ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT

BROWN COUNTY WATER UTILITY, INC.
Water System Improvements Project
SRF PROJECT DW 13 13 07 02

DATE: November 18, 2015

TARGET PROJECT APPROVAL DATE: December 18, 2015

I. INTRODUCTION

The above entity has applied to the Drinking Water State Revolving Fund (SRF) Loan Program for a loan to finance all or part of the drinking water project described in the accompanying Environmental Assessment (EA). As part of facilities planning requirements, an environmental review has been completed which addresses the project's impacts on the natural and human environment. This review is summarized in the attached EA, which can also be viewed in color at http://www.in.gov/ifa/srf/.

II. PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT (FNSI)

The SRF Drinking Water Program has evaluated all pertinent environmental information regarding the proposed project and determined that an Environmental Impact Statement is not necessary. Subject to responses received during the 30-day public comment period, and pursuant to Indiana Code 4-4-11, it is our preliminary finding that the construction and operation of the proposed facilities will result in no significant adverse environmental impact. In the absence of significant comments, the attached EA shall serve as the final environmental document.

III. COMMENTS

All interested parties may comment upon the EA/FNSI. Comments must be received at the address below by the target approval date above. Significant comments may prompt a reevaluation of the preliminary FNSI; if appropriate, a new FNSI will be issued for another 30-day public comment period. A final decision to proceed, or not to proceed, with the proposed project shall be effected by finalizing, or not finalizing, the FNSI as appropriate. Comments regarding this document should be sent within 30 days to:

April Douglas
Senior Environmental Manager
State Revolving Fund
100 N. Senate Ave.  IGCN 1275
Indianapolis, IN  46204
317-234-7294; adouglas@ifa.in.gov
ENVIRONMENTAL ASSESSMENT

I. PROJECT IDENTIFICATION

Project Name and Address: Water System Improvements Project
Brown County Water Utility, Inc.
5130 North State Road 135
Morgantown, IN 46160

SRF Project Number: DW 13 13 07 02

Authorized Representative: Ben Phillips, Board of Director President

II. PROJECT LOCATION

The Brown County Water Utility, Inc. (BCWU) service area generally includes Brown County and extends into Morgan, Johnson, Monroe and Bartholomew Counties. There are multiple project sites included in the proposed project. The Water Transmission Main on Spearsville-Peoga Road is located in the Beanblossom and Morgantown quadrangle in Brown and Johnson County, Hamblen, Hensley and Jackson Townships in Township 10N Range 2E, Section 13; Township 10N Range 3E, Sections 1, 2, 3, 4, 8, 9, 17, and 18, and in Township 11N Range 3E, Sections 35 & 36; The Upper Salt Creek Road Water Main replacement is located in the Beanblossom quadrangle in Brown County, Hamblen Township in Township 10N Range 3E, Sections 11, 14, 23, and 26; The Upper Beanblossom Road Water Main Replacement is located in Beanblossom quadrangle in Brown County, Hamblen Township in Township 10N Range 3E, Sections 9 and 16; The Three story Hill Water Main Replacement is located in the Morgantown quadrangle in Brown County, Jackson Township in Township 10N Range 2E, Sections 10, 11 and 12; The Raw Water Transmission Main is located in the Morgantown quadrangle in Morgan County, Jackson Township in Township 11N Range 2E, Sections 27 and 28; The Carmel Water Storage Tank is located in Morgantown quadrangle in Brown County, Jackson Township in Township 10N Range 2E, Section 3; The Lanam Water Storage Tank is located in Belmont quadrangle in Brown County, Jackson Township in Township 9N Range 2E, Section 9; The Knob Hill Booster Station is located in Hindustan quadrangle in Monroe County, Benton Township in Township 10N Range 1E, Section 35; and The Cottonwood Tank is located in Morgantown quadrangle in Brown County, Jackson Township in Township 10N Range 2E, Section 9. See Figure 1.

