Program Development Summary Report
Boneyard Creek North Branch Improvement Project
(Replaces Lower Boneyard Improvement Plan Phases 3, 4, and 5)

Draft October 2016
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EXECUTIVE SUMMARY

Farnsworth Group was selected by the City of Champaign in the Summer of 2015 to evaluate the previous concept and provide preliminary design for the Boneyard Creek North Branch Improvements, located north of University Avenue to the headwaters of the Boneyard Creek, on the east side of Neil Street. Subconsultants for this study team include Applied Ecological Services, Inc., Green Metro Planning LLC, Lin Engineering Ltd., SWT Design, Inc., and Webb Engineering Services, Inc. This project corresponds to Phases 3, 4, and 5 in the Camp Dresser and McKee “Lower Boneyard Creek Improvement Plan”, dated July 1999 and revised July 2001.

The primary objective of the project is to provide protection to the City of Champaign from the 1% annual chance storm event (100 year) along the Boneyard Creek, specifically from University Avenue (near Second Street) upstream to the diversion structure at Neil Street. This project will also prepare for future implementation of the remaining phases of the “Lower Boneyard Creek Improvement Plan” to complete the Boneyard Improvements initiated by the City of Champaign in 1990. Reducing flooding on Washington Street by improving the Washington Street viaduct is also a priority of the project.

Secondary goals of the project include creating an ecologically and structurally stable stream environment, developing a community amenity along the creek and surrounding floodplain area, supporting economic development, and maintaining and improving a trail corridor through the project area.

To evaluate the project area, existing site conditions were determined from an exhaustive field topographic ground survey. In addition to the topographic information, utility companies were contacted for verification of their facility locations and to coordinate planned facility relocations. A wetland delineation was conducted in the project area and an environmental site assessment will be conducted as the project design progresses.

In order to obtain input from the community, several stakeholder interviews were held with property owners and interested parties in the vicinity. Also, two Owner’s Project Requirements workshops were held with an invitation to the general public and city staff for input regarding the desired direction of the project. The summary of the stakeholder input is contained within the body of this report with a thorough listing of community concerns identified. Although not all stakeholders shared the same vision for the finished project, all responses from stakeholders were considered and ranked to narrow goals and focus the project.

Existing traffic patterns in the project area will be altered slightly during construction. The only permanent traffic changes will be the closure of two alleyways due to removal of the stream crossings. Alleys proposed to be closed are the alley between Park St. and Church St. (between 2nd and 3rd Streets) and between Church St. and Hill St. (between 1st and 2nd Streets). Parking will be increased overall as part of this project, particularly near proposed amenities. A pedestrian and bike trail will follow the Boneyard Creek throughout this project area to provide improved trail circulation and connectivity within the City of Champaign.
An existing structures condition report was conducted for bridges and culverts; however, most of the structures are planned to be replaced to accommodate the deeper and wider channel required for flood conveyance. Depressed culverts will be used in most cases to provide a natural bottom channel instead of a concrete bottom for fish and macroinvertebrate habitat.

Completion of the project will provide the needed flood protection, as well as provide amenities and aesthetic value to the neighborhood. The City of Champaign prefers the final project to be low maintenance. The maintenance concern has been considered while developing the project recommendations and alternates.

Upon review by the City of Champaign, the design team is ready to proceed with final design to further the project for practical, economic, and aesthetic benefit to the City.

The overall site plan (shown in Appendix F) shows the project beginning at the headwaters of the Boneyard Creek at Neil Street. The Creek will meander through the area from Neil Street to Market Street. A pedestrian trail will follow along-side the Creek to provide safe access to nature through the area. The Boneyard Creek will then flow through Bristol Place into a detention basin that will offer flood control and nature lookout opportunities.

From the Bristol Basin, the Boneyard will be rerouted across the Canadian National Railroad and daylighted through Wesley Park instead of being piped beneath the Herff Jones facility. South of Wesley Park, the Oak Ash Basin will be redesigned as a permanently wet basin with park amenities surrounding it.

The Boneyard will drain from the Oak Ash basin under the Norfolk Southern Railroad into the Washington Street Basin. Drainage from the west will be routed away from the Washington Street viaduct into the Columbia Avenue Basin, which will drain into the Washington Street Basin. A small viaduct storage and pumping station east of the Washington Street underpass will alleviate flooding at the Washington Street viaduct. South of Washington Street, several sections of the Boneyard Creek will be daylighted and meander with the pedestrian trail to University Avenue. The project preliminary design does not preclude construction of a railroad overpass at Bradley Avenue, should one be constructed in the future. The project total cost, including design, property acquisition, construction, and project management is estimated as $24.3 million.
INTRODUCTION

1.1 Project Goals

Primary Goal
Improve Flood Protection – Provide protection to the City of Champaign from the 1% annual chance storm event (100 year) along the Boneyard Creek, from University Avenue (near Second Street) upstream to the diversion structure at Neil Street. Specifically, the 100 year flood will be contained within the creek and adjacent greenbelt. These sections of the Boneyard Creek were addressed by Phases 3, 4 and 5 of the “Lower Boneyard Creek Improvement Plan” report (CDM, 2001). The project has evaluated the work proposed in the “Lower Boneyard Creek Improvement Plan” and developed a concept reflecting recent City drainage project precedents to reduce water surface elevations, mitigate discharges, and improve the channel upstream of University Avenue. In addition, the viaduct at Washington Street will be improved to increase the level of flood protection to IDOT’s 50 year standard.

Secondary Goals
Create a Community Amenity – Provide open space, recreational, cultural and aesthetic benefits in addition to achieving functional stormwater protection requirements.

Support Economic Development – Increased stormwater protection combined with open space, recreational, cultural and aesthetic benefits are anticipated to spur neighborhood reinvestment and infill development.

Maintain and Improve Circulation – Reconfigure street pattern and alter traffic patterns necessary to avail the needed area/volume for stormwater protection area. Maintain necessary neighborhood vehicular circulation and property access. Provide pedestrian (and bicycle) corridor and access to green space.

An overall site plan of the conceptual improvements for the North Branch of the Boneyard Creek is included in Appendix F. Flood protection is provided for in the concept plan. The plans also create a community amenity in the area that will work to connect neighborhoods and support economic development.

1.2 Plan of Record

The existing Plan of Record for the project is the report, “Lower Boneyard Creek Improvement Plan” (Improvement Plan), by Camp Dresser and McKee, revised July 25, 2001 and formally adopted by the City of Champaign. Evaluating the Improvement Plan in light of recent City drainage project precedents was included in the scope of work for this project. This Program Development Report documents current concept design recommendations for the implementation of the Boneyard Creek channel and detention improvements.

The Program Development Report outlines how the Oak-Ash detention basin will have an enlarged storage volume and will be a permanently wet pond with a wetland fringe to provide wildlife habitat, bank stabilization, sediment removal, and filtration. Additional detention is proposed at three locations: the east end of Columbia Avenue, on the creek north of
Washington Street, and near Bradley Avenue west of the Canadian National railroad tracks. The North Reach of the Boneyard Creek is proposed to be day-lighted in two areas: north of university Avenue and in Wesley Park.

Meanders and connection to its floodplain are also high on the list of improvements for the channel reach. The 1%-annual chance storm event will be contained within the channel boundaries and adjacent greenbelt as a result of the channel improvements. Also, all bridges and culverts along the North Reach will be improved or replaced to allow for increased hydraulic capacity, safer sidewalk crossings, aesthetically-pleasing areas, and traffic safety.
2 STAKEHOLDER INPUT

Objective
Obtain and incorporate consensus concerns, interests and opinions of the neighborhood and the community.

Input from stakeholders is vitally important for project consensus and success. Reaching out to stakeholders to open lines of communication ensures that expectations are met, current issues are solved, and common definition of project success is developed. In order to gather feedback from interested parties, two Owner’s Project Requirements workshops were conducted in the project area: one for owners and neighborhood representatives, and one for City staff. Individual interviews were also conducted with property owners, business owners, and other interested parties.

2.1 Owner’s Project Requirements (OPR) Workshops

An OPR Workshop for owners and neighborhood representatives was held on Thursday, October 1, 2015, from 6-8:30pm (CST). Approximately 20 people were in attendance, half of whom were owners and neighborhood representatives, the other half being design professionals and workshop facilitators. The nominal group technique was used to gather information. The nominal group technique involves asking the group a question, allowing for silent brainstorming, then having participants contribute one response at a time, round-robin format, until all participants have provided all of their responses. Responses are then discussed one at a time. Participants are allowed to contribute to the discussion and add new responses in the discussion period.

Four questions were asked of participants. The questions and top five ranked questions are listed in Table 1. A complete report of the meeting is detailed in Appendix A.

Table 1. OPR Workshop results from owners and neighborhood representatives. Top five answers, as ranked by representatives, are shown.

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<tr>
<th>Question A.</th>
<th>What amenities, features and design improvements are important to neighborhood residents and businesses?</th>
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<tbody>
<tr>
<td>1</td>
<td>Flood reduction and Control</td>
</tr>
<tr>
<td>1</td>
<td>Clean and healthy stream</td>
</tr>
<tr>
<td>3</td>
<td>Attractive landscape design</td>
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<tr>
<td>3</td>
<td>Continuous walkway</td>
</tr>
<tr>
<td>5</td>
<td>Move flow out from under property</td>
</tr>
<tr>
<td>Question B.</td>
<td>How do you think this project may positively or negatively affect the use of your property?</td>
</tr>
<tr>
<td>1</td>
<td>Improve cleanliness and reduce flooding</td>
</tr>
<tr>
<td>2</td>
<td>Improve overall character of area</td>
</tr>
<tr>
<td>3</td>
<td>Enhance connectivity of property to city</td>
</tr>
<tr>
<td>4</td>
<td>Property owners could lose property</td>
</tr>
</tbody>
</table>
An OPR Workshop for City of Champaign staff was held on Friday, October 2, 2015, from 9-12pm (CST). Sixteen people were in attendance, seven of whom were city staff, the other half being design professionals and workshop facilitators. The nominal group technique was used to gather information and four questions were asked of participants. The questions and top five ranked questions are listed in Table 2. A complete report of the meeting is detailed in Appendix A.

Table 2. OPR Workshop results from city staff. Top five overall ranked answers are shown.
2 Promote redeveloping
3 Unintended use (criminal)
4 Increase visibility of neighborhoods
5 Increase property value (residential or business)

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<tr>
<th>Question C. What are problems to avoid based on your experiences with similar projects of this nature along Boneyard Creek?</th>
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<tbody>
<tr>
<td>1 Ambitious design = maintenance issues</td>
</tr>
<tr>
<td>2 Ensure adequate communication with residents</td>
</tr>
<tr>
<td>3 Integrate debris collection by stream (direct to specified location)</td>
</tr>
<tr>
<td>4 Activate entire area</td>
</tr>
<tr>
<td>5 Durable materials (avoid cutting budget)</td>
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<th>Question D. What questions can you imagine asking neighborhood residents and any businesses a year after this Boneyard Creek Improvement Project, and how do you hope that they will answer them?</th>
</tr>
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<tbody>
<tr>
<td>1 Has drainage improved? Hasn't flooded since project</td>
</tr>
<tr>
<td>2 Do you use facilities? Yes, all the time</td>
</tr>
<tr>
<td>3 Is your life better and how? Healthier and happier</td>
</tr>
<tr>
<td>4 Do you feel safe? Yes</td>
</tr>
<tr>
<td>5 Did project meet expectations? Absolutely!</td>
</tr>
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</table>

2.2 Individual Interviews

Invitations were extended to adjacent property, business owners and other interested parties in the community to give them the opportunity to meet individually with a small project team of City staff and the Consultant team members. The interviews were designed to discuss the project in general terms and to solicit stakeholder input. An Interview template was developed for items of discussion and the interviewee was invited to discuss any concerns and expectations associated with the project area. Interviews were conducted with five property owners. Additional coordination was conducted with the Champaign Park District planner, City staff from the Police Department, Planning and Neighborhood Services, and staff from the Champaign County Housing Authority.

2.3 Coordination with Existing Neighborhood Groups

City staff has met regularly with interested neighborhood groups during the concept development. Groups include the North First Street Business Association and the Fifth and Hill Neighborhood Rights Campaign. Coordination was also conducted with the Bristol Park Redevelopment Team and the Don Moyer Boys and Girls Club.
2.4 Summary & Themes
All the data received from the stakeholders including the individual interviews and OPR Workshops were reviewed by the consultant team to identify recurring themes in stakeholder feedback. Flood control and healthy stream were the highest ranking themes from stakeholders for this project. A summary of responses are above and the full reports from the OPR workshops, plus the interview template used for one-on-one meetings are included in Appendix A.
3 EXISTING SITE CONDITIONS

Objective
Understand current neighborhood environment to identify transitional elements necessary to accomplish the proposed improvements. Identify constraints that are not practical to change.

3.1 Background Information
Due to a history of flooding along the Boneyard Creek in Champaign-Urbana, a Boneyard Creek Task Force was created in 1993 to develop and recommend solutions to alleviate the flooding problems in Champaign. A document called the Boneyard Creek Improvement Plan (BCIP) was created by Camp Dresser & McKee (CDM) in 1999 and revised in 2001. The Improvement Plan outlines seven phases of work on the Boneyard Creek, of which Phases 3, 4 and 5 are addressed by the current project.

3.2 Watershed Description
The Boneyard Creek is a tributary of the Saline Branch located within the Cities of Champaign and Urbana with a drainage area of 7.45 square miles. Phases 3, 4 and 5 of the Improvement Plan target the upstream 2.14 square miles of the watershed, above University Avenue. The upper 0.84 square miles of the watershed is diverted by the Northwest Diversion Structure at Neil Street. The Boneyard Creek then begins flowing at Neil Street, across from Edgebrook Drive.

From Neil Street, the Creek runs south through Champaign until it reaches University Avenue (the downstream limit of this project). The West Branch of the Boneyard Creek watershed has a drainage area of 0.58 square miles and drains into the Boneyard Creek at the Oak Ash detention basin. South of the Oak Ash detention basin, Washington Street is currently subject to frequent flooding. The Washington Street viaduct is drained by a 24-inch diameter storm sewer with a pump station to pump runoff into the Boneyard Creek. The project location is shown in Figure 1, where the northern drainage area west of Neil is 0.84 mi², the western drainage area is 0.58 mi², and the total drainage area is 2.14 mi².
Figure 1. Project location map showing drainage areas to Boneyard Creek North Branch.
3.3 Topography
A field topographic survey was conducted throughout the project area in July 2015 through January 2016. The survey includes channel thalweg, banks, slope, and cross-sections, as well as overland ground shots in the floodplain and surrounding project area. Existing topographical features, such as trees, curbs, top of roadways, culverts, bridges, manhole covers, and inlets were also surveyed. See Appendix B for plats showing the topography in the project area.

3.4 Utilities
Utility companies were contacted for utility information in the project area. In addition, a utility coordination meeting was held on March 1, 2016 with representatives from the involved utility companies to ascertain the location of utilities in the area and to outline the relocation needs of the utility representatives. Representatives from the following were present: Ameren, Comcast, Illinois American Water Company, Urbana Champaign Sanitary District, and City of Champaign Planning.

Possible conflicts that were identified during the meeting include a gas regulator station at the corner of 3rd Street and Hill Street (Ameren), a high pressure gas line along 3rd Street (Ameren), an underground electric project at the Southeast corner of Columbia Avenue and Walnut Street (Ameren), and an interceptor through the Oak Ash and Washington Street Basins (Urbana-Champaign Sanitary District). As the project progresses, coordination with all utility companies will be performed to ensure service to the project area during construction and upon project completion. Please refer to Section 16 for an in-depth discussion of utility relocation requirements.

3.5 Environmental Site Assessment
The approach to Phase I Environmental Site Assessments (ESAs) will be a two-fold process. First, the purchased commercial properties by the City of Champaign will be assessed for potential or existing environmental contaminants. The commercial properties preliminarily targeted for purchase and subsequent ESAs include: 206 E. University Avenue, 524 N. Market Street, and the property southeast of the intersection of the two railroads. A limited Phase I ESA will be conducted on these three properties to identify potential environmental concerns in the area.

Specifically, the environmental assessor will be looking for hazardous and non-hazardous wastes regulated under the Resource Conservation and Recovery Act (RCRA), petroleum contaminated soils, and underground petroleum storage tanks. The Phase I ESA will not cover the environmental concerns associated with the demolition of structures, namely the presence of lead-based paints and asbestos. A separate asbestos assessment will be conducted by the City of Champaign for properties purchased with structures.

Should any Phase I ESA reveal evidence of environmental contamination, a Phase II assessment will conducted. Phase II assessment may include sampling and soil boring if needed to define the contamination type and extent.
The second part of the ESA process will occur during the construction phase. During the performance of construction related activities, the Contractor may encounter previously unidentified abandoned underground storage tanks and/or contaminated soil and groundwater resulting from the on-site or off-site release of potentially regulated substances. Potentially regulated substances include, but are not limited to, media contaminated by old petroleum products, underground storage tanks, and channel sediments contaminated by used motor oil.

If suspect material is detected prior to or during construction, the material will be identified, categorized, and managed accordingly. If the material is a non-hazardous waste, it will be disposed of as a non-hazardous special waste in accordance with Federal, State, and local regulatory requirements and regulations.

3.6 Wetland Delineation
Wetlands were identified in the project area. A full wetland delineation report is being prepared by Applied Ecological Services and will be available for review by January 2017. Appendix C shows a draft map of the existing wetlands in the study area.
4 STORMWATER DETENTION AND CONVEYANCE REQUIREMENTS

Objective

Provide protection to the City of Champaign from the 1% annual chance storm event (100 year) along the Boneyard Creek, specifically from University Avenue (near Second Street) upstream to the diversion structure at Neil Street. The project will reduce water surface elevations, mitigate discharges, and improve the channel upstream of University Avenue. In addition, the viaduct at Washington Street will be investigated to improve the level of flood protection.

Using this information, determine the impacts to the project area for the target level of protection.

The “Lower Boneyard Creek Improvement Plan” (2001) determined that the Boneyard Creek should contain the 1%-annual chance storm event within its channel banks and adjacent greenbelt, thereby protecting the City of Champaign from excessive flooding. This goal will be achieved without increasing water surface elevations in the City of Urbana. In order to meet the specified goals of the project, the hydrology and hydraulics of the proposed project were modeled and compared to the existing conditions model. The U.S. Environmental Protection Agency’s (EPA’s) Stormwater Management Model (SWMM) was used for the hydrologic and hydraulic modeling.

4.1 Model Development

4.1.1 Hydrology

A combined hydrologic and hydraulic model for the Boneyard Creek was developed in EPA SWMM in 1999 as part of the Lower Boneyard Creek Improvement Plan. The SWMM model has undergone several iterations since 1999, as detailed in Section 4.1.2. The existing and proposed models use the Illinois State Water Survey (ISWS) Bulletin 70 rainfall for the 1%-annual chance storm event with an areal reduction factor. An areal reduction factor (ARF) takes into consideration the spatial variability over a watershed. The Bulletin 70 rainfalls and the adjusted rainfalls for the ARF are shown in Table 3.

The 1st quartile Huff distribution input as an intensity (in/hr) was used in both models. The 1st quartile storm distribution is used for storm durations of six hours or less. A critical duration analysis of the storm durations from 1-hour to 12-hours concluded that the 2-hour storm event produces the highest peak flows in the system. The 100 year, 2-hour storm is used in the existing and proposed models.
Table 3. Comparison of Bulletin 70 Rainfall Data at a Point and within an Area for the 1% annual chance event.

<table>
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<tr>
<th>Storm Duration</th>
<th>ISWS Bulletin 70</th>
<th>Bulletin 70 with ARF*</th>
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<tbody>
<tr>
<td>1-hour</td>
<td>3.11</td>
<td>2.86</td>
</tr>
<tr>
<td>2-hour</td>
<td>3.90</td>
<td>3.71</td>
</tr>
<tr>
<td>3-hour</td>
<td>4.23</td>
<td>4.06</td>
</tr>
<tr>
<td>6-hour</td>
<td>4.96</td>
<td>4.81</td>
</tr>
<tr>
<td>12-hour</td>
<td>5.75</td>
<td>5.64</td>
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*ARF = Areal reduction factor.

4.1.2. Hydraulics

Original SWMM4 Model

A hydraulic model of the Boneyard Creek was first developed in 1999 as part of the Lower Boneyard Creek Improvement Plan. This model was developed using SWMM Version 4. The SWMM4 model included all reaches of the Lower Boneyard Creek from the Northwest Diversion Structure at Neil Street to the confluence of Boneyard Creek and Saline Branch, including:

- Urbana Reach
- University Reach
- Campustown Reach
- Southwest Reach
- 2nd Street Reach
- North Reach
- West Fork

The SWMM4 model for the Boneyard Creek was updated in 2001 to represent the Phase 1 improvements as described in the Executive Summary of the Lower Boneyard Creek Improvement Plan. The Phase 1 improvements include:

- University Reach Channel Improvements
- Campustown Inline Storage and Channel Improvements
- Healey Street Detention Basin

Original SWMM5 Model

Starting in 2004, the Boneyard Creek SWMM4 model was used for a Boneyard Creek floodplain analysis by the USGS to provide the basis for new FEMA floodplain maps adopted in 2013. The original SWMM4 model was converted to the new SWMM Version 5 (SWMM5) format. Unlike the DOS based SWMM4, SWMM5 is a Windows based program that has many new features for data editing and presentation of model results. During the model conversion process, the following changes were made to the hydraulic model:
Overland Flow - In the SWMM 4 model, overland flow was routed separately in the Runoff Block of the model. SWMM Version 5 does not have a separate Runoff Block as in SWMM Version 4, so overland flow is routed together with other hydraulic components in the model.

Outlet Conditions – For the 100-year design storm in the SWMM 5 model, the downstream water elevation at Saline Branch was set to match the elevation used in the IDNR HEC-2 model of the Boneyard Creek, which was based on a 10-year flood in the Saline Branch. In the original SWMM4 model, free discharge condition was assumed. Preliminary analyses show that the change of the outlet conditions has insignificant impact on the portion of Boneyard Creek upstream of Wright Street.

Existing Conditions SWMM5 Model

Beginning in 2005, the model was used to perform the hydrologic and hydraulic modeling for Phase 2 of the Boneyard Improvement Project, which included the Second Street basin and corresponding channel improvements. The original SWMM5 model was used as a base, and information concerning the new detention area at Second Street and redesigned channel geometry was updated in the model.

Proposed Conditions SWMM5 Model

The proposed conditions SWMM5 Model was completed for the current project. The existing conditions model was modified to reflect the conceptual design, including new culvert crossings, daylighting portions of the creek, an enlarged and reconfigured Oak-Ash basin, new basins at the Bristol development, Columbia Avenue, and North of Washington Street, and a new drainage configuration for the Washington Street viaduct. Dynamic flow routing was used to route flow between all nodes. Dynamic flow routing solves the one-dimensional Saint Venant flow equations and can accurately characterize pressurized flow in a pipe, overtopping of nodes, channel storage, backwater, flow reversal, and losses associated with entrances and exits.

4.2 Results

The hydrologic and hydraulic analyses for the Boneyard Creek were performed for the following two conditions using the current SWMM5 model:

1. Existing Conditions
2. Proposed Conditions

4.2.1. Existing Condition

The existing condition analysis includes Phases 1 and 2 improvements of the Boneyard Creek, as proposed in the “Lower Boneyard Creek Improvement Plan” (2001) and modified by final project design. Phase 1 improvements included University Street reach channel improvements,
Campustown inline storage and channel improvements and the Healey Street detention basin. The Phase 2 improvements included the Second Street Basin and corresponding channel improvements. The maximum water surface elevation for the 100-year storm is shown on Figure 2. In general, the maximum water surface elevations for the 100-year storm are lower than the street level in the Campustown reach.

Figure 2. FEMA effective 100-year water surface elevations in the North Branch of the Boneyard Creek with updated 100-year floodplain elevations for Phase 2 improvements shown with the thick black line.
4.2.2. Proposed Condition

The proposed condition analysis includes proposed improvements roughly corresponding to Phases 3, 4 and 5 improvements proposed in the “Lower Boneyard Creek Improvement Plan” (2001). The key features of the proposed condition improvements are listed in Table 4.

Table 4. Summary of Proposed Improvements

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Location</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Detention Basins</td>
<td>Columbia Avenue Basin</td>
<td>9 acre-feet of storage</td>
</tr>
<tr>
<td></td>
<td>North of Washington Street Basin</td>
<td>12 acre-feet of storage</td>
</tr>
<tr>
<td></td>
<td>Bristol Area Basin</td>
<td>8 acre-feet of storage</td>
</tr>
<tr>
<td>Enlarge Existing Basin</td>
<td>Oak Ash Basin</td>
<td>56 acre-feet of storage</td>
</tr>
<tr>
<td>Daylight Stream</td>
<td>North of University Avenue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Through Wesley Park</td>
<td></td>
</tr>
<tr>
<td>Enlarge Culverts</td>
<td>East of Columbia Avenue</td>
<td>replacing existing culvert</td>
</tr>
<tr>
<td></td>
<td>South of Bradley Avenue</td>
<td>new culvert</td>
</tr>
<tr>
<td>Improvement to Pump Station</td>
<td>Washington Street Viaduct</td>
<td>storage for 1 acre-foot</td>
</tr>
</tbody>
</table>

In general, the maximum water elevations for the 100-year storm will be contained within the stream corridor with a minimum of one foot of freeboard. The stream corridor is comprised of the low-flow channel and adjacent floodplain, or bankfull bench. The low-flow channel will convey the usual flow through the watershed, as well as storm events up to the 2-year storm event (or bankfull event). For events greater than the bankfull event, flow will utilize the flat bankfull bench (shown as riparian planting in Figure 3). The stream corridor encompasses the low flow channel, bankfull bench, and sloped side until the grade matches the flat adjacent land (denoted as dry planting in Figure 3).

Figure 3. Sketch of the proposed Boneyard Creek stream corridor cross-section.

The proposed SWMM5 model assumes the proposed North Branch of Boneyard Creek will have much more storage for floodwaters than the existing condition. Improvements to the stream corridor and additional detention areas provide the necessary stormwater storage.
5 DESIGN ELEMENTS

Objective
Based on the stakeholder input, existing conditions analysis, stormwater management and engineering considerations, and other contributing factors, determine the program requirements and design elements to include in the overall project schematic design.

5.1 Project Themes
Various themes for the project appeared numerous times in discussions with the City staff and stakeholders. As a result of these discussions, the design team has developed the following list of elements as a guide in developing schematic design options.

5.1.1. Pedestrian Friendly
Encourage a pedestrian friendly environment. The project should ensure walking connectivity with other areas of the City of Champaign as well as continuous walkways within the project corridor. The area should be family-friendly, safe, and comfortable to visit and explore. The walking path should offer interest to the pedestrian with meandering trails, benches, and overlooks. Cross-walks, lighting, clear sight lines, and traffic calming devices should reinforce the safety of users.

5.1.2. Natural
Create a naturalistic environment. The project should feature a clean and healthy stream acting as a natural area corridor within the City. The project should be functional and provide habitat for birds, butterflies, and other urban wildlife. The stream reconstruction shall utilize stream geomorphic best knowledge to maximize stream structural stability.

5.1.3. Amenity
Produce an amenity for the community. This project presents a unique opportunity to create a significant public amenity within an urban infill project. The new improvements should incorporate an attractive landscape design, gathering areas for residents, and provide a pleasant aesthetic environment with social and cultural opportunities to enhance quality of life for the neighborhood and the community.

5.1.4. Sustainable
Develop sustainable design solutions. Design solutions and materials used in the project should be sustainable in the sense that they should not require continuous monitoring, maintenance, or replacement to function properly. Native plantings should be used to maximize stability and minimize long term maintenance. Garbage and geese maintenance should be addressed. Understanding the maintenance requirements of the proposed improvements is important to the long term success of this project. Balancing the amount of required maintenance with the anticipated benefit of the improvement will be important as the design progresses.
5.2 Hydrologic Sustainability

The goal of the project is to provide increased stormwater protection to the area. It is also a key component of the project to create an amenity for the community. The design of the hydrologic system will need to balance between various engineering solutions and the requirements to sustain the desired amenities. A clear understanding of the hydrology during normal conditions, anticipated storm events, and the transition period will be critical in developing a sustainable environment. The following elements and criteria will be considered in the hydrologic design of the system.

5.2.1. Planting Constraints

The hydrology will dictate the types of plantings that are possible. If it is expected that an area will be frequently inundated, or inundated for an extended period of time, certain types of plantings will be possible. Similarly, if an area is expected to be dry under normal conditions, different plantings must be selected. Plantings will be determined in order to create a sustainable environment as possible.

5.2.2. Open Natural Water Body

An open natural water body was mentioned by a number of stakeholders as a desirable amenity to include in the project. Engineering requirements in order to create a hydrological system to sustain an open water body will be explored during the schematic design phase. Factors to be considered include the volume of water available with or without the use of pumping systems, the expected variation between normal and high water elevations including shoreline stabilization, and water quality. All of these factors will have an impact on the design and feasibility of creating an open water body.

5.3 Safety

Safety in the area is a major concern of the stakeholders and City staff. To ensure a safe area, the design team will be creating well-lit pathways, open sight lines for police patrol, and creating inviting areas to activate spaces in order to reduce crime. In addition to crime-related safety, open water bodies will be designed with safety in mind. Flat benches just below the normal water depth of detention areas will be constructed to prevent water-related accidents.

5.4 Ecological Habitat Considerations

Habitat for certain types of wildlife will be provided since the project will be taking a highly urbanized area and creating a significant amount of open space. New improvement designs will enhance ecological habitats and encourage wildlife to achieve an ecological balance.

The purpose of the proposed Boneyard Creek Improvement Project is primarily for flooding protection. Detention storage will be provided with hydraulically designed and constructed detention storage and wetland storage areas. No reduction in available habitat is planned as part of this project, only modifications and improvements to existing drainage features.

As part of this project, ecological habitat improvements are planned in the form of creating more natural channel conditions, which may include meandering sections configured in a run, riffle, pool morphology with pools formed at the outside edge of each meander. Planned channel modifications will create dispersed habitat areas for aquatic ecology. Planned
improvements will provide for a more stable, natural condition more supportive of ecological habitat than the existing condition. Additional habitat enhancement for this project is through the creation of a partial wetland area that will provide select vegetation and habitat space for a broader range of ecology. Necessary maintenance efforts will be considered during vegetation selection.

Boneyard Creek lies within the Vermilion Watershed and is identified within the Illinois Environmental Protection Agency’s 303(d) list of impaired water bodies as ID: ILBPJC06, Segment BPJCA. According to the most current 303(d) list (2002), the Creek does not fully support N1: Overall Use and N20: Aquatic Life beneficial uses. The causes listed for these impairments include nutrients (nitrates and total ammonia) and organic enrichment resulting in low dissolved oxygen levels. The sources for these impairments include non-point urban runoff and hydrologic / habitat modification.

By design, the project is intended to improve channel capacity and enhance stormwater detention, and may also provide limited water quality improvement via detention settling and wetland treatment of flows from the tributary drainage area. No increase in nutrient or organic loading is expected from the project’s detention improvements. Use of the intended improvement site, beyond water quantity control facilities and features, will be pedestrian in nature. Park-like features such as paved walkways, park benches, and grassed and planted areas will be constructed throughout the project site. No commercial, industrial, or residential uses will occur, therefore the introduction of constituents which may adversely affect downstream water quality is expected to be insignificant. No point source discharges will result, nor planned exterior features or storage of materials that may adversely affect the quality of stormwater runoff from the site. Site areas not used for stormwater detention features will be stabilized and vegetated as quickly as possible, with certain areas graded to direct project site runoff into the constructed detention facilities. Limited impervious surfaces are proposed and net gains in overall water volume, water quality, and habitat should result.

5.5 Educational Opportunities
Educational opportunities such as interpretive signage about the history, hydrology and wildlife of the area will be incorporated into the design of the project. The project area will create a teaching environment for residents and park users. Nature observation decks and outlooks will be incorporated into the design to provide opportunities for learning and experiencing nature.
6 TRAFFIC PATTERNS AND ALLEY CLOSURES

Objective
Consider street and alley temporary and permanent closures to maintain or improve functional local traffic patterns.

