



**ENVIRONMENTAL BEST MANAGEMENT
PRACTICE GUIDELINE
FOR CONCRETING CONTRACTORS**

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ENVIRONMENT PROTECTION AUTHORITY

ENVIRONMENTAL BEST MANAGEMENT
PRACTICE GUIDELINE
FOR CONCRETING CONTRACTORS



Institute of
Public Works
Engineering
Australia



Australian
Pre-Mixed
Concrete
Association



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PREFACE

This Environmental Best Management Practice Guideline for Concreting Contractors (the BMP guideline) has been produced in response to an identified need to establish an industry environmental benchmark for activities undertaken by contractors involved in the concreting industry.

The BMP guideline has been developed by a steering committee comprising representatives from the Master Builders Association (MBA), Australian Pre-Mixed Concrete Association (APMCA), Concrete Pumping Association (CPA), Civil Contractors Federation (CCF) and Institute of Public Works Engineering Australia (IPWEA), as well as by consultation with other industry groups and stakeholders.

This BMP guideline has been designed to be a workable and usable document for industry stakeholders. The steering committee therefore welcomes any feedback and ideas regarding the document through their appropriate associations or via the NSW Environment Protection Authority (EPA). Such feedback will give the steering committee direction on how the document can be improved to reflect the needs of the concrete industry sector.

1

INTRODUCTION

1.1 Citation

This industry Environmental Best Management Practice Guideline for Concreting Contractors may be cited as the Best Management Practice (BMP) guideline.

1.2 Purpose

This BMP guideline describes practical information and procedures for the concrete contracting industry to help achieve compliance with NSW environmental laws and achieve positive environmental outcomes.

1.3 Scope

This BMP guideline applies to concrete contractors (individuals or companies) taking delivery of fresh concrete and having the responsibility to place, transfer and/or finish the concrete into its final position.

1.4 Commencement date

This BMP guideline commenced on 1 November 2002. The intention of the concrete industry sector representatives is to review the BMP guideline initially after 12 months, with a continuing process of review initiated every second year thereafter. If significant changes occur that necessitate the amendment of this document outside the two-year review process, the amendment will be initiated by the aforementioned representatives and will be the result of a full consultative process.

Concrete placers and finishers and other industry members are encouraged to provide feedback and to report new initiatives to their associations so that the BMP guideline can evolve through each review.

1.5 Industry endorsement

This BMP guideline has been approved as an environmental BMP guideline by the following representative bodies of the concrete industry sector:

- Master Builders Association
- Australian Pre-Mixed Concrete Association
- Concrete Pumping Association

- Civil Contractors Federation
- Institute of Public Works Engineering Australia.

Extensive consultation has been undertaken with both State and local government and industry stakeholders.

1.6 What is an environmental best management practice guideline?

Environmental 'best management practice' is simply undertaking day-to-day concreting activities in a way that is least likely to harm the environment. That is, the procedures and practices outlined in this document are 'best' for the environment and are preferred to certain existing procedures and practices that may create more waste and/or cause more pollution.

This BMP guideline document is for information purposes only and is not enacted legislation. Therefore, a person or company cannot be prosecuted or fined for failing to comply with this environmental BMP guideline alone.

However, understanding and following this BMP guideline will significantly reduce the risk of concrete contractors breaching NSW environmental legislation that could result in 'on-the-spot' fines. The BMP guideline should be followed, unless there is an alternative course of action that achieves the same or better environmental outcomes during concreting activities.

A State or local government authorised officer may cite some of the practices in this BMP guideline in a Clean-up or Prevention Notice, indicating the measures that should be taken to remedy an alleged non-compliance with the *Protection of the Environment Operations Act 1997* (POEO Act). Failure to comply with a requirement of a notice is an offence.

In summary, this industry environmental best management practice guideline:

- **gives practical guidance** on how environmental best management practices can be achieved in the concreting industry sector
- **should be followed** unless there is an alternative course of action that achieves the same or a better environmental outcome.

Unlike a statutory act or regulation, a BMP guideline cannot be legally breached. However, it can be used as a reference or as supporting evidence in legal proceedings.

2 OBLIGATIONS OF CONCRETING STAKEHOLDERS INVOLVED IN CONSTRUCTION ACTIVITIES

Each individual, company (including company directors) or organisation has a 'duty' to ensure their actions or activities do not cause or contribute to pollution of the environment. The following describes what is considered to be a reasonable 'duty' of stakeholders involved in concreting contracting. Although these descriptions attempt to be as comprehensive as possible, the 'level of duty' outlined below should be interpreted as a guide only.

2.1 Obligations of the developer

The developer is responsible for site planning issues and for demonstrating that environmental best management practices have been incorporated into the development application. Any regulatory requirements placed on the site, such as consent conditions or Clean-up and/or Prevention Notices, must be brought to the attention of the site manager.

It is essential that the developer understand from the outset the approval process and who the appropriate consent authority is for the proposed development (see section 5.2). However, regardless of the scale, type and location of the development, the developer is responsible for initial site planning issues. The developer must demonstrate to the consent authority that an appropriate site management plan (SMP) has been developed that identifies and addresses potential pollution from the site. Further, the SMP should demonstrate that sufficient planning has occurred to ensure appropriate resources are available to maintain the SMP throughout the duration of development. The SMP and appropriate pollution controls should be identified and incorporated into the development proposal at the earliest planning stage.

It is the responsibility of the developer to liaise with site management (the site supervisor or builder) to discuss the development proposal in the planning phase. The practical experience of a site manager should be beneficial in contributing to the SMP on issues such as pollution controls, excess concrete management, practical wash-down location and site accessibility for concrete agitator trucks. If sufficient consideration is given to proper site planning, it can help identify and reduce site problems encountered during the construction stage. Any specific environmental requirements described in a development

consent and/or Clean-up or Prevention Notice served on the developer must be brought to the attention of the site manager.

The developer should demonstrate enough detail in the development and/or building application to enable the consent authority to satisfy itself that best environmental management practices have been considered. Once the consent authority is satisfied this requirement has been met it can proceed to issuing a construction certificate. A consent authority may require a specific waste, soil or water (or combination of these) management plan to accompany a development application and SMP. Any specific details and accompanying requirements for submitting a development application should first be discussed with the appropriate consent authority.

2.2 Obligations of the consent authority

The consent authority is responsible for ensuring that development applications comply with all relevant standards, codes and planning instruments.

When it assesses the development and/or building application (if required), the consent authority should satisfy itself that the developer has developed an appropriate SMP giving details of strategies to address all likely environmental issues.

Requirements of development applications and/or conditions of consent will vary among consent authorities owing to variations in local environmental planning instruments.

The consent authority should assess each application on the details and merit presented within the application and should liaise with the developer or delegate on any issues that need to be clarified.

2.3 Obligations of the appropriate regulatory authority

The appropriate regulatory authority (ARA) is responsible for enforcing the requirements outlined in relevant environmental legislation.

