ClarkQuinn
Clark, Quinn, Moses, Scott & Grahn, LLP

Thomas Michael Quinn
Matthew R. Clark
Robert B. Scott
Charles R. Grahn
Frank D. Otte*
John "Bart" Herriman
John M. Moses
Michael P. Maxwell
William W. Gooden**
David P. Coyne
Jennifer F. Perry
Russell L. Brown**

Senior Counsel
James C. Clark
Raymond J. Grahn

Land Use Consultant
Elizabeth Bentz Williams, AICP

Alex M. Clark (1991)
Peter A. Pappas (1986)
Thomas M. Quinn (1973)
Joseph M. Howard (1964)

*Also admitted in Montana
** Registered Civil Mediator

Wm. Michael Turner
CELRL-PM-P-E (Room 708)
U.S. Army Corps of Engineers
P.O. Box 59
Louisville, KY 40201-0059

September 28, 2011

VIA EMAIL

Dear Mr. Turner:

Introduction

We would like to join the Town of Rocky Ripple ("Rocky Ripple"), Butler University ("Butler"), Citizen's Water, the Butler-Tarkington Neighborhood Association ("BTNA"), Meridian Kessler Neighborhood Association ("MKNA"), Broad Ripple Village Association ("BRVA"), Midtown Indianapolis, Inc. ("Midtown") and numerous individuals, families, and local and state elected officials in opposition to the Proposed Action contained in the U.S. Army Corps of Engineers ("Corps") Phase 3b of the White River (North) Flood Damage Reduction Project (the "Project") Draft Supplemental Environmental Impact Statement, dated June 2012 ("DSEIS").

Rocky Ripple Must be Included in the Project

Including Rocky Ripple is the most reasonable alternative to the Project[1]. The current design would leave Rocky Ripple and its over Seven Hundred (700) citizens and Three Hundred and Thirty (330) homes exposed to flooding and poses a significant, inevitable threat to human life and loss of property. High water events along the White River have been more numerous in recent years and a significant flood event over-topping and/or breaching Rocky Ripple's inadequate and failing earthen levee, which was constructed by the federal government in 1930s, will happen in the near future. In fact, it has been roughly one hundred years since the last historic flood, which destroyed Rocky Ripple. Based on the actuarial assumptions used by the Corps, there is a very good chance of another historic flood just around the corner. It is not a matter of if Rocky Ripple will flood but when. Attached hereto as Exhibit A, please find a study of the Rocky Ripple levee, which was commissioned by the City of Indianapolis.

After Rocky Ripple was excluded from the Project in 1996, the City conveyed to Rocky Ripple that the town would have an opportunity to be re-included in the Project in future years. In

[1] We hereby incorporate by reference all of our comments, concerns and attachments sent to the Corps on or about April 4, 2011 in opposition to the Corps Environmental Assessment dated February 1, 2011 (hereinafter "EA Concerns"). Due to the fact that the Corps did not revise the alignment and barely revised the structure of the flood wall along Westfield Boulevard, many of the EA Concerns apply equaling to the DSEIS.

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · ph (317) 637-1321 · fx (317) 687-2344
www.clarkquinnlaw.com

2001 and 2005, Rocky Ripple requested to be re-included in the Project but the requests were denied. (See EA Concerns). Nowhere in the letter from the City does the City require the Rocky Ripple to officially pass a resolution or ordinance in order to be re-included in the Project, which is the purported reason why Rocky Ripple's plea was denied. Regardless, the Town Council of Rocky Ripple unanimously passed a resolution on February 24, 2011 (See EA Concerns) and again in August of 2012 (Attached hereto as Exhibit B), requesting that the town be re-included in a flood protection project. Lastly, by giving Rocky Ripple false hope that it could be re-included in the Project in the future, Rocky Ripple has a strong claim for detrimental reliance under the law against the Corps and the City, in the event Rocky Ripple is excluded from the Project.

The DSEIS Proposed Action will Increase Flooding in Rocky Ripple

The DSEIS Proposed Action that requires the walling off Rocky Ripple, except for 52nd and 53rd Streets, which will be sandbagged in the event of a high water incident, violates federal law by increasing the likelihood of flooding, property damage and death in Rocky Ripple. Indeed, without the Project, if a significant high water incident occurred, there is a substantial likelihood that the dilapidated earthen levee in Rocky Ripple would breach, the flood waters would overrun the Central Canal and disperse throughout lower lying areas in BTNA and surrounding areas. However, the Proposed Action's design would not permit flood waters will not have the opportunity to disperse throughout the aforementioned low lying areas. Rather, the flood waters will be trapped or held back by the four to six foot wall along Westfield Boulevard, thus increasing the height of the flood waters in Rocky Ripple. Therefore, not only will those single story homes in Rocky Ripple be inundated by the flood waters, but many of the two story homes will now be at a higher risk of total destruction.

To add to the problem, residents in Rocky Ripple cannot rebuild their homes if fifty percent (50%) of their homes are damaged by flooding. Excluding Rocky Ripple the Project will increase the severity of flooding, which will increase the amount of damage to property and structures in Rocky Ripple, thus removing residents' ability to rebuild in the event of a significant flood. Because the Project will increase the height of the water during a flood in Rocky Ripple, the Corps Project violates federal law and flies in the face of the Corps' purported mission to save properties, lives and livelihoods.

The DSEIS Proposed Action will Significantly and Negatively
Affect the Property Values in BTNA and Rocky Ripple

Contrary to the Corps' unsupported notion that the Project will increase property values in the area, the current Project will have a devastating affect on property values. First, all of the residents who invested in homes along Westfield Boulevard will see a decline in the market value of their homes. See Exhibit C, attached hereto, demonstrating the negative impact the Corps' plan will have on real estate values. This analysis, from an experienced realtor in Indianapolis, is in marked contrast to the Corps' unsupported claim the Project will increase values in the area.

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · *ph* (317) 637-1321 · *fx* (317) 687-2344
www.clarkquinnlaw.com

In addition, the DSEIS Proposed Action will utterly destroy the property values within Rocky Ripple. First, who would chose to live in Rocky Ripple if they are not allowed to rebuild their homes after a flood? Second, an imposing wall surrounding Rocky Ripple will send a terrible message to would be homeowners that Rocky Ripple is "one the other side of the tracks" and not a good investment. Lastly, the Corps (and the City) will be committing Inverse Condemnation by walling off Rocky Ripple. Indeed, this Project will so negatively affect property values in Rocky Ripple that the Corps and City will be on the hook for the reduction in property values in Rocky Ripple. These costs, as well as others, were not incorporated in the Corps' calculations in the DSEIS.

The DSEIS Proposed Action Violates the Executive Order 12898
Relating to Environmental Justice in Low-Income Populations

The EA wrongly indicated that the current plan will have no impact on lower socioeconomic communities. Quiet to the contrary, the current plan will have a substantial environmental, human health and economic effect on the residents of Rocky Ripple. The residents of Rocky Ripple not only have a lesser median income (for individuals and households) than the surrounding neighbors and those communities impacted by the first stages of the flood reduction project, *i.e.* Broad Ripple, Warfleigh, Meridian Kessler, and the Western portion of Butler Tarkington, but Rocky Ripple's residents are much older than the surrounding communities as well. See EA Concerns. Because many Rocky Ripple residents are on fixed incomes and are much older than the general population, they are as a result less mobile than other residents. What does the Corps expect will happen to the older, less affluent residents of Rocky Ripple when the existing earthen levee breaches? As the Corps knows full well, high water incidents can happen quickly and do not always provide sufficient notice to those impacted. Furthermore, even if residents of Rocky Ripple are evacuated, what happens to their homes, in which they have invested a great deal during their lives. They will not be able to rebuild for the reasons stated above. In fact, simply constructing a wall on the other side of Rocky Ripple will reduce property values significantly by sending a message to would-be home buyers, that Rocky Ripple is no longer a viable community in which to live. Treating an older, lower socioeconomic community like Rocky Ripple like second-class citizens flies in the face of the Executive Order of 1994.

Significant, Adverse Effects and Environmental Harm

1. The DSEIS Proposed Action will have an Adverse Effect on the City's drinking water supply, which is also used to fight fires throughout Indianapolis.

A serious concern that has not been adequately addressed by the DSEIS is that a large segment of the Canal, which is the water source for a significant proportion of the City's potable drinking water and the water used to fight fires in Indianapolis, is not protected from flood waters by the current design. See EA Concerns relating to environmental contamination. In addition, based on comments and modeling from Citizens Water, in the event of a high water incident, a large portion of the canal could be lost (as happened years ago when a tree fell, which drained the canal). The West bank of the Canal is not sturdy soil, which is the

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · *ph* (317) 637-1321 · *fx* (317) 687-2344
www.clarkquinnlaw.com

reason the Corps decided not to build the flood wall there in the first place. Thus, the likelihood of this area containing high water is slim.

