

## Staff Report

**Donation of Abandoned Union Pacific Railroad  
Bridge Over Squaw Creek**

December 22, 2010

**BACKGROUND:**

On November 24, 2009, the City Council discussed the proposed donation of an abandoned Union Pacific Railroad (UPRR) railroad bridge over Squaw Creek and approximately 1.8 acres of land. Several issues were brought to the attention of the Council pertaining to impacts on public safety and the potential significance of the bridge as it relates the City's trail system programming. During public forum there were several members of the community that voiced support for accepting the bridge to preserve it as a piece of local history.

Staff detailed in their report to City Council some logistical issues regarding an analysis of the bridge structure, as well as a preliminary cost estimate to improve the bridge and connect it into surrounding trails. The UPRR stated their desire to have the City either reject the donation, or accept it based upon a positive outcome of a structural analysis; a definitive answer from the City was desired by November 25, 2009. Given the large number of unknowns, City Council expressed the need for an extension of this deadline to facilitate further discussion on the implications of accepting the bridge and how it may impact trail funding and prioritization citywide.

Therefore, a motion was passed to direct staff to hire an engineering firm to conduct a structural analysis of the bridge only, contingent upon the UPRR granting an extension of the deadline. Understanding the complexity of this decision, the UPRR granted an extension until the December 22, 2009 City Council meeting.

**STRUCTURAL ANALYSIS/COST:**

The engineering firm of WHKS & Co. was hired to conduct the structural analysis of the bridge and develop a probable cost to improve the surface and connect into the existing trail network from Stuart Smith Park on the west to the 6<sup>th</sup> Street and Hazel Avenue intersection on the east. The analysis was conducted during the week of December 7<sup>th</sup> after coordinating with the UPRR for entry onto their property.

WHKS & Co. has prepared a report detailing their analysis and probable cost opinions (see attached). Based on the report, the bridge is structurally sound for use by pedestrians with the following safety improvements needed before surfacing/decking and trail connections can be constructed. The first being the timber abutment backwalls at either end of the bridge are in poor condition and will need to be replaced. Secondly, there are approximately twenty-four (24) railroad ties that have rotted and/or

deteriorated to the point in which they should be replaced. Third, there will need to be clearing and grubbing of trees beneath the bridge and lastly, a large hole will need to be filled at the western approach.

**The engineers generated an estimate of \$157,000 to construct the necessary surface and safety improvements to the bridge and make east-west connections in to the City's existing trail network. Additionally, a new public crossing agreement for the extra width at the existing Hazel Avenue railroad crossing is required from UPRR, which has an estimated cost of \$48,000 to \$72,000 (\$12,000 per 8-foot section) based upon the requirements of the design. This brings the total estimated project cost to improve this facility for public use to \$229,000.**

As stated during the November 24, 2009 meeting, accepting this donation will still require the City to hire an independent land acquisition company to produce an appraisal to be used for tax purposes by the UPRR; however, their main intent throughout this process has always been to correct this public safety hazard. It is still estimated to be \$5,000 to conduct research on the property and generate an official appraisal. The City will also need to secure the bridge immediately if it is acquired. The cost to secure the bridge with fencing is estimated at \$2,500. This amounts to \$7,500 that must be spent if the bridge is acquired before any surfacing or repair costs.

It should be noted that Carroll Marty, an Ames resident, has contacted the City with a proposal to construct the railing and surface improvements to the bridge only using volunteer labor from the community. Along with the proposal was an attached quote for the pressure-treated wooden dimensional stock and hardware necessary to finish the bridge as suggested by Mr. Marty. The attached quote totaled \$12,119.98 for materials only. This cost does not include any required preparatory actions such as backwall repair, timber replacement, clearing and grubbing, and assumes no labor costs. It also does not include any of the costs to connect the bridge into the City's trail system. **Due to concerns with safety, liability, and compliance with state public improvement laws, the City Attorney has advised against pursuing this volunteer proposal.**

#### **SIXTH STREET ALTERNATIVES:**

At the November 24, 2009 meeting, City Council asked for cost estimates for widening the current Sixth Street Bridge to better accommodate bike traffic and for a new stand-alone bike bridge over Squaw Creek. These items were detailed in the attached report by WHKS & Co. The cost to widen the existing bridge is estimated to be \$337,000, while the cost for the stand-alone bridge is projected at \$646,000.

