

Development of an Australian Protocol for Stormwater Quality Improvement Devices

Progress report for Stormwater Australia

March 2014

SQID Project Progress Report

Introduction

Stormwater Australia (SWA) (formerly the Stormwater Industry Association) completed a *Literature Review on Performance Testing Approaches for Gross Pollutant Traps* (GPT Literature Review) in 2010 which was never released at the time as it was not universally accepted by industry. The literature review was the first step in the development of an Australian testing protocol for stormwater quality improvement devices (SQIDs) and contains 17 recommendations to guide further work. Upon release the literature review received negative feedback from some industry members and was not acted on for two years. Interest in the project was rekindled at *Stormwater 12* in Melbourne and since then the literature review has been released publically on the SWA website. The National SIA initiated a workgroup to progress onto stage 2 of protocol development. The scope of the project has become broader than just Gross Pollutant Traps (GPTs) and now includes a range of SQIDs. The project has progressed over the course of 2013 although it has not been rapid. National regulator views were gathered with positive responses in February. Rod Wiese developed a discussion paper which formed the basis of a presentation and very positive discussions at the *Stormwater Victoria Conference* in May 2013. As part of the same presentation Iouri Vaisman overviewed a road map discussion paper to develop an *Independent Verification Scheme for stormwater treatment devices* for Melbourne Water to apply in Victoria. This document was released by Melbourne Water for industry consultation in October 2013 and can be viewed on the SWA national website.

Also on the National SWA website are articles posted earlier in 2013 detailing that SQID manufacturers including Humes, Rocla and Stormwater 360 have expressed their strong support to the National SWA for the development of a national protocol. They also voiced a desire to develop a Code of Conduct for SWA members dealing in SQIDs.

From July to September 2013 discussions were held Australia wide with people from four industry sectors manufacturers, researchers, regulators and users who have direct involvement with SQIDs. The purpose of the discussions were to understand these manufacturer's attitudes to the development of an Australia wide testing protocol for SQIDs, what their experiences have been and how they best see the process moving forward. Further feedback and information continues to arise and will be documented by the working group. It is felt that the information gathered to date provides a good indication of the attitudes of each of these sectors of the industry. It is summarised in this report.

Manufacturers

So far discussions have been undertaken with six manufacturers [Humes, Rocla, Stormwater 360, Ecosol, Baramy and SPEL¹] to gain their views on the development of an Australian testing protocol and how their current devices have been tested. Similar to views already gained from Humes, Rocla and Stormwater 360, Ecosol, Baramy and SPEL all expressed their willingness to be involved in the development of an Australian testing protocol. All manufactures acknowledged benefits is doing so although there was a degree of caution expressed by some.

It was generally agreed that a protocol will assist greatly in justifying the claims and performance of SQIDs and create a more balanced marketplace where users are able to better compare devices. Having clear guidance for device testing was seen to be a major benefit rather than creating new methodologies and procedures each time testing is carried out in Australia. High value was placed on developing performance results from testing in Australian conditions rather than using results from other countries.

Points of caution were raised including the importance of developing a fully independent protocol, accepted by manufacturers large or small. There was strong feeling that a protocol should not disadvantage any manufacturer, limit different treatment approaches or stifle innovation in the development of new products. The cost of testing was a major concern with the fear that a testing methodology could be too expensive for smaller companies particularly when introducing new products. The value of installing custom built systems was also raised and whether they could fall out of favour to SQIDs if their performance is not measured against an accepted protocol.

Many manufacturers market devices in Australia based on designs from overseas companies and have data that has been generated from the country of origin. The USA is the most common source country and the protocols used in the states of New Jersey and Washington State were the two most referenced. The USA has a number of protocols that have been developed and they were previously well summarised in the GPT Literature Review. Companies with overseas links are keen to provide contact to overseas industry representatives that have has experience with the development and use of protocols.

