

End Bent Cap Construction

End bent caps are part of the 23rd Street Flyover's bridge substructure and provide a portion of the supporting framework for massive concrete U-Beams and steel tub girder beams that will elevate U.S. 98 over the Bay Line Railroad, 23rd Street, Seaport Drive, and Collegiate Drive. They also serve to support the bridge structure's load by transferring the load through the prestressed concrete pilings, or piles.

End bent caps are located at the top of MSE (Mechanically Stabilized Earth) walls where elevation is needed to transition ground level (at-grade) traffic to an elevated roadway or bridge. The MSE wall itself is not a part of the end bent cap; instead, it wraps around the end bent cap structure.

Once the MSE wall is built tall enough to what is called "finish elevation", end bent cap construction begins. Contractors saw off prestressed concrete piles to achieve the specific height required to form the end bent cap structure.

There are two major components to the end bent cap structure. The first component is the end bent cap **foundation** consisting of prestressed concrete piles that are vertically embedded within the end bent cap structure.

The second major component consists of three exposed portions of the main end bent cap which include: the **beam pedestals**, **back wall**, and two side walls called **cheek walls** (see photo). This horizontal section rests on the embedded (vertical) prestressed concrete piles.

Before placing concrete in the horizontal section, a formwork (or temporary plywood structure) is constructed around the prestressed concrete pilings to support and hold fluid concrete in place. Rebar, or reinforcing steel, is then tied inside the temporary structure using steel wire ties per a predetermined blueprint. Once the rebar is tied in place, concrete is placed inside the plywood structure. The process is repeated to form the beam pedestals, back wall, and cheek walls after the main end bent cap is constructed.

Reinforced concrete is formed when concrete sets and hardens around rebar. This is important because reinforced concrete creates a stronger element of the bridge structure that performs well in harsh conditions including exposure to heat, freezing temperatures, tension, or compression. **Coping panels** (concrete finishing panels) are placed along the upper edge of MSE wall panels. The coping panels tie the MSE wall panels together with the end bent cap, creating an aesthetically pleasing finish.

Once the end bent cap's concrete has cured completely, **bearing pads** are placed on top of the beam pedestals. Concrete and steel tub girder beams are set in place on these **bearing pads**. The pads serve an important function of supporting the permanent bridge structure, reducing friction, and transferring forces from the roadway surface into the bridge substructure, allowing necessary movement to occur.