In the event of such a breach due to high water, there would be a shortage of potable water in Indianapolis and expose Indianapolis residents that rely on potable drinking water from the White River and White River North Water Treatment Plants to unnecessary risks to their health and welfare that could be avoided by an alternative alignment of the floodwall. The City of Indianapolis would not be able to provide adequate fire service to its residents and an untold number of businesses would not be able to operate, thus providing less revenue to the State of Indiana and the City of Indianapolis. Again, these costs (and others) should be taken into consideration by the Corps in the DSEIS.

2. The DSEIS Proposed Action will have an Adverse Effect on Recreation

Any plan to run a concrete wall on either side of the canal would have adverse effects on the use of the canal as parkland utilized for recreational activity. A concrete floodwall with a height of 6 feet in sections will create both visual and physical barrier to the Canal. The Canal is truly a unique geographic structure, a cultural gem and a focal point for the north side of the City of Indianapolis, and is an integral part of the City of Indianapolis' park system. Indeed, residents, as well as visitors from outside Indianapolis, are drawn to the Canal to walk, run, fish, and bike along the towpath. Mostly, people just want to enjoy this unique natural setting in the middle of an urban area. The loss of hundreds of trees and the construction of a wall will irreparably harm the aesthetics and destroy the pastoral character of this section of the Canal and potentially destabilize the surrounding neighborhood. Walls attract litter, graffiti and other undesirable activity. Finally, as discussed above, this project will also lower the property values in the immediate area and may negatively impact the nearby businesses at 56th and Illinois Street if foot traffic along the Canal decreases as a result of this Project. As specifically stated in Exhibit C, "constructing a wall ... near the canal would (i) alter the historical feel and walk ability of the neighborhoods; (ii) have a significant, negative impact on the quality of life and human environment for families in the area; and (iii) negatively impact the real estate values of all homes in the proximity of the Central Canal." Because of these significant negative impacts on the community, the Corps plan violated the NEPA and other laws.

3. The DSEIS Proposed Action will have a Significant, Adverse Effect on a Unique and Historical Geographic Structure

The Project will also have a significant, negative impact the historic nature of the Canal. The Canal was constructed many years ago as a means of connecting the Wabash and Erie Canal to the Ohio River for purposes of trade and travel. Unfortunately for the State of Indiana at the time, the project bankrupted the State, so the project was curtailed significantly. This bankruptcy led to the revision of the Indiana Constitution in 1851 to place limits on the amount of debt government entities could incur. Regardless, the Canal remains one of the most unique and historic geographic structures in the City of Indianapolis and State of Indiana. In fact, the canal has been recognized as being eligible for the historical register and has been designated an American Water Landmark, because of its historic location and association with water. Moreover, the Indiana Department of Natural Resources stated that the wall could have

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · ph (317) 637-1321 · fx (317) 687-2344
www.clarkquinnlaw.com

a significant impact on the historic nature of the Canal. See Exhibit D. Simply adding two feet of removable wall to the top of the proposed wall will not negate the damage that will result from the construction of the wall. Due to the historic significance of the Canal, and the damage to the canal that would ensue, the Project violates NEPA.

4. The DSEIS Proposed Action will have an adverse effect on other beneficial projects within Rocky Ripple and on Butler University's campus

In addition to dooming Rocky Ripple to inevitable flooding, , the current Project will have a significant adverse effect on the many parks within Rocky Ripple and many green spaces on Butler University's campus. In fact, Holt Park, the site of the annual Rocky Ripple Festival, is utilized by many in Rocky Ripple residents as well as residents living outside of the municipal boundaries of Rocky Ripple.

Furthermore, although owned by Butler University, Holcomb Gardens is used by the community as a whole and is a true gem in the middle of an urban setting. The current Project would seal off Holcomb Gardens and other beneficial areas of Butler's campus, into the flood plain forever. Butler University, an adversely affected person under NEPA, opposes the Project for a panoply of environmental reasons. Moreover, as set forth in Exhibit D, the Indiana Department of Natural Resources believes that the Project could have a significant negative affect on Holcomb Gardens, which is now on or is eligible for the National Historical Register.

5. The DSEIS Proposed Action will have an Adverse Effect on Aquatic Fauna

The Canal is also an ecologically critical area that will be impacted by the construction of the proposed project. The Canal itself is an ecosystem that hosts many diverse aquatic fauna, that is reported to include without limitation, turtles, fish, frogs, mussels, and a variety of other creatures. The DSEIS wholly ignores and does not consider comments made in response to the EA by professors as Butler University relating to the full range of aquatic fauna that inhabit the Canal and the potentially significant adverse environmental impact that the project may have on these species. Moreover, Indiana Department of Natural Resources ("DNR") finds that the removal of the trees, which the Corps claims is necessary, will disrupt wildlife in and around Friedman Park and the White River. Not to mention that the Corps is out of compliance with DNR's previously issued permit to construct a permanent structure in a flood plain. See Exhibit E.

The Corps' Calculations in DSEIS are Flawed,
Wholly Inadequate and Do Not Take into Consideration other Relevant Costs

1. The DSEIS does not provide sufficiently detailed calculations relating to the cost of the alternatives in order for the general public to determine the accuracy of such numbers.

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · ph (317) 637-1321 · fx (317) 687-2344
www.clarkquinnlaw.com

The Corps DSEIS simply indicates that the Rocky Ripple Alignment would cost roughly an additional $35M but provided no breakdown of costs in order to determine whether the estimate is accurate.

2. The Corps' calculations do not take into consideration other relevant costs.

The Corps DSEIS does not take into consideration the cost of valuable structures. First, not protecting Rocky Ripple could destroy over 330 homes in Rocky Ripple in the event of a high water incident. An estimate of the cost of the average home in Rocky Ripple would be roughly One Hundred and Twenty Five Thousand Dollars ($125,000.00). That is roughly Forty One Million Two Hundred Fifty Thousand Dollars ($41,250,000) that is being placed at risk by not including Rocky Ripple. Those are funds that will be paid out by insurers and FEMA in the event of a significant flood. That does not include the loss of property tax revenues generated at the local level.

In addition, as discussed above, the Canal is the source of sixty percent (60%) of the City's potable drinking water and water used by businesses and to fight fires. There is a significant cost of not protecting this important segment of the Canal. Indeed, citizens will be without drinking water and will have to buy water, fire departments will not be able to properly respond to emergencies, and many businesses that rely on a dependable source of water will not be able to conduct business. These costs will show up in the form of lost wages for employees, increased costs to insurance companies, and lost tax revenue at the local, state and federal level of government.

3. The DSEIS is based on false assumptions.

The DSEIS incorrectly relies solely on incremental Benefit-to-Cost-Ratio ("BCR") analysis, leading the Corps the cheapest option. However, this is not the proper criteria for whether the Rocky Ripple Alignment meets cost benefit ratio thresholds or can receive federal funds. The criteria for the calculation should include Remaining-Benefit-to-Remaining-Cost-Ratio and BCR since this phase of the Project is a Continuation Construction Project under a March 8, 2012 Corps Director of Civil Works' Policy Memorandum. Because the DSEIS, as mentioned before, does not supply data for public inspection or correctly consider the costs of excluding Rocky Ripple from the Project, we cannot provide any alternative calculations. The Corps must revisit this issue in further any study.

The DSEIS Proposed Action has Created a Genuine Controversy

The Project has created genuine controversy that has been well documented in the media, provoking an irate response from citizens, neighborhood groups, Citizens Water, Butler University and others stemming from many of the concerns listed above. Attached hereto please find Exhibit F, showing over 550 signatures from citizens in the impacted areas opposing the Project. The Corps simply has not met its obligations under and is in violation the NEPA, which requires the agency to make genuine efforts to notify affected parties to

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · ph (317) 637-1321 · fx (317) 687-2344
www.clarkquinnlaw.com

facilitate opportunities for participation and collaboration. These actions by impacted persons in the community demonstrate the level of controversy brought on by the current Project.

The Corps Should Conduct a General Re-evaluation Review in Order to Re-include Rocky Ripple

The limited re-evaluation of the Rocky Ripple Alignment in the DSEIS was wholly insufficient for the reasons stated above. Therefore, the Corps should conduct a General Re-evaluation Review in order to reincorporate Rocky Ripple. The community stands ready to work with the Corps and the City to provide full, fair and smart flood protection for Rocky Ripple and the surrounding neighborhoods without destroying them in the process.

Conclusion

We oppose the Project as described in the DSEIS and request the Corps and the City of Indianapolis cease its consideration. We request full, fair and smart flood protection for citizens of Rocky Ripple by adopting an alignment generally consistent with the existing earthen levee in Rocky Ripple and redesigning the floodwall (as proposed in the Rocky Ripple alignment in the DSEIS) to have less an impact on structures in Rocky Ripple. We look forward to working with the Corps as it reconsiders the Project.