It should be noted that if the 6<sup>th</sup> Street Bridge over Squaw Creek is replaced at some point in the future, including a 10 foot shared use path on the bridge would be more cost effective than widening the current bridge.

### **COMMISSION RESPONSES:**

On December 14, 2009, the Historic Preservation Commission discussed the donation of the UPRR Bridge and land. Commission members stated that they support the City's acceptance of the donation and expressed their recommendation that the City apply for its inclusion into the national historic register. The Commission believes the bridge is a key piece to the continuity of transport within Ames (that is, the Dinkey-Interurban-C&NW-UP line as a link from downtown to campus). In addition, the Manhattan Project and the refining of uranium at ISC during WWII is important information to include in an application for listing of the bridge on the National Register of Historic Places. The Commission has emphasized that if deemed historic, the project might be eligible to receive historic grant funding.

This proposed donation was discussed during review of upcoming Capital Improvement Plan projects with the Parks and Recreation Commission on November 19, 2009. While no motion was passed, the Commission expressed support for the City Council's considering acceptance of the bridge as long as the structural assessment reveals no significant structural issues or costs.

### **FUNDING/GRANT SOURCES:**

If the City accepts the bridge, funding will be needed to complete the necessary repairs in order to make it usable for pedestrians. There are three options that could be considered to fund the necessary improvements. The first would be to reprioritize this project with the other projects in the CIP. This option might a delay projects in the Share Use Path program or Parks and Recreation programs in the CIP. A second option is to insert this project in fiscal year 2014/15, following completion of the Skunk River Trail. The third option would be to create a new CIP project and fund it with unobligated monies in the Local Option Sales Tax Fund balance.

As part of the report, WHKS & Co. identified potential funding sources that could be potentially used for the improvements. It should be noted that some of the funding sources may not apply since the bridge and trail extensions do not currently tie into a regional system. If the bridge is accepted and included in the National Historic Register, more grant sources be available. In the case that the bridge is accepted, City staff will further explore and apply for grants to assist in the funding of this project.

### **ALTERNATIVES:**

1. Do not accept the donation of the abandoned Squaw Creek Railroad Bridge and adjacent land from the UPRR. The UPRR has indicated that this action will lead to the immediate removal of the bridge.
2. Accept the donation of the abandoned Squaw Creek Railroad Bridge and adjacent land from the UPRR, hire an appraiser, secure the bridge, and
  - a. explore grant and funding opportunities

- b. incorporate this project into the CIP to include the improvements (\$229,000) to the abandoned Squaw Creek Railroad Bridge and trail extensions by delaying an existing programmed project or inserting it into the fifth year of the plan.
- c. create a new project in the first year of the CIP to include the improvements (\$229,000) to the abandoned Squaw Creek Railroad Bridge and trail extensions from the unobligated Local Option Sales Tax Fund balance.
- d. Work with a volunteer group to identify if any elements of the necessary work is possible. However, as expressed above, because of safety and liability issues, the use of volunteer labor for this high bridge is not advisable.

**STAFF COMMENTS:**

Because an east/west shared-use path already exists in close proximity to the Bridge segment that is being offered, the staff does not believe the acceptance of the bridge is advisable at this time. However, if the City Council decides that the existing 6<sup>th</sup> Street bridge is inadequate to accommodate east/west pedestrian and bike traffic or that the historic significance warrants it, a decision to accept the bridge can be justified. If the Council accepts this "donation", then the staff believes that the improvements outlined by WHKS should be accomplished as soon as possible with contracted workers along with the identification of a funding strategy.

In addition, it appears that that the UPRR has made their last offer regarding the "donation" of the bridge. If this wasn't the case, the Council could have requested that the UPRR to agree to install the bike path pad between their rails on Hazel without charging the City. This action would reduce the estimated improvement costs to the City by \$48,000 to \$72,000.