III. PROJECT NEED AND PURPOSE

The Brown County Utility Inc. system consists of a groundwater supply, storage tanks, booster stations and distribution system. The system has been satisfactorily maintained but requires upgrades to continue to meet the public health needs of the service area. The areas of need include:

- Water Transmission Main on Spearsville-Peoga Road and installation of a new Spearsville Booster Station to Peoga (2 route options) – Construction of the water main along this route will provide safe and reliable water to more residents of Brown County and improve looping in
the distribution system. The construction of this new 10-inch water main will provide increased flow capacity which will solve current pressure problems in the Peoga area, and at the Spicer water storage tank. In addition, the new Spearsville Booster Station will provide energy efficiency and reliability to the water system. See Figures 2-7, and 18-22.

- Water Main Replacement Projects: Upper Salt Creek Road, Upper Beanblossom Road, Three Story Hill - Replacement of existing water mains along these routes will eliminate leaking, protect public health, reduce water loss, and improve looping in the distribution system. The proposed projects will also provide increased flow capacity which will solve current pressure problems in their respective areas. See Figures 8-13.

- Replacement of the Carmel and Lanam Water Storage Tank - The two existing elevated water storage tanks are key, critical components which maintain pressure and flow to the distribution system. According to recent inspection reports, due to aging and deterioration the tanks have reached the end of their expected useful life and need to be replaced. In order to provide for long term reliability, the two proposed projects involve the demolition and abandonment of the existing tanks and the construction of new elevated water storage tanks. The storage volume of each new tank will be increased to address growth potential/future needs and to improve pressure and flow to the distribution system. See Figures 15 and 16.

- Replacement of the Knob Hill Booster Station - The existing Knob Hill Booster Station is a key, critical component which maintains pressure and flow to customers in this zone. The existing booster station is more than 40 years old, placing it at the end of its expected useful life, and needs to be replaced. The station's vault configuration makes it difficult to service and requires confined space entry. In order to provide for long term reliability, the proposed project involves the demolition and abandonment of the existing station, and the construction of a new booster station. The new booster station will also allow for the elimination of Knob Hill Elevated Water Storage Tank when the tank is no longer serviceable. See Figure 17.

- Cottonwood Tank pressure zone isolation via installation of an altitude control valve - The existing Cottonwood Elevated Water Storage Tank was intended to work with the Lanam Tank. Due to system hydraulics, Cottonwood Tank is currently only marginally effective. The Lanam and Cottonwood tanks do not have altitude control valves; therefore, efforts to operate the tanks together often result in tank overflow problems. This proposed project involves modifications to create a separate pressure zone for the Cottonwood Tank. The proposed improvements, consisting of the installation of an altitude control valve onto the feed line that leads to the tank, will prevent overflow of the Cottonwood tank. This separate pressure zone will allow full operation of the Cottonwood and Lanam Tanks without tank overflows. See Figure 23.

- Replacement of raw water main from the Remote Well Field to the water treatment plant - The existing raw water main is a critical component, as the utility relies heavily on the water supply from the Remote Well Field to produce water and convey it to the system. The existing raw water main is aging and is connected into some smaller piping at the water plant. The raw water, conveyed by the main, has a very high iron concentration, which results in accumulation of oxidized iron in the water main. This accumulation in the pipe reduces the size of the pipe, which results in its reduced capacity. The accumulation of the iron, coupled with the smaller diameters of the existing pipe, causes restrictions in the pipe and subsequent problems in the treatment process. This has been a problem for BCWU in the past.
The precipitated iron can be cleaned out of the water main, by way of “Pigging” the main. Pigging is accomplished by inserting a “pig” or swab into the pipe, and pumping water behind it to scour the pipe. The existing raw water main configuration does not provide for good accessibility to flush and clean pipes by pigging. Due to the restrictions in the main, it is necessary to replace the existing raw water main.

The proposed project will replace the existing smaller pipe with a 16-inch pipe, which will eliminate the restrictions of the existing main. The new main will also be shifted away from Indian Creek to eliminate the erosion problems that have exposed the existing main. As part of this project, a swabbing vault will be installed at the water plant to facilitate the pigging operation. This will significantly improve BCWU’s ability to clean and maintain the raw water main. See Figure 14.