NSW Environment Protection Authority (EPA) officers regulate activities listed in Schedule 1 of the POEO Act. These generally include large agricultural, extractive, industrial and transport infrastructure activities. Council officers regulate those activities not listed in Schedule 1 of the POEO Act, usually including small to medium-sized manufacturing, retail and residential activities. The nature of the activity being undertaken will determine who the ARA is.

Council and EPA officers are responsible for administering environmental compliance in accordance with NSW legislation. Authorised EPA and council officers can undertake routine and

unannounced inspections of building and development sites to determine compliance with consent conditions and/or NSW environmental legislation.

The ARA officer will attempt to work with site management to resolve pollution issues. However, fines or prosecution procedures can be pursued if the ARA officer considers a breach (or potential breach) of the legislation has occurred. The ARA may, by a Clean-up and/or Prevention Notice, direct a person or company to take specific actions as specified in the Notice.

2.4 Obligations of the site manager/supervisor

The site manager has the overall responsibility for construction issues, occupational health and safety (OH&S) and environmental management of the site. The site manager also has the responsibility to ensure that all workers on the site are aware of and are undertaking their duties in compliance with relevant environmental legislation and industry standards.

The responsibility of the site manager may be delegated to a specific individual (that is, the site supervisor) or otherwise incorporated into an existing role of a site contractor, usually the 'principal' contractor or builder. The site manager has the prime responsibility for all construction site issues, including scheduling and delivery of materials, access, OH&S and the overall environmental management of the site.

The site manager or delegate must provide all delivery, site access, excess concrete management and wash-down details to the concrete supplier before delivery and must clearly outline any specific delivery instructions relative to the construction site. Where possible, all activities (including the delivery of concrete) should be carried out on the construction site so as to minimise the risk of spillage into the local stormwater system. If this is not possible, the site manager must ensure that sufficient pollution controls are in place upon receipt of the concrete delivery so as to prevent concrete or slurry contaminating street gutters or stormwater drains.

The site manager needs to plan for the management of excess concrete and identify what procedures and safeguards are in place to minimise over ordering. For example, the site manager should arrange with the concrete supply company to accept excess concrete back and/or organise for onsite designated concrete/masonry receptacles for collection and recycling.

When planning for pumping concrete on to the site, the site manager or delegate should also refer to the WorkCover NSW Code of Practice – Pumping Concrete.

The site manager must be aware of any specific conditions placed upon the site from the development consent and/or regulatory notices served on the construction company or site by the ARA. It is the site manager's responsibility to ensure compliance with the requirements specified in these regulatory controls.

It is also the site manager's responsibility to oversee all site workers, including concreting contractors, and ensure that their actions are complying with requirements of the POEO Act. However, in certain circumstances individuals are considered responsible for their own actions if it can be demonstrated that they have deliberately acted outside the specific instructions and/or directions of their company or supervisor.

By ensuring that all site contractors have attained relevant industry-sector environmental competency standards and/or have their own Environment Management Plan (EMP) the site manager, site supervisor or builder can minimise contractors' potential environmental risk. However, the responsibility to promote and maintain appropriate site environmental standards still ultimately rests with the site manager.

Information on relevant competency standards that apply to concrete contractors is available from the Construction Industry Training Advisory Board NSW (CITAB).

2.5 Obligations of the concrete provider (batch plant)

The concrete provider has responsibility to ensure appropriate training has been provided to their agitator truck drivers, and must provide appropriate details and resources to drivers to enable them to complete a delivery without causing environmental pollution.

Companies delivering concrete should provide appropriate environmental awareness and ongoing vocational training to all concrete truck drivers, whether they are employees or contractors. Training should cover all aspects of environmental responsibility required of a concrete driver, including spill response procedures, pollution controls, excess concrete recycling procedures, noise and dust mitigation, and duty to notify.

Before delivery, the concrete batch plant operator should make or confirm arrangements for the recycling of excess concrete and site wash-down with the client.

The concrete batch plant should have provision for appropriate wash-down facilities for agitator trucks upon their return, as well as receptacles on-site for excess concrete. The batch plant company

should have an environmental policy and EMP that outlines the company's commitment to and processes for minimising, reusing and recycling excess set and new concrete, process water and rainwater on site.

It is the responsibility of the concrete batch plant operator to convey to the deliverer any specific delivery requirements requested by the client.

2.6 Obligations of the concrete deliverer (agitator truck driver)

The agitator truck driver has responsibility for delivering concrete to a site and then returning to the batch plant without causing environmental harm through spillage or leakage of concrete.

The concrete deliverer is responsible for safe and timely delivery to the site without causing spillage en route. The driver should be made aware of, and should then observe, all environmental requirements that apply to a particular site, such as site access, delivery restrictions and excess concrete handling requirements.

The agitator truck should be clean of debris before it leaves the batch plant.

The driver should check with their batch plant office as to whether the client has both provision for managing excess concrete and a concrete wash-down area for cleaning of equipment. The driver should have a contingency plan if excess concrete cannot be recycled on-site and/or if a suitable equipment wash-down area cannot be provided. However, under no circumstances should any excess concrete, slurry or truck wash-down water enter a drain or waterway or otherwise pollute the environment (see section 3.5).

If concrete has to be unloaded off the construction site (that is, from the street or footpath), pollution controls must be in place to minimise likely contamination of a street drain or waterway. The driver should understand the importance of appropriate environmental controls and raise any concerns regarding such controls with the site manager. All concrete spillages outside the construction site must be thoroughly cleaned up immediately. At no time should any excess or spilled concrete be hosed or washed into the stormwater system.

2.7 Obligations of the concrete pumping contractor

The concrete pumping contractor has a responsibility to ensure that all staff and/or subcontractors act in ways that do not cause environmental harm through spillage or leakage of concrete.

It is the responsibility of the concrete pumping contractor to consult with the site manager and confirm whether an adequate concrete wash-down facility is located at the work site to accommodate concrete pumping activities.

The concrete pumping contractor should discuss existing work site pollution controls with the site manager and provide any additional pollution controls required for this specialised activity. In addition to collaborating with the site manager in the overall planning for pumping concrete on site, the concrete pumping contractor should also refer to the WorkCover NSW Code of Practice – Pumping Concrete.

It is the responsibility of the concrete pumping contractor to ensure concrete residue and/or wash-down residue from their activities does not contaminate drains or waterways. Clean-up of all equipment, including the receiving hopper, pipelines and hoses, must also be done in a manner that does not contaminate drains or waterways (see section 3.6).

Wash-down water produced during clean-up of equipment must be disposed of in a manner that does not and will not contaminate nearby drains, waterways or soil. It is the responsibility of the concrete pumping contractor to manage the disposal of excess concrete and wash-down water generated during the pumping and clean-up operation. Disposal to the sewer system is not permitted without prior consultation with the local sewage authority (Sydney Water, Hunter Water Corporation or the local council).

