



C.R.Welsby Engineers Pty Ltd
Building Services Specialists

Australian Institute of Police Management

(For The Australian Federal Police)

North Head, Sydney

Report

For

Site Stormwater Assessment

Project No : 08-147

Revision : Issue D – Preferred Project Report (16.12.08)

Introduction

This Site Stormwater Assessment report responds to the requirement for an assessment on the effects stormwater will have on the site due to the development with reference with compliance to the Environment Protection and Biodiversity Conservation (EPBC) Act. The basis of this report is formed by the following parameters:

- Building Code of Australia and relevant Australian Standards.
- Discussions with project Ecological consultant.
- Maintaining the ecological / environmental protected aspects of the historical site.
- Consideration of options in regard to safety of site personnel.
- Practicalities of construction and installation.
- *Soil Erosion and Sediment Control strategy during construction*
- *Historical rainfall data for the area*

The systems recommended for the site were selected after consideration of a number of alternatives and a subsequent review process. The review has been based on a variety of criteria, and life cycle considerations, with the systems chosen being considered to provide the most appropriate balance between:

- Maintaining the ecological and environmental significance of the site.
- *Soil Erosion* and Energy Dissipation of stormwater outlets
- Functionality to satisfy the end user requirements.
- Ease of maintenance
- System life
- Flexibility for future change and adaptive reuse
- Capital cost
- Removal of contaminants from vehicles entering the site

Relevant Codes and Standards

All systems have been designed to comply with the requirements of:

- Building Code of Australia (BCA).
- Australian Rainfall and Runoff – 1987
- Environment Protection and Biodiversity Conservation (EPBC) Act
- Relevant Australian Standards

The Existing Site Drainage

The site has an area of 1.8 hectares with its northern boundary fronting Sydney Harbour. The existing site has been used to house the Australian Institute of Police Management since the early 1960's and is currently, still being used by the AIPM. The site has three main drainage components, being the following;

- a) A series of piped drainage systems to convey stormwater from the site to the harbour
- b) A semi piped water course to allow upstream drainage through the site
- c) Landscape and bush land areas which, freely drain overland to the harbour

Currently there are no stormwater on-site detention or retention facilities, and no treatment facilities for contaminated stormwater.

Drainage Parameters

There are a number of parameters that shaped the design of the stormwater infrastructure for the site. These parameters include the natural watercourse traversing the site, ecological and environmental impacts, increase in stormwater piped infrastructure catchment area within the site, requirement for reusing existing discharge outlets and stormwater retention.

This scope of stormwater design does not comprise the natural water course traversing the site. However, as the existing semi-piped watercourse will be reopened as a natural stream with a boxed culvert below existing buildings, we have re-directed all stormwater from within the development site away from the natural watercourse to ensure no adverse impact, and to minimise the possibility of localised flooding.

Hardstand impervious areas have increased slightly as part of the redevelopment (8% of the total site area). In addition to alleviate previous problems with localized flooding, extra drainage pits have been added to remove the previously uncaptured overland flows.

The introduction of water storage tanks (2 x 9,000 litres, 2 x 8,600 litres & 1 x 14,000 litres) across the development to collect and store roof rainwater will substantially improve runoff from the site by reducing flows. The collected water is to be utilized for various activities including toilet flushing and irrigation.

Due to the localized environment being fragile we are required to use the existing discharge outlet locations. To minimise potential environmental impact around the escarpment the existing 450mm discharge pipe located in the central area of the northern boundary will be re-used.

Under the proposed scheme Garden Cottage, Harbour Cottage, Spring Cove Cottage, Kookaburra Cottage, Garden Store and the workshop do not form part of this scope of works, however, all in-ground stormwater drainage pipework draining these buildings are to be reconnected into the new stormwater drainage system.

Drainage Infrastructure Design

Due to the drainage parameters outlined above, three separate drainage systems have been provided. For the purpose of this report these three systems will be known as SWDS1, SWDS2 & SWDS3 (refer to appendix A).

The discharge outlet for SWDS1 is to replace an existing site stormwater outlet in the northeastern corner of the site. SWDS1 commences at the southern side of the proposed new administration building and drains through a piped system down the eastern side of the site collecting stormwater throughout including large areas of vehicular access. Due to contaminants which these vehicular areas may collect, a humeceptor model: STC2 has been provided in the design to remove contaminants before discharging into the surrounding environment. The humeceptor has been located to minimise impact on the environment during installation by maximising the distance from ecologically sensitive areas. The landscape Architect has designed the antiscour / energy dissipation area into the surrounding landscape. This energy dissipation area will ensure erosion of the surrounding bushland does not occur.