Ecosol referenced the Auckland Regional Council *Proprietary Devices Evaluation Protocol [PDEP] for Stormwater Quality for Stormwater Quality Treatment Devices*. This document details a readily understood assessment protocol with two pathways of evaluation. The protocol and the methodology used to develop it should be further assessed for appropriateness to the Australian setting.

SPEL arranged a discussion with Tom Panks from BaySaver Technologies in the USA who was directly involved in the development of the New Jersey Protocol. Tom's experiences were very insightful. Local manufacturers were all represented on a technical committee that spent twelve months coming to agreement and all objections raised were addressed. Laboratory testing and subsequent field testing are both addressed but the protocol has only tackled Total Suspended Solids (TSS). Testing may be undertaken by a recognised third party or the manufacturer can undertake testing at their facility with the oversight of an independent approved auditor.

¹ SPEL is not a member of SIA but is willing to participate

All manufacturers have or are currently undertaking the testing of products in Australia in conjunction with a number of different research organisations. They were all happy to share their experiences and provide links to the institutions undertaking their testing. Ecosol provided a guided tour of their testing facility in South Australia and discussed their recent testing procedures.

There was a diverse range of views on the value of laboratory testing versus field testing. It is recognised that laboratory testing allows for easier recreation of repeatable events and comparable results. There was also much enthusiasm by some for testing devices in real situations. The cost of field testing and inconsistency of comparable results were seen as major drawbacks however advocates see value in having field results. A major challenge raised by all is the variation in rainfall across Australia and the need to accommodate this in a national protocol. Another common point raised was the importance of broadening any protocol beyond TSS but not so broad that costs become excessive. It was also noted that there needs to be a clearly understood and agreed set of definitions for testing.

The value of testing in conjunction with the use of a modelling system was seen as a major benefit and MUSIC has a strong position as the preferred model because of its current Australia wide application.

As discussed the methodology to develop a protocol must have strong governance, be transparent and accepted by all manufacturers. There is a challenge working across the breadth of Australia although modern communication tools make this easier. It was suggested by some that a small trusted representative group should undertake the development and others wanted to ensure all players were engaged. Use of the Standards Australia methodology was suggested.

Researchers

Discussions were held with four different research organisations (Sunshine Coast University, Queensland University of Technology, Eng Test [University of Adelaide] and the University of South Australia). All of them are interested in the development of a protocol and would like to be involved in the process moving forward. There was great benefit seen from applying recognised approaches and methods rather than having to spend time devising and testing methodologies whenever a different device is tested. Although it was mentioned that a testing protocol would need to have enough flexibility to be able to accommodate different testing approaches if they are devised, particularly for new devices.

They were all willing to discuss methods and share experiences that they have gained. The time to design successful testing methodologies was a common comment as was the challenge of creating repeatable events. The difficulty of producing consistent sample materials to represent contaminants was a common issue. Development of clear specifications for sediments, nutrients or whatever is being tested for as part of the protocol was strongly supported.

The value of laboratory testing for the establishment of repeatable testing procedures and limit of cost was a common response. Similar to the manufacturers there was strong enthusiasm by some for the value of field testing to gain a better understanding of real conditions. The challenge in these situations is testing truly comparable events.

Issues raised were also very similar to those of the manufacturers including the challenge of recreating the variation in rain events across Australia. The broadening of testing was supported particularly to include nutrients and hydrocarbons for devices designed to capture them. It was agreed that clear definitions are required for consistency. In the lab situation, when creating measured feed stock it can be difficult to maintain consistency of delivery. Combining pollutants into an approximate “real world” mix is the preferred approach but in some cases pollutants are best tested in isolation. The value of incorporating a model (most support MUSIC) was supported by all researchers. There were differing views on the use of scaled devices as opposed to full sized devices.

The University of South Australia brought attention to the *European Standard [BS EN 858-2:2003]*. This was developed for the removal of light liquids (e.g. oil and petrol) and it was also raised by the South Australian EPA. This protocol or similar is of particular importance when installing devices in service stations and other fuel storage and handling facilities.