Sincerely,

Bart Herriman
5340 Riverview Drive
Indianapolis, IN 46208

Zach Cattell
706 W. 54th Street
Indianapolis, IN 46208

Beth Herriman
5340 Riverview Drive
Indianapolis, IN 46208

Rebecca Cattell
706 W. 54th Street
Indianapolis, IN 46208

cc: Senator Richard Lugar
Senator Dan Coats
Congressman Andre Carson
Mayor Greg Ballard
State Representative Ed DeLaney
State Senator Scott Schneider
State Senator Greg Taylor
Councilor Monroe Gray
DPW Director Lori Miser

320 North Meridian Street, Suite 1100 · Indianapolis, Indiana · 46204-1729 · ph (317) 637-1321 · fx (317) 687-2344
www.clarkquinnlaw.com

CHRISTOPHER B. BURKE ENGINEERING, LTD. - INDIANA

WR-24 - Rocky Ripple Levee Inspection

Marion County, Indiana

Prepared For:
City of Indianapolis
Department of Public Works

September 2011

WR-24 – ROCKY RIPPLE LEVEE INSPECTION

MARION COUNTY, INDIANA

Prepared for:

City of Indianapolis
Department of Public Works
1200 S. Madison Avenue Suite 200
Indianapolis, IN 46225

September 2011

Prepared by:

Christopher B. Burke Engineering, Ltd.
115 West Washington Street, Suite 1368 South
Indianapolis, Indiana 46204

CBBEL Project No. 06-0580 BG9

Table of Contents

Waterway: West Fork White River
Levee: WR-24 – Rocky Ripple Levee

Inspection Date: June 21, 2011

Inspectors: Brian W. McKenna, P.E., Christopher B. Burke Engineering, Ltd. (CBBEL)
Aaron J. Fricke, P.E. CBBEL

Location: Levee WR-24, also known as and herein referred to as the Rocky Ripple Levee, is located in Marion County, Indiana within the Town of Rocky Ripple on the east (left) bank of the West Fork White River. It is in the following sections of the Public Land Survey System (PLSS): Sections 10, 11, and 14 of Township 16N, Range 3 East.

Refer to **Exhibit 1** for a project location map.

Levee Description: The Rocky Ripple Levee is an 8,600-ft long earthen embankment. From its downstream end, the levee begins at the Indianapolis Department of Waterworks (DOW) Canal south of the Butler University Athletic Fields and runs parallel and adjacent to the West Fork White River around the Town of Rocky Ripple and ties into high ground near the end of Ripple Road at the IDW Canal. **Exhibit 2** is a map showing the levee alignment. Based on visual observations, the embankment slopes are generally between 2:1 (H:V) and 3:1 (H:V), the typical crest width is approximately 6-8 feet, and the embankment height ranges from about 2 feet to 10 feet.

Inspection Purpose: The purpose of the inspection was to conduct a visual observation of the levee to determine deficiencies that would need to be corrected in order to restore the levee to its original level of flood protection (approximately 10-year return period) and to prepare a conceptual opinion of probable cost for correcting such deficiencies.

BACKGROUND INFORMATION

Project History: According to the Indianapolis North Flood Damage Reduction Feasibility Study prepared by the City of Indianapolis and the United States Army Corps of Engineers (USACE) in 1996, the Rocky Ripple Levee was constructed in the 1930s by the Works Progress Administration (WPA) in conjunction with the City of Indianapolis. Construction of the Rocky Ripple Levee was part of a comprehensive plan developed by the City to address flooding in response to the disastrous 1913 flood of record. Little else is known about the original design and construction of the levee. The study states that the existing overtopping frequency is ten percent per year (10-year return period), but characterizes the level of protection as only a 14.3% chance (approximately 7-year return period) based on a reliability analysis and the potential for failure prior to overtopping. For the purpose of this study, it is assumed that the existing overtopping frequency, the 10-year return period, was the intended design level of protection.

Since the time of its construction, the Rocky Ripple Levee has been considered in several studies and plans as part of a larger flood control system. The United States Congress authorized the Indianapolis Local Flood Protection Project (ILFPP) under the Flood Control Act of 1936 which would provide for flood control works and channel improvements for two areas of

Indianapolis: the Fall Creek Section near Downtown Indianapolis and the Warfleigh Section near Broad Ripple and Rocky Ripple. The Warfleigh Section of the ILFPP authorized in 1936 was to include improvements to the levee protecting Rocky Ripple as part of an overall line of protection extending from the southern terminus of the existing Rocky Ripple Levee at the IDW Canal along and adjacent to the West Fork White River to near the intersection of 62nd Street (Broad Ripple Avenue) and Haverford Avenue.

Several additional studies and investigations have occurred since the authorization by Congress in 1936, particularly for the Warfleigh Section. The Fall Creek Section of the ILFPP was eventually completed, but the Warfleigh Section was not. The USACE completed a planning report for the ILFPP in 1952 that was essentially a reexamination of the congressionally-authorized plan for the Warfleigh Section. No major changes were recommended, but additional openings, ramps, wall construction, and appurtenant structures were deemed necessary due to new development in the area. Rocky Ripple continued to be included in the plans for the line of protection. A similar study was performed by the USACE in 1969 which also proposed flood protection for Rocky Ripple. This study recommended that the ILFPP be reclassified from a deferred to an active category. In 1974, however, an economic restudy of the Warfleigh Section concluded that the authorized project was not economically feasible at the time of writing due to high interest rates and recommended that the project status be returned to a deferred category.

In response to significant flooding that occurred in January 1991, the City of Indianapolis requested assistance from the USACE. The project remained dormant until 1992 when Congress appropriated funding for the USACE to conduct a reconnaissance study of flooding problems in northern Indianapolis. This study concluded that constructing new flood control works and upgrading existing works in Broad Ripple, Warfleigh, and Rocky Ripple appeared to be economically feasible. A feasibility study began in 1993, and an interim report titled Indianapolis North Flood Control Feasibility Study was issued in November 1995. The plan recommended constructing new flood control works and upgrading existing works to form a continuous line of protection from approximately the existing southern terminus of the Rocky Ripple Levee along the West Fork White River to approximately the intake of the IDW Canal in Broad Ripple.

According to the 1995 plan, the Rocky Ripple segment of the proposed levee system was to consist of earthen levee and floodwall generally along and/or parallel to the alignment of the existing levee. An important consideration of the proposed plan was to avoid the removal of any homes as requested by Rocky Ripple residents. Under this proposed plan, a new earthen levee would be constructed parallel to and north/east of the existing levee from the southern terminus at the IDW Canal to approximately Riverview Drive. A floodwall would be constructed on the riverward slope of the existing levee along Riverview Drive to about the Rocky Ripple Town Hall. Several decks built into the levee would need to be removed to construct the floodwall. A new earthen levee would be constructed on the landward side of the existing levee from the Rocky Ripple Town Hall to a point approximately 700 feet upstream. A floodwall would then be constructed from the end of the new earthen levee to the northern terminus of existing Rocky Ripple Levee where it would tie into the next segment of the overall project. The proposed levee would provide Rocky Ripple with protection for up to and including a 300-year flood event on the West Fork White River.

The Town of Rocky Ripple and its residents had several concerns regarding the 1995 plan which led the Rocky Ripple Town Board to vote unanimously in opposition to the project in April 1996. For this reason, the City of Indianapolis was not at the time prepared to proceed with the southern portion of the overall project until alternate alignments could be developed that would be acceptable to the Rocky Ripple Town Board. The final draft of the feasibility report, titled Indianapolis North Flood Damage Reduction Feasibility Study, published in September 1996, included flood damage reduction for only the areas upstream of Rocky Ripple, which consisted of two sections known as the Warfleigh Section and the Monon-Broad Ripple Section. The Warfleigh and Monon-Broad Ripple Sections were completed in 2004 and 2009, respectively.

It is important to note that the last section of the overall project, now known as South Warfleigh, is a necessary part of the overall line of protection and must be constructed to provide the intended level of flood protection and remove homes from the high-risk Special Flood Hazard Area (SFHA) on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs). The current proposed alignment of the South Warfleigh section runs along the east bank of the West Fork White River to Rocky Ripple then crosses the IDW Canal. It then runs along the east side of the IDW Canal and ties into high ground at Butler University. This alignment does not include additional flood protection for Rocky Ripple.

Due to public concerns about the proposed alignment and the lack of additional flood protection for the Town of Rocky Ripple, the USACE will prepare a Supplementary Environmental Impact Statement addressing four alternatives for the South Warfleigh Section. These alternatives include: 1.) the proposed alignment described above that does not include Rocky Ripple, 2.) a modification of this alignment that moves the IDW Canal crossing about 600 feet downstream, 3.) a levee protecting the Town of Rocky Ripple, and 4.) no action (do not complete the section). The potential impacts to the existing Rocky Ripple Levee will depend on the results of this study and the course of action that follows. A draft Supplemental Environmental Impact Statement was expected to be released in June 2011 but had not been issued at the time of this writing.

