Pedestrian Bridge and Trail – City of Volga, Iowa

Ryan McDonough, Nathan Gjersvik, Ryan Kowalsky & Spencer McDermott
Civil & Environmental Engineering
The University of Iowa

Overview and Site Map

The City of Volga, Iowa requested the preliminary design of a pedestrian bridge and trail to connect the east and west side of the city which is separated by the Volga River. The project also includes the removal of the remains of the existing Cass Street bridge, which will enhance the flood capacity of the river through Volga and remove the eyesore. The project site, shown in Figure 1, extends from Volga Street to Chase Street and then south from Chase Street to the old elementary school building.

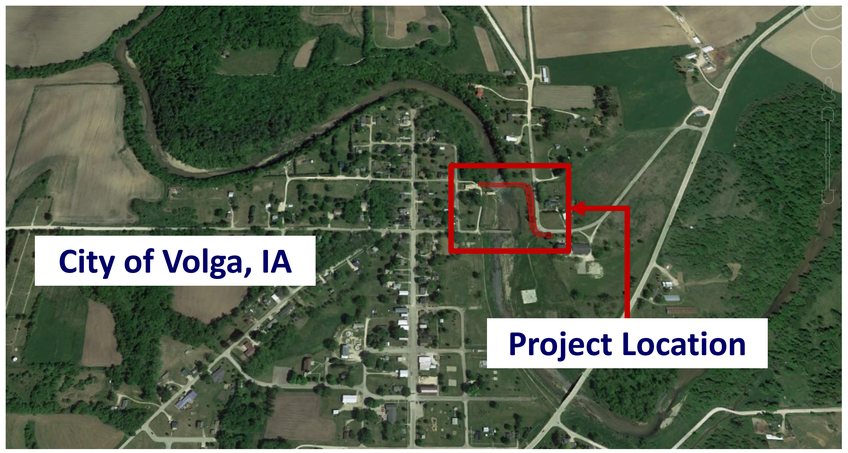

Figure 1. Project site map.

Background Information

In 1999, the City of Volga suffered a catastrophic flood. The Cass Street bridge that connected both sides of town was partially washed away during the flood. Since then, they have built a dike on the west side of the river to protect the city from flooding again. County Highway C2W crosses the river on the south side of town giving access to the east side of the Volga River. Many Volga residents live on the north and west sides of town, making the highway an inconvenient way to travel to the east side, especially for pedestrians.

Design Objectives

The goal of this project was to build a functional, cost-effective, and safe bridge & trail system that would suit the city of Volga for years to come. The team used a variety of resources including, but not limited to, the AASHTO LRFD Bridge Design Manual and the Iowa DOT Design manual. The bridge truss is pre-fabricated from CONTECH Engineered Solutions. All other elements of the bridge were designed by the student team.

Figure 2. Flood of 1999 in downtown Volga, IA.

Completed Design

The steel truss bridge has two spans of 150' and 117' with one pier located outside of the main river channel which prevents footings from being in the river under normal flow conditions. The deck is a 12’ wide and 6” thick concrete slab which is doubly reinforced. The elevation of the bridge is 797.5’ which is 3.9' above the 50-year flood elevation and provides adequate clearance for floating debris. The trail will be 10’ wide made of 6” thick concrete and will begin near the old school building by the campground and end at the existing trail that leads to the kayak/boat launch.

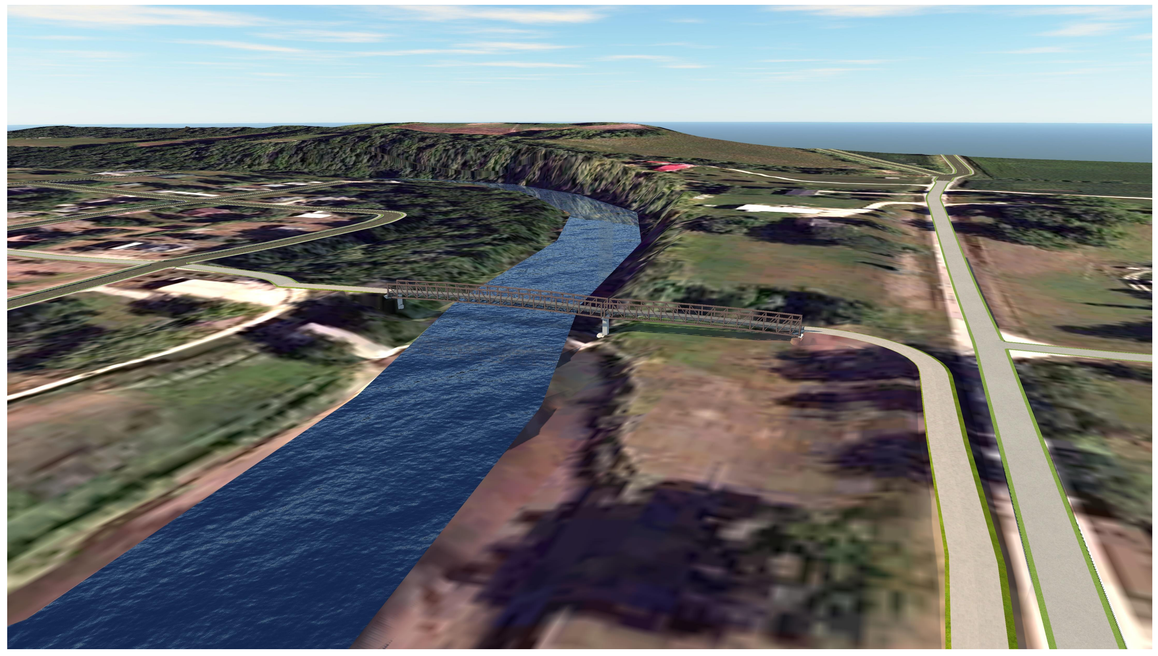

Figure 3. 3D rendering of the final bridge and trail design.

Conclusions and Recommendations

The Bridge and Trail system is designed to accommodate pedestrians, UTV’s, and commercial lawnmowers for quick, safe and reliable access across the Volga River. The bridge crossing the Volga River is a pre-fabricated steel truss spanning a total of 267 feet. The trail system is 10’ wide, 6” thick Portland Cement Concrete that connects to the old school and gymnasium. The final cost of the project is $1,494,000 and may be drawn out into two phases if monetary restrictions apply. Phase 1 is construction of the bridge and trail system and Phase 2 is demolition of the damaged Cass Street bridge.

References

(2008). AASHTO LRFD bridge design specifications. Washington, D.C.: American Association of State Highway and Transportation Officials.

Iowa DOT Design Manual. (n.d.). Retrieved April 16, 2020, from iowadot.gov/design/Design-manual

National Weather Service. (n.d.) Retrieved April 16,2020, from weather.gov/arx/may1799