FINAL DETAILED PROJECT REPORT

SECTION 14 EMERGENCY STREAMBANK PROTECTION

Lick Run
Pleasant Hills Authority
Allegheny County, Pennsylvania

April 14, 2016

FINDING OF NO SIGNIFICANT IMPACT

REGIONAL EMERGENCY STREAMBANK PROTECTION PROGRAM
WITH SPECIAL CONDITIONS PURSUANT TO
SECTION 14 OF THE 1946 FLOOD CONTROL ACT, AS AMENDED

1. In 2000, under the Authority of Section 14 of the 1946 Flood Control Act, as amended, the Pittsburgh District, United States Army Corps of Engineers implemented a 5-year Regional Emergency Streambank Protection Program with Special Conditions governing the placement of fill material or other plant or structural materials for bank protection and stabilization in all waters in the District. The Environmental Assessment (EA) prepared in response to the National Environmental Policy Act (NEPA) for that Regional Emergency Streambank Protection Program was circulated for public review and comment and coordinated with numerous Federal and State offices in five states in which the Pittsburgh District lies (portions of New York, West Virginia, Pennsylvania, Ohio, and West Virginia). Responses to the original Public Notice and EA issued in 2000 did not raise any objections or significant issues providing the special conditions were implemented. Because the time period for the original Regional program expired, the District is re-circulating the same document for review and approval. The only difference between the original document and the current one is that the District is seeking a 10-year renewal. Work performed under Section 14 corrects bank and shore erosion that endangers public or non-profit facilities. Bank protection typically is provided by the placement of riprap, quarry-run stone, gabions, retaining walls, bioengineering techniques, or rigid linings.

2. Alternatives considered in the EA for the proposed Emergency Streambank Protection Program are (1) No-Action, where emergency streambank stabilization will continue with individual processing of each project, (2) Implement the Section 14 Regional Program Without Special Conditions, (3) Implement the Regional Section 14 Program With Special Conditions. The No-Action alternative would result in the individual processing of Section 14 activities. Since individual approvals would be required, the No-Action alternative would result in the continuation of a greater expenditure of both time and funds than if the Regional Emergency Streambank Protection Program With Special Conditions was implemented. Alternative 2 entails a greater risk of adverse environmental impact than the No-Action alternative or Alternative 3. Alternative 3 ensures that any significant impacts to environmentally sensitive areas are avoided through adherence to the Special Conditions. Therefore, the preferred alternative is to implement the Regional Emergency Streambank Protection Program With Special Conditions.

3. In accordance with ER 200-2-2, Policy and Procedures for Implementing NEPA, and 33 CFR 320, Regulatory Program for the Corps of Engineers, an updated Environmental Assessment (EA) has been prepared and circulated to all appropriate Federal and State agencies and other interested groups for review and comment. Coordination with the State Historic Preservation Officer will be specifically conducted for each project. The EA indicated that no significant adverse environmental impacts would result from the proposed work. The proposed work would create a beneficial socioeconomic impact by providing protection to public and non-profit facilities. There would be no changes of land use as a result of authorization granted under this

program. The repair of property would allow the public to continue to use each respective facility as originally intended.

4. Streambank protection would cause minimal loss of wildlife habitat; in cases where bioengineering is used, this loss would be short-term. Providing streambank protection may require extending the bank shoreward to create milder slope conditions. However, any design should minimize removal of vegetation to that necessary to achieve this stable streambank design slope configuration. Placement of bank protection would temporarily increase turbidity levels, dislocate various organisms, and possibly disrupt the movement of some organisms. Bank stabilization would reduce long-term erosion and siltation. Materials such as riprap could also provide quality habitat for some aquatic organisms. Standards of water quality established by the states of Pennsylvania, West Virginia, Ohio, Maryland and New York are not anticipated to be exceeded during and immediately after implementation of bank protection and would be expected to improve once implementation has been completed. State Water Quality Certifications pursuant to Section 401 of the Clean Water Act will be requested from the applicable state for each project . Pursuant to the U.S. Fish and Wildlife Coordination Act of 1958, coordination was conducted with the U.S. Fish and Wildlife Service (USFWS) and respective state fish and wildlife agencies during preparation of the EA. Also, under Section 7 of the Endangered Species Act, each project will be coordinated with the USFWS and the respective state fish and wildlife agency. Accordingly, the proposed work will not adversely affect any Federally or state-listed threatened or endangered species or critical habitat.

5. I have reviewed the EA for the Emergency Streambank Protection Program and the Public Notice, as well as all responses and comments received during the review period. In addition, I have evaluated the proposed placement of fill material in accordance with the Guidelines promulgated by the Administrator of the Environmental Protection Agency pursuant to Section 404(b)(1) of the Clean Water Act. I have determined that the discharge of dredged or fill material will not result in environmental contamination and that it will be in compliance with the Guidelines, in accordance with 40 CFR 230.12. In light of the general public interest, I have determined that the work will not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Accordingly, I have reasonably concluded that an Environmental Impact Statement covering the proposed work is not required.

6. This finding of No Significant Impact precedes the agency's final decision concerning this project.

Date: 9-14-06

-S-
Stephen L. Hill
Colonel, Corps of Engineers
District Engineer

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EMERGENCY STREAMBANK PROTECTION
(Section 14 of the Flood Control Act of 1946, as amended)

Lick Run
Pleasant Hills Authority
Allegheny County, Pennsylvania

1 Study Authority

This study is being completed under the authority provided by Section 14 of the 1946 Flood Control Act, as amended. The purpose of the Section 14 authority is to provide emergency streambank and shoreline protection for public facilities, such as roads, bridges, hospitals, schools, and water/sewage treatment plants that are in imminent danger of failing. Projects authorized under Section 14 are cost-shared at 100% Federal up to $100,000, then 50% Federal and 50% non-federal for the feasibility phase, and 65% Federal and 35% non-federal for the design and construction phase. The Section 14 authority has a per project limit of $5,000,000. This study was originally requested by Mr. Richard Nieman, Chairman, Pleasant Hills Authority ("Authority") on September 26, 2007 (Letter of Intent, 2007) with the most recent request by Mr. Nieman, dated March 26, 2014 (Letter of Intent, 2014 Appendix A). The Authority is the local sponsor for this study and the presumed sponsor for the design/construction phases, as well.

