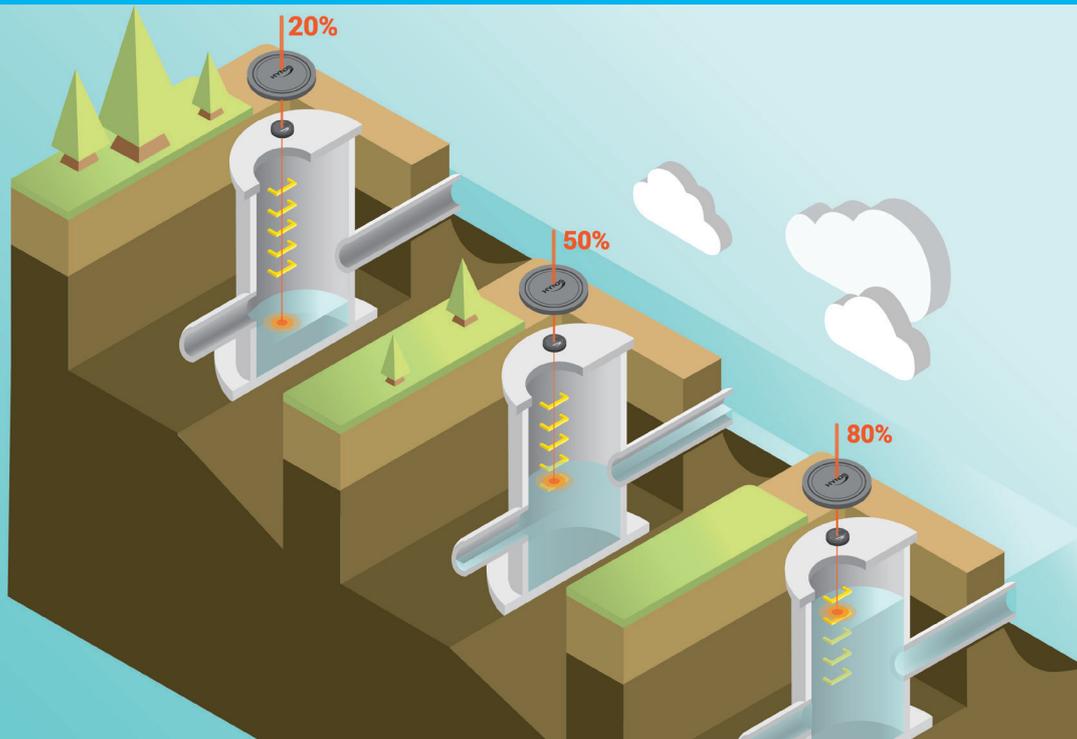




## Application Guide

# Smarterwater<sup>®</sup> Manhole Sensor

Version: 1.3  
July 2021



## Network Capacity

### Sensor

The Smarter Manhole sensor is a product 100% developed in New Zealand by Hynds Smarterwater to respond to the need for measurement of water in gravity infrastructure so that the various water resources can be managed. Measure to Manage, Measure to Act.

The Smarter manhole Sensor is the first of its kind, being an in-manhole IoT level measurement sensor that does not diminish the effectiveness of the access point. We developed the sensor to discretely fit into the manhole cover itself, automatically measure level and tamper events and transmit them to the asset owner.

### Application

In most gravity systems the manhole acts as a detention device and provides added capacity to the network. When the surge capacity of a manhole is inundated with different forms of infiltration, the network has a resulting loss of detention capacity, increasing the likelihood of flooding and system failure. When this goes unnoticed, the first sign of trouble is usually a flood of either stormwater or wastewater. These can occur in the street, on properties or anywhere manhole access has been provided.

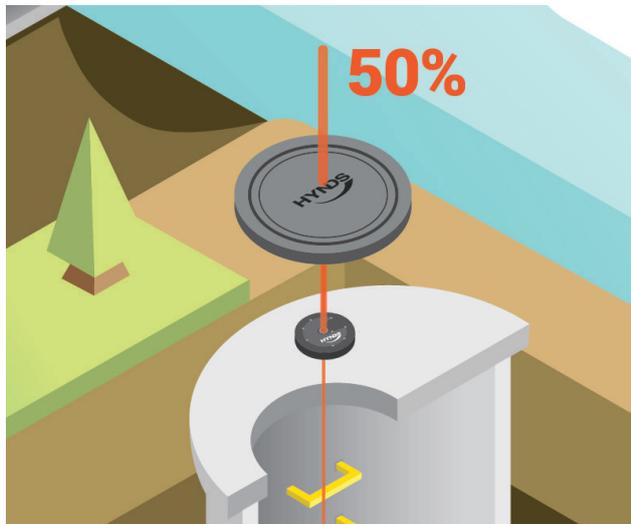
This poses a risk to public health through contamination and potentially exposed manhole entries, as well as environment and property damage. It also means the work teams need to work in more hazardous environments or are unable

### Application (continued)

to resolve the problem until after it subsides, leaving communities in distress.

If one manhole is a valid detention device, and therefore an indication of its performance, then it follows for gravity stormwater and wastewater networks, that they are made up of a series of linked detention vessels.

By utilising the smarter manhole sensor in various locations such as lower stormwater catchments and wastewater systems, the sensor can tell the work teams where to look, and when to look.



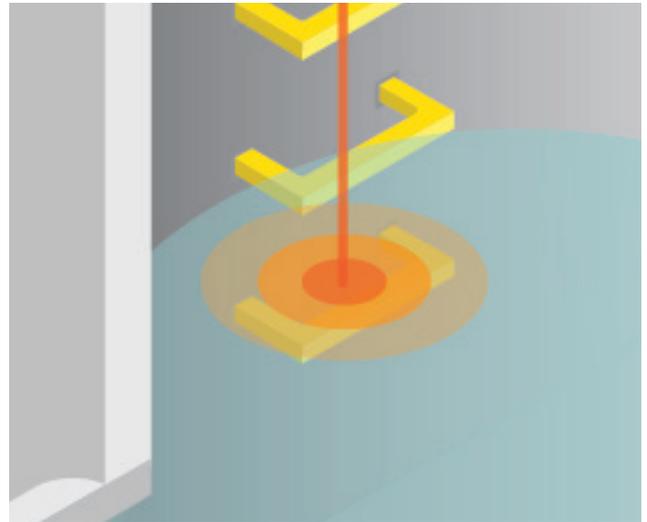
Measure to Manage, Measure to Act. More than that, a number of devices distributed throughout the network can provide an indication of network capacity.

### Solution

The manhole itself has an easily calculated capacity. When the Smarter Manhole sensor is applied, the change in capacity of that manhole can be measured. This process can be applied to a single manhole or many.

For stormwater systems, normal rain events tend to place the maximum load on the capacity of the lower catchment so the Smarter Manhole sensor will allow the asset owner to learn what the normal rain-based capacity of any location is.

By taking the normal behaviour of the manhole and adding any other infiltration events, it becomes possible to see where a location is vulnerable to surface flooding. If we then look at many locations across the network at once, suddenly you can see which parts of the network are working well, under stress or about to fail.



With this information, the asset owner can now make management choices. If one part of the system is regularly at 80% capacity, an abnormal tide or rain event could result in flooding, but if other parts of the network are at much lower utilisation, a diversion pipe and valves could be employed. Optimising the network not only reduces flooding, but it also makes the best use of the asset already in place and helps with the design modelling for the most cost effect designs in the future.