

Waterloo Pedestrian Bridge

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Pedestrian Bridge Over CN Railyard

This project is located near the center of Waterloo, Iowa. The Canadian National Railway owns and operates a railyard in which trains will queue in this locations for loading, unloading, and recoupling rail cars. This becomes an issue when trains that are stopped sit in the intersection of the tracks and 4th street for hours at a time. In the past people have been hurt trying to cross between the cars on foot. The main goal of our project is to provide a safe and efficient route for pedestrians traveling along E. 4th street.

Access Point Design

For this structure, two separate access points were designed – a spiral ramp for the north end and an elevator tower with stairs for the south. The elevator and stairs were chosen due to limited space availability on the south end. The north end spiral ramp is an economically efficient choice and is also intended to be an aesthetically appealing addition to the park it resides in. Both structures are supported by pile foundations on their respective ends due to large loads and limited space.



Figure 1 (left). An overview of the north side of the project site.
 Figure 2 (right). An overview of the south side of the project site.

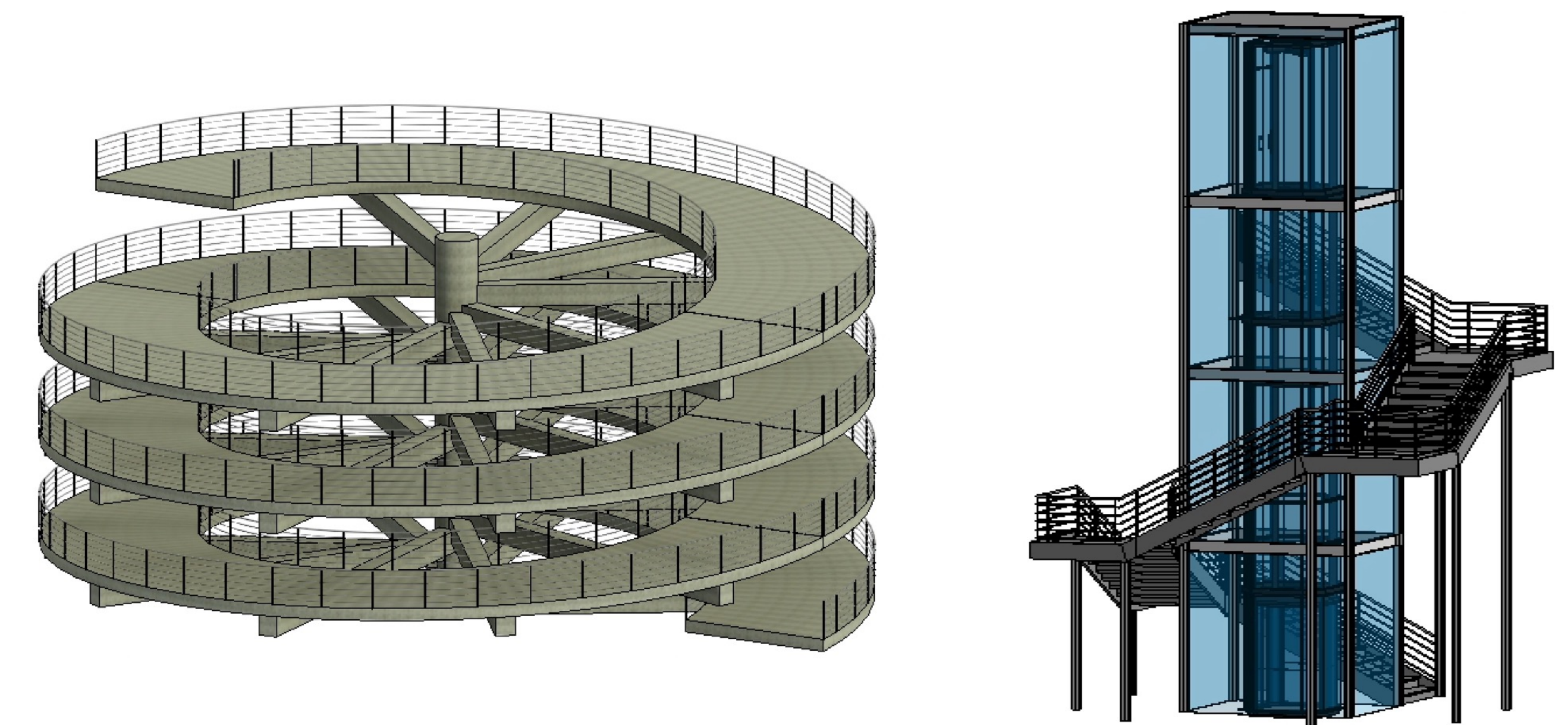


Figure 5 (left). Revit model of the spiral ramp.
 Figure 6 (right). Revit model of the elevator tower and staircase.

Cable-Stayed Design

The cable-stayed design was picked based on the span length and aesthetics. The bridge shall feature decorative lighting, and have a twin set of towers to hold the cables. There will be a 10' tall safety wire mesh fence around the bridge. There shall be two steel girders, and an 8" concrete deck. The bridge in Figure 4 below was used as aesthetic inspiration

Final Design and Cost Estimate

The total project was broken up into three major sections. Those sections are Substructure, Superstructure+Approches, and Site Design. Combining the total cost of these sections we added a 10% contingency for unexpected construction costs. We believe our design of a cable-stayed bridge parallel to East 4th Street provides the client with the best option due to their constraints and goals for this project.



Figure 3 (left). A Revit model of the proposed bridge's superstructure.
 Figure 4 (right). Cable-stayed pedestrian bridge in Memphis , TN.

Project Cost Breakdown	
Category	Cost
Substructure	\$ 850,000.00
Superstructure+Approches	\$ 3,600,000.00
Site Design	\$ 250,000.00
Contingency (10%)	\$ 470,000.00
Total Cost	\$ 5,170,000.00

Figure 7. A cost summary of all the main sections of the project along with contingency.

References

Figure 4. *Beat the Train: U of M Pedestrian Bridge Opens*. MemphisFlyer. (n.d.). <https://www.memphisflyer.com/beat-the-train-u-of-m-pedestrian-bridge-opens>.