Previous Inspections:

An inspection of the Rocky Ripple Levee was performed as part of the Marion County Flood Control Study in 1989 by SEG Engineers & Consultants, Inc. and Dodson-Lindblom Associates, Inc. The inspection report states that the overall condition of the levee ranged from poor to fair and that the entire levee was overgrown with vegetation. It notes that several homes had been built into the levee and that a 20-ft wide gap existed approximately 250 feet upstream of the IDW Canal. Contrary to the 1996 USACE report and its determination of the level of protection, the flood risk analysis performed as part of this inspection revealed that the lowest portion of the levee was about two (2) feet below the profile of the 10-year flood. Recommendations included clearing vegetation and raising the levee to provide 100-year flood protection with three (3) feet of freeboard. It does not appear that these recommendations were ever implemented.

The Indiana Department of Natural Resources (IDNR) performed a routine inspection of the Rocky Ripple Levee in May 1994. The inspection report states that the levee was in poor condition due to houses built into the landward slope and large trees on the slopes and crest. The report also mentioned that little maintenance was being performed. The IDNR also

performed a routine inspection of the Rocky Ripple Levee in December 1997 and found the levee to be in poor condition due to encroachments by homes and large trees on the embankment.

Land Use:

The land use behind the Rocky Ripple Levee is predominantly single-family residential. Nearly all of the entire incorporated Town of Rocky Ripple is located behind the levee. Since the levee is not recognized by FEMA as providing 1%-annual-chance (100-year) flood protection, the area behind the levee is shown in Zone AE, a high-risk flood zone, on FEMA FIRM No. 18097C0135E for Marion County, Indiana dated January 5, 2001. The effective FIRM mapping is shown on **Exhibit 3**.

Elevations: (ft. NGVD 29)

Published flood elevations are provided in the effective Flood Insurance Study (FIS) for Marion County, Indiana, revised July 5, 2005. The levee crest elevations used in this report are estimated based on the 2009 Marion County Digital Elevation Model (DEM) from LIDAR. No survey was completed for this report. Levee crown elevations should therefore be considered approximate and need to be field verified. All elevations are based on the National Geodetic Vertical Datum of 1929 (NGVD 29) unless otherwise noted.

10-year Flood Elevation Downstream / Upstream: 707.8 / 711.2
50-year Flood Elevation Downstream/Upstream: 710.8/715.0
100-Year Flood Elevation Downstream / Upstream: 712.0 / 716.3
Levee Crown Elevation Downstream / Upstream: 710.4 (+/-) / 721.2(+/-)
Typical levee crown elevations range from approximately 710 to 714.
Lowest Crown Elevation: 707.4 +/- (≈960 feet upstream of southern terminus)
Lowest Ground Elevation on the landside of the Levee: 698.1 (+/-)
(Approximately 530 feet south of 51st Street in wooded area between extension of Lester Street and IDW Canal)

Ownership:

According to the aforementioned Indianapolis North Flood Damage Reduction Feasibility Study, the majority of the Rocky Ripple Levee is privately owned. South of the Rocky Ripple Town Hall along Riverview Drive, parcels extend from the road to the West Fork White River, including the levee. The study also states that the upstream-most 3,000 feet of the levee is on property owned by the Town of Rocky Ripple and that the Town has an easement for flood damage reduction maintenance along the entire length of the levee.

Parcel data obtained from Marion County appears to confirm the findings of the Indianapolis North Flood Damage Reduction Feasibility Study that the majority of the levee is privately-owned. The parcel data shows that the levee from the southern terminus at the IDW Canal to approximately where it crosses Riverview Drive is owned by Butler University. It is important to note that according to the Board of Capital Asset Management Resolution No. 96-46 that was adopted by the City of Indianapolis on June 26, 1996, the City of Indianapolis reportedly holds easements south of the Rocky Ripple Town Hall which give the City the right to enter and leave the specified area for construction, maintenance, and repair. The legal status of any claimed easements that may be in place was not verified.

INSPECTION FINDINGS

Overview: The condition of the Rocky Ripple Levee was considered to be poor with numerous deficiencies. According to USACE rating criteria, the overall project rating would be "unacceptable."

Limitations of Inspection: The inspection was limited to a visual observation of the levee only and did not include any subsurface investigations, geotechnical analyses, survey, or testing/operation of appurtenances. It also did not include an investigation or analysis of interior drainage. Costs for these services are included in the professional services line items in the conceptual opinion of probable cost discussed in the following sections.

Observed Deficiencies: The deficiencies observed during the visual inspection are summarized below. **Exhibit 4** shows the general locations of the deficiencies. Due to the large number of repeated deficiencies found, a general description of typical deficiencies is provided in lieu of listing each instance individually. It should be noted that a thorough inspection of the levee was not possible in several areas due to dense tree and brush growth as well as encroachments.

- Unacceptable tree and brush growth along the entire levee segment and within 15 feet of each toe of slope. Tree and brush growth is particularly pervasive from Station 0+00 to Station 23+85.
- Lack of acceptable grass cover. In particular, there is no grass cover from Station 0+00 to Station 23+85.
- Encroachments by homes, decks, fences, stairs, and other objects on the levee and within the 15-foot clear zones along each toe of the levee. Several homes along Riverview Drive are built on and/or into the levee embankment.
- Closure structures (flap gate and sluice gate at Station 0+50) have corroded and are in need of replacement. The associated concrete headwalls are also deteriorated.
- Animal burrows, depressions, and erosion gullies are present on the levee embankment. A severe depression approximately 8 feet in diameter and 3 feet deep was observed near Station 13+70.
- A 36"-diameter interceptor sewer crosses the levee and apparently does not have any means of closure which could lead to flooding of the area behind the levee.

DISCUSSION OF RESTORATION COSTS

Overview: The deficiencies observed during the visual inspection must be corrected in order for the Rocky Ripple Levee to be restored to provide the level of protection originally intended. Restoration of the levee should fulfill the following objectives:

- Before the City invests any funds toward this project, the City should obtain easements and/or ownership of the entire reach of levee through buyouts or eminent domain including 15 feet from the landward and riverward toes of slope so that further maintenance and control of unwanted encroachments can be assured.*
- Existing residential structures encroaching onto the levee or the 15-foot clear zones along each toe should be removed.*
- Encroachments other than residential structures should be removed from the levee and within the 15-foot clear zones.
- The levee embankment and a 15-foot clear zone at each toe should

be free of trees and undesirable vegetation.
- Closure structures should be repaired or replaced.
- The levee embankment crest elevations should be maintained.
- The levee should have appropriate vegetative cover consisting of well-maintained grass.

* Not included in conceptual opinion of probable cost due to unavailability of adequate data.

Conceptual Opinion of Probable Cost:

A conceptual opinion of probable cost was prepared for the construction of improvements to the levee to correct deficiencies and to fulfill the objectives listed above. It was prepared based on inspection observations, rough field measurements, aerial photography, and GIS mapping. No detailed design data or plans, analyses, or survey information was available or used in the preparation of these opinions. Therefore, the costs provided should be considered conceptual in nature with the intent of providing an order of magnitude estimate of likely construction costs without land acquisition, buyouts, or demolition.

The following paragraphs provide a summary of the opinions of probable cost for the major project components. The levee was divided into three segments based on the scope and nature of repairs. These three segments are shown on **Exhibit 5**. A more detailed breakdown of the costs is provided in the attached **Table 1**.

1. Professional Services - **$675,000**

   Professional services are required to design the necessary repairs to the levee and to permit the project through the appropriate agencies. This includes engineering design fees, construction observation, and surveying.

