Bathurst , New South Wales, Australia

Validating Hydraulic Modeling Using Real-Time Sewer Monitors

Case Study

Overview

Bathurst Regional Council (BRC) in New South Wales, Australia, is famous for the V8 Supercars annual race around Mount Panorama. Less known is the scale and complexity of BRC's wastewater infrastructure across approximately 310 miles, serving the Bathurst Township and several surrounding communities northwest of Sydney, AUS.

To better understand how its wastewater collection system behaves under certain conditions, in 2025 BRC enlisted the help of Hydronis Solutions, a SmartCover® Systems channel partner, to validate findings of its hydraulic modeling system. Modeling was conducted in 2024 by engineering firm Mott MacDonald to improve BRC's system reliability and assist with planning.

BRC and Mott MacDonald partnered with Hydronis to deploy remote sewer-monitoring technology by SmartCover, enabling real-time data collection to be compared with hydraulic model projections and verify the system's performance. Additionally, BRC and Mott MacDonald sought to better understand the impact of rainfall on the sewer system. To achieve this, five rain gauges were strategically installed throughout the network. The resulting data helped identify any discrepancies within the hydraulic model and allowed the team to integrate expected system behavior during wet-weather events. The dual installation enhanced model accuracy across various rainfall conditions.

The Challenges

The project presented several unique challenges. It marked the first collaboration between Hydronis and SmartCover systems to implement real-time sewer-monitoring technology in Australia. To enhance their expertise with the SmartCover products and applications, the Hydronis team underwent online training led by SmartCover representatives and supplemented their learning with instructional videos and other technical resources.

Highlights

- Precise flow-level data to support BRC's new hydraulic model configuration.
- Cost-effective flow rate estimates using the secure MySmartCover.com and Manning's equation validated the hydraulic model.
- SmartRain virtual gauges and flow data improved understanding of rainfall impacts and I&I issues.
- Hourly SmartRain data transmitted to MySmartCover.com for continuous analysis.
- Monthly SmartInsights reports provide summaries that highlight key system performance metrics and actionable findings.

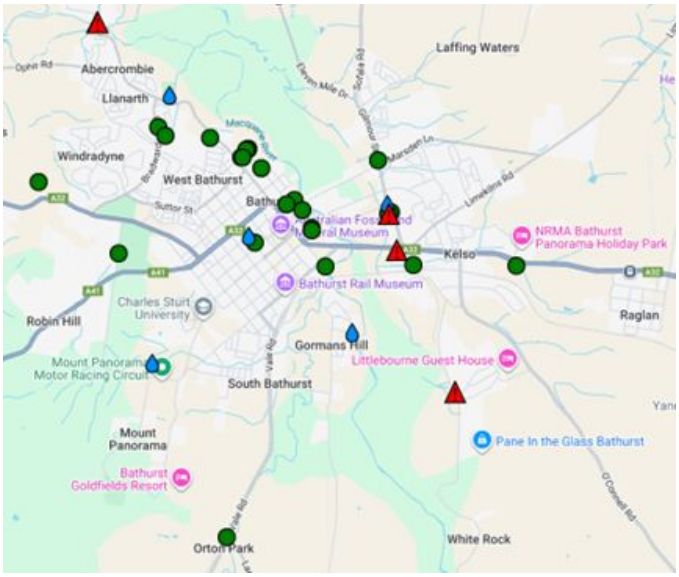

Figure 1: MySmartCover.com Exert of BRC Monitoring Locations

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Other challenges:

- BRC required physical rain gauges that needed weekly servicing, creating a logistical challenge for Hydronis since it operates out of Melbourne, an eight-hour drive each way.
- Australian manhole lids are made of 220.46 pounds of concrete or cast iron and are dragged to access a manhole. A side mount was used instead of a SmartCover standard monitor mount on the underside of existing lids.
- At least one manhole was located under large trees, blocking antenna connectivity.
- Data accuracy was a top priority for BRC and Mott MacDonald, raising initial concerns about the reliability of virtual SmartRain gauges. To address that concern, the Hydronis team recommended a trial using virtual gauges alongside the physical monitoring system for comparisons.

