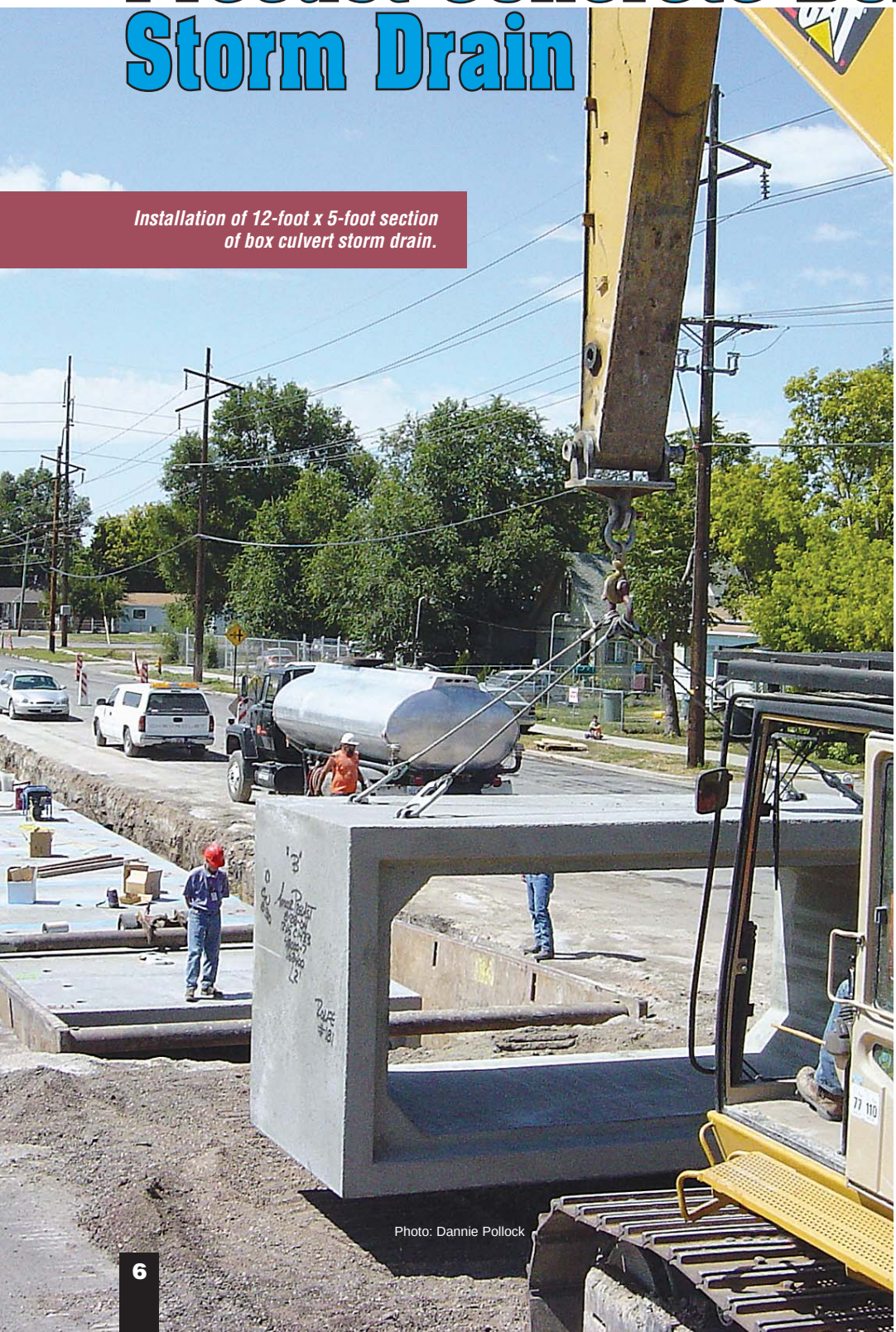
Feature Story

Salt Lake City Goes Beyond Gold with Precast Concrete Box Culvert Storm Drain



Installation of 12-foot x 5-foot section of box culvert storm drain.

Photo: Dannie Pollock

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Projects of Olympian proportions are no stranger to Salt Lake City, Utah. At a cost of $13 million at completion, the 900 South Storm Drain project is the largest stormwater project in the City's 1993 Storm Drainage Master Plan. The project will relieve overloading of several east-west storm drains, alleviate upper mid-city capacity overloading, street flooding and backwater effect at the Jordan River, and improve stormwater quality. The storm drain project provided the opportunity to reconstruct and enhance the beauty of portions of 900 South, one of the earliest streets to be paved in Salt Lake City, and a major boulevard that was showing the wear and tear of age. The project was completed using more than two miles of precast concrete boxes and concrete pipe.

