



# PAR 1088 SOUTH PLATTE INTERCEPTOR

Denver, CO

<b>Owner</b>	<b>Metro Wastewater Reclamation District</b>
<b>Engineer</b>	<b>HDR Engineering</b>
<b>General Contractor</b>	<b>Western Summit</b>

# SOUTH PLATTE INTERCEPTOR WHITE PAPER

## **FOREWORD**

This paper addresses the Denver Metro Wastewater Reclamation District’s South Platte Interceptor Manhole Lining Project, PAR 1088, completed in 2015. Coblaco Services was contracted by Western Summit, General Contractor, to resurface and line 64 manholes, varying in diameter from five (5) feet to ten (10) feet, and ranging in depth from eight (8) feet to thirty-nine (39) feet.

The purpose of this paper is to highlight the scope, challenges, and successes with the project and materials used, with additional insight provided from the material supplier. Follow-up inspections were recently conducted to ensure compliance with the material’s 5-year warranty, and the findings are also included.

## **BACKGROUND**

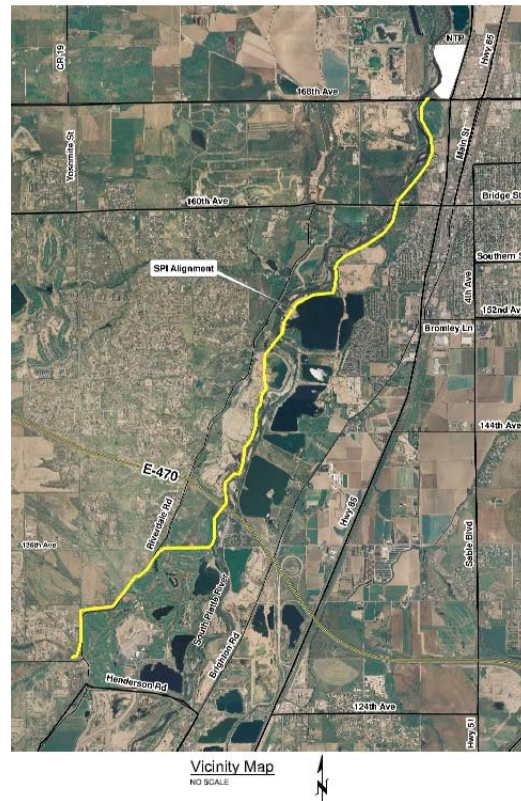
The Metro Wastewater Reclamation District embarked on a program to build a 104-million-gallons-per-day, 6.8-mile wastewater interceptor—the metro area’s largest interceptor project in more than 30 years—to connect to its new 24 mgd wastewater treatment facility. The South Platte Interceptor, located in Brighton, CO, collects and conveys sanitary wastewater from the northern Metropolitan Denver area to Metro’s new Northern Regional Wastewater Treatment Plant. The interceptor was developed in response to unprecedented growth experienced in Denver’s northeastern metro area.

## **MASTER SCOPE SUMMARY**

The PAR 1088 South Platte Interceptor project included furnishing and installing approximately 6.8 miles of gravity wastewater interceptor, ranging in pipe size from 30-inches to 78-inches in diameter. The interceptor was constructed complete with manholes, connection/metering structures, open cut crossing of the South Platte River, and bio-filter type odor control facility. Five (5) tunnels were required for the interceptor, ranging in length from 150 feet to 3,723 feet.

Extensive dewatering was necessary for portions of the interceptor sewer installation constructed near the South Platte River. A slurry wall needed to be constructed approximately 1.1 miles adjacent to the interceptor, with slurry wall repairs required where the interceptor crossed it and other existing gravel lake slurry walls. Additionally, the interceptor corridor was to be restored, along with the re-seeding of any disturbed areas. Finally, any trees removed during construction were to be replaced, and wetland and riparian mitigation measures would also need to be made, as necessary.

Water was to be pumped between the Ken Mitchell Lake cells to enable interceptor construction. In addition, a drainage traffic crossing structure was set up to allow pipeline corridor access. A new lift station connected the existing force main to a new force main (6-inch diameter/1,180 feet long) which discharges



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into the new gravity interceptor. The new gravity interceptor connects to the new MWRD Northern Treatment Plant, which was completed in 2015. See Figure 1.0 for a project survey map of the project.

