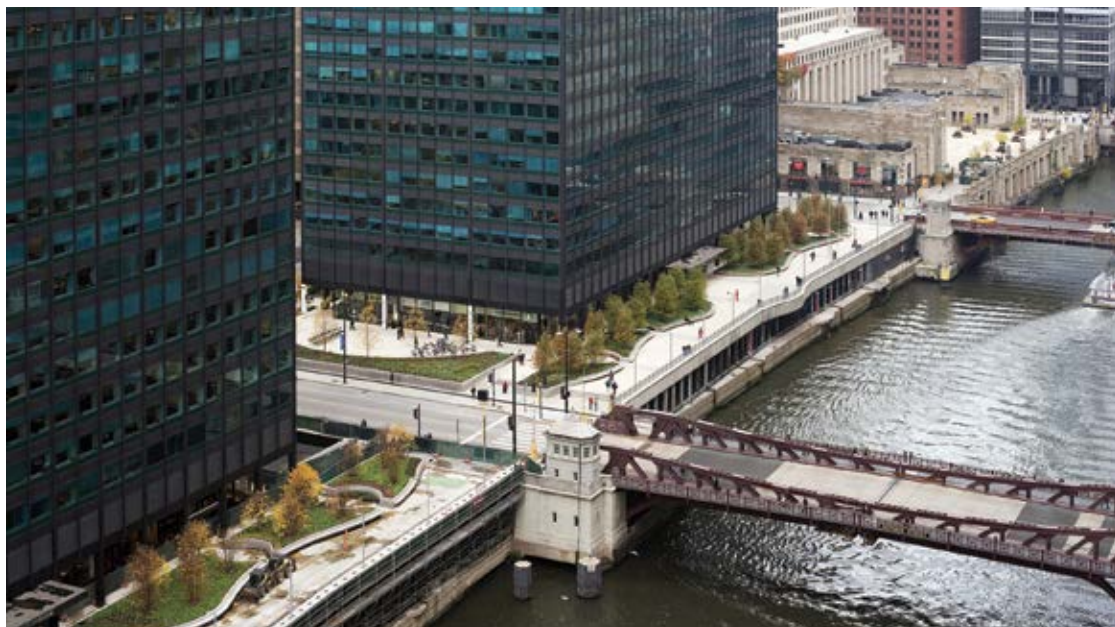


# 10 and 120 South Riverside Plaza Overbuild Restoration

Chicago, IL

Submitted by Carl Walker, Inc.



*Aerial view of completed plaza restoration of 10 and 120 South Riverside Plaza*

**1**0 and 120 South Riverside Plaza are twin, 22-story buildings located along the Chicago River in the West Loop of downtown Chicago, IL. Adjacent to Chicago Union Station, the buildings were constructed directly above the railroad tracks and platforms. The plazas act as both main entrances to the buildings as well as a pedestrian corridor along the Chicago River.

The “Overbuild Structure” collectively refers to the structural elements forming the enclosure for the Metra commuter and Amtrak passenger terminal below the 10 and 120 South Riverside Plaza property. The main components of the overbuild structure include the plaza and first floor structural slab, precast plenum slabs, supporting beams and columns, and the buildings’ truck docks. The plaza surface includes all hardscape, landscape, paving, planter walls, benches, railings, lighting, and other plaza features.

## PROBLEMS THAT PROMPTED REPAIR

The existing plaza was deteriorated and the waterproofing system was 23 years old and in poor condition. The plazas exhibited widespread leaking, particularly at the expansion joints, drains, and other

penetrations and points of transition. The leaking was a nuisance to the patrons on the train platforms below and was causing deterioration of the structural elements of the plaza and plenum structures. Deterioration included spalled and delaminated concrete, failed precast plenum planks, and severely corroded steel framing.

Poor drainage characteristics at the plaza level caused frequent buckling of the paver system during winter freeze-thaw cycles, resulting in uneven walking surfaces. Existing planter walls were also deteriorated due to 23 years of leaking and chloride exposure.

Due to the years of ongoing leaking, several of the steel beams supporting the plaza and plenum structures exhibited corrosion, with some exhibiting severe deterioration. Deterioration was particularly concentrated at the building perimeter, as well as other areas of long-term leaking.

## INSPECTION, EVALUATION, AND TEST RESULTS

A condition assessment of the entire plaza and overbuild structure, including visual review of the plaza from the topside, underside from track level





*Example of deteriorated expansion joint*



*Poor drainage and improper slopes caused widespread deterioration*

via reticulating lifts, as well as from within the plenum space, was completed in 2008. Concrete cores were taken for chloride, petrographic, and compressive strength analysis at representative locations to assess the durability and condition of the plaza structural slabs.

Materials testing consisted of chloride ion content testing, compressive strength testing, and petrographic examination. Testing indicated that the concrete was adequate; however, chloride levels throughout the plaza slabs were above the threshold value to initiate corrosion of embedded reinforcement.

## **REPAIR SYSTEM SELECTION**

Concrete repair materials were designed to include modern durability features, such as air entrainment and a water-cement ratio below 0.40. Installation was performed using ICRI-recommended practices to ensure durability. The plaza system was designed to accommodate both the phasing sequence as well as the existing structural slab slopes. Changes in sequencing and overall construction schedules created the need for proprietary fast-setting repair mortars and polymer-modified concrete to expedite waterproofing installation.

Hot-applied waterproofing was selected to accommodate the variety of existing conditions, configurations, and overburden systems. Perimeter expansion joints, which were previously installed a few years prior due to a prioritized phasing approach, were designed with an integral gutter system to accept and control water. They were also designed with a removable concrete bulkhead to allow subsequent installation and tie-in of the new plaza system without affecting the expansion joint itself.

