

# *Jefferson Place Villa Community*



## Pedestrian Bridge Review Report



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# 1. INTRODUCTION & BRIDGE DESCRIPTION

## 1.1 INTRODUCTION

Engineering Resources, Inc. was contacted by The Newcomb Group to review the condition of the existing pedestrian bridge over the Graham McCulloch Ditch Branch No. 1. The bridge is a part of the Jefferson Place Villa Community.

Existing plans and documentation of the construction are not available. The purpose of this review is to determine the current condition of the bridge and provide guidance for the association related to the future safety of the structure.

## 1.2 DESCRIPTION OF THE BRIDGE

Based on historical aerial photos, the bridge appears to have been constructed between 1986 and 1995. On April 2, 2018, Aaron Isch, PE, an INDOT certified bridge inspector, visited the site and reviewed the condition of the structure.

The bridge is a single span prestressed concrete double tee beam bearing on cast-in-place concrete abutment walls. In addition, there appears to be a two-inch cast-in-place concrete topping installed on the precast double tee.



VIEW FROM BELOW - LOOKING EAST



VIEW FROM BELOW - LOOKING WEST

The bridge span length is approximately 56 feet out to out. The deck width (walking surface) is 6'-9" which is also the distance between the hand rails.

There are several utilities attached to the underside of the bridge. These appear to be related to irrigation and lighting/electrical. Details related to these utilities are outside of the scope of this report.

The useful width of the bridge is limited by the entry features that are included at each end of the bridge.

These features have an opening width of approximately 4 feet. Therefore, only pedestrians and vehicles/equipment, with width less than 4 feet, can use the bridge.



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The stems of the double tees are dapped meaning they are notched at each end. This is a typical design for a parking garage double tee floor system where the stems fit into a pocketed spandrel beam.

In addition, the cross section of the double tee is not symmetrical. The north side has a 6-inch overhang while the south side has a 21-inch overhang. The double tee appears to have been a standard 8-foot width. It appears that 15 inches of the north top flange was removed. It's unclear if this was intentional.



NORTH SIDE OVERHANG



SOUTH SIDE OVERHANG

It is likely this was a double tee intended to be used for a parking garage structure due to the many similarities in production for similar components.



### 1.3 IDNR CONSTRUCTION APPROVAL

According to the National Flood Insurance Rate Map (18003C0286G), issued by FEMA, the bridge was constructed within the Floodway of the Graham McCulloch Ditch.



We reviewed the Flood Insurance Study for this stream, and the bridge was not included in the latest version, August 2009. The Indiana Department of Natural Resources, Division of Water, is responsible for permitting all construction within the limits of a Floodway for the state.

The IDNR website includes hydraulic computer modelling for all Floodway permits issued. We completed a review of this data and did not find any record of this bridge being approved by the Division of Water. It is possible this was constructed without proper permitting and is therefore in violation.

## 2. CONDITION ASSESSMENT

### 2.1 SUPERSTRUCTURE CONDITION

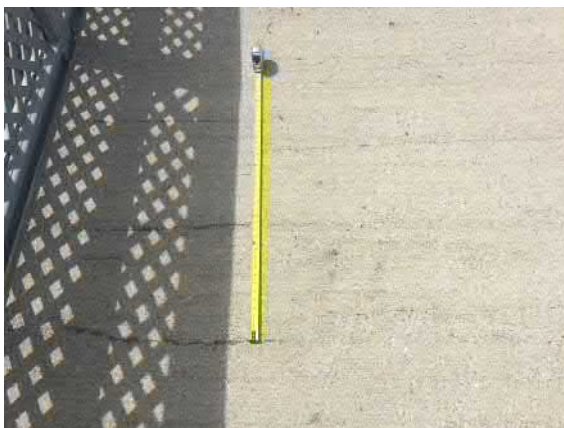
The superstructure appears to be in fair condition. Since there were no plans available, the design loading is unknown. If the double tee was originally designed for use in a parking garage, the typical loading would be 50 pounds per square foot (psf). While this is less than the typical design loading for a pedestrian bridge which can vary from 65psf to 90psf, a portion of the top flange was removed. This reduces the amount of live loading that can be applied to the structure though both stems remain to carry the loading. In addition, the entry features limit the width of loads the bridge can carry. Current pedestrian guide specifications do not require a bridge to be designed for vehicular loading if the width is less than 6 feet. Therefore, it is likely that this bridge has adequate capacity to carry the intended live loading.

There are several locations where the superstructure shows signs of minor deterioration. There is a steel plate insert in the top of the flange, under the railing edge, that is exposed.



The top flange has a longitudinal crack between the precast tee and the cast-in-place topping at the end of the bridge. There is also exposed reinforcing steel which appears to be at the cut where the section of top flange was removed.

There is diagonal cracking in the top flange at the end of the bridge adjacent to the tee stems.



Finally, there is exposed reinforcing steel in the top of the flange topping visible in the walking surface which is probably due to inadequate cover.

While these are currently minor, once steel corrosion is visible, the condition will likely advance more rapidly.



## 2.2 SUBSTRUCTURE SCOUR/EROSION

This substructure appears to be in good condition. There are no visible signs of settlement or distress. The concrete wingwalls have some very minor cracking. Generally, the substructure of the bridge is performing satisfactorily.

On the east side of the stream, there is some erosion and undermining of the abutment foundation. It's difficult to determine if this is related to stream scour or if the utilities attached to the abutment contributed to the condition.



Regardless of the cause, we recommend protecting the base of the foundation with 18 inches of revetment riprap over geotextiles in accordance with the requirements of the Indiana Department of Transportation (INDOT) Standard Specification. This will armor the foundation against erosion and scour damage to ensure proper performance in the future.

## 2.3 HANDRAILING CONDITIONS

The scope of this report is limited to typical bridge related components. The handrailing review was not included in the original scope. However, there are several deficiencies that were noted during the site visit and due to the conditions, they are included in this section.

First, the railing connections are corroding and the ends of the vertical railing posts are deteriorating and have split. The railing is somewhat loose and is sagging between posts.



The distance between railing posts is approximately 8 feet which is possibly longer than the capacity of the top handrail component. The conditions of the railing should be reviewed in more detail and upgraded as required.

### 3. SUMMARY

The pedestrian bridge appears to be in fair condition. Our review did not include a structural analysis or load rating as there were no existing plans for the structure. However, as discussed in the report, the bridge likely has adequate capacity to carry the intended pedestrian loading.

There are several conditions, identified in this report, that warrant maintenance work to ensure proper long-term performance of the bridge. These include substructure armoring, superstructure repairs, patching and/or sealing and railing/entry feature improvements. Repair details are beyond the scope of this report.

In addition to maintenance issues, the bridge appears to have been constructed without approval of the IDNR, Division of Water. It is unknown if County Drainage Board Approval was obtained. Obtaining formal approval of permits may be necessary in the future pending agency reviews and notices of violation.

The condition of this bridge was obtained by visual observations only. No physical testing was conducted. The scope of this report is intended to be limited to those items associated with bridge structural components. This report was not intended to address pedestrian safety related to non-structural items or features related to the Americans with Disabilities Act. If questions arise as to the intended scope of this report, Engineering Resources should be contacted for clarification.



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President