Excess concrete should be disposed of into a site receptacle designated for concrete and masonry and allowed to set.

The concrete pumping company or business has a duty to provide appropriate on-the-job training that addresses industry competency standards in environmental awareness to all employees and/or subcontractors. Training should cover all aspects of environmental responsibility required of a concrete pumping contractor, including spill response procedures, pollution controls, proper clean-up procedures, noise and dust mitigation, and duty to notify relevant authorities.

2.8 Obligations of the concrete placer and/or finishing contractor

The concrete placer and/or finisher has responsibility to undertake their activities without causing environmental harm through spillage or leakage of concrete.

Before commencing work, the concrete placer or finisher should discuss existing pollution controls at the work site with the site manager and should provide any additional pollution controls required of this specialised activity. The concrete placer or finisher should also consult the site manager as to whether an adequate concrete wash-down facility is located at the work site to accommodate concrete placing or finishing activities.

It is the responsibility of the concrete placer and/or finisher to ensure concrete residue and wash-down residue from their activities (including exposing aggregate) does not contaminate drains or waterways. Clean-up of all equipment must be done in a manner that does not contaminate drains or waterways (see section 3.4).

Any wash-down water produced during clean-up of equipment must be disposed of in a manner that does not and will not contaminate the stormwater system. Disposal of wash-down water to the sewer system is not permitted without prior consultation with the local sewage authority (Sydney Water, Hunter Water Corporation or the local council).

Excess concrete should be disposed of into a site receptacle designated for concrete and masonry and allowed to set.

The concrete placer's or finisher's company or business has a duty to provide appropriate induction and ongoing vocational training to all employees or contractors. Training should cover all aspects of environmental responsibility required of a concrete placing or finishing contractor, including minimising pollution, pollution controls, proper clean-up procedures, excess concrete handling and ordering, noise, vibration and dust mitigation, and duty to notify relevant authorities.

3

ENVIRONMENTAL BEST MANAGEMENT PRACTICES FOR CONCRETE CONTRACTORS

Fresh concrete and cement-related mortars are toxic to marine life. Run-off from washing or leaking of equipment or from disposing of these materials to the street gutters and stormwater drains eventually finds its way into waterways. Not only does this cause serious environmental degradation, but also it is against the law and will most likely result in an on-the-spot fine of \$1,500 being issued by the Appropriate Regulatory Authority (ARA), along with a Clean-up Notice.

The information provided in this section is designed to assist all people involved in planning for, facilitating and undertaking concreting works (see section 2). Understanding and following these environmental best management practices should significantly reduce the likelihood of pollution from typical day-to-day concreting activities, including:

- equipment wash-down on a building site
- hardstand construction
- concrete, tile and brick cutting
- washing exposed aggregate
- concrete delivery
- concrete pumping.

3.1 Establishing and using a concrete wash-down area on site [see Figure 1]

Purpose

Establishing and maintaining a designated wash-down area on a construction site allows subcontractors to properly wash down equipment without contaminating the local stormwater system.

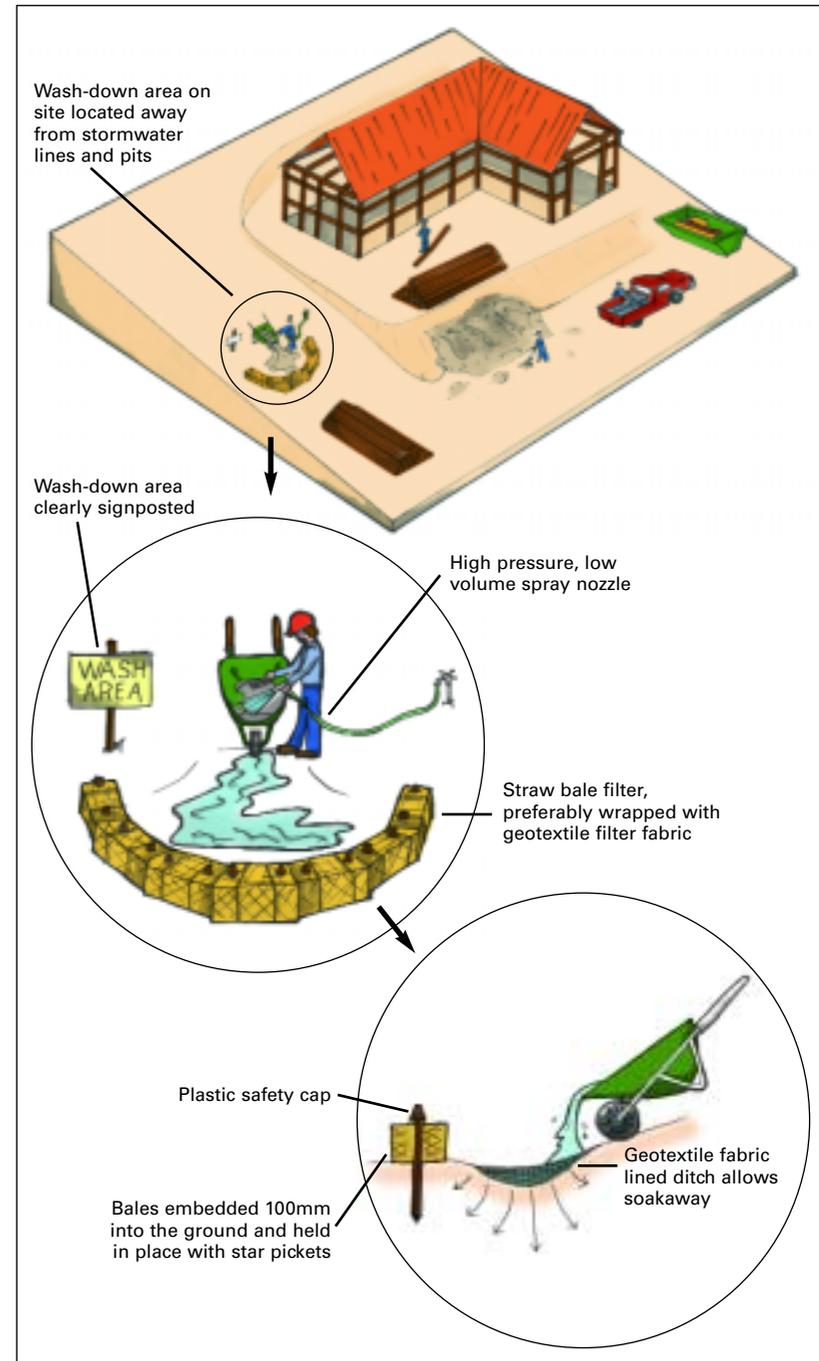
Applications

- for storing wet and dry concrete and cement mortar materials and equipment
- on-site preparation and use of concrete and cement mortar equipment
- equipment wash-down only (not for disposal of excess concrete).