- Replacement of existing and addition of new distribution system valves and hydrants - This proposed project involves the replacement of non-operational and broken valves and flush hydrants, and the installation of additional new valves and flush hydrants for improved operations, maintenance, and service to customers.

- Replacement of 1,200 water service lines, main to meter - This proposed project involves the installation of ¾-inch HDPE service lines to replace the aging and chronically leaking existing polybutylene service lines. This replacement will reduce maintenance and repair costs, reduce water loss, improve protection of public health and customer service.

- Replacement of 2,400 residential water meters with new automatic meter reading (AMR) meters - This proposed project involves the installation of new meters with a built-in automated meter reading function, which will replace the old (manual read) residential water meters. This replacement will improve meter reading accuracy, reduce lost water and meter reading labor costs, and improve safety of meter reading staff.

IV. PROJECT DESCRIPTION

The proposed project includes:

- Water Transmission Main on Spearsville-Peoga Road and installation of a new Spearsville Booster Station to Peoga (2 route options);
- Water Main Replacement: Upper Salt Creek Road, Upper Beanblossom Road, Three Story Hill;
- Replacement of the Carmel and Lanam Water Storage Tank;
- Replacement of the Knob Hill Booster Station;
- Cottonwood Tank pressure zone isolation via installation of an altitude control valve Replacement of raw water main from the Remote Well Field to the water treatment plant Replacement of existing, and addition of new, distribution system valves and hydrants;
- Replacement of 1,200 water service lines, main to meter; and
- Replacement of 2,400 residential water meters with new automatic meter reading (AMR) meters.
V. ESTIMATED PROJECT COSTS, AFFORDABILITY AND FUNDING

A. Selected Plan Estimated Cost Summary

**Construction Costs**

A. Primary Project-Ravine Area
   - All sanitary and storm sewer installation: $1,537,254
   - Contingency: 154,000
   - **Construction Sub-Total**: $1,691,254

Non-Construction Costs: $527,500

**Primary Project Total Estimated Project Cost**: $2,218,754

B. Alternate Routing
   - All sanitary and storm sewer installation: $1,967,667
   - Contingency: 196,000
   - **Construction Sub-Total**: $2,163,667

Non-Construction Costs: $527,500

**Alternate Routing Total Estimated Project Cost**: $2,691,167

B. The Brown County Water Utility, Inc. will finance the project with a loan from the State Revolving Fund Loan Program for a 20-year term at an annual fixed interest rate to be determined at loan closing. The actual loan amount will depend on the bids received.

VI. DESCRIPTION OF EVALUATED ALTERNATIVES

The “No Action” alternative is not practical, environmentally sound nor economical. The BCWU system is aging, and reaching the point where it is necessary to replace certain components of the original water system. Additionally, these projects will solve current pressure problems, eliminate leaking, protect public health, reduce water loss, and improve looping in the distribution system.

Replacement of water service lines, main to meter, and replacement of residential water meters with new automatic meter reading (AMR) meters, will reduce maintenance and repair costs, reduce water loss, improve protection of public health and customer service, as well as improve meter reading accuracy, reduce meter reading labor costs, and improve safety of meter reading staff.

VII. ENVIRONMENTAL IMPACTS OF THE FEASIBLE ALTERNATIVES

A. Direct Impacts of Construction and Operation

**Disturbed/Undisturbed Land**: Project areas will likely occur in both undisturbed and previously disturbed areas. Water main installation will include undisturbed land, as will the construction of the proposed Carmel and Lanam Storage Tanks. An archaeology report on these areas was completed and provided to the DHPA for review.

**Structural Resources**: Construction and operation of the project will not alter, demolish or remove historic properties. If any visual or audible impacts to historic properties occur, they will be temporary and will not alter the characteristics that qualify such properties for inclusion in or
eligibility for the National Register of Historic Places. The SRF’s finding pursuant to Section 106 of the National Historic Preservation Act is: "no historic properties affected."