December 16, 2009

Mr. John Joiner, P.E.  
Public Works Director, City of Ames  
515 Clark Avenue  
Ames, IA 50010

RE: Abandoned Railroad Bridge over Squaw Creek

Dear Mr. Joiner,

On December 1 and 7, 2009, representatives of WHKS & Co. conducted an inspection of the abandoned Union Pacific Railroad (UPRR) bridge over Squaw Creek, just south of the 6<sup>th</sup> Street crossing of Squaw Creek, in Ames. The bridge was visually inspected from the banks, on the bridge deck, and from the water with a boat. A comprehensive hands-on inspection was not performed. The inspection generally consisted of examining individual members and the overall bridge for signs of damage or deterioration that would compromise the structural integrity of the bridge. Photos, diagrams and measurements of critical member dimensions were also taken.

A structural analysis was performed to check the load-carrying capacity of the main bridge members for an 85-psf pedestrian load and an H5 (10,000-lb) truck load. A thorough structural analysis, considering things such as thermal and stream forces, was not performed. Past performance of the bridge demonstrates that it is able to adequately resist such forces.

### **Bridge Description**

The bridge consists of five spans, each of which is between 43- and 49-ft long. Total bridge length is approximately 234-ft and bridge deck width is around 7'-9". The age of the bridge is unknown, though it is at least 80 years old based on analysis of historical aerial photography in the area. Plans of the bridge were not obtained. Photos of the bridge are included in Appendix B.

Each span is supported by four 34-in deep steel I-beams. The beams are simple span and have horizontal bracing within the webs to control lateral movement. There are currently railroad ties on top of the beams at approximately 1-ft spacing, and timber curbs on each side. There are no deck planks or railings on the bridge, but the railroad rails have been removed. Abutments and piers consist of 8-in steel piles, four at each abutment and eight at each pier. The two piers near the stream contain extensive diagonal bracing to stiffen them against stream and ice forces.

### **Bridge Condition & Assessment**

#### **Deck**

Many of the railroad ties were in poor condition due to rotting and deterioration. Up to 10% of the ties may need to be replaced. The 4x8 timber curbs were completely covered with snow at the time of inspection, but were in noticeably poor condition in places. Timber/lumber safety railings

and decking planks will need to be installed on the bridge. The timber curbs are assumed to be in need of replacement to ensure adequate connection for the railings.

#### Superstructure

The steel I-beams showed some light surface rust and pitting, though not enough to cause a reduction in strength. All bracing, connections, and stiffeners appeared to be intact and in satisfactory condition. Analysis of the superstructure showed that the beams are able to carry an 85-psf pedestrian load and an H5 truck load satisfactorily.

#### Substructure

The piers and abutments also showed some light surface rust and pitting but were in generally good condition. However, the backwalls at each abutment were in poor condition with several timber planks and piles completely rotten. The deteriorated backwall planks and piles at each abutment should be replaced.

Pier 3 (in the stream) has had several bracing members and piles on the upstream side that were bent likely due to ice or debris impact. Hand probing around Pier 3 revealed that the streambed was around 3-ft below the water level, implying that there are likely no major scour problems. There was also a significant amount of down timber and debris on Pier 3 that should be removed. Analysis of the substructure showed that the piers and abutments are able to carry an 85-psf pedestrian load and an H5 truck load satisfactorily.

#### Approaches

There are currently no paved approaches or trails leading to the bridge. Construction of the trails will involve clearing of topsoil, subgrade preparation, placing an 8-ft wide, 5-in HMA recreational trail, and other miscellaneous items. The near (west) approach is approximately 2-ft below the bridge deck elevation for approximately 10- to 15-ft and will have to be filled. Approach railings will also need to be constructed at the abutment wings.

#### Other

Clearing and grubbing under the bridge and along the proposed trails will be required due to trees growing under the bridge, near the piers and along the trail slopes. The far (east) abutment has a large amount of rocks and debris on the bearings, which should be cleared.