Precast concrete pavers on a pedestal support system were used to address difficulties in providing adequate surface drainage in limited-depth conditions and eliminate ponding on the surface.



*Repairs were designed with a removable concrete bulkhead*



*Precast concrete pavers on pedestal support system*



Cast-in-place planter walls were selected in lieu of precast due to the large variety of differing conditions and configurations.

## **SITE PREPARATION**

### **PHASING**

The work was completed in three primary phases starting with replacement of the truck docks and perimeter expansion joints in 2009, followed by repair/replacement of the plaza system at 10 South Riverside Plaza commencing in 2012, overlapping the commencement of the 120 S. Riverside Plaza in 2014, with both plaza projects being completed in 2015. Structural repairs to the underside of the overbuild structure were performed in conjunction with each plaza restoration.

The plazas provide the only means of entry/exit to their respective buildings, and together act as a primary

pedestrian corridor for city commuters and visitors. The requirement to maintain pedestrian traffic through the plazas during all phases of construction was absolute. Numerous sequencing and associated temporary fencing layouts were developed to meet this demand.

### **WORK AREA ISOLATION AND OCCUPIED AREA PROTECTION**

A 6 ft (1.82 m) high chain-link fence with screening was installed around all work sites with gates, chains, and locks to control pedestrian flow around construction zones. Public way access permits and street barricades, as well as coordination of loading dock access with the owner and partial street closures with City of Chicago officials, were necessary to accommodate debris removal and material delivery to the very confined site. Temporary dining decks were constructed over existing planter areas to maintain outdoor restaurant dining areas throughout the plaza restoration project.

### **SURFACE PREPARATION**

ICRI Technical Guidelines covering surface preparation were specified and used for concrete repairs and waterproofing applications. Approximately 0.5 in. (13 mm) of concrete was milled from the plaza concrete overlay surfaces to remove surface scaling. Additional depths were removed at the perimeter of the building and other transition areas as required to accommodate the depth of the new plaza system and create improved surface drainage patterns.

### **APPLICATION METHOD SELECTION**

Concrete repair materials were chosen for their durability features as well as to accommodate the often-restrictive repair windows, particularly for repairs performed at the underside from the train platforms. The new cast-in-place concrete walls had compound angles and curves requiring complex formwork and a high degree of precision to achieve the desired aesthetics.

Formed and pumped repairs were selected for vertical column and wall repairs. Shotcrete repairs were used for overhead repairs due to the limited access and to minimize Amtrak flagmen expense.

### **REPAIR PROCESS EXECUTION**

#### **LOGISTICAL ISSUES FOR DEMOLITION, SHORING, DEBRIS REMOVAL, AND CONCRETE DELIVERY**

Debris removal was performed during off-peak traffic periods to minimize congestion. Due to weight limitation on the plaza deck, ready mix concrete truck access, as well as placement of site-batching plants, was restricted to roadways adjacent to the plazas, necessitating pumping the concrete to placement locations. Temporary holes were made through the plaza structure to allow shotcrete and pumping hoses to reach underside repair areas.



*Intensive preplanning minimized interference with pedestrian movement and railroad operations*



*High pedestrian traffic called for multiple phasing of project*



Final plaza includes curvilinear planter designs

Intensive preplanning with building management staff minimized contractor interference with pedestrian movement and normal facility operations. Planning and scheduling of debris removal and material deliveries with City of Chicago Department of Transportation and work over the railroad right-of-way with Amtrak personnel was also required.

Special formwork and shoring designs were necessary to accommodate overhead repairs over the railroad tracks and passenger platforms where interference was not permitted after each daily work shift.

## OPERATIONAL/ARCHITECTURAL IMPROVEMENTS

Although the project was initially undertaken to address leaking and deterioration, it also provided an opportunity to modernize the outdated plaza layout. New planter, paver, and landscaping layouts were designed and installed at both buildings. Their performance as building entry/exits, as well as function as a pedestrian corridor, was enhanced by the addition of accessible ramps at both ends of each plaza. Additionally, outdoor dining areas were expanded to support the restaurants at each building. New lighting provided a more comfortable and safe space for evening use.

The award-winning landscape layout was designed to provide shade, as well as create the feel of a natural river edge. The planting includes native and adaptive species to minimize maintenance and irrigation demands.

## QUALITY CONTROL

Quality control was provided by testing agencies on-site during all concrete placements and waterproofing installations. Because high-performance concrete materials with a good historic track record were specified, no significant problems were encountered with concrete materials after delivery and placement. Quality control was particularly

critical due to the use of colored concrete and difficult forming and placement of irregularly shaped cast-in-place planter walls. Electric field vector mapping was also performed over 100% of the waterproofed areas to ensure a leak-free membrane system prior to installation of the overburden.

## SPECIAL FEATURES

The repair and renovation of the 10 and 120 South Riverside Plaza project was very logistically challenging, including the restoration of two highly used plazas in the heart of downtown Chicago. Close coordination was required with Amtrak to perform necessary repairs within the train right-of-way. Additionally, the new plaza design included a curvilinear planter layout that required complex formwork and considerable precision and consistency on the part of the contractor to meet the aesthetic demands.

### 10 and 120 South Riverside Plaza

#### OWNER

**Jones Lang LaSalle Americas (Illinois), LP**  
Chicago, IL

#### PROJECT ENGINEER/DESIGNER

**Carl Walker, Inc.**  
Lombard, IL

#### REPAIR CONTRACTOR

**Bulley & Andrews Concrete Restoration**  
Chicago, IL

#### MATERIAL SUPPLIERS/MANUFACTURERS

**Carlisle Coatings & Waterproofing, Inc.**  
Wylie, TX

#### Boller Construction

Waukegan, IL