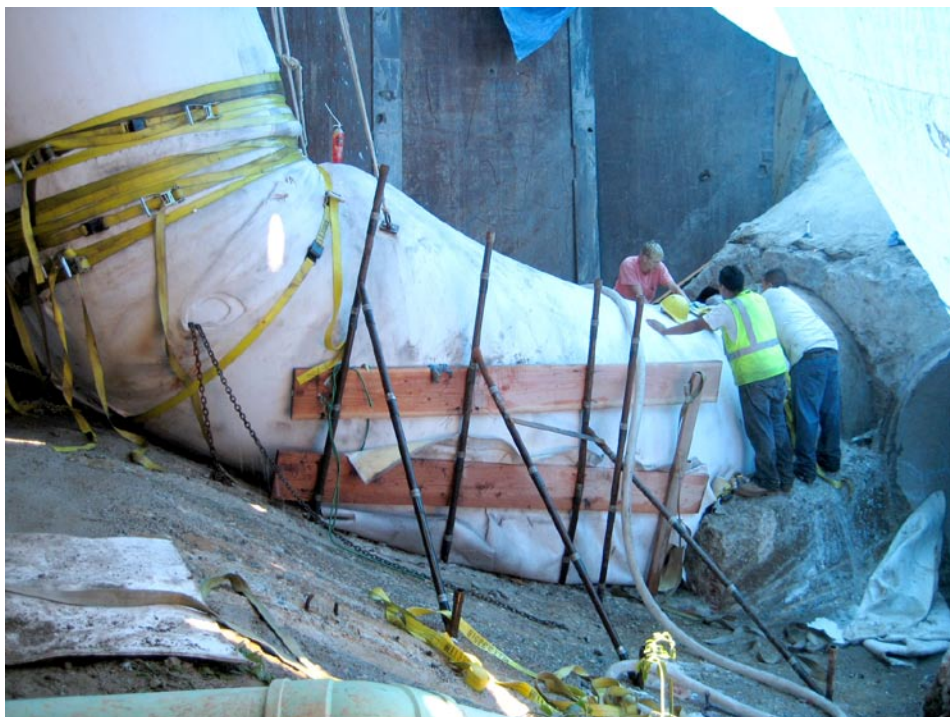


Biggest Cured-In-Place Pipe (CIPP) Lining Project in the History of the City's Wastewater Program

The Lower North Outfall Sewer (LNOS) Rehabilitation Phase II project is rehabilitating approximately 18,200 feet of the North Outfall Sewer (NOS) by cast-in-place concrete lining from the Centinela siphon located under the 405 Freeway through Culver City to the intersection of Rodeo Road and Jefferson Ave.

As a part of the rehabilitation project, the existing three 78-inch diameter concrete siphon barrels which are 1,772 feet long and constructed in 1920's are being rehabilitated with a CIPP lining method. The CIPP lining casts a corrosion resistant epoxy vinyl ester resin into an existing pipe using a felt host. The felt is inverted and cast within the pipe with the use of cold water to prevent a reaction. The water is then heated to 180° F to cause a reaction within the resin to cure it to be a hard solid material. The contract provided 14 different material options for the CIPP System and the Contractor chose "Spiniello" which uses Ashland Q6405 vinyl ester resin for the liner. The liner is required to have a minimum thickness of 1.295 inch and provide a minimum long term tensile strength of 1,200 psi and flexural modulus



Liner being installed.



Water is being filled in the inverted liner.

of 100,000 psi.

The CIPP liner for the siphon barrels is made of a plastic cover sheet and seven layers of felt which is made of polyester staple fiber. The liners were manufactured 450 feet in length and two pieces were spliced to make a 900 foot long liner bag before shipping to the project site. The liner bags were then spliced again at the jobsite to make a 1,800 foot long liner for one siphon barrel. The total weight of one completed liner bag is approximately 57,600 lbs.

The CIPP lining of one of the barrels began on July 22, 2008. Initially, vacuum pumps were used to remove air from the liner. The resin for the liner was delivered in the morning and tested for an optimum "gel" time of 13-16 minutes at 180° F. After the resin was tested to be acceptable, it was pumped into a portion of the liner which was sitting on a roller bed. Approximately 255,000 lbs of resin was used to complete one siphon barrel lining. Then the liner bag was cut open and sewn with ropes to invert. The inverted liner bag was slowly filled with water and

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Largest CIPP Project - continued from page 1

guided to the siphon barrel for installation. Two fire hydrants were used simultaneously to fill the inverted liner bag with cold water. Large amounts of ice were used to keep the water in the bag at temperatures below 70° F to prevent the resin to start reaction earlier than desired. The inversion of the liner bag was continued around the clock. The installation of the liner bag to the entire reach of the siphon barrel was completed on July 25, 2008. Three large vinyl hoses were also installed for the entire siphon reach to circulate water.