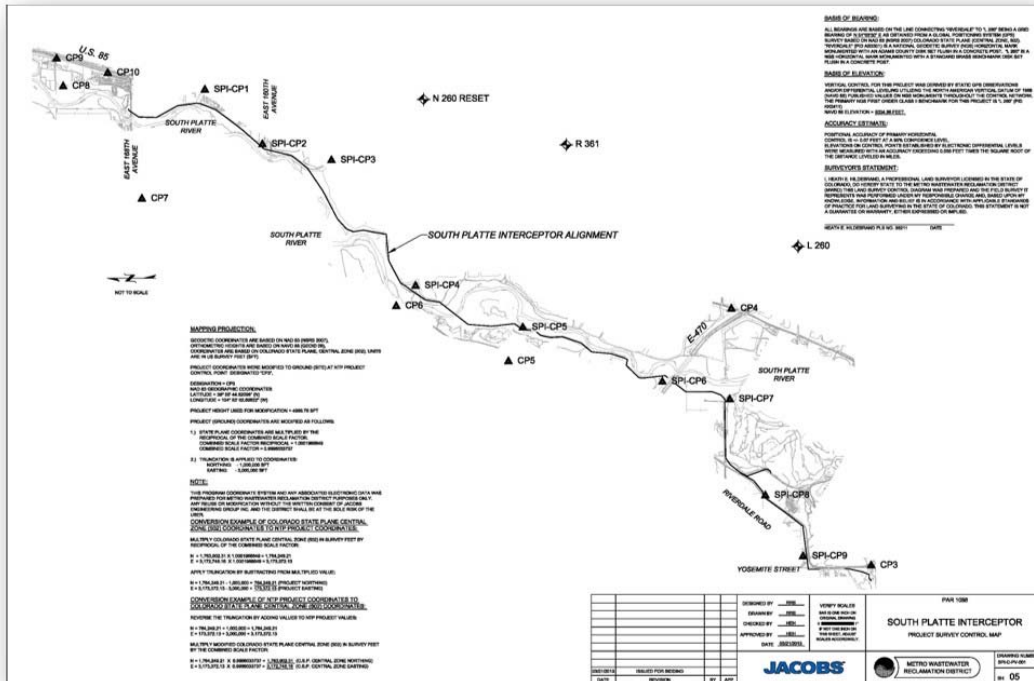


Figure 1.0

## **COBLACO SCOPE SUMMARY**

Coblaco Services completed the following scope for the GC, Western Summit:

### **PRIOR TO START**

1. Mobilized all supplies and equipment to Brighton, CO.
2. Reviewed the Job Safety Analysis with a Western Summit Supervisor to discuss any known or potential hazards related to the job-site or the specified scope.
3. Completed required training and wore all proper PPE required for each specific task.
4. Installed and maintained proper safety equipment to allow safe access to all areas.

### **PRE-CAST MANHOLE & CAST IN PLACE VAULT PREPARATION & LINING**

1. Established control measures such as installation of ventilation equipment and the use of a (4) gas meter to manage OSHA Confined Space requirements while performing work inside interceptor.
2. Media-blast prepared the interior new concrete surfaces in accordance with NACE No. 6/ SSPC SP-13 joint surface preparation standards for concrete, using Green Diamond<sup>®</sup>, nickel slag with a gradation of 30/60. The surface was prepared to a minimum of ICRI CSP- 4, degree of roughness.
3. Removed spent blast abrasive from the pipe for proper off-site disposal.
4. Rinsed the surface with High Pressure water. Any residual was removed by pump and properly disposed of in the on-site concrete wash-out area.
5. Applied Sauereisen RestoKrete 208 Epoxy-Modified Resurfacer to the properly-prepared surface to fill all voids, bug holes or other irregular surfaces and provide a smooth, continuous surface for paint application. The material was spray applied and back troweled to a thickness sufficient to provide a smooth continuous surface.
6. Spray applied one (1) coat of Sauereisen 210X Epoxy to a minimum of 125 mils DFT.
7. Visually inspected all coated surfaces and repaired where necessary.
8. Holiday tested all coated surfaces per NACE SP-O188.

### **COATING/MATERIAL PDS SUMMARY**

Sauereisen SewerGard 210X epoxy is a protective lining specifically formulated for municipal wastewater environments. SewerGard<sup>™</sup> No. 210X provides a chemical-resistant barrier for concrete, masonry, brick, and steel substrates.

Sauereisen RestoKrete<sup>®</sup> Epoxy Modified Cement 208 is a substrate repair material and water resistant barrier for prevention of inflow and infiltration in concrete or brick substrates.

These products were specified in the bid documents, and selected for their durability, performance, and product warranties. Product Data Sheets for both materials are attached (Attachment A).