6.1 Street Continuance – Closure Alternates
The project area does not have any one-way roads and is not in a highly urban or highly trafficked area. The project does require culvert and bridge replacements underneath roadway intersections; construction closures will be necessary but minimized to the extent possible.

6.2 Alley Continuance-Closure Alternates
There are three alleys at the south end of the project area. The Boneyard Creek crosses each of these alleys. Recommendations for each alley are outlined below and illustrated in Figure 4.

6.2.1. Hill-Church Mid-block
It is recommended that the alley in between Hill Street and Church Street, connecting First and Second Streets be removed. One house east of First Street has an unpaved vehicle access to the backyard that is inaccessible from their driveway. Thus the alley removal would start east of this house to allow access to this yard, and removal would continue across the Boneyard Creek to Second Street.

6.2.2. Church-Park Mid-block
It is recommended that the alley in between Church Street and Park Street, connecting Second Street with Third Street be removed on the western portion of the alley. By closing the western portion of the alley, the Boneyard Creek is daylighted and no culvert is necessary. On the east side of the alley, a gravel parking lot, alley parking on brick pavers, and an unpaved vehicle access to a backyard (which is also accessible from the driveway) will remain open and accessible.

6.2.3. Park-University Mid-block
It is recommended that the alley between Park Street and University Avenue connecting Second Street and Third Street will remain open. The Carle Arrow Ambulance Service uses the alley on a regular basis, a gravel parking lot is located off of the alley and entrances to two parking lots are accessed from the alley. This alley will be closed during construction, but will re-opened for use after construction.
Figure 4. Map of alley closures and continuance.
7 PUBLIC SAFETY
An interview with Lieutenant Tod Myers of the Champaign Police Department was conducted to identify any possible safety concerns with the conceptual design of the North Reach Boneyard Creek. Overall, Lt Myers liked the project. He raised a few concerns to be considered for maximum safety in the design.

1. Lines of sight along pathways and to pavilions
Lines of sight should be maintained along pathways and to pavilions for patrolling officers to clearly see areas people utilize. Consideration should be given to ensure that an officer in a car will be able to look down a path to the next street in order to safely patrol an area. Pavilions should also be visible from a patrolling car on nearby roadways. For example, the Oak-Ash pavilion should be visible from Holts Drive and/or the adjacent parking lot. Turn-arounds in parking lots are convenient for patrolling officers. Also, landscaping should avoid bushes where people can hide.

2. Security access
Security access will not be a problem with the current conceptual design. Police cars can drive down the paths if necessary. Safety will also be increased by reducing traffic and on-street parking on Holt Drive with the addition of a parking area and turn-around near Oak-Ash.

3. Alley closure
No concerns were raised pertaining to the proposed alley closures associated with the project.

4. Path to Neil Street
From a safety standpoint, the preferred option for the pathway to Neil Street is to run the path next to Howard Street instead of meandering through city lots and down Hickory Street.

5. Detention basin perimeters
Concerns were raised pertaining to the detention basins in residential areas with children of all ages. Safety ledges in the ponds may be designed to provide protection against drowning should a person fall into a basin. Safety ledges are three to six foot wide flat ledges designed to be situated slightly under the base level water elevation of a basin.
8 PARKING ANALYSIS

Objective
Summarize existing parking to evaluate new configuration options. New parking options should provide equivalent or increased parking at strategic and practical locations.

8.1 Existing Conditions
The project area is primarily single family residential development with some commercial/industrial development. Parking is currently not a problem in the area, nor is it expected to be upon completion of the improvements. No existing parking will be eliminated as a result of this project.

8.2 Proposed Project Parking
Several locations in the project area provide the possibility of additional parking. The proposed parking locations include off-street and on-street parking for the trail, Boneyard Creek, and commercial access. Trailhead parking near Wesley Park is discussed below. Bristol area parking configurations and Oak Ash Basin parking are discussed later in the report in Sections 13 and 15, respectively.

8.2.1. Trailhead Parking near Wesley Park
A small off-road trailhead parking lot near Wesley Park is proposed, providing visitors with 20 parking spots. The improvement plan would also feature a turn-around at the west end of the road. Visitors parking in the Wesley Park parking would be able to access Wesley Park or the trail system that will run the length of the North Reach Boneyard Creek Improvement Project. Parking near Wesley Park is approximately in the middle of project area.

![Figure 5. Proposed trailhead parking near Wesley Park.](image)
9  PROJECT PEDESTRIAN ROUTING  

Objective  
*Provide pedestrian (and bicycle) linkage through Champaign. Identify the desirable alignments throughout the project area and linkages to the surrounding neighborhood.*

The City of Champaign together with the Champaign Park District have created a recreational Trails Plan as a cohesive planning effort to develop a network of trails throughout the City of Champaign. Trails promote healthier lifestyles, provide recreational opportunities, and link neighborhoods and communities. The project will incorporate a trail system throughout its length to connect neighborhoods, allow residents access to nature, and to provide foot transport through the City.

9.1 University Avenue at 2nd Street  
Currently, the Boneyard Creek is contained within a culvert underneath the Carle Arrow Ambulance building and adjacent empty lot to the west on University Avenue between Second and Third Streets. Several options have been considered to improve this particular section of the Boneyard Creek. The first option (Figure 6) daylights the Creek north of University Avenue next to the Carle Arrow Ambulance building. This option would involve purchasing the lot adjacent to the Carle Arrow Ambulance building for the channel and trail footprints. The pedestrian trail would originate at the Second Street Basin, cross University at a new high visibility crosswalk, meander past the daylighted creek, cross the alley, then continue along the straightened channel next to the Boys and Girls Club. This option has several advantages, including the many benefits of daylighting the stream for wildlife habitat, flood storage, and human connectivity to nature. This option requires only one lot to be purchased by the City of Champaign. The lot is a mid-block lot, which should have a reasonable value associated with it. The trail system hugs the open Creek, which provides a large aesthetic advantage in this plan.
Figure 6. Option 1* for University Avenue at 2nd Street involving an Open Stream on 206 E. University
The second option (Figure 7) is similar to the first in that the Boneyard Creek would be daylighted north of University Avenue. However, this option would involve purchasing the Carle Arrow Ambulance property in order to use that land for the creek and trail footprint. As in Option 1, the pedestrian trail would cross University Avenue, meander along the daylighted creek, cross the alley and parallel the straightened channel along the Boys and Girls Club.

Figure 7. Option 2 for University Avenue at 2nd Street involving an Open Stream on the Carle Arrow Ambulance Site.
Option 3 (Figure 8) refrains from purchasing any properties between University Avenue and the alley and keeps the Boneyard Creek piped for that stretch of stream. After crossing the alley, the stream would be daylighted through the land currently used as the Boys and Girls Club’s parking lot. The pedestrian trail would follow North 2nd Street until meeting up with the Boneyard Creek after crossing Park Street.

Figure 8. Option 3 for University at 2nd Street involving an Open Stream at the Boys and Girls Club.
Option 4 (Figure 9) utilizes all three of the lots next to the Carle Arrow Ambulance building to daylight and meander the Boneyard Creek north of University Avenue. The Creek would cross the alley and follow a straightened channel to Park Street. The pedestrian route would cross University Avenue at the N. 2nd Street stoplight, meander alongside the daylighted Creek, cross the alley, then follow the straightened channel to Park Street.

Figure 9. Option 4 for University Avenue at 2nd Street involving the full potential for the Boneyard Creek.
Option 5 (Figure 10) keeps the Boneyard Creek piped until north of Park Street, though the pedestrian trail crosses University Avenue mid-block and travels next to the Carle Arrow Ambulance building, across the alley and in-between parking lots next to the Boys and Girls Club. The trail would have a park-like atmosphere.
9.2 Washington Street to Bradley Avenue

9.2.1. Routing Options
For the pedestrian route from Washington Street to Bradley Avenue, Option 1 (Figure 11) incorporates a new pedestrian crossing at the Norfolk Southern Railroad to maintain proximity to the Boneyard Creek and proposed amenities. The trail then follows the proposed stream alignment, taking advantage of the improvements in the area. When the Boneyard Creek is piped south of Bradley Avenue to cross the Canadian National railroad, the trail would continue on the east side of the railroad tracks before following Bradley Avenue and eventually crossing the street.

One of the challenges with Option 1, as well as with several other of the pedestrian routing options from Washington Street to Bradley Avenue, is the proposed at-grade pedestrian crossing of the Norfolk Southern Railroad. Communications with a Public Improvements Engineer at Norfolk Southern Railroad indicated that, for safety reasons, new at-grade railroad crossings are discouraged and a minimum of one existing railroad crossing would need to be closed in order for the proposed crossing to be considered. With help from a Railroad Safety Specialist at the Illinois Commerce Commission, the proposed at-grade crossing issue has been further pursued with Norfolk Southern and is currently being circulated within the Norfolk Southern office for review and discussion. The railroad in question is a very low volume track (two trains per 24 hours) and has a one-way low-speed (OWLS) diamond crossing with the Canadian National Railway 430 feet west of the proposed pedestrian at-grade trail crossing, causing Norfolk Southern trains to observe a maximum timetable speed of 10 miles per hour. These two conditions strengthen the case for consideration of a new at-grade pedestrian crossing.
Figure 11. Option 1 for Washington to Bradley involving a meandering trail system near the Boneyard Creek.

Option 2 (Figure 12) involves routing pedestrians to Phillips Drive to cross the Railroad tracks so to avoid an additional railway crossing. This arrangement has disadvantages, namely taking foot traffic significantly out of the way, away from the Boneyard Creek and the proposed amenities. Also there is the risk that people will disregard the trail diversion and unsafely cross the railroad anywhere along the tracks. Farther north along the path, south of Bradley Avenue, an easement would have to be obtained from the Champaign County Housing Authority for the City to construct and maintain the trail.
Figure 12. Option 2 of Washington to Bradley involving a new culvert and northern connection.
Option 3 (Figure 13) does create a new railroad crossing and follows the stream until the Boneyard Creek would remain in existing culverts under the Canadian National railroad and underneath the Herff Jones building. The pedestrian trail would continue along the east side of the railroad tracks, away from the Creek in this section. The same challenges of property use permission south of Bradley Avenue exist for this option.

Figure 13. Option 3 of Washington to Bradley involving the existing Creek route with a pedestrian trail to Bradley Avenue.
Option 4 (Figure 14) displays the Boneyard Creek daylighted on the east side of the railroad tracks, but the pedestrian train would run along North Market Street on the west side of the railroad tracks. The high volume of traffic on North Market Street and the disconnect between the trail and Creek are two disadvantages of this option.
Option 5 (Figure 15) uses the Phillips Drive railroad crossing north of Washington Street. It also shows the Boneyard Creek crossing the Canadian National Railroad and running along the west side of the tracks. The pedestrian trailway would go through a tunnel under the railroad tracks and parallel the Boneyard Creek. The problems with this arrangement include building a large portion of the project in the railroad’s right-of-way, impacting the Herff Jones parking lot, and providing sight lines and drainage in a pedestrian tunnel.

Figure 15. Option 5 of Washington to Bradley involving a trail tunnel under the railroad.
Option 6 (Figure 16) incorporates a new crossing of the Norfolk Southern Railroad to keep the pedestrian traffic close to the Boneyard Creek. The trail continues to follow the Creek until south of Bradley Avenue where the stream would be piped below the railroad and the trailway would continue north to Bradley before crossing.

Figure 16. Option 6 of Washington to Bradley involving a new culvert and northern connection.
9.3 Boneyard at Neil Street

Currently, no trail system exists from Neil Street along Howard Street to the Boneyard Creek. Howard Street has a small section of sidewalk along it, but there is no connectivity from Neil Street to either Howard Street or the Boneyard Creek.

In the proposed plan, four alternates are investigated for a trail alignment to connect Neil Street to the Boneyard Creek. The proposed section will meet up with a future trail, shown on the Champaign Trails Plan, that will travel west from Neil Street on Edgebrook Drive.

The first alternate shows a trail alignment along Howard Street (Figure 17). The trail cuts directly from Neil Street, next to the Boneyard Creek Diversion structure, along Howard Street to a newly graded park area and the Boneyard Creek.

![Figure 17. Option 1 for Boneyard at Neil Street.](image)

The second option shows a trail alignment behind Howard Street (Figure 18). The trail cuts from Neil Street to Hickory Street, where it jogs south then east again behind the houses along Howard Street. The land the trail would utilize in this alignment is currently owned by the City of Champaign. The trail meets up with the Boneyard Creek sooner than in the first alternate and follows the channel to the newly graded park area and downstream.
Option 3 utilizes the existing pedestrian crossing of Neil Street north of Edgebrook Drive at Kenyon Road (Figure 19). The trail would be routed along existing sidewalks on Kenyon Road, then turn south to intersect Hickory Street and follow Hickory Street south till it meets with the Boneyard Creek.

Option 4 is similar to Option 3 in that it uses the existing Neil Street crossing (Figure 20) and follows the Kenyon Road sidewalk to Hickory Street extended. At Hickory Street, the trail would then cut to the east one block on Leichner Drive before turning south along open land and meeting up with the Boneyard Creek and adjacent land improvements.
Figure 20. Option 4 for the Boneyard at Neil Street, which utilizes an existing cross-walk across Neil St. and parallels more open space.
10 STRUCTURAL CONSIDERATIONS

Objective
Determine the most cost effective structural considerations in order to accommodate the anticipated stormwater protection area needed. Include aesthetic considerations in the evaluation.

10.1 Precondition Survey

10.1.1. Type of Survey
The precondition survey consisted of a visual, but cursory, inspection of all the structures that will be impacted by the subject project. The structures inspected were culverts, bridges, head walls and end walls. The inspection of existing pipes, utilities and conduits were excluded from any such inspections.

The precondition survey included any and all deficiencies to each component of a structure. All deficiencies were photographed and mapped on sketches of the structure. The intent of the precondition survey is to inform all parties of the structure’s existing condition prior to any disturbance from the project’s construction activities.

10.1.2. Conducted Survey
A precondition survey has been conducted of the existing structures within the proposed project area by Lin Engineering, Ltd. The survey was conducted on December 9 – 15, 2015. Pictures, sketches, and key dimensions were measured and recorded.

10.2 Existing Structure Condition Report
A Structure Condition Report was developed by Lin Engineering, Ltd. The full report is located in Appendix E. A total of 28 structures were inspected and reported upon by Lin Engineering, Ltd. Of the 28 structures, eight were noted to have structural concerns.

10.3 Proposed New Structures
Several new structures will be constructed as part of the project. Daylighting large sections of the Creek, lowering the flowline, and realigning and reintroducing meanders to the creek necessitate new culvert crossings, resized culverts and new pedestrian crossings. For the project, eight structures will be new structures at the same location as a removed structure and nine structures will be new at a new location. All eight of the structures with concerns will be replaced or removed.

The preferred structure when replacing culverts and bridges is to install a bridge over the Boneyard Creek. The open bottom of a bridge structure allows a natural stream channel to develop, including a proper stratification of substrate for fish and invertebrate habitat and natural formation of in-stream sedimentation. Concrete-lined culverts, conversely, can fragment a stream, particularly if the culvert becomes perched above the level of the stream. In locations where a bridge may be cost prohibitive for this project, an oversized culvert may be
used and buried 1.5 – 2 feet below grade. Burying part of the culvert allows the natural stream substrate to line the bottom of the stream and adjust to the natural stream gradient. The stream crossing at the Canadian National Railroad, for instance, is sized to be a 48” RCP culvert. For structural purposes, a round culvert must be used at this crossing, replaced via bore and jack. A 48” RCP pipe may be used in this instance, though the pipe will impact fish migration to area upstream. Alternately, a larger pipe may be used, at a greater cost, then partially buried to provide for water and fish passage, creating a healthier, more species-diverse stream system.
LAND USE
The Boneyard Creek watershed is 100% developed. The area consists primarily of single family residential development (52%). High density residential development comprises 10% of the watershed and commercial/industrial development is 31% of the watershed. Parks and open space makes up 7% of the watershed.
12  VIADUCT DRAINAGE

Objective
Understand the existing viaduct drainage issues and identify opportunities for improvement made possible by this phase of the Boneyard Creek Improvement Plan. Include aesthetic and circulation considerations in the evaluation.

12.1  Existing Conditions
The Canadian National Railroad crosses Washington Street in Champaign via an overpass. Washington Street is very low underneath the railroad tracks and is susceptible to frequent flooding. The Washington Street viaduct drains to a 24” diameter storm sewer and pump station to take runoff from the west side of the railroad tracks to the Boneyard Creek on the east side of the tracks. Flooding occurs frequently in this area, partially due to out of bank flooding from the Boneyard Creek recirculating into the viaduct and from flooding of the viaduct pump outlet during large events which prevents the viaduct from dewatering.

12.2  Proposed Plans
In order to prevent flooding on Washington Street, most of the runoff currently reaching the Washington Street viaduct will be routed north of Washington Street to the Columbia Street basin area, then east into the Boneyard Creek via the existing storm sewer. The remainder volume of runoff that will still reach the viaduct, equating one acre-foot, will be stored underground in the open area east of N. 1st Street, south of Washington Street. The stored volume of water will be pumped into the Boneyard Creek.

An analysis in EPA SWMM5 was performed to determine how large a drainage area should be routed to the Columbia Street Basin and how much runoff should be routed through the viaduct. For each drainage area routed through the viaduct (1.5 acres – 48.9 acres), the peak...
runoff, storage area, pump capacity needed, and peak pump discharge were determined. A summary of the analysis is shown in Table 5. The purpose of the Washington Street Viaduct storage is to prevent flooding on Washington Street by storing runoff in an underground storage facility. The underground facility will be located on the southeast corner of Washington Street and First Street. Water will be pumped into the Boneyard Creek from the storage facility. A pumping station is necessary since the grades in the area prevent water from gravity-draining into the Boneyard Creek.

<table>
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<th>Drainage Area (ac)</th>
<th>Peak Runoff (cfs)</th>
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</table>

The most feasible design is to divert all runoff to the Columbia Street Basin except for runoff from 1.5 acres. The underground storage area can store the entire volume of runoff from the 1.5 acres if the pump should happen to fail. The remaining runoff from the 47.4 acres from the west side of the watershed is proposed to be diverted to the Columbia Street Basin and piped underneath the Canadian National Railroad to the Boneyard Creek, north of Washington Street.
13  BRISTOL PLACE DESIGN PARAMETERS

Objective
Clearly define the viable design recommendations to explore for Bristol Place based on the criteria included in the program development.

13.1  Existing Use
The existing Boneyard Creek is small, channelized, and mowed through the Bristol Park area. The neighborhood directly to the Creek’s east is one of the lowest-valued neighborhoods with one of the highest crime rates in the City of Champaign. One storefront sits at the Northeast corner of Bradley Avenue and North Market Street. A playground exists in Bristol Park, near the Boneyard Creek.

Figure 22. Existing conditions of Bradley Avenue. Top picture shows street level view of Bradley Avenue facing west, bottom picture is looking southeast at the Boneyard Creek.
13.2 Proposed Plans

The City of Champaign is in the process of buying out all the houses in the Bristol Place neighborhood in order to demolish the area and redevelop the seven blocks. After extensive outreach to the community and coordination with the Bristol Park Steering Committee, a master plan detailing new residential housing, a small commercial section, an enlarged park, and an enhanced Boneyard Creek was approved by City Council and is being implemented.

Proposed Alternative #1: Overpass plan

In 2000, a study was prepared for the City of Champaign by Mark K. Nolan at the Department of Urban and Regional Planning at the University of Illinois at Urbana-Champaign on the feasibility of constructing an overpass for Bradley Avenue over the Canadian National Railroad. The study presents information on traffic impacts of the grade separation, how emergency vehicles are impeded by trains on Bradley Avenue, and possible funding for a grade separation. The complete report is located in the Appendix.

The proposed Alternative #1 presents Bradley Avenue as an overpass from N. Market Street across the Canadian National Railroad to Fourth Street. The Boneyard Creek would be able to pass freely underneath the overpass on the east side of the overpass span. A small row of commercial property would line N. Market Street from Bradley Avenue to Garwood Street, with a small parking lot to the east of the storefronts. The existing playground would remain north of Garwood Street and the Boneyard Creek would meander through the adjacent land. A detention basin (Bristol Basin) would be located south of the overpass to help mitigate downstream flood elevations. A walking trail along the Creek would be present to connect to the Champaign Trail System (Figure 23).
Proposed Alternative #2: At-grade plan
The proposed Alternative #2 presents Bradley Avenue remaining at-grade, without an overpass. The Boneyard Creek would cross Bradley via a box culvert in approximately the same location it crosses the street currently. Depending on final development layouts, the Bradley Avenue crossing location could be adjusted anywhere between the existing location and the Canadian National Railroad tracks. A row of commercial property could either front N. Market Street, as in Alternative #1, or they could line the south side of Bradley Avenue, with space between two storefronts through which the Boneyard Creek will meander. A parking lot for the stores could be placed south of the commercial properties, with two access drives from Bradley Avenue. An existing store would remain on the northeast corner of Bradley and Market Street. Two in-line basins would be created along the Boneyard through the Bristol Park property to provide the necessary storage volume to mitigate downstream flooding. A walking trail along the Creek would be present to connect to the Champaign Trail System. Figure 24 shows the Alternate #2 design featuring an at-grade Bradley Avenue.
13.3 Stormwater Conveyance Requirements
Currently, the Boneyard Creek flows from the northwest corner of the Bristol Place development to Bradley Avenue, where it flows under the road via a box culvert. The proposed channel configurations both involve a meandering stream. Alternative #1 proposes a channel alignment crossing below the Bradley Avenue overpass east of its current location. Alternative #2 proposes a very similar alignment to existing conditions, where the stream would pass through an updated box culvert in the same vicinity it crosses now.

13.4 Stormwater Detention
In both design alternatives for Bristol Place, adequate detention is provided. A storage volume of eight acre-feet is needed to hold upstream runoff to mitigate flooding downstream. In Alternative #1, the detention basin would be located south of the Bradley Street overpass, in-line with the stream. In Alternative #2, two smaller in-line basins are proposed north of Bradley Street as part of the park improvements.

13.5 Pedestrian Circulation
Pedestrian circulation through Bristol Park from the southeast to the northwest is important in order to allow safe access across Bradley Street and connect the Boneyard Creek to the Champaign Trails System. Circulation within the park should provide connections between active and passive uses, including a connection across the Boneyard Creek. Connections to the adjacent proposed Bristol Place neighborhood are also important.
In the overpass option, the pedestrian trail reaches Bradley Avenue from the south, crosses under the overpass, then ramps up to the overpass to cross the railroad and Boneyard Creek. A ramp from the overpass to ground level on the west side would provide access to the Boneyard Creek and adjacent amenities (Figure 25).

![Figure 25. Overpass option for Bradley Avenue at Bristol Place.](image)

The at-grade option for Bradley Avenue would entail the pedestrian trail approaching Bradley Avenue from the south, following Bradley Avenue across the tracks, then crossing Bradley Avenue at a new mid-block pedestrian crossing near the Boneyard Creek (Figure 26).
13.6 Commercial Parking
A commercial strip is proposed near the Bristol Place redevelopment. Each alternative contains an area designated for commercial properties with an adjacent off-street parking lot. The parking lot associated with the commercial property along Market Street would be accessible from Market Street north of Bradley Avenue (Figure 25). The commercial property along Bradley would be accessible from Bradley Avenue east of Market Street (Figure 26).

13.7 Traffic Routing
Depending upon which alternate for Bradley Avenue is selected (overpass alternate versus at-grade alternate), extensive rerouting of traffic along Bradley Avenue may be required during construction. A detailed plan of construction traffic routing will be included in the final design phase.
14 COLUMBIA STREET DESIGN PARAMETERS

Objective
Clearly define the viable design recommendations to explore for the Columbia Street Basin based on the criteria included in the program development.

14.1 Existing Use
At the east end of Columbia Avenue at Market Street, flooding routinely occurs due to an undersized storm sewer connection underneath the Canadian National Railroad tracks to the Boneyard Creek to the east. Currently, the area prone to flooding is the intersection and two private property lots used by towing companies.

Figure 27. Existing conditions of the Columbia Street Basin area. The intersection and lots east of Columbia Avenue with parked cars are the properties subject to frequent flooding.

14.2 Proposed Plans
There is a recognized need to either add detention west of the Canadian National Railroad or increase the culvert size under the railroad and add additional detention to the proposed Washington Street Detention Basin. Two alternatives are proposed for stormwater and flooding management in the area.

Proposed Alternate #1: Columbia Avenue Basin
The first alternate shows a detention basin on the private property (contingent on purchase by the City) at the east end of Columbia Avenue west of the Canadian National Railroad (Figure 28). The detention basin will be nine acre-feet to address the existing flooding. It will store...
runoff as water is metered under the railroad tracks via the existing storm sewer to the Boneyard Creek. This proposed alternate includes a second in-line detention basin north of Washington Street (12 acre-feet) on the east side of the Canadian National Railroad. This Alternate is dependent upon the City purchasing private property at the east end of Columbia Avenue.

![Figure 28. Proposed Alternate #1: Columbia Avenue Basin outfalling to an existing storm sewer and detention basin North of Washington Street.](image)

**Proposed Alternate #2: North of Washington Street Wetland**

The second alternate shows no detention basin on the private property east of Columbia Avenue (Figure 29). Instead, the existing culvert from Columbia Avenue underneath the Railroad to the Boneyard Creek will be replaced with a larger culvert that will outlet into a large detention basin located east of the Canadian National Railroad and north of Washington Street. The basin (23 acre-feet) will provide the stormwater storage volume necessary to reduce flooding on the Columbia Street property in addition to the detention volume required along the main creek channel. This Alternate is not dependent upon the purchase of the private property at the east end of Columbia Avenue.
**14.3 Stormwater Conveyance Requirements**
Currently, the Boneyard Creek flows from its crossing of the Norfolk Southern Railroad to its crossing at Washington Street with no meanders or detention areas. The culvert draining runoff from the west side of the Canadian National Railroad is undersized causing flooding to occur east of Columbia Street. Both proposed alternates also provide a large amount of storage to mitigate flooding on the Columbia Street property and downstream properties. The existing storm sewer under the railroad tracks can be used if the Columbia Street detention volume is added west of the tracks. An enlarged culvert is required if the detention for Columbia Avenue is located east of the tracks.

**14.4 Stormwater Detention**
In both design alternatives for Columbia Street adequate detention is provided. In Alternate #1, a nine acre-foot detention basin is proposed east of Columbia Street that connects to a 12 acre-foot in-line detention basin North of Washington Street. In Alternate #2, a large in-line 23 acre-foot detention basin North of Washington Street mitigates flooding.

**14.5 Pedestrian Circulation**
A Greenway Trail is proposed to border the basin North of Washington Street regardless of which Alternate is chosen. The Trail will provide for safe crossings at Washington Street and Norfolk Southern Railroad. The trail system is important to connect the project, connect people with nature, and provide a safe area for pedestrian travel.
15 OAK ASH BASIN DESIGN PARAMETERS

Objective
Based on the stakeholder input, existing conditions analysis, stormwater management, engineering considerations, and other contributing factors, the appropriate program requirements and design elements were determined to include in the schematic design of the Oak Ash Basin.

15.1 Existing Use
The Oak-Ash stormwater detention basin exists just north of the Norfolk Southern Railroad line. It was designed as a dry detention basin, but consistently has a wet bottom and contains some identified wetland areas. The Oak-Ash basin is drained through two 48-inch diameter culverts running beneath the Norfolk Southern Railroad.

15.2 Proposed Plans
The Oak-Ash detention basin will be expanded to hold more stormwater runoff from the upstream reach of the Boneyard Creek. The basin will also be adjusted to be a wet detention basin with a large wetland fringe around the pond. The Oak Ash Basin will feature an observation and passive recreation area, outdoor education, nature trails and boardwalks, wildlife habitat, wetlands and water detention, and a community park. South of the Oak Ash basin will be a parking lot and potentially an adventure playground. The railroad will be screened from view and a meadow or prairie planting area will help to transition the area from a neighborhood to natural setting. Final design of amenities will be coordinated with the adjacent Dr. Martin Luther King Jr. subdivision residents. See Figure 30.
15.3 **Stormwater Detention**
The proposed Oak Ash detention basin is designed to hold 56 acre-feet of runoff, which is an increase of 20 acre-feet. The increased detention volume will help mitigate flooding downstream and reduce peak flows throughout the project area.

15.4 **Pedestrian Circulation**
A pedestrian trail is proposed to parallel the Boneyard Creek, access the adventure playground north of Washington Street, cross the Norfolk Southern Railroad at a new pedestrian crossing, then meander around and through sections of the Oak Ash Detention Basin and accompanying park.
Figure 31. Oak Ash Basin Proposed Layout Design
15.5 Parking
Recreation areas, outdoor education areas, a community park, nature trails, boardwalks, and wildlife habitat are planned for the Oak-Ash area, which necessitates additional parking for visitor use. Challenges of the location include two railroads to safely cross, while keeping close proximity to the area attractions. Several options were explored and discussed. A visual of the options are shown below in the following figures with a short description of the option in each caption. A summary of the pros and cons of each option is listed in Appendix I.

Figure 32. Parking option at Oak Ash Basin. Access the parking lot from Phillips Drive, have an area to turn-around within the parking lot, and cross the railroad tracks at a new non-vehicular trail crossing near the Boneyard Creek corridor.
Figure 33. 2nd St. Extension to Parking North of RR. Includes a dedicated road for Oak Ash access, but requires construction of a new road and new railroad non-vehicular crossing, which would require extensive grading and is unlikely to receive a railroad permit.

Figure 34. Ash St. Extension to Parking North of RR. Includes extension of an existing street, but requires a new railroad crossing which is unlikely to receive a railroad permit. This option may also increase traffic on Ash Street.
Figure 35. Parking Between Ash St. and Phillips Dr. This option includes utilizing property the City owns along the railroad. Visitors would be able to access parking from Ash Street or Phillips Drive and it only requires a trail crossing at the railroad. There is a concern about police access for this option and the parking area serving as a cut-through for vehicles.

Figure 36. Parking North of RR. Phillips Drive Entrance. This option includes a dedicated entrance to the Oak Ash area and no necessary railroad crossing, as it is utilizing the existing Phillips Drive crossing for roadway and trailway.
Figure 37. Parking Lot Off Of Washington Street. This option includes parking directly off of Washington Street. It would require no new railroad crossing. It could potentially conflict with stormwater detention needs for the Washington Street viaduct, it would require a more out-of-the-way trail crossing, it is farthest away from the Oak Ash amenities of all the options, and it would be a smaller lot size than other options.
16  UTILITY RELOCATION REQUIREMENTS

Objective

Determine the utility relocation requirements based on the stormwater management configuration options. Include potential utility upgrades in the evaluation.

16.1  Private Sector

16.1.1. Ameren-IP (Gas & Electric)
Ameren identified three possible conflicts with the North Reach Improvements Project, including an existing gas regulator station at the corner of 3rd Street and Hill Street, a high pressure gas line along 3rd Street, and an underground electric project at the Southeast corner of Columbia Avenue and Walnut Street. Coordination with Ameren will be performed as the project progresses to ensure service to the project area during construction and upon project completion.

16.1.2. Comcast (Cable)
No known issues with cable throughout the project site exist. As the project progresses, coordination with Comcast will continue in order to ensure continual service throughout the project area.

16.1.3. Illinois American Water (Water)
No known issues with the water line throughout the project site exist. As the project progresses, coordination with the Illinois American Water Company will continue in order to ensure continual service throughout the project area during the span of the project.

16.2  Public Sector

16.2.1. City of Champaign (Storm & Sanitary Sewers)
The project team and the City of Champaign have been coordinating with each other on storm and sanitary sewer lines and conditions. Plans have been made to enlarge some storm sewers in order to safely carry flow to the Boneyard Creek.

