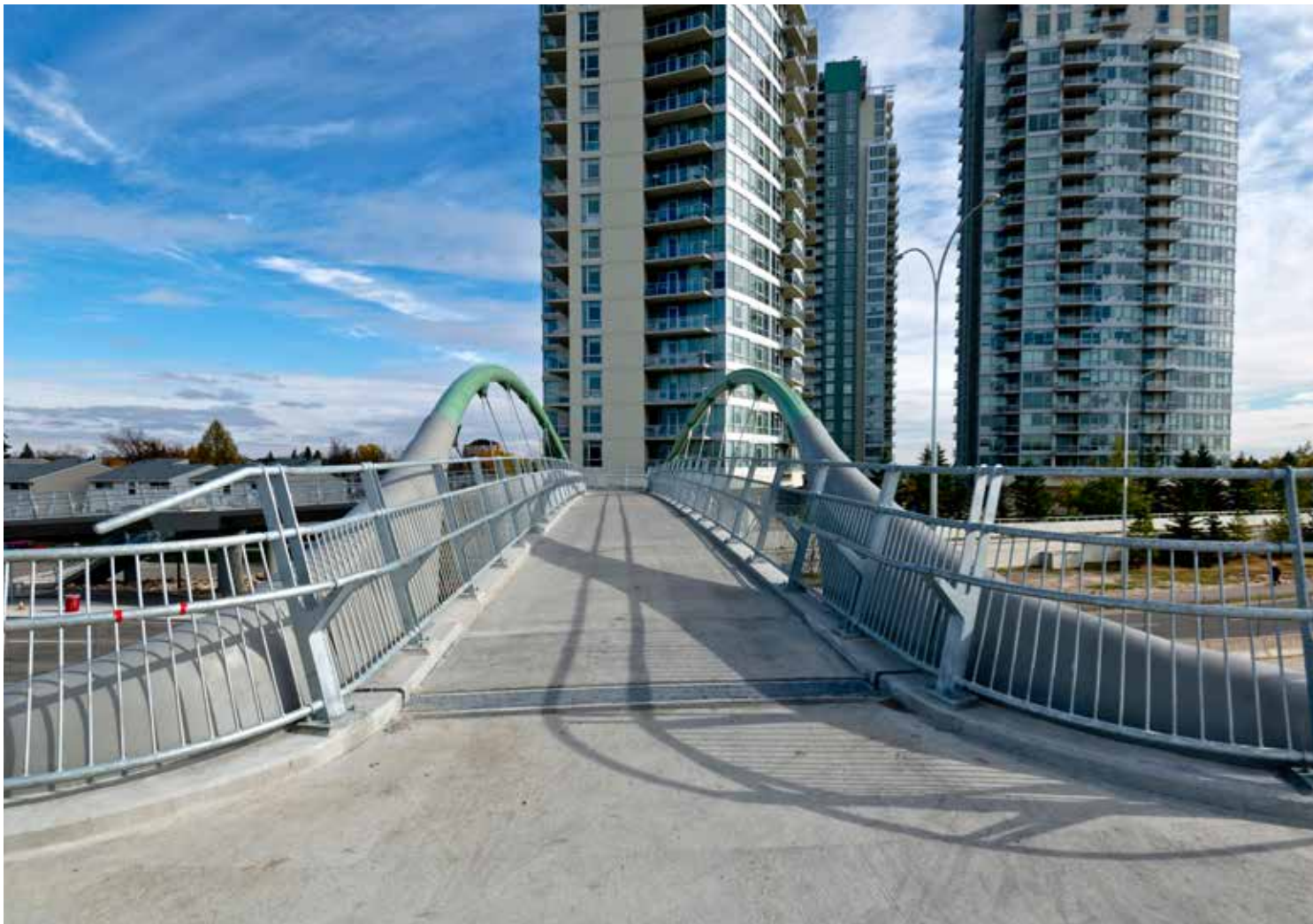


# Improving Connectivity

BY GEOFF KALLWEIT



**T**he Westbrook pedestrian bridge replacement project was initiated by the City of Calgary as part of a larger program to rebuild key pedestrian crossings in the city. The bridge sits within the context of an Area Redevelopment Plan (ARP) that the city developed in 2009 to shape the future direction of the Westbrook Village community.

