



Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

by

Property and Asset Management

Sydney Harbour Foreshore Authority

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Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Table Of Contents

1	INTRODUCTION	2
2	PURPOSE.....	3
3	SCOPE.....	3
4	APPLICATION OF THE EMP.....	4
4.1	REFERENCE TO THE EMP	4
4.2	RESPONSIBILITIES	5
4.3	DOCUMENT REVISION	7
5	RISKS AND CONTROL MEASURES	8
5.1	EXPOSURE PATHWAYS.....	8
5.2	CONTROL MEASURES FOR CURRENT ACTIVITIES	10
5.3	CONTROL MEASURES FOR FUTURE ACTIVITIES.....	10
5.4	ASBESTOS MATERIALS	13
5.5	REPORTING OF COMPLAINTS AND INCIDENTS	13
	APPENDIX A: EMP INDUCTION REGISTER	15
	APPENDIX C: INSPECTION RECORD.....	19
	APPENDIX D: COMPLAINTS AND ENVIRONMENTAL INCIDENT REGISTER	21
	APPENDIX E: MATERIALS TRACKING REGISTER	23

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

1 INTRODUCTION

This Environmental Management Plan (EMP) has been prepared for use by the Sydney Harbour Foreshore Authority (the Authority) and relates to the management of potential environmental and health risks associated with contaminated fill materials that may have been used to establish parts of the Authority's public domain.

As a result of the long industrial use within large parts of the Authority's public domain, waste materials contaminated with a number of types of contaminants have been used to fill land. Some of these materials are known to have been used on some of the Authority's public domain, although comprehensive assessment has not been undertaken.

Typical contaminants identified in fill materials comprise heavy metals, especially lead, that was used in paint, pipes and solder; polynuclear aromatic hydrocarbons (PAHs) that result from partial burning of coal and coke; and heavy petroleum hydrocarbons that result from their use as oils and lubricants. In some instances, fragments of asbestos cement materials (ACM) commonly referred to as "fibro", have been incorporated into the fill materials.

This EMP has been prepared to assist the Authority in:

- managing the public domain so that users of these facilities, including members of the public and maintenance workers, are protected; and
- ensuring the environment is protected during normal use of the public domain and during any works that may be required.

The principal elements of the EMP are:

- assigning responsibilities for implementation of the EMP
- protection of the health of users of the public domain by ensuring maintenance of the clean surface cover to prevent exposure to contaminants that may be present in fill materials at depth
- protection of the health of maintenance workers when the surface cover is disturbed by works
- ensuring contaminated or potentially contaminated fill materials encountered during maintenance works are disposed of properly or are replaced at depth beneath the restored surface cover
- maintaining records of inspection of the integrity of the surface cover and of maintenance works.

For the purpose of this EMP, the surface cover is required to be one of more of the following:

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

- topsoil, topsoil with grass cover, or mulch or wood chips, all to a minimum thickness of 50 mm
- a durable artificial fabric, such as artificial turf, rubberised matting, etc that is securely attached to the surface of the public domain
- pavements or roadways or building footprints constructed of concrete, asphaltic cement or other materials such as bricks, paving stones, etc, that cannot be removed by users in the course of their expected use of the public domain.

2 PURPOSE

The Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997* took effect on 1 December 2009. Under the Guidelines further contamination assessment is not needed where:

- “The site is currently used for public open space purposes (for example, parks, playgrounds, playing fields).
- Public access to the site is allowed.
- The site is completely covered with clean material (for example, grass, soil, pavements).
- An appropriate Environmental Management Plan (EMP) and Occupational Health and Safety Plan (OH&S Plan) are being implemented at the site for users and visiting maintenance workers.”

The purpose of this EMP is to document procedures required to ensure that:

- the surface covers of the Authority’s public domain is maintained so that users are not exposed to potentially contaminated fill materials.
- works requiring disturbing the surface of the public domain are undertaken in a manner that protects the health of the workers and members of the public.

3 SCOPE

The sites covered by this EMP include all public domain owned by the Sydney Harbour Foreshore Authority including:

- Darling Harbour;
- The Rocks;
- Ballast Point;
- White Bay; and
- Rozelle Marshalling Yards.

Darling Harbour was capped and turfed as it was developed for the bicentenary; Ballast Point was remediated as part of the development of the new park; the Rozelle Marshalling Yards have never been remediated though the site is fenced and access to the public is generally restricted; and within the Rocks there may be pockets of-lead based paints in the soil or small volumes of poisons used for rodent controls.