A common view from researchers was that the methodology for the development of a protocol needs to be transparent, independent of influence and include all sectors of the industry. All institutions expressed interest in being engaged in the future process.

There will be great benefit to all researchers and the industry if the information and data that is obtained from device testing is openly and transparently shared in a public forum.

Regulators

Discussions were held with regulators in Queensland, New South Wales, Victoria, Tasmania, South Australia and Western Australia. All of those interviewed believed that there would be value in having a recognised validation protocol against which SQIDs could be tested and compared. Sampling was undertaken in each state that provided a reasonable summary of current activity and enthusiasm for a protocol development.

The regulatory approach to reducing pollution in stormwater varies from state to state as does the commitment to compliance. Typically while there has been increased recognition of the environmental degradation caused by urban stormwater over the last two decades and many excellent guidance documents to reduce it have been produced, the willingness to support and enforce change has varied greatly. Water Sensitive Urban Design (WSUD), including stormwater quality improvement, has been championed in all states but varying levels of legislative support, particularly in the planning and development area has meant implementation is far from uniform. Budget reductions across all regulatory agencies, over the last 12 months, have meant that resources available for stormwater controls have been significantly reduced.

Queensland and Victoria have State planning legislation that supports the implementation of WSUD and stormwater quality improvements. Both states have good documentation and guidelines to support this uptake which provides a strong foundation for local government to establish planning policy to assist with implementation.

NSW does not have overriding state legislation but local government has a strong responsibility to prepare planning controls. Consequently local government councils have established planning policy to support WSUD and stormwater quality improvement.

South Australia has released a WSUD technical guideline and Western Australia a very comprehensive water planning library of guidelines but neither yet have strong planning controls to support implementation. Local government councils in both states have the ability to set planning controls but this has not been exercised by many.

Tasmania defaults to the Derwent Estuary Program for guidance on WSUD. Some local government councils have established guidelines and are influencing planning decisions.

State regulators contacted all acknowledged the value in having an acknowledged protocol and were willing to be engaged in the process although their level of involvement would be limited due to recent prioritisation and budget pressure. Melbourne Water has the most enthusiasm for involvement and has already commissioned background work on the *Independent verification of stormwater treatment devices* and the development of a database to house the information generated. The importance of undertaking an independent transparent process to ensure universal acceptance was again strongly supported.

All agencies expressed their concern about the lack of consistent maintenance of SQIDs. Many examples were cited of devices not working due to lack of maintenance and some have been bypassed to avoid the need for maintenance. The improper disposal of waste material from devices was also an issue of increasing concern, although it was acknowledged that costs for such services can be particularly high.

Local government regulators are increasingly asking for information to verify the performance of SQIDs they are not familiar with and spending time reviewing them. Those interviewed would like to be engaged in protocol development however they also are under increasing resource pressure. They see much value in having a protocol that provides a consistent way of assessing SQIDs.

Linkage to MUSIC modelling was seen to be an obvious step as was the establishment of an accessible reference database. Close involvement with the Institute of Public Works Engineers Australia (IPWEA) was raised as a positive way to engage and move forward with the local government sector both at the regulator and user level. IPWEA provides technical support to local government engineers and has previously been involved in support in this area. Jim Davies in Western Australia provided a copy of *A Guide to the Selection of a Storm Water Pollutant Trap (SPT)* that his company, JDA Consultant Hydrogeologists, had prepared for Foundation for the Technical Advancement of Local Government Engineering in Western Australia in 2006. IPWEA Victoria is involved in the Melbourne Water verification project and Andrew Allan has had positive discussions with Chris Champion IPWEA national CEO on their ongoing involvement in the protocol development.

For the development of a national protocol one state regulator suggested following the model that has been used for the National Water Quality Management Strategy documents.