2 Existing Facility Conditions

The project area is located on the right descending bank of Lick Run within the corporate limits of South Park Township and Jefferson Hills Borough, Allegheny County, Pennsylvania Figure 1 and Figure 2). The Pleasant Hills Authority Sewage Treatment Facility typically handles 3 million gallons of sewage per day and serves approximately 8,300 customers. Customers are located in six communities including Pleasant Hills, Baldwin, South Park, Whitehall, and to a lesser extent Bethel Park and Jefferson.

Erosion has been occurring in the study area for a number of years and is an imminent threat to the structural integrity of the second stage aeration tanks, Blower Building #2, the 36-inch influent pipeline, lime storage tank, Second Stage Final Clarifier #1, and the second stage aeration tanks at the plant (Figure 1). The right descending bank of Lick Run is being eroded resulting in bottom scour, shallow bank failures, and streambank retreat. The top of bank has encroached within the facility perimeter fence to the corner of the foundation under the lime storage tank (which shares a foundation with the second stage aeration tanks), within five feet of Second Stage Final Clarifier #1, and within ten feet of Blower Building #2. If corrective action is not implemented, erosion will damage critical plant facilities and cause plant closure.

During a site visit on August 24, 2015 Pittsburgh District engineering staff confirmed that the site conditions assumed in this feasibility report reflect the current site conditions (see Photo 1-Photo 7). Additionally, the Authority indicated that they intend on constructing a new headworks building west of Blower Building #2, a new pump station north of the lime storage tank, and a new 30 inch ductile iron force main parallel to Lick Run within the next 3-5 years.