2. Construction Costs - **$3,412,200**

   a.) Levee Embankment Reconstruction – STA 0+00 to 23+85 ***($902,000)***

   This section of the Rocky Ripple Levee from its southern terminus at the IDW Canal to approximately Riverview Drive is so overgrown with trees and brush that it is expected that removal of such vegetation and the associated root structures may necessitate the reconstruction of nearly the entire embankment. It is therefore conservatively assumed that the levee would need to be completely reconstructed in this area. The cost for reconstruction includes clearing/grubbing, removing the existing embankment material, placing and compacting new fill material, stabilization with seed and erosion control blanket, restoration of closure structures, and constructing access roads from Riverview Drive and 51st Street. It also includes installation of a vertical gate closure on the 36”-diameter interceptor sewer that crosses the levee. A closure is needed to prevent flooding of interior areas in the event of a failure of the line.

b.) Levee Embankment Restoration – STA 23+85 to 50+65
($405,000)

This section of the Rocky Ripple Levee essentially runs parallel to Riverview Drive and 54th Street from where the levee crosses Riverview Drive to the Rocky Ripple Town Hall. It is characterized by numerous encroachments by homes, decks, fences, stairs, and other objects. Several homes are built into the land side of the levee. At minimum, the riverward slope and a 15-foot clear zone at the toe of the levee should be cleared of trees, undesirable vegetation, and encroachments such as fences and stairs. As previously stated, residential structures were assumed to remain. The disturbed area would then be stabilized with seed and erosion control blanket. The northern approximately 400 feet of this segment parallel to 54th Street is similar to the southernmost section of the levee in that it is completely overgrown with trees and brush and likely requires complete reconstruction of the embankment.

c.) Levee Embankment Restoration – STA 50+65 to 85+99
($436,000)

This section of the Rocky Ripple Levee extends from the Rocky Ripple Town Hall to the northern terminus of the levee. Many areas, particularly on the riverward slope, are covered by trees and brush which should be cleared. A 15-ft clear zone from both the landward toe and riverward toe of slope should be established. Some encroachments by houses, decks, fences, and other objects are present, but are much less frequent than between Station 23+85 and 50+65. In general, the homes in this area are built further away from the levee. Any homes or decks that do encroach on the levee are assumed to remain, while any other encroachments are assumed to be removed. Disturbed areas should be stabilized with seed and erosion control blanket. It is important to note that the height of the levee with respect to landward elevations is less than 3 feet in some areas along this section.

d.) Miscellaneous Construction Costs
($531,800)

Pavement restoration on portions of 52nd Street from the IDW Canal to Riverview Drive and on Riverview Drive and 54th Street from near where the road crosses the levee to Clarendon Road is included in the cost estimate. It is assumed that heavy construction traffic will likely cause deterioration of these roadways and that they would need to be restored by milling and overlaying with asphalt. An assumed cost for environmental mitigation is included due to the potential disturbances to wetlands and forested floodway. A more detailed study of environmentally sensitive areas would be needed to determine more exact costs. Miscellaneous construction costs also take into account erosion and sediment control and mobilization and demobilization.

e.) Construction Contingencies
($1,137,400)

Construction contingencies are included due to the broad nature of the study and to account for uncertainty and unknown factors that could potentially impact costs. The construction contingencies are conservatively assumed to be 50% of the overall construction cost.

3. Costs not determined:

a.) Buyout and/or eminent domain acquisition of residential structures
b.) Removal of residential structures and associated restoration
c.) Obtaining easements

The total conceptual opinion of probable cost for restoring the levee to its intended level of flood protection is **$4,087,200**, excluding the cost of property/easement acquisition, structure demolition, and associated restoration (grading, stabilization, seeding, etc.) which are not currently determined. A detailed breakdown of costs is included on the attached **Table 1**. This estimate does not include any land acquisition, easements, demolition of homes, or buyouts. It is important to note that the cost of constructing a new levee/floodwall along approximately the same alignment with a reported 300-year level of protection was estimated to be approximately $5.7 million in the 1996 Indianapolis North Flood Damage Reduction Feasibility Study. This would likely be significantly more expensive in present value, particularly given that design and construction standards have changed since the time of writing.

Additional Considerations:

The recommendations and conceptual opinion of probable cost presented above represent the ***minimum*** steps that should be taken to rehabilitate the levee to its original level of flood protection based on the visual inspection and file research. Little is known about the original construction of the levee, and numerous modifications to the structure that have occurred throughout the years. This includes construction of residential structures on and into the levee. Furthermore, it has been assumed that the levee embankment is constructed of suitable materials and that the interior drainage system is adequate. Additional deficiencies may be present that were not able to be observed during the visual inspection that may need to be addressed and would increase costs.

It should be noted that the encroachments observed on the Rocky Ripple Levee, particularly homes and desks built on or into the levee, is a major concern and is inconsistent with guidance and regulations from the USACE and FEMA. The presence of such encroachments could compromise the structural integrity of the levee, hinder flood-fighting capabilities, and encumber maintenance efforts. For these reasons, the encroachments should be removed and appropriate ownership of the levee established either through buyouts or easement acquisition. This was not included in the conceptual opinion of probable cost due unavailability of adequate data.

ATTACHMENTS & REFERENCES

Attachments:

- **Table 1: Opinion of Probable Cost for Levee Rehabilitation** – Detailed cost breakdown for levee rehabilitation
- **Exhibit 1** – Project Location Map
- **Exhibit 2** – Site Map
- **Exhibit 3** – Effective FEMA Flood Insurance Study Mapping
- **Exhibit 4** – Inspection Summary
- **Exhibit 5** – Recommended Rehabilitation/Reconstruction Plan
- **Levee Photographs** – Photographs of the levee embankment and drainage structures taken on the date of the inspection

References:

Ballard, Gregory A. Letter to Andre Carson. 24 May 2011.

City of Indianapolis, Indiana Department of Capital Asset Management. Resolution No. 96-46, 1996. 26 June 1996.

City of Indianapolis, Indiana Department of Public Works. Indianapolis North Flood Damage Reduction Project. 28 February 2011.

City of Indianapolis, Indiana and the United States Army Corps of Engineers. Indianapolis North Flood Control Feasibility Study (Interim). November 1995.

City of Indianapolis, Indiana and the United States Army Corps of Engineers. Indianapolis North Flood Damage Reduction Feasibility Study. September 1996.

Federal Emergency Management Agency (FEMA). Flood Insurance Study for Marion County, Indiana, All Jurisdictions. 5 July 2005.

Indiana Department of Natural Resources. Levee Information Data Sheet, Rocky Ripple Levee – White River (WR-24). 4 May 1994.

Indiana Department of Natural Resources. Levee Information Data Sheet, Rocky Ripple Levee – White River (WR-24). 18 December 1997.

SEG Engineers and Consultants, Inc. and Dodson-Lindblom Associates, Inc. Marion County Flood Control Works Study. 1989-1990.

United States Army Corps of Engineers. Environmental Assessment, Indianapolis, White River (North), IN Flood Damage Reduction Project Phase 3B and Environmental Mitigation. January 2011.

United States Army Corps of Engineers. Intent to Prepare a Supplemental Environmental Impact Statement for the Indianapolis, White River (North), IN, Flood Damage Reduction Project. 2011.

Opinion of Probable Cost for Levee Rehabilitation

WR-24 - Rocky Ripple Levee

Line	Description	Estimated Quantities	Units	Unit Price	Estimated Cost (Rounded)
1	**Professional Services**				
2	Engineering Design and Project Management	1	LS	$ 350,000	$ 350,000
3	Construction Inspection	1	LS	$ 250,000	$ 250,000
4	Surveying	1	LS	$ 75,000	$ 75,000
5			Estimated Professional Services Cost		$ 675,000
6	**Levee Embankment Reconstruction - Station 0+00 to 23+85**				
7	Clearing and Grubbing	3.7	AC	$ 30,000	$ 111,000
8	Remove Existing Embankment & Unsuitable Material	16,000	CY	$ 15	$ 240,000
9	Place and Compact Fill	13,000	CY	$ 15	$ 195,000
10	Topsoil Placement	3,000	CY	$ 5	$ 15,000
11	Finish Grading	19,000	SY	$ 2	$ 38,000
12	Seeding	19,000	SY	$ 1	$ 19,000
13	Erosion Control Blanket	19,000	SY	$ 3	$ 57,000
14	Install 48" Tideflex TF-1 Check Valve at Station 0+50	1	LS	$ 40,000	$ 40,000
15	Install 48" Sluice Gate at Station 0+50	1	EA	$ 25,000	$ 25,000
16	Construct Concrete Headwalls at Station 0+50	2	EA	$ 1,000	$ 2,000
17	Install Vertical Gate Closure on Interceptor Sewer	1	EA	$ 50,000	$ 50,000
18	Gravel Access Roads from Riverview Dr. & 51st Street	1	LS	$ 110,000	$ 110,000
19			Estimated Levee Embankment Reconstruction - Station 0+00 to 23+85 Cost		$ 902,000
20	**Levee Embankment Restoration - Station 23+85 to 50+65**				
21	Selective Demolition on Riverward Slope	1	LS	$ 100,000	$ 100,000
22	Clearing and Grubbing	3.0	AC	$ 30,000	$ 90,000
23	Remove Existing Embankment & Unsuitable Material	4,000	CY	$ 15	$ 60,000
24	Place and Compact Fill	2,500	CY	$ 15	$ 37,500
25	Topsoil Placement	1,500	CY	$ 5	$ 7,500
26	Finish Grading	15,000	SY	$ 2	$ 30,000
27	Seeding	15,000	SY	$ 1	$ 15,000
28	Erosion Control Blanket	15,000	SY	$ 3	$ 45,000
29	Gravel Access Roads	1	LS	$ 20,000	$ 20,000
30			Estimated Levee Embankment Restoration - Station 23+85 to 50+65 Cost		405,000
31	**Levee Embankment Restoration - Station 50+65 to 85+99**				
32	Selective Demolition on Riverward Slope	1	LS	$ 10,000	$ 10,000
33	Clearing and Grubbing	5.0	AC	$ 30,000	$ 150,000
34	Remove Existing Unsuitable Material	4,000	CY	$ 15	$ 60,000
35	Place and Compact Fill	2,000	CY	$ 15	$ 30,000
36	Topsoil Placement	2,000	CY	$ 5	$ 10,000
37	Finish Grading	26,000	SY	$ 2	$ 52,000
38	Seeding	26,000	SY	$ 1	$ 26,000
39	Erosion Control Blanket	26,000	SY	$ 3	$ 78,000
40	Gravel Access Roads	1	LS	$ 20,000	$ 20,000
41			Estimated Levee Embankment Restoration - Station 50+65 to 85+99 Cost		436,000
42	**Miscellaneous Construction Costs**				
43	Pavement Restoration (52nd St., Riverview Dr., 54th St.)	1	LS	$ 75,000	$ 75,000
44	Environmental Mitigation	1	LS	$ 250,000	$ 250,000
45	Erosion and Sediment Control	1	LS	$ 103,400	$ 103,400
46	Construction Mobilization/Demobilization	1	LS	$ 103,400	$ 103,400
47			Estimated Miscellaneous Construction Costs		$ 531,800
48	**Construction Contingencies**				
49	Construction Contingencies (50%)	1	LS	$1,137,400	$ 1,137,400
50			Estimated Construction Contingencies		$ 1,137,400
51					
52			**Estimated Construction Cost**		**$ 3,412,200**
53					
54			**Estimated Total Project Cost**		**$ 4,087,200**