Planning

- Decide on the location of the wash-down area during the planning stage. The proposed area should be highlighted in the

Figure 1 Establishing a concrete wash-down area on-site



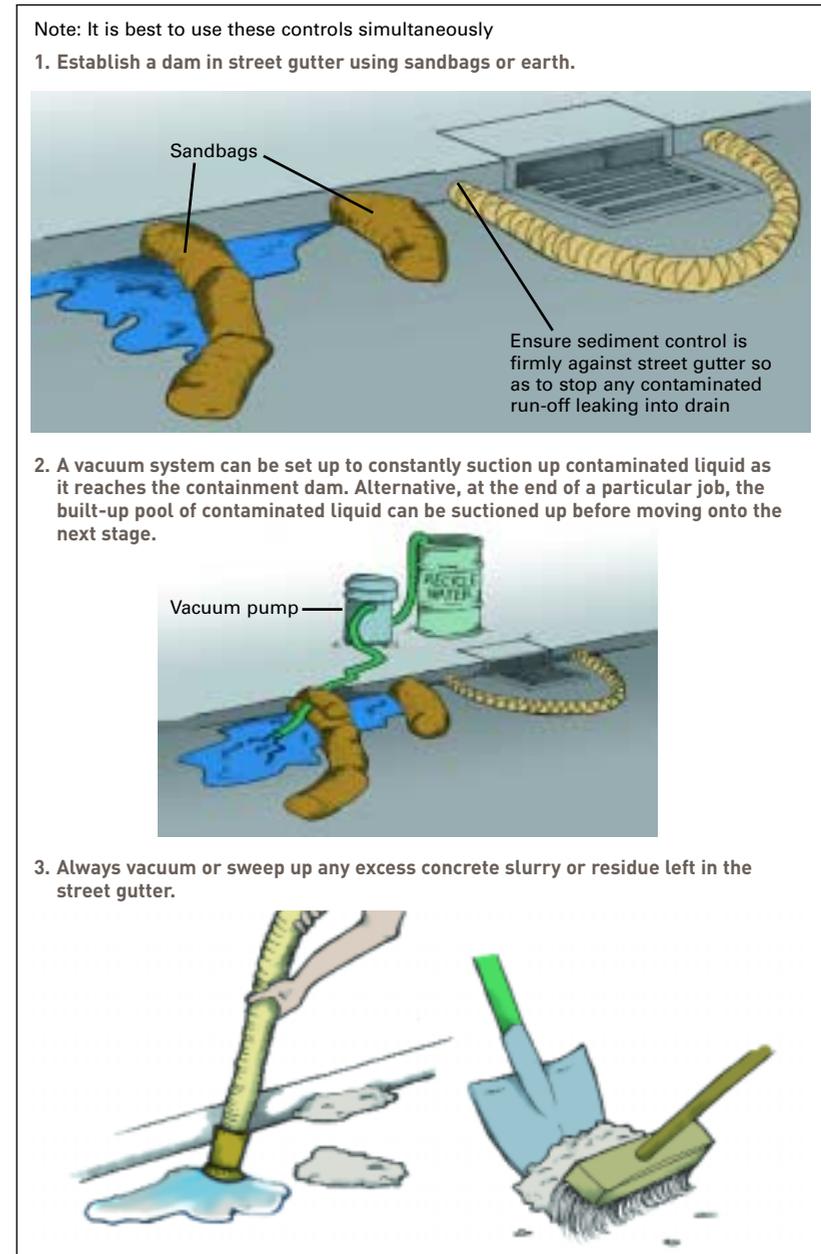
site management plan (SMP). Choose a location on site that provides maximum access to concrete contractors and their equipment.

- The wash-down area should be located away from drainage lines and stormwater pits.
- The wash-down area should slope away from the nearest stormwater drains or pits towards appropriately constructed sediment controls.
- Ensure that all contractors are aware that a wash-down area is available on site. It should be clearly signposted to alert staff and subcontractors of their responsibilities.

Best management practices

- ✓ The wash-down area must be located within appropriate sediment controls. These should be inspected and maintained regularly and be repaired or replaced as necessary.
- ✓ To minimise the amount of wash-down water generated, scrape excess concrete off equipment before it is washed.
- ✓ Place excess concrete into a site receptacle designated for concrete and masonry and allow to set.
- ✓ A high pressure, low volume water spray nozzle conserves water and reduces maintenance of sediment controls.
- ✓ Wash-down water is best managed by draining it into a container (such as 200L drum), allowing the water to stand until the solid particles settle out to the bottom. After adjusting the pH of the water to neutral, it can then be siphoned off and reused, and the residue in the bottom allowed to set, then recycled with other excess concrete and masonry material (see Figure 4).
- ✓ No wash-down water may be disposed of to the sewerage system without prior agreement of the local water authority.
- ✓ As a final option, the wash-down area should drain to a low point where water is allowed to percolate through geotextile fabric into the soil. The settled and hardened concrete residue on the ground must be allowed to set and must be placed in a designated concrete/masonry recycling bin on site.
- ✓ Do not allow equipment wash-down water to flow directly into a stormwater drain or system.

Figure 2 Best management practice for preventing concrete run-off entering stormwater drains (for concrete cutting, hardstand management and washing down exposed aggregate)



Inspection and maintenance

- The site manager should monitor on-site concrete wash-down and excess concrete handling and recycling areas at least on a daily basis.
- Failure to maintain wash-down facilities will result in deteriorating site conditions, which in turn can result in on-the-spot fines or prosecution.

Limitations

- Sufficient area for concrete wash-down activities must be designated and maintained on the construction site. This issue should be addressed in the planning stage.
- Not all subcontractors are aware of and properly utilise site wash-down areas provided.
- Although a wash-down area is designed for washing general concrete equipment, excessive water usage and wash-water disposal can reduce the soakaway capacity of the soil.

3.2 Hardstand construction management (see Figure 2)

Purpose

Proper management during construction of hardstand areas can minimise the risk of causing pollution of the environment as well as maximising concrete recycling opportunities.

Applications

- application of concrete and/or seal coat during paving, footpath, driveway, curb and guttering surfacing and resurfacing
- storage of paving equipment
- concrete cleaning (including exposing aggregate, rinsing and sweeping).

Best management practices

- ✓ If existing concrete needs to be replaced, ensure that it is separated for recycling. **Do not** dispose of concrete to land fill.
- ✓ Apply concrete and/or sealing coats during dry weather to prevent contaminated run-off entering the street gutters or stormwater drains.
- ✓ Avoid mixing excess amounts of fresh concrete or cement mortar onsite.

