

Stormwater Management and Infiltration along Central Corridor Light Rail Transit (LRT)

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Presenter's Biography

MIKE CURRENTLY MANAGES civil engineering for the Central Corridor LRT project between Minneapolis and St Paul. The 11-mile-long project includes complete reconstruction of the roadway and all utilities on 6 miles of University Avenue in St Paul. Prior to this work, Mike was the chief engineer on the Northstar Commuter Rail project, which recently opened between Big Lake, Minn. and downtown Minneapolis and includes the new downtown intermodal station integrated into the Twin's new home at Target Field. In his over 25 years of experience, he has worked on transit projects across the U.S., including the Hiawatha LRT line; two lines of Portland LRT; four lines in Charlotte including BRT, LRT and Commuter Rail; and Bus Rapid Transit lines in Cleveland, San Diego and the Twin Cities.

In addition to transit, Mike has managed several large stormwater-management facility projects, including design and construction of the \$35 Million stormwater-management facilities for the Minneapolis-St Paul International Airport. This system includes three large water quality ponds with associated dams; two 12-foot-diameter tunnels under a State Highway; over 17,000 LF of 12x12 box culvert; and an energy-dissipation system designed to handle almost 4,000 cfs of stormwater from over 2,200 acres of the MSP airport. The fast-tracked project required preparation of a Federal Environmental Assessment and permits from 35 Federal, State and Local agencies, yet was completed ahead of schedule and under budget.

Presentation Abstract

CONSTRUCTION OF THE NEW Central Corridor LRT line requires complete reconstruction of over 100 acres of what is today an almost entirely paved right-of-way within the boundaries of Capitol Region Watershed District (CRWD) in St Paul. With buildings immediately adjacent to the 120-foot wide right-of-way, and even more intense use of the roadway needed to accommodate LRT, the options for meeting the CRWD watershed rules were highly limited, and precluded any "traditional" means of meeting water quality, rate control and volume reduction standards.

Working in cooperation with CRWD, the City of St Paul, and Ramsey County, the Central Corridor team designed a unique stormwater-management system utilizing green infrastructure practices to convey and infiltrate stormwater runoff under the sidewalks. The green infrastructure practices of permeable pavers and trees as well as infiltration trenches address several project goals, including:

- Treating runoff to remove heavy sediments and other pollutants
- Reducing the quantity and rate of water entering the Mississippi River
- Infiltrating significant portions of the street and sidewalk runoff
- Increasing the amount of pervious surface in the right-of-way
- Providing a natural water source for over 1250 new trees along the corridor
- Incorporating sustainable design features where appropriate
- Enhancing the livability of the area thru streetscape enhancements

The system used a combination of permeable pavers, and perforated pipe run through infiltration trenches, both as conveyance and storage, to capture a significant share of the water, which would otherwise go to the Mississippi River untreated and at a high rate. The infiltration trenches were designed in a system which uses drainage rock and structural soil to support vibrant tree growth while also allowing for sidewalk and roadway pavement over the trenches.

The Central Corridor team also partnered with CRWD on several other green infrastructure practices, to supplement the CCLRT integrated tree trench system. Designed not only to enhance stormwater management performance, but also as a showcase for public outreach and education, CRWD and the City of Saint Paul designed and funded stormwater planters, rain gardens and infiltration trenches at several side street locations along the corridor. These highly visible stormwater enhancements serve as a daily reminder to people in the area of the importance of stormwater quality and as an example of low impact, attractive practices others can follow.

In total, the combined team of CCLRT, CRWD, the City of St Paul, and Ramsey County showed that by partnering throughout the design process, significant stormwater enhancements can be incorporated into even the densest of urban environments at a reasonable cost. The combination of treatment and infiltration, along with significant conversion of existing paved areas to pervious surfaces, will greatly enhance the quality of the street in terms of the environment, livability for residents, and economic vitality for businesses.