The discharge outlet for SWDS2 is designed to reuse the existing 450mm pipe outlet that is semi exposed in the ground. The location of this outlet is on the northern boundary at the escarpment face. SWDS2 commences at the proposed new carpark located in the south-western corner of the site and drains through a piped system down the western side of the site collecting stormwater throughout including large areas of vehicular access. Due to contaminate which these vehicular areas may collect, a humeceptor model: STC3 has been provided in the design to remove contaminates before discharging into the surrounding environment. The location of the humeceptor has been to allow the existing 450mm pipe to be reused at the same invert levels and to minimise impact on the environment during installation by maximising the distance from ecologically sensitive areas.

The discharge outlet for SWDS3 is located on the western side of the site and is a new discharge point. SWDS3 drains minor surface runoff and subsoil drainage from the western end of the heritage road and pathway adjacent the northern residential building. The location of the outlet minimises impact on the environment during installation by maximizing the distance from ecologically sensitive areas. The landscape Architect has designed the antiscour / energy dissipation area into the surrounding landscape. This energy dissipation area will ensure erosion of the surrounding bushland does not occur.

Effects on the Environment Due to the Stormwater Infrastructure

The proposed stormwater infrastructure for the site has been designed to minimise impact on the surrounding environment. Consultation with the environmental consultant aims to ensure that any impact on the Little Penguin and Long-nosed Bandicoot populations is minimised. With this in mind we have allowed for reuse of existing stormwater discharge points wherever possible. Any new outlet / discharge points have been located in areas where little, or no impact on the environment will occur. Generally water quality of the stormwater from the site will be a far higher quality than existing, due to the introduction of stormwater treatment devices.

The component of the proposed stormwater infrastructure that has the greatest potential for environmental impact on the site is the construction of the new stormwater infrastructure. To reduce this potential impact, the design has prohibited drainage works in all environmentally sensitive areas including those areas sensitive to the Little Penguin and Long-nosed Bandicoot populations. Prohibited zones shall be coordinated between the site superintendant and the project ecological consultant.

Throughout the construction phase for the development there will be erosion and sediment controls in place. These controls are a silt catchment fence line on the low side of all construction areas, a vehicular and pedestrian washdown bay and a vehicular shake down area. These measures will restrict the flow of any loose soil or contaminates to within the construction zone, and prevent introduction into the surrounding environment.

Geotechnical results show that rock levels on the site start at an approximate depth of 0.5m. As there will be limitations on machinery use, a horizontal bore is most likely the construction method that will be used, if the existing stormwater outlets draining through the escarpment wall are to be reconstructed or lowered. This will greatly reduce any environmental impact on the site. During construction the escarpment face and surrounding area will need to be monitored to make sure there is no geotechnical disturbance. If it was proposed that new pipework be installed to discharge at the escarpment the impact on the environment that surrounds the escarpment on the northern boundary would have detrimental effects. Therefore, the existing semi-exposed 450mm discharge pipe will remain.

Stormwater treatment devices have been included in the design. Each device will effectively remove any contaminate that may enter the stormwater infrastructure. As a result a high level of clean water will discharge into the harbour, and there will be no impact on marine life, and other fauna and flora in and around the site.

Conclusions

The inclusion of treatment devices for the removal of contaminate that may otherwise be present within the stormwater discharge of the site will improve the quality of water entering the environmentally sensitive areas.

The existing stormwater discharge locations have been maintained. Existing discharge locations have been accepted into the environment for many decades. To maintain the sensitive environment the design has accommodated these existing outlets, which if removed or relocated could have damaging effects of the local environment.

The introduction of stormwater retention to the site has allowed for greater areas of surface water to be directed into the infrastructure. The inclusions of both of the above have counteracted each other and therefore the amount of post-developed stormwater discharging the site will effectively equal the pre-developed volumes. Therefore on-site detention is not required. In addition, construction of any on-site detention facility would have a major impact on the environment that surrounds the escarpment on the northern boundary and would have detrimental effects.

The current proposed design is a result of finding the best balance of efficient construction and hydrology as well as maintaining the integrity of the site with regards to the environment and ecosystems of the Little Penguin and Long-nosed Bandicoot populations.

C.R.WELSBY ENGINEERS Pty Ltd.
Shop 3/145 Balgownie Road, Balgownie. 2519
PHONE: 42838108 FAX: 42838508
ACN 118 815 348 ABN 67 118 815 348

Appendix A

Individual site stormwater drainage systems' drawings (SWDS1, SWDS2 & SWDS3)

Appendix B

Stormwater design drawings (SW1 & SW2)

Appendix C

Erosion and sediment control design drawings (ES1 & ES2)