- ✓ Where possible, divert all contaminated run-off away from street gutters, stormwater drains and local waterways.
- ✓ Ensure appropriate sediment controls are in place around stormwater drains and street gutters before starting works.
- ✓ Contain all concrete slurry and run-off in a pooled area (for example, portable booms, sandbags).
- ✓ If time permits, allow the fine suspended material to settle.
- ✓ Consider all reuse opportunities and/or disposal options. For example, on solid surfaces such as roads and gutters a wet industrial vacuum or suction pump can collect and filter run-off water into a container (such as a 200L drum) for reuse in another concrete mix process.
- ✓ Alternatively, treat the water (filter solids such as grit and pebbles and adjust the pH), then dispose of it to either the sewer (under contract with the local water authority (Sydney Water, Hunter Water Corporation or the local council)) or an approved liquid waste treatment facility.
- ✓ For small volumes of water and as a final resort where containment is not possible, allow water to flow across grassed areas (not bushland) and percolate into the soil.
- ✓ Always park machinery over drip trays or absorbent materials to prevent oil leaking into the stormwater system.
- ✓ Cover materials and stockpiles with plastic or tarpaulins to reduce dust and erosion problems.
- ✓ Always erect a sediment fence on the downward side of the stockpile to filter suspended solids.

Inspection and maintenance

- Inspect and maintain machinery regularly to minimise leaks and drips.
- Inspect pollution controls regularly or after every storm event. Record inspections and actions in a diary.
- Maintain pollution controls in a manner that does not impede traffic flow before or during rain events.
- The site or project manager must maintain vigilance during the work activities to ensure that pollution control measures are being followed and are effective.
- Placing equipment or materials in a position where they may pollute the environment may result in on-the-spot fines or prosecution.

Figure 3 Best management practice for containing and diverting concrete runoff

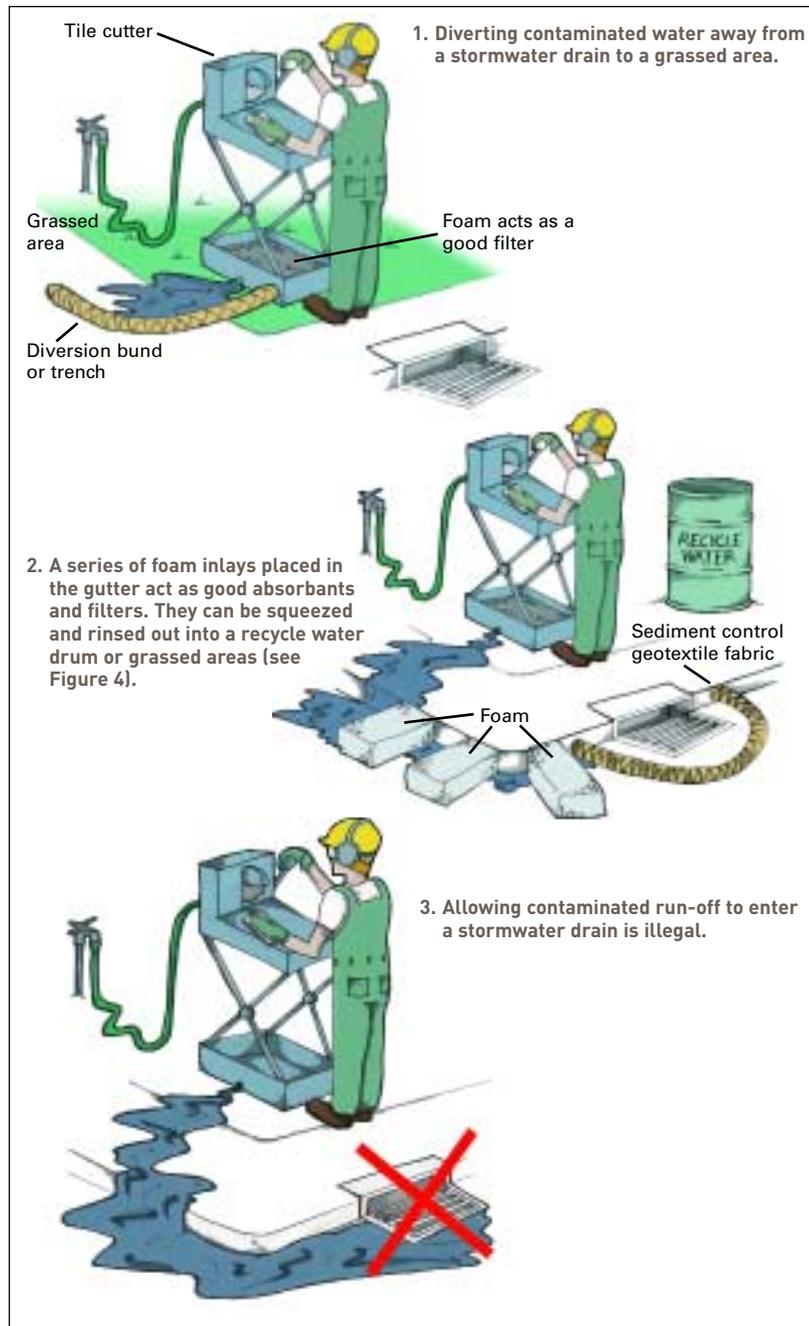
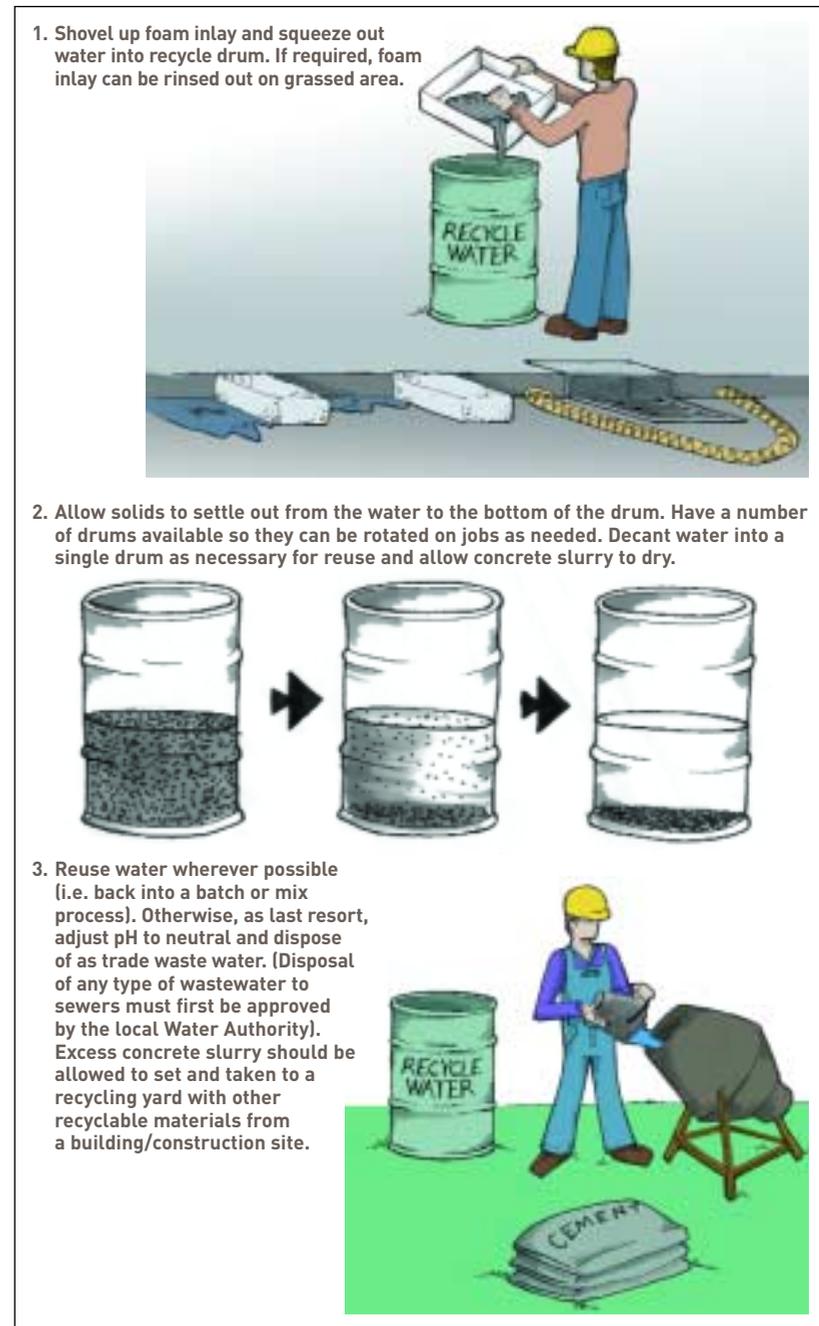


