Historic Category

St. Charles Municipal Center River Wall and Plaza Restoration

St. Charles, IL

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The Municipal Center, situated along the eastern shore of the Fox River in St. Charles, IL, consists of the municipal building and an adjacent plaza. The plaza abuts the north, south, and west sides of the building and is generally located 12 ft (3.7 m) above the Fox River. The west edge of the plaza is defined by a 12 ft (3.7 m) tall Lannon limestone-clad river wall. After 60 years, the river wall had experienced extensive deterioration, which required repair. In addition, significant alterations to the original plaza had been performed in the 1970s and 1990s. Reconstruction of the original design of the plaza and river wall was performed from July 2009 through May 2010 at a cost of approximately $3.4 million.

BACKGROUND

The Municipal Center, listed on the National Register of Historic Places, was completed in 1940 at a cost of $250,000. The building was designed by noted architect R. Harold Zook in the art moderne style. The building is clad with black granite base and white Georgian marble. An 84 ft (25.6 m) tall octagon tower is the primary architectural feature of the building.

Extensive deterioration to the Lannon limestone cladding and underlying concrete wall at the north end of the river wall. Installation of the portable dam system for the contractor to perform repairs within the river is shown in the foreground

The main features of the Municipal Center site are as follows:

- **Plaza area**: This area adjacent to the building was significantly modified in the 1970s and 1990s from the original design, both in configuration and materials. The area includes site features such as planters, lighting, and site furniture, including benches, statues, and plaques.
- **River wall**: Extending from the southwest corner of the building past the north end of the site, the wall is visually connected to the massing of the building. The wall consists of a concrete retaining wall clad with rough-cut Lannon (dolomitic) limestone. An Indiana (oolitic) limestone parapet wall extends above the top of the concrete river wall and defines the edge of the plaza area. The wall also incorporates two fountains and a stair connecting the plaza area to a fishing platform located at the river level.
- **Fishing platform**: The fishing platform was modified since its original construction. A portion of the original walking surface and original planters, which at one time had spreading ewes, had been covered by asphaltic pavement.
- **North viewing platform**: The viewing platform was added in the 1970s as part of the reconfiguration of the eastern shore river walk and park north of the Municipal Center. The surface of the north viewing platform is a connecting link for pedestrians between those spaces and Main Street and areas on the Main Street Bridge along the south edge of the site.

INVESTIGATION

An investigation of the plaza and river wall was performed between 2006 and 2007 to determine the extent and causes of deterioration and develop a plan for the restoration of the plaza and river wall. It consisted of a review of available documentation, visual and close-up hands-on inspection, and laboratory analysis of building materials.

The investigation revealed significant deterioration of the original Lannon limestone cladding on the river wall due to weathering and the Indiana limestone parapet wall due to corrosion of embedded steel bars and plates. The combination of exposure and incorporation of corrodible metal anchors resulted in an advanced state of deterioration of the limestone and mortar. Observed distress included spalls, incipient spalls, cracks, deteriorated mortar joints, exfoliating/scaling of the limestone surfaces, and displacement of the cladding.

Cores through the stone cladding revealed varying levels of distress of the concrete structure at the plaza and river wall, including spalls and delaminations. A laboratory study of concrete core samples indicated that the original concrete was not air-entrained.

REPAIR METHODOLOGY

Based on the design team's recommendation, the owner opted to revive Zook's original design intent of the plaza. The primary objective of the repairs was to use materials and techniques that would be sympathetic to the original design intent and perform well under the extreme environmental conditions at the site.

PLAZA AREA

Based on the original design drawings, it appeared that the plaza was to be paved with materials and patterns similar to the interior floor surfaces; however, these materials are not durable in Midwestern climates. The new plaza paving was designed to replicate the original design intent with paving materials selected to be durable with a color palette consistent with the building floor. Based on these criteria, a 6 in. (152 mm) thick reinforced conventional air-entrained concrete slab-on-ground was selected with an integral color pigment to achieve the desired colors. Approximately 200 yd^3 (153 m^3) of the integrally colored concrete, placed in more than a dozen pours, was required to achieve the as-designed pattern of the plaza slab and planters.