**Surface Waters:** The projects will not adversely affect waters of high quality listed in 327 IAC 2-1-2(3), exceptional use streams listed in 327 IAC 2-1-11(b), Natural, Scenic and Recreational Rivers and Streams listed in 312 IAC 7-(2), Salmonid Streams listed in (327 IAC 2-1.5-5(a)(3), or waters on the Outstanding Rivers list. The proposed water main replacement projects will include stream crossings installed via open-cut and bore methods. All comments from the USFW and IDNR regarding these stream crossings will be implemented.

**Wetlands** (Figures 2-23): Any wetlands impacts will be temporary as these areas will be bored to reduce environmental impacts to the designated wetlands.

**Floodplain** (Figure 2-23): The project will not include dredge or fill in the floodway without a permit from IDNR Division of Water.

**Groundwater:** The project will not affect groundwater. Dewatering is not expected. The project will not impact a sole source aquifer.

**Plants and Animals:** The project will be implemented to minimize impact to non-endangered species and their habitat. Mitigation measures cited in comment letters from the Indiana Department of Natural Resources and U.S. Fish and Wildlife Service will be implemented.

**Prime Farmland:** The project will convert prime farmland.

**Air Quality:** Construction activities may generate some noise, fumes and dust, but should not significantly affect air quality.

**Open Space and Recreational Opportunities:** The project will neither create nor destroy open space or recreational opportunities.

**Lake Michigan Coastal Program:** The project will not affect the Lake Michigan Coastal Zone.

**National Natural Landmarks:** Construction and operation of the proposed project will not affect National Natural Landmarks.

**B. Indirect Impacts**

Brown County’s Preliminary Engineering Report (PER) states:

*The utility will ensure that future drinking water infrastructure projects connecting to SRF-funded facilities will not adversely affect wetlands, wooded areas, steep slopes, archaeological/historical/structural resources, or other sensitive environmental resources. The utility will require new drinking water infrastructure projects to be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities.*

**C. Comments from Environmental Review Authorities**

In correspondence dated November 17, 2015, the Indiana Department of Natural Resources Division of Historic Preservation and Archaeology stated:
In regard to the phase Ia archaeological field reconnaissance report, based on the submitted information and the documentation available to the staff of the Indiana SHPO, we concur with the recommendation that further archaeological investigation is not necessary.

Therefore, we concur with the SRF’s November 4, 2015 finding, on behalf of the EPA, of “No Historical Properties affected” for this Federal undertaking.

In correspondence dated August 12, 2015, the United States Fish and Wildlife Service stated:

These comments are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U.S. Fish and Wildlife Service’s Mitigation Policy.

The proposed project consists of installation of new water main, replacement of existing water main, construction of new water storage tanks, upgrades to an existing booster station, and various other improvements. The project will require several stream crossings and work within wetland areas. We do not anticipate significant impacts on fish and wildlife resources from this project, but we recommend the following mitigation measures to minimize impacts.

1. Avoid or minimize removal of mature native hardwood trees within the construction corridor.

2. Use directional drilling at all stream crossings to avoid stream and riparian impacts.

3. If directional drilling is not feasible, construct the stream crossings during a low flow period and use best management practices to prevent erosion and soil runoff to the streams.

4. Establish vegetated buffer strips along stream banks after work is completed. Buffer strip widths should be at least 10 feet and preferably 25 feet.

5. Avoid disturbance within the stream channel during the fish spawning season (April 1-June 30). Ephemeral streams, agricultural ditches and badly degraded streams can be excluded from this recommendation.

6. Revegetate disturbed areas as soon as possible after construction, using native vegetation. We recommend seed mixes that include species of nectar-producing plants and milkweed endemic to the area where the mix is applied.

Wetland and stream impacts may require permits from the US Army Corps of Engineers, the Indiana Department of Environmental Management’s Water Quality Certification program and the Indiana Department of Natural Resources. Wetland impacts should be avoided, and any unavoidable impacts should be compensated for in accordance with the Corps of Engineers mitigation guidelines.