Users

Discussions were held with users (a mix of State authority, local government staff and stormwater designers) and they were generally all supportive of the introduction of a protocol to assist with the understanding and selecting of SQID devices. The value of independent information was seen as a positive benefit particularly to choose a device best suited to requirement. Similar to regulators much time can be spent on seeking verification of unfamiliar SQIDs.

Users report that they are often overwhelmed in sorting through and effectively comparing documentation and specifications from different manufacturers. Any tools that could assist with this would be welcome.

There is strong enthusiasm for the development of a guide for users containing information and tools that can assist with selection of SQIDs. In the discussion paper Rod Wiese prepared earlier in the year he provides a most useful summary of the considerations and questions that users may have during the selection of a SQID including:

- Performance requirements
- Treatment efficiency
- Flow
- Application
- Head loss
- Maintenance
- Physical characteristics
- Construction considerations
- Approximate cost
- Validation/certification

It is envisaged that a web-based database of SQIDs will be developed that will enable users to search by setting parameters of specific requirements and the devices that match will be listed for more detailed examination. This is currently under formulation as part of the SQID web page development.

Similar to the regulators there was common concern about the maintenance and long term asset management cost required for devices. Examples were provided from all states where SQIDs have been installed and are not being adequately maintained to keep them operating properly. In many cases the amount of equipment required to properly clean and drain a device is seen to be prohibitive to frequent maintenance. The disposal of extracted material is a growing concern because of the cost involved to do so.

Users are varied in their enthusiasm for direct involvement in protocol development but they expressed the desire to be kept up to date with information and provided the opportunity to contribute if desired.

Protocol Development Methodology

The methodology for developing an industry agreed testing protocol for SQIDs in Australia needs to be well planned and carefully orchestrated. The process must be carried out in a transparent, open and honest manner that provides a comfortable environment for manufacturers and suppliers to participate contribute and move forward.

As indicated during the summaries presented two protocol development methodologies were suggested the Australian Standards model and the National Water Quality Management Strategy model.

Steve Frost provided a report to the National SWA Committee in October 2012 which also discussed the use of an Australian Standard. There are three pathways for the development of a Standard, Standards Australia Resourced, Committee Driven and Externally Funded although the Committee Driven pathway is only available to a committee that has previously developed a Standard. The Standards Australia website provides documentation of these three pathways.

In brief the stages of Standard development via either pathway are:

- Project proposal and approval
- Committee establishment and administration
- Project control (including project management)
- Standards drafting
- Consultation (including conflict resolution)
- Standards publication

Utilising the Standards Australia approach offers a realistic way of progressing to a nationally recognised protocol. Caution to the introduction of a Standard was expressed by some industry participants because of the potential high cost of such a system. A strong case for the development of a SQID Standard would need to be developed and put to Standards Australia.

Some manufacturers expressed their concern at the cost implications of imposing a standard on the industry.

Steve's paper also summarised a proposal by Iouri Vaisman to undertake a stage 2A project that would provide a detail scope and program for stage 2. In brief this methodology was:

- Appoint project manager
- Undertake industry engagement (including industry workshop)
- Form industry reference group
- Define scope of the project
- Detail program and costs of project
- Seek funding for next phase of project

This approach only goes partway to the development of a protocol however it does provide a fully scoped and costed project with which to seek funding.

Development of a National Water Guideline and national document undertakes a series of typical steps:

- Recognition of the need for guideline document
- Appointment of Project Manager (Federal Government Employee)
- Identification and allocation of funding
- Formation of Steering Committee (stakeholder representation)
- Formation of Working Group (technical input)
- Engagement of third party to develop guideline (input from Working Group)
- Public consultation (including conflict resolution)
- Guideline released

To progress with this approach there would need to be strong support from state jurisdictions and it would need to be determined if there is any support for it under any of the national funded water programs such as the National Water Initiative. The NWI is overseen by the National Water Commission which is currently reviewing the last ten years of water reform in Australia. The federal government has also changed and future water funding opportunities are not likely to be clear until 2014.