Figure 4 Best management practice for managing concrete runoff waste



Limitations

- Colloidal (very fine suspended) particles are not effectively removed by straw bails, sandbags and geotextile fabric. Where possible, run-off should be contained, allowing the suspended particles to settle, and the pH adjusted.
- Limit all outdoor works during wet weather.

3.3 Making concrete, brick and tile cuts (see Figure 3)

Purpose

With proper management during slab concrete, tile or brick cutting, the risk of causing pollution of the environment can be minimised. Consider the following pollution control options before undertaking concrete cutting of any nature.

Prevention

- When purchasing or hiring equipment, consider environmental features such as water suction attachments, a water flow regulator, dust vacuum and noise attenuators.
- For wet cuts use as little water as possible.
- Set up cutting equipment away from stormwater drains. The set-up area should be sufficiently large to contain water run-off, residues and any waste material.

Best management practices

- ✓ Where the job requires cutting near a stormwater drain, then you will need to implement management practices that will prevent or minimise pollution.
- ✓ Divert run-off away from street gutters and stormwater drains, to containment areas. This can be done using diversion channels or bunds (see Figures 2 and 3).
- ✓ Ensure appropriate sediment controls are in place around stormwater drains and street gutters before starting sawcut works.
- ✓ If time permits, allow the fine suspended material to settle.
- ✓ Consider all re-use opportunities and recycling options. All set and excess concrete should be recycled.
- ✓ For example, run-off water on solid surfaces can be collected and filtered into a container by a wet industrial vacuum or suction pump for re-use in another concrete mix process (see Figure 2).

- ✓ Alternatively, treat the water (filter solids such as grit and pebbles and adjust the pH), then dispose of it to either the sewer (under contract with the local water authority (Sydney Water, Hunter Water Corporation or the local council)) or an approved liquid waste treatment facility.
- ✓ For small volumes of water and as a final resort where containment is not possible, allow the water to flow across grassed areas (not bushland) and percolate into the soil.
- ✓ Alternatively, place a series of absorbent material inlays such as foam to soak up the small amount of run-off. Once the cut is completed the water can be drained into a container for re-use or treatment before disposal.
- ✓ Always allow any concrete slurry or residue to dry, and sweep or scrape it up afterwards.

Waste water and slurry management

- On solid surfaces a wet industrial vacuum or suction pump can collect and filter contained run-off water into a container (such as a 200L drum). This water may be able to be reused.
- Alternatively, treat the water (filter solids such as grit and pebbles and adjust the pH) then dispose of it to either the sewer (under contract with the local water authority (Sydney Water, Hunter Water Corporation or the local council)) or an approved liquid waste treatment facility.
- Small volumes of concrete slurry can be disposed of by pouring it into geotextile-lined ditches within the wash-down area. Water should be allowed to evaporate or soak into the ground. Allow the slurry to dry before disposing of it in the recycling bin.
- Immediately after you complete the job, shovel, sweep, or vacuum any residue left in street gutters. Under no circumstances should any residue be hosed down the stormwater system.

3.4 Washing down exposed aggregate concrete

Purpose

Minimise the likelihood of contaminated run-off entering the stormwater system from the washing of concrete to expose aggregate, or from similar wet concrete washing activities.

Applications

- washing down exposed aggregate
- concrete cleaning (including exposing aggregate, rinsing and sweeping).

Best management practices

- ✓ The procedure of washing exposed aggregate (removing fine particles) is likely to cause pollution of the stormwater system and may therefore incur on-the-spot fines or prosecution.
- ✓ If washing exposed aggregate concrete is still an option, contaminated run-off must be prevented from reaching stormwater drains. This can be achieved by diverting the water to a bermed or level area.
- ✓ Consider all re-use opportunities and recycling options. All set and excess concrete should be recycled.
- ✓ For example, on solid surfaces such as roads and gutters, a wet industrial vacuum or suction pump can collect and filter run-off water into a container (such as a 200L drum) for re-use in another concrete mix process (see Figure 2).
- ✓ Alternatively, treat the water (filter solids such as grit and pebbles and adjust the pH), then dispose of it to either the sewer (under contract with the local water authority (Sydney Water, Hunter Water Corporation or the local council)) or an approved liquid waste treatment facility.
- ✓ For small volumes of water, and as a final resort where containment and collection are not possible, allow the water to flow across grassed areas (not bushland) and percolate into the soil.
- ✓ Never allow contaminated run-off water to enter a stormwater drain or watercourse.
- ✓ Collect and return sweepings from exposed aggregate concrete to the stockpile or recycling bin.
- ✓ Where possible, expose aggregate during hot, dry conditions so that the water can evaporate easier, and avoid exposing aggregate over prolonged rainy periods.

Waste water and slurry management

- On solid surfaces a wet industrial vacuum or suction pump can collect and filter contained run-off water into a container (such as a 200L drum). This water may be re-used.

- Alternatively, treat the water (filter solids such as grit and pebbles and adjust the pH), then dispose of it to either the sewer (under contract with the local water authority (Sydney Water, Hunter Water Corporation or the local council)) or an approved liquid waste treatment facility.
- Shovel, sweep, or vacuum any excess concrete slurry or residue left in street gutters immediately after completing the job. Under no circumstances should any residue be hosed down the stormwater system.

3.5 Concrete delivery

Purpose

Proper management during the delivery of concrete can minimise the risk of contaminating street gutters, stormwater drains and watercourses.