This ARP was built with the Westbrook LRT Station acting as a central hub in a transit oriented development (TOD). In keeping with the defining principles of a TOD, walkability was identified as a key consideration within the ARP. To support a vibrant and interconnected neighbourhood, the city envisioned that “pedestrian and cyclist connections [would] be abundant and convenient...”

The existing pedestrian overpass being replaced was in disrepair and sub-standard in many ways. The grades leading up to the span were very steep, even for able bodied users; the bridge was too narrow to permit bi-directional wheelchair or bike traffic; and lighting in the area was sparse leading to security concerns. Although the location of the crossing was





generally acceptable, there were missed opportunities in how the ramps were aligned, and many adjacent pedestrian routes were left unserved.

When RJC Engineers was awarded the contract to design the bridge replacement, the placement of the new span was reconsidered to leverage two opportunities: improvements to bridge access locations, and an offline alignment that would avoid unnecessary pedestrian detouring. By placing the bridge appropriately, the design team was able to introduce five points of access with better connectivity to transit, bike routes, and desirable destinations in the area. By locating the bridge sufficiently away from the existing span, it became possible to build the new bridge without demolishing the old one. Doing so maintained current pedestrian routes and avoided lengthy detours.

### AESTHETIC CONSIDERATIONS

The considerate approach to locating and configuring the bridge went hand in hand with the team's approach to the bridge's aesthetic character. A well-considered aesthetic configuration could help maintain visual continuity and allow the bridge to appear unified and balanced. While developing span options for the crossing, the design team began playing with alterations to a traditional tied-arch configuration that would improve the sense of continuity with its supports. The result was a hybrid arch configuration that integrated concrete and steel in a novel way to flow naturally into the pier caps at either end of the span.

The most jarring aesthetic inconsistency with many tied-arch overpasses on flat terrain is the lack of continuity of the lines of the arch when they arrive at the supporting piers. When natural topography such as river banks or hills can act as termination points for the span, a tied-arch sits comfortably in its context, anchoring itself to the earth that supports it. But when a tied-arch is placed like a drop-in span between conventional piers, the lines of the arch are left stranded where they terminate, leaving the impression that the span has been inserted into the gap haphazardly.

### GEOMETRIC ADJUSTMENTS

To avoid a sense of disparity between span and supports, the design team adjusted the visual lines of the Westbrook arches with an inflection point and upward curvature near the ends of the span. The upward curving line was carried across the supporting pier cap and blended into the approaching ramps and stairs. This aesthetic gesture de-emphasized the distinction between the form of the span and the form of the pier cap, creating better continuity where the two meet.

### USE OF CONSTRUCTION MATERIALS

The infill span of a tied-arch overpass is typically composed of structural steel to reduce the weight of the span and make it easier to lift into place. Conversely, the approach structures are often built in concrete to reduce the maintenance associated with coating re-application. By forming arch terminations with precast concrete, the design team sought to leave the impression that the steel portions of

the span were growing from extensions of the pier caps, rather than being perched upon them.

### CONNECTION DESIGN

With the amount of effort devoted to creating better visual continuity between the span and support structure, it would have been an aesthetic defeat to introduce clumsy connections where structural components met. Heavy bolted joints or large jumps in section size would have broken the visual continuity and interrupted the otherwise simple lines of the arch. To avoid this issue, the team designed field-welded and site-cast connections to minimize their bulk as much as possible. These connection details allowed the majority of the load transfer to occur within the outline of the structure, maintaining its natural lines.

### ENHANCED COMMUNITY CONNECTION

To support the City of Calgary's desire for a convenient active-modes network in the Westbrook Village neighbourhood, the design team took on a mandate to deliver a thoroughly considered, well-integrated bridge design. Their design of a replacement for the existing Westbrook pedestrian bridge broadened the transportation network in the area, corrected functional deficiencies in the crossing, and produced a beautiful, balanced bridge. As the Westbrook TOD continues to grow and mature, the design team hopes to watch the bridge become more and more embedded in the fabric of the community. **CB**

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