Snow pack in the nearby mountains was 489

percent above normal on June 1, 1983. While unusually cold spring weather prevented a gradual spring melting, normal June temperatures brought extensive flooding that alerted City leaders to the importance of, and need for stormwater facilities. Major stormwater capital improvements were soon planned, but funding of the works stalled construction until 1991 when the City became one of the first in the Nation to create a stormwater utility. The utility became a key source of revenue for funding stormwater quality programs that had to be implemented to meet regulations of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act. In 1993, Salt Lake City developed a Storm Drainage Master Plan that identified 89 separate projects estimated to cost $70 million in 1993 dollars.

The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave the Environmental Protection Agency (EPA) the authority to implement pollution control programs, such as setting wastewater standards for the industry. The Clean Water Act also continued requirements to set water quality standards for all contaminants in surface waters. The Act made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. It also funded the construction of sewage treatment plants with the construction grants program, and recognized the need for planning to address the critical problems posed by non-point source pollution.

CH2M HILL initiated project planning and design in 1995, and on May 17, 2004 construction began on the 900 South Storm Drain Project. The project ultimately will convey 208 cubic feet per second of urban runoff from the Liberty Park area to the Jordan River in a precast concrete box culvert. Construction of the project was awarded to Rolfe Construction Co. and divided into two phases. The first phase consisted of 4,700 feet of 12-foot x 5-foot box culvert from the Jordan River to 400 West. The second phase is comprised of 1000 feet of 12-foot x 5-foot box culvert and 2,650 of 9-foot x 5-foot box culvert from 400 West to State Street. The future Phase 3, to bid in the spring of 2005, consists of 6,800 feet of 66-inch diameter reinforced concrete pipe.

The location and depth of existing utilities within city streets and the flat grade of the project alignment were critical design considerations. Mr. Dannie Pollock, of CH2M HILL, indicated that, “To avoid a major portion of utility conflicts and obtain the needed capacity, a concrete box culvert placed under shallow cover was the ideal solution. With only three inches of road base separating the

Only three inches of road base separated the box culvert storm drain from the asphalt in certain locations.

box culvert from the asphalt in certain locations, there was little room for error in design and construction."

A one-acre wetland stormwater treatment facility was constructed at the outfall of the culvert before discharging into the Jordan River. This facility serves as the end-of-line treatment of the stormwater to enhance the quality of the discharge to the river to meet EPA and the Clean Water Act regulations. Additional features of the project included a low maintenance 66-inch reinforced concrete pipe direct bored siphon at State Street to facilitate construction and tight specifications to ensure that construction met the rigid requirements of the City.

A key success of the project was a proactive public outreach program with financial incentives paid to the contractor to lessen the impact on those residing in the vicinity of the project. Since the project impacted several residents and businesses, the contractor was required to keep the public informed of construction activities and coordinate every aspect of the project with a Citizens Advisory Committee that was responsible for evaluating the contractor's incentive bonuses. Asked about the public outreach program, Mr. Kim Rolfe of Rolfe Construction said, "Salt Lake City has some tough construction requirements for this project. We found the precast box culvert to be up to the test in meeting these requirements. Box culvert construction efficiency has exceeded those which were planned."

Through the bidding process, it became clear that the precast concrete box culvert was significantly lower in cost than a comparable cast-in-place concrete box storm drain alternative. The precast concept also minimized impacts to the public. Savings are realized when access to roadways, businesses and residences, and public outreach is stressed as major items of concern during the bid process. When constructing buried infrastructure in a built-up area of a city, the speed of installing precast concrete drainage products translates into significant cost savings and positive public involvement.

The 2002 Salt Lake City Olympics have now passed into history, along with the excitement of the games. Nevertheless, the City continues to build extraordinarily demanding infrastructure detailed in its 1993 Storm Drainage Master Plan that will provide a greater service to its citizens than any world-class sports event.

Project:	900 South Storm Drain Project Salt Lake City, Utah
Owner:	Salt Lake City Department of Public Utilities
Engineers, Project Manager:	CH2M HILL Salt Lake City, Utah
Contractor:	Rolfe Construction Co. Sandy, Utah
Producer:	Amcor Precast (a division of Oldcastle Precast, Inc.) Ogden, Utah
Quantities:	5,700 feet of 12-foot x 5-foot x 5-foot reinforced concrete box sections 2,650 feet of 9-foot x 5-foot reinforced concrete box sections 6,800 feet of 66-inch diameter reinforced concrete pipe (Phase 3) 280 feet of 66-inch and 30-inch diameter reinforced concrete pipe - State Street Siphon

Amcor Precast's Ogden facility has been in service for more than 50 years. Along with a complete line of concrete pipe and manhole products, Amcor also produces utility vaults, catch basin products, box sections, and a wide variety of other precast concrete products. See www.oldcastle-precast.com.