#### **Cost Estimates**

Costs estimates for the three options listed below were prepared based on average unit cost data compiled by the Iowa DOT and estimated quantities to complete the proposed scope of work listed for each option. The cost estimates also include mobilization (10% of total cost) and a 20-30% contingency that includes engineering and construction observation.

#### Improvements to Abandoned UPRR Bridge and Connecting Trails

This option includes the bridge deck and rail improvements noted above, replacement of deteriorated backwall members, west approach fill, clearing and grubbing, and construction of approximately 1,200-ft of trail connecting the bridge to the existing trail network.

**Based on the proposed scope of work for this option, we estimate the total project cost for this option to be \$157,000.** This excludes any costs associated with the proposed railroad crossing at North Hazel Ave, which is being coordinated with the Railroad by the City. Contingency is taken as 20% of the total cost. See Appendix A for a breakdown of the estimated costs.

#### Widening 6<sup>th</sup> Street Bridge over Squaw Creek

This option includes widening of the existing 6<sup>th</sup> Street bridge over Squaw Creek to accommodate a 10-ft shared-use path on one side. Adding one beam line and widening the piers and abutments would be necessary. A 10-in wide concrete barrier rail would separate the path from traffic. Minor approach sidewalk work would also be necessary to tie the bridge path to the existing sidewalk.

**Based on the proposed scope of work for this option, we estimate the total project cost for this option to be \$337,000.** Contingency is taken as 30% of the total cost due to the additional uncertainties of this work. See Appendix A for a breakdown of the estimated costs.

One option that was not considered here, but that may be a legitimate option, is a 10-ft shared-use path on a potential new 6<sup>th</sup> Street bridge over Squaw Creek. If the City chooses to replace the 6<sup>th</sup> Street bridge at some point in the future, including a 10-ft path on one side, as opposed to the current 6-ft sidewalk, would add relatively little cost to the overall project and would be significantly less expensive than widening the current bridge.

#### New Pedestrian Bridge over Squaw Creek

This option includes construction of a new 3-span pre-engineered steel truss trail bridge over Squaw Creek to accommodate a 10-ft shared-use path. The bridge would be constructed near the existing 6<sup>th</sup> Street bridge. Construction of abutments, two piers, bank shaping, and rip-rap erosion protection would be necessary. Cofferdams for pier construction are assumed to be needed due to the pier locations and soil conditions. Approach sidewalk work would also be necessary to tie the bridge to the existing sidewalk.

**Based on the proposed scope of work for this option, we estimate the total project cost for this option to be \$646,000.** Contingency is taken as 30% of the total cost due to the additional uncertainties of this work. See Appendix A for a breakdown of the estimated costs.

**Potential Funding Sources**

Potential grants for improvements to the existing railroad bridge or construction of a new or widened recreational trail bridge are listed below in Table 1. Conversion and re-use of the existing railroad bridge may be more attractive to several of the grant programs however. More information on most of the grant programs is available at the following Iowa DOT website: [http://www.sysplan.dot.state.ia.us/main\\_grants.htm](http://www.sysplan.dot.state.ia.us/main_grants.htm)

**Table 1. Potential Funding Sources**

<b>Grant</b>	<b>Qualifications</b>	<b>Annual Funding Level</b>	<b>Application Deadline</b>
Recreational Trails Program (Federal)	<ul style="list-style-type: none"> <li>• Minimum 20% match</li> <li>• Must be maintained as public facility for minimum of 20 years</li> </ul>	\$1 million	October 1
Recreational Trails Program (State)	<ul style="list-style-type: none"> <li>• Minimum 25% local match (volunteer services not eligible)</li> <li>• Must be part of local trail plan</li> <li>• Must be maintained as public facility for minimum of 20 years</li> </ul>	\$2 million	January 2 and July 1
Federal Transportation Enhancement Program (Regional)	<ul style="list-style-type: none"> <li>• Minimum 20% local match</li> <li>• Must have direct relationship to existing or planned facilities</li> </ul>	\$4.5 million for regional projects	October 1 (verify with MPO)
Transportation, Community and System Preservation (TCSP) Program	<ul style="list-style-type: none"> <li>• Minimum 20% local match</li> <li>• Discretionary funding source</li> </ul>	\$5.4 million (approximate)	Requested through elected congressional officials
Iowa Clean Air Attainment Program (ICAAP)	<ul style="list-style-type: none"> <li>• Minimum 20% local match</li> <li>• Must improve air quality or reduce traffic congestion</li> </ul>	\$4.7 million (approximate)	October 1
Safe Routes to School Program	<ul style="list-style-type: none"> <li>• No local funding match required</li> <li>• Must address infrastructure &amp; noninfrastructure components</li> <li>• Must be maintained as public facility for minimum of 10 years</li> </ul>	\$1 million (approximate)	October 1