Applications

- for agitator truck drivers delivering concrete to construction sites
- for site managers ordering concrete deliveries.

Best management practices

- ✓ When selecting a concrete supplier, ensure that they have an EMP that includes appropriate environmental training for employees and contractors. Each driver should have knowledge of the guidelines for safe concrete delivery. The guidelines are available from the Australian Pre-mixed Concrete Association.
- ✓ Where possible, ensure the delivery of concrete occurs on the site, where the risk of spillage contaminating the stormwater system is minimised.
- ✓ If site access is restricted and the delivery of concrete must occur on the street, appropriate sediment controls will need to be in place before pouring begins.
- ✓ The site manager will need to be satisfied that all appropriate pollution controls have been placed before the concrete pour.
- ✓ Sweep up any spillage that has occurred during the delivery procedure before removing the sediment controls. Do not hose concrete spillage into any stormwater drain or gutter.
- ✓ Vehicles should return to their depot with excess concrete and for thorough wash-down.

Figure 5 Concrete pumping

Portable concrete collection units can be used to capture excess wet concrete and wash out water.



The unit can then be removed to allow excess wet concrete to be handled without contaminating the stormwater system.



- ✓ Alternatively, excess concrete could be placed in the site's designated concrete/masonry recycling receptacle.
- ✓ Chutes, barrels, wheelbarrows and other equipment must be rinsed in the site wash-down area. Remove excess concrete before rinsing and place in the designated concrete/masonry recycling receptacle.
- ✓ Mud, soil and stones carried off site are regarded as pollutants. All tyres and undercarriages must be clean before vehicles leave the construction site.

Inspection and maintenance

- The driver should inspect and maintain the truck at all times.
- Pollution controls should be in place before concrete delivery. If the driver has any concerns regarding these pollution controls, these concerns should be raised with the site manager.
- The site or project manager must maintain vigilance or delegate authority to ensure that pollution control procedures are in place.
- Placing equipment or material in a position where it is likely to pollute the environment may result in on-the-spot fines or prosecution.

Limitations

- Difficult access to some construction sites may restrict vehicle movement.
- There may be no suitable wash-down areas on site.

3.6 Concrete pumping (see Figure 5)

Purpose

Proper management during the pumping of concrete can minimise the risk of any detrimental impact on the environment.

Applications

- for concrete pumping contractors working on construction sites
- for site managers overseeing concrete-pumping activities.

Best management practices

- ✓ When selecting a concrete pumping contractor, ask about their EMP and commitment to providing appropriate environmental training to their employees. Each contractor should have knowledge of and should fulfil the requirements of the WorkCover NSW Code of Practice – Pumping Concrete.

- ✓ Vehicles and machinery must be regularly serviced and maintained to minimise noise and exhaust emissions and oil and fuel drips.
- ✓ Where possible, concrete pumping equipment should be set up within the construction site. This reduces the potential of leakages from hoppers, hoses and fittings that could contaminate the stormwater system.
- ✓ Exhaust emissions can be reduced by fitting pollution control equipment. For example, a catalytic converter can be fitted to the exhaust system of each petrol-driven internal combustion engine.
- ✓ Ensure adequate protective screens are erected around the pump area to prevent concrete splashing into street gutters or stormwater drains.
- ✓ Where possible, ensure the pumping of concrete occurs at a location on the site where any spillage will not contaminate the stormwater system.
- ✓ Where a concrete pump is located at a roadway or footpath where excess material could enter the stormwater system, appropriate bunding to trap spilled material should be installed. Portable concrete collection units (plastic or metal trays or receptacles) placed under pumping equipment to collect any spilled material during works (see Figure 2).
- ✓ The site manager or delegate must be satisfied that all appropriate pollution controls are in place before pumping starts.
- ✓ Hoses, hoppers, wheelbarrows and other equipment must be washed in the site wash-down area after all excess material has been removed by hand.
- ✓ Excess and residue concrete from the hopper and line should either be collected and sent back with the delivery truck or placed in the site's designated concrete/masonry recycling receptacle.
- ✓ To minimise the amount of wash-down water generated, scrape excess concrete residue from the hopper before washing. Do not wash out the hopper directly into the street gutter.
- ✓ It is the responsibility of the concrete contractor to properly manage the disposal of wash-down water generated during the cleaning process. Options for collection, treatment and disposal of wash-down water should be discussed with the site manager.
- ✓ Wash-down water from the hopper must not contaminate the stormwater system. The wash-down area should be used only for

small volumes of wash-down water and is not to be used as a disposal point.

- ✓ Mud, soil and stones carried off site are regarded as pollutants. Therefore, tyres and undercarriages must be clean before vehicles leave the construction site.

Inspection and maintenance

- Inspect and maintain machinery regularly to minimise leaks and drips.
- Pollution controls should be in place before concrete is pumped. The concrete pump contractor should inspect pollution controls to ensure they are adequate, and should liaise with the site manager if there are any problems.
- The site or project manager or delegate must maintain vigilance during the work activities to ensure that pollution control procedures are being followed.
- Placing equipment or material where it is likely to pollute the environment may result in on-the-spot fines or prosecution.

Limitations

- Difficult access to some construction sites may restrict both concrete delivery and pumping activities. Concrete pumping from the street must be undertaken with proper planning, caution and diligence to minimise the risk of polluting street gutters and stormwater drains.

3.7 Further information on BMPs

This section makes reference to establishing and maintaining appropriate pollution and sediment controls. It is beyond the scope of this guide to provide detailed specifications of all the various materials and construction techniques used for pollution and sediment controls at construction and building sites.

The most relevant and practical examples for avoiding pollution from concreting activities are illustrated in Figures 1–5. However, contractors involved in the construction and building industry should familiarise themselves with the alternative types and methods of pollution and sediment controls available.

Sources of further information relating to pollution controls and environmental management issues at building sites include:

- EPA 1998. *Environmental Information for Builders*. NSW Environment Protection Authority, Sydney. Available from the EPA's Pollution Line (131 555).
- DLWC 2000. *Guidelines for Erosion and Sediment Control on Building Sites*. NSW Department of Land and Water Conservation, Sydney. Available from your industry association.
- ACCI 2000. *Waste Strategies in Commercial Construction: Guidelines for Minimising Waste*. Australian Centre for Construction Innovation, Sydney. Available from ACCI (02) 9385 0400.

Alternatively, local councils can often provide relevant information to developers on sediment control techniques.



4.1 Training

An employer has a duty to provide appropriate training, information, instruction and supervision of employees so as to enable them to perform their work in a manner that meets industry competency standards.

Environmental training should begin at the time of induction of a new employee or contractor. All new employees should be told their environmental responsibilities and the environmental best management practices that apply to their particular work activities. On-the-job training should include and emphasise these elements.

Comprehensive training of staff can dramatically reduce the environmental risk of an employee's or contractor's activities and liability under environmental law. Lack of skill and knowledge is often a contributory factor in pollution incidents.