### **PROJECT WARRANTY REQUIREMENTS**

The liner manufacturer, Sauereisen, warranted that the materials furnished would be free from defects in materials and workmanship. Furthermore, Sauereisen would repair or replace any such defect discovered within five (5) years from the date of substantial completion. In addition, Sauereisen warranted all work performed under this section to install the liner system, for a period of five (5) years from the date of substantial completion. This warranty covered any type of defect or failure in the HDPE liner system,

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including, but not limited to, failure of factory seams or field joints, and water penetration due to inadequate sealing of the edges.

### **PROJECT EXECUTION SUMMARY**

With a majority of work being completed between July 2014 and April 2015, the weather was a significant factor in execution. Temperatures ranged from below freezing to over 100°F with days of rain, snow and sunshine. Tasks were coordinated around the weather and environmental controls were implemented to ensure continued production. Average crew sizes of 4-6 technicians were utilized, sometimes with two separate crews working on different locations and tasks. Crews performed tasks in sequence in a manufacturing line style to complete all tasks on all of the manholes, structures and tunnels in the allotted project timelines. In total, over 25 technicians and administrators contributed to the project utilizing a full company fleet of pick-up trucks, covered trailers, a 42' semi-trailer, 4 blast trucks (outfitted with abrasive blast pots and compressors), a mortar pump and two plural component airless pumps.

### **PROJECT CHALLENGES**

In preparation for the project, Coblaco's crew inspected the entire job site and all access points to better understand the PPE needed, and any additional steps to be taken beyond those defined in the scope of work. Throughout the project, challenges were presented in various forms, perhaps the biggest of which being the setup of scaffolding. Coblaco's crew had to take a creative approach to accommodate manholes of different sizes and varying depths, as well as adjusting the scaffolding on uneven flooring. Further, although the site was dewatered at the start of the project, water infiltration took place from other areas around the interceptor, requiring additional dewatering measures. Finally, two coats of 60 mils needed to be applied within a 24-hour window. All of these required extra production and maneuvering of the assigned schedule. In the end, Coblaco's crew worked through the difficulties to complete the project within the deadline.

### **PROJECT INSPECTION AND SCOPE SUMMARY**

- Holiday testing was performed with a new Tinker and Razor, Model AP/W Holiday Detector. The holiday testing process was completed in an iterative manner, with the final spark test being witnessed, approved and signed off by the resident inspector/engineer. Coblaco Services would pass the holiday test for a given structure once there were no more voids or thin spots (holidays) detected, using high voltage spark testing equipment set at 100 volts per mil of coating/lining thickness per NACE standard SP-0188 (i.e. 125 mils final coating thickness = 12,500 volts).
- The surface of all cast-in-place concrete structures and 10% of all precast concrete structures that were coated/lined were 100% holiday tested in the presence of the Engineer or Owners Representative. Coblaco would have to re-apply epoxy material if pinholes, thin areas and other imperfections were identified, then retest. Coblaco Services then needed to repeat this process until no holidays were identified.
- The Owner reserved the right to conduct additional holiday testing, as necessary. Coblaco complied with Engineer or Owner requests to perform follow-up holiday testing and inspections, and re-applied epoxy material as necessary.

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- Bond strength was measured in accordance with ASTM D4541, adhesion tester type IV. Adhesion testing could be performed any time after the liner was cured. However, the minimum bond strength had to be obtained within ten days after completing the lining. The minimum pull force was to be 200 psi and not less than 80% of the break shall be of a cohesive nature.
- The surface of all cast-in-place concrete structures and 10% of all precast concrete structures that were coated/lined were tested for cohesion in the presence of the Engineer or Owner's Representative. Coblaco Services performed adhesion testing on all cast-in-place concrete structures and on 10% of precast concrete structures.

## **PROJECT OUTCOMES & MATERIAL PERFORMANCE**

### **SUPPLIER PERSPECTIVE**

*In 2015 Coblaco Services was awarded Denver Metro Wastewater Reclamation District's South Platte Interceptor Manhole Lining Project. This project included the resurfacing and lining of 64 deep manholes. As part of an extensive approval process, Metro Wastewater Reclamation District specified Sauereisen RestoKrete No.208 epoxy-modified cement for resurfacing the concrete substrate, followed by a 125 mil application of Sauereisen SewerGard No.210 epoxy as the protective lining. Both materials were spray applied, which increased production rates and reduced time spent in a confined space. They used a Graco M680 Mortar Pump to spray apply the RestoKrete No.208 and finished it using a trowel and dry grout sponge. The SewerGard No.210 was spray applied using a Graco Plural Component Pump setup at a 3:1 volumetric ratio. Coblaco was flawless in their spray application of both materials and the finished product was exceptional. After five years in service, a thorough inspection was completed and only three small areas required repair. The success of this project demonstrates the value of a complete specification, quality products and a qualified contractor.*