Endangered Species

The proposed project is within the range of the federally endangered Indiana bat (Myotis sodalis) and the federally threatened northern long-eared bat (Myotis septentrionalis).

Indiana bats hibernate in caves, then disperse to reproduce and forage in relatively undisturbed forested areas associated with water resources during spring and summer. Recent research has shown that they will inhabit fragmented landscapes with adequate forest for roosting and foraging. Young are raised in nursery colony roosts in trees, typically near drainageways in undeveloped areas. Like all other bat species in Indiana, the Indiana bat diet consists exclusively of insects.
During the summer, NLEBs typically roost singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically ≥ 3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on presence of cavities or crevices or presence of peeling bark. It has also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable). They forage for insects in upland and lowland woodlots and tree lined corridors. During the winter, NLEBs predominantly hibernate in caves and abandoned mine portals. Additional habitat types may be identified as new information is obtained.

There is suitable summer habitat for the Indiana bat and northern long-eared bat present throughout the area surrounding the project site. There are no current records of Indiana bats near the site but to our knowledge the area has not been surveyed. The project will not eliminate enough habitat to affect these species, but to avoid incidental take from removal of an occupied roost tree we recommend that tree-clearing be avoided during the period April 1 – September 30. If this measure is implemented we concur that the proposed project is not likely to adversely affect these listed species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. If however, new information on endangered species at the site becomes available or if project plans are changed significantly, please contact our office for further consultation.

In correspondence dated September 4, 2015 the Department of Natural Resources Environmental Unit stated:

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

If our agency has regulatory jurisdiction over the project, the recommendations contained in this letter may become requirements of any permit issued. If we do not have permitting authority, all recommendations are voluntary.

Regulatory Assessment: Portions of this project may require the formal approval of our agency pursuant to the Flood Control Act (IC 14-28-1) for any proposal to construct, excavate, or fill in or on the floodway of a stream or other flowing waterbody which has a drainage area greater than one square mile. However, portions of the project may qualify for a general license under Administrative Rule 312 IAC 10-5 that applies to utility line crossings (see enclosure). Please include a copy of this letter with the permit application (if required).

Natural Heritage Database: The Natural Heritage Program's data have been checked. The species and managed lands below have been documented within ½ mile of the project areas, as indicated.

A. Raw Water Transmission Main:
   - Little Spectaclecase (Villosa Ilenosa); state special concern mussel
B. Cottonwood Vault:
   - Yellowwood State Forest (east of project area)
C. Upper Salt Creek Road Water Main:
   - Hills of Gold Forest Legacy Area (adjacent to the north end of project)
Fish & Wildlife Comments: The raw water main will be bored under Indian Creek; therefore, we do not foresee any impacts to the little spectaclecase as a result of this project as long as standard erosion control measures are implemented.

Avoid and minimize impacts to fish, wildlife, and botanical resources to the greatest extent possible, and compensate for impacts. The following are recommendations that address potential impacts identified in the proposed project area:

1) Directional Boring: We recommend that all creek or stream crossings be done using a trenchless method. If the open-trench method is necessary and the only feasible option at any of the planned stream crossings due to the site conditions, then the following measures should be implemented:

a) Any open trench stream crossing should be timed to coincide with the low-water time of year (typically mid- to late-summer).

b) Restore disturbed streambanks using bioengineering bank stabilization methods and revegetate disturbed banks with native trees, shrubs and herbaceous plants. Stream bank slopes after project completion should be restored to stable-slope steepness (not steeper than 2:1).

c) The cleared width through any forested area should be the minimum needed to install the line and no more than 20 feet wide through the forested area to allow the canopy to close over the line.

d) Use graded stone or riprap to protect the section of trench below the normal water level from scour or erosion (any stone or riprap fill in the streambed must not be placed above the existing streambed elevation to avoid creating a fish passage obstruction).

