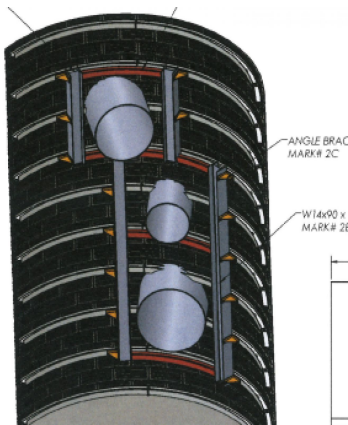


## CSX Transportation Howard St. Tunnel Camden Street Drain Replacement Baltimore, MD



### PROJECT OVERVIEW AND CHALLENGES

Bradshaw completed this high profile project in downtown Baltimore, MD as part of a design-build team. An existing storm drain was located in the invert of the Howard Street CSX Rail Tunnel had been the cause of frequent flooding. This project replaced that 48" storm with a larger, deeper siphon drain which eliminated the flooding and allows CSX to increase the depth of the existing CSX tunnel to gain freight capacity through the area. A total of three tunnels were mined out of a 26' diameter by 55' deep shaft. The shaft was excavated through subsurface conditions consisted of wet, poorly graded sand with silt and gravel, which required extensive sodium-silicate grouting groundwater infiltration and used steel ribs and liner plate for structural support. Excavation had to be suspended periodically to allow for tunnel excavations at the different elevations and additional horizontal grouting programs for the lower tunnels.



### PROJECT INFORMATION - 576

#### OWNER:

CSX Transportation  
904-359-3100

#### ENGINEER:

McMillen Jacobs Associates  
Joe Schrank  
615-490-9025  
schrank@mcmjac.com

#### CONTRACTOR:

Clark Construction Group, LLC

#### COMPLETION DATE:

5/19/2018

#### GEOLOGY:

Dense Alluvial Sand and Gravel

#### EXCAVATION METHOD:

Conventional Mini Excavator

#### MINING DIMENSIONS:

55' x 26' Diameter

#### FINAL LINING:

26' Liner Plate with Steel Ribs  
Cast-in-Place Concrete Vault

#### FOR MORE INFORMATION:

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Refer to Project 576