The Solution

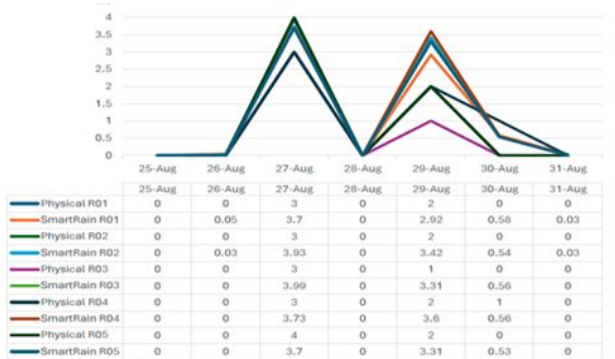
Hydronis deployed a suite of SmartCover solutions to support BRC's hydraulic modeling validation and system monitoring. Installation of 30 SmartCover SmartFLOE monitors provide continuous field data for direct comparison with the theoretical outputs of the hydraulic model.

To improve rainfall measurement, Hydronis implemented SmartCover SmartRain technology by testing the virtual gauges alongside physical rain gauges. SmartRain gauges were paired with five physical gauges at identical locations, allowing direct comparison of accuracy and reliability. The virtual gauges matched the precision of the physical instruments while offering reduced maintenance and faster data access. This tailored solution provided BRC and Mott MacDonald with a robust, data-driven foundation for assessing system performance and supporting long-term planning.

Figure 2: Side mount of the SmartCover SmartFLOE monitor

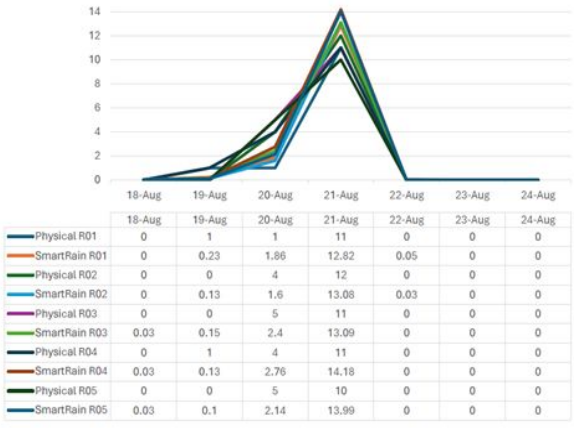
Hydronis and SmartCover also implemented several custom solutions to address BRC's additional operational challenges:

- Side mount installation to monitor the total dynamic range of the manhole and eliminate confined space entry.
- An adjustable antenna cable was engineered to span from the manhole to an unobstructed position, demonstrating the flexibility of the SmartCover solution.
- Hydronis developed customised reporting templates in line with existing SmartCover installation requirements to capture all site data to inform backend population of the MySmartCover.com platform.



	25-Aug	26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug
Physical R01	0	0	3	0	2	0	0
SmartRain R01	0	0.05	3.7	0	2.92	0.58	0.03
Physical R02	0	0	3	0	2	0	0
SmartRain R02	0	0.03	3.93	0	3.42	0.54	0.03
Physical R03	0	0	3	0	1	0	0
SmartRain R03	0	0	3.99	0	3.31	0.56	0
Physical R04	0	0	3	0	2	1	0
SmartRain R04	0	0	3.73	0	3.6	0.56	0
Physical R05	0	0	4	0	2	0	0
SmartRain R05	0	0	3.7	0	3.31	0.53	0

Figure 3: Rainfall comparative data for Aug. 25-31, 2025



	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug
Physical R01	0	1	1	11	0	0	0
SmartRain R01	0	0.23	1.86	12.82	0.05	0	0
Physical R02	0	0	4	12	0	0	0
SmartRain R02	0	0.13	1.6	13.08	0.03	0	0
Physical R03	0	0	5	11	0	0	0
SmartRain R03	0.03	0.15	2.4	13.09	0	0	0
Physical R04	0	1	4	11	0	0	0
SmartRain R04	0.03	0.13	2.76	14.18	0	0	0
Physical R05	0	0	5	10	0	0	0
SmartRain R05	0.03	0.1	2.14	13.99	0	0	0

Figure 4: Rainfall Comparative data for Aug. 18-24, 2025

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Since the monitors are mobile, they have been moved around easily to assess various locations within the system as needed. With satellite and cellular communications, alarms occur even during power outages and sewer surcharges.

