

TP108

– where to from here?

Graham Levy, a technical director from Beca, won the 2017 Stormwater Paper of the Year with a review of the Technical Publication 108 (TP108) which was published by Auckland Regional Council (ARC) in 1999 and which has been used as the primary flow estimation tool in the Auckland region since. We incorrectly said in the last issue that he had won it for another paper that Graham co-authored with C J Oliver – Hydrology of Urban Development.



Graham Levy.

This is a short précis of his paper, which can be read in full on the Water New Zealand website. It is also worth noting that Graham was part of the Beca team that developed TP108 for Auckland Regional Council in 1999.

While Technical Publication 108 (TP108) is still in use, there have been moves within the stormwater industry, supported and promoted by Water New Zealand, to develop a national standard similar to Australian Rainfall and Runoff to establish consistent and reliable flow estimation methods across the country. In the absence of that guidance, many different flow estimation methods are in use, with variable reliability and suitability.

In the absence of national guidance, TP108, or the NRCS (Natural Resources Conservation Service of the US Department of Agriculture) method on which it is based, has been adopted and adapted in part, or in full, for urban runoff estimation in other parts of the country. It is widely used, but also in some respects misused. This misuse arises in part from a lack of understanding of the basis on which TP108 was adapted to the Auckland Region, and sometimes a lack of robust (or in some cases any) validation of the method to local conditions in new areas.

This paper sets out some underlying principles on which the application of the NRCS method to Auckland was based, and how it was adapted and validated to suit the particular requirements that ARC had defined.

It discusses some examples where the method has been used inappropriately, or in new areas, resulting in poor estimation of runoff characteristics. From there the paper provides some guidance on factors that should be addressed, particularly in relation to validation, when transferring the method to other parts of New Zealand. There is also commentary on appropriate contexts in which to use the method, and where other tools might be more appropriate.

Developed as a standard approach for designers and regulators for the calculation of stormwater flows for the Auckland Region, TP108 has a particular focus on urban stormwater, and on understanding the effects on catchment hydrology of the change from rural to urban land use. It is a relatively simple approach that avoids direct modelling of the physics of the hydrological processes taking place, but is instead strongly based on reproducing what is actually observed in hydrological basins.

The combination of this simplicity, and the connection to reality, make it attractive. Therefore, when ARC was considering options for a guideline, and settled on the

NRCS method, it was in the context of a significant effort to validate it to local Auckland conditions.

The attraction of the method, and the experience from Auckland use, has resulted in it being adapted and/or adopted in other parts of the country, sometimes with validation to local conditions, and sometimes not. Unfortunately, without that validation, as with any hydrological method, there is a risk of significant error in flow estimates.

This paper is intended as a thought piece to stimulate further discussion and action towards robust and standardised urban hydrological analysis in New Zealand, including the wider use of the TP108 approach.

It is important to recognise that the development of TP108 took place in a particular context, and if different performance criteria had been used, a different methodology might well have been adopted.

ARC was seeking a design tool that met principal criteria. There were notable omissions from the list of objectives, which might have influenced the choice for TP108 and might be pertinent in today's context.

Therefore TP108 cannot be treated as a “one size fits all” approach, and other methods are needed in some circumstances.

TP108 or related methods based on NRCS are being used more widely, but are not necessarily reliable or validated for the particular context where they are being used. The

NRCS method is often misunderstood or misapplied, leading to reduced reliability. If the method is to be used in a new area, there should be a focus on validation to local conditions, including specific consideration of both volume and peak flow rate.

The NRCS method is not suited to all situations – other tools are better in some contexts. In particular, it is not ideal for high definition detailed urban models. It is perhaps more complex than necessary for simple site-level runoff calculations where rational formula is simpler and potentially adequate. Neither is it ideal for a continuous simulation context that is needed for understanding lifecycle performance of urban drainage systems and devices.

The ideal would be a nationwide consistency of approach to rainfall runoff estimation that gave the industry and the public greater confidence in reliability. This approach would include different methods for different design / analysis contexts, but would be based on real flow data and appropriate validation in different contexts across the country.

Consideration should be given to methods that allow for continuous simulation, to better reflect the importance of environmental effects and everyday flows, rather than just for flood estimation. [WENZ](http://www.waternz.org.nz)

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- Read the paper here: www.waternz.org.nz