This EMP should be applied in all circumstances outlined below due to the likely presence of contamination albeit, of varying levels within the Sydney Harbour Foreshore Authority precincts.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

4 APPLICATION OF THE EMP

4.1 REFERENCE TO THE EMP

The EMP should be referred to under the following circumstances:

- periodically, to ensure the surface cover material is maintained and that contaminated or potentially contaminated materials are not present at the surface
- prior to commencing works, including both “minor works” and “major works” (as defined below) that involve the disturbance of the surface.

For the purposes of this EMP:

- “Minor works” comprise works that require minimal disturbance to the surface cover and comprise activities such as:
 - maintenance of surfaces, including mowing, weeding
 - replacement of artificial turf or other surface covers.
- “Major works” comprise larger scale disturbance to the surface cover and the underlying materials and comprise activities such as:
 - excavation of soils for the construction of pathways, walkways, playing equipment areas and the like
 - construction/maintenance of the public domain
 - construction and maintenance of sub-surface services, such as gas, electricity, stormwater, surface drainage, telephone, cabling and water supply
 - installation of equipment (eg: seats, telephone boxes, garbage bins etc) that require excavation of soils for placement of footings
 - installation and maintenance of landscaped areas, including the planting and removal of trees and shrubs.

This EMP does not replace the Construction EMP that is required to be prepared, implemented and monitored by the contractor engaged to carry out “major works”, as defined below, on the public domain. The Construction EMP is required to be a separate, stand-alone document that addresses matters such as control, monitoring and corrective measures associated with:

- erosion and sediment migration
- storm water and groundwater run-off
- air quality
- protection of flora and fauna
- noise
- vibration

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

- treatment of hazardous materials, including fill materials
- disposal of waste materials
- vehicle movements

The above matters are not addressed in this EMP and the Contractor would be responsible for all aspects of implementing, monitoring, reporting, etc as may be required by the Authority or by law.

This EMP also does not address the Occupational Health, Safety & Rehabilitation Plan that would be required to be prepared, implemented and monitored by the contractor engaged to carry out “major works” on the public domain.

4.2 RESPONSIBILITIES

The Authority’s Regulatory Manager Property and Asset Management is responsible for the overall implementation and maintenance of the EMP and for ensuring that Authority staff and contractors working in the Authority’s public domain have been informed of the requirements of the EMP prior to commencement of works.

The supervisor or person-in-charge of works in the public domain is responsible for implementing the requirements of the EMP during the course of works and at the completion of the works.

The specific responsibilities of the Regulatory Manager Property and Asset Management, and the supervisor or person-in-charge of the works are as follows:

Position	Responsibilities
Regulatory Manager/Asset Management	<ul style="list-style-type: none">- Advise persons working at in the public domain of the requirements of the EMP.- Ensure appropriate consents and licences (as required) are obtained for the works.- Provide training and induction of employees and contractors before and during the works, as appropriate (Appendix A).- Provide a copy of the EMP to the supervisor or person-in-charge of employees and/or contractor/s who are undertaking the works.- Ensure implementation of the EMP. Maintain a log of Project Personnel (Appendix B).- Ensure Authority staff and contractors comply with the requirements of the EMP.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Position	Responsibilities
	<ul style="list-style-type: none"> - Ensure Authority staff and contractors clearly understand the requirements of the EMP and ensure that compliance with the EMP is a condition of any agreement with these parties. - Ensure the conditions of the EMP are implemented and supplemented, if necessary, by conditions of a Development Consent. - Update the EMP if the condition of the public domain is changed, and, if necessary, inform other parties of the changes. - Ensure the public domain is maintained in accordance with the EMP. - Provide the EMP for inclusion on the relevant records maintained by the Regulatory Manager. - Ensure an inspection of the surface of the public domain is undertaken at six-monthly intervals or at other suitable interval. Record the results of the inspections in Appendix C of the EMP. - Ensure all non-conformance and/or complaints are recorded in Appendix D of the EMP.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Position	Responsibilities
Foreshore Authority outdoor staff or contractor	<ul style="list-style-type: none"> - Implement the EMP to ensure compliance. - Complete the registers, databases and records required by the EMP. - Conduct works in an environmentally responsible manner. - Meet relevant OH&S regulatory requirements. - Implement the works in a safe and responsible manner. - Ensure that environmental protection measures are in place and are functioning correctly during the works and after completion of the works, if required. <ul style="list-style-type: none"> o Notify the Regulatory Manager if suspected asbestos containing material is encountered during works on the Site. o Complete non-conformance and corrective action reports as required and undertake follow-up corrective actions, as required. - Conduct monitoring as required in the EMP. - Undertake audits of activities in accordance with the requirements of the EMP. - Ensure non-conformance and/or complaints are reported to the Regulatory Manager - Undertake corrective actions in response to requests made by the Regulatory Manager regarding specific environmental or safety issues. - Ensure all works comply with relevant regulatory requirements. - Inform the Regulatory Manager if conditions change significantly from those documented in the EMP.