2) Forest and Wetland Habitat: We recommend a mitigation plan be developed (and submitted with the permit application, if required) if habitat impacts will occur. The DNR's Floodway Habitat Mitigation guidelines (and plant lists) can be found online at: http://www.in.gov/legislative/tac/20120801-IR-312120434NRA.xml.pdf. Impacts to non-wetland forest over one (1) acre or more should be mitigated at a minimum 2:1 ratio. If less than one acre of non-wetland forest is removed in a rural setting, replacement should be at a 1:1 ratio based on area. Impacts to non-wetland forest under one (1) acre in an urban setting should be mitigated by planting five trees, at least 2 inches in diameter-at-breast height (dbh), for each tree which is removed that is 10" dbh or greater (5:1 mitigation based on the number of large trees).

The mitigation site for impacts in the floodway should be located in the floodway, downstream of the one (1) square mile drainage area of that stream (or another stream within the 8-digit HUC, preferably as close to the impact site as possible) and adjacent to the existing forested riparian habitat.

The additional measures listed below should be implemented to avoid, minimize, or compensate for impacts to fish, wildlife, and botanical resources:

1. Revegetate all bare and disturbed areas with a mixture of native grasses, sedges wildflowers, and native shrub and hardwood tree species as soon as possible upon completion. Do not use any varieties of Tall Fescue or other non-native plants (e.g. crown-vetch).

2. Minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush.
3. Do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife.

4. Do not cut any trees suitable for Indiana bat roosting (greater than 3 inches dbh, living or dead, with loose hanging bark) from April 1 through September 30.

5. Use minimum average 6 inch graded riprap stone extended below the normal water level to provide habitat for aquatic organisms in the voids.

6. Plant native hardwood trees along the top of the bank and right-of-way to replace the vegetation destroyed during construction.

7. Post “Do Not Mow or Spray” signs along the right-of-way.

8. Appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized.

9. Seed and protect all disturbed streambanks and slopes that are 3:1 or steeper with erosion control blankets (follow manufacturer’s recommendations for selection and installation); seed and apply mulch on all other disturbed areas.

In correspondence dated August 25, 2015 the Natural Resources Conservation Service Stated:

The proposed project to for the Brown County Water Rehabilitation in the Brown, Johnson, Morgan and Monroe Counties, as referred to in your letter received August 3, 2015, will cause a conversion of prime farmland.

VIII. MITIGATION MEASURES

Brown County’s PER states:

Precautions shall be taken during construction to prevent erosion and sediment transport. Project plans shall include requirements for construction sequencing and both temporary and permanent erosion control measures. All disturbed areas shall be restored to their pre-construction condition. All vegetated land shall be permanently seeded and maintained as necessary until vegetation growth is established.

A rule 5 permit is required through IDEM for Construction/Stormwater Pollution Prevention. The County SWCD will routinely inspect the construction area to insure that appropriate measures are taken to minimize erosion and sediment transport off-site. All mitigating measures recommended by reviewing authorities shall be implemented for this project.

IX. PUBLIC PARTICIPATION

A properly noticed public hearing was held on May 29, 2014, at 6:30 pm at the utility office, located at 5130 North State Road 135, Morgantown IN, to discuss the PER. No written comments were received during the 5-day comment period following the hearing.
Figure 5: Spearsville-Peoga Road Water Main Replacement - Floodplain and Wetland Map

Match to Figure 4.2.1c

Proposed 10" Water Main

Spearsville Road

Twin Lakes Road

May 16, 2014

1% Risk (aka 100-yr Flood Zone)

Floodway

Streams (NHD)

Rivers (NHD)

Wetlands

Wetland Points

0.2% Risk (aka 500-year Flood Zone)

Stream Features

Wetland Lines

Lakes (NHD)

Rivers - Outstanding (NRC)

Rivers (Local-Resolution NHD)

Streams (Local-Resolution NHD)

Roads 2005 (INDOT)

1:8,000

Revised July 14, 2015

U.S. Geological Survey
Figure 8: Upper Salt Creek Road (Ford Ridge Road to Sprunica Road) Water Main Replacement - Floodplain and Wetland Map

- Begin proposed 8" water main from Ford Ridge Road, aka Fords Lane
- Stream Crossing: unnamed tributary to North Fork Salt Creek, Construction Method: open cut
- End proposed 8" water main

