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CULVERT REHABILITATION WITH KUSTOMFLO HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

A cost-effective Solution for Culvert Restoration in the Niagara Region

Culverts play a vital role in maintaining connectivity, ensuring public safety, and managing water flow beneath roadways, railways, and other infrastructure. Over the years, these structures have deteriorated due to freeze-thaw cycles, severe use, and the corrosive effects of de-icing salts, compromising their structural integrity and functionality.

Signs of wear and impact on structural integrity in the existing concrete culvert within the Niagara region had become obvious. Issues such as loose joints, resistance loss, corrosion and rebar exposure required a dedicated attention to ensure the continued functionality and structural integrity of these essential infrastructure components.

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THE CONTEXT

The Niagara Region, in collaboration with Devron Ltd and CRL Campbell, faced a significant challenge involving damaged concrete culverts. The objective was to find a solution to restore the structural integrity, while maintaining the capacity for water flow under the roads.

The decision between rehabilitation and replacement hinged on factors such as the extent of damage, site conditions, and feasibility. More specifically, replacing culverts under roads with heavy traffic or major embankments presents significant challenges related to costs and traffic control. The partnership with Soleno aimed at finding an effective and efficient solution for this critical infrastructure issue.

THE SOLUTION

To meet the project's requirements, Soleno's technical service recommended a high-density polyethylene (HDPE) pipe: the KustomFlo pipe, with smooth interior and exterior walls. This pipe made it possible to rehabilitate the 2 existing culverts with a waterproof, cost-efficient and large diameter relining.

Two KustomFlo pipes with an inside diameter of 800 mm and an outside diameter of 902 mm, were selected. The combined length of the installed pipes was 65 metres. The decision to use KustomFlo pipes was based on their functionality, life cycle costs, and environmental impact considerations.

THE BENEFITS

Using KustomFlo pipes as culvert linings provides numerous of benefits, including structural rehabilitation and enhanced flow capacity due to the smooth interior surface. These pipes also offer corrosion resistance, reduced maintenance costs, and a lightweight design. Additionally, KustomFlo pipes feature a double gasket design, facilitating quick and efficient installation compared to threaded ends. It's worth noting that 65 meters of KustomFlo pipes were installed in just one day, without disrupting traffic flow, thanks to a unique design and installation sequence.

Niagara's culvert rehabilitation with KustomFlo HDPE pipes proved to be a cost-efficient and highly effective solution for addressing structural deterioration. This approach enhanced the culvert's durability and hydraulic performance while significantly reducing maintenance costs and minimizing traffic disruptions. This case study demonstrates how the use of KustomFlo can be a successful strategy to extend the lifespan of critical infrastructure, ensuring public safety and the continuous flow of water beneath roads.



A DURABLE AND SUSTAINABLE SYSTEM

Rehabilitating a culvert made of high-density polyethylene (HDPE), a lightweight, high-performance, and durable material, ensure a perfectly sealed system. Furthermore, HDPE resists to corrosion, abrasion, de-icing salts, and vibrations, guaranteeing the durability and sustainability of the infrastructure. Its cost-efficiency and reduced environmental footprint make it a superior choice over concrete or steel.



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