CASE STUDY:

STORMWATER DETENTION

MIDLAND SALES YARD COMMERCIAL & RETAIL DEVELOPMENT, MIDLAND WESTERN AUSTRALIA
JANUARY 2020

ECOAID ™

ecoAID is an underground modular stormwater management system used to detain, infiltrate or harvest stormwater run-off and also provides stormwater treatment by utilising an internal gross pollutant and sediment trap via a designated inlet row called a 'Catch-All-Row" (C-A-R). The dual function of stormwater collection and treatment allows the engineer to optimise their drainage layout by minimising the number of external manhole pits required on site with the added benefit of omitting any need for upstream gross pollutant and sediment traps.

ecoAID is an exceptionally strong and robust water storage and treatment system that is designed to be used under public roads and highways, car parks, sports fields and public open space providing the engineer with opportunities to save valuable land space and protect our natural waterways from the damaging effects of pollution from new and existing developments.

GEOFABRICS®
Smarter Infrastructure

Midland Sales yard was an old industrial area that has been redeveloped as part of the Midland regeneration plan. Aigle Royal have developed the 14 hectare site into a new light industrial, large format retail and commercial area providing new services to the area. The large site will generate a significant volume of stormwater that required a management plan to mitigate its impact on the surrounding area.

After careful consideration by Cardno engineering consultants the Australian made 'ecoAID™ Stormwater Chamber System' was specified to provide underground water storage across the entire site. There were a number of reasons for the specification of ecoAID™, however the deciding factors on this particular project was cost and most importantly because ecoAID™ has been designed to cater for extremely heavy semi-trailer loads (designed, tested and manufactured to AS 5100.1 Concrete Bridge Design Code).

The project consisted of 5no. underground stormwater tanks (4no. detention & 1no. Infiltration) equating to a total of 1,547m^3 of stormwater storage. One tank was installed under an access road, one tank in the verge and three tanks under the car park area. The construction site posed many challenges including highly contaminated material and weak subgrade. After detailed discussions between Cardno and Geofabrics the most cost effective solution was proposed and consisted of the following:

Tensar TX160 TriAx® Geogrid installed directly on top of the subgrade in the tank locations under the car park areas. This was to minimise excavation into the contaminated subgrade material and

Tensar TriAx® Geogrid being installed to stabilise the subgrade.

The HDPE liner and bidim® A44 as a cushion layer.

The design consists of five separate tanks across the site catering for approximately 1547m³ of stormwater storage.

to minimise the quantity of granular fill which was being imported in order to meet the base material strength requirements.

A robust HDPE geomembrane was used to line 4no. ecoAID™ tanks preventing the loss of water and providing the detention function. It was also important to capture and store water through an impermeable barrier to prevent infiltration and leaching into the surrounding contaminated soil.

Bidim® A44 needle free non-woven geotextile was used underneath and on top of the HDPE liner acting as a cushion layer. Bidim® needle free products are used for liner protection applications to ensure no holes are caused by broken needles from the geotextile manufacturing process. Bidim® NF products are certified needle free which is critical in geomembrane protection/cushion layer applications – “Needle-free” geotextiles are defined as a roll of geotextile containing “no metal greater than 1mm² in a roll”.

The next stage of the system was to install 20-50mm dia drainage rock providing additional storage and strength to the system. Recycled Crushed Concrete was selected as it’s cost effective and provides a great opportunity to recycle and reuse existing aggregate which helps towards a sustainable and low emissions environment.

The ecoAID™ chambers, end caps, associated geotextile wrap and inlet manholes were then installed and the final pour of the drainage rock embedment material was completed before the HDPE liner contractors came back to close up the ecoAID™ tanks.

In summary, the ecoAID™ chamber system was specified because:

1) It’s cost effective - good for the client.

2) It’s a strong system being able to cater for semi-trailer and heavy vehicle loads - ideal for this project.

3) The chambers are quick, light and easy to install - great for the contractor.

4) Clean washed recycled drainage rock (RCC) is acceptable for the foundation and embedment backfill material - good for the environment and a great cost saving for the client.

5) Geofabrics provide upfront and ongoing design suggestions to ensure the project requirements are met - an easier life for the design consultant.

6) ecoAID™ is designed, tested and manufactured in Australia - positive for the local manufacturing industry and lower carbon footprint compared to imported products.