSW (DECCW), 2009, *Waste Classification Guidelines, Part 1: Classifying Waste*. Sydney, NSW.

Landcom, 2004, Managing Urban Stormwater: Soils and construction vol. 1 (4th edn)

Environmental Investigations (EI) (2007). Tubman Consulting Engineers Pty Ltd, *Targeted Acid Sulfate Soil Assessment (Revised).* Report No. E681.2 AA dated 12 June 2007.

Marrickville Council, 2011, Marickville Development Control Plan (MDCP), Amendment No. 2, Sydney, NSW. Accessed at http://www.marrickville.nsw.gov.au/en/development/planning-controls/marrickville-dcp-2011/.

NEPC, 2013, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (April 2013), Canberra.

URS (2006). *Final Report Contamination Management Plan for the Cooks River Rail Terminal, Bellevue Street, St Peters, NSW*. Dated 4 April 2006, reference SMP-R1.

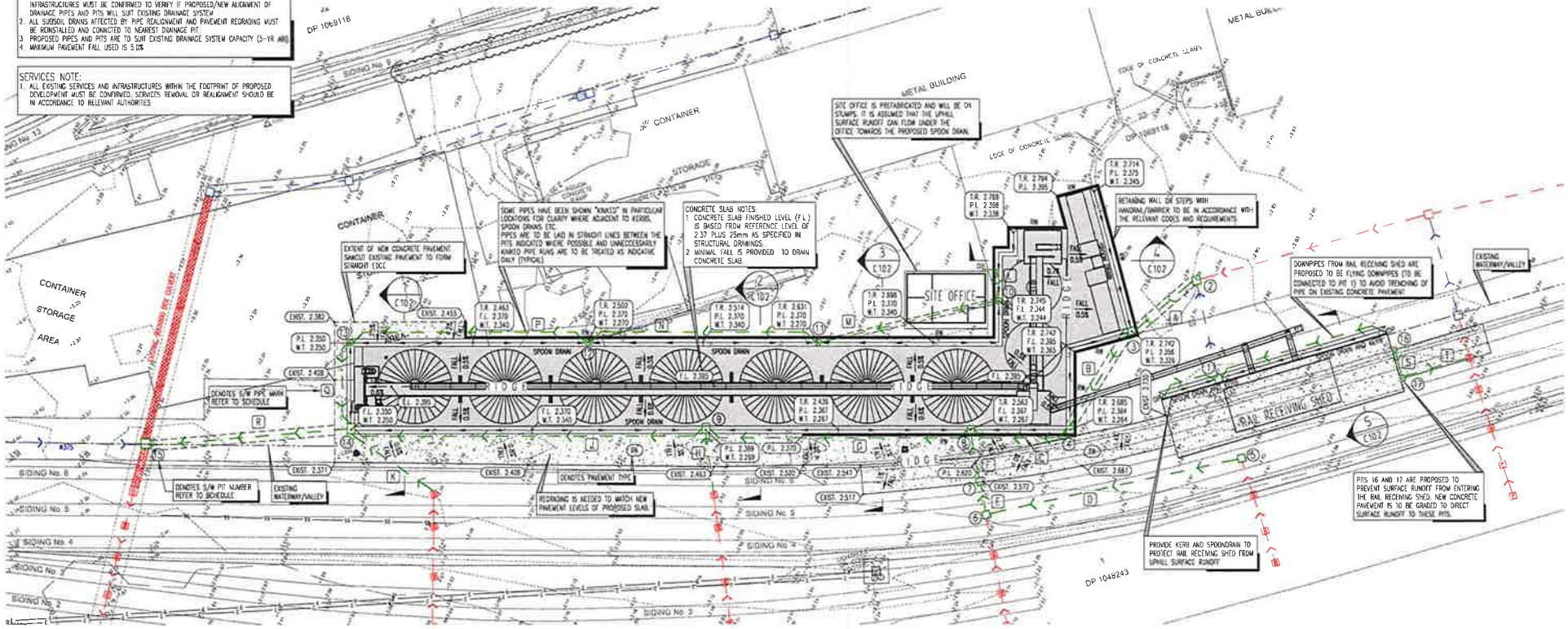
Appendix A

PROPOSED STORMWATER DRAINAGE LAYOUT

REFER TO DRAWING C100 FOR CIVIL NOTES.
REFER TO DRAWING C101 FOR SCHEDULES.