16.2.2. Urbana Champaign Sanitary District (Sanitary Sewer)
A sanitary interceptor runs underneath the Oak Ash Basin to University Avenue. The Urbana Champaign Sanitary District (UCSD) has plans to perform improvements upon the interceptor, which will have conflicts with the proposed Oak Ash Basin improvements and Washington Street Basin. The design team is in communication with the UCSD to properly coordinate the two projects as the Boneyard Creek improvement project progresses.
PROPERTY ACQUISITIONS/VACATION REQUIREMENTS

Objective

Identify property acquisitions necessary to construct the stormwater management improvements. Include evaluation of adjacent properties if they offer unique improvement or development opportunities.

Project construction will require obtaining easements and the purchase of properties. A land acquisition plan will be developed for the project as part of the final design process. The City has been acquiring properties along the Boneyard Creek since 1994. Properties in the project area owned by the City are shown in Figure 38.
Figure 38. Properties owned by the City of Champaign (blue shaded).
18 SCHEMATIC DESIGN ALTERNATES AND DIRECTION

The Appendix shows several of the design schematics, including options for Bradley Avenue, Oak Ash Parking, Washington Street Viaduct, and pedestrian routing. Please see the Appendix table of contents for a complete list of schematic designs.
19 PROJECT BUDGET COSTS

A summary of the construction cost estimates is shown below in Table 6. The total construction cost estimate for the Boneyard Creek North Branch Improvements is $22 million. Table 6 separates the cost estimates into four phases. Each phase location is described as follows.

Phase A: University Avenue to Washington Street
Phase B: Washington Street to Norfolk Southern Railroad, including Columbia Street Basin and Washington Street Basin
Phase C: Norfolk Southern Railroad to south of Bristol Place
Phase D: Bristol Place to Neil Street

An itemized construction cost estimate for the project is presented in Appendix N.
Table 6. Summary of Cost Estimates for the Boneyard Creek North Branch Improvement Project.

<table>
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<th>C</th>
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20 PERMITTING REQUIREMENTS
Multiple permits will be required to construct this Project. Permitting Agencies identified having jurisdiction for this project include the U.S. Army Corps of Engineers, the Illinois Department of Natural Resources, the Illinois Environmental Protection Agency, the Illinois Department of Transportation, the Canadian National Railroad, Norfolk Southern Railway, Illinois American Water, Illinois Historical Preservation Agency, the Illinois Department of Conservation, the Illinois Office of the State Fire Marshal, the Urbana Champaign Sanitary District and the City of Champaign. Discussions with the Norfolk Southern Railway are detailed in Section 8.2.1 concerning the proposed at-grade pedestrian crossing. A permit for a stormwater utility crossing beneath the Canadian National Railroad will be required. A coordinated effort will be made to keep permitting agencies informed of the status of the project and to forward interim submittals where appropriate.
APPENDIX

A. Stakeholder Owner’s Property Requirements Workshop Reports and Interview Template
B. Existing Topography
C. Wetland Location Map
D. H/H Analysis – SWMM5
E. Existing Structure Condition Report
F. Overall Site Plan
G. Proposed Cross-section Sketches
H. Bradley Avenue Concepts
I. Parking Options for Oak Ash Basin
J. Washington Street Viaduct Concepts
K. Pedestrian Routing
L. Proposed Structure Details
M. Market Street Details
N. Cost Estimates
O. The Bradley Avenue / Canadian National – Illinois Central Railroad Grade Separation Study, 2000
P. Intergovernmental Agreement
Appendix A

Stakeholder Owner’s Property Requirements Workshop Reports and Interview Template
Boneyard Creek North
Branch Improvements
(FGI #0150740.00)

Owner’s Project Requirements (OPR) Workshop #1 Results

October 1, 2015

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Overview

Farnsworth Group, Inc. led an Owner’s Project Requirements workshop for Boneyard Creek North Branch Improvements on Thursday, October 1, 2015; 6:00pm to 8:30pm (CST). The purpose of the workshop was to elicit feedback from various interested parties on the significant issues and functionality of the facility and to discuss what is necessary for a successful project including operation and maintenance. The workshop used a Nominal Group Technique (NGT), which used a series of questions to gather information on several key issues relevant to this project. The results from the workshop provided an overall consensus from all participants.

Attendees

A group of individuals participated in this workshop representing the following key interest categories:

- Design Professionals (DP)
- Owner/Neighborhood Representatives (NR)
- Workshop Leader (WL)
- Workshop Scribe (WS)

Table 1 summarizes the interest categories for the attendees.

Table 1 – Workshop Attendees

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<tr>
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Owner’s Project Requirements Workshop Procedure

The nominal group technique, which formed the basis of the workshop procedure was developed in the early 1970's by Delbeq and Van de Ven. Farnsworth Group has been successful in applying this technique on a variety of building projects and believed that it was the most strategic method to gain feedback on a variety of issues, from a variety of project interest areas, in a short period of time. It was found that a discussion of this format was very important to have earlier on as a part of the pre-design process.

The procedure involved a series of four (4) questions posed to the participants by the Workshop Leader (Ian McIntosh, Farnsworth Group, Inc.) and documented by the Workshop Scribe (Anthony Jansen, Farnsworth Group, Inc.). For each question, there was a quiet individual brainstorming period, during which participants recorded their responses without any discussion.

Using a round-robin format, participants were allowed to contribute one response, then a second, a third, etc., until all participants had provided all of their responses. Limited clarification of responses was permitted during this step.

The responses were then discussed one at a time. All participants were allowed to contribute and new responses were generated and recorded during the discussion.

From the final list of responses, each participant ranked their top five responses. This ranked data was entered to a spreadsheet database and used to obtain consensus of the entire group of attendees.

Workshop Results

The tables in this section summarize the results to the following four (4) questions that were asked in this workshop:

Question A. What amenities, features and design improvements are important to neighborhood residents and businesses?
Question B. How do you think this project may positively or negatively affect the use of your property?
Question C. What issues or concerns do you have about the area in and around the Boneyard Creek as it now exists?
Question D. What hopes and/or expectations do you have as the City begins this next phase of the Boneyard Creek Improvement Plan, namely the North Branch?

For each table, the top 5 overall scores (there were some ties) of all participants as well as the top 5 scores of the Owner’s Representatives (i.e. the Neighborhood Representatives) are shaded to show the responses for which there was greatest consensus.
### Table 2 – Responses to Question A – What amenities, features and design improvements are important to neighborhood residents and businesses?

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<td>19.0</td>
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</tr>
<tr>
<td>A-11</td>
<td>Clean and healthy stream.</td>
<td>Permit the stream to flow; no debris/trash.</td>
<td>26.0</td>
<td>2</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>A-1</td>
<td>Attractive landscape design.</td>
<td>Similar to Scott Park.</td>
<td>22.0</td>
<td>3</td>
<td>18.0</td>
<td>2</td>
</tr>
<tr>
<td>A-28</td>
<td>Continuous walkway.</td>
<td></td>
<td>14.0</td>
<td>4</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>A-13</td>
<td>Safe and comfortable to explore/visit.</td>
<td></td>
<td>12.0</td>
<td>5</td>
<td>10.0</td>
<td>4</td>
</tr>
<tr>
<td>A-5</td>
<td>Walking connectivity with city.</td>
<td>Scott Park connects University with downtown.</td>
<td>12.0</td>
<td>5</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>A-29</td>
<td>Continuous natural area corridors.</td>
<td>It would be broken up by ½ block concern.</td>
<td>12.0</td>
<td>5</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-7</td>
<td>Move flow out from under property.</td>
<td>No interference; no bottleneck.</td>
<td>11.0</td>
<td>11.0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A-17</td>
<td>Redirect Boneyard.</td>
<td></td>
<td>10.0</td>
<td>10.0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A-6</td>
<td>Not Impact Development Plans for 26,000sf of land.</td>
<td>For 15-20 years Manssour couldn’t develop land due to setback rules (1/2 block). Consider the NY City example of building over water. Design underground.</td>
<td>8.0</td>
<td>8.0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>A-10</td>
<td>Connectivity to bike/pedestrian trails.</td>
<td>Inner city to neighborhood. Trail and bike loop throughout city.</td>
<td>9.0</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>A-8</td>
<td>Parks/Open spaces.</td>
<td>Opportunity to preserve space and create destination park.</td>
<td>9.0</td>
<td>3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>A-24</td>
<td>Good lighting.</td>
<td>Safe. Energy efficient.</td>
<td>8.0</td>
<td>5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>A-15</td>
<td>Open lines of sight.</td>
<td>Sensitivity to personal security, e.g., no big bushes for hiding. Good for police to see also.</td>
<td>7.0</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-3</td>
<td>Walking path and waterfall(s).</td>
<td>Other than straight – (meandering).</td>
<td>7.0</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-31</td>
<td>Urban agriculture.</td>
<td></td>
<td>6.0</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-22</td>
<td>Nature observation decks/outlooks, etc.</td>
<td>For people to gather/play, etc. Vegetation filters.</td>
<td>6.0</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-2</td>
<td>Kid friendly.</td>
<td></td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-21</td>
<td>Pedestrian friendly.</td>
<td>Multi-use trail. Because of traffic, need one to not hinder the other – harmony between both.</td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-25</td>
<td>Shade trees.</td>
<td></td>
<td>5.0</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-14</td>
<td>Low maintenance and drought resistant. Native plants.</td>
<td>Reduce burden of paying someone to water. Also, having botanical would be good although this is a bit contradictory.</td>
<td>5.0</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-12</td>
<td>Seating.</td>
<td></td>
<td>4.0</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response #</td>
<td>Responses</td>
<td>Clarification</td>
<td>Overall Score</td>
<td>Overall Rank</td>
<td>Owner (NR) Score</td>
<td>Owner (NR) Rank</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>A-20</td>
<td>Develop habitat for butterflies/birds → use for education.</td>
<td></td>
<td>4.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-4</td>
<td>Hear and see water.</td>
<td>E.G., waterfalls (prefer don’t touch).</td>
<td>4.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-26</td>
<td>Energy efficient and dark sky lighting.</td>
<td></td>
<td>3.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-9</td>
<td>Enhancement of and compatible with surrounding neighborhood(s)</td>
<td>Enhance and keep compatible and safe for kids.</td>
<td>3.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-27</td>
<td>Flower islands.</td>
<td></td>
<td>2.0</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-18</td>
<td>Limit future trash.</td>
<td>Improve way to maintain trash.</td>
<td>1.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-19</td>
<td>Improve maintenance of geese.</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-23</td>
<td>Family areas (or groups from neighborhoods).</td>
<td>Sit and/or eat.</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
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<tr>
<td>A-30</td>
<td>Allow construction over it.</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-32</td>
<td>Bike repair stations.</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td></td>
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</tbody>
</table>
Table 3 – Responses to Question B – How do you think this project may positively or negatively affect the use of your property?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (NR) Score</th>
<th>Owner (NR) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>Enhance connectivity of property to city.</td>
<td></td>
<td>39.0</td>
<td>2</td>
<td>15.0</td>
<td>3</td>
</tr>
<tr>
<td>B-2</td>
<td>Improve cleanliness and reduce flooding.</td>
<td></td>
<td>41.0</td>
<td>1</td>
<td>23.0</td>
<td>1</td>
</tr>
<tr>
<td>B-3</td>
<td>Remove direction of Boneyard through property.</td>
<td></td>
<td>7.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>B-4</td>
<td>Increase opportunities for activities.</td>
<td></td>
<td>13.0</td>
<td></td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>B-5</td>
<td>Improve overall character of area.</td>
<td></td>
<td>35.0</td>
<td>3</td>
<td>20.0</td>
<td>2</td>
</tr>
<tr>
<td>B-6</td>
<td>Increase utilization of under-utilized areas.</td>
<td></td>
<td>5.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>B-7</td>
<td>Positively impact/compliment park (at Hum. Kin.).</td>
<td></td>
<td>4.0</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>B-8</td>
<td>Crime reduced through more activities. Generally by activating spaces – people will see what’s happening.</td>
<td></td>
<td>9.0</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>B-9</td>
<td>Scenic improvement.</td>
<td></td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>B-20</td>
<td>Inconvenience during construction.</td>
<td></td>
<td>2.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>B-11</td>
<td>Property owners could lose property.</td>
<td></td>
<td>14.0</td>
<td>14.0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>B-13</td>
<td>Add property value.</td>
<td></td>
<td>21.0</td>
<td>4</td>
<td>12.0</td>
<td>5</td>
</tr>
<tr>
<td>B-16</td>
<td>Increase taxes.</td>
<td></td>
<td>12.0</td>
<td>12.0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>B-15</td>
<td>Require setbacks?</td>
<td></td>
<td>10.0</td>
<td></td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>B-14</td>
<td>Enhance health of neighborhood.</td>
<td></td>
<td>16.0</td>
<td>5</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>B-18</td>
<td>Clean/Flowing water.</td>
<td></td>
<td>5.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>B-10</td>
<td>More activity = more noise.</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-12</td>
<td>Reduce flood risk. Included in B-2</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-17</td>
<td>Increase connectivity.</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-19</td>
<td>Improve quality of life. Included in B-14</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-21</td>
<td>Integrate entire city. Included in B-1</td>
<td></td>
<td>1.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 4 – Responses to Question C – What issues or concerns do you have about the area in and around the Boneyard Creek as it now exists?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (NR) Score</th>
<th>Owner (NR) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-2</td>
<td>Cleanliness.</td>
<td></td>
<td>40.0</td>
<td>1</td>
<td>18.0</td>
<td>3</td>
</tr>
<tr>
<td>C-1</td>
<td>Creek is unsafe and eyesore.</td>
<td></td>
<td>33.0</td>
<td>2</td>
<td>21.0</td>
<td>1</td>
</tr>
<tr>
<td>C-5</td>
<td>Flooding at Washington Street.</td>
<td>Flooding in general.</td>
<td>29.0</td>
<td>3</td>
<td>19.0</td>
<td>2</td>
</tr>
<tr>
<td>C-6</td>
<td>Impact best use Mansour’s property.</td>
<td>At 204-206 University Avenue/Land Owner</td>
<td>21.0</td>
<td>4</td>
<td>9.0</td>
<td>5</td>
</tr>
<tr>
<td>C-12</td>
<td>Maintenance challenge.</td>
<td></td>
<td>18.0</td>
<td>5</td>
<td>10.0</td>
<td>4</td>
</tr>
<tr>
<td>C-15</td>
<td>Breeding ground for mosquitos.</td>
<td></td>
<td>13.0</td>
<td></td>
<td>9.0</td>
<td>5</td>
</tr>
<tr>
<td>C-19</td>
<td>Lack of lighting and crime rate.</td>
<td></td>
<td>10.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>C-18</td>
<td>Inaccessibility.</td>
<td></td>
<td>4.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>C-17</td>
<td>Numerous geese/rodents/groundhogs.</td>
<td>Included in C-15</td>
<td>1.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>C-16</td>
<td>Old design.</td>
<td></td>
<td>2.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>C-14</td>
<td>Moving under existing building.</td>
<td>Included in C-6</td>
<td>0.0</td>
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</tr>
<tr>
<td>C-13</td>
<td>Conflicts with structures and properties.</td>
<td>Included in C-6</td>
<td>0.0</td>
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<td></td>
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</tr>
<tr>
<td>C-11</td>
<td>Goes through residential areas.</td>
<td></td>
<td>9.0</td>
<td></td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>C-10</td>
<td>Very steep banks.</td>
<td></td>
<td>2.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>C-9</td>
<td>Not meeting potential.</td>
<td></td>
<td>14.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>C-8</td>
<td>Unattractive ditch and attracts trash.</td>
<td>Included in C-2</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-7</td>
<td>Water quality.</td>
<td></td>
<td>14.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>C-4</td>
<td>Areas hard to cross.</td>
<td>University Avenue/railroad/etc.</td>
<td>9.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>C-3</td>
<td>Weeds/Unkempt.</td>
<td>Included in C-2</td>
<td>0.0</td>
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</tbody>
</table>
Table 5 – Responses to Question D - What hopes and/or expectations do you have as the City begins this next phase of the Boneyard Creek Improvement Plan, namely the North Branch?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (NR) Score</th>
<th>Owner (NR) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1</td>
<td>Create functional and scenic value to immediate and surrounding areas.</td>
<td>“Scenic” means it will be an asset aesthetically. “Functional” means it will relieve flooding in homes.</td>
<td>75.0</td>
<td>1</td>
<td>41.0</td>
<td>1</td>
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<tr>
<td>D-13</td>
<td>Teaching environment (including youth).</td>
<td></td>
<td>25.0</td>
<td>2</td>
<td>12.0</td>
<td>3</td>
</tr>
<tr>
<td>D-11</td>
<td>Reduce impact on commercial development.</td>
<td></td>
<td>21.0</td>
<td>4</td>
<td>21.0</td>
<td>2</td>
</tr>
<tr>
<td>D-8</td>
<td>Pleasant and interesting (meandering!).</td>
<td></td>
<td>15.0</td>
<td>5</td>
<td>8.0</td>
<td>4</td>
</tr>
<tr>
<td>D-12</td>
<td>Enhancement and celebration of neighborhood’s character.</td>
<td></td>
<td>23.0</td>
<td>3</td>
<td>12.0</td>
<td>3</td>
</tr>
<tr>
<td>D-14</td>
<td>Improve diversity (people).</td>
<td></td>
<td>11.0</td>
<td></td>
<td>8.0</td>
<td>4</td>
</tr>
<tr>
<td>D-10</td>
<td>Residents can experience nature.</td>
<td></td>
<td>11.0</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>D-15</td>
<td>Improve diversity (nature).</td>
<td></td>
<td>12.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>D-2</td>
<td>Improved and increased outdoor activities.</td>
<td></td>
<td>12.0</td>
<td></td>
<td>7.0</td>
<td>5</td>
</tr>
<tr>
<td>D-3</td>
<td>A place where folks can smile and have fun.</td>
<td></td>
<td>12.0</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>D-4</td>
<td>Relieve flooding.</td>
<td>Included in D-1</td>
<td></td>
<td></td>
<td>0.0</td>
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</tr>
<tr>
<td>D-5</td>
<td>People walk or bike to work.</td>
<td></td>
<td>9.0</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>D-6</td>
<td>Promote pride in residents in area.</td>
<td>Included in D-1</td>
<td></td>
<td></td>
<td>0.0</td>
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</tr>
<tr>
<td>D-7</td>
<td>Boneyard moves from negative to positive.</td>
<td>Included in D-1</td>
<td></td>
<td></td>
<td>0.0</td>
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</tr>
<tr>
<td>D-9</td>
<td>Habitat with minimal people/animal conflicts.</td>
<td></td>
<td>8.0</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>
Attachment A

Workshop Sign-in/Attendance Sheet
Boneyard Creek North
Branch Improvements
(FGI #0150740.00)

Owner’s Project Requirements (OPR) Workshop #2 Results

October 2, 2015

Contact: John Dabrowski
o. 217.352.7408
f. 217.352.7409
e. jdabrowski@f-w.com
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Overview

Farnsworth Group, Inc. led a 2nd Owner’s Project Requirements workshop for Boneyard Creek North Branch Improvements on Friday, October 2, 2015; 9:00am to 12:00pm (CST). The purpose of the workshop was to elicit feedback from various interested parties on the significant issues and functionality of the facility and to discuss what is necessary for a successful project including operation and maintenance. The workshop used a Nominal Group Technique (NGT), which used a series of questions to gather information on several key issues relevant to this project. The results from the workshop provided an overall consensus from all participants.

Attendees

A group of individuals participated in this workshop representing the following key interest categories:

- Design Professionals (DP)
- City Staff (CS)
- Workshop Leader (WL)
- Workshop Scribe (WS)

Table 1 summarizes the interest categories for the attendees.

Table 1 – Workshop Attendees

<table>
<thead>
<tr>
<th>Names</th>
<th>Affiliation</th>
<th>Role</th>
<th>Telephone</th>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cole Clayton</td>
<td>Applied Ecological Services</td>
<td>DP</td>
<td>224-500-7810</td>
<td><a href="mailto:coleclayton@appliedco.com">coleclayton@appliedco.com</a></td>
</tr>
<tr>
<td>Paul Toenjes</td>
<td>SWT Design</td>
<td>DP</td>
<td>314-644-5700</td>
<td><a href="mailto:pault@swtdesign.com">pault@swtdesign.com</a></td>
</tr>
<tr>
<td>Klaus Rausch</td>
<td>SWT Design</td>
<td>DP</td>
<td>314-644-5700</td>
<td><a href="mailto:klausr@swtdesign.com">klausr@swtdesign.com</a></td>
</tr>
<tr>
<td>Janel Gomez</td>
<td>City of Champaign</td>
<td>CS</td>
<td>217-403-4700</td>
<td><a href="mailto:janel.gomez@ci.champaign.il.us">janel.gomez@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>David Oliver</td>
<td>City of Champaign</td>
<td>CS</td>
<td>217-403-7070</td>
<td><a href="mailto:david.oliver@ci.champaign.il.us">david.oliver@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>Ernesto Salinas</td>
<td>City of Champaign - Public Works</td>
<td>CS</td>
<td>217-403-4700</td>
<td><a href="mailto:ernesto.salinas@ci.champaign.il.us">ernesto.salinas@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>Eleanor Blackmon</td>
<td>City of Champaign</td>
<td>CS</td>
<td>217-403-4700</td>
<td><a href="mailto:Eleanor.blackmon@ci.champaign.il.us">Eleanor.blackmon@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>Doug Eppich</td>
<td>Farnsworth Group, Inc.</td>
<td>DP</td>
<td>217-352-4549</td>
<td><a href="mailto:deppich@att.net">deppich@att.net</a></td>
</tr>
<tr>
<td>Stan Webb</td>
<td>Webb Engineering Services</td>
<td>DP</td>
<td>314-588-0600</td>
<td><a href="mailto:swebb@webb-engineering.com">swebb@webb-engineering.com</a></td>
</tr>
<tr>
<td>Rob Kowalski</td>
<td>City of Champaign</td>
<td>CS</td>
<td>217-403-8800</td>
<td><a href="mailto:rob.kowalski@ci.champaign.il.us">rob.kowalski@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>Jim Wolterman</td>
<td>SWT Design</td>
<td>DP</td>
<td>314-644-5700</td>
<td><a href="mailto:jimw@swtdesign.com">jimw@swtdesign.com</a></td>
</tr>
<tr>
<td>Dave Clark</td>
<td>City of Champaign – Public Works</td>
<td>CS</td>
<td>217-403-4700</td>
<td><a href="mailto:Dave.clark@ci.champaign.il.us">Dave.clark@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>John Barker</td>
<td>City of Champaign - Fire Department</td>
<td>CS</td>
<td>217-463-7202</td>
<td><a href="mailto:John.barker@ci.champaign.il.us">John.barker@ci.champaign.il.us</a></td>
</tr>
<tr>
<td>John Dabrowski</td>
<td>Farnsworth Group, Inc.</td>
<td>DP</td>
<td>217-352-7408</td>
<td><a href="mailto:jdbrowski@f-w.com">jdbrowski@f-w.com</a></td>
</tr>
<tr>
<td>Ian McIntosh</td>
<td>Farnsworth Group, Inc.</td>
<td>WL</td>
<td>678-223-8074</td>
<td><a href="mailto:imcintosh@f-w.com">imcintosh@f-w.com</a></td>
</tr>
<tr>
<td>Anthony Jansen</td>
<td>Farnsworth Group, Inc.</td>
<td>WS</td>
<td>217-352-7408</td>
<td><a href="mailto:ajansen@f-w.com">ajansen@f-w.com</a></td>
</tr>
</tbody>
</table>
**Owner’s Project Requirements Workshop Procedure**

The nominal group technique, which formed the basis of the workshop procedure was developed in the early 1970's by Delbeq and Van de Ven. Farnsworth Group has been successful in applying this technique on a variety of building projects and believed that it was the most strategic method to gain feedback on a variety of issues, from a variety of project interest areas, in a short period of time. It was found that a discussion of this format was very important to have earlier on as a part of the pre-design process.

The procedure involved a series of four (4) questions posed to the participants by the workshop leader (Ian McIntosh, Farnsworth Group, Inc.) and documented by the workshop scribe (Anthony Jansen, Farnsworth Group, Inc.). For each question, there was a quiet individual brainstorming period, during which participants recorded their responses without any discussion.

Using a round-robin format, participants were allowed to contribute one response, then a second, a third, etc., until all participants had provided all of their responses. Limited clarification of responses was permitted during this step.

The responses were then discussed one at a time. All participants were allowed to contribute and new responses were generated and recorded during the discussion.

From the final list of responses, each participant ranked their top five responses. This ranked data was entered to a spreadsheet database and used to obtain consensus of the entire group of attendees.

**Workshop Results**

The tables in this section summarize the results to the following four (4) questions that were asked in this workshop:

- **Question A.** What amenities, features and design improvements are important to neighborhood residents and businesses?
- **Question B.** How do you think this project may positively or negatively affect the use of your property?
- **Question C.** What are problems to avoid based on your experiences with similar projects of this nature along Boneyard Creek?
- **Question D.** What questions can you imagine asking neighborhood residents and any businesses a year after this Boneyard Creek Improvement Project, and how do you hope that they will answer them?

The following is a listing of other items that were not voted upon; they are included in the document for informational purposes only:

1. How long are booms? There are different ones (Eleanor will send information to Doug).
2. Acquiring land along University is always an option.
3. Is there a TIFF involved? According to Rob; yes. We’re looking to create a new TIFF District in the next six months. (This would help fund redevelopment - not a typical TIFF to generate a lot). More discussion forthcoming regarding re-expanding Bristol Park.
4. Is there maximum depth of speed of flow? According to John; there’s no equipment to accommodate.
5. Is security camera of interest to city? According to Eleanor; maybe. There are a few now but it needs to balance with privacy for public. There was a camera at 2nd Street that indicated how bad a flood is.
For each table, the top 5 overall scores (there were some ties) of all participants as well as the top 5 scores of the Owner's Representatives (i.e., the City Staff) are shaded to show the responses for which there was greatest consensus.
### Table 2 – Responses to Question A – What amenities, features and design improvements are important to neighborhood residents and businesses?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (CS) Score</th>
<th>Owner (CS) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Flood control</td>
<td></td>
<td>55.0</td>
<td>1</td>
<td>30.0</td>
<td>1</td>
</tr>
<tr>
<td>A-12</td>
<td>Healthy stream</td>
<td>Good water quality</td>
<td>23.0</td>
<td>2</td>
<td>6.0</td>
<td>5</td>
</tr>
<tr>
<td>A-19</td>
<td>Plant habitat</td>
<td></td>
<td>18.0</td>
<td>3</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>A-3</td>
<td>Walking and bicycle trail</td>
<td>i.e. (the look of it; example the limestone, the planting, etc.) Concerned that because it is in low income, the quality will be decreased.</td>
<td>16.0</td>
<td>4</td>
<td>12.0</td>
<td>2</td>
</tr>
<tr>
<td>A-18</td>
<td>Design compares with 2nd Street</td>
<td></td>
<td>15.0</td>
<td>5</td>
<td>7.0</td>
<td>4</td>
</tr>
<tr>
<td>A-2</td>
<td>Safe environment</td>
<td></td>
<td>11.0</td>
<td>8</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>A-10</td>
<td>Forum for teaching</td>
<td></td>
<td>13.0</td>
<td>6</td>
<td>6.0</td>
<td>5</td>
</tr>
<tr>
<td>A-4</td>
<td>Park and open space</td>
<td></td>
<td>3.0</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-5</td>
<td>Path with lighting</td>
<td></td>
<td>3.0</td>
<td>3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>A-6</td>
<td>How often will it be maintained?</td>
<td></td>
<td>9.0</td>
<td>4</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>A-7</td>
<td>Noise creation</td>
<td>Minimize during normal use afterwards.</td>
<td>6.0</td>
<td>6</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>A-8</td>
<td>Picnic tables</td>
<td>Included in A-8</td>
<td>6.0</td>
<td>6</td>
<td>6.0</td>
<td></td>
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<tr>
<td>A-9</td>
<td>Seating</td>
<td>Included in A-8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>A-11</td>
<td>Connectivity</td>
<td>Connect - Downtown to Creek → Bike, etc.) Connect all communities to pathway - ex. schools.</td>
<td>11.0</td>
<td>5</td>
<td>5.0</td>
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<tr>
<td>A-13</td>
<td>Trash removal</td>
<td></td>
<td></td>
<td>0</td>
<td>0.0</td>
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<tr>
<td>A-14</td>
<td>Durable mats</td>
<td>Materials - last a while (no rusting of trash receptacles)</td>
<td>4.0</td>
<td>4</td>
<td>4.0</td>
<td></td>
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<tr>
<td>A-15</td>
<td>Safe/active recreation</td>
<td>Signage for exercise stations and chin up bars. Reason to get boys/girls out/about. Included in A-3</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-16</td>
<td>Naturalized water way</td>
<td>Has meandering, pools, ripples. Included in A-12</td>
<td>4.0</td>
<td>4</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>A-17</td>
<td>Areas for reading</td>
<td>Included in A-8</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-20</td>
<td>Landscape features and textures</td>
<td>Architectural stone; same design themes as 2nd Street; extras to make it nice!! Included in A-18</td>
<td>4.0</td>
<td>4</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>A-21</td>
<td>Community interaction with area</td>
<td>i.e., bands to play, events, etc.</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-22</td>
<td>Markers to identify vegetation, etc. (education)</td>
<td>Included in A-10</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-23</td>
<td>Prairie Heritage</td>
<td>Native sustainable plants. Included in A-19</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-24</td>
<td>Critter Maintenance</td>
<td>Good droppings, groundhogs at</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Response #</td>
<td>Responses</td>
<td>Clarification</td>
<td>Overall Score</td>
<td>Overall Rank</td>
<td>Owner (CS) Score</td>
<td>Owner (CS) Rank</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>A-25</td>
<td>Habitat/Wildlife corr. (birds, butterflies, etc.)</td>
<td>Included in A-19</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
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<tr>
<td>A-26</td>
<td>Inviting destination</td>
<td></td>
<td>8.0</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-27</td>
<td>Safe street crossings</td>
<td>Pedestrians, bikes, connectivity, railroad crossing</td>
<td></td>
<td></td>
<td>0.0</td>
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<tr>
<td>A-28</td>
<td>Pet-friendly</td>
<td>Doggy stations. Included in A-13</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-29</td>
<td>Low maintenance over time</td>
<td>Included in A-6</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>A-30</td>
<td>Leftover land for developing</td>
<td></td>
<td>5.0</td>
<td>4.0</td>
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<tr>
<td>A-31</td>
<td>Address conflicts of Boneyard under buildings</td>
<td></td>
<td>6.0</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-32</td>
<td>I.D. where you are</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
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</table>
### Table 3 – Responses to Question B – How do you think this project may positively or negatively affect the use of your property?