Notes and Assumptions

Gen. All costs are estimates based on the engineer's knowledge of common construction methods and materials. Christopher B. Burke Engineering does not guarantee that the actual bid price will not vary from the costs used with this estimate.

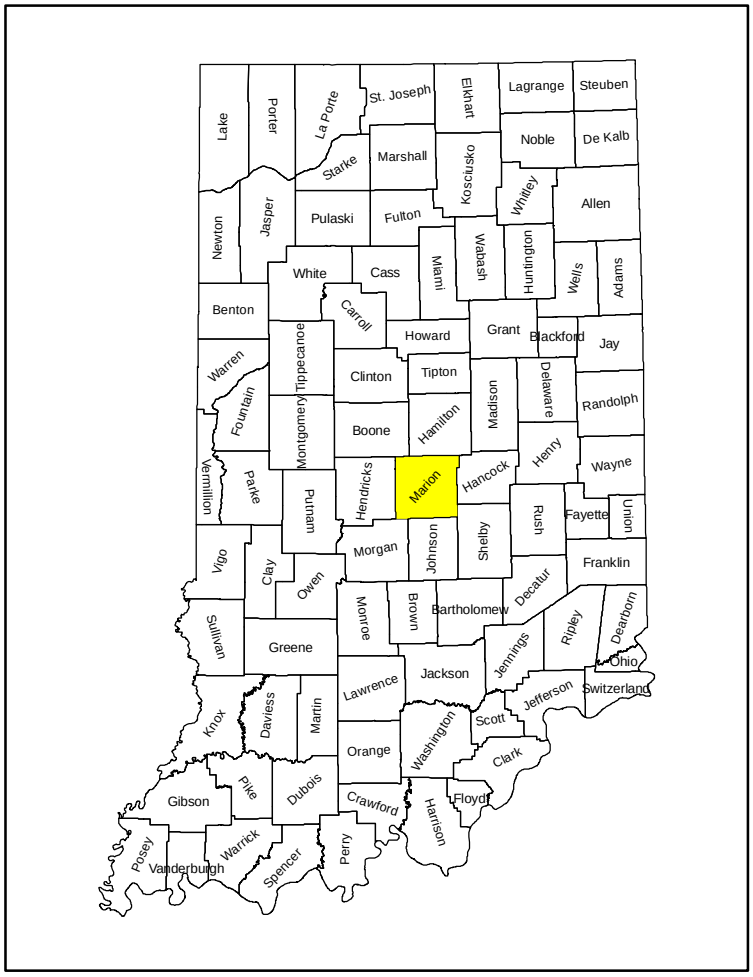
Gen. All costs are in 2011 dollars.

Gen. Estimated costs have been rounded.

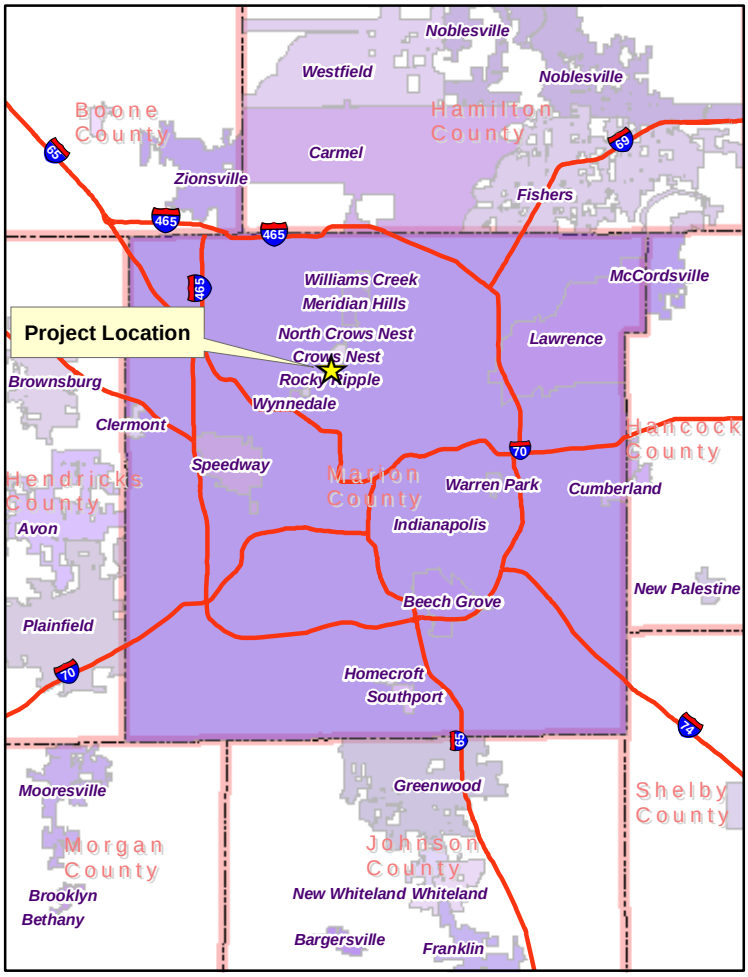
Gen. This estimate does not include unforeseen cost increases that may result from shortages in fuel and materials as a result of natural or man made disasters.

Gen. This estimate does not include any land acquisition, easements, demolition of homes, or buyouts.

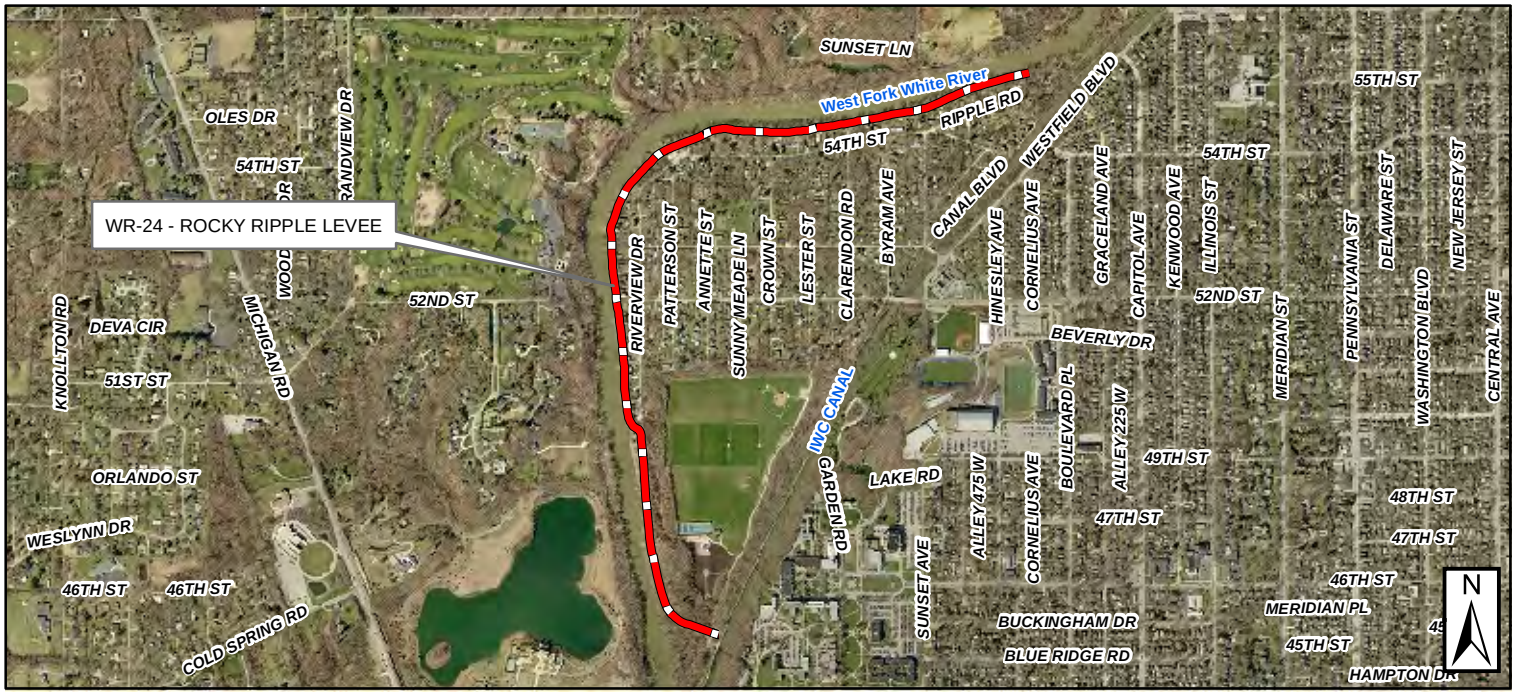
Gen. Construction contingencies are computed from construction costs only.