May 14, 2014

Legend:
- Green: Wetland Lines
- Light Blue: Streams (NHD)
- Light Gray: Lakes (NHD)
- Blue: Rivers - Outstanding (NRC)
- Light Green: Rivers (Local-Resolution NHD)
- Dashed Light Blue: Streams (Local-Resolution NHD)
- Brown: Roads 2005 (INDOT)
- Pink: 0.2% Risk (aka 500-year Flood Zone)
- Yellow: 1% Risk (aka 100-yr Flood Zone)
- Light Yellow: Floodway
- Green: Wetland Points
- Dark Green: Wetlands

Scale: 1:8,000

U.S. Geological Survey
Figure 10: Upper Beanblossom Road Water Main Replacement - Floodplain and Wetland Map

- Begin proposed 6" water main replacement
- Stream Crossings: Beanblossom Creek; Construction Method: Bore
- Bean Blossom Creek
- Webber Hill Road
- End proposed 6" water main

May 16, 2014

Legend:
- Streams (NHD)
- Stream Features
- Wetland Lines
- Lakes (NHD)
- 0.2% Risk (aka 500-year Flood Zone)
- 1% Risk (aka 100-yr Flood Zone)
- Floodway
- Rivers - Outstanding (NRC)
- Rivers (Local-Resolution NHD)
- Streams (Local-Resolution NHD)
- Roads 2005 (INDOT)
- Wetlands

1:8,000

U.S. Geological Survey
Figure 12: Three Story Hill Road Water Main Replacement - Floodplain and Wetland Map

Stream Crossing: unnamed tributary to Big Thunder Creek, Construction Method: open cut

May 16, 2014

- **Wetland Points**
- **Wetland Lines**
- **Streams (NHD)**
- **Lakes (NHD)**
- **Stream Features**
- **1% Risk (aka 100-yr Flood Zone)**
- **0.2% Risk (aka 500-year Flood Zone)**
- **Floodway**
- **Rivers - Outstanding (NRC)**

North
Figure 13  Three Story Hill Road Water Main Replacement - Floodplain and Wetland Map

End proposed 12" water main replacement

Three Story Hill Road

Ritter Road

PUBGh

Match to Figure 4.2.4b

May 16, 2014

- Green: Wetland Points
- Blue: Wetland Lines
- Light Blue: Streams (NHD)
- Light Blue: Lakes (NHD)
- Black: Stream Features
- Pink: 0.2% Risk (aka 500-year Flood Zone)
- Yellow: 1% Risk (aka 100-yr Flood Zone)
- Green: Floodway
- Blue: Rivers - Outstanding (NRC)

U.S. Geological Survey
Figure 14: Raw Water Main Replacement - Floodplain and Wetland Map

- Indian Creek
- Railroad Road
- Whetsville Road
- R2UBH
- Wells 3, 8, and 4
- PFO1A
- Well 7
- Indian Creek
- Stream Crossing: unnamed tributary to Indian Creek; Construction Method: bore
- Stream Crossing: Indian Creek; Construction Method: bore
- Begin proposed 16" raw water main at existing WTP
- Water Treatment Plant (WTP) and wells 1, 2, 5, and 6

May 14, 2014

- Wetland Lines
- Rivers - Outstanding (NRC)
- Roads 2005 (INDOT)
- Streams (NHD)
- Streams (Local-Resolution NHD)
- Lakes (NHD)
- Rivers (Local-Resolution NHD)
Figure 16  Proposed Lanam Tank Site - Floodplain and Wetland Map

May 16, 2014

- Wetland Points
- Streams (NHD)
- Stream Features
- Wetland Lines
- Lakes (NHD)
- Rivers - Outstanding (NRC)
- Rivers (Local-Resolution NHD)
- Streams (Local-Resolution NHD)
- Roads 2005 (INDOT)
- 0.2% Risk (aka 500-year Flood Zone)
- 1% Risk (aka 100-yr Flood Zone)
- Floodway
- Wetlands

U.S. Geological Survey