<table>
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<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (CS) Score</th>
<th>Owner (CS) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>Reduce flooding</td>
<td></td>
<td>52.0</td>
<td>1</td>
<td>31.0</td>
<td>1</td>
</tr>
<tr>
<td>B-7</td>
<td>Promote redeveloping</td>
<td></td>
<td>35.0</td>
<td>2</td>
<td>12.0</td>
<td>4</td>
</tr>
<tr>
<td>B-10</td>
<td>Unintended use (criminal)</td>
<td>New spaces will change dynamics; police required.</td>
<td>28.0</td>
<td>3</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>B-18</td>
<td>Increase visibility of neighborhoods</td>
<td>More aware of areas</td>
<td>21.0</td>
<td>4</td>
<td>14.0</td>
<td>2</td>
</tr>
<tr>
<td>B-6</td>
<td>Increase property value (residential or business)</td>
<td></td>
<td>18.0</td>
<td>5</td>
<td>12.0</td>
<td>4</td>
</tr>
<tr>
<td>B-13</td>
<td>Provides park-like amenities</td>
<td>Some areas are just ditches</td>
<td>17.0</td>
<td></td>
<td>13.0</td>
<td>3</td>
</tr>
<tr>
<td>B-24</td>
<td>Creating environment for healthy lifestyle</td>
<td></td>
<td>16.0</td>
<td></td>
<td>6.0</td>
<td>5</td>
</tr>
<tr>
<td>B-2</td>
<td>Greater demand for use of facilities (business)</td>
<td>People using restrooms, etc.</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-3</td>
<td>Link to trail system</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-4</td>
<td>Unclear markings lead to trespassing</td>
<td>Intentional (shortcut or not)</td>
<td>2.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>B-5</td>
<td>Increase casual traffic to businesses</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-11</td>
<td>Safer neighborhood environment</td>
<td>Included in B-10</td>
<td>4.0</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>B-12</td>
<td>Residents don’t want change (i.e. land use)</td>
<td>Various reasons</td>
<td>2.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>B-14</td>
<td>Increase use of open spaces</td>
<td></td>
<td>3.0</td>
<td></td>
<td>0.0</td>
<td></td>
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<tr>
<td>B-15</td>
<td>Increase value = higher taxes</td>
<td></td>
<td></td>
<td></td>
<td>0.0</td>
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<tr>
<td>B-16</td>
<td>Homeless population using area</td>
<td>Included in B-10</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-17</td>
<td>Blighted areas become attractive</td>
<td>Included in B-7</td>
<td>2.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>B-19</td>
<td>Increase neighborhood cohesiveness</td>
<td>Included in B-18</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-20</td>
<td>Educational opportunities</td>
<td></td>
<td>2.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-21</td>
<td>Land use changes (commercial)</td>
<td>Included in B-12</td>
<td></td>
<td></td>
<td>0.0</td>
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</tr>
<tr>
<td>B-22</td>
<td>Short-term meeting place</td>
<td></td>
<td>1.0</td>
<td></td>
<td>0.0</td>
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<tr>
<td>B-23</td>
<td>Potential user/resident conflicts</td>
<td>Loitering, etc. included in B-4</td>
<td></td>
<td></td>
<td>0.0</td>
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</tr>
<tr>
<td>B-8</td>
<td>Inconvenience during construction</td>
<td></td>
<td>1.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>B-9</td>
<td>Increased maintenance activities</td>
<td>i.e. residents not use to mowing, garbage haulers</td>
<td>4.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
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</table>
**Table 4 – Responses to Question C** – What are problems to avoid based on your experiences with similar projects of this nature along Boneyard Creek?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (CS) Score</th>
<th>Owner (CS) Rank</th>
</tr>
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<tbody>
<tr>
<td>C-1</td>
<td>Ambitious design = maintenance issues</td>
<td>i.e. landscaping</td>
<td>45.0</td>
<td>1</td>
<td>21.0</td>
<td>1</td>
</tr>
<tr>
<td>C-6</td>
<td>Ensure adequate communication with residents</td>
<td></td>
<td>27.0</td>
<td>2</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>C-18</td>
<td>Integrate debris collection by stream (direct to specified location)</td>
<td></td>
<td>19.0</td>
<td>3</td>
<td>9.0</td>
<td>4</td>
</tr>
<tr>
<td>C-10</td>
<td>Activate entire area</td>
<td>Look at entire Boneyard. Go from amenities to amenities (spread out)</td>
<td>18.0</td>
<td>4</td>
<td>10.0</td>
<td>3</td>
</tr>
<tr>
<td>C-7</td>
<td>Durable materials (avoid cutting budget)</td>
<td>Non-removable - i.e., theft, etc.</td>
<td>16.0</td>
<td>5</td>
<td>11.0</td>
<td>2</td>
</tr>
<tr>
<td>C-16</td>
<td>Avoid hiding spaces (ex. difficult to police)</td>
<td></td>
<td>13.0</td>
<td>10.0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C-11</td>
<td>Avoid missing opportunities to brand trail</td>
<td>This is a piece of something larger. Included in C-10.</td>
<td>6.0</td>
<td>6.0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>C-15</td>
<td>Avoid wrong plant species</td>
<td></td>
<td>9.0</td>
<td>6.0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>C-12</td>
<td>Avoid this project causing floods elsewhere</td>
<td>Also during construction</td>
<td>13.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-13</td>
<td>Avoid stagnant water due to design (infiltration basins don't work)</td>
<td></td>
<td>10.0</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-14</td>
<td>Avoid erosion during construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-17</td>
<td>Avoid inadequate owners buy in from residents, businesses, etc.</td>
<td>Included in A-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-19</td>
<td>Features to help secure booms (facilitate emergency activities of fire department)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-2</td>
<td>Under-sizing detention features</td>
<td></td>
<td>4.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-20</td>
<td>Avoid inadequate budget for future maintenance.</td>
<td>Included in C-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-21</td>
<td>Avoid negativism by neighborhood due to project</td>
<td>Included in C-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-22</td>
<td>Conducive to being plowed (snow)</td>
<td></td>
<td>2.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-23</td>
<td>Furniture replacement parts list</td>
<td>Also final as-built planting list, lighting, pumps, handrails, etc.</td>
<td>1.0</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-24</td>
<td>Avoid creating unsafe street crossings.</td>
<td>Railroads</td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-25</td>
<td>Avoid problems establishing vegetation (ex. being flooded) i.e., on front end of project</td>
<td></td>
<td>8.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-3</td>
<td>Creating too much geese habituating</td>
<td></td>
<td>1.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-4</td>
<td>Overburden maintenance</td>
<td>Included in C-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-5</td>
<td>Better native vegetation maintenance i.e., finding better way - getting it done. Avoid</td>
<td></td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response #</td>
<td>Responses</td>
<td>Clarification</td>
<td>Overall Score</td>
<td>Overall Rank</td>
<td>Owner (CS) Score</td>
<td>Owner (CS) Rank</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>---------------</td>
<td>---------------</td>
<td>--------------</td>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>problems with maintenance contractors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-8</td>
<td>Avoid restricted access to stream (too steep banks)</td>
<td>5.0</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-9</td>
<td>Avoid too optimistic schedules (2 separate railroads)</td>
<td>Optimistic = realistic</td>
<td>3.0</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5 – Responses to Question D - What questions can you imagine asking neighborhood residents and any business a year after this Boneyard Creek Improvement Project, and how do you hope that they will answer them?

<table>
<thead>
<tr>
<th>Response #</th>
<th>Responses</th>
<th>Clarification</th>
<th>Overall Score</th>
<th>Overall Rank</th>
<th>Owner (CS) Score</th>
<th>Owner (CS) Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-7</td>
<td>Has drainage improved?</td>
<td>Haven't flooded since project.</td>
<td>42.0</td>
<td>1</td>
<td>20.0</td>
<td>1</td>
</tr>
<tr>
<td>D-1</td>
<td>Do you use facilities?</td>
<td>Yes, All the time.</td>
<td>32.0</td>
<td>2</td>
<td>18.0</td>
<td>2</td>
</tr>
<tr>
<td>D-2</td>
<td>Is your life better and how?</td>
<td>Healthier/happier</td>
<td>23.0</td>
<td>3</td>
<td>8.0</td>
<td>4</td>
</tr>
<tr>
<td>D-4</td>
<td>Do you feel safe?</td>
<td>Yes</td>
<td>21.0</td>
<td>4</td>
<td>13.0</td>
<td>3</td>
</tr>
<tr>
<td>D-3</td>
<td>Did project meet expectations?</td>
<td>Absolutely!</td>
<td>19.0</td>
<td>5</td>
<td>18.0</td>
<td>2</td>
</tr>
<tr>
<td>D-14</td>
<td>What is favorite landscape feature?</td>
<td>Adventure playground</td>
<td>8.0</td>
<td>8</td>
<td>8.0</td>
<td>4</td>
</tr>
<tr>
<td>D-5</td>
<td>Have you met any new neighbors?</td>
<td>Yes → New Neighborhood Association</td>
<td>13.0</td>
<td>7</td>
<td>7.0</td>
<td>5</td>
</tr>
<tr>
<td>D-10</td>
<td>Any noise issues due to maintenance?</td>
<td>No, quiet as monks.</td>
<td>2.0</td>
<td>2</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>D-11</td>
<td>Bring friend to see us project?</td>
<td>Yes, Included in D-9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-12</td>
<td>Has project improved community?</td>
<td>Two thumbs up! Included in D-8.</td>
<td>4.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>D-13</td>
<td>Has lifestyle changed?</td>
<td>Yes, lost weight. Included in D-2.</td>
<td>2.0</td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>D-15</td>
<td>Have you seen more residential/commercial development?</td>
<td>Yes</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-16</td>
<td>What do you like least?</td>
<td>??</td>
<td>5.0</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>D-17</td>
<td>Is the maintenance satisfactory?</td>
<td>Yes</td>
<td>11.0</td>
<td></td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>D-6</td>
<td>Most interesting thing you've seen.</td>
<td>Migratory birds/kids/etc.</td>
<td>3.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>D-8</td>
<td>How do improvements fit?</td>
<td>Can't remember it without it.</td>
<td>12.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>D-9</td>
<td>Are you proud of project?</td>
<td>Yes, extremely.</td>
<td>13.0</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
</tbody>
</table>
Attachment A

Workshop Sign-in/Attendance Sheet
Project Meeting Summary

Meeting Site: Champaign Police Department

Participants: Representing:
Eleanor Blackmon City of Champaign
Stan Webb Webb Engr. Services
John Dabrowski Farnsworth

Reason for Meeting:
Interview

Summary of Discussion:
The items below, which are now numbered and categorized for identification purposes, were discussed, though not necessarily in the order listed.

A. Business Operations

B. General Design Features

C. Neighborhood

D. Safety

E. Parking

F. Photo gallery

Follow-up action required:
Appendix B

Existing Topography
Appendix C

Wetland Location Map
Exhibit X: Wetlands Map

Legend

- Wetlands

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Appendix D

H/H Analysis – SWMM5
Appendix E

Existing Structure Condition Report
Introduction

Lin Engineering, Ltd. inspected all structures within the project limits on dates 09-Dec-2015 and 15-Dec-2015. Existing structure conditions were observed and documented, and key dimensions were measured and recorded. Refer to Exhibits A and B for structure numbering and locations, respectively.

Structure #1 (SN 010-6040)

This structure is a 30" diameter precast pipe culvert with an upstream concrete headwall. Silt and vegetation buildup exists at both openings. The culvert is in good condition and structurally adequate to remain in place. It is recommended that silt and debris be removed from the pipe.

Structure #2 (SN 010-6060)

This structure is a concrete arch pedestrian bridge with an end-to-end length of 13'-4". Cracking exists on both faces of the bridge. There are areas of spalling and honeycombing on the slab underside. The bridge is in fair condition and structurally adequate to remain in place.

Structure #3 (SN 010-6070)

This structure is an arch shape, corrugated metal pipe culvert with a maximum width of 54” and brick and mortar headwalls. Culvert length along the stream is 30'-0". Silt and vegetation buildup exists at both ends. The CMP is in fair condition with moderate rust along the watermark. Both headwalls are pushing out with grout loss. The culvert is structurally adequate to remain in place.
Structure #4 (SN 010-6080)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 20'-0". The timber decking has intermittent split planks with some mold on the underside. Moderate rust exists on the steel structure. There are no anchor bolts to resist lateral movement if a flooding event were to occur. The bridge is in good condition and is structurally adequate to remain in place.

Structure #5 (SN 010-6090)

This structure is an arch shape, corrugated metal pipe culvert with a maximum width of 50" and brick and mortar headwalls. Culvert length along the stream is 78'-0". The CMP has heavy rust along the bottom quarter of the pipe with section loss at the waterline. The upstream headwall has failure in isolated locations. The culvert is in fair condition and is structurally adequate to remain in place.

Structure #5A (part of SN 010-6090)

This structure is a pedestrian bridge with a concrete deck and end-to-end length of 14'-6". The steel pipe railing has paint failure with moderate rust. The slab is in good condition with some cracks and leaching on the underside and a spalled area beneath the center handrail post. An area of washout exists behind the west abutment. The bridge is structurally adequate to remain in place.
**Structure #6 (SN 010-6100)**

This structure is a pedestrian bridge with a concrete deck and end-to-end length of 13'-0". Steel triangular grating has been placed south of the bridge over the channel. The slab is in good condition with some cracks and leaching on the underside. The bridge is in good condition and is structurally adequate to remain in place.

![Structure #6 Image](image1.jpg)

**Structure #7 (SN 010-6110)**

This structure is a pedestrian bridge with steel beams encased in a concrete deck. The end-to-end length is 11'-0". Steel triangular grating has been placed west of the bridge over the channel. The underside of the deck has severe spalling under the exposed beams, which are rusted and pitted. The bridge is in need of significant repairs.

![Structure #7 Image](image2.jpg)

**Structure #8 (SN 010-6120)**

This structure is a concrete box culvert with concrete wing-walls at both ends. The culvert has a 4'-9" width (at right angles) and 74'-0" length along the stream. A large vertical crack exists on the northwest wing-wall and the previously exposed portion of the culvert at the upstream end was being covered in steel plating at the time of inspection. There is severe honeycombing at the waterline, a large spalled area on the west side, and other spalls and exposed reinforcement throughout. The culvert is in need of significant repairs.

![Structure #8 Image](image3.jpg)
Structure #9 (SN 010-6130)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 25'-0". The timber decking has intermittent split planks with some mold on the underside. The west abutment timber tie is rotting with section loss, and the west anchor bolts are slightly backed off. The bridge is in fair condition and structurally adequate to remain in place. It is recommended that deteriorated timber ties be replaced.

Structure #10 (SN 010-6170)

This structure consists of a set of twin concrete pipe culverts. A stone headwall with 36" diameter openings exists on the upstream end. Steel debris gates with a 44" diameter west opening and 48" diameter east opening exist at the downstream end. Culvert length along the stream is 110'-0". The pipes are in good condition. The north ends of both pipes have spalled off sections. The culverts are in fair condition and structurally adequate to remain in place.

Structure #11 (SN 010-6210)

This structure is a concrete box culvert with concrete wing-walls at both ends and a concrete overflow spillway at the upstream end. The culvert has an 8'-0" width and 113'-0" length along the stream. The culvert and concrete walls are in good condition. The culvert is structurally adequate to remain in place.
Structure #12

This structure is a 60” diameter concrete pipe culvert with concrete headwalls at both ends and a sheet pile wing-wall on the upstream end. The culvert is in good condition and structurally adequate to remain in place.

Structure #13 (SN 010-6230)

This structure is a 60” diameter concrete culvert with flared ends. Culvert length along the stream is 55’-6”. The pipe is in good condition with minor spalls at the flared ends. The culvert is structurally adequate to remain in place.

Structure #14

This structure consists of a set of twin 48” diameter precast pipe culverts with a concrete headwall on the downstream end and steel end sections at the upstream end. Culvert length along the stream is 118’-0”. Minor spalls exist in the north cell. Both cells have areas where the precast sections have shifted, allowing water and possibly some soil to leak through. The culverts are in satisfactory condition and are structurally adequate to remain in place.
Structure #14A

This structure consists of a 54" diameter concrete culvert with a concrete weir on the upstream end. Culvert length along the stream is 33’. A large scour hole exists at the south side of the downstream end. The culvert is in good condition and structurally adequate to remain in place.

Structure #15

This structure consists of a single span concrete superstructure with stone wall supports. Bridge end-to-end length is 15’-6" and out-to-out width is 20’-2". Heavy map cracking exists at the fascia, and the concrete barriers have areas of spalling. There are no signs of delamination, but the deck underside contains heavy honeycombing and efflorescence at the joints. The bridge is structurally adequate to remain in place.

Structure #16

This structure consists of an abandoned, two span timber bridge with timber column supports at the mid-span and ends. Bridge end-to-end length is 28’-9". The soil is washing out at the end supports. The bridge is not structurally adequate for re-use.
Structure #17 (SN 010-6360)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 24'-0". The timber decking has intermittent split planks with some mold on the underside. The handrail paint is in fair condition. The east side of the deck has settled somewhat, and the west timber retaining wall is failing. There is also a moderate amount of washout at the east support. The bridge is in fair condition and requires repairs.

Structure #18 (SN 010-6370)

This structure is a concrete bridge with an end-to-end length of 13'-3". The northwest wing-wall is vertically cracked and pushing out, and a vertical crack runs down to the piping on the southeast wing-wall. A large longitudinal spall exists underneath the deck, along with longitudinal cracks with leaching. The structure is in fair condition and is structurally adequate to remain in place.

Structure #19 (SN 010-6380)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 35'-0". The timber decking has intermittent split planks with some mold on the underside. The handrail paint is in fair condition. There is washout at the east support, and all anchor bolts are buried. The bridge is in good condition and is structurally adequate to remain in place.
Structure #20 (SN 010-6390)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 24'-0". The timber decking has intermittent split planks with some mold on the underside. The east side of the deck has settled 2¼" below the top of sidewalk, and the west timber retaining wall is failing. There is washout at the east support, and all anchor bolts are buried. The bridge is in fair condition and is structurally adequate to remain in place. It is recommended that deteriorated timber ties be replaced.

Structure #21 (SN 010-6400)

This structure is a concrete box culvert with concrete wing-walls. The culvert has a 12'-0” width (at right angles) and 56'-0" length along the stream. Large horizontal cracks exist on both headwalls. Both ends have significant map cracking with leaching at the top, and the sidewalls have calcium running down the sides. The culvert is in fair condition and is structurally adequate to remain in place.

Structure #22 (SN 010-6410)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 25'-0". The timber decking has intermittent split planks with mold on the underside. The east brick and mortar wing-wall is pushed out, and the west wall is in poor condition. There are no anchor bolts to resist lateral movement. The bridge is in fair condition and is structurally adequate to remain in place. It is recommended that deteriorated timber ties be replaced.
Structure #23 (SN 010-6420)

This structure is a precast bridge with three segments post-tensioned together. The end-to-end length is 20'-0". The steel railing has moderate paint failure and rust. The deck is in good condition. There is severe erosion in front of the east abutment. The bridge is in fair condition and is structurally adequate to remain in place.

Structure #24 (SN 010-6430)

This structure consists of a concrete culvert with concrete headwalls. The culvert width varies from 6'-2" to 7'-3" (at right angles) and the length is 129'-0" along the stream. The upstream opening is missing a handrail section. At the center of the culvert, a large spall exists on the top slab and the slab drops down with efflorescence and map cracking around it. Numerous vertical cracks are evident along the walls. There is a deep scour hole near the center of the culvert where there is no bottom slab. The culvert is in need of significant repairs.

Structure #25 (SN 010-6440)

This structure is a pre-fabricated steel pedestrian bridge with timber decking. Bridge end-to-end length is 25'-0". The timber decking has intermittent split planks with mold on the underside. The paint is in good condition, with some minor rust on the structural steel. The anchor bolts are also in good condition. The bridge is in good condition and is structurally adequate to remain in place.
**Structure #26 (SN 010-6450)**

This structure is a precast bridge with three segments post-tensioned together. The end-to-end length is 19'-0". The steel railing has paint loss and minor rust. The deck is in good condition. The bridge is in fair condition and is structurally adequate to remain in place.

**Structure #27**

This structure is a arch shape, corrugated metal pipe culvert with a maximum width of 84" and stone Gabion walls at the downstream end. The length of the culvert is 120'-0" along the stream. This structure was part of the Boneyard South improvements and is in good condition. The culvert is structurally adequate to remain in place.

**Structure #28**

This structure is a 72" diameter concrete pipe culvert that transitions into a 9'-0" wide concrete box culvert. There are stone Gabion walls at the upstream end and a steel debris gate at the downstream end. This structure was part of the Boneyard South improvements and is in good condition. The culvert is structurally adequate to remain in place.
<table>
<thead>
<tr>
<th>Figure ID</th>
<th>Structure #</th>
<th>Location</th>
<th>Type</th>
<th>Size and Description</th>
<th>Comments</th>
<th>Approximate Invert (base elevation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10-0604</td>
<td>Hickory St., south of Howard St.</td>
<td>Culvert</td>
<td>Flow area = 30” x 61’</td>
<td>729.09 - 731.98</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10-0606</td>
<td>West side of Champagne St., north of Bellefontaine St.</td>
<td>Bridge</td>
<td>Flow area = 67” x 2.5'H</td>
<td>731.4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10-0607</td>
<td>Champagne St., north of Bellefontaine St.</td>
<td>Culvert</td>
<td>Flow area = 54” x 4’ (top)</td>
<td>731.04 - 731.12</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>10-0608</td>
<td>East side of Champagne St., north of Bellefontaine St.</td>
<td>Bridge</td>
<td>Flow area = 2’W x 2’H (bottom)</td>
<td>730.93</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10-0609</td>
<td>Bellefontaine St., west of Market St.</td>
<td>Culvert</td>
<td>Flow area = 2’W x 2’H (top)</td>
<td>730.19 - 730.00</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10-0610</td>
<td>South side of Bellefontaine St., west of Market St.</td>
<td>Bridge</td>
<td>Flow area = 2’W x 3’H (top)</td>
<td>729.96</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10-0611</td>
<td>West side of Market St., south of Bellefontaine St.</td>
<td>Bridge</td>
<td>Flow area = 2’W x 3’H (top)</td>
<td>728.99 - 728.67</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10-0612</td>
<td>Market St. near Bellefontaine St.</td>
<td>Culvert</td>
<td>Flow area = 3.5” x 3.5”</td>
<td>729.88</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>10-0613</td>
<td>East of Market St., south of Bellefontaine St.</td>
<td>Bridge</td>
<td>Flow area = 2’W x 2’H (bottom)</td>
<td>728.00 - 727.70</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10-0610</td>
<td>Garwood St., east of Market St.</td>
<td>Culvert</td>
<td>Flow area = 36” x 3.5’H</td>
<td>724.52</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10-0621</td>
<td>Bradley Ave., east of Market St.</td>
<td>Culvert</td>
<td>Flow area = ±12’</td>
<td>720.72</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-</td>
<td>South of Bradley Ave., under Herff Jones</td>
<td>Bridge</td>
<td>Flow area = 2’W x 2’H (bottom)</td>
<td>723.3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>10-0622</td>
<td>East of Market St., south of Herff Jones</td>
<td>Culvert</td>
<td>Flow area = 22” x 2’H</td>
<td>722.22</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>-</td>
<td>- RR corner of Oak Ash Detention Basin, under RR</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>722.0</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>-</td>
<td>South end of Oak Ash Detention Basin, under RR</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>722.0</td>
<td></td>
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<tr>
<td>16 - 1A</td>
<td>-</td>
<td>SE corner of RR intersection north of Washington St.</td>
<td>Bridge</td>
<td>Flow area = 2’W x 2’H (top)</td>
<td>722.05</td>
<td></td>
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<tr>
<td>17</td>
<td>10-0630</td>
<td>North side of Washington St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>721.3</td>
<td></td>
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<tr>
<td>18</td>
<td>10-0630</td>
<td>North side of Washington St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>720.95 - 721.72</td>
<td></td>
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<td>19</td>
<td>10-0630</td>
<td>South side of Washington St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>721.27</td>
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<td>20</td>
<td>10-0630</td>
<td>North side of 1st St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>720.2</td>
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<td>21</td>
<td>10-0630</td>
<td>North side of 1st St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>720.70 - 720.30</td>
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<td>22</td>
<td>10-0630</td>
<td>South side of 1st St., east of 1st St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>720.9</td>
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<td>23</td>
<td>10-0630</td>
<td>East of 1st St., in alley between Church St. &amp; 6th St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>720.94</td>
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<td>24 - 1A</td>
<td>-</td>
<td>- Park St., east of 2nd St.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (top)</td>
<td>720.44 - 720.21</td>
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<tr>
<td>25</td>
<td>-</td>
<td>North side of alley between 2nd St. and 3rd St., north of University Ave.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>719.12 - 718.65</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>-</td>
<td>North side of alley between 2nd St. and 3rd St., north of University Ave.</td>
<td>Bridge</td>
<td>Flow area = 22” x 2’H (bottom)</td>
<td>717.43 - 717.00</td>
<td></td>
</tr>
</tbody>
</table>
STRUCTURE 3

PLAN

VIEW A

VIEW B
2.625" OD STEEL PIPING

STRUCTURE 9

9.25" x 1.5" wood planks

25-0

3-11'

4-6'

3-6'

22-10

PLAN

VIEW A
STRUCTURE 13

PLAN

A

VIEW A

B

VIEW B
STRUCTURE 15
STRUCTURE 17

VIEW A

PLAN

CHANNEL

A

3.6

5.7

2.3

6.0

9.25” x 1.5” wood planks

24-0

3-9

4-4

7-0

6-0

5-7

3-6

N
STRUCTURE 18

PLAN

11" OD STEEL

13.5" OD STEEL

13" ID STEEL

LONGITUDINAL SPALL

STEEL PROTECTIVE SHEETING (OUT TO EDGE OF BRIDGE)

VIEW A

VIEW B
STRUCTURE 23

VIEW A

3" STEEL SQUARE TUBE HANDRAIL

PLAN

A

A
STRUCTURE 25

VIEW A

9.25" x 15" wood plate
6'-0"
20'-9"

PLAN

A

12" ID CONCRETE
STEEL
3.5" OD
PVC
WRAPPED
2.5" OD

25-0
4'-5"
3'-10"
7'-0
8-6

N

PLAN

A

A

A

10" ID CONCRETE
5.5" OD
2.5" OD
STEEL
WRAPPED
PVC
3" STEEL SQUARE TUBE HANDRAIL

VIEW A

PLAN

STRUCTURE 26
Appendix F

Overall Site Plan
Appendix G

Proposed Cross-section Sketches
Every day is Earth Day at AES.
Appendix H

Bradley Avenue Concepts
Appendix I

Parking Options for Oak Ash Basin
1. Boys and Girls Club Park
- Garden
- Outdoor Education
- Nature Play
- Urban Character
- Water Detention
- Tie into 2nd Street Amenities

2. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Urban to Neighborhood

3. Skelton Park
- Community Garden
- Water Detention

4. Oak Ash South
- Adventure Playground
- Screen Railroad
- Meadow/ Prairie
- Transition from Neighborhood to Natural

5. Oak Ash Basin
- Observation and Passive Recreation
- Outdoor Education
- Nature Trails and Boardwalks
- Wildlife Habitat
- Wetlands and Water Detention
- Community Park

6. Wesley Park
- Active Play
- Gathering
- Picnic Area
- Neighborhood Park

7. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Natural to Neighborhood

8. Bristol Park
- Nature/ Adventure Play
- Mixture of Facilities for Young and Old
- Pond/ Water Detention
- Neighborhood Park

9. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements

10. Human Kinetics Park
- Focus on Human Kinetics Mission
- Sports and Fitness
- Water Detention
- Walking/ Fitness Loop

11. Connector
- Trail Amenities
- Narrow Channel
- Tie into Neil Street

OVERALL PLAN

KEY
- Improved Creek Corridor
- Greenway Trail
- Parking for 20 Cars
- Railroad Crossing
- Ash Street Connection
OVERALL PLAN

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into 2nd Street Amenities

2. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/Prairie
   - Transition from Neighborhood to Natural

3. Skelton Park
   - Community Garden
   - Water Detention

4. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

6. Wesley Park
   - Active Play
   - Gathering
   - Picnic Area
   - Neighborhood Park

7. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Natural to Neighborhood

8. Bristol Park
   - Nature/Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/Water Detention
   - Neighborhood Park

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Narrow Channel
   - Tie into Neil Street

10. Human Kinetics Park
    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/Fitness Loop

11. Connector
    - Trail Amenities
    - Scott Park-like Stream Enhancements
    - Transition from Natural to Neighborhood

KEY

- Improved Creek Corridor
- Greenway Trail
- Parking for 25 Cars
- Railroad Crossing
- Ash Street Entrance
- Phillips Drive Entrance

PARKING OPTION: PARKING BETWEEN ASH ST. AND PHILLIPS DR.
<table>
<thead>
<tr>
<th>PARKING OPTION</th>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ND ST. EXTENSION TO PARKING NORTH OF RR</td>
<td>Dedicated road for Oak Ash access</td>
<td>Requires construction of entirely new street</td>
</tr>
<tr>
<td></td>
<td>Police access/ visibility north of railroad</td>
<td>Railroad coordination: Roadway and trail crossing required over railroad</td>
</tr>
<tr>
<td></td>
<td>Ease of access to Oak Ash amenities</td>
<td>Parking near residence backyards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible conflict with Overhead Lines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extensive grading needed for railroad crossing</td>
</tr>
<tr>
<td>ASH ST. EXTENSION TO PARKING NORTH OF RR</td>
<td>Extension to existing street</td>
<td>Railroad coordination: Roadway and trail crossing required over railroad</td>
</tr>
<tr>
<td></td>
<td>Police access/ visibility north of railroad</td>
<td>Parking near residence backyards</td>
</tr>
<tr>
<td></td>
<td>Ease of access to Oak Ash amenities</td>
<td>Additional traffic on Ash Street</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible conflict with Overhead Lines</td>
</tr>
<tr>
<td>PARKING BETWEEN ASH ST. AND PHILLIPS DR.</td>
<td>Utilizes existing City owned property along railroad</td>
<td>Only requires trail crossing over railroad</td>
</tr>
<tr>
<td></td>
<td>Allows for dual entrance/ exit points at Ash Street and Phillips Drive</td>
<td>No police access/ visibility north of railroad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Could serve as cut-through for cars</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May require railroad coordination/ approval due to proximity.</td>
</tr>
<tr>
<td>PARKING NORTH OF RR. PHILLIPS DRIVE ENTRANCE</td>
<td>Police access/ visibility north of railroad</td>
<td>Possible conflict with existing overhead lines</td>
</tr>
<tr>
<td></td>
<td>Dedicated Oak Ash entry road</td>
<td>Entry road very near to railroad crossing/ possible conflict</td>
</tr>
<tr>
<td>PARKING LOT OFF OF WASHINGTON STREET</td>
<td>Directly off of Washington Street</td>
<td>Good access to Skelton Park</td>
</tr>
<tr>
<td></td>
<td>Good access to Skelton Park</td>
<td>No new railroad crossing required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Could conflict with stormwater detention needs for Washington Street viaduct</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No police access/ visibility north of railroad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Far from major Oak Ash amenities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smaller lot (maximum size 18 to 20 cars)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trail crossing at Phillips is far from Boneyard/ circuitous route</td>
</tr>
</tbody>
</table>
1. Boys and Girls Club Park
- Garden
- Outdoor Education
- Nature Play
- Urban Character
- Water Detention
- Tie into 2nd Street Amenities

2. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Urban to Neighborhood

3. Skelton Park
- Community Garden
- Water Detention

4. Oak Ash South
- Adventure Playground
- Screen Railroad
- Meadow/Prairie
- Transition from Neighborhood to Natural

5. Oak Ash Basin
- Observation and Passive Recreation
- Outdoor Education
- Nature Trails and Boardwalks
- Wildlife Habitat
- Wetlands and Water Detention
- Community Park

6. Wesley Park
- Active Play
- Gathering
- Picnic Area
- Neighborhood Park

7. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Natural to Neighborhood

8. Bristol Park
- Nature/Adventure Play
- Mixture of Facilities for Young and Old
- Pond/Water Detention
- Neighborhood Park

9. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Neighborhood to Natural

10. Human Kinetics Park
- Focus on Human Kinetics Mission
- Sports and Fitness
- Water Detention
- Walking/Fitness Loop

11. Connector
- Trail Amenities
- Narrow Channel
- Tie into Neil Street

Legend
- Proposed Stream Channel
- Proposed Detention/Wet Pond
- Proposed Trail
- Greenspace
- City Property

KEY
- Improved Creek Corridor
- Greenway Trail
- Parking for 20 Cars
- Family Pavilion
Appendix J

Washington Street Viaduct Concepts
Appendix K

Pedestrian Routing
Goals of North Branch Improvements

- Flood Reduction and Control
- Clean and Healthy Stream
- Improve Overall Character and Health of Area
- Walking/ Biking Connectivity with City
- Natural Area Corridor
- Environment for Healthy Lifestyle
- Forum for Teaching/ Education
- Safe, Comfortable and Interesting Experience
- Quality to Match Completed Boneyard Projects
OVERALL PLAN
Boneyard Creek North Branch | Champaign, IL

1. Boys and Girls Club Park
   • Garden
   • Outdoor Education
   • Nature Play
   • Urban Character
   • Water Detention
   • Transition from Urban to Neighborhood

2. Connector
   • Trail Amenities
   • Scott Park-like Stream Enhancements
   • Transition from Urban to Neighborhood

3. Skelton Park
   • Community Garden
   • Water Detention
   • Neighborhood Park

4. Oak Ash South
   • Adventure Playground
   • Screen Railroad
   • Meadow/Prairie
   • Transition from Neighborhood to Natural