4.3 DOCUMENT REVISION

This EMP is required to be reviewed biannually and to be up-dated or amended, as necessary.

It is the responsibility of the Regulatory Manager to ensure the EMP supplied to any person is the current up-dated or amended version.

It is the responsibility of the supervisor or person-in-charge of works proposed to be undertaken to ensure they have the current version of the EMP.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

The up-to-date version of the EMP will be available from the Regulatory Manager.

5 RISKS AND CONTROL MEASURES

5.1 EXPOSURE PATHWAYS

The Authority's public domain is actively utilised and the presence of contaminants at depth within filling materials does not affect the safe use of these facilities when the surface cover is complete.

However, if the surface cover is disturbed, it is possible that a risk of exposure to contaminants may result. In order to develop appropriate measures to control this increased exposure, it is necessary to understand the potential exposure pathways, which comprise inhalation (breathing dust and vapours), skin contact and ingestion (swallowing).

A summary of contaminants commonly identified in materials used to fill land including their potential health affects and exposure pathways, are summarised in the table below.

Contaminant of Concern	Source	Chemicals	Physiological Effect	Exposure Pathway
Polynuclear aromatic hydrocarbons (PAHs) Petroleum hydrocarbons	Waste from industrial activities.	PAHs (e.g., naphthalene, fluorene, acenaphthene, anthracene, benzo(a)pyrene and chrysene). Long-chain petroleum hydrocarbons (generally oils and lubricants). Volatile hydrocarbons (e.g., short-chain petroleum hydrocarbons and benzenes, toluene and xylenes) are less likely to be present.	Inhalation of PAHs (as dust as PAHs are not very volatile) may cause bronchitis and possibly cancer of the respiratory system. Repeated skin contact may result in allergic dermatitis and skin cancer. Inhalation of volatile hydrocarbons, if present, may cause central nervous system effects such as headaches, blurred vision and narcosis when present in high concentrations. Skin contact may	Inhalation of vapours or contaminated dust. Skin contact with contaminated liquids or soil. Ingestion of contaminated liquids or soil.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Contaminant of Concern	Source	Chemicals	Physiological Effect	Exposure Pathway
			cause dermatitis. Long term or chronic exposure may result in liver damage, effects on the blood forming- systems, Exposure to benzene may result in leukaemia.	
Metals / metalloids	Waste from industrial activities.	Metals and metalloids including arsenic, cadmium, copper, chromium, lead, mercury, nickel and zinc. Lead is the most common heavy metal identified in fill materials at levels of concern.	Exposure may result in liver and kidney damage, irritation of the eyes and respiratory system, and dermatitis. Exposure to high concentrations of some metals has been linked to cancer.	Inhalation of vapours or contaminated dust. Skin contact with contaminated liquids or solid materials. Metals other than mercury are not volatile, and exposure by inhalation is expected to constitute a low risk.
Asbestos	Uncontrolled filling materials containing ACM.	Asbestos fibres that are “respirable”. Little or no health risk is posed by fragments of bonded ACM, such as “fibro”. Bonded ACM produces respirable fibres only when subjected to high speed impact by drilling, sawing, sanding, etc.	May cause serious health effects, such as asbestosis, mesothelioma, lung cancer and pleural disease. The risk is greater with increased exposure and even minor exposures can have serious health effects.	Inhalation of asbestos fibres into the lungs.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

5.2 CONTROL MEASURES FOR CURRENT ACTIVITIES

Measures to control the risk posed by potential contaminants have been implemented in the public domain through the presence of a surface cover, which generally comprises clean soil, grassed and landscaped areas, artificial turf and matting, pavements and buildings. These measures are required to be maintained into the future to ensure that the risk of exposure to potential contaminants in fill materials at depth is eliminated.

The maintenance measures for the surface cover are as follows:

- vegetation, including grassed areas, landscaped areas and topsoil, are required to be maintained
- paving concrete and other physical barriers are required to be maintained.

5.3 CONTROL MEASURES FOR FUTURE ACTIVITIES

For future use of the public domain and for non-intrusive maintenance purposes (“minor works”), the surface cover is required to be maintained.

“Minor works”, involving activities such as lawn mowing, weeding gardening and general maintenance activities do not require specific controls, providing the works do not disturb the surface cover and the underlying fill materials.