During the monitoring period, several upward trends were detected, signaling potential downstream issues. Hydronis communicated the findings to BRC through regular updates. In another instance, heavy rainfall in New South Wales caused trend increases and high-level alarms across multiple monitors, revealing substantial stormwater inflow and infiltration into the sewer system. In both cases, BRC successfully avoided any incidents.

The integration of smart sewer technology has enabled BRC's ability to continuously monitor system conditions in real time, supporting the development of an accurate future modeling system as well as current risk assessments.

BATHURST REGIONAL COUNCIL

The Results

According to feedback from BRC and Mott MacDonald, the ongoing project is a success. The monitors have delivered precise data and met project specifications. The results have revealed important performance trends and, as an added benefit, identified points of I&I and emerging trend increases.

All data streams are continuously monitored and reported through the MySmartCover.com online platform, with Hydronis delivering regular updates and analytical reports to BRC and Mott MacDonald. The SmartRain gauges transmit hourly readings directly to the platform for real-time analysis, while physical rain gauges supply daily data through an external application.

The SmartRain gauges have enhanced data interpretation through a multi-chart viewer integrated into the cloud-based MySmartCover.com platform. To ensure proper maintenance of the physical gauges, Hydronis partnered with a local Bathurst business to perform routine servicing.

SmartCover monthly SmartInsights reports summarize system performance, identifies high-risk areas, and track progress against previous periods. Actionable insights are reported for both immediate operations and long-term planning, including for capital improvement projects.

Conclusion

Outcomes have demonstrated how the integration of a SmartCover real-time monitoring system, the local expertise of Hydronis, and Mott MacDonald's system modeling is providing BRC with a clearer, data-driven view of its network. Through the successful delivery of this project goals, BRC is positioned to make more informed decisions about operations that will reduce risks, improve system performance, and better protect the community and the environment.

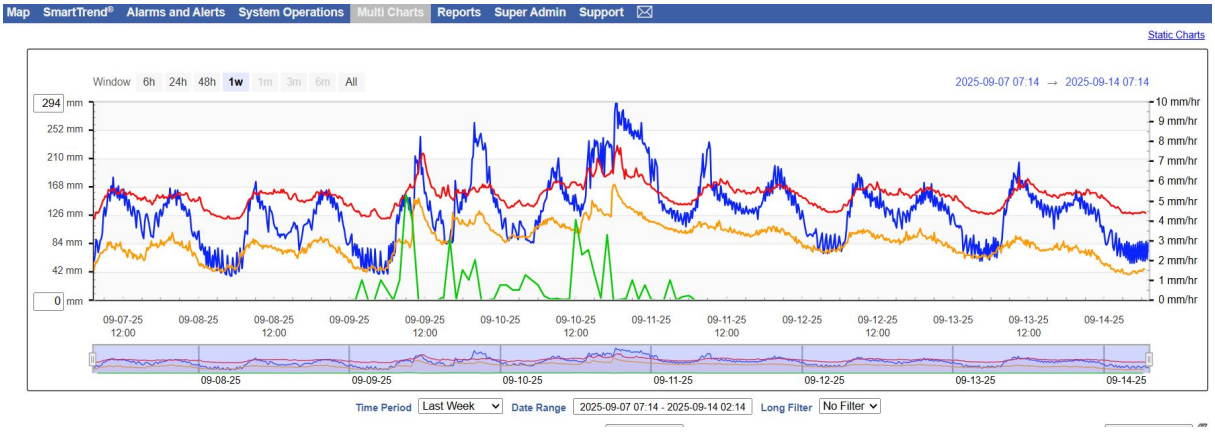

Figure 5: Multi Chart Viewer on MySmartCover.com with Flow Level Data Overlaid Against SmartRain Data

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