5. Oak Ash Basin
   • Observation and Passive Recreation
   • Outdoor Education
   • Nature Trails and Boardwalks
   • Wildlife Habitat
   • Wetlands and Water Detention
   • Community Park

6. Wesley Park
   • Active Play
   • Gathering
   • Picnic Area
   • Neighborhood Park

7. Connector
   • Trail Amenities
   • Scott Park-like Stream Enhancements
   • Transition from Natural to Neighborhood

8. Connector
   • Trail Amenities
   • Scott Park-like Stream Enhancements
   • Pond/ Water Detention
   • Neighborhood Park

9. Connector
   • Trail Amenities
   • Scott Park-like Stream Enhancements

10. Human Kinetics Park
    • Focus on Human Kinetics Mission
    • Sports and Fitness
    • Water Detention
    • Walking/ Fitness Loop

11. Connector
    • Trail Amenities
    • Scott Park-like Stream Enhancements
    • Pond/ Water Detention

12. Human Kinetics Park
    • Mixture of Facilities for Young and Old
    • Pond/ Water Detention
    • Neighborhood Park

Legend
- Proposed Stream Channel
- Proposed Detention/ Wet Pond
- Proposed Trail
- Greenspace
- City Property

UNIVERSITY AVENUE AT 2ND STREET OPTION: OPEN STREAM AT BOYS AND GIRLS CLUB
Boneyard Creek North Branch | Champaign, IL

KEY
1. Open, Enhanced Stream
2. Underground Culvert
3. Multi-Use Trail
4. High Visibility Crosswalk
5. Median
6. Potential Parking Lot Relocation
7. Boys and Girls Club Park and Education Area
8. Accessible Parking Spaces
OVERALL PLAN
Boneyard Creek North Branch | Champaign, IL

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into and Street Amenities

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Urban to Neighborhood

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

4. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/ Prairie
   - Transition from Neighborhood to Natural

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

6. Wesley Park
   - Active Play
   - Gathering
   - Point Area
   - Neighborhood Park

7. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Natural to Neighborhood

8. Bristol Park
   - Nature/ Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/ Water Detention
   - Neighborhood Park

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements

10. Human Kinetics Park
    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/ Fitness Loop

11. Connector
    - Trail Amenities
    - Narrow Channel
    - Tie into Neil Street

Legend
- Proposed Stream Channel
- Proposed Detention/ Wet Pond
- Proposed Trail
- Greenspace
- City Property

UNIVERSITY AVENUE AT 2ND STREET
OPTION: BONEYARD CREEK FULL POTENTIAL
Boneyard Creek North Branch | Champaign, IL
OVERALL PLAN

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into Street Amenities

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Urban to Neighborhood

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

4. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/Prairie
   - Transition from Neighborhood to Natural

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

6. Wesley Park
   - Active Play
   - Gathering
   - Picnic Area
   - Neighborhood Park

7. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Natural to Neighborhood

8. Bristol Park
   - Nature/Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/Water Detention
   - Neighborhood Park

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements

10. Human Kinetics Park
    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/Fitness Loop

11. Connector
    - Trail Amenities

Legend

- Proposed Stream Channel
- Proposed Detention/Wet Pond
- Proposed Trail
- Greenspace
- City Property
Overall Plan

Boneyard Creek North Branch | Champaign, IL

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into and Street Amenities

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

4. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/Prairie
   - Transition from Neighborhood to Natural

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
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   - Community Park

6. Wesley Park
   - Active Play
   - Gathering
   - Picnic Area
   - Neighborhood Park

7. Connector
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8. Bristol Park
   - Nature/Adventure Play
   - Mixture of Facilities for Young and Old
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9. Connector
   - Trail Amenities
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    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/Fitness Loop

11. Connector
    - Trail Amenities
    - Narrow Channel
    - Tie into Neil Street

Legend

- Proposed Stream Channel
- Proposed Detention/Wet Pond
- Proposed Trail
- Greenspace
- City Property

Challenge:
Ownership, Conflict with Parking Lot and Building at Oakwood Trace Apartments

Challenge:
At Grade Railroad Crossing/Railroad Coordination

KEY

- Improved Creek Channel
- New Culvert
- Multi-Use Trail
- Pedestrian Crossing Gate
- High Visibility Crosswalk and Potential Pedestrian Signal

PREFERRED ROUTE: WASHINGTON TO BRADLEY
NEW CULVERT AND NORTHERN CONNECTION

Boneyard Creek North Branch | Champaign, IL
OVERALL PLAN

Boneyard Creek North Branch | Champaign, IL

Human Kinetics Park
Beardsley Park
Bradley Ave
E. Washington Street
N. 2nd Street
N. Market Street
N. Clock St.
Bellefontaine
Garwood St.
Champaign St.
Walnut St.
Hickory St.
Neil St.
N. 3rd Street
University Ave.
E. Park St.
E. Church St.
E. Hill St.
Phillips Drive
Holts Dr.
Nelson
Foxwell
N. 1st Street
Wesley Park
Herff Jones
Boys and Girls Club
Skelton Park
8. Bristol Park
9. Connector
10. Human Kinetics Park
5. Connector
6. Wesley Park
4. Oak Ash South
3. Skelton Park
1. Boys and Girls Club Park

Legend
- Proposed Stream Channel
- Proposed Detention/ Wet Pond
- Proposed Trail
- Greenspace
- City Property

KEY
- Improved Creek Channel
- New Culvert
- Multi-Use Trail
- Widened Viaduct
- High Visibility Crosswalk and Potential Pedestrian Signal

Challenge:
- Property Ownership at Oakwood Trace Apartments
- Railroad Right of Way
- North Market Street Traffic
OVERALL PLAN

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into Street Amenities

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Urban to Neighborhood

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

4. Oak Ash South
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   - Transition from Neighborhood to Natural

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   - Community Park

6. Wesley Park
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   - Gathering
   - Picnic Area
   - Neighborhood Park

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   - Transition from Natural to Neighborhood

8. Bristol Park
   - Nature/Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/Water Detention
   - Neighborhood Park

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements

10. Human Kinetics Park
    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/Fitness Loop

11. Connector
    - Trail Amenities
    - Neighborhood Park

Challenge:
- Railroad Right of Way Required
- Impacts to Herff Jones Parking
- Railroad Right of Way Tunnel Construction and Experience

KEY
- Improved Creek Channel
- Trail Tunnel/Culvert
- Multi-Use Trail
- Pedestrian Crossing Gate
- High Visibility Crosswalk and Potential Pedestrian Signal
OVERALL PLAN
Boneyard Creek North Branch | Champaign, IL

Human Kinetics Park

Beardsley Park

Bradley Ave

E. Washington Street

N. 2nd Street

N. Market Street

N. Clock St.

Bellefontaine

Garwood St.

Champaign St.

Walnut St.

Hickory St.

Neil St.

N. 3rd Street

University Ave.

E. Park St.

E. Church St.

E. Hill St.

Phillips Drive

Holts Dr.

Foxwell

N. 1st Street

Wesley Park

Herff Jones

Boys and Girls Club

Skelton Park

8. Bristol Park

• Nature/Adventure Play
• Mixture of Facilities for Young and Old
• Pond/Water Detention
• Neighborhood Park

5. Oak Ash Basin

• Observation and Passive Recreation
• Outdoor Education
• Nature Trails and Boardwalks
• Wildlife Habitat
• Wetlands and Water Detention
• Community Park

4. Oak Ash South

• Adventure Playground
• Screen Railroad
• Meadow/Prairie
• Transition from Neighborhood to Natural

3. Skelton Park

• Community Garden
• Water Detention
• Neighborhood Park

2. Connector

• Trail Amenities
• Scott Park-like Stream Enhancements
• Transition from Urban to Neighborhood

1. Boys and Girls Club Park

• Garden
• Outdoor Education
• Nature Play
• Urban Character
• Water Detention?
• Tie into 2nd Street Amenities

10. Human Kinetics Park

• Focus on Human Kinetics Mission
• Sports and Fitness
• Water Detention
• Walking/Fitness Loop

9. Connector

• Trail Amenities
• Scott Park-like Stream Enhancements
• Transition from Natural to Neighborhood

6. Wesley Park

• Active Play
• Gathering
• Picnic Area
• Neighborhood Park

5. Oak Ash Basin

• Observation and Passive Recreation
• Outdoor Education
• Nature Trails and Boardwalks
• Wildlife Habitat
• Wetlands and Water Detention
• Community Park

4. Oak Ash South

• Adventure Playground
• Screen Railroad
• Meadow/Prairie
• Transition from Neighborhood to Natural

3. Skelton Park

• Community Garden
• Water Detention
• Neighborhood Park

2. Connector

• Trail Amenities
• Scott Park-like Stream Enhancements
• Transition from Urban to Neighborhood

1. Boys and Girls Club Park

• Garden
• Outdoor Education
• Nature Play
• Urban Character
• Water Detention?
• Tie into 2nd Street Amenities

Legend
Proposed Stream Channel
Proposed Detention/Wet Pond
Proposed Trail
Greenspace
City Property

Challenge:
Ownership, Conflict with Parking Lot and Building at Oakwood Trace Apartments

Challenge:
Impedes Future Development

Challenge:
Railroad Right of Way

Challenge:
At Grade Railroad Crossing/Railroad Coordination

KEY
1. Improved Creek Channel
2. New Culvert
3. Multi-Use Trail
4. Pedestrian Crossing Gate
5. High Visibility Crosswalk and Potential Pedestrian Signal
OVERALL PLAN
Boneyard Creek North Branch | Champaign, IL

Human Kinetics Park
Beardsley Park
Bradley Ave
E. Washington Street
N. 2nd Street
N. Market Street
N. Clock St.
Bellefontaine
Garwood St.
Champaign St.
Walnut St.
Hickory St.
Neil St.
N. 3rd Street
University Ave.
E. Park St.
E. Church St.
E. Hill St.
Phillips Drive
Holts Dr.
Nelson
Foxwell
N. 1st Street
Wesley Park
Herff Jones
Boys and Girls Club
Skelton Park
8. Bristol Park
9. Connector
10. Human Kinetics Park
11. Connector
7. Connector
6. Wesley Park
5. Oak Ash Basin
4. Oak Ash South
3. Skelton Park
2. Connector
1. Boys and Girls Club Park

OAK ASH DETENTION BASIN PROGRAM IDEAS
Boneyard Creek North Branch | Champaign, IL

Legend
- Improved Creek Channel
- Nature Trails/ Boardwalk
- Multi-Use Trail
- Adventure Playground
- Pavilion/ Classroom
- Family Pavilion

KEY
- Proposed Stream Channel
- Proposed Detention/ Wet Pond
- Proposed Trail
- Greenspace
- City Property
OVERALL PLAN

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into 2nd Street Amenities

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Urban to Neighborhood

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

4. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/Prairie
   - Transition from Neighborhood to Natural

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

6. Wesley Park
   - Active Play
   - Gathering
   - Picnic Area
   - Neighborhood Park

7. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Natural to Neighborhood

8. Bristol Park
   - Nature/Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/Water Detention
   - Neighborhood Park

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Pond/Water Detention
   - Neighborhood Park

10. Human Kinetics Park
    - Focus on Human Kinetics Mission
    - Sports and Fitness
    - Water Detention
    - Walking/Fitness Loop

11. Connector
    - Trail Amenities
    - Narrow Channel
    - Tie into Neil Street

KEY
- Pond/Water Detention
- Multi-Use Trail
- Walking Trails
- Pavilion
- Park Amenities
- Realigned Clock Street
OVERALL PLAN

11. Connector
   - Trail Amenities
   - Narrow Channel
   - Tie into Neil Street

10. Human Kinetics Park
   - Focus on Human Kinetics Mission
   - Sports and Fitness
   - Water Detention
   - Walking/ Fitness Loop

9. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements

8. Bristol Park
   - Nature/ Adventure Play
   - Mixture of Facilities for Young and Old
   - Pond/ Water Detention
   - Neighborhood Park

7. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Natural to Neighborhood

6. Wesley Park
   - Active Play
   - Gathering
   - Picnic Area
   - Neighborhood Park

5. Oak Ash Basin
   - Observation and Passive Recreation
   - Outdoor Education
   - Nature Trails and Boardwalks
   - Wildlife Habitat
   - Wetlands and Water Detention
   - Community Park

4. Oak Ash South
   - Adventure Playground
   - Screen Railroad
   - Meadow/ Prairie
   - Transition from Neighborhood to Natural

3. Skelton Park
   - Community Garden
   - Water Detention
   - Neighborhood Park

2. Connector
   - Trail Amenities
   - Scott Park-like Stream Enhancements
   - Transition from Urban to Neighborhood

1. Boys and Girls Club Park
   - Garden
   - Outdoor Education
   - Nature Play
   - Urban Character
   - Water Detention
   - Tie into 2nd Street Amenities

KEY
- Improved Creek Corridor
- Pond/ Water Detention at Human Kinetics Park
- Modified Diversion Structure
- Multi-Use Trail
- Bioswale
11. Connector
- Trail Amenities
- Narrow Channel
- Tie into Neil Street

10. Human Kinetics Park
- Focus on Human Kinetics Mission
- Sports and Fitness
- Water Detention
- Walking/ Fitness Loop

9. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements

8. Bristol Park
- Nature/ Adventure Play
- Mixture of Facilities for Young and Old
- Pond/ Water Detention
- Neighborhood Park

7. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Natural to Neighborhood

4. Oak Ash South
- Adventure Playground
- Screen Railroad
- Meadow/ Prairie
- Transition from Neighborhood to Natural

10. Human Kinetics Park
- Focus on Human Kinetics Mission
- Sports and Fitness
- Water Detention
- Walking/ Fitness Loop

5. Oak Ash Basin
- Observation and Passive Recreation
- Outdoor Education
- Nature Trails and Boardwalks
- Wildlife Habitat
- Wetlands and Water Detention
- Community Park

3. Skelton Park
- Community Garden
- Water Detention
- Neighborhood Park

1. Boys and Girls Club Park
- Garden
- Outdoor Education
- Nature Play
- Urban Character
- Water Detention
- Tie into 2nd Street Amenities

KEY
- Improved Creek Corridor
- Pond/ Water Detention at Human Kinetics Park
- Modified Diversion Structure
- Multi-Use Trail
- Bioswale
- Signalized Pedestrian Crossing
11. Connector
- Trail Amenities
- Narrow Channel
- Tie into Neil Street

10. Human Kinetics Park
- Focus on Human Kinetics Mission
- Sports and Fitness
- Water Detention
- Walking/ Fitness Loop

9. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements

8. Bristol Park
- Nature/ Adventure Play
- Mixture of Facilities for Young and Old
- Pond/ Water Detention
- Neighborhood Park

7. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Natural to Neighborhood

6. Wesley Park
- Active Play
- Gathering
- Picnic Area
- Neighborhood Park

5. Oak Ash Basin
- Observation and Passive Recreation
- Outdoor Education
- Nature Trails and Boardwalks
- Wildlife Habitat
- Wetlands and Water Detention
- Community Park

4. Oak Ash South
- Adventure Playground
- Screen Railroad
- Meadow/ Prairie
- Transition from Neighborhood to Natural

3. Skelton Park
- Community Garden
- Water Detention
- Neighborhood Park

2. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Urban to Neighborhood

1. Boys and Girls Club Park
- Garden
- Outdoor Education
- Nature Play
- Urban Character
- Water Detention?
- Tie into and Street Amenities

Moving Forward: Next Steps?
1. Boys and Girls Club Park
- Garden
- Outdoor Education
- Nature Play
- Urban Character
- Water Detention
- Tie into 2nd Street Amenities

2. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
- Transition from Urban to Neighborhood

3. Skelton Park
- Community Garden
- Water Detention
- Neighborhood Park

4. Oak Ash South
- Adventure Playground
- Screen Railroad
- Meadow/ Prairie
- Transition from Neighborhood to Natural

5. Oak Ash Basin
- Observation and Passive Recreation
- Outdoor Education
- Nature Trails and Boardwalks
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- Community Park

6. Wesley Park
- Active Play
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7. Connector
- Trail Amenities
- Scott Park-like Stream Enhancements
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- Sports and Fitness
- Water Detention
- Walking/ Fitness Loop

11. Connector
- Trail Amenities
- Narrow Channel
- Tie into Neil Street

**OVERALL PLAN**

**KEY**
- Improved Creek Corridor
- Pond/ Water Detention at Human Kinetics Park
- Modified Diversion Structure
- Multi-Use Trail
- Culvert
- Signalized Pedestrian Crossing

**ROUTING OPTION: BONEYARD AT NEIL STREET**

**BONEYARD CREEK NORTH BRANCH | CHAMPAIGN, IL**

**Legend**
- Proposed Stream Channel
- Proposed Detention/ Wet Pond
- Proposed Trail
- Greenspace
- City Property
Appendix L

Proposed Structure Details
NOTIFY LANDSCAPE ARCHITECT IMMEDIATELY IN EVENTS OF DISCREPANCIES, OMISSIONS, AND/OR CONFLICTS IN THE DRAWINGS OR SPECIFICATIONS. THE CONTRACTOR IS NOT AUTHORIZED TO SCALE THE DRAWINGS. ALL QUESTIONS IN REFERENCE TO CONTRACT DOCUMENTS SHALL BE IMMEDIATELY DIRECTED TO THE LANDSCAPE ARCHITECT.

**Typical Intersection Crossing**
- Identifies typical configuration of the intersection
- Includes cross sections and details for proper construction

**Typical Stormwater BMP**
- Illustrates best management practices for stormwater management
- Demonstrates rain gardens, Safe Streets, and other green infrastructure solutions

**Typical Straight Headwall**
- Represents a headwall designed for straight sections of the project
- Includes dimensions and material specifications

**Typical Straight Crossing**
- Shows typical crossing design
- Highlights components such as curbs, gutters, and storm drain inlets

**Typical Intersection Corner**
- Depicts corner details for correct construction
- Ensures smooth transitions and proper alignment

**Typical Greenway Markers**
- Indicates markers along the greenway system
- Helps in identifying and maintaining the greenway path

**Trail Bridge**
- Illustration of a pedestrian bridge
- Indicates materials, dimensions, and structural integrity

**Typical Corner Headwall**
- Shows corner headwall details
- Provides guidelines for structural and aesthetic consistency

**TYPICAL INTERSECTION CROSSING**
- Details of the intersection design
- Includes cross sections and detailing for clear construction guidance

**NOT FOR CONSTRUCTION**
- Stated on the drawings to ensure they are not used for construction purposes

**Scale: X"=X'**
- Indicates the scale of the drawings
- Assists in understanding the relative sizes of the components

**N.T.S.**
- Represents notes to the scale that provide additional information
- Helps in interpreting the drawings accurately

**MISSOURI ONE-CALL SYSTEM INC.**
- TOLL FREE 1-800-344-7483
- MODOT (314) 340-4100

**February 11, 2016 - CONCEPT DEVELOPMENT**
- Date of the concept development phase
- Signifies the beginning of the design process

**Boneyard Creek North Branch Improvements**
- Project title
- Indicates the scope and location of the project

**Drawn**
-突击 planted for
- Denotes the drafter responsible for the drawings

**Reviewed**
-突击 planted for
- Indicates the reviewer for the drawings

**Key Plan**
- Provides an overview of the project layout
- Helps in navigating the site plan
Appendix M

Market Street Details
MARKET STREET STREETSCAPE AND DEVELOPMENT - MARKET STREET ROUTE OPTION - NORTH

Boneyard Creek North Branch - Champaign, IL

EXISTING ROAD WIDTH
- 10' TRAIL
- 11' LANE
- 11' LANE
- 5' WALK

BMP BMP

SECTION AT HERFF JONES
Appendix N

Cost Estimates
<table>
<thead>
<tr>
<th><strong>Summary of Total Estimated Construction Cost by Section</strong></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Grand Total</th>
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<td>Bridge/Culvert Demolition</td>
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<td><strong>$5,327,150</strong></td>
<td><strong>$4,623,550</strong></td>
<td><strong>$6,101,150</strong></td>
<td><strong>$21,583,800</strong></td>
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### Estimated Bridge/ Culvert Construction Cost by Section

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<th>Bridge/Culvert Demolition</th>
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<th>C</th>
<th>D</th>
<th>Grand Total</th>
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<th>Bridge/Culverts</th>
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<tr>
<td><strong>Skelton Park</strong></td>
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<td>$ 993,800</td>
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<tr>
<td>Hoop Bike Racks</td>
<td>$ 800</td>
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<td>$ 800</td>
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<tr>
<td>Prefabricated Pedestrian Bridge ~ 25 ft clear span; 6 ft wide (South)</td>
<td>$ 43,000</td>
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<td>$ 43,000</td>
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<td>Trash Receptacles</td>
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**Wesley Park**

<table>
<thead>
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<td>Benches</td>
<td>$ 5,000</td>
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<tr>
<td>Hoop Bike Racks</td>
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<tr>
<td>Limestone Landscape Boulders</td>
<td>$ 6,300</td>
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<tr>
<td>Pavilion (30 Person)</td>
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<td>Play surfacing</td>
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<tr>
<td>Prefabricated Pedestrian Bridge ~ 15 ft clear span; 6 ft wide (West of Wesley Park)</td>
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<td>Relocate Playground</td>
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**Bristol Place**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Benches</td>
<td>$ 30,000</td>
<td>$ 30,000</td>
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<td>Bridge Landings Both Sides (Stone Veneer, Cap)</td>
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<td>$ 80,000</td>
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<tr>
<td>Hoop Bike Racks</td>
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<tr>
<td>Limestone Landscape Boulders</td>
<td>$ 15,750</td>
<td>$ 15,750</td>
</tr>
<tr>
<td>Pavilion (20 Person)</td>
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<tr>
<td>Playground Structure</td>
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<tr>
<td>Playground Surfacing</td>
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<td>Prefabricated Pedestrian Bridge ~ 20 ft clear span; 6 ft wide</td>
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<td>$ 37,000</td>
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<tr>
<td>Prefabricated Pedestrian Bridge ~ 25 ft clear span; 6 ft wide</td>
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<td>$ 86,000</td>
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<tr>
<td>Rock Outcrop</td>
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<tr>
<td>Trash Receptacles</td>
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**Human Kinetics**

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<td>Additional Seating Node (Limestone Seatwall, Decorative Concrete Pavers)</td>
<td>$ 12,500</td>
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<tr>
<td>Limestone Landscape Boulders</td>
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**Grand Total**

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<tr>
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<th>Grand Total</th>
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<tr>
<td></td>
<td>$ 51,800</td>
<td>$ 270,800</td>
<td>$ 671,200</td>
<td>$ 993,800</td>
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## Estimated Creek and Trail Construction Cost by Section

<table>
<thead>
<tr>
<th>Section</th>
<th>A</th>
<th>B</th>
<th>C</th>
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<th>Grand Total</th>
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<tbody>
<tr>
<td><strong>Creek Improvements</strong></td>
<td><strong>$1,231,950</strong></td>
<td><strong>$120,525</strong></td>
<td><strong>$297,600</strong></td>
<td><strong>$797,350</strong></td>
<td><strong>$2,447,425</strong></td>
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<tr>
<td>Canopy Trees</td>
<td><strong>$26,400</strong></td>
<td><strong>$18,000</strong></td>
<td><strong>$21,000</strong></td>
<td><strong>$63,000</strong></td>
<td><strong>$128,400</strong></td>
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<tr>
<td>Channel Excavation</td>
<td><strong>$590,000</strong></td>
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<tr>
<td>Channel plantings</td>
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<td><strong>$8,000</strong></td>
<td><strong>$28,000</strong></td>
<td><strong>$83,200</strong></td>
<td><strong>$159,680</strong></td>
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<tr>
<td>Culvert (Stone Veneer, Cap, Handrail, Concrete Pavers)</td>
<td><strong>$135,000</strong></td>
<td><strong>$30,000</strong></td>
<td><strong>$75,000</strong></td>
<td><strong>$90,000</strong></td>
<td><strong>$330,000</strong></td>
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<td>Curbside Bioretention Area (Planting, Soils, Curbs)</td>
<td><strong>$126,000</strong></td>
<td><strong>$12,000</strong></td>
<td><strong>$13,500</strong></td>
<td><strong>$96,000</strong></td>
<td><strong>$247,500</strong></td>
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<td>Ephemeral Swale/Slough</td>
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<td><strong>$14,400</strong></td>
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<td>Evergreen Trees</td>
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<td><strong>8,000</strong>$</td>
<td><strong>16,000</strong>$</td>
<td><strong>16,000</strong>$</td>
<td><strong>47,600</strong>$</td>
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<td>Flowering Trees</td>
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<td><strong>$18,000</strong></td>
<td><strong>$72,000</strong></td>
<td><strong>$138,600</strong></td>
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<tr>
<td>Limestone Landscape Boulders</td>
<td><strong>$27,000</strong></td>
<td><strong>$9,000</strong></td>
<td><strong>$18,000</strong></td>
<td><strong>$19,350</strong></td>
<td><strong>$73,350</strong></td>
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<td>Planting Area (Shrubs, Perennials, Amended Topsoil, and Mulch)</td>
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<td><strong>$12,000</strong></td>
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<td>Property Relocation/Environmental/Demolition</td>
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<td><strong>$65,500</strong></td>
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<tr>
<td>Retention/Wet Meadow</td>
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<td></td>
<td><strong>$80,000</strong> $48,600 $128,600</td>
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<td>Turf/Native Area (assumed some topsoil can be salvaged from site)</td>
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<td><strong>5,525</strong>$</td>
<td><strong>6,500</strong>$</td>
<td><strong>20,800</strong>$</td>
<td><strong>35,295</strong>$</td>
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<td><strong>Trail</strong></td>
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<td><strong>$452,500</strong></td>
<td><strong>$956,000</strong></td>
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<td><strong>$3,449,000</strong></td>
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<td>Bridge Landing Both Sides (Stone Veneer, Cap)</td>
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<td></td>
<td><strong>$120,000</strong></td>
</tr>
<tr>
<td>Bridge Landings Both Sides (Stone Veneer, Cap)</td>
<td></td>
<td><strong>$40,000</strong></td>
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<td><strong>$120,000</strong></td>
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<tr>
<td>Drinking fountain</td>
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<td><strong>$5,500</strong></td>
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<tr>
<td>Drinking fountains</td>
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<td></td>
<td><strong>$5,500</strong>$</td>
<td><strong>$5,500</strong>$</td>
<td><strong>$11,000</strong>$</td>
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<tr>
<td>Freestanding play equipment along trail</td>
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<td><strong>$100,000</strong>$</td>
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<td>Seating Node (Limestone Seatwall, Decorative Concrete Pavers)</td>
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<td>**$25,000$$</td>
<td>**$37,500$$</td>
<td>**$50,000$$</td>
<td>**$162,500$$</td>
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<td>Trail (10'') - Prime</td>
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<td>**$94,500$$</td>
<td>**$457,500$$</td>
<td>**$577,500$$</td>
<td>**$1,341,000$$</td>
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<tr>
<td>Trail (6'') - Secondary</td>
<td>**$36,000$$</td>
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<td>**$151,500$$</td>
<td>**$435,000$$</td>
<td>**$633,000$$</td>
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<tr>
<td>Trail lighting</td>
<td>**$225,000$$</td>
<td>**$225,000$$</td>
<td>**$225,000$$</td>
<td>**$225,000$$</td>
<td>**$900,000$$</td>
</tr>
<tr>
<td>Trail Markers 3' High (CMU Column with Stone Veneer and Cap)</td>
<td>**$6,000$$</td>
<td>**$2,000$$</td>
<td>**$4,000$$</td>
<td>**$8,000$$</td>
<td>**$20,000$$</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>**$1,885,950$$</td>
<td>**$573,025$$</td>
<td>**$1,253,600$$</td>
<td>**$2,183,850$$</td>
<td>**$5,896,425$$</td>
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### Estimated Washington St. Viaduct Improvement
### Construction Cost by Section

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<td>Viaduct Improvements at Washington St.</td>
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<tr>
<td>Washington St.</td>
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<td>$ 1,047,375</td>
<td>$ 1,357,375</td>
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<td>Pump station</td>
<td>$ 310,000</td>
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<tr>
<td>Concrete Retaining Wall (8'), Stone Veneer, and Cap</td>
<td>$ 270,000</td>
<td>$ 270,000</td>
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<tr>
<td>Curbs</td>
<td>$ 34,000</td>
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<tr>
<td>Handrail</td>
<td>$ 59,375</td>
<td>$ 59,375</td>
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<tr>
<td>Planting Area</td>
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<tr>
<td>Retaining wall</td>
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<tr>
<td>Stone Veneer and Cap (Existing Walls)</td>
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<td>$ 28,800</td>
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<tr>
<td>Trash Receptacles</td>
<td>$ 3,000</td>
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</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>$ 310,000</td>
<td>$ 1,047,375</td>
<td>$ 1,357,375</td>
</tr>
<tr>
<td>Description</td>
<td>Est. Const. Cost</td>
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<tr>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>Additional Costs for Overpass Alternate for CNRR at Bradley Ave.</td>
<td>$ 9,515,400</td>
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<tr>
<td>10.00 Bradley Ave.</td>
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<tr>
<td>Bridge Section - 36 inch steel beams and MSE wall abutments ~ 635 ft back to back abutment; 48 ft out to out width</td>
<td>$ 5,360,000</td>
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<tr>
<td>Lighting</td>
<td>$ 350,000</td>
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<tr>
<td>MSE Section - Custom MSE panels, rails</td>
<td>$ 350,000</td>
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<tr>
<td>MSE Section - Pavement</td>
<td>$ 330,000</td>
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<tr>
<td>MSE Section - Walks</td>
<td>$ 230,400</td>
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<tr>
<td>MSE Section - Wall ; 48 ft out to out width</td>
<td>$ 3,070,000</td>
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<tr>
<td>Pavement Transitions @ Fourth St. and Market St.</td>
<td>$ 150,000</td>
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<tr>
<td>Single cell precast box culvert with bottom buried 2 ft ~ 10 ft wide; 5 ft high; 370 ft long</td>
<td>$(325,000)</td>
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</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>$ 9,515,400</strong></td>
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</tr>
</tbody>
</table>
Appendix O

The Bradley Avenue / Canadian National – Illinois Central Railroad Grade Separation Study, 2000
The Bradley Avenue / Canadian National –
Illinois Central Railroad Grade Separation Study

Prepared for the City of Champaign Planning Department
By Mark K. Nolan
University of Illinois at Urbana-Champaign
Department of Urban and Regional Planning
Urban Planning 495: Capstone Workshop
Professor Leonard Heumann

In Partial Fulfillment of the Masters of Urban Planning
December 20, 2000
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The Bradley Avenue / CN-IC Railroad Crossing

Introduction

The City of Champaign has expressed a need for the design study of an over- or underpass of the Canadian National-Illinois Central (CN-IC) railroad tracks at Bradley Avenue in Champaign’s North End. There is concern that both automobile traffic on Bradley and freight train traffic on the CN-IC tracks will increase in the future, further contributing to traffic problems and thus warranting a separation of the two modes. It has been noted that the crossing design study must consider the affects of monetary cost, environmental and safety impacts, and perhaps most importantly any possible negative impacts on the physical and social fabric of the neighborhood and surrounding community. These are all major concerns that have proven to be both challenging and rewarding during the process of assembling this report.

This report must consider issues directly related to the Bradley Avenue / CN-IC crossing. However, the true measure of its usefulness will be the degree to which it fits and contributes to the overall plan for Bristol Place and its other component parts. The grade separation alternatives will each differently affect not only the development of the intersection of Bradley and Market Street, but also environmental issues pertaining to the Boneyard Creek, the physical connections between the quadrants of the neighborhood surrounding the crossing, traffic patterns in and through the neighborhood, and more. The direct and reciprocal relationship between the Bradley Avenue / CN-IC Grade Separation Project and the remaining components of the Bristol Place plan must be considered in addition to those factors stated above.