Where intrusive maintenance is required to be undertaken (“major works”), additional control measures may be required depending on the scope of the works. Whilst it is not possible to assess the impacts from all future activities, it is possible to consider exposure scenarios likely to be associated with a range of general maintenance and intrusive works.

“Major works” that result in the disturbance of the surface cover and exposure to the underlying fill materials, require control measures to be implemented.

The control measure required to be implemented for “minor works” and “major works” are set out in the following table:

Works	Possible Risks to Site Users	Possible Risks to the Environment	Control Measures Required
Minor works Minor works comprise maintenance activities involving contact with the surface cover including the topsoil and grass capping	Ingestion, inhalation and skin contact with soils containing contaminants.	Low risk of runoff from contaminated soil may impact surrounding land and/or waterways if not appropriately contained.	No eating, drinking, smoking; avoid contact with soil (wear gloves); wash hands and clothes after work and before eating or smoking. A P2 face mask should

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Works	Possible Risks to Site Users	Possible Risks to the Environment	Control Measures Required
<p>layer and minimal contact with the underlying fill materials.</p> <p>Typical activities include maintenance of grass cover, landscaping and planting of shallow-rooted shrubs.</p>			<p>be used if dusty conditions develop. Dust generation should be controlled by dampening the materials.</p> <p>If minor quantities of soil / fill materials are required to be excavated (e.g. for shallow tree planting), remove the surface cover material separately, cover excavated fill materials with plastic sheeting. When required, replace the fill material back into its original position prior to reinstating surface cover layer. Ensure all potentially contaminated fill materials are placed in excavation pit prior to reinstatement of the clean surface cover.</p> <p>If visible fragments of potential asbestos containing materials are encountered, refer to the specific instructions below.</p>
<p>Major works</p> <p>Major works involve significant contact with fill materials underlying the surface cover of topsoil and grass. Typical activities may include repairs to underground pipes, cables and intrusive earthworks.</p>	<p>Ingestion, inhalation and skin contact with fill materials containing contaminants.</p>	<p>Potential for runoff / leaching from contaminated soil to impact surrounding land and/or waterways, if not appropriately contained.</p> <p>Acid sulfate soils (ASS) may be present in low-lying areas (< 5m AHD) near the bays and estuaries. In the event that ASS soils are likely to be</p>	<p>No eating, drinking, smoking; avoid contact with soil; wear Level D PPE including latex gloves, hard-hat, steel-toed boots, high-visibility vest and safety glasses during manual handling of soil in an excavation and in soil stockpiles; wash hands and clothes after work.</p> <p>Prevent dust by dampening fill materials prior to and during</p>

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Works	Possible Risks to Site Users	Possible Risks to the Environment	Control Measures Required
		<p>present or their presence is confirmed, a separate acid sulfate management should be implemented according to the requirements of NSW Acid Sulfate Soil Management Advisory Committee (1998) <i>Acid Sulfate Soil Manual</i>.</p>	<p>excavation.</p> <p>If dust is generated or asbestos containing materials are identified or suspected, wear a P2 face mask suitable for asbestos (at a minimum).</p> <p>If soil / fill materials are required to be excavated, excavate capping material separately, cover excavated materials with plastic, then place it back into original position prior to reinstating capping layer. Ensure all potentially contaminated fill materials are placed in excavation pit prior to reinstatement of clean capping layer. Develop safety documentation for works.</p> <p>If disposal of surplus excavated materials is required, classification is required to be undertaken in accordance with NSW EPA (2004) <i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non Liquid Wastes</i> for disposal to a facility licensed by NSW DEC to receive the class of waste material. Records of disposal to be maintained and recorded in the materials tracking register (Appendix E)</p>

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

5.4 ASBESTOS MATERIALS

5.4.1 Small quantities of asbestos fragments

All asbestos containing materials that has been disposed in an uncontrolled manner is required, as a precautionary measure, to be considered as friable (meaning can be reduced to a powder between the fingers) until it is proven not to be friable. However, common sense is required to be exercised. For example, if a few fragments of bonded asbestos cement materials ("fibro") are present, it is safe to pick them up and to place them in double plastic bags for disposal in a dedicated container and subsequent disposal at a landfill licensed to receive this class of material.

However, if a large number of fragments of bonded asbestos cement materials or friable material is encountered, the possibility of friable asbestos is increased, and the procedure described below is required to be implemented.

5.4.2 Significant quantities of asbestos materials

If either a large quantity of cement-bonded asbestos fragments and/or friable asbestos are identified or suspected during intrusive activities, excavation works should stop and the materials should be covered with substantial plastic sheeting that is securely anchored to the ground surface and be enclosed within a barrier to prevent access. Appropriate signage should be displayed to warn of the presence of these materials.