Lick Run Section 14 Streambank Restoration Project Area

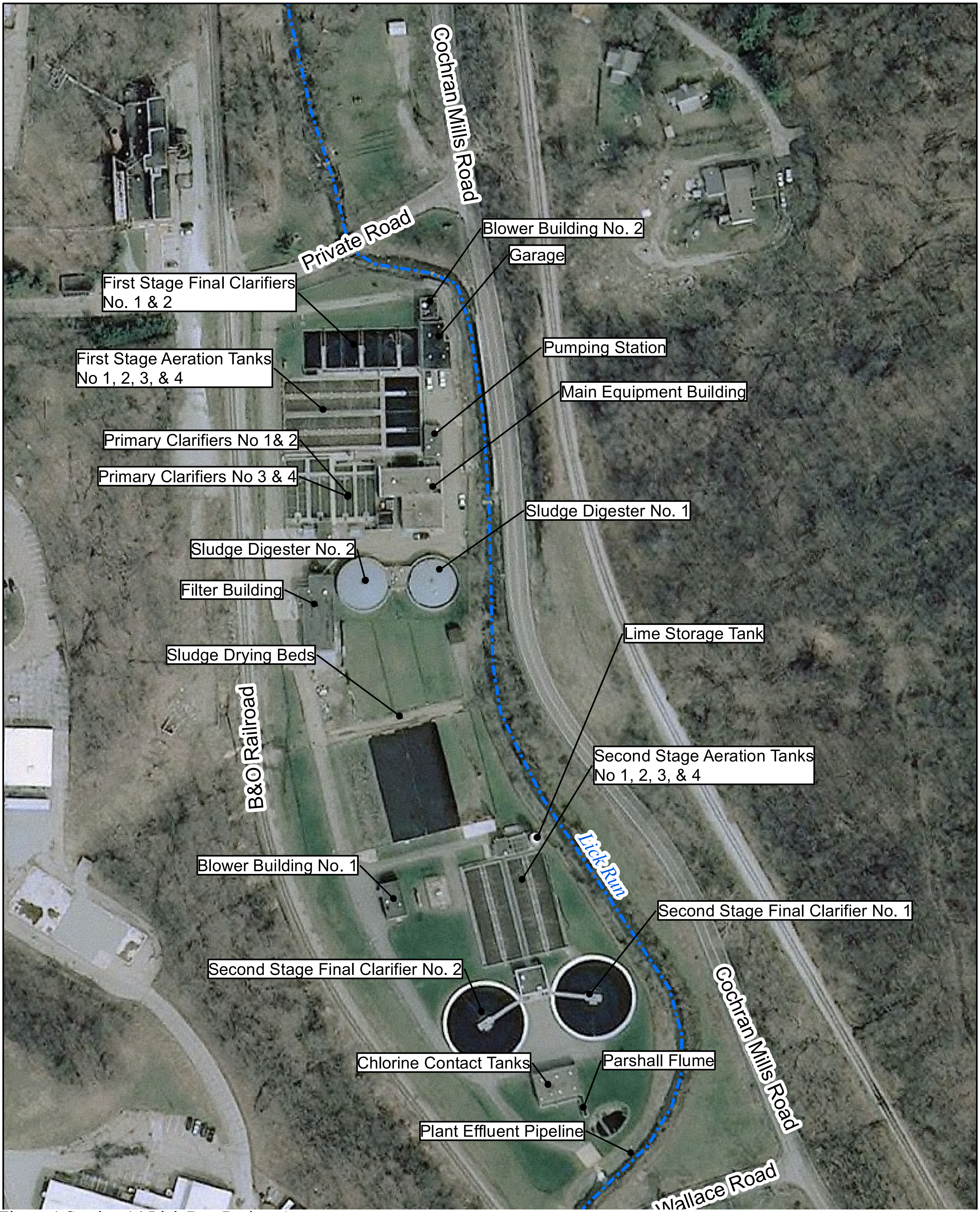

Figure 1 Section 14 Lick Run Project Area

Communities in Pleasant Hills Authority Service Area

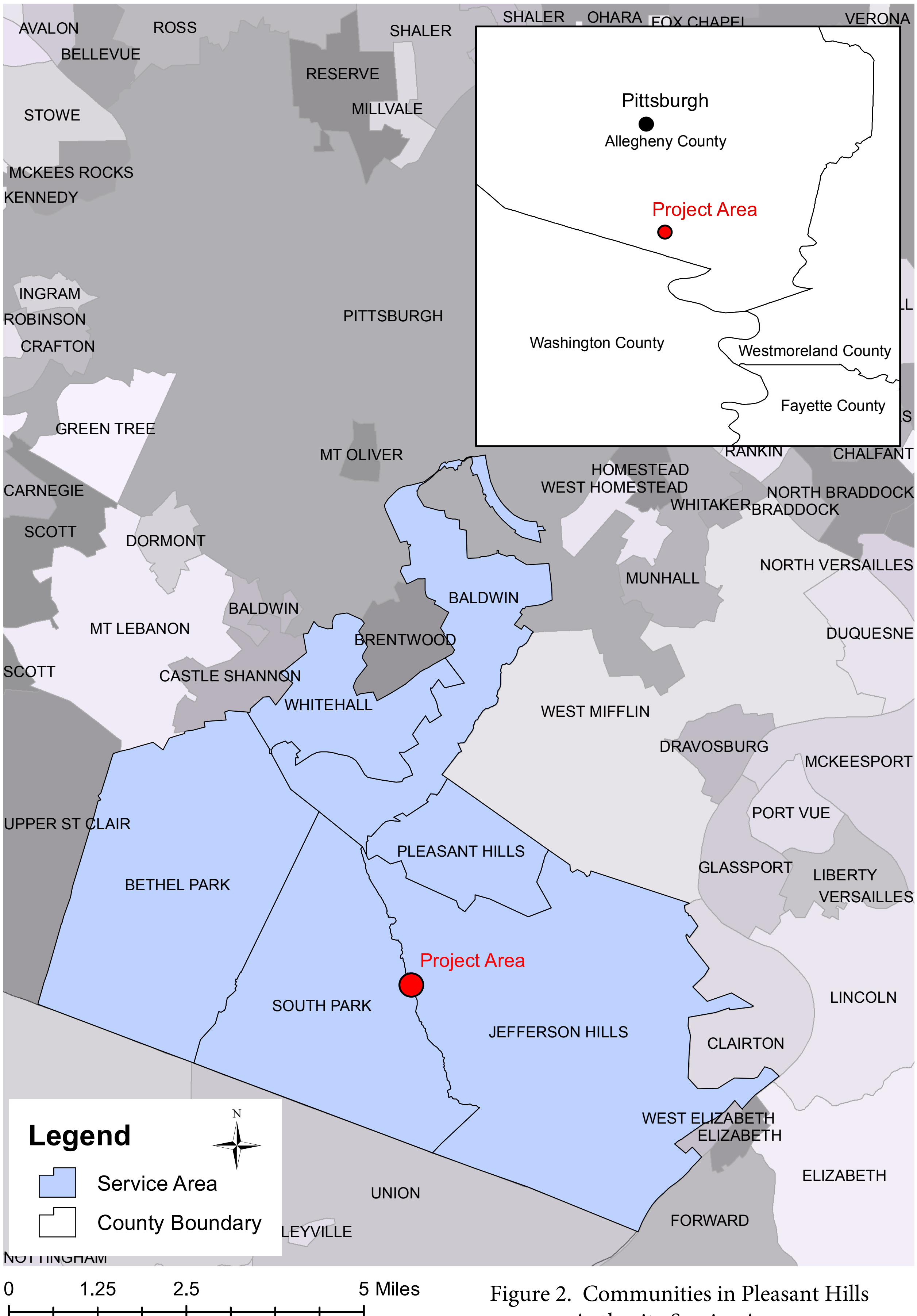

Figure 2. Communities in Pleasant Hills Authority Service Area

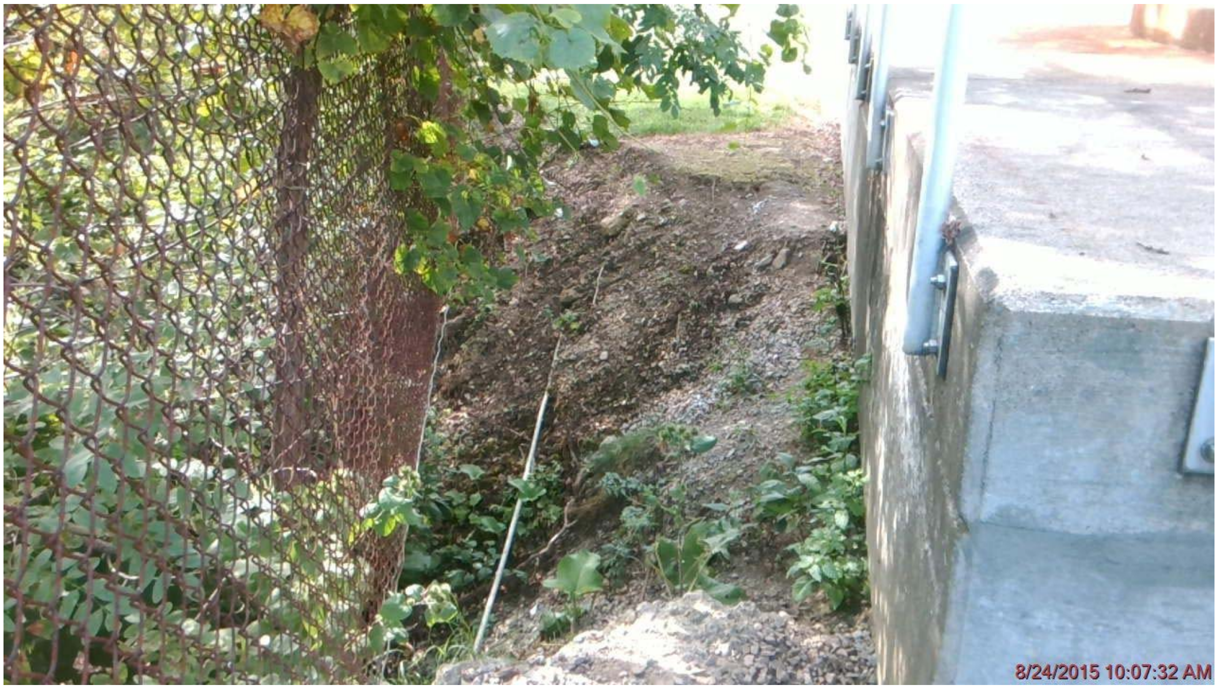

Photo 1 Under-mining of the foundation for the second stage aeration tanks.

Photo 2 Erosion near fence line, 2009.

Photo 3 Evidence of advancing erosion, 2015.

Photo 4 Bank erosion near the treated-water-outfall.

Photo 5 Gabion baskets were installed near Blower Building #2 by the Authority to protect the bank from erosion.

Photo 6 Undermining of the gabion baskets.

Photo 7 Bank erosion upstream of the gabion baskets near Blower Building #2.

3 Problems, Opportunities and Planning Objective

The general purpose of any project authorized by Section 14 is to protect public works and non-profit public services from streambank and shoreline erosion. For this study, the following Problem and Opportunity statement defines the nature of the concern at Lick Run to be addressed by streambank protection alternatives:

Facilities comprising the Pleasant Hills Authority Sewage Treatment Plant are threatened from erosion occurring over approximately 675 feet along the right descending bank of Lick Run. This streambank is being eroded and undercut, resulting in scour, shallow bank failures, and streambank retreat. The primary opportunity is to avoid costly future measures by the Authority that would be needed to repair facilities damaged by the progression of such streambank deterioration.

The objective of any protection alternative is to protect all facilities necessary for sewage plant operation from damage due to streambank erosion for at least 50 years.

4 Future Without Project Condition

The traditional Corps definition of the Without-Project Condition (WOPC) is the most likely condition expected to prevail throughout the analysis period in absence of additional project

(Congressional) authorizations. The imminent threat posed by erosion along the banks adjacent to the Pleasant Hills Sewage Treatment Facility, as described in Section 2, requires that the Authority take action in the near term to avoid failure of facilities due to progression of erosion during the analysis period. This would avert the consequences of facility failure, including the potential for municipal pipeline damage, and customer infrastructure damage. The WOPC for this study assumes relocation of sewage plant facilities required to maintain uninterrupted service.

5 Solutions Considered