This report is intended to be used by the City of Champaign Planning and Public Works/Engineering Departments as the first step towards determining what options exist regarding the crossing of Bradley Avenue and the CN-IC tracks. The City has expressed concern for this issue, and has set funding aside in its 2001-2002 Capital Improvement Plan to study it. A primary goal of this report is to enable the client to more efficiently carry out further study on this particular issue as well as contributing to the overall plan for the area including but not limited to Bristol Place.
The Context of the Project

The larger context of the Bradley Avenue / CN-IC railroad crossing is Champaign’s North End, and is roughly bordered by Neil Street to the west, Interstate 74 to the north, Lincoln Avenue to the east and Washington Street to the south (see figure 1). To the north and northwest of the crossing is Bristol Place, a low- to middle-income residential neighborhood. To the southwest is the Beardsley Park neighborhood, somewhat more established than Bristol Place. South of the crossing is a warehouse and light industrial district with some established businesses and related activities. Northeast of the crossing is an asphalt plant, and east and southeast is consisted of public housing immediately adjacent to the project site and a residential neighborhood further to the southeast.

For the purposes of this report, the defined project site is considered to be along Bradley Avenue from its intersection with Market Street to the west to Fourth Street to the east. At Market Street there is an established business in the Seaboot restaurant at the southeast corner, a small park and residential area at the southwest corner, a funeral home at the northwest corner, and vacant land to the northeast. As one moves east along Bradley Avenue, the residences of the Bristol Place neighborhood on the north side begin to thin out as the railroad tracks are approached. On the south side east of the Seaboot restaurant, the City of Champaign owns several parcels up to the CN-IC tracks, which are currently vacant. Immediately northeast of the crossing is the asphalt plant, and on the southeast quadrant is the site of the former Parkside Apartments, which are proposed to be renovated in the near future.

There is a reciprocal relationship between all of the entities discussed above and any proposed grade separation alternative. An analysis of every aspect of this project must carefully consider how it may be affected by these entities as well as any impacts that it may have on nearby residents.

The Potential for a Grade-Separated Crossing

It is the finding of this report that a grade separation structure at Bradley Avenue and the CN-IC tracks is both necessary and achievable. The following discussion – based upon
Figure 1: Project Area Map, Champaign's North End
automobile and train traffic and their relationship to one another – provides a basis for this argument and will serve as the grounds for further study.

Automobile and Train Traffic

Perhaps the primary reason for the consideration of a grade-separated crossing at Bradley and the CN-IC tracks is the recent intensification of traffic experienced there. The Bristol Place area, specifically at the intersection of Market Street and Bradley Avenue, has seen a steady increase in automobile traffic over the past ten years. This is even more apparent when comparing traffic counts of 1996 with those obtained in 2000. According to the Illinois Department of Transportation’s 1996 Champaign-Traffic Map and a count completed by the City of Champaign in March of 2000, average daily traffic (ADT) on Bradley Avenue at Market Street has increased nearly 19 percent in four years, from 10,900 to 12,940. Traffic is most likely to continue to increase into the future as trends indicate and as Champaign’s North End begins to develop as planned. If this rate is applied to the 1996 traffic at Bradley and the CN-IC tracks, by 2020 the crossing may see an increase in ADT from 11,800 to 25,000 or even 33,000, depending on whether actual increases in traffic follow a linear or exponential projection. This significant increase of two to three times the current amount of automobile traffic alone warrants the consideration of a grade separation.

The recent increase in CN-IC railroad activity has also raised concerns over the interaction of automobiles and trains at the crossing. Since Canadian National acquired Illinois Central it has shifted its switching activity from Chicago to the Champaign Yard, which is located just north of the crossing. This has resulted in an increase in the number of trains that cross Bradley Avenue to twenty or twenty-five trains per day. And although CN-IC officials do not plan to increase this current level of activity in the future, it undeniably has contributed to longer waits for motorists while trains cross Bradley Avenue. When considering this, the potential increase in automobile traffic and the development planned in the Bristol Place plan, this at-grade crossing is currently and will be experiencing significant delays while both automobiles and trains continue compete for the same piece of pavement.

The Bradley Avenue / CN-IC Grade Separation Project
Mark K. Nolan, UIUC Department of Urban & Regional Planning
The Bradley Avenue / CN-IC Railroad Crossing Exposure Index

The relationship between automobile traffic on Bradley Avenue and train traffic on the CN-IC railroad tracks is of course what causes traffic to back up at the crossing and is the source of potential safety problems. Because this relationship is easily observed and measurable, some states have taken to using it as a surrogate for vehicular delay and crash costs in determining whether or not to construct a grade separation structure at an existing at-grade crossing. This “exposure index,” defined at the product of average daily roadway traffic and the number of trains per day, can be used here to define the relationship between automobiles and trains at the Bradley Avenue crossing and as a gauge to help determine if a grade separation is needed.

An adequate and efficient tool, the exposure index was used here to begin observing the potential of the Bradley Avenue / CN-IC railroad crossing for grade separation. When a predetermined value of the index or “threshold” is reached, then a grade separation structure warrants consideration. These threshold values may vary depending on location (urban vs. rural), type of roads (state highway vs. local) and by speed (greater or less than 50 miles per hour). Some agencies use 30,000 for an urban location, and others use 100,000 for roads not on the state highway system. In 1997 the Canadian National Railway Company and the City of Edmonton used 200,000 as a threshold exposure index in an area with similar density and land use as the Bradley Avenue crossing, and this figure was used in this report. The following tables list exposure index values at the crossing for 1996, 2000, 2010 and 2020 based upon linear and exponentially projected ADTs.

Table 1: Linear Projection (increase = 550 ADT/yr):

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT</td>
<td>11,800</td>
<td>14,000</td>
<td>19,500</td>
<td>25,000</td>
</tr>
<tr>
<td>Exposure Index</td>
<td>236,000</td>
<td>280,000</td>
<td>390,000</td>
<td>500,000</td>
</tr>
</tbody>
</table>

Table 2: Exponential Projection (1 yr. growth rate = 4.4%):

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT</td>
<td>11,800</td>
<td>14,000</td>
<td>21,500</td>
<td>33,000</td>
</tr>
<tr>
<td>Exposure Index</td>
<td>236,000</td>
<td>280,000</td>
<td>430,000</td>
<td>660,000</td>
</tr>
</tbody>
</table>
Based upon these figures, the exposure index for the Bradley Avenue / CN-IC railroad crossing is higher than the 200,000 threshold in every case, including the four-year old IDOT counts. And these figures are considerably higher than the 30,000 or 100,000 threshold used by some agencies. Therefore, based on the preceding information and the exposure index of the crossing in particular, it is evident that the potential of a grade-separated crossing at Bradley Avenue and the CN-IC tracks exists and should be investigated further.

**Availability of Funding**

The Illinois Commerce Commission (ICC) serves as the most significant source of funds for railroad/roadway grade separation projects. The ICC funding source for these projects is the Grade Crossing Protection Fund, into which Governor George Ryan’s Illinois First program deposits $2.25 million per month in motor fuel tax receipts. This money is used to help pay for the cost of highway/rail grade crossing signal improvements and construction or reconstruction of bridges (highways over railroads or railroads over highways) where railroads cross a county, township, road district, or municipal highway, road or street. It is believed that Bradley Avenue is eligible for this funding.

The ICC normally pays 85 percent of the cost for grade crossing signal improvements, with the local highway agency responsible for 10 percent of the cost and the railroad responsible for the remaining 5 percent plus all costs associated with operation and maintenance of the new signal equipment. Most importantly for the purposes of the Bradley Avenue / CN-IC Railroad crossing, the ICC also pays up to 60 percent of the cost of roadway or railroad bridges and approach roads associated with the grade separation. The local highway agency is responsible for assembling a funding package for the remainder. In addition to funding capital improvements at specific railroad-highway crossings, the ICC is also responsible for overall crossing safety by insuring that crossing approaches, surfaces and signals are maintained in accordance with Commission rules.

It is also most likely that a Bradley Avenue / CN-IC grade separation structure will be eligible for Federal Surface Transportation funds, which are allocated to such projects from the State through the Champaign-Urbana Urbanized Area Transportation Study
(CUUATS) planning process. Currently, the Bradley Avenue grade separation is one of several projects being considered for future transportation funding by a CUUATS sub-committee. If the project receives priority status for Federal funding, Federal Surface Transportation funds can be used to pay up to 50 percent of construction costs not paid by the ICC. It should be noted here that in order for a project to receive Federal funding an environmental impact report/statement is required.

In addition to these funding sources, according to the ICC the railroad may be responsible for 5 percent of grade separation structure costs not paid by the Commission. As a result of the combination of the ICC 60 percent funding level with Federal and railroad funding up to 55 percent of the remainder, the local highway agency and/or municipality may be responsible for only 18 percent of the total construction cost. For example, for a $5 million grade separation structure, local funding sources will only have to pay for $900,000 of the construction costs (see pages 27 and 44 for a discussion of the construction costs and funding levels associated with specific examples in this report). Consequently, if the Bradley Avenue / CN-IC grade separation project were to receive full funding from the sources listed here, then the project may indeed be very affordable.
Initial Screening Process and Fatal Flaw Analysis

The development of the final grade separation alternatives that are to be evaluated were derived from a field or "universe" of eight alternatives, which ideally includes all possible options from which to choose a short list of possibilities. These alternatives include various combinations of overpass and underpass options, re-routing traffic and a no-build option. The universe of alternatives that was considered in the initial screening process and fatal flaw analysis is as follows:

- Alternative A: Raise Bradley Avenue and leave the CN-IC railroad tracks at grade;
- Alternative B: Lower Bradley Avenue and leave the CN-IC railroad tracks at grade;
- Alternative C: Raise the CN-IC railroad tracks and leave Bradley Avenue at grade;
- Alternative D: Lower the CN-IC railroad tracks and leave Bradley Avenue at grade;
- Alternative E: Raise Bradley Avenue and lower the CN-IC railroad tracks;
- Alternative F: Lower Bradley Avenue and raise the CN-IC railroad tracks; and
- Alternative G: Re-route traffic to a new overpass to the north of the crossing; and
- Alternative H: A no-build option.

The initial screening process discussed below was developed to narrow the universe of alternatives to a short list that includes the no-build option. It is hoped that this preliminary analysis will reveal major problems that might limit provision of any of the grade separation alternatives above. Although almost any proposal can be accomplished assuming sufficient resources, there are cases where a specific proposal cannot or should not be provided. Below is a discussion of the alternatives within the context of this fatal flaw analysis, with particular attention paid to those alternatives that prove to be incompatible with the goals of this project.

Raising and Lowering the CN-IC Railroad Tracks

The maximum change in grade of the railroad that can be achieved at Bradley Avenue is derived from the maximum 0.5 percent slope (see "Assumptions," below) from the intersection of the CN-IC railroad tracks with the Conrail Railroad tracks approximately 2,140 feet to the south. This is based upon the assumption that raising this railroad-to-railroad
intersection would prove to be immensely cost prohibitive. Maintaining the clearance above the CN-IC railroad tracks at the I-74 expressway overpass to the north is not an issue then, because the distance from this point to Bradley Avenue is approximately 2,850 feet and thus is outside our area of concern (see figure 1).

However, due to this relatively flat maximum grade that must be maintained for the railroad and the distance to the Conrail Railroad tracks to the south, there is not enough horizontal distance to allow for the railroad tracks to be raised above or lowered below Bradley Avenue without changing the elevation of the roadway. This is due to the minimum clearances that must be maintained for structures that pass over both roadways and the railroad tracks (again, see "Assumptions," below). As a result of these insurmountable physical limitations, any alternative that changes the elevation of the railroad while leaving Bradley Avenue at grade cannot be considered. This requires that Alternatives C and D above must be eliminated from final consideration during this initial screening process.

**Constructing a New Roadway and Overpass Structure to the North**

To route through traffic out of the area and away from the at-grade crossing, an option to leave the crossing as it exists and building a new roadway that curves to the northeast from Market has been considered (see Alternative G, above). From the intersection of Market and Bradley, eastbound traffic would be routed onto a new roadway that heads northeast, increasing elevation until crossing a bridge over the CN-IC railroad tracks. This new grade-separated crossing would occur less than one-quarter mile north of the existing crossing, possibly near the extension of Garwood or Bellfontaine Streets. The roadway would then turn northward, decreasing in elevation until touching down on Oak Street, which continues north-northeast to Kenyon Road. This frontage road on the south side of Interstate 74 gives access to several business and light industrial locations in Champaign's North End.

This grade separation alternative would not only entail the construction of a longer overpass structure than other options but also new infrastructure and the reconstruction of the north half of Oak Street to accommodate increased traffic. In addition, trains crossing
Bradley Avenue would still cause motorists wishing to travel to and from residential and commercial centers along Bradley to wait. Also, two to three square blocks of residential land would have to be acquired to construct the new roadway, which would displace several residents and thus is entirely incompatible with the Bristol Place plan. Moreover, much of the Bristol Place neighborhood would exist in the shadow of a quarter-mile long elevated roadway, which in combination with the vacated land may eliminate any potential that the community has for future development. Therefore, due to these reasons and several other issues at hand, it was determined that Alternative G is an unsuitable candidate and thus will be eliminated from final consideration.

Remaining Five Alternatives

The remaining five alternatives - Alternatives A, B, E, F and H - were run through the same screening process as Alternatives C, D and G above. However, no fatal flaws were found in any of these options and in fact each was a viable solution to the problem. Thus, these remaining five alternatives will be retained into the final evaluation phase and will be discussed in greater detail below.
Final Bradley Avenue / CN-IC Railroad Grade Separation Alternatives

Assumptions

A number of assumptions were made before the physical aspects of the alternatives were worked out in detail. Most of these deal with engineering matters, including minimum clearances, bridge structure thickness and maximum slopes of railroad and roadways. The following is a list of assumptions that were taken into account and factored into the design of the grade separation alternatives:

- According to engineers at CN-IC railroad, design regulations state that there needs to be a minimum of 23 feet of clearance from the top of the rail to the bottom of any overhead structure.

- According to officials at the Illinois Department of Transportation (IDOT), legal clearance above a state or municipal highway must be 14 feet 6 inches to the bottom of any overhead structure. The Champaign Fire Department asks for this same minimum clearance for its vehicles.

- Also according to CN-IC railroad engineers, with a maximum 50-foot span a railroad bridge structure would be about 5 feet thick from top of rail to bottom of steel. This would require a center pier on Bradley Avenue, and thus widen the roadway and possibly increasing right-of-way requirements.

- A roadway bridge structure with an 80-foot span is assumed to be 6-feet thick from finished pavement to bottom of steel. This span leaves 18 feet from the centerline of the outside railroad tracks to the bridge piers, which is the minimum distance preferred by CN-IC engineers (CN-IC regulations specify that the minimum clearance be 12.5 feet).

- According to IDOT regulations, the maximum slope for a state or municipal highway is 8 percent (a rise or fall of 8 feet for every 100 feet of horizontal distance). It was understood, after speaking with engineers at the City of Champaign Public Works Department, that this maximum slope should be avoided if at all possible due to the
difficulty of heavy vehicles maneuvering in poor weather conditions. Therefore it was determined to use 6 percent as the maximum slope for Bradley Avenue in this project.

- According to CN-IC railroad engineers, the maximum slope for railroad tracks is not to exceed 0.5 percent (a rise of 6 inches for every 100 feet of horizontal distance).
- Any alternatives that involve either raising or lowering the railroad at Bradley assume the maximum grade change allowable by the combination of maximum slope (see above) and available horizontal distance (see below).

**Alternative A: Raise Bradley Avenue and Leave Railroad at Grade**

With this grade separation alternative, an overpass structure would be built to carry Bradley Avenue over the railroad (see figure 2). The railroad tracks would remain at their current grade. In order to minimize the slope of the roadway, Bradley Avenue would begin to rise at Market Street 775 feet to the west of the tracks, and at Fourth Street 625 feet to the east. In order to clear the maximum height above the railroad, the roadway structure would be built to a height of 29 feet and result in a slope of over five percent to the west and nearly six and one-half percent to the east.

Due to the change in grade of Bradley Avenue and the new bridge structure, several intersecting streets and entrances will be significantly affected. Access from Bradley Avenue to sites east of the Bradley and Market Street intersection may be difficult, and become impossible as one moves eastward. The same holds true for entrances west of Fourth Street on Bradley, as one moves westward. Clock Street, Chestnut Street and Oak Street would be cut off from Bradley altogether; however, these streets may be able to pass under the overpass if so desired.

**Alternative B: Lower Bradley Avenue and Leave Railroad at Grade**

Like Alternative A, the railroad tracks would remain at grade with this option; however, Bradley Avenue would be lowered below the tracks to a level such that the minimum clearance above the roadway is achieved (see figure 3). In order to minimize the slope of the roadway and also any negative impacts on the Boneyard Creek, Bradley Avenue
Figure 2: Alternative A – Raise Bradley Avenue, leave railroad at grade
Figure 3: Alternative B – Lower Bradley Avenue, leave railroad at grade
would remain at grade until crossing the Creek where it begins its decent 523 feet to the west of the tracks. To minimize disruption of properties at the east end of the project, the reconstructed Bradley Avenue would begin to decline at the church entrance 435 feet to the east. This would result in a cut of 19.5 feet below the railroad and the construction of a bridge structure to carry the tracks over the roadway. To reach this level the roadway would slope at over three percent to the west and six percent to the east.

Like Alternative A, access from Bradley Avenue to sites east of the Bradley and Market Street intersection may prove challenging, and become increasingly so as one moves eastward. The same holds true for entrances west of Fourth Street on Bradley, as one moves westward. Clock Street may have to be cut off from Bradley because changing its slope to meet the new lower elevation would adversely affect access to residential sites on Clock. Chestnut Street and Oak Street would be cut off from Bradley altogether, and would not be able to pass over Bradley without increasing the slope of Bradley Avenue on both sides in order to maintain the minimum clearance.

**Alternative E: Raise Bradley Avenue and Lower Railroad**

With this grade separation alternative, an overpass structure would be built to carry Bradley Avenue over the railroad, similar to Alternative A. However, for Alternative E the railroad tracks would be lowered as much as possible which is eight feet, given the parameters discussed above (see figure 4). In order to minimize the slope of the roadway, Bradley Avenue would begin to rise at Market Street to the west of the tracks and at Fourth Street to the east. In order to clear the maximum height above the railroad, the roadway structure would be built to a height of 29 feet above the railroad tracks and result in a slope of nearly four percent to the west and over four percent to the east. The elevation of the new bridge overpass structure would be 21 feet higher then the current elevation of the at-grade crossing.

Because of the construction of a Bradley Avenue overpass would significantly change the elevations at side streets and entrances, it may be possible to increase the slopes of the east and west approaches to minimize this effect. Similar to Alternative B, the roadway may remain at grade to the west until crossing the creek before beginning its ascent over
Figure 4: Alternative E – Raise Bradley Avenue, lower railroad
the railroad tracks, and can match existing grade at the church entrance to the east. With this option the slope of the roadway would increase to over five percent to the west and six percent to the east.

After the construction of temporary railroad tracks is complete, the CN-IC railroad tracks would have to begin to be lowered at its intersection with the Conrail Railroad tracks over 2,000 feet to the south. This would result in the excavation, re-grading and lowering of over 4,000 feet of tracks – including the CN-IC Champaign Yard which begins approximately forty feet north of the crossing – while maintaining operation of the railroad (see “Cost Evaluation” on page 44 for a discussion of the costs associated with this modification).

Due to the change in grade of Bradley Avenue and the new bridge structure, several intersecting streets and entrances will be significantly affected. Access from Bradley Avenue to sites east of the Bradley and Market Street intersection may be difficult, and become impossible as one moves eastward. The same holds true for entrances west of Fourth Street on Bradley, as one moves westward. Clock Street, Chestnut Street and Oak Street would be cut off from Bradley all together; however, Chestnut and Oak may be able to pass under the overpass if so desired.

**Alternative F: Lower Bradley Avenue and Raise Railroad**

Similar to Alternative B, with this option Bradley Avenue would be lowered below the tracks to a level such that the minimum clearance above the roadway is achieved. However, to minimize roadway excavation the railroad tracks would be raised as much as possible – also eight feet, given the parameters discussed above (see figure 5). In order to minimize the slope of the roadway and also any negative impacts on the Boneyard Creek, Bradley Avenue would remain at grade until crossing the Creek where it begins its decent to the west of the tracks. To minimize disruption of properties at the east end of the project, the reconstructed Bradley Avenue would begin to decline at the church entrance to the east. This would result in a cut of 11.5 feet below the railroad and the construction of a bridge structure to carry the tracks over the roadway. To reach this level the roadway would slope at one and one-half percent to the west and three percent to the east.
Like Alternative E, temporary railroad tracks would have to be constructed to maintain railroad operations. After this is completed the CN-IC railroad tracks would have to begin to be raised at its intersection with the Conrail Railroad tracks over 2,000 feet to the south. This would result in the re-grading and raising of over 4,000 feet of tracks – including the CN-IC Champaign Yard – while maintaining operation of the railroad.

With this alternative access to entrances on the east and west ends of the project may not be greatly affected. In addition, Clock Street may be able to be re-graded to meet Bradley Avenue without adversely affecting access to residential sites there. Chestnut Street and Oak Street may have to be cut off from Bradley, although lowering the grades of the streets to the level of the new roadway may be feasible if not difficult.

**Alternative H: No-Build Option**

For the no-build alternative the crossing of Bradley Avenue and the CN-IC railroad tracks would remain at grade (see figure 6). There exists the possibility of improving the safety and appearance of the crossing, possibly by installing new signals, signage, landscaping and other improvements. However, the crossing would remain essentially as it exists today. A discussion of the costs involved in doing this can be found on page 44.
Bradley Avenue – CN-IC railroad Grade Separation Evaluation Criteria

In order to effectively evaluate each of these five remaining grade crossing alternatives, it is necessary to outline a framework of criteria that will enable us to structure the evaluation. Each alternative will perform differently depending on the factor considered, with differing levels of success of addressing each. For this report, each alternative will be assessed according to a group of criteria and compared to the other alternatives within that group. An original list of sixteen criteria was developed to evaluate the alternatives (see below).

1. Physical feasibility;
2. Surrounding land use;
3. Potential land development;
4. Social impacts;
5. Environmental impacts;
6. Roadway traffic;
7. Railroad traffic;
8. Vehicular delay;
9. Construction costs;
10. Life cycle costs;
11. Public safety;
12. Visual and aesthetic impact;
13. Noise pollution;
14. Air quality;
15. Construction impacts; and

However, it was determined that organizing these factors into groups of criteria that minimize similarities and correlations between some variables would result in a more coherent and efficient analysis of mutually exclusive alternatives. From the original sixteen factors, six classes of criteria were created that are inclusive of all relevant factors and as mutually exclusive as possible. These six classes are: physical feasibility, environmental
impacts, social impacts, traffic impacts, public safety and costs. Below is a discussion of the six classes of criteria that were used to evaluate the remaining grade separation alternatives, with a brief inventory of what factors are included in each class. Also included are more detailed descriptions of the criteria and how each might relate to the current study and to other criteria in its class.

1. Physical Feasibility

This class of criteria includes issues dealing with topography, soil suitability, street and railway configuration, location of utilities, and existing land use.

Physical feasibility can be summarized to indicate to what degree the proposed grade separation alternative is physically possible and would be compatible with existing topographic conditions, based upon reasonable engineering judgement. Particular emphasis should be placed on the probable impact on adjacent and other land uses from a grade separation alternative, including the denial of access to adjacent properties from any approach roadway modifications. In addition, whether or not the soil and geological conditions at the site are suitable for construction must be considered. This includes the stability of the soil for roadway and bridge construction, and also for the excavation of new roadways.

Given other physical characteristics, it must be determined to what degree the roadway and railroad configuration is compatible with the grade separation. For example, will either Bradley Avenue or the CN-IC railroad tracks have to be realigned to suit a particular alternative? This holds true for the location of utilities both above and below ground in the vicinity of the crossing. While water main and sanitary sewer lines located under Bradley Avenue may make lowering its elevation more difficult, any overhead lines may have the same effect with a bridge structure. The possibility of relocating utilities or disrupting service during construction must also be considered.
2. Environmental Impacts

This includes impacts associated with water quality and resources, flooding, air quality, noise pollution, natural resources, ecological impacts, and visual and aesthetic impacts.

Transportation facilities are developed within a myriad of federal, state and local regulatory rules and procedures relating to the project’s impact upon the natural and man-made environment. Therefore it is essential for the purposes of this report to become aware of the more severe impacts of the proposed grade separation, and to be able to evaluate any that might seriously affect the implementation of the proposal. This includes any alterations of groundwater quality, which may be adversely affected by excess surface runoff in urban areas, and also the existing water table, which may change as a result of deep roadway excavation. Related to these factors are the frequency of flooding problems, which may or may not increase due to changes to topography and an alternative’s effect on the Boneyard Creek nearby.

Air quality and noise pollution are also important factors to bear in mind when evaluating the merits of a grade separation alternative. The potential for adverse impacts on these factors must be carefully considered, as must the direct relationship between them and the impacts of automobile and railroad traffic (see below).

Other environmental factors such as impacts on any natural resources or wildlife ecology near the project must also be considered, although these evaluation criteria are not particularly relevant factors in the area immediately surrounding the crossing. However, visual and aesthetic impacts will play key roles in how the success or failure of a given alternative is determined. These impacts might include adverse effects such as obstruction of views to and from significant places, and whether or not a grade separation structure is visually compatible with its environment.

3. Social Impacts

This includes impacts associated with equity, neighborhood and community impacts, potential economic and land development, and historic and cultural resources.
Factors related to the social impacts of any capital improvement project are by nature more difficult to define than other more concrete and measurable evaluation criteria. However, a project such as this in the north end of Champaign must take into account its effect on the social fabric and structure of the neighborhood. Therefore any unbalanced effects that a grade separation alternative might have on any individual or group of residents must be weighed with respect to the project’s benefits. This includes whether or not anyone nearby or elsewhere is disadvantaged by the project or left out entirely.

Other criteria relating to neighborhood and community impacts might include changes to the social dynamic of Bristol Place, and how a grade separation structure might both physically and figuratively divide the neighborhood. Any possible interruption to the continuity of the neighborhood fabric must be taken seriously, such as the potential isolation of residents from amenities and from each other. Adverse effects on cultural resources such as churches, meeting halls and other gathering places must also be minimized, as should any negative impacts on historic structures in the area. This holds true for the larger Champaign-Urbana community as well.

Another vital aspect of any transportation-related development project is its impact on potential economic and land development practices in the area. Will adjacent land become more or less desirable to potential developers due to the physical changes proposed by a grade separation alternative? As a result, will land value be effected, and might these factors contribute to a change in the underdeveloped and under-served nature of the Bristol Place neighborhood? The context of this study must also not be forgotten. The Bradley Avenue – CN-IC railroad grade separation project is to be examined as a component part of the overall Bristol Place plan, and as such impacts on the potential commercial and retail development of the southeast corner of Bradley and Market Street must be taken into account. Different grade separation alternatives may help, hinder or have relatively little effect on this and other social aspects of the Bristol Place plan, and this indeed will serve as a critical element of their evaluation.
4. Traffic Impacts

This criterion includes issues dealing with the effects on automobile traffic, railroad traffic, traffic circulation and pattern, and vehicular delay.

This class of criteria requires the consideration of traffic related impacts of each grade separation alternative. The need to alleviate problems at railroad crossings concerning the amount and pattern of traffic is often times the sole reason for studying a grade separation. However here it must be understood that traffic impacts, while they can be measured somewhat directly and apart from other criteria, actually influence some if not most of those contained within each of the other five classes.

In evaluating a grade separation alternative it should be determined if it will have a direct impact on increasing or decreasing the amount of traffic in the area. It also should be able to accommodate current projected average daily traffic (ADT) increases as well as any changes that the grade separation itself might produce. While traffic may move more efficiently through the proposed grade separation, it should be noted that this might attract more automobile users to and through the area. Also, railroad traffic cannot be ignored when evaluating an alternative. According to CN-IC railroad there is no planned increase in the number of trains through the area, and a grade separation structure will not change this. However, how might each alternative affect the speed of trains through the area? Might railroad operations be improved by a grade separation? It must also be noted that CN-IC railroad operations will have to be maintained during construction, which will be a factor both in traffic impacts and costs, below.

Directly related to a grade separation alternative’s effect on the amount of traffic in the area is its impact on the circulation and pattern of traffic. How might traffic patterns in the neighborhood change with each alternative, and might this change be an improvement upon current conditions, or will it have adverse effects in the surrounding residential neighborhood? Whether or not the existing street network can accommodate an increase in automobile traffic must be considered. It should also be determined how each alternative might help alleviate the problem of idling traffic at the crossing, which can cause travelers to change their driving routes accordingly. Following this, might there be any overall effect felt throughout the greater Champaign-Urbana community? A significant
change to traffic patterns in the Bristol Place neighborhood might indeed cause a “ripple effect” in other parts of town.

5. Public Safety

This group includes pedestrian safety, effects on automobile and train accidents, and emergency vehicle access.

Along with traffic impacts, public safety is often cited as a major reason to grade-separate a roadway-railroad intersection. Separating the two major modes of transportation can drastically change the nature of a crossing and thus requires consideration in this alternative evaluation. Any adverse impacts on pedestrian safety at and around the crossing as well as in the surrounding neighborhood must be considered, along with any improvements made to the same. Pedestrian traffic is an important issue near the crossing because many of the Bristol Place neighborhood’s residents walk and use public transportation to travel, resulting in more interactions between them and automobiles and trains. How might each grade separation alternative alter these interactions? Another significant pedestrian safety concern is related to roadway overpasses, such as the risks associated with pedestrians falling off of and throwing objects from the bridge.

Automobile and train accidents are also apparent and important criteria to be used in the alternative evaluation process. How might each alternative effect the current nature of automobile-train interaction at the crossing? Decreasing this particular relationship is an inherent goal of a roadway-railroad crossing grade separation. Might the alternative create greater or fewer hazards that might result in single- or multi-car accidents nearby? Physical alterations to sight lines and roadway slope are two important aspects to consider in this respect.

Emergency vehicle access is another essential criteria to be used in this evaluation. Currently, if responding to a call in the northeast part of the city, the Champaign Fire Department must detour its trucks to Washington Street to the south if a train is crossing Bradley Avenue. Not only can this cause delays in response time, but in addition the Washington Street overpass is too low for some equipment to pass under. How might each grade separation alternative effect this situation? Will access through the area be
improved upon for all emergency vehicles to pass efficiently? In addition, access to the neighborhood must be evaluated. Some grade separation alternatives may cause cross streets to be cut off from Bradley Avenue or clearances over these streets to be low. This would effect the ability of some emergency vehicles to navigate within the neighborhood.

6. Costs

This includes construction costs and associated impacts, life cycle cost analyses, right-of-way requirements, and available funding.

In order to budget and allocate resources efficiently, the costs of any major capital improvement project must be considered in its evaluation. This most definitely holds true for the Bradley Avenue / CN-IC railroad grade separation project. The costs and impacts associated with construction of a grade separation structure will have to be included. Construction and mitigation costs, reimbursement to businesses for construction delays and the overall time involved must be considered. In addition, life cycle and annual costs that will accumulate over the life of the structure must be accounted for. These include costs associated with regular maintenance of the roadway, railroad and any bridge structures that will be needed. Also, when might the structure need to be replaced; in other words, what is the life span of each alternative?

The various right-of-way requirements of each alternative will also be considered with these other cost criteria. Additional land might need to be acquired to accommodate side slopes or roadway realignment. In addition, available funding for each grade separation alternative also falls under this class of criteria. However, each alternative with the exception of the no-build option will receive funding from the ICC and Federal Government regardless of the grade separation method used (see page 6, above).
Evaluation of the Remaining Alternatives

The following is an analysis of each of the five remaining grade separation alternatives based on the six criteria classes discussed above. Each alternative will be evaluated within the context of each criteria class. Thus, thirty separate evaluations will be performed (5 alternatives x 6 criteria classes). Subsequent to this analysis will be a discussion of how these criteria should be weighed with respect to each other in the overall evaluation and preferred selection process.

Physical Feasibility Evaluation

Several issues dealing with physical feasibility will affect each alternative equally, or will not be factors at all. For example, the topography of the land surrounding the crossing is relatively flat, which may actually have an adverse effect on all grade separation alternatives because there are no high spots from which to bridge. Also, until core samples can be taken the soils and subsurface geography is assumed to be of adequate stability for the construction of a grade separation structure. Additionally, with the remaining five alternatives no realignment of Bradley Avenue or the CN-IC railroad tracks will be necessary and none interferes directly with the Boneyard Creek.