STATE MAP



VICINITY MAP



LOCAL MAP

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT: WR-24 - ROCKY RIPPLE LEVEE INSPECTION	PROJECT NO. 06-0580 BG9	APPROX. SCALE N.T.S.
TITLE: WR-24 - ROCKY RIPPLE LEVEE PROJECT LOCATION MAP		DATE: 06/2011
		EXHIBIT 1

Notes:
1. 2010 aerial photography provided by the City of Indianapolis.
2. Municpal boundaries are shown per 2005 GIS data provided by the City of Indianapolis.
3. Stationing is for reference only.

END ROCKY RIPPLE LEVEE
STATION 85+99

ROCKY RIPPLE TOWN HALL

BEGIN ROCKY RIPPLE LEVEE
STATION 0+00

56TH ST
SUNSET LN
CROW'S NEST
WEST FORK WHITE RIVER
RIPPLE RD
ALLEY 5425 N
54TH ST
KARSTADT AVE
CANAL BLVD
WESTFIELD BLVD
ROCKY RIPPLE
53RD ST
52ND ST
51ST ST
49TH ST
47TH ST
46TH ST
LAKE RD
BUTLER ATHLETIC FIELDS
BUTLER UNIVERSITY
IDW CANAL
GARDEN RD
CLARENDON RD EDR
CLARENDON RD WDR
CLARENDON RD
UNNAMED
UNNAMED
RIVERVIEW DR
PATTERSON ST
ANNETTE ST
LESTER ST
CLARENDON RD
CROWN ST
SUNNY MEADE LN
ROOKWOOD AVE
HINESLEY AVE
CORNELIUS AVE
SUNSET AVE
BYRAM AVE
ALLEY 975 W
ALLEY 925 W
ALLEY 875 W
ALLEY 825 W
ALLEY 775 W
ALLEY 725 W
ALLEY 675 W
ALLEY 625 W
ALLEY 575 W
ALLEY 550 W
ALLEY 475 W
ALLEY 425 W
ALLEY 5250 N
85+00
80+00
75+00
70+00
65+00
60+00
55+00
50+00
45+00
40+00
35+00
30+00
25+00
20+00
15+00
10+00
5+00
0+00

Legend

- WR-24 Rocky Ripple Levee
- Municipal Boundary

0 200 400 800 Feet

N

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT:	PROJECT NO.	APPROX. SCALE
WR-24 - ROCKY RIPPLE LEVEE INSPECTION	06-0580 BG9	1"= 400'
		DATE: 06/2011
TITLE: SITE MAP		EXHIBIT 2

Notes:
1. *2010 aerial photography provided by the City of Indianapolis.*
2. *Stationing is for reference only.*
3. *Flood zone designations are based on the effective Flood Insurance Study for Marion County, Indiana (All Jurisdictions) dated January 5, 2001.*

END ROCKY RIPPLE LEVEE
STATION 85+99

BEGIN ROCKY RIPPLE LEVEE
STATION 0+00

56TH ST
SUNSET LN
WEST FORK WHITE RIVER
RIPPLE RD
ALLEY 5425 N
54TH ST
KARSTADT AVE
CANAL BLVD
WESTFIELD BLVD
CORNELIUS AVE
HINESLEY AVE
52ND ST
49TH ST
47TH ST
46TH ST
53RD ST
51ST ST
LAKE RD
BUTLER ATHLETIC FIELDS
BUTLER UNIVERSITY
IDW CANAL
RIVERVIEW DR
PATTERSON ST
ANNETTE ST
SUNNY MEADE LN
CROWN ST
LESTER ST
CLARENDON RD
GARDEN RD
CLARENDON RD EDR
CLARENDON RD WDR
ROOKWOOD AVE
UNNAMED
ALLEY 975 W
ALLEY 925 W
ALLEY 875 W
ALLEY 825 W
ALLEY 775 W
ALLEY 725 W
ALLEY 675 W
ALLEY 625 W
ALLEY 575 W
ALLEY 550 W
ALLEY 475 W
ALLEY 425 W
ALLEY 5250 N
SUNSET AVE
BYRAM AVE

85+00 80+00 75+00 70+00 65+00 60+00 55+00 50+00 45+00 40+00 35+00 30+00 25+00 20+00 15+00 10+00 5+00 0+00

0 200 400 800 Feet

N

Legend

- WR-24 Rocky Ripple Levee

Effective Flood Zone Designations

- Zone AE - Floodway
- Zone AE
- Zone X (Shaded)

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT:	PROJECT NO.	APPROX. SCALE
WR-24 - ROCKY RIPPLE LEVEE INSPECTION	06-0580 BG9	1"= 400'
		DATE: 06/2011
TITLE: EFFECTIVE FEMA FLOOD INSURANCE STUDY MAPPING		EXHIBIT 3

Notes:
1. *2010 aerial photography provided by the City of Indianapolis.*
2. *Stationing is for reference only.*

END ROCKY RIPPLE LEVEE
STATION 85+99

ENCROACHMENTS BY HOMES, DECKS, FENCES, AND OTHER OBJECTS; TREE GROWTH ON EMBANKMENT (TYPICAL, STATION 50+65 TO 85+99)

LACK OF 15-FOOT CLEAR ZONE AT LANDWARD AND RIVERWARD TOE OF SLOPE (TYPICAL, ENTIRE LEVEE)

NUMEROUS ENCROACHMENTS BY HOMES, DECKS, FENCES, AND OTHER OBJECTS; TREE GROWTH AND UNDESIRABLE VEGETATION ON EMBANKMENT (TYPICAL, STATION 23+85 TO 50+65)

VERY DENSE TREE AND BRUSH GROWTH; NO GRASS COVER (TYPICAL, STATION 0+00 TO 23+85)

ANIMAL BURROW HOLES, DEPRESSIONS, AND EROSION GULLIES PRESENT ON LEVEE EMBANKMENT (TYPICAL, STATION 0+00 TO 23+85)

36" INTERCEPTOR SEWER CROSSING LEVEE WITH NO KNOWN CLOSURE (STATION 7+90)

48" FLAP GATE AND SLUICE GATE ARE CORRODED; HEADWALLS DETERIORATED. (STATION 0+50)

BEGIN ROCKY RIPPLE LEVEE
STATION 0+00

56TH ST
SUNSET LN
WEST FORK WHITE RIVER
RIPPLE RD
ALLEY 5425 N
54TH ST
KARSTADT AVE
CANAL BLVD
WESTFIELD BLVD
CORNELIUS AVE
HINESLEY AVE
53RD ST
52ND ST
51ST ST
49TH ST
47TH ST
46TH ST
LAKE RD
ROOKWOOD AVE
BUTLER UNIVERSITY
BUTLER ATHLETIC FIELDS
IDW CANAL
RIVERVIEW DR
PATTERSON ST
LESTER ST
CLARENDON RD
SUNSET AVE
BYRAM AVE
ANNETTE ST
ALLEY 975 W
ALLEY 925 W
ALLEY 875 W
ALLEY 825 W
ALLEY 775 W
ALLEY 725 W
ALLEY 675 W
ALLEY 625 W
ALLEY 575 W
ALLEY 550 W
ALLEY 475 W
ALLEY 425 W
ALLEY 5250 N
UNNAMED
CLARENDON RD EDR
CLARENDON RD WDR

85+00
80+00
75+00
70+00
65+00
60+09
55+00
50+00
45+00
40+00
35+00
30+00
25+00
20+00
15+00
10+00
5+00
0+00

