



Evaluation of Expanded Polypropylene Rings for Manhole Grade Adjustment

Project Number 2013-09

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Problem The traditional method of adjusting the elevation of a manhole casting by using concrete rings has historically been prone to many problems. Concrete rings—along with the mortar used to install them—may crack and deteriorate. The casting subsequently settles, causing the road surface to become uneven. The deteriorated rings also allow stormwater to enter sanitary sewer manholes, increasing wastewater treatment costs. In recent years, the City of Eden Prairie began using hard plastic rings as a lighter, more versatile alternative. However, these rings may only be stacked vertically and cannot be offset.

Solution Eden Prairie installed new polypropylene (foam) plastic manhole rings in its town center. These rings are lighter and more durable than concrete and offer more versatility than hard plastic rings, since they can be easily stacked or staggered when necessary. Because the foam rings are between two and five times as expensive as the concrete rings, depending on thickness, the city wanted to evaluate their performance under high-traffic conditions.

Procedure The city began installing the foam rings in May 2014 on both sides of Prairie Center Drive, a four-lane street in one of Eden Prairie's most heavily traveled areas. In total, foam ring installations were completed on more than 30 catch basins in need of major repair.

Results The foam rings were much easier for the construction crew to install; it took less effort and significantly less time to position the assembly and make changes to match the grade line. Also, since the foam rings are not hollow-cast like the hard plastic rings, the adhesive used to bond one ring to another could be applied more liberally and quickly, and the face-to-face bonding area created a much stronger seal with less opportunity for failure in the future. Additionally, the rings could be stacked in a fairly extreme offset. One procedural lesson learned included using lower-cost hard plastic rings to build vertically upward as much as possible after the foam rings were used to achieve the required offset. Had foam rings been used throughout, the project cost could have easily doubled.

Approximate Cost \$16,545

OPERA Funding \$9,850

Implementation The city will inspect the repaired structures annually to determine how normal Minnesota environmental conditions impact the life cycle of structures rehabilitated using foam rings.

Status Complete

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