Alternative A (figure 2)

Since this alternative entails only the construction of an overpass of Bradley Avenue over the railroad tracks then no alteration to the physical terrain is required. As such, the bridge structure is the highest of the five alternatives, necessitating the greatest roadway slope as well. Underground utilities will not need to be moved; however, the overhead wires that run parallel to the railroad tracks may need to be relocated or raised above the new structure. Moreover, all cross streets between Market and Fourth Streets will be cut off entirely from Bradley, although they may be able to pass under the bridge — with legal clearance for Chestnut and Oak Streets — if the City so desires.

Due to the change in elevation, access to any property along Bradley Avenue will be severely limited by Alternative A. This would affect current entrances to the Seaboat restaurant, a service entrance to Cap and Gown, the Public Housing Authority of Cham-
paign County’s (PHACC) land and the Church of the Living God on the south side of Bradley. On the north side, access may be eliminated to the vacant lot on the corner of Market Street and Bradley, a residence and the asphalt plant near the railroad tracks. In addition, all the residences of Bristol Place will have direct access to Bradley Avenue eliminated with this option.

**Alternative B (figure 3)**

This grade separation alternative requires the lowering of Bradley Avenue under the existing railroad tracks, and as such necessitates the deepest excavation of all the remaining alternatives. A relatively steep slope of the east approach roadway results from the desire to minimize impacts on the Church of the Living God. As with many excavation projects of this type, sheet piling may be required during construction to hold back the embankment. Moreover, all underground utilities, including a water main and sanitary sewer, will have to be lowered (requiring a lift station) or relocated (requiring more right-of-way) in order to reconstruct Bradley nearly twenty feet below its current elevation. Also, Chestnut and Oak Streets will be cut off from Bradley and will not be able to pass over without encroaching the legal clearance height of 14 feet 6 inches. Clock Street to the north may also suffer the same fate.

Due to the change in elevation, access to any property along Bradley Avenue between the Boneyard Creek and the Church of the Living God will be severely limited by Alternative B. This would affect current entrances to Cap and Gown’s service areas and the PHACC’s land on the south side of Bradley and residences on the north side. However, unlike Alternative A this option will leave access to those properties west of the Boneyard and east of and including the church unaltered, thus affecting overall access to the Bristol Place neighborhood to a somewhat lesser degree.

**Alternative E (figure 4)**

Similar to Alternative A this option entails the construction of an overpass over the CN-IC railroad tracks, which in and of itself has no physical barriers. However, with Alternative E the railroad tracks and perhaps more importantly the south end of CN-IC railroad’s Champaign Yard will be lowered. This certainly will require a great deal of excavation both north and south of the Bradley Avenue/CN-IC railroad crossing.
Moreover, there may be some conflict with underground utilities during the lowering of the railroad and overhead lines for the construction of the overpass. Similar to Alternative A, all cross streets between Market and Fourth Streets will be cut off entirely from Bradley, although they may be able to pass under the bridge if the City so desires, but without legal clearance.

Also like Alternative A the change in elevation will negatively impact access to any property along Bradley Avenue, although to a lesser degree near the east and west ends of the project. This would affect current entrances to the Seaboard restaurant, a service entrance to Cap and Gown, the PHACC’s land and the Church of the Living God on the south side of Bradley. On the north side, access may be severely limited to the vacant lot on the corner of Market Street and Bradley, a residence and the asphalt plant near the railroad tracks. In addition, all the residences of Bristol Place will have direct access to Bradley Avenue eliminated with this option.

**Alternative F (figure 5)**

Like Alternative B this grade separation alternative requires the lowering of Bradley Avenue under the railroad tracks. However there will be less alteration and excavation under the railroad with this alternative because the CN-IC railroad tracks will be raised up. This combination results in the flattest approach slopes along Bradley Avenue of all the alternatives. A significant impact to the physical topography will result from the raising of the railroad; however, the material that is excavated to reconstruct Bradley may be used to construct the higher rail bed. As with many excavation projects of this type, sheet piling may be required during construction to hold back the embankment around Bradley.

Similar to Alternative B the water main and sanitary sewer under Bradley may have to be lowered or relocated – albeit to a lesser degree – in order to reconstruct Bradley nearly twelve feet below its current elevation. Also, Chestnut Street will be cut off from Bradley and will not be able to pass over Bradley Avenue. Oak Street may also suffer the same fate, but Clock Street will be able to maintain its intersection with Bradley, unlike Alternative A.
This alternative negatively affects access to adjacent land the least of the alternatives that require a grade-separated crossing. Access to all properties along Bradley Avenue can be preserved, with the lone exception being the entrance to PHACC’s housing site at the southeast corner of the crossing. This may not be an issue because the Housing Authority has had thoughts of eliminating this entrance in the future. For all of these reasons Alternative F should have a minimal effect on access to and from the Bristol Place neighborhood by automobile.

**Alternative H (figure 6)**

With this no-build alternative physical feasibility is not a factor. There are no utility conflicts, and access to all cross streets and adjacent property will remain in its adequate state.

**Environmental Impact Evaluation**

The most prominent environmental feature near the intersection of Bradley Avenue and the CN-IC railroad tracks is the Boneyard Creek, and thus any direct negative impact upon it should be minimized. As it was stated previously, however, none of the five remaining grade separation alternatives will interfere in this way because Bradley Avenue will not need to be lowered directly over the Creek. Additionally, no known natural resources or other large-scale ecological entities should be affected negatively, unless indirectly by any of the following factors discussed below.

**Alternative A (figure 2)**

Because this alternative entails only the construction of a roadway overpass structure over the railroad tracks, there will be very little excavation involved relative to the three other alternatives that require changes to topography. Therefore this alternative should have little or no impact on water quality and resources, and any flooding problems will not be worsened. If flooding were to occur near the crossing, then the threat of water crossing Bradley Avenue will be eliminated with a bridge structure.

Air quality in its current state, on the other hand, may slightly improve because there will be fewer cars waiting for trains and at cross streets, thus resulting in fewer emissions in
the immediate area. Also, trains that travel through the area will no longer have to use their whistle in order to warn motorists that they are crossing Bradley. This small benefit may be negated, however, since automobiles on Bradley Avenue may travel faster and will be elevated above the surrounding land, which may increase the ambient noise level there. Additionally, the large and high bridge structure may have a significant impact on the visual and aesthetic qualities of the Bristol Place neighborhood. In combination with the possible increased automobile noise levels, the bridge might resemble a busy highway cutting through a mostly residential neighborhood not unlike the I-74 overpass to the north.

**Alternative B (figure 3)**

This alternative requires that a great deal of excavation be done in order to lower Bradley Avenue nearly twenty feet below its current elevation. Because this is the deepest cut that must be made for any of the alternatives, impacts on water quality and resources must be carefully considered. There exists the possibility that this deep excavation could cut into the water table, thus negatively impacting subsurface water resources. Not unrelated to this are flooding problems, which will most likely worsen beyond current levels with the road cut and may require water pumps or some other means of mitigation.

Like with Alternative A, air quality may slightly improve because there will be fewer cars waiting for trains and at most cross streets, thus resulting in fewer emissions in the immediate area. Also similar to the previous option, trains that travel through the area will no longer have to use their whistle in order to warn motorists that they are crossing Bradley. In addition to this, although automobiles will be travelling faster, related noise will for the most part be confined to the roadway cut and thus may not be as much as a factor elsewhere as with Alternative A. Also, the visual and aesthetic impact of Alternative B would be much less than Alternative A. This is because although Alternative B will have similar automobile speeds and behaviors, traffic will be below ground level where the earth can absorb more noise.

**Alternative E (figure 4)**

Alternative E requires Bradley Avenue to be raised twenty-one feet above its current elevation while at the same time lowering the railroad tracks eight feet. Therefore this
alternative would most likely impact water quality and resources to a small degree due to the lowering of the railroad. Also for this reason any current flooding in the area may worsen slightly, and could pose a problem for the lowered railroad bed. If flooding were to occur near the crossing, then the threat of water crossing Bradley Avenue will be eliminated with the proposed overpass structure.

Like with Alternative A air quality in its current state may slightly improve because there will be fewer cars waiting for trains and at cross streets, thus resulting in fewer emissions in the immediate area. Similarly, trains that travel through the area will no longer have to use their whistle in order to warn motorists that they are crossing Bradley. This small benefit may be negated, however, since automobiles on Bradley Avenue may travel faster and will be elevated above the surrounding land, which may increase the ambient noise level there.

Also similar to Alternative A, the bridge overpass structure may have a negative impact on the visual and aesthetic qualities of the neighborhood. In combination with the possible increased automobile noise levels, the bridge might resemble a busy highway cutting through a mostly residential neighborhood, although with a lesser impact than Alternative A. Moreover, with this option visual and aesthetic impacts associated with trains may decrease slightly because the rail bed — which is currently raised slightly above the surrounding terrain — will be lowered several feet and thus may not occupy such prominence in the area.

Alternative F (figure 5)

This alternative requires Bradley Avenue to be excavated nearly twelve feet below its current elevation while at the same time raising the railroad tracks eight feet. Consequently there exists the likelihood that this excavation could cut into the water table and possibly negatively impact subsurface water resources, although not to the degree of Alternative B. And similar to Alternative B the chance exists that flooding problems may worsen beyond current levels with the road cut and may require water pumps or some other means of mitigation.
Like with Alternatives A and B, air quality may slightly improve because there will be fewer cars waiting for trains and at most cross streets, thus resulting in fewer emissions in the immediate area. Also similar to those alternatives, trains that travel through the area will no longer have to use their whistle in order to warn motorists that they are crossing Bradley. In addition to this, although automobiles will be travelling faster, related noise will for the most part be confined to the roadway cut and thus may not be as much as a factor elsewhere as with Alternatives A and E. Also, the visual and aesthetic impact of Alternative F would be similar to Alternative B, although the CN-IC railroad tracks will be raised slightly, which could add to its presence. Also, Alternative F will have similar automobile speeds and behaviors as other alternatives; however, like Alternative B traffic will be below ground level where the earth can absorb more noise.

Alternative H (figure 6)

Any flooding problems near the crossing area will not improve or be negatively affected by the minor improvements associated with Alternative H. However, while the other four alternatives offer significant improvements over current levels of emissions by eliminated idling traffic waiting for trains, the no-build option allows this problem to continue. Noises associated with at-grade crossings such as cars, trains, warning devices and whistles will also persist. There are no visual and aesthetic impacts associated with Alternative H aside from any landscaping improvements or signage that are installed.

Social Impact Evaluation

The impact of each grade separation alternative on the social fabric and structure of the neighborhood is a difficult task, but one which must be accomplished. The social structure of Bristol Place and adjacent neighborhoods is unique in Champaign and will most definitely be affected by a separation of the Bradley Avenue / CN-IC railroad crossing. Nevertheless, each alternative would tend to affect all people in the community relatively equally – at least in a limited sense – regardless of race, religion and sexual orientation. Thus, equity in this way would not be as much of an issue as some other social factors; however, it does play a role in other aspects of this class of criteria which will be discussed below. Additionally, impacts on any historic resources will not be factors in
determining the success or failure of a particular alternative because there are none in the immediate area.

**Alternative A (figure 2)**

The construction of a quarter-mile long overpass structure adjacent to a residential neighborhood, as Alternative A requires, will have effects on the community. The new bridge would not only visually interrupt the landscape, but also physically impede residents from crossing from one side of Bradley Avenue to the other. In order to do so, a pedestrian will have to pass under the bridge or cross the street at either Market or Fourth Streets. This may then become a figurative barrier, effectively isolating residents to the north from retail and employment opportunities to the south. As a result Alternative A may in effect place a wall through the neighborhood, which would act as a dividing edge rather than a connecting seam. Also resulting from this overpass, this grade separation alternative may make it difficult for people in the neighborhood to access cultural resources such as the church at Fourth Street and Bradley.

With Alternative A access to land adjacent to Bradley Avenue will be severely limited (see Physical Feasibility, above). This of course will have an effect on the ability of the land to be developed for future use as well as current uses. Because entry from Bradley Avenue to almost all property on both the north and south sides of the street will be lost, this land will become less desirable to potential developers, which includes the PHACC and its proposed Oakwood Trace Townhome project on the Parkside site. As a result the neighborhood may lose an opportunity to increase its value and attractiveness. This leads to the alternative’s compatibility with the overall Bristol Place plan. The viability of a commercial and retail development project on the south side of Bradley Avenue between Market Street and the CN-IC railroad tracks is being studied. If the Bradley Avenue overpass that is proposed by Alternative A is constructed, then it is probable that this development project will not occur.

**Alternative B (figure 3)**

The excavation and construction of a nearly one thousand foot Bradley Avenue underpass, as Alternative B requires, will also have effects on the neighborhood. The lowered roadway would completely block residents from crossing from one side of Bradley Ave-
nue to the other between the Boneyard Creek and the church entrance. In order to do so safely a pedestrian will have to walk to either Market Street or Fourth Street. Like Alternative A this grade separation may then become a figurative barrier that isolates residents to the north from retail and employment opportunities to the south. The roadway cut may not visually obstruct residents to the degree of Alternative A; however, its physical presence may actually act as more of a dividing edge than an overpass would. Because the underpass leaves the entrance to the Church of the Living God unaltered, access to it for neighborhood residents should not be severely affected.

With Alternative B access to land adjacent to Bradley Avenue will be somewhat limited (see Physical Feasibility, above); however, not to the same degree as with Alternative A. This will have an effect on the ability of the land to be developed for future use as well as current uses. Because entrance from Bradley Avenue to several properties on both the north and south sides of the street will be lost, much of this land will become less desirable to potential developers. Similar to Alternative A the neighborhood may lose an opportunity to increase its value and attractiveness. Thus the alternative’s compatibility with the overall Bristol Place plan must be considered. The underpass will affect the proposed commercial/retail development project on the southeast quadrant of the intersection of Bradley Avenue and Market Street. Access to this property from Bradley could only be obtained west of the Boneyard Creek. Thus if Alternative B is constructed then it is possible that the success of this development, along with the proposed Oakwood Trace Townhome project, may be in doubt.

**Alternative E (figure 4)**

The social impacts of Alternative E will be nearly the same as those discussed in Alternative A. The proposed bridge structure would visually interrupt the landscape and physically impede residents from crossing from one side of Bradley Avenue to the other. Hence Alternative E, like Alternative A, would leave a wall in the neighborhood which would act as a dividing edge rather than a connecting seam. Also like Alternative A, this grade separation alternative may make it difficult for people in the neighborhood to access cultural resources such as the Church of the Living God at Fourth Street and Bradley.
Access to and impacts on land adjacent to Bradley Avenue with Alternative E are also similar to those associated with Alternative A. Accordingly, this land may become less desirable to potential developers, including the proposed Oakwood Trace Townhome project on the Parkside site and the potential commercial/retail development being proposed in the Bristol Place plan. Although access to Bradley Avenue from this land may be less difficult to provide than with Alternative A, doing so will require significant alteration of the sites.

**Alternative F (figure 5)**

This alternative requires the excavation and construction of a somewhat lower Bradley Avenue and a railroad overpass. Although this alternative may look similar to Alternative B in terms of social impact, the impacts of the two grade separation options would be quite different. Because Alternative F alters the elevation of Bradley Avenue the least of all the alternatives, the physical and figurative barriers associated with the others will not apply. The slightly lowered roadway would prevent residents from crossing Bradley Avenue from some point between Clock and Chestnut Streets to east of Oak Street. This would pose the smallest impediment of the four alternatives that entail a grade separation. Moreover, the underpass leaves the entrance to the church unaltered, thereby maintaining access to it for neighborhood residents.

Similarly, with Alternative F access to land adjacent to Bradley Avenue will be somewhat limited (see Physical Feasibility, above), but only at sites immediately adjacent to the railroad tracks. Access to most land should not change a great deal from its current state, with the exception of the Oakwood Trace Townhome site, which may have to move its Bradley Avenue entrance to the east. In addition, Alternative F appears to be the most compatible with the overall Bristol Place plan because it is the only alternative that offers the benefits associated with a grade separation and continued access to the proposed commercial/retail development site at Market and Bradley.

**Alternative H (figure 6)**

The social impacts associated with the no-build option are minimal. No physical or figurative barriers are required by this alternative, and access to land along Bradley Avenue will remain unaltered. Pedestrians will be able to cross Bradley at any point along the...
street as long as a crosswalk is provided, which will allow users to access the church at Bradley and Fourth Street. Potential development at the project site will be no more or less likely with the no-build option, which includes the proposed commercial/retail development at the west end and the PHACC project on the Parkside site. A possible exception to this is the effect of increased automobile traffic on Bradley Avenue contributing to longer waits and lines of cars when trains cross the roadway. This may deter some future developers from considering the project site a viable development opportunity.

**Traffic Impact Evaluation**

Two factors related to traffic affect all five alternatives equally. First, the forecasted traffic increase on Bradley Avenue can be accommodated by all alternatives because the four-lane configuration of the roadway would be maintained. This in all likelihood holds true for any increases in traffic that each alternative itself may contribute to. Second, none of the alternatives will have an effect on the number of trains that pass through the area. Whether or not the crossing is grade-separated is independent of the decisions of CN-IC railroad regarding its train traffic.

**Alternative A (figure 2)**

Separating the automobile and train modes of transportation will result in the elimination of automobile traffic sitting idle while trains cross Bradley Avenue. This elimination of vehicular delay applies to all of the alternatives excepting the no-build option, which of course includes Alternative A. As a result of this grade separation, motorists will likely chose to take Bradley Avenue when they otherwise might avoid it due to the possibility of encountering a train at the crossing. Thus, traffic will increase through the area because of this and the fact that with Alternative A all intersections between Market and Fourth Streets are eliminated. In addition, the railroad traffic will also be positively affected by the grade separation because trains will be able to move through the area faster and unimpeded by automobiles. Moreover, since Alternative A leaves the railroad tracks at their current elevation there would be no interruption of CN-IC railroad operations during the construction of the Bradley Avenue overpass.
Due to the separation of all cross streets from Bradley Avenue with this alternative, there would be no access to Bradley by automobile between Market and Fourth Streets. In order for traffic to gain access to Bradley from the Bristol Place neighborhood, motorists would have to travel west to Market Street and then turn south. Otherwise the CN-IC railroad tracks would impede access for eastbound travelers. This change to the traffic pattern of the neighborhood would significantly impact traffic flow, and may cause more traffic to use residential streets that were not designed to accommodate it. Accordingly, some streets currently designated as one-way in Bristol Place may have to be reverted back to two-way streets.

**Alternative B (figure 3)**

Alternative B also entails separating train traffic from automobiles and thus the elimination of vehicular delay at the crossing. Thus, similar to Alternative A, more traffic will be attracted to and through the area because of this and the fact that with Alternative B all intersections between Market and Fourth Streets are eliminated, with the possible exception of Clock Street to the north. Also, the railroad traffic will be positively affected by the grade separation because trains will be able to move through the area faster and unimpeded by automobiles. However, since Alternative B leaves the railroad tracks at their current elevation but entails the construction of a railroad bridge over a lowered Bradley Avenue, there may be some inconvenience to CN-IC railroad operations while construction is occurring and railroad traffic is maintained.

Like Alternative A, with Alternative B there would be no access to Bradley by automobile between Market and Fourth Streets, with the remote exception of Clock Street. Traffic in the neighborhood would have to be routed to Market Street as the only means of accessing Bradley. As it was discussed above this change to the traffic pattern of the neighborhood would significantly impact traffic flow, and may cause more traffic to use residential streets that were not designed to accommodate it. Accordingly, some streets currently designated as one-way in Bristol Place may have to be reverted back to two-way streets.
Alternative E (figure 4)

Like the first two grade separation options Alternative E requires separating train traffic from automobiles and thus the elimination of vehicular delay at the crossing. Accordingly, more traffic will be attracted to and through the area because of this and the fact that with Alternative E all intersections between Market and Fourth Streets are eliminated. Also, the railroad traffic will be positively affected by the grade separation because trains will be able to move through the area faster and unimpeded by automobiles. However, since Alternative E entails the lowering of railroad tracks below their current elevation and the construction of an overpass structure overhead, there will be some inconvenience – certainly more so than Alternative B – to CN-IC railroad operations while construction is occurring and railroad traffic is maintained.

The affect of this alternative on traffic flow and pattern would be the same as with Alternative A: there would be no access to Bradley by automobile between Market and Fourth Streets. As a result traffic in the neighborhood would have to be routed to Market Street as the only means of accessing Bradley. This change to the traffic pattern of the neighborhood would significantly impact traffic flow, and may cause more traffic to use residential streets that were not designed to accommodate it. Not unlike the previous two alternative some streets currently designated as one-way in Bristol Place may have to be reverted back to two-way streets.

Alternative F (figure 5)

Alternative F also involves the separation of train traffic from automobiles and thus the elimination of vehicular delay at the crossing. Accordingly, more traffic will be attracted to and through the area because of this and the fact that with Alternative F most intersections between Market and Fourth Streets are eliminated, with Clock Street to the north the only exception. Railroad traffic will be positively affected by the grade separation because trains will be able to move through the area faster and unimpeded by automobiles. However, like Alternative B this alternative entails the construction of a railroad bridge over a lowered Bradley Avenue, and also requires that the railroad bed be raised up as well. Due to this there will likely be some inconvenience to CN-IC railroad opera-
tions while construction is occurring and railroad traffic is maintained, possibly similar in magnitude as with Alternative E.

Unlike the three previous grade separation alternatives, Alternative F would allow Clock Street both north and south to maintain its intersection with Bradley Avenue. Consequently, traffic from the Bristol Place neighborhood could access Bradley without having to re-route to Market Street, resulting in a lesser impact on the traffic pattern of the neighborhood than the other alternatives. Accordingly, the flow of traffic will not need to change much and most one-way streets may remain so.

**Alternative H (figure 6)**

With the no-build option the traffic on Bradley Avenue and in the area nearby its intersection with the CN-IC railroad tracks should not increase over and above current projections. Vehicular delay at the crossing will increase as well, which should enforce the status quo of traffic patterns and related activities in the area. Railroad traffic would also remain impeded by the gated at-grade crossing while general CN-IC railroad operations would be unaffected.

**Public Safety Evaluation**

Below are the individual descriptions of each grade separation alternative with respect to public safety criteria.

**Alternative A (figure 2)**

With each grade separation alternative, pedestrian traffic will be significantly affected. Because an overpass will be built for Bradley Avenue from Market Street to Fourth Street with Alternative A, no pedestrians will be allowed to cross Bradley, resulting in fewer interactions between automobiles and pedestrians. However, any people on foot that are walking along the overpass may face the risk of being struck by vehicular traffic that may be travelling at faster speeds due to the nature of the overpass. Also, there are hazards associated with pedestrians falling off of the twenty-nine foot overpass onto the tracks below, and also throwing objects off of the bridge. Moreover, some feel that the risk of crimes being committed below the long overpass is significant in this particular case.
By nature of a grade separation project, automobile-train accidents would be eliminated with Alternative A. This is a significant improvement over the current at-grade crossing. Additionally, fewer cross streets will intersect with Bradley Avenue, thus reducing the chance of automobile accidents associated with residential streets intersecting with arterials. Similarly, with Alternative A sight lines for motorists should be more than adequate approaching the intersections on the east and west ends of the project from the overpass.

Improvement would also be seen in emergency vehicle access through the crossing as these vehicles would be able to use Bradley Avenue to get to other sites without the threat of a train causing them to detour. However, emergency vehicle access into and from the surrounding neighborhood could be severely limited with Alternative A depending on the ability for fire equipment to pass under the overpass, if the roadways are reconfigured to do so.

**Alternative B (figure 3)**

Because an underpass will be built for Bradley Avenue from Market Street to Fourth Street with Alternative B, no pedestrians will be allowed to cross Bradley, resulting in fewer interactions between automobiles and pedestrians (similar to Alternative A). However, any people on foot that are walking along the newly lowered roadway may face the risk of being struck by vehicular traffic that may be travelling at faster speeds. Additionally, there may be less space for pedestrians on Bradley Avenue to move out of the way of traffic with Alternative B, depending on how the underpass is designed. Also, there are hazards associated with pedestrians falling off of the railroad overpass onto the road below, and also throwing objects off of the bridge onto traffic on Bradley Avenue. However this risk may be somewhat less than the one associated with Alternative A, because theoretically fewer pedestrians will be walking along the railroad bridge than on a roadway overpass. Relatively, the risk of crimes being committed below a short railroad overpass on Bradley Avenue is slight.

Not unlike Alternative A, automobile-train accidents would be eliminated with Alternative B, which would be a significant improvement over existing conditions near the at-grade crossing. Additionally, fewer cross streets will intersect with Bradley Avenue, thus reducing the chance of automobile accidents associated with residential streets intersect-
ing with arterials. Sight lines for motorists travelling under the railroad bridge may be somewhat obstructed relative to Alternative A do to the bridge structure and inclined approaches to Market and Fourth Streets.

Also like Alternative A improvement would be seen in emergency vehicle access through the crossing as these vehicles would be able to use Bradley Avenue to get to other sites without the threat of a train causing them to detour. However, emergency vehicle access into and from the surrounding neighborhood could be severely limited with Alternative B depending on whether or not Clock Street is able to intersect with Bradley and the ability for fire equipment to pass under the overpass, if the roadways are reconfigured to do so.

**Alternative E (figure 4)**

Because with Alternative E Bradley Avenue will be raised from Market Street to Fourth Street for the overpass, no pedestrians will be able to cross Bradley, resulting in fewer interactions between automobiles and pedestrians. However, like Alternative A any people on foot that are walking along the overpass may face the risk of being struck by vehicular traffic. Also, the hazards associated with pedestrians falling off of the overpass onto the tracks below and also throwing objects off of the bridge apply here as well. Once more, the risk of crimes being committed below the overpass is significant in this case as it was for Alternative A.

Naturally automobile-train accidents would be eliminated with Alternative E, once again a significant improvement over the current at-grade crossing. Additionally, fewer cross streets will intersect with Bradley Avenue, thus reducing the chance of automobile accidents associated with residential streets intersecting with arterials. Similarly, with Alternative E sight lines for motorists should be more than adequate approaching the intersections on the east and west ends of the project from the overpass.

With Alternative E improvement would be seen in emergency vehicle access through the crossing in the same manner and to the same degree as Alternative A. However, also like the first alternative emergency vehicle access into and from the surrounding neighborhood could be severely limited depending on the ability for fire equipment to pass under the overpass, if the roadways are reconfigured to do so.
Alternative F (figure 5)

Because an underpass will be built for Bradley Avenue from the Boneyard Creek to the church entrance with Alternative F, no pedestrians will be allowed to cross Bradley between these points, resulting in a smaller chance of pedestrians being involved in accidents. However, like Alternative B any people on foot that are walking along the newly-lowered roadway may face the risk of being struck by vehicular traffic. Additionally, there may be less space for pedestrians on Bradley Avenue to move out of the way of traffic with Alternative F, depending on how the underpass is designed. Also, the hazards associated with pedestrians falling off of and throwing objects from the railroad overpass exist here to the same degree as with Alternative B. And like this alternative, the risk of crimes being committed below a short railroad overpass on Bradley Avenue is slight for Alternative F.

The benefits associated with the elimination of automobile-train accidents and the reduction of intersections would also be the same in Alternative F as they are for Alternative B, with the possible exception of sight line conditions, which may be slightly better for Alternative F due to the relatively flatter slopes of the approach roadway. The similarities between the two alternatives also apply to emergency vehicle access to and through the neighborhood, which should be an improvement over current conditions.

Alternative H (figure 6)

If the Bradley Avenue / CN-IC railroad crossing is left at-grade then there would be much more potential interaction between pedestrians, cars and trains all along the project area than with any of the grade separation alternatives. And taking into account the forecasted increase in traffic on Bradley, this situation may worsen. Moreover, emergency vehicles will still have to detour to Washington Street if a train is crossing Bradley, although access into the immediate neighborhood should remain adequate.

Cost Evaluation

The evaluation of grade separation alternatives with respect to cost was performed in a slightly different manner than the other five criteria classes. This is because factors associated with costs can more readily be measured and compared once a determination is
made regarding the estimation of costs. What follows is a discussion of this process, and an estimation of construction costs based upon current and past roadway-railroad grade separation projects in east-central Illinois. Until a consultant can perform a more thorough and detailed cost estimate, the following tables will serve as an estimate of construction costs in round numbers:

**Table 3: Gross Construction Costs**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Railroad Bridge Costs</th>
<th>Roadway Bridge Costs</th>
<th>Railroad Excavation Costs</th>
<th>Roadway Excavation Costs</th>
<th>Pavement Reconstruction Costs</th>
<th>Upgrade Existing Crossing</th>
<th>Total Gross Construction Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$0</td>
<td>$3,500,000</td>
<td>$0</td>
<td>$0</td>
<td>$1,200,000</td>
<td>$0</td>
<td>$4,700,000</td>
</tr>
<tr>
<td>B</td>
<td>$5,400,000</td>
<td>$0</td>
<td>$1,500,000</td>
<td>$800,000</td>
<td>$0</td>
<td>$7,700,000</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>$0</td>
<td>$3,000,000</td>
<td>$2,000,000</td>
<td>$1,200,000</td>
<td>$0</td>
<td>$6,200,000</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>$6,900,000</td>
<td>$0</td>
<td>$1,000,000</td>
<td>$800,000</td>
<td>$0</td>
<td>$8,700,000</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$500,000</td>
<td>$500,000</td>
<td></td>
</tr>
</tbody>
</table>

* Pavement costs = $1.1 million per lane mile

**Table 4: Funding and Net Construction Costs**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Total Gross Construction Costs</th>
<th>ICC Portion (60%)</th>
<th>CN-IC Portion (5%)</th>
<th>Federal Portion (50% of remainder)</th>
<th>Construction Costs, City of Champaign Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$4,700,000</td>
<td>$2,820,000</td>
<td>$235,000</td>
<td>$822,500</td>
<td>$820,000</td>
</tr>
<tr>
<td>B</td>
<td>$7,700,000</td>
<td>$4,620,000</td>
<td>$385,000</td>
<td>$1,347,500</td>
<td>$1,300,000</td>
</tr>
<tr>
<td>E</td>
<td>$6,200,000</td>
<td>$3,720,000</td>
<td>$310,000</td>
<td>$1,085,000</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>F</td>
<td>$8,700,000</td>
<td>$5,220,000</td>
<td>$435,000</td>
<td>$1,522,500</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>H</td>
<td>$500,000</td>
<td>$425,000</td>
<td>$25,000</td>
<td>$0</td>
<td>-$50,000</td>
</tr>
</tbody>
</table>

**ICC funds up to 85% of costs associated with upgrading an existing crossing**

The costs associated with the construction of a railroad bridge are higher for Alternative F than for Alternative B because the latter not only entails the construction of the bridge itself but also raising the tracks to the north and south. Similarly, the roadway bridge for Alternative A would cost more than Alternative E because the overpass is considerably longer for the former option. Also, estimated roadway excavation costs are higher for
Alternative B than for Alternative F because more roadway excavation is involved for Alternative B. Any necessary costs associated with right-of-way acquisition for any of the alternatives are factored into these costs as well. In addition, it was determined that the differences in long term and maintenance costs associated with each alternative were insignificant when compared to the magnitude of the construction costs.

Findings of Cost Evaluation

According to the estimation of costs above, Alternative F would be the most expensive to build, followed by Alternative B, E, A and of course H, with costs ranging from $0.5 million for the no-build option to $8.7 million for Alternative F. This observation is perhaps not surprising given the nature of each alternative and what each entails. However, what is interesting to note is the relative differences in the City’s portion of the costs after all funding sources are factored in. The no-build option remains considerably less expensive than the other four alternatives. However, only a few-hundred thousand dollars separates the alternatives that involve the separation of Bradley Avenue from the CN-IC railroad tracks. This is a relatively small amount when considering the gross construction costs and benefits of each.