Two large boilers mounted on trucks were used to heat the approximately 440,000 gallons of water in the installed liner bag by pumping hot water through the installed three large vinyl hoses. This process, called the "cooking" of the liner, continued until the temperature in the liner bag reached 180° F. On July 26, 2008 around 9:00 pm, the temperature was reached and it was held until 5:30 am the next day to complete the curing of the resin to a hard solid material, at which point the cooling down process began. On July 28, 2008, the temperature of the water in the liner was below 100° F and a hole was made at the downstream side of the liner to allow the water to drain. The byprod-

uct of this process provided a sewer gas resistant thick hard solid liner that will last for years to come.

The CIPP lining of the second siphon barrel was started on August 4, 2008 and the third barrel lining will occur in the later part of August 2008.

The Contractor is Colich and Sons/J.R. Pipeline, a joint venture, and the subcontractor who is performing the CIPP lining is Spiniello Companies. The construction is being managed by **Christine Jones, Richard Louie, and Yoon Cho** of Wastewater Conveyance Construction Division. The project manager is **Sean Zahedi**, of Wastewater Conveyance Engineering Division (WCED).



CIPP lined siphon inlet.

Edward Arrington and **Ceferino Serafin** of Structural Division, and **Keith Hanks** of WCED provided technical support. Mike Howard and his inspectors from the Bureau of Contract Administration are providing inspection services.

New Notices

Notice 022

Notice No. 022 dated July 31, 2008 "Update of Master Specification Library: Division 3 Concrete, Division 4 Masonry" states that the Specification Divisions 3 and 4 have been updated and uploaded to the Bureau's Master Specification Library (MSL). The replaced specifications were moved to the Archive of the MSL and can be readily retrieved should future litigation or change orders require them.

We will continue to enhance the MSL by incorporating lessons learned from the projects. Your comments or suggestions regarding the MSL can be submitted using the "Comments Submittal and Tracking" feature of MSL. The users of the MSL are also encouraged to check periodic revisions by clicking the "Recent Revision" in the left hand frame of the MSL.

The details of the updates are available at: <http://engpermits.lacity.org/bms/menu.cfm>.

If you have any questions on these updates or suggestions to improve the Bureau's MSL, please contact **Jeong Park** or **Fuh-Shing Pan** at (213) 485-5313 and (213) 847-1930, respectively.

Notice 023

Notice No. 023 dated July 31, 2008 "Update of Master Specification Library: Division 11 - Equipment, Division 13 - Special Construction, Division 15 - Mechanical" states

that the Specification Divisions 11, 13 and 15 have been updated and uploaded to the Bureau's Master Specification Library (MSL). The replaced specifications were moved to the Archive of the MSL and can be readily retrieved should future litigations or change orders require them.

We will continue to enhance the MSL by incorporating lessons learned from the projects. Your comments or suggestions regarding the MSL can be submitted using "Comments Submittal and Tracking" feature of the MSL. The users of the MSL are also encouraged to check periodic revisions by clicking the "Recent Revision" in the left hand frame of MSL.

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Notice 024

Notice No. 024 dated July 31, 2008 "Update of General Requirements: Section 01292 - Partial Payments, Section 01295 - Final Payments" states that the General Requirements, Sections 01292 (Partial Payments) and 01295 (Final Payment) were updated and uploaded to the Master Specification Library

(<http://engpermits.lacity.org/bms/menu.cfm>).

The revisions were made to clarify language as to the date of acceptance. The revisions stipulate the date of acceptance as the date of final field acceptance established by the Bureau of Contract Administration Final Inspector. This marks a significant change from the formal date of acceptance as used by the Board. The date of acceptance also determines, among other things, the deadline dates for filing subcontractor stop notice claims which is critical to avoid confusion and potential litigation.

Notice 025

Notice No. 025 dated July 31, 2008 "Revised General Requirements (GR) Section 01351-Escrow Bid Documents" includes some key revisions:

- GR Section 01351 now applies to all programs and is recommended for all projects larger than \$10 million or smaller more complex projects.
- Escrow bid documents are now required to be submitted to the Board within 48 hours of receiving bids instead of 24 hours.
- Bid documents will be stored at or near the job site instead of at an institution.

GR Section 01351 can be downloaded under GENERAL REQUIREMENTS at the BOE Master Specification Library <http://eng.lacity.org/techdocs/speclibrary/index.htm>.