Five alternatives were evaluated in this feasibility study. Plan A includes 3 alternatives that involve streambank stabilization techniques to mitigate streambank erosion directly. Plan B involves the relocation of facilities that are threatened by streambank erosion without the implementation of any streambank erosion mitigation measures. Plan C is the no action alternative (aka "No Action Plan") which identifies the consequences and costs associated with not implementing any streambank erosion mitigation techniques (Plan A) or relocations of critical threatened facilities (Plan B). To address several different possible scenarios of facility replacement for Plan B, several potential costs were developed.

Plan A alternatives

1. Plan A-1: Concrete block wall
2. Plan A-2: Cast-in-place concrete wall
3. Plan A-3: Post and panel wall

Plan B alternative

1. Plan B: Relocation

Plan C alternative

1. Plan C: No Action

Other alternatives of Plan A were analyzed, including bioengineering[1] and longitudinal peaked stone toe protection (LPSTP)[2] but were found to be impractical due to the steep slopes and minimal space available for their implementation. Gabions were considered impractical because they are less reliable than a concrete application and require more maintenance.

5.1 Plan A Alternatives A-1, A-2, and A-3

At Location 1 and 2 (Figure 4), a concrete block wall, a cast-in-place concrete wall, or a post and panel wall were considered in combination with a riprap revetment and grout-filled bags for additional streambank protection.

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[1] Bioengineering uses living plants, or plants in combination with dead or inorganic materials, to protect a bank from erosion (Programmatic Environmental Assessment, 2006).
[2] LPSTP is a continuous stone dike placed longitudinally at, or slightly streamward, of the toe of an eroding bank.

Table 1 Plan A variations, by location.

Plan	Description	Location 1	Location 2
A-1	Concrete Block Wall	X	X
A-2	Cast-in-place Concrete Wall	X	X
A-3	Post and Panel Wall	X	X
	Riprap	X	
	Grout-Filled Bags		X

Table 2 Plan A retaining wall and bank stabilization lengths, by location.

	Length of Retaining Wall	Length of Riprap or Grout-filled Bag Protection
Location 1	295-FT	140-FT
Location 2	96-FT	144-FT

5.1.1 <u>Riprap revetment</u>

A riprap revetment would be used to stabilize the streambank in Location 1. Riprap is installed to match the existing slope, likely between 3H:1V and 2H:1V up to the 100-year water surface. A geotextile fabric is placed between the riprap and the existing ground to reduce soil loss and maintenance from vegetation growth. Due to the steep slopes and limited space available, riprap was not considered at the location 2 site.