Weighting of Evaluation Criteria

Inherently each criterion and each criteria class will have different and varying effects upon the different alternatives. Therefore in order to obtain a true and accurate representation of “stakeholder” views on the criteria, it was necessary to weigh each of the six groups according to their importance in evaluating the alternatives. To accomplish this, ten stakeholder representatives were identified and asked to rank the six groups of criteria according to their individual views on the relative importance of each in evaluating the various grade separation alternatives. Following is a list of the interested stakeholders who were identified and who participated in this process:

- Beardsley Park Neighborhood Association;
- Bristol Place Project Team;
- Canadian National - Illinois Central Railroad;
- Champaign County Regional Planning Commission;
- Champaign Department of Engineering and Public Works;
• Champaign Fire Department;
• Champaign Police Department;
• City of Champaign Planning Department;
• Illinois Department of Transportation; and
• Public Housing Authority of Champaign County.

A vote distribution process was used to weigh the relative importance of the criteria (see Appendix A for a more detailed description of this process). The average of the ten stakeholder scores for each of the six criteria was then computed and normalized on a scale of 1 to 100 percent to reflect their relative weight. These are listed below, from the class of criteria with the greatest weight to the least. These are the variables that were used in the Analytical Hierarchy Process (below).

1. Public Safety: 24.6%
2. Traffic Impacts: 19.2%
3. Social impacts: 18.3%
4. Physical feasibility: 14.6%
5. Environmental impacts: 13.8%
6. Costs: 9.6%

As demonstrated by the list of criteria above, on average the stakeholders viewed public safety as being the most important factor in evaluating the grade crossing alternatives, with traffic and social impacts appearing second and third in the list. This is not surprising given the nature of the project and the reasons often cited for constructing a grade separation structure to replace an existing at-grade crossing. What may be somewhat unexpected is the relatively small weight or importance given to cost by the stakeholders, perhaps reflecting that all stakeholders value a separation, and the cost of a separation will be relatively similar for all the feasible alternatives.

**The Analytical Hierarchy Process**

The process of evaluating multiple planning alternatives can prove to be a difficult task for planners. Not only must one consider many possible solutions, but also countless
criteria for evaluating those solutions. The Analytical Hierarchy Process (AHP) allows the planners to simultaneously simplify and rationalize the decision making process by organizing the overall goal, criteria and alternatives into a hierarchy. In this manner, judgements are made between pairs of factors instead of among many. In this way the planner can consider each of the many factors involved while not losing sight of the original goal.

**Application of the AHP**

For the AHP to be effective (and to make criteria judgements more operational), the goals of the plan must be clearly understood. These goals serve as the first level of the hierarchy that structures the problem. The goal is to determine the most appropriate grade separation alternative at the intersection of Bradley Avenue and the CN-IC railroad tracks in Champaign, Illinois. From this primary goal come several factors that contribute to its fulfillment and serve as the second level in the hierarchy. For this study, there are six contributing factors or classes or criteria. These include physical feasibility, environmental impacts, social impacts, traffic impacts, public safety and cost. Each factor, through the AHP method, will contribute differently to the process, which will be borne out by the final results.

The final level of the hierarchy consists of the grade separation alternatives to be considered, which will be assessed according to the factors listed above. According to the primary goal, and to the initial screening process above, these five alternatives include raising Bradley Avenue and leaving the CN-IC railroad tracks at grade (Alternative A); Lowering Bradley Avenue and leaving the CN-IC railroad tracks at grade (Alternative B); Raising Bradley Avenue and lowering the CN-IC railroad tracks (Alternative E); Lowering Bradley Avenue and raising the CN-IC railroad tracks (Alternative F); and a no-build option (Alternative H). All five of these alternatives exhibit varying degrees of success; the Analytic Hierarchy Process helps determine which one is most appropriate (see Appendix B).

This process included the selection and weighting of evaluation criteria discussed above and was used here as an aid to the evaluation process. It was used as a tool to structure the evaluations and to better understand what role each was to play in the selection of the
The most appropriate grade separation alternative. Therefore the AHP was not an end in itself but rather the means toward accomplishing the goals of this study. The following recommendation is the result of not only the AHP process but also the evaluations discussed above placed within the context of the Bristol Place neighborhood in Champaign, Illinois.
The Bradley Avenue / CN-IC Railroad Preferred Grade Separation Alternative

Alternative F, which entails the combination of lowering Bradley Avenue eleven and one-half feet and raising the railroad tracks eight feet, is the recommended grade separation alternative for the Bristol Place neighborhood in Champaign.

There are several reasons for the selection of Alternative F as the preferred alternative. First, Alternative F performed nearly as well or better than all the other alternatives in the three most important evaluation criteria classes. In public safety (see page 44), determined by stakeholders to be the most significant factor in evaluating alternatives, Alternative F rates higher than all other alternatives, slightly higher than Alternative B. This is primarily due to the elimination of risks associated with an at-grade crossing, maintaining the best overall emergency vehicle access, as well as having the least impact on driver and pedestrian safety.

For traffic impact criteria (see page 40), also heavily weighted by stakeholders, this combined roadway underpass/rail bridge alternative significantly outperforms each of the other four options. In addition to allowing automobiles and trains to operate without interfering with each other, as three of the four other alternatives do, Alternative F impacts vehicular travel patterns and flow the least due to its relatively small change in elevation. Moreover, this alternative performs extremely well in the second most important criteria: social impacts (see page 37). The topological changes required by Alternative F, along with those of the no-build option, involve the smallest interruptions to the community fabric and in fact improve the situation by providing for smoother traffic flow while at the same time preserving the surrounding land’s ability to support future development. The only class of criteria where Alternative F appears to rate poorly is in costs; however, this is by far the least important factor according to stakeholders and relatively speaking differs very little from Alternatives B and E.
Appendix A: Evaluation Criteria Weighing Process

As discussed above on page 46, ten stakeholders were asked to rank the six criteria to be used in the evaluation of the five grade separation alternatives. Each stakeholder was selected due to their particular interest in the project and to represent as best as possible the values held within the community. Below is a list of each of the ten stakeholders, along with the name of each representative selected.

1. Beardsley Park Neighborhood Association (Felicia Cockerall, President)
   This organization was selected to represent the residents in the community surrounding the crossing.

2. Bristol Place Project Team (Jason Liechty)
   Mr. Liechty and the Bristol Place Project Team was included for input on the project’s compatibility with the overall Bristol Place plan, and to represent future development interests. The Project Team is composed of nine graduate students – including the author – in the University of Illinois’ Department of Urban and Regional Planning, who is each working on specific aspects of the overall plan.

3. Canadian National - Illinois Central Railroad (Tom Zeinz, Midwest Engineering)
   Mr. Zeinz was selected to represent engineering, design and safety interests of the CN-IC Railroad.

4. Champaign County Regional Planning Commission (Mylinda Granger)
   CCRPC was selected to represent planning uses on a county-wide scale.

5. Champaign Department of Engineering and Public Works (Rick Marley, Assistant City Engineer)
   Mr. Marley was selected for his prior interests in this project and to represent issues related to engineering and maintenance.

6. Champaign Fire Department (Steve Clarkson)
   The Fire and Police Departments were included to represent public safety interests in Champaign.

7. Champaign Police Department (Gary Spear, Crime Analysis)
   See number 6, above.

8. City of Champaign Planning Department (Rajesh “Cac” Kamak, Planner 1)
   As the primary client, Mr. Kamak was selected for his interests in transportation-related planning issues and to represent the Planning Department.

9. Illinois Department of Transportation (Dennis Markwell, Program Development)
   Mr. Markwell was selected to represent state-wide transportation planning issues and IDOT regulations.
10. Public Housing Authority of Champaign County (Elawrence Davis, Executive Director)

As Executive Director of the PHACC, Mr. Davis was included because the Housing Authority owns or manages the two key properties affected by the project on the east side.

In order to obtain a representation of the relative importance of the six classes of criteria, all ten stakeholders were given 24 votes to disperse among the six criteria according to their views on their relative importance. If they felt that a certain class of criteria is more important than the others, then it would receive more votes. If the individual stakeholder felt that they are all of equal importance, as was the case of the Public Housing Authority of Champaign County, then each class was given four votes. The only requirement for the stakeholders was that the total of their votes was to equal 24. The table below summarizes the individual responses from the stakeholders, along with their average scores.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Physical Feasibility</th>
<th>Environmental Impacts</th>
<th>Social Impacts</th>
<th>Traffic Impacts</th>
<th>Public Safety</th>
<th>Costs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beardsley Park Neighborhood Association</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Bristol Place Project Team</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Canadian National - Illinois Central Railroad</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Champaign County Regional Planning Commission</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Champaign Department of Engineering and Public Works</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Champaign Fire Department</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Champaign Police Department</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>City of Champaign Planning Department</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Illinois Department of Transportation</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Public Housing Authority of Champaign County</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>24</td>
</tr>
</tbody>
</table>

Averages: 3.5  3.3  4.4  4.6  5.9  2.3  24
Appendix B: The Analytical Hierarchy Process

After determining the goal and factors or criteria to be used in our analysis, the next step in utilizing the AHP is to determine the relative importance of the six second-level criteria in achieving the stated goal. In order to simplify and structure this process, a table of values will be created to compare each class of criteria with another, until the matrix is complete (see figure B-2). Thus, in our analysis, traffic impacts are two times as important as costs in achieving the goal. Likewise, environmental impacts are three-fourths as important as social impacts. After the table is complete, we see that public safety and perhaps traffic impacts are the most important factors, while costs are the least. These relative figures of course depend upon the values of the individual stakeholders. Ideally the matrix below would reflect the values of all affected residents of the Champaign-Urbana metropolitan area.

**Figure B-1: AHP Criteria**

<table>
<thead>
<tr>
<th></th>
<th>Physical Feasibility</th>
<th>Environmental Impacts</th>
<th>Social Impacts</th>
<th>Traffic Impacts</th>
<th>Public Safety</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Feasibility</td>
<td>1.00</td>
<td>1.06</td>
<td>0.80</td>
<td>0.76</td>
<td>0.59</td>
<td>1.52</td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td></td>
<td>0.94</td>
<td>1.00</td>
<td>0.75</td>
<td>0.72</td>
<td>0.56</td>
</tr>
<tr>
<td>Social Impacts</td>
<td></td>
<td>1.26</td>
<td>1.00</td>
<td>1.00</td>
<td>0.96</td>
<td>0.75</td>
</tr>
<tr>
<td>Traffic Impacts</td>
<td></td>
<td></td>
<td>1.05</td>
<td>1.00</td>
<td>0.78</td>
<td>2.00</td>
</tr>
<tr>
<td>Public Safety</td>
<td></td>
<td></td>
<td>1.34</td>
<td>1.28</td>
<td>1.00</td>
<td>2.57</td>
</tr>
<tr>
<td>Costs</td>
<td></td>
<td></td>
<td>0.52</td>
<td>0.50</td>
<td>0.39</td>
<td><strong>1.00</strong></td>
</tr>
</tbody>
</table>

After completion of the previous step, a priority vector must be established for the problem. This step will reveal the exact relative importance of the criteria classes. To do this, the values in figure B-1 are summed across for each criteria and the results normalized for comparison. This process is illustrated below (see figure B-2).

**Figure B-2: Priority Vector**

<table>
<thead>
<tr>
<th></th>
<th>Row Total</th>
<th>Normalized Value</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical feasibility</td>
<td>5.73</td>
<td>14.6%</td>
<td>4</td>
</tr>
<tr>
<td>Environmental impacts</td>
<td>5.40</td>
<td>13.8%</td>
<td>5</td>
</tr>
<tr>
<td>Social impacts</td>
<td>7.21</td>
<td>18.3%</td>
<td>3</td>
</tr>
<tr>
<td>Traffic Impacts</td>
<td>7.53</td>
<td>19.2%</td>
<td>2</td>
</tr>
<tr>
<td>Public Safety</td>
<td>9.66</td>
<td>24.6%</td>
<td>1</td>
</tr>
<tr>
<td>Costs</td>
<td>3.77</td>
<td>9.6%</td>
<td>6</td>
</tr>
</tbody>
</table>
Next a comparison must be made for each grade separation alternative using the criteria above, similar to the process illustrated in figure B-1. Thus, six unique comparisons of Alternatives A, B, E, F and G will be made, each one taking into account only one of the six classes of criteria (see figure B-3). Priority vectors for each alternative are obtained similar to figure B-2, above.

**Figure B-3: Grade Separation Alternatives**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt. A</td>
<td>1.00</td>
<td>2.25</td>
<td>1.29</td>
<td>1.50</td>
<td>0.64</td>
<td>22.3%</td>
<td>Alt. A</td>
<td>4.00</td>
<td>3.00</td>
<td>1.50</td>
<td>1.71</td>
<td>1.33</td>
</tr>
<tr>
<td>Alt. B</td>
<td>0.44</td>
<td>1.00</td>
<td>0.57</td>
<td>0.67</td>
<td>0.29</td>
<td>10.0%</td>
<td>Alt. B</td>
<td>0.33</td>
<td>4.00</td>
<td>0.50</td>
<td>0.57</td>
<td>0.44</td>
</tr>
<tr>
<td>Alt. E</td>
<td>0.78</td>
<td>1.75</td>
<td>1.00</td>
<td>1.17</td>
<td>0.50</td>
<td>17.5%</td>
<td>Alt. E</td>
<td>0.00</td>
<td>2.00</td>
<td>1.00</td>
<td>1.14</td>
<td>0.89</td>
</tr>
<tr>
<td>Alt. F</td>
<td>0.67</td>
<td>1.50</td>
<td>0.86</td>
<td>1.00</td>
<td>0.43</td>
<td>15.0%</td>
<td>Alt. F</td>
<td>0.58</td>
<td>1.75</td>
<td>0.88</td>
<td>1.00</td>
<td>0.78</td>
</tr>
<tr>
<td>Alt. H</td>
<td>1.56</td>
<td>3.50</td>
<td>2.00</td>
<td>2.33</td>
<td>1.00</td>
<td>35.0%</td>
<td>Alt. H</td>
<td>0.75</td>
<td>2.25</td>
<td>1.13</td>
<td>1.29</td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt. A</td>
<td>1.00</td>
<td>1.75</td>
<td>1.00</td>
<td>0.70</td>
<td>0.58</td>
<td>17.5%</td>
<td>Alt. A</td>
<td>1.00</td>
<td>1.29</td>
<td>1.13</td>
<td>0.75</td>
<td>2.25</td>
</tr>
<tr>
<td>Alt. B</td>
<td>0.57</td>
<td>1.00</td>
<td>0.57</td>
<td>0.40</td>
<td>0.33</td>
<td>10.0%</td>
<td>Alt. B</td>
<td>0.78</td>
<td>1.00</td>
<td>0.88</td>
<td>0.58</td>
<td>1.75</td>
</tr>
<tr>
<td>Alt. E</td>
<td>1.00</td>
<td>1.75</td>
<td>1.00</td>
<td>0.70</td>
<td>0.58</td>
<td>17.5%</td>
<td>Alt. E</td>
<td>0.89</td>
<td>1.14</td>
<td>1.00</td>
<td>0.67</td>
<td>2.00</td>
</tr>
<tr>
<td>Alt. F</td>
<td>1.43</td>
<td>2.50</td>
<td>1.43</td>
<td>1.00</td>
<td>0.83</td>
<td>25.0%</td>
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A summary of the above steps can now be obtained by combining the priority vectors for both the evaluation criteria and grade separation alternatives. The final step of the AHP involves multiplying these resulting priority matrices to obtain a rating of each alternative (see figure B-4).
Figure B-4: Priority Matrices and Alternative Ranking

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The results of the AHP, as indicated above, demonstrate that the five alternatives are indeed not equal in terms of satisfying the goal of choosing the most appropriate grade separation alternative at the Bradley Avenue / CN-IC railroad crossing. However, Alternative F did receive the highest priority rating (23.0%), and therefore is the best grade separation alternative for the crossing according to the Analytical Hierarchy Process. Each alternative has its strengths; for instance Alternative A ranks highly in environmental impacts and Alternative G in physical feasibility and costs. However, Alternative F rated highly in the more important criteria such as public safety, traffic impacts and social impacts. This is borne out by the values stated above, and as a result Alternative F received the higher rating. As demonstrated here, the Analytical Hierarchy Process is an effective and simple way to evaluate a complex web of alternatives and criteria, provided that the goals are clearly stated and the values of all stakeholders are represented. This latter point may prove to be the most difficult; however, the AHP simplifies the process by setting up comparisons between two factors at a time, effectively minimizing confusion.
Appendix P

Intergovernmental Agreement
REPORT TO CITY COUNCIL

FROM: Steven C. Carter, City Manager

DATE: August 13, 1997

SUBJECT: EXPLANATION OF COUNCIL BILL NO. 97 -

Introduction: This Council Bill would approve an intergovernmental agreement between the City and the Park District relative to maintenance of the properties adjacent to the Boneyard Creek Channel.

Background: As early as 1987, the Park District and the City have been discussing relative responsibilities with respect to the potential use of the Boneyard Creek as a focus for not only drainage, but recreational green-belt through the City. Over the many years of ups and downs in the relationships with other governmental entities, the Park District has been a steadfast partner with the City in the Boneyard Creek vision. Throughout the years, the Park District has been committed to maintenance of the green-way adjacent to the Boneyard Creek Channel. Over the years, the City has entered into various individual license agreements with the Park District for maintenance of properties that have been purchased by the City for future Boneyard Creek Channel improvements. This agreement proposed for approval by the City Council would formalize the long-term licensing arrangement between the City and the Park District for all the property purchased for Boneyard Creek Channel improvements and further formalize the partnership that is well under way between the Park District and the City relative to these properties. At this time, the agreement would exclude those properties between First Street and Wright Street, south of Springfield Avenue, pending finalization of design concepts for this area.

Essentially, the agreement would be a continuation of the prior agreements that the City Council has generally authorized in 1991 between the City and the Park District. Since 1991, the City and the Park District have entered into 27 individual agreements relative to the properties that the City has acquired.

Currently, the City has 16 properties that have been purchased, cleared and are in need of a license agreement. In the future, the City intends to purchase an additional 19 properties for Boneyard Channel improvements that will require license agreements.

The essence of the agreement is that the City would acquire and demolish and place the properties in a condition that would be suitable for Park District use. After this time, the City would notify the Park District and the Park District would be responsible for maintenance and supervision of those properties. The Park District can, over the term of the license, plan improvements, secure grants where available and integrate the property into its long-term goals.

Alternatives:

1. Pass the Council Bill and approve the agreement.
2. Do not pass the Council Bill and do not approve the agreement.

**Discussion of Alternatives:** Alternative 1, approval of the agreement, is consistent with the long-term direction of the City Council and commitment by the Park District. The advantages to this agreement are that it would promote the recreational use of property adjacent to the Boneyard Creek Channel and relieve the City of maintenance responsibility for the term of the agreement.

Another advantage of Alternative 1 is it eliminates the need to have individual license agreements for each property acquired. In the past, the individual agreements have been difficult to track. Occasionally, properties have been purchased, cleaned and no license agreement executed. This has required the City to maintain the property.

Both parties, pursuant to the agreement, retain an option to terminate the agreement. The Park District would be required to provide 18 months' notice prior to termination. If the City terminates the agreement, the City would be responsible for reimbursing the Park District for its investment in the items placed on the properties.

Alternative 2, which would be not to approve the agreement, would be inconsistent with the long-term policy direction of the City Council. This alternative, if chosen, would mean that the City would continue to maintain the properties as they are acquired, except for those properties which are currently licensed to the Park District.

**Budget and Staffing Impact:** There would be continuing interaction between the City and the Park District for the duration of the project. The City and the Park District would work on a continuing basis to ensure that the properties were in appropriate condition for the Park District to undertake its responsibilities under the agreement.

Clearly, in the long term, the Park District is best suited for the long-term maintenance of the properties adjacent to the Boneyard. Currently, Boneyard properties without park District license agreements are maintained contractually. The potential cost for mowing the 16 properties without license agreements is $4,480. This assumes 14 mowings per year at a cost of $20 per mowing. This includes no cost for other maintenance items, i.e. garbage and trash removal. This cost could increase by $5,320 annually if the other 19 properties needed for Boneyard Creek Channel improvements are purchased and maintained by the City. These potential costs would become the responsibility of the Park District under the agreement.

**Recommended Action:** The administration recommends approval of this Council Bill.

**Prepared by:**

Frederick C. Stavins  
City Attorney

**Reviewed by:**

Dennis Schmidt  
Assistant City Engineer

FCS/sjw
COUNCIL BILL NO. 97 - 232

A RESOLUTION

APPROVING AN INTERGOVERNMENTAL AGREEMENT
WITH THE CHAMPAIGN PARK DISTRICT RELATIVE
TO PROPERTY ADJACENT TO THE BONEYARD CREEK CHANNEL

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CHAMPAIGN,
ILLINOIS, as follows:

Section 1. That the agreement entitled "Intergovernmental Agreement for the
Maintenance and Use of Property Adjacent to the Boneyard Creek Channel" is hereby
approved.

Section 2. That the City Manager is hereby authorized to execute an agreement
in substantially the same form as approved in Section 1 above.

Section 3. That the City Clerk is hereby directed to send a copy of this
Resolution and executed agreement to Robert Toalson, General Manager, Champaign Park
District, 706 Kenwood Road, Champaign, Illinois 61821; French Fraker, Dobbins, Fraker,
Tennant, Joy & Perlstein, 215 North Neil Street, Champaign, Illinois 61820; the City Engineer
and the City Attorney.

COUNCIL BILL NO. 97 - 232

PASSED: AUGUST 19, 1997

APPROVED: ____________________________
Mayor

ATTEST: ____________________________
Deputy City Clerk

APPROVED AS TO FORM:

City Attorney
AN INTERGOVERNMENTAL AGREEMENT
FOR THE MAINTENANCE AND USE OF PROPERTY
ADJACENT TO THE BONEYARD CREEK CHANNEL
(NOT INCLUDING STORMWATER DETENTION FACILITIES)
(CHAMPAIGN PARK DISTRICT - CITY OF CHAMPAIGN, ILLINOIS)

This Intergovernmental Agreement is entered into this 14th day of
August, 1997, by and between the City of Champaign, Illinois, a
Municipal Corporation ("City"), and the Champaign Park District, a Municipal Corporation ("Park
District").

WITNESSETH:

WHEREAS, the City and Park District are body politics and corporate of the State of
Illinois and authorized to enter into an intergovernmental agreement pursuant to Article VII of
the Illinois Constitution of 1970 and Section 1 of the Intergovernmental Cooperation Act, 5 ILCS
220/1, for the benefit of both entities; and

WHEREAS, the City and Park District have preliminarily identified the parcels acquired
and likely to be acquired by the City for the Boneyard Creek Channel Improvements that would
be compatible for use for park purposes (not including stormwater detention facility); and

WHEREAS, the City and Park District wish to set forth their understanding as to how the
use of property acquired by the City will be authorized for Park District uses and the properties
maintained by the City and Park District; and

WHEREAS, the City and Park District have entered into prior agreements regarding
certain individual parcels adjacent to the Boneyard Creek Channel in anticipation of the
improvements and park uses; and

WHEREAS, the parties wish to replace said prior agreements with this Agreement; and
WHEREAS, the City has entered into other intergovernmental agreements with other governmental entities regarding the improvement of the Boneyard Creek Channel; and

WHEREAS, the City intends to acquire the Boneyard Creek Channel and adjacent property in order to perform channel improvements and channel maintenance; and

WHEREAS, the property adjacent to the channel will be necessary for said City purposes and also available for other compatible park purposes, including, but not limited to, recreation, non-motorized transportation and ornamental landscaping and open space; and

WHEREAS, the City and the Park District finds that the development of the property adjacent to the Boneyard Creek Channel for park purposes is compatible with both their goals and objectives; and

WHEREAS, the City and the Park District find that the terms of this Agreement will allow ease of administration and of the future operation and maintenance of properties acquired for Boneyard Creek Channel Improvements (not including stormwater detention facilities); and

WHEREAS, the City and Park District intend to enter into further agreements concerning the properties acquired for the Boneyard Creek Improvement Project between First Street and Wright Street, south of Springfield Avenue.

NOW THEREFORE, the Park District and City agree as follows:

Section 1. Parcels Subject to License. Attachment A lists the parcels that the parties agree the City has acquired or intends to acquire for the Boneyard Creek Channel Improvements. These parcels are depicted on Attachment B. This list and map may be amended from time to time with mutual agreement of the City Manager of the City and the General Manager of the Park District, provided that the parcels to be acquired will ultimately provide a continuous strip of public property suitable for park purposes (subject to use of certain intervening parcels solely for right-of-way or vehicular and pedestrian use, except as noted on
Attachment A and B. All such parcels are termed "Licensed Property". Property indicated on Attachment A or depicted on Attachment B south of Springfield Avenue between First and Wright Streets shall not be included in this Agreement.

Section 2. License. When the City acquires title to a parcel of real estate described on said attachments and has demolished or otherwise removed all structures located on that respective property (except for pedestrian or vehicular bridges) and has restored said site to grade (except as provided herein), this Agreement shall constitute and be treated as a grant of a license to the Park District, solely for use for park purposes of that respective parcel real estate as described in Attachments A and B as from time to time amended. Those parcels which are currently licensed to the Park District are listed on Attachment C.

Section 3. Non-Assignment or Transfer. The license granted in Section 1 is given only to the Park District and may not be assigned or transferred by the Park District without the written authorization of the City.

Section 4. City - Clearance and Grading Prior to Transfer. The Park District shall inspect the property subject to this Agreement and inform the City of any special clearance instructions other than as stipulated in this Section. The City, at its sole expense, shall clear or cause to be cleared all structures, demolition debris, gravel driveway materials, and concrete pads, walks and items identified through special instructions from the Licensed Property prior to the grant of said license becoming effective. The City, at its sole expense, shall fill all demolition areas to grade. The City shall fill the last six (6) inches with topsoil in all fill areas and seed all areas on the parcel disturbed by demolition unless otherwise requested not to seed or fill by the Park District.

Section 5. Park District - Care of the Licensed Property. The Park District shall seed with grass or plant other ornamental landscaping or make such other improvements on
the Licensed Property as it deems appropriate at its sole expense. The Park District, at its sole expense, shall maintain and supervise the Licensed Property with the same degree of quality and care as the other real estate the Park District uses for park purposes, including ornamental landscaping. Provided, however, that the Park District shall have no responsibility for maintaining that portion of the Licensed Property within the channel, including, but not limited to, the banks of the Boneyard Creek or the flow of the Boneyard Creek, except that the Park District shall maintain grass areas of channel if the side slope is four to one (4:1) or flatter.

**Section 6. Maintenance of Channel - Paramount Use.** To the extent authorized by law, and notwithstanding this license agreement, the City will maintain the stream banks and stream flow of the Boneyard Creek across this Licensed Property to the extent it deems appropriate. It may enter the Licensed Property and take any action reasonably necessary on the Licensed Property in order to maintain or improve the Boneyard Creek and its banks and flow. The City shall attempt to minimize any disturbance of grass and ornamental plantings, and other park improvements, located on the Licensed Property while performing such work.

**Section 7. Landscaping and Improvements.** Any landscaping or other improvements (including fill, grading and signs) made to or placed on the Licensed Property shall be done in accordance with plans acceptable to the City considering the City's needs of future maintenance of the Creek. The City Manager or the City Manager's designee shall make the determination whether the plans are acceptable, but only after consultation with the Park District's General Manager or the General Manager's designee.

**Section 8. Commencement and Termination of License.**

A. Except as provided for in Section 11 with respect to those properties currently licensed by the City to the Park District, the license granted by this Agreement shall commence for each parcel on the date that the City sends notice to the Park District that the property is in
the required condition required by this Agreement. The notice shall be sent by the City Engineer or the Engineer's designee. The notice shall include an up-to-date Attachment C showing the property added to the list and the date of the addition to the list. At least annually, the City shall provide the Park District with an updated map generally in the form of Attachment B, depicting all properties for which this license grant has become effective since the last map update. The license shall thereafter continue for an indefinite duration but may be revoked by the City at any time as to the Licensed Property or any portion of the Licensed Property in accordance with the provisions contained in this Section.

B. Ninety (90) days after the passage of an ordinance or resolution by the City Council of the City stating that the license granted by this Agreement is void and no longer in effect as to a particular Licensed Property or any portion of a Licensed Property, the said license shall be void and no longer effective as to that portion of the Licensed Property described in such ordinance or resolution. The City shall not terminate the license granted by this Agreement as to any portion of licensed property necessary to provide continuous park use, except as noted on Attachment B. This Agreement and the licenses granted by this Agreement may be terminated by the Park District or the City at any time provided the terminating party provides at least eighteen (18) months written notice of its intent to terminate this Agreement. Should the City terminate the Agreement, it shall reimburse the Park District for the expense of any sidewalks, plantings, recreational equipment and other improvements left on the Licensed Property at its termination based on the fair market value for said fixtures at the date of termination. Should the Park District terminate the Agreement, it shall transfer ownership of all sidewalks, plantings, recreational equipment and other improvements which are present at the time notice of termination is sent which the City designates it seeks to own.
within ninety (90) days of receipt of the notice of intent to terminate. Said property shall become City property at no cost to the City.

**Section 9. Indemnification.** Notwithstanding any other term of this Agreement and regardless of any insurance carried by the Park District for the benefit of the City, the Park District hereby waives and releases the City from and agrees that the City shall not be held liable for, and agrees to indemnify and hold the City (including all of its agents, officers and employees) harmless against any loss or damage to property or any injury to or death of any person occurring on or about or resulting from use of the Park District maintained portion of the Licensed Property, unless caused by the sole negligence or willful misconduct of the City or its agents, officers or employees. Notwithstanding any other term of this Agreement and regardless of any insurance carried by the Park District for the benefit of the City, the Park District shall protect, defend, indemnify and save harmless the City and its officers, employees and agents against and from any and all liabilities, damages, suits, actions, claims, demands, losses, expenses, attorney's fees, and costs of every kind and nature incurred by or asserted or imposed against the City or its officers, employees or agents, or any of them, by reason of any accident, injury (including death), or damage to any person or property however caused (other than by the sole negligence or willful misconduct of the City or its officers, employees or agents) resulting from, arising out of or in connection with any use, non-use, possession, occupation, existence, condition, operation, design, construction, maintenance or management of or on or in connection with the Park District maintained portion of the Licensed Property.

**Section 10. Insurance.** The Park District shall maintain, at its sole expense, for so long as the licenses granted by this Agreement remain effective as to Licensed Property or any portion of Licensed Property, a public liability and property damage insurance program which
names the City as an additional insured. This insurance shall be in at least the following amounts:

$1,000,000.00 combined single limit/bodily injury or death

$300,000.00 combined single limit/property damage

The Park District shall file with the City Clerk a current certificate of insurance evidencing such coverage at the inception of this Agreement and annually thereafter as such insurance coverage is renewed. The City shall provide the same coverage which names the Park District as an additional insured.

The City agrees to indemnify the Park District on the same terms for actions or claims resulting from the City's use or management of the channel.

**Section 11. Prior Agreements.** The parties agree that the license granted by this Agreement is in effect for those properties listed on Attachment C and depicted on Attachment B without further payment or notice by the City despite any other provision to the contrary (these having been previously licensed to the Park District by prior agreements). This Agreement shall hereafter govern the use of those properties by the Park District in lieu of and in replace of prior license agreements regarding these properties, and said prior license agreements are hereby terminated and of no further effect.

**Section 12. Notice.** All notices required hereunder shall be sent, first class, certified mail, or personally delivered to:

City
City Manager
102 North Neil Street
Champaign, Illinois 61820

Park District
General Manager
706 Kenwood Road
Champaign, Illinois 61821

or to such other location designated by the parties.
IN WITNESS of this Agreement, the parties hereto set their hands and seals and executed this Agreement the date and year first above written.

CITY OF CHAMPAIGN, ILLINOIS

City Manager

ATTEST:

City Clerk

(SEAL)

APPROVED AS TO FORM FOR CITY:

City Attorney

CHAMPAIGN PARK DISTRICT

President

ATTEST:

Secretary

(SEAL)

APPROVED AS TO FORM FOR PARK DISTRICT:

Its Attorney
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Attachment C
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5/28/97