At the earliest practical time after the identification of a large number of asbestos cement fragments and/or potentially friable asbestos materials, the works supervisor should contact the Authority's Regulatory Manager for advice on how to proceed. It is expected that a suitably qualified Occupational Hygienist or Environmental Consultant would be contacted by the Authority for further advice.

5.4.3 Leaving excavated soils

Excavated fill materials or soils containing or suspected of containing significantly contaminated materials and/or potentially friable asbestos materials must not be left unattended. If it is necessary to leave the site unattended, the fill materials or soils are required to be dampened to prevent generation of dust, and placed back in the excavation and the surface cover reinstated so that exposure to these materials cannot be gained by users of the public domain.

5.5 REPORTING OF COMPLAINTS AND INCIDENTS

If a complaint is made by a member of the public or by any other person with respect to and environmental management or control issue either during "minor works" or during "major works" or at any other time, appropriate corrective action is required to be undertaken as soon as practicable.

Similarly, if an or an environmental incident occurs that has given or may give rise to pollution of soil, air or waters, appropriate corrective action is required to be undertaken as soon as practicable.

In addition to the above, complaints and environmental incidents are required to be notified to the Authority's Regulatory Manager Property and Asset Management as soon as practicable after a complaint has been made or an environmental incident has occurred.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

Records of complaints and incidents are required to be entered into the Register contained in Appendix D of this EMP, but only after corrective action has been taken and the Authority's Regulatory Manager Property and Asset Management has been notified.

APPENDIX A: EMP INDUCTION REGISTER

EMP INDUCTION REGISTER FOR MINOR & MAJOR WORKS

The purpose of the Induction Register is to acknowledge acceptance and compliance with the procedures outlined within this EMP that will be implemented during both “minor works” and “major works” by signing the attached log. Copies of this document must be made available for review and be readily available at the job Site.

The Induction Register is required to be completed by each person inducted into the EMP undertaking “minor” or “major works” in the public domain.

[illegible]

Appendix B: Log of Project Personnel

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

PROJECT PERSONNEL LIST AND EMP PLAN ACKNOWLEDGMENT RECORD FOR MINOR & MAJOR WORKS

The purpose of the Log of Project Personnel is to maintain a record of personnel carrying out “minor works” and “major works” in the public domain. All personnel are required to sign this document, indicating they have read and understand the EMP.

Copies of this EMP must be made available for review and be readily available at the work-site.

LOG OF PROJECT PERSONNEL

[illegible]

APPENDIX C: INSPECTION RECORD

INSPECTION REPORT FOR MINOR & MAJOR WORKS

The purpose of the Inspection Report is to maintain a record of inspections undertaken in the public domain and to record the results of the inspections including a record of any corrective actions that are required periodically to ensure environmental compliance and during and after completion of “minor works” and “major works”, as required.

Environmental Management Plan for Sydney Harbour Foreshore Authority Public Domain

The Inspection Report is required to be completed by the works supervisor and/or the Manager Property or asset Management as appropriate following completion of the inspection.

Date:	
Works supervisor:	Name: Sign:
Time:	
Site / Area:	
Observations:	
Problems (if observed):	
Report to:	Project Manager (Name):
Corrective Action (if required):	
Signed by the Regulatory Manager/Property /Asset Management (as appropriate) upon completion:	
Feedback Response to Prevent Future Occurrences	
Date:	

APPENDIX D: COMPLAINTS AND ENVIRONMENTAL INCIDENT REGISTER

Environmental Management Plan for Sydney Harbour Foreshore Public Domain

COMPLAINTS AND ENVIRONMENTAL INCIDENT REGISTER

The purpose of the Complaints and Environmental Incident Register is to maintain a register of complaints from local residents, contractors, users of the public domain or other concerned parties, that have been made or occurred during “minor works” or “major works” or at any other time. The Register is required to include a record of any action taken with respect to the complaints.

The Complaints and Environmental Incident Register is required to be completed immediately following the receipt of any complaints associated with works undertaken in the public domain. If the space in the Register is insufficient, attach a separate sheet to Appendix D.

[illegible]

APPENDIX E: MATERIALS TRACKING REGISTER

Environmental Management Plan for Sydney Harbour Foreshore Public Domain

MATERIALS TRACKING REGISTER

The purpose of the Materials Tracking Register is to document the movement of fill materials both on and off the public domain.

The Materials Tracking Register is required to be completed following the import or export of fill materials to the public domain. If the space in the Register is insufficient, attach a separate sheet to Appendix E.

Date	Description of Material	Amount	Destination	Verification (Name/Initials)