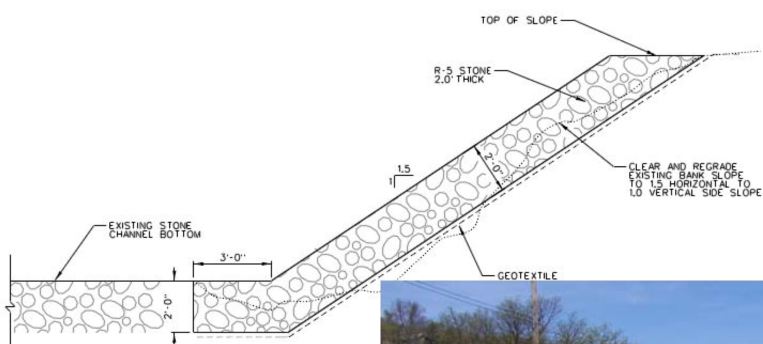

Figure 3 Typical riprap protection section (Turtle Creek As-built, 2010)

Photo 8 Example of new riprap bank protection (Turtle Creek Photos, 2010).

Plan A Alternatives

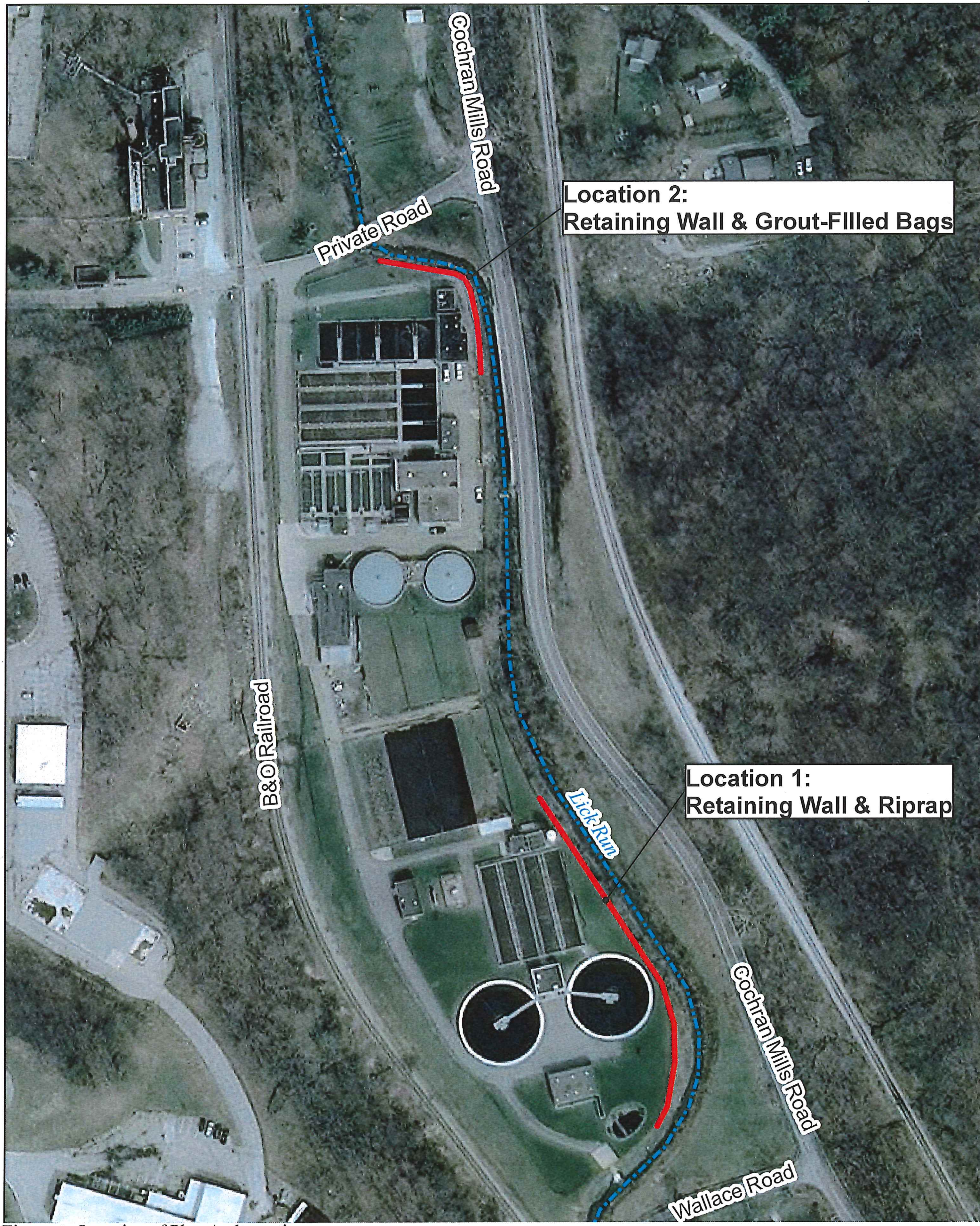

Figure 4. Location of Plan A alternatives

5.1.2 Grout-filled bags at toe of existing gabions

Grout-filled bags (also sometimes called concrete bags) would be used to stabilize the streambank in Location 2. Grout-filled bags are nylon bags placed parallel to the streambank with reinforcing bars installed vertically and horizontally (MMDL 2008). Optionally, a sheet pile wall can be driven at the base of the toe to keep the structure in place as shown in Figure 6 The bags are filled with ready-mix grout using a grout pump and are used to help protect the existing gabion wall from undercutting. Grout-filled bags will be installed below the long-term scour depth of Lick Run, up to the second row of gabions. Grout-filled bags would provide greater rigidity and structural support for the undermined gabion revetment than riprap and were considered more viable than riprap at Location 2.