Legend
WR-24 Rocky Ripple Levee

0 200 400 800
Feet

N

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT:	PROJECT NO.	APPROX. SCALE
WR-24 - ROCKY RIPPLE LEVEE INSPECTION	06-0580 BG9	1"= 400'
		DATE: 06/2011
TITLE: INSPECTION SUMMARY		EXHIBIT 4

Notes:
1. *2010 aerial photography provided by the City of Indianapolis.*
2. *Stationing is for reference only.*

END ROCKY RIPPLE LEVEE
STATION 85+99

LEVEE EMBANKMENT RESTORATION
STATION 50+65 TO STATION 85+99

LEVEE EMBANKMENT RESTORATION
STATION 23+85 TO STATION 50+65

LEVEE EMBANKMENT RECONSTRUCTION
STATION 0+00 TO STATION 23+85

BEGIN ROCKY RIPPLE LEVEE
STATION 0+00

56TH ST
QUESTO
SUNSET LN
WEST FORK WHITE RIVER
85+00
80+00
75+00
70+00
65+00
60+00
55+00
50+00
RIPPLE RD
ALLEY 5425 N
54TH ST
ALLEY 575 W
KARSTADT AVE
CANAL BLVD
WESTFIELD BLVD
CORNELIUS AVE
HINESLEY AVE
54TH ST
ALLEY 975 W
ALLEY 925 W
ANNETTE ST
ALLEY 775 W
ALLEY 725 W
ALLEY 675 W
ALLEY 625 W
BYRAM AVE
SUNSET AVE
45+00
ROCKY RIPPLE
40+00
53RD ST
RIVERVIEW DR
ALLEY 825 W
LESTER ST
CLARENDON RD
ALLEY 5250 N
52ND ST
35+00
SUNNY MEADE LN
CROWN ST
ALLEY 875 W
30+00
51ST ST
25+00
BUTLER ATHLETIC FIELDS
IDW CANAL
20+00
LAKE RD
ALLEY 550 W
49TH ST
15+00
GARDEN RD
47TH ST
ALLEY 475 W
ALLEY 425 W
10+00
ROOKWOOD AVE
BUTLER UNIVERSITY
CLARENDON RD EDR
CLARENDON RD WDR
UNNAMED
46TH ST
5+00
0+00
CLARENDON RD

0 200 400 800 Feet

Legend

- Reconstruction - STA 0+00 to 23+85
- Restoration - STA 23+85 to 50+65
- Restoration - STA 50+65 to 85+99

N

Christopher B. Burke Engineering, Ltd.
PNC Center, Suite 1368 South
115 West Washington Street
Indianapolis, Indiana 46204
(t) 317.266.8000 (f) 317.632.3306

PROJECT:	PROJECT NO.	APPROX. SCALE
WR-24 - ROCKY RIPPLE LEVEE INSPECTION	06-0580 BG9	1"= 400'
		DATE: 06/2011
TITLE: RECOMMENDED REHABILITATION/RECONSTRUCTION PLAN		EXHIBIT 5

LEVEE PHOTOGRAPHS

Photo 1: View from Southern Terminus of levee at IDW Canal
(Looking along crest which is covered by vegetation; Station 0+00)

Photo 2: 48” Flap gate on riverward side of levee (Station 0+50)
Note that the gate is corroded and the headwall severely deteriorated.

Photo 3: Concrete headwall and flap gate (Station 0+50)
Note the large crack at the top of the headwall.

Photo 4: 48” Sluice gate on landward side of levee (Station 0+50)
Note the corrosion on the gate and the large tree limb that has fallen on the guides.

Photo 5: Corroded connections on 48” sluice gate & deteriorated headwall (Station 0+50)

Photo 6: Large trees growing on landward slope (Station 3+00)

Photo 7: Levee Crest (Station 3+35)
Note the extensive tree growth and lack of grass cover.

Photo 8: Large tree uprooted on levee embankment (Station 6+00)

Photo 9: 36” Interceptor sewer exposed near landward toe; crosses through levee (Station 7+90)

Photo 10: Landward slope (Station 9+00)
Note the extensive tree growth and lack of grass cover.

Photo 11: Riverward slope (Station 10+20)
Note the extensive tree growth and lack of grass cover.

Photo 12: Trail crossing over levee, looking at the riverward slope (Station 11+30)
Note the erosion and lack of grass cover.

Photo 13: Large depression on riverward slope (Station 13+70)
The depression is about 8-ft in diameter and 3-ft deep.

Photo 14: Encroachments and debris against riverward slope of levee (Station 17+70)

Photo 15: Riverview Drive run-up over levee at change in levee alignment (Station 22+30)
Note the tree growth on the embankment slopes.

Photo 16: Deck constructed into riverward slope of levee (Station 23+90)

Photo 17: 6-ft high (+/-) concrete wall on riverward side of levee underneath deck (Station 24+40)
The wall is presumably part of the levee.

Photo 18: Riverward slope of levee looking south (Station 25+20)
Note the tree growth, undesirable vegetation, and encroachments.

Photo 19: Riverward slope of levee looking north (Station 27+00)
Note the tree growth and undesirable vegetation.

Photo 20: Riverward slope of levee and crest looking north (Station 28+00)
Note the tree growth on the riverward slope and the houses encroaching onto the levee.

Photo 21: Riverward slope of levee and crest looking north (Station 28+80)

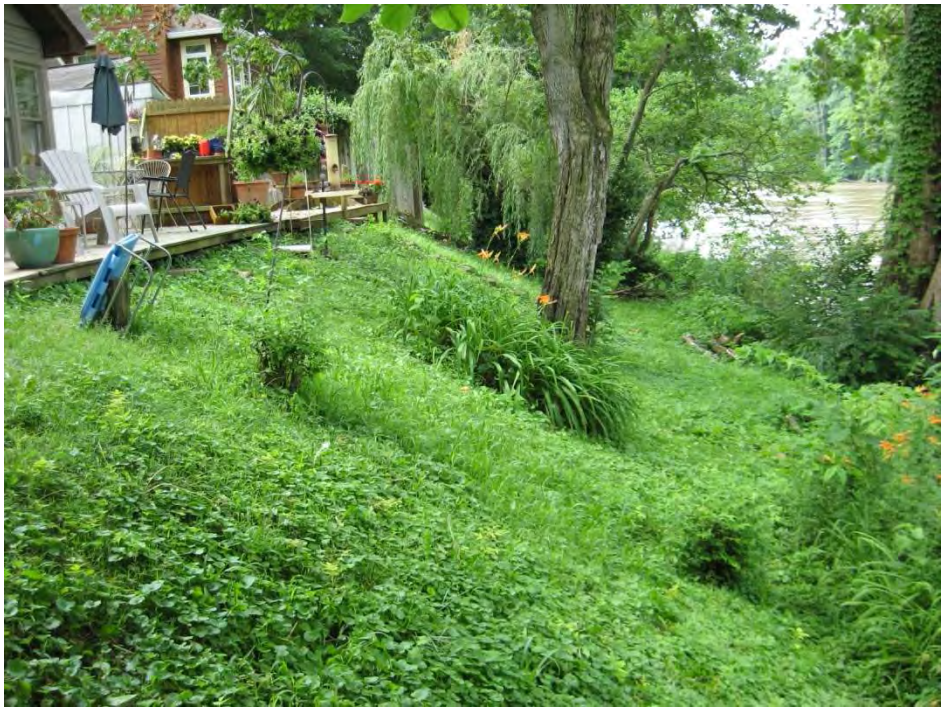


Photo 22: Riverward slope of levee looking south (Station 33+70)

Photo 23: Crest of levee levee looking south (Station 36+50 +/-)
Note the trees and heavy vegetative growth.

Photo 24: Crest of levee looking north (Station 36+50 +/-)
Note the trees and heavy vegetative growth.

Photo 25: Retaining wall built into landward side of levee near home (Station 42+00)

Photo 26: Retaining wall built into landward side of levee near home
(Looking south near Station 46+50)

Photo 27: Dense brush and tree growth (looking north near Station 46+50)

Photo 28: Crest and landward slope of levee behind Rocky Ripple Town Hall
(Looking northeast near Station 50+50)

Photo 29: Deck encroaching onto levee (Station 54+00)

Photo 30: Crest of levee (looking northeast near Station 55+00)

Photo 31: Debris dumped on riverward slope near Station 57+00

Photo 32: Crest of levee looking west near Station 59+00

Photo 33: Crest of levee looking east near Station 59+50

Photo 34: Deck encroaching on riverward slope of levee (Station 60+60)

Photo 35: Crest and landward slope (looking west near Station 64+00)
Note that the levee height with respect to the landward side is only about 2 feet in this area.

Photo 36: Crest and riverward slope of levee (looking east near Station 64+50)
Note the trees, undesirable vegetation, and encroachments.

Photo 37: Levee embankment (looking east near Station 67+70)

Photo 38: House with basement encroaching onto levee (looking east near Station 69+70)