<b>Grant</b>	<b>Qualifications</b>	<b>Annual Funding Level</b>	<b>Application Deadline</b>
Urban Youth Corps Program	<ul style="list-style-type: none"> <li>• Minimum 30% local agency match</li> <li>• No more than 10% may be in-kind services</li> </ul>	\$100,000 (anticipated)	March 1
Iowa DNR Resource Enhancement and Protection (REAP)	<ul style="list-style-type: none"> <li>• Matching funds not required</li> <li>• Funds expansion of parkland and multi-purpose recreation areas</li> </ul>	\$200,000	August 15
National Park Service Land and Water Conservation Fund	<ul style="list-style-type: none"> <li>• 50/50 matching grant program</li> <li>• Must comply with statewide SCORP plan</li> <li>• Must hold and maintain land in perpetuity</li> </ul>	\$180,000 (anticipated)	March 15

There are also a number of grants and donations available from foundations and corporations, such as Bikes Belong Coalition, Walmart Foundation, and other local companies. Due to the age and historical nature of the bridge, historic preservation funding such as *Preserve America* and *Save America's Treasures* administered by the National Park Service, may also be considered. However, these may require designation of the bridge as a National Historic Site. A thorough list of potential funding sources, both public and private, is available online at the Rails-to-Trails Conservancy website: [http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/funding\\_financing.html](http://www.railstotrails.org/ourWork/trailBuilding/toolbox/informationSummaries/funding_financing.html)

**Conclusion**

Considering the age of the bridge and lack of maintenance in recent years, the abandoned UPRR bridge is in relatively good condition. The inspection showed no major defects or damages, and a structural analysis of the major bridge components showed that it can satisfactorily carry pedestrian loading as well as an H5 truck load. However, there are numerous improvements and repairs that must be made before using the bridge as a shared-use path.

The cost estimate for repair and improvements to the railroad bridge is significantly less than the other two options presented. There may be opportunities for grant money to cover some or all of the work. When evaluating all the options, the City may also want to consider the possibility of including a 10-ft shared use path on a possible future 6<sup>th</sup> Street bridge replacement. Of the options considered here however, the option to rehabilitate and re-use the abandoned UPRR bridge is the most feasible and least costly.

Mr. John Joiner  
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December 16, 2009

Please do not hesitate to contact us if you have any questions. We look forward to hearing the outcome of the City's decision.

Sincerely,

**WHKS** & Co.



Joshua J. Opheim, E.I.

JJO/jjo: 7278

Enclosures (2)