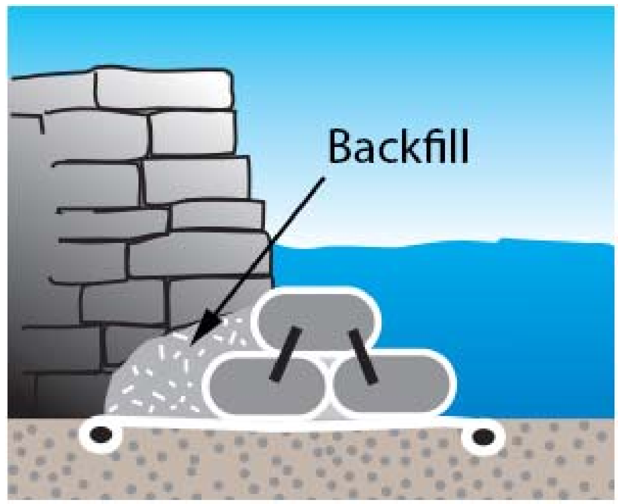

Figure 5 First example of grout-filled bag installation (Fabriform, 2015)

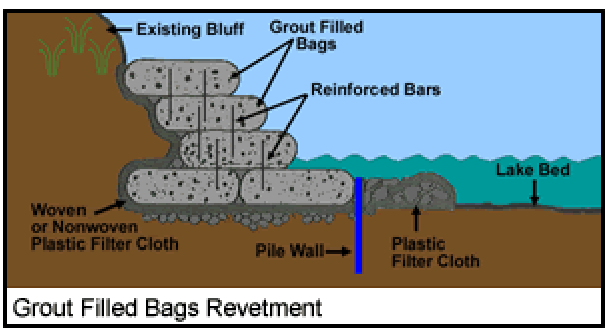

Figure 6 Second example of grout filled bag installation (MMDL, 2008).

Photo 9 Grout-filled bags with biodegradable sacks protecting a stream bank (Pipeshield, 2014).

5.1.3 <u>Precast concrete block wall</u>

A precast concrete block wall is a standard retaining wall type that uses precast blocks, keyed so that adjacent blocks fit together. The blocks are stacked on top of each other, sometimes staggered, but may be in line with each other depending on the manufacturer and design. For the Plan A option, the existing bank would be graded to a ratio of 0.5 horizontal to 1 vertical (0.5H:1V) down to bedrock. A 4 inch thick concrete leveling pad would be poured along the wall alignment to provide a stable and level foundation as well as prevent any undermining of the wall. Once this pad is established, the precast concrete blocks can be placed. The blocks come in many different styles and sizes. For a particular block wall manufacturer, the blocks are 6 feet long, 3 feet wide, and 2 foot high, and are connected with a tongue-and-groove type system and stacked to a total of 8 feet in height. The wall will have a batter[3] of 1H:8V. A granular drainage layer wrapped with geotextile will be laid along the slope side of the concrete block to reduce water surcharge on the wall. The slope remaining above the wall would be re-vegetated with native grasses and shrubs.

Figure 7 Example of a retaining wall for streambank protection and protection of nearby structures (RisiStone, 2010).

[3] Slope of the face of the wall from a vertical plane

5.1.4 Cast-in-place concrete wall

The cast-in-place concrete wall is formed and placed on-site. There are many geometric variations of this type of wall but given the space constraint on site, it is assumed that the wall will be either vertical or near vertical. Rock anchors or tie backs could be used for stability purposes but were assumed to be unnecessary due to the relatively small height of this wall. For this reason, anchors and tie-backs were not factored into the costs. Similarly to the precast concrete block wall, the existing bank would be graded to a ratio of 0.5 horizontal to 1 vertical (0.5H:1V) down to bedrock. Reinforced concrete would be poured on top of a gravel base, up to 8 feet in total height with a batter of 1H:8V. A granular drainage layer wrapped with geotextile will be installed for drainage. The slope above the wall would be re-vegetated with native grasses and shrubs.

Figure 8 A cast-in-place wall constructed to provide flood protection and streambank stability (McKeesport, 2015).

5.1.5 Post and panel wall

A post and panel wall, also called a soldier pile wall, uses vertically-mounted W-shape soldier piles or H-piles inserted into a concrete-filled drilled shaft. A 4 to 6 inch leveling pad would be installed on top of the drilled shaft concrete to provide a level surface for the precast panels. Precast concrete panels are then inserted into the space between the pile supports to the full-height of the retaining wall. Depending on the height of the wall, rock anchors or tie-backs can be installed for additional support. The post and panel wall in Plan A would be installed to a height of approximately 8 feet, which will likely not require anchors or tie-backs. The spacing between piles would depend on the design surcharge load and the size of commercially available precast panel inserts but is typically between 6 and 12 feet apart. Gravel or a geocomposite drainage material would be installed between the pre-cast panels and the existing ground. The slope above the wall would be re-vegetated with native grasses and shrubs.

Photo 11 Construction of a post and panel wall. This wall uses precast concrete panels inserted into W-shape soldier piles (McKeesport, 2006).