DESIGN NOTES:
1. PRIOR TO COMMENCEMENT OF FINAL DESIGN, DETAILS OF EXISTING STORMWATER INFRASTRUCTURES MUST BE CONFIRMED TO VERIFY IF PROPOSED/NEW ALIGNMENT OF DRAINAGE PIPES AND PITS WILL SUIT EXISTING DRAINAGE SYSTEM
2. ALL SUBSOIL DRAINS AFFECTED BY PIPE REALIGNMENT AND PAVEMENT REGRADING MUST BE REINSTALLED AND CONNECTED TO NEAREST DRAINAGE PIT.
3. PROPOSED PIPES AND PITS ARE TO SUIT EXISTING DRAINAGE SYSTEM CAPACITY (5-YR ARI)
4. MAXIMUM PAVEMENT FALL USED IS 5.0%

SERVICES NOTE:
1. ALL EXISTING SERVICES AND INFRASTRUCTURES WITHIN THE FOOTPRINT OF PROPOSED DEVELOPMENT MUST BE CONFIRMED. SERVICES REMOVAL OR REALIGNMENT SHOULD BE IN ACCORDANCE TO RELEVANT AUTHORITIES



DRAINAGE PLAN.

SCALE 1:250

0 2500 5000 7500 10000 12500 25000mm

SCALE 1:250

LEGEND

- CONCRETE SLAB/FOOTING PER STRUCTURAL ENGINEER'S DESIGN
- HEAVY DUTY CONCRETE PAVEMENT (VEHICULAR) TYPE P.X
- EXISTING SPOT LEVEL
- EXISTING CONTOUR
- PROPOSED CONTOUR
- SPOON DRAIN
- PROPOSED STORMWATER PIPE
- PROPOSED G'S GRATED SUMP
- NEWLY CONSTRUCTED PIPE BASED FROM AS BUILT DRAWINGS
- NEWLY CONSTRUCTED PIT BASED FROM AS BUILT DRAWINGS
- EXISTING PIPE (PROJECTED FROM DRAWING "LH9497-CRE-300 TO 301")
- EXISTING PIT (PROJECTED FROM DRAWING "LH9497-CRE-300 TO 301")
- SUBSOIL DRAIN
- COMMUNICATIONS CONDUITS
- ELECTRICAL CONDUITS
- PIT NUMBER
- STORMWATER PIPE MARK
- DOWN PIPE CONFIRM WITH ARCH' DWGS
- INSPECTION OPENING (I.O)
- DESIGN LEVEL
- T.K. TOP OF KERB
- W.T. WATER TABLE
- P.L. PAVEMENT LEVEL
- I.L. INVERT LEVEL
- T.B. TOP OF BANK
- B.B. BOTTOM OF BANK
- F.L. FINISHED LEVEL
- F.F.L. FINISHED FLOOR LEVEL
- B.L. BENCH LEVEL
- C.L. COVER LEVEL

STORMWATER PIT SCHEDULE

PIT No.	DESCRIPTION	COVER LEVEL (C.L.)	INVERT LEVEL (I.L.) IN	INVERT LEVEL (I.L.) OUT	COVER	PIPE #	IN/ OUT
1	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
2	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
3	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
4	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
5	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
6	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
7	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
8	900 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
9	1200x900 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
10	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
11	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
12	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
13	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
14	1200x900 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
15	1200x1200 GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
16	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT
17	600 SQ GS	xx.xxx	xx.xxx	xx.xxx	CLASS 'D' GRATE	XXX XXX	IN OUT