# WHKS & Co.

## Estimated Project Costs (Preliminary)

Abandoned UPRR Bridge over Squaw Creek  
City of Ames, IA

### Bridge Improvements and Connecting Trails

Item	Description	Quantity	Unit	Rate	Amount
1	Excavation, Class 20	14.1	CY	\$ 55.00	\$ 775.50
2	Structural Steel	596	LB	\$ 15.00	\$ 8,940.00
3	Miscellaneous Hardware	500	LB	\$ 10.00	\$ 5,000.00
4	Treated Timber & Lumber	7.389	MFBM	\$ 4,500.00	\$ 33,250.50
5	Plank Deck Lumber	4.596	MFBM	\$ 5,000.00	\$ 22,980.00
6	Piles, Wood (Treated Timber Trestle Piles)	240	LF	\$ 40.00	\$ 9,600.00
<b>SUBTOTAL (Bridge):</b>					<b>\$ 80,546.00</b>
7	Clearing and Grubbing	0.3	ACRE	\$ 2,000.00	\$ 600.00
8	On-site Topsoil	450	CY	\$ 5.00	\$ 2,250.00
9	Class 10 Excavation	100	CY	\$ 5.00	\$ 500.00
10	Subgrade Preparation	1600	SY	\$ 2.00	\$ 3,200.00
11	5" HMA Recreational Trail (8' Width)	1070	SY	\$ 27.00	\$ 28,890.00
12	Other Trail Items	1	LS	\$ 3,000.00	\$ 3,000.00
13	Mobilization (10%)	1	LS	\$ 11,898.60	\$ 11,898.60
<b>SUBTOTAL (Trail):</b>					<b>\$ 50,338.60</b>
14	Contingency (20%; includes Engineering & Observation)				\$ 26,176.92
<b>TOTAL (Rounded):</b>					<b>\$ 157,000.00</b>

# WHKS & Co.

## Estimated Project Costs (Preliminary)

6th St. Bridge over Squaw Creek

City of Ames, IA

### Bridge Widening for 10-ft Shared-Use Path

Item	Item	Quantity	Unit	Rate	Amount
1	Bridge Widening (5'-8 x 256')	1451	SF	\$ 125.00	\$ 181,375.00
2	Conc. Barrier, Reinforced, Separation	250	LF	\$ 60.00	\$ 15,000.00
3	Approach/Sidewalk Work (20%)	1	LS	\$ 39,275.00	\$ 39,275.00
4	Mobilization (10%)	1	LS	\$ 23,565.00	\$ 23,565.00
<b>SUBTOTAL:</b>					<b>\$ 259,215.00</b>
5	Contingency (30%; includes Engineering & Observation)				\$ 77,764.50
<b>TOTAL (Rounded):</b>					<b>\$ 337,000.00</b>

# WHKS & Co.

## Estimated Project Costs (Preliminary)

Pedestrian Bridge over Squaw Creek

City of Ames, IA

### 10-ft Steel Truss Bridge adjacent to 6th St. Bridge

Item	Item	Quantity	Unit	Rate	Amount
1	Excavation, Class 20	67	CY	\$ 40.00	\$ 2,680.00
2	Structural Concrete (Abutments, Piers)	77	CY	\$ 500.00	\$ 38,500.00
3	Reinforcing Steel (Epoxy Coated)	19250	LB	\$ 1.50	\$ 28,875.00
4	Piles, Steel, HP10x57	1600	LF	\$ 40.00	\$ 64,000.00
5	Pre-engineered Steel Truss Trail Bridge	1	LS	\$ 190,000.00	\$ 190,000.00
6	Cofferdams (Piers)	2	EA	\$ 25,000.00	\$ 50,000.00
7	Approach Railings	1	LS	\$ 2,500.00	\$ 2,500.00
8	Approach/Sidewalk Work (20%)	1	LS	\$ 75,311.00	\$ 75,311.00
9	Mobilization (10%)	1	LS	\$ 45,186.60	\$ 45,186.60
<b>SUBTOTAL:</b>					<b>\$ 497,052.60</b>
10	Contingency (30%; includes Engineering & Observation)				\$ 149,115.78
<b>TOTAL (Rounded):</b>					<b>\$ 646,000.00</b>



**Figure 1. Top of Bridge Deck Looking East.**



**Figure 2. Proposed Trail Looking West.**



**Figure 3. Bridge Profile, North Side.**



**Figure 4. West Abutment Wingwall.**



**Figure 5. West Abutment.**



**Figure 6. Bad Planks in West Abutment.**





**Figure 7. Pier 1 Details.**



**Figure 8. Pier 2 and Profile View, South Side.**



**Figure 9. Pier 3 in Stream.**





**Figure 10. Pier 4 View.**



**Figure 11. East Abutment Details.**



**Figure 12. Profile View, North Side Viewing Pier 4.**