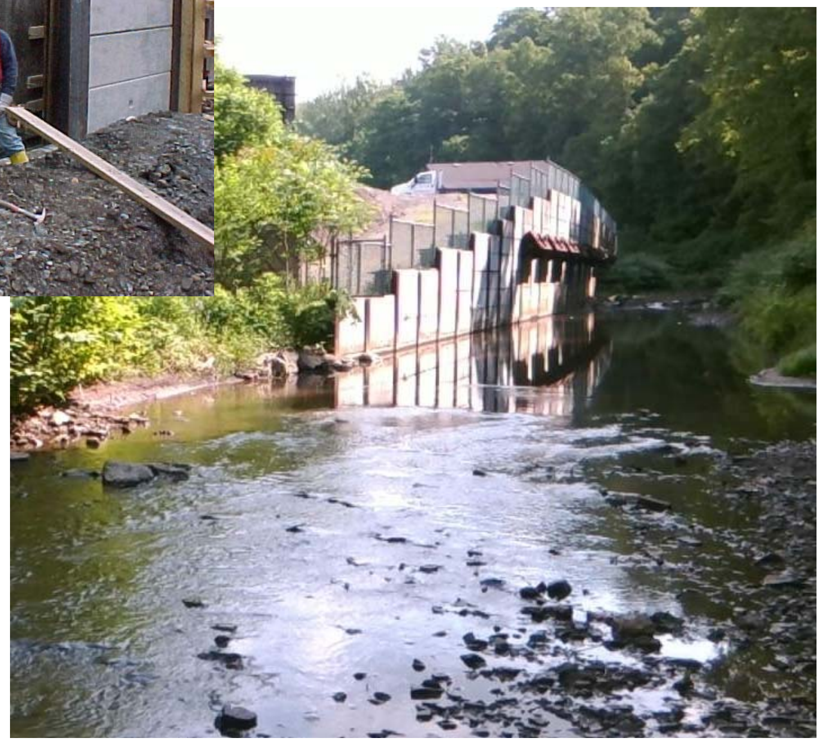

Photo 10 Post and panel wall several years after construction. Anchor rods were used to stabilize the wall and a fence was installed for safety (McKeesport, 2015).

5.2 Relocation, Plan B

This plan, as an alternative to the bank protection in Plan A, would involve construction of new facilities in alternate nearby locations to replace the threatened facilities. Schedule A (Refer to Figure 9, Table 4, Table 5, and Table 6) includes threatened critical existing facilities, Schedule B includes threatened non-critical existing facilities, and Schedule C includes threatened proposed facilities. This plan would require 5 to 10 years for implementation as estimated by Authority officials. New non-federal funding for the project would first need to be obtained prior to design and construction.

5.3 No Action Plan

If no remedial action is taken the erosion of the streambank would continue unmitigated. In the No Action Plan, erosion will continue to threaten Schedule A facilities and could begin to negatively affect Schedule B facilities. If any Schedule A facilities become unstable or too vulnerable to continue operating, the entire operation of the plant can be compromised. Existing critical facilities include those listed in Table 4 (Schedule A), and existing non-critical facilities are listed in Table 5 (Schedule B). If even one of the critical facilities in

Schedule A fails, the plant can no longer treat incoming raw sewage. Loss of any schedule A facility would result in sewage being released into the local watershed without treatment, municipal pipeline damage, and customer infrastructure damage. Sewage would likely back-up in the municipal sewer system and discharge out of manholes and into customers residences and businesses. If an untreated sewage discharge were to occur, environmental impacts would include an immediate release of high levels of nutrient-laden material resulting in a process of rapid growth of algae followed by depleted oxygen levels. Depleted oxygen levels can cause serious harm to fish and other aquatic species and can result in fish kills. If the sewage release is not remedied, this situation could lead to the eutrophication of the stream or permanent over-enrichment due to the continued nutrient release.

Untreated sewage released into streams can also lead to human health impacts since sewage often contains waterborne pathogens. Any human contact (either through recreation or drinking) with waterways containing untreated sewage could result in illness. A secondary negative human impact of untreated sewage is the existence of strong odors that would affect businesses and residents located within the area.

The sponsor has indicated that the Schedule B facilities are those that are not currently directly related to the treatment of incoming raw sewage. These facilities are either permanently off-line or are used for the support of treatment plant operations. The Schedule B facilities are located nearby to critical Schedule A facilities. If streambank erosion advances far enough to fail one of the Schedule B facilities, it could cause direct damage to a critical Schedule A facility. For example, the foundation of the Lime Storage Tank is currently being undermined by streambank erosion as shown in Photo 1. The foundation of the Lime Storage Tank is shared with the Second Stage Aeration Tanks so the impact would be that due to the failure of a Schedule B facility, a Schedule A facility also fails. Due to the unacceptable and costly negative impacts, the No Action Plan was not considered for further investigation.

6 Implementation costs

6.1 Streambank Protection Plan A, Screening Level Alternative Estimates

As described in section 3.1, three construction alternatives were evaluated under Plan A. The screening level construction cost estimates for the three variations of Plan A are presented below. Refer to - for a detailed breakdown by code-of-accounts for all Plan A variations. All three construction alternative estimates were developed using parametric estimating techniques using historical pricing from previous similar contracts and are considered Screening Level (Class 5) estimates in accordance with ER 1110-2-1302.

Table 3 Screening Level Estimates for Plan A (Construction Alternatives).

Plan A Variation[4]	Cost
A-1 Precast Concrete Block Wall	$784,000
A-2 Cast-in-place Concrete Wall	$927,000
A-3 Post and Panel Wall	$1,194,000

[4] Includes the cost for riprap and grout-filled bags

The least-cost Plan A alternative is Plan A-1, the precast concrete block wall. Plan A-1 was then developed to a Feasibility Level (Class 4) estimate in accordance with ER 1110-2-1302 and is described below. All plans would have the same construction duration and the same Operations and Maintenance costs[5]

6.2 Streambank Protection Plan A-1, Feasibility Level Analysis

As described above, Plan A-1 (precast block wall) is the least-cost construction alternative. As the recommended alternative, A-1 was further developed to a Feasibility Level cost estimate, including a detailed MCACES (MII) estimate, a design and construction schedule and a risk-based contingency. Refer to , - for a detailed breakdown of the feasibility cost, construction schedule, Risk Analysis, and the Total Project Cost Summary. The Project First Cost is $838,000 at the October 2015 price level. The Project First Cost includes $604,000 in construction, $12,500 in real estate administrative costs (no acquisition), $161,000 in engineering and design and $60,000 in construction management. All costs above are at an October 2015 price level and risk-informed contingency of approximately 25% ($168,000).

The Total Project Cost, which is the Project First Cost plus inflation through the end of the project, is $867,000.

The feasibility study cost, estimated at $150,000, is not included in the Project First Cost or Total Project Cost above. The first $100,000 of the feasibility investigation is 100% Federally-funded, the remaining costs, estimated at $50,000, will be cost shared at 50%/50%.

Plan A-1 is also the least cost in consideration of interest during construction, which would be lower than the other plans, and future Operation, Maintenance, Repair, Replacement and Rehabilitation (O&M) costs[6].