NOTES
1 PIT NUMBER 15 IS TO REPLACE EXISTING "BREAK-IN" PIT TO BOX CULVERT TO SUIT NEW PIPE SIZE AND INVERT LEVEL
2 ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN SHOULD BE INSPECTED AND CLEANED. BUILDER/CONTRACTOR TO NOTIFY THE OWNER/ENGINEER IF ANY PART OF THE EXISTING STORMWATER DRAINAGE SYSTEM IS FOUND DAMAGE AND NEEDS TO BE REPAIRED

STORMWATER PIPE SCHEDULE

MARK	LOCATED BETWEEN PITS	DESCRIPTION SIZE/GRADE	REMARKS
A	2 – 3	ø600 RCP @ 0.50%	
B	3 – 4	ø600 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
C	4 – 8	ø600 RCP @ 0.50%	
D	5 – 6	ø375 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
E	6 – 7	ø450 RCP @ 0.50%	
F	7 – 8	ø450 RCP @ 0.50%	
G	8 – 9	ø600 RCP @ 0.50%	
H	EXIST – 9	ø375 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
J	9 – 14	ø900 RCP @ 0.50%	
K	EXIST – 14	ø375 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
L	DP – 10	ø150 PVC @ 0.50%	
M	10 – 11	ø300 RCP @ 0.50%	

STORMWATER PIPE SCHEDULE

MARK	LOCATED BETWEEN PITS	DESCRIPTION SIZE/GRADE	REMARKS
N	11 – 12	ø300 RCP @ 0.50%	
P	12 – 13	ø375 RCP @ 0.50%	
Q	13 – 14	ø375 RCP @ 0.50%	
R	14 – 15	ø900 RCP @ 0.50%	PIPE GRADE AND INVERT LEVEL TO MATCH EXISTING
S	16 – 17	ø300 RCP @ 0.50%	
T	17 – EXIST	ø300 RCP @ 0.50%	

NOTES
1 ALL PIPES SIZES ARE PRELIMINARY ONLY. DETAILS OF EXISTING PIPES (SIZE AND INVERT LEVELS) MUST BE PROVIDED TO THE DESIGNER PRIOR TO FINAL DESIGN OF STORMWATER PIPES AND PITS
2 ALL PIPES 300mmø OR LARGER MUST BE REINFORCED CONCRETE PIPE CLASS "4" APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS, U.N.O.
3 EQUIVALENT STRENGTH FRC PIPES MAYBE USED IN LIEU OF REINFORCED CONCRETE PIPES.
4 ALL DRAINAGE PIPES LESS THAN OR EQUAL TO 225ø SHALL BE uPVC DWV GRADE CLASS SN8 IN ACCORDANCE WITH AS/NZS 1260:2009 PVC-U PIPES. ALL PVC PIPES ARE TO BE JOINED WITH SOLVENT WELDS

NOTE
1 THE CIVIL CONTRACTOR/BUILDER IS TO REFER TO THE SOIL BORELOGS & CLASSIFICATION
2 THE SOIL BORELOGS MAY INDICATE THAT EXISTING FILLING IS PRESENT ON SITE.
IF SO, THE CIVIL CONTRACTOR/BUILDER IS TO REFER TO THE CIVIL COMPACTION NOTES
3 REFER TO THE CIVIL STORMWATER NOTES FOR FLEXIBLE CONNECTION REQUIREMENTS

WARNING
BEWARE OF UNDERGROUND SERVICES.
THE LOCATION OF SERVICES ARE INDICATIVE ONLY AND NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. CONTRACTOR TO VERIFY ALL SERVICES PRIOR TO ANY EXCAVATION

PRELIMINARY ISSUE
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DESCRIPTION	DATE	BY	REV.
PRELIMINARY ISSUE	28-03-14	LP	B
PRELIMINARY ISSUE	28-02-14	LP	A

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CONSULT AUSTRALIA Member Firm

SCALES	AS SHOWN
DATE	02-14
DRAWN	LGP
CHECKED	MKD
TITLE	CIVIL DRAINAGE PLAN
ADDRESS	20 CANAL RD, ST PETERS
CLIENT	AHRENS/MCS
PROJECT	MCS - COOKS RIVER - DEVELOPMENT APPLICATION
JOB #	12-631
SHEET #	C101
REV	B

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