Contact your industry association to find out what environmental training is available through them or is recommended by other training providers such as TAFE or ITAB.

Environmental induction training should cover at least:

- responsibilities under the *Protection of the Environment Operations Act 1997* and relevant Regulations under the Act
- local government legislation and general requirements under the development application process
- overview of relevant industry codes of practice and guidelines
- setting-up and maintenance of pollution controls
- spill clean-up procedures
- excess concrete management and handling.

4.2 Supervision

Supervision responsibilities include:

- ensuring that only those employees that have received training and instruction are authorised to carry out the work
- adequately monitoring the work being undertaken to ensure that environmental best management practices are followed.

5.1 Acts, Regulations, standards and codes

The following Acts, Regulations, standards and codes of practice apply to concrete placing and finishing contractors and are related to environmental protection, planning or management:

- *Protection of the Environment Operations Act 1997 (POEO)* and Regulations
- *Environmental Planning and Assessment Act 1979* and Regulations
- *Waste Avoidance and Resource Recovery Act 2001*
- *Local Government Act 1993* and Regulations
- Local Government by-laws.
- Code of Practice – Pumping Concrete, WorkCover NSW, 1994.

Whether deliberate or accidental, it is an offence under section 120 of the POEO Act to cause or permit the pollution of any waters unless the discharge occurs as a condition of an Environment Protection Licence. This includes the pollution of any part of a stormwater system.

5.2 Who is the appropriate consent authority?

To formulate an appropriate development proposal, the developer will first need to ascertain the zoning of the land under the relevant environmental planning instrument. The developer should consult with the local council and landowners to identify the appropriate assessment process under the *Environmental Planning and Assessment Act 1979* and any other relevant information.

The developer will also need to be aware of the schedule of EPA licensed activities under the POEO Act. The developer may be required to apply to relevant State government authorities to attain statutory licences, permits or certificates before commencing development.

5.3 What is your 'duty' as an employer or site manager?

A 'duty' is an undertaking or action that a person is bound to do by moral or legal obligation. The placing, pumping and finishing of concrete requires compliance with the above Acts, Regulations, standards and codes. Generally, employers have a duty to ensure that their activities or the activities of their employees are not having a detrimental impact on the environment, by:

- undertaking all practical measures to prevent pollution occurring during work activities
- ensuring that all work practices are undertaken in a manner that does not breach environmental legislation
- ensuring that all equipment is properly used and maintained in a manner that does not breach environmental legislation
- providing such information, instruction, training and supervision as may be necessary to ensure employees' activities do not have a detrimental impact on the environment.

In certain circumstances, 'vicarious liability' can place responsibility on individuals or corporations for acts or omissions of their employees or independent contractors.

5.4 What is your 'duty' as an employee and/or concrete contractor?

An employee has a duty to co-operate with and undertake work activities as directed by the site manager. Employees have a duty in regard to their environmental performance and ignorance of the law is not a defence against prosecution.

Contractors have a duty to undertake work activities in accordance with their contractual obligations. Contractors have a duty in regard to their environmental performance and ignorance of the law is not a defence against prosecution.

Appropriate Regulatory Authority (ARA)

Council and EPA officers are responsible for administering environmental compliance in accordance with NSW environmental legislation, including the *Protection of the Environment Operations Act 1997* (POEO Act).

Schedule 1 of the POEO Act lists those operations and activities that are regulated by the EPA and require an environment protection licence. Activities not listed in Schedule 1 are generally regulated by local councils.

Competent person

A person who is regarded by an employer, company or site manager as having adequate knowledge and skills to perform the task required and who has acquired this knowledge through either vocational training, qualification, or experience, or a combination of these.

Consent authority

The *Environmental Planning and Assessment Act 1979* (EPAA Act) gives details of the appropriate assessment process required for specific developments and activities. A consent authority will make assessment of individual applications against relevant local, regional and State planning instruments.

Requirements of development applications and/or conditions of consent will vary among consent authorities owing to variations in the requirements of these environmental planning instruments (EPIs).

Concrete contractor

A person, company or business taking delivery of fresh concrete and having the responsibility to place, transfer and/or finish the concrete into a final position.

Duty

An undertaking or action that a person is bound to do by moral or legal obligation.

Eco-efficiency

A combination of economic and ecological efficiency to achieve sustainability means producing more product or goods and services by using less energy and fewer natural resources, thereby using resources more efficiently and causing less waste and pollution.

Environmental best management practice

A term used to describe the performance of day-to-day activities in a

way that minimises detrimental impact upon the environment and therefore reduces the risk of legal liability.

Environmental Management Plan (EMP)

An EMP is a document that formalises the environmental policy, ethos and management credentials of an individual contractor or business. The EMP provides existing and potential clientele with an outline of the knowledge, understanding and commitment of the contractor/business toward reducing the environmental risk of concreting activities.

Environmental planning instruments (EPIs)

EPIs contain provisions for regulating and controlling the use of land and the purposes for which land may be used. Examples are State environmental planning policies (SEPPs), regional environmental plans (REPs), local environmental plans (LEPs), development control plans (DCPs) and council codes and policies.

Hardstand area

An area or surface where wet concrete has been placed, formed, laid or moulded and allowed to cure.

Legislation

A law or a group of laws enacted.

Site management plan (SMP)

In this guideline, a site management plan (SMP) refers to a plan that comprehensively identifies the likely environmental issues of a specified development proposal and outlines appropriate strategies to manage the impact of these issues. An SMP may also be commonly referred to by the ARA as a: 'site environmental management plan' (SEMP), 'erosion and sediment control plan' (ESCP), or 'environmental management plan' (EMP).

Stakeholder

An individual person or persons, including a company, business, government authority or representative group who has an interest in a particular action, activity or process.

Stormwater system

A system of pipes, gutters, drains, floodways and/or channels that is a public work constructed to collect or transport stormwater in or through an urban area.

Wash-down water

Contaminated water resulting from the rinsing, washing and cleaning of equipment reasonably associated with and used by concrete contractors.

ACCI 2000. *Waste Strategies in Commercial Construction: Guidelines for Minimising Waste*. Australian Centre for Construction Innovation, Sydney. Available from ACCI (02) 9385 0400.

Concrete Matters (educational poster) Australian Pre-Mixed Concrete Association (NSW).

City of Sacramento (1994) *Administrative and Technical Procedures Manual for Grading and Erosion and Sediment Control*. City of Sacramento, Department of Utilities – Stormwater Management Program.

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Newcastle City Council & Lake Macquarie City Council (2001) *Protecting our Environment is Easy – Simple Solutions to Common Environmental Problems faced by Concrete, Bricklaying and Paving Contractors*. Lake Macquarie City Council.

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Southern Sydney Regional Organisation of Councils (SSROC) (2001) *Do It Right On Site – Environmental Information for Builders*, SSROC.

WorkCover NSW (1994) *Code of Practice – Pumping Concrete*. WorkCover NSW, Sydney.



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