6.3 Relocation, Plan B

The estimated cost for Plan B, relocation, is assumed to be the replacement value based upon an industrial appraisal for the facility. The Summary Revaluation Report for the Authority (Insurance Values, 2015) provided a valuation for each component of the facility. The replacement value will serve as a relocation cost but the actual cost would be much higher since the costs of design, additional utilities, lands, and management are not included. According to the Revaluation Report, replacement costs of critical existing facilities are shown in Schedule A. In Plan B (relocation) costs are based on Schedule A costs only. This is because Schedule A represents the minimum practical relocation cost and is the most conservative approach.

[5] Operations & maintenance for all plans includes trash & debris removal and vegetation maintenance.
[6] Operation and maintenance for any of these plans includes trash and debris removal.

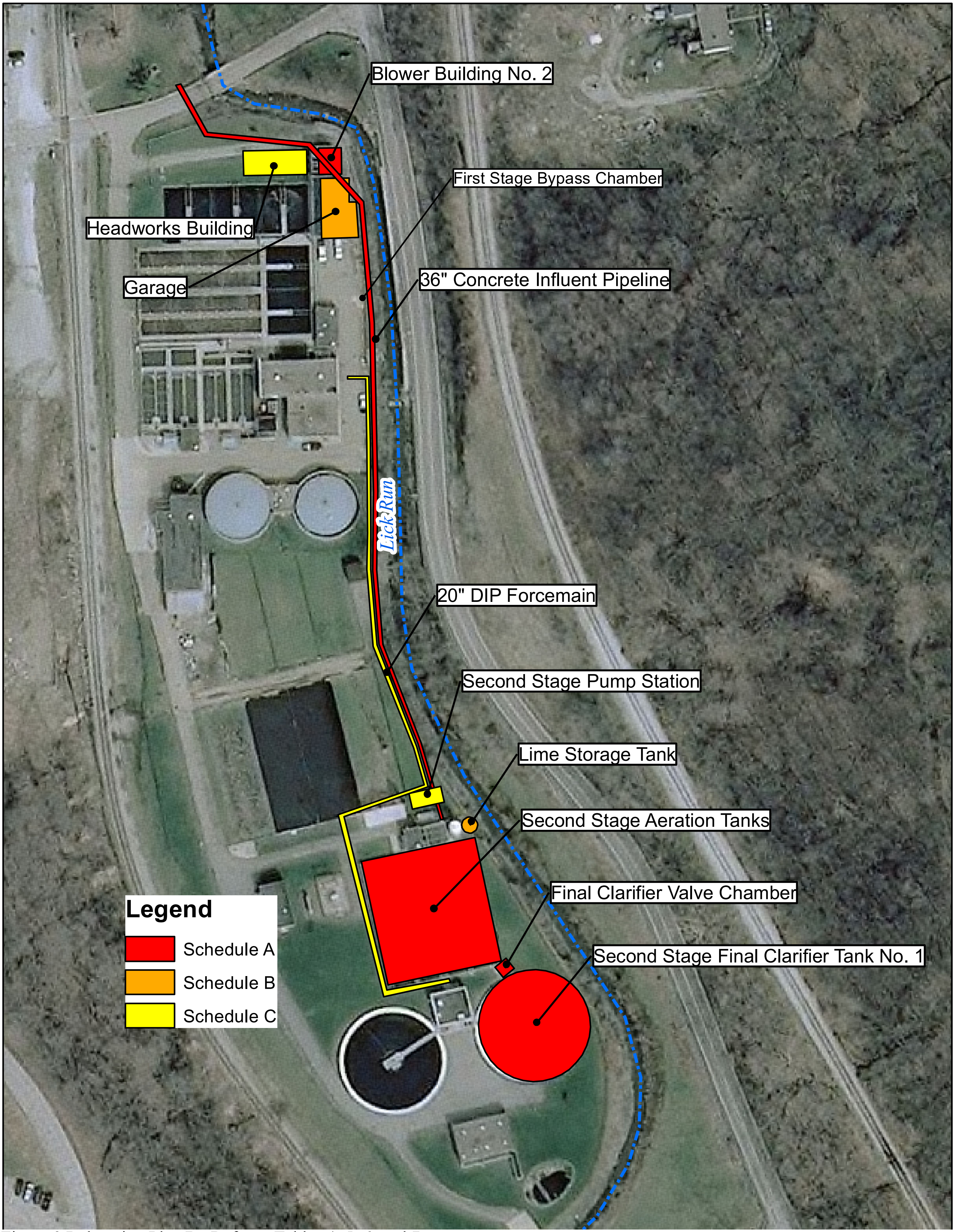

Figure 9 Relocation Plan B. Refer to Tables 4, 5, 6, and 7.

Table 4 Plan B, Schedule A. Cost to demolish and reconstruct existing critical plant facilities.

Schedule A			
Facility	Demolition Cost	Construction Cost	Total Cost
Second stage final clarifier tank 1	$5,000	$902,054	$907,054
Second stage aeration tanks	$17,500	$1,944,613	$1,962,113
First stage bypass chamber	$1,000	$69,205	$70,205
Blower building 2	$3,000	$269,914	$272,914
Final clarifier valve chamber[7]	$1,000	$94,672	$95,672
36" concrete influent pipeline, 300 LF[8]	$10,800	$100,000	$110,800
Total	$38,300	$3,380,458	$3,418,758

If the non-critical existing facilities are included in the relocation additional replacement costs are shown in Schedule B. Existing non-critical facilities are those that are threatened by streambank erosion, but the WWTP would still be able to treat incoming raw sewage without these facilities.

Table 5 Plan B, Schedule B. Cost to demolish and reconstruct existing non-critical plant facilities.

Schedule B			
Facility	Demolition Cost	Construction Cost	Total Cost