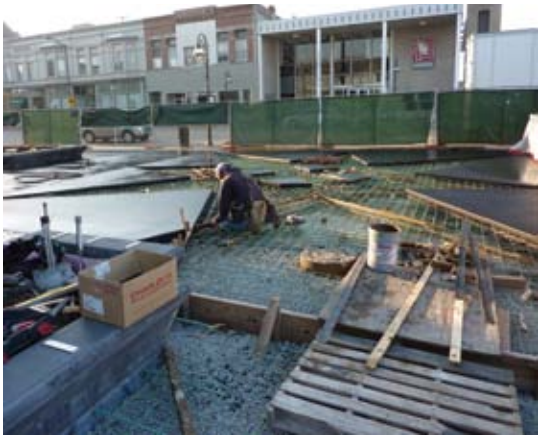
RIVER WALL

Options for restoration of the river wall cladding, parapet walls, and stair enclosure were studied. As a result of these studies, the following solutions for each portion of the river wall were implemented:

River wall and cladding:

- Extensive deterioration of the northern portion of the concrete river wall, directly adjacent to the dam, required that it be removed and rebuilt. The rebuilt wall consisted of an 8 in. (203 mm) thick conventionally air-entrained concrete wall reinforced with epoxy-coated steel reinforcement. The new wall was anchored to the existing dam abutment structure with rock anchors embedded 3 to 5 ft (0.9 to 1.5 m) into the existing structure.

Rebuilding the concrete fishing platform using epoxy-coated steel reinforcement



Installation of epoxy-coated reinforcement and intricacy of forming the integrated design features in the color concrete plaza slab

Additional concrete patching was required throughout the remainder of the wall. The concrete repairs were typically 4 in. (102 mm) deep, requiring that the concrete repair materials be placed into the formwork. The patches were anchored to the original base mix concrete with embedded epoxy-coated steel dowels.

- Each piece of the existing Lannon limestone cladding was digitally identified and documented prior to disassembly. Salvageable units were retained and reinstalled in their original position. New matching Lannon limestone units were used to replace deteriorated units. The new wall cladding was anchored to the repaired concrete backup wall with regularly spaced stainless steel anchors.

Parapet wall:

- The west and north edges of the plaza are defined by the cut Indiana limestone parapet wall that extends above the Lannon limestone-clad river

Overall view of completed integrally colored design feature in the concrete plaza slab

Overall view of completed river wall repairs, including rebuilt fishing platform, fountains, precast concrete stair, and precast concrete parapet walls

wall. Previous modifications to the plaza raised the elevation of the pavement, causing the height of the parapet wall to be less than that required by the current building code. The design team and owner opted to install a stainless steel railing in lieu of significantly altering the look and configuration of the existing parapet wall.

- The pieces of the existing cut Indiana limestone parapet that were salvageable were reinstalled along the north side of the plaza. Along the west edge of the plaza, the parapet wall was recreated using precast concrete panels simulating the look, color, and texture of the original cut limestone parapet wall. Numerous mockups and submittals were required by the precast concrete subcontractor to develop and fine-tune the concrete color, finish, and jointing so that the final precast concrete members matched the cut limestone. The use of epoxy-coated steel reinforcement, air-entrained concrete, and stainless steel connections was specified to help increase the durability of the precast concrete members.

Stair:

- As with the parapet wall along the west side of the plaza, the design team and owner opted to recreate the previously cut limestone cladding of the stair using matching precast concrete. Again, the use of epoxy-coated steel reinforcement, air-entrained concrete, and stainless steel connections was specified to help increase the durability of the precast concrete members.

FISHING AND VIEWING PLATFORMS

The fishing and viewing platforms had been altered geometrically and physically from the original design intent. These features are less significant as they relate to the river wall and the plaza because they are physically separated and have minimal visual impact. The design team and owner opted to retain the viewing platform to maintain the connecting link between the plaza and the river wall to the north. As such, the fishing and viewing platforms were restored with special attention paid to incorporating details correlating with the original designer's intent and expression. The extent of deterioration of the original concrete structures of the fishing and viewing platforms required that they be completely removed and rebuilt.

CONSTRUCTION

The work site presented the contractor with many challenges, including a small site with difficult access for delivering, storing, and setting new materials; placing large volumes of concrete; maintaining egress for the functioning municipal building; and the need to perform extensive repairs from the Fox River. To accomplish the work from within the river, the contractor used a portable dam system, creating a semi-dry condition around the repair areas. The dam system was in place for approximately 4 months during the reconstruction.

St. Charles Municipal Center

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