The methodology for the development of the Auckland Regional Council Proprietary Evaluation Protocol provides a potential model and correspondence is being exchanged with the Auckland Council to gain further details.

Conclusion

This report captures a sample of opinions across the industry in 2013 on the establishment of an Australian testing protocol for SQIDs. It is not comprehensive and discussions with stakeholders continue and information continues to be gained from organisations and individuals. This will continue to be captured and passed onto the SQID Working Group. For SWA members a feedback page is being established on the national website. Together with updates in the SWA Bulletin this will serve as the main means of communication until there is documentation that requires broad industry consultation.

Across those interviewed there is much enthusiasm for developing an Australian testing protocol for SQIDs. The next steps need to be undertaken carefully to ensure a transparent process which does not place any stakeholders offside. Most stakeholders see the SWA as the ideal entity to lead this process.

There are a number of protocols from across the world that have been established and serve as useful reference points for the development of an Australian protocol. The challenge now is to establish an Australian protocol that is accepted by manufacturers, researchers, regulators and users. It is envisaged that this will be a transitional development based on three levels of accreditation.

Next steps

The SWA National Committee, at its annual general meeting in October, reaffirmed the high priority of this project in the coming year.

The project currently has a small Working Group consisting of Andrew Allan, Rod Wiese, Peter Newland and Terry Lucke with extra input from Steven Frost and Andrew King.

It is recommended that a Steering Committee is established to oversee the next stage of the project. This committee should consist of SWA members with representation from manufacturers, researchers, regulators and users. Ideally two representatives from each sector would provide a balanced view point. The Steering Committee will be tasked with overseeing the three tiers of certification as described below.

The intention of the SWA is to establish a searchable database that contains information on the different proprietary devices that are available on the Australian market. It is envisaged that there will be three levels of “accreditation” or “certification” of information contained on this database. The first level will contain the current information and data that is made available by manufacturers. The second level will consist of the same information and data presented in the first level but reviewed by a recognised independent party that has “certified” it to be credible. The third level will consist of information and data that has been gained in accordance with the Australian protocol when it is developed.

There are a number of stages that fall out of this approach:

- **Stage 1:** Develop a database of existing information and data.
- **Stage 2:** Provide certification of existing information. This will require the establishment of an independent committee that assesses the available information and data or the accreditation of individuals who carry out the assessment.
- **Stage 3:** Develop an agreed protocol that will include an independent accreditation process.

It is noted that the Auckland Council PDEP contains a very similar approach with two pathways to “certification” of a device. The first “Body of Evidence” pathway evaluates “information and data from trials undertaken outside the Auckland region, including internationally”. The second “Evaluation” pathway is undertaken by “installing a device locally and undertaking field testing to obtain local data”. However this does not include laboratory testing. When more information is obtained it is expected that it will assist development of a methodology in Australia.

To support the establishment and running of a certification funds need to be sourced. A preliminary estimation of funding to establish the program is \$200,000. This need to be further developed into a firm funding model and potential partners in each jurisdiction approached to gain their support and willingness to fund the process.

The SQID webpage remains an important priority and is being established on the SWA National website. These pages will serve as a portal for information exchange with members. The database of currently available information will be placed on the page for trialling with members.

Melbourne Water has released the *Independent verification scheme for stormwater treatment devices* road map discussion paper for feedback. The document has been provided to the SWA and had been placed on the national website to gain member feedback. This document provides a process for the establishment of a Victorian independent verification scheme for stormwater treatment devices. Melbourne Water has engaged closely with the SWA on the development of this document and is currently keen to collaborate with the SWA on the establishment of a broader Australian protocol.

It is important that the relationships, such as the one with Melbourne Water, that have been established over the last twelve months are maintained in the development of the national protocol.

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