

Metro Transit - St. Louis Leak Remediation Design Bi-State Development Agency

Location:	St. Louis, Missouri
Date:	2010 – Present
Structure:	2 Cut and Cover LRT Tunnels 2 Cut and Cover Stations
Length:	Approximately 1.10 miles (1.8 kilometers) total
Cross-Section:	Height: 21.2 feet (6.5 meters) Width: 35 feet (10.7 meters)
Geology:	Fill, loess and glacial deposits; Cheltenham Syncline
Cost:	Rehabilitation cost: Approximately \$30 million
Client:	Bi-State Development Agency
Owner:	Bi-State Development Agency

Following the completion of the inspections, GZ has been tasked with performing a leakage remediation design. This design includes installing drainage pipes into the walls of the tunnels, and conveying water gathered in these pipes to existing tunnel drainage. Areas displaying leakage which are not treated with the drainage pipes will be addressed using crystalline waterproofing material and hydrophilic injection grout. The methodology of this design will halt the water intrusion without significantly changing the leakage regime.



Figure 1. Digital Scan of Tunnel #3 During Detailed Inspection

Inspection and Design Services for Tunnel Leak Remediation:

The Cross County MetroLink Extension Project, opened in 2006, was a 8 mile, 9 station extension to the existing alignment, expanding service towards the Clayton, Maplewood and Shrewsbury neighborhoods. Included in the alignment were 3 cut-and-cover tunnels (Tunnel #1, Tunnel #2, and Tunnel #3) and 2 below grade stations (Skinker Station and Big Bend Station). The tunnels and stations were constructed with cast-in-place base slabs and tunnel walls, and pre-cast concrete roof segments; concrete floor and wall segments were cast-in-place a bentonite-type waterproofing material was installed. Pre-cast arch tops were installed and waterproofed using a separate bentonite waterproofing membrane followed by 5 to 20 feet (1.5 to 6 meters) of granular backfill material. Tunnel #2, Tunnel #3, Skinker Station, and Big Bend Station began showing signs of water infiltration immediately following the completion of construction.

This water leakage has contributed to early concrete deterioration, as well as other serviceability issues. Gall Zeidler Consultants (GZ) initially performed a leakage assessment, analyzing possible causes of tunnel leakage into these structures. The Bi-State Development Agency (METRO) then tasked GZ with performing detailed leakage inspections of the structures affected by the leaks. These inspections determined both the location and severity of any water infiltration in the both tunnels and stations. Included in these inspections were digital tunnel scans.

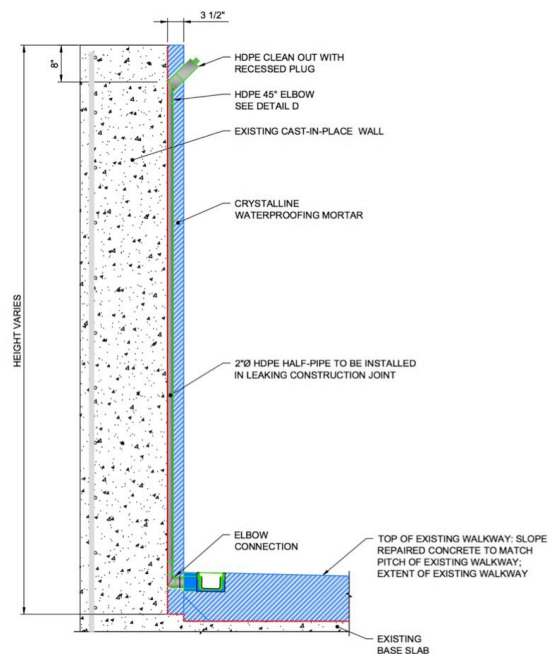


Figure 2. Cross Section of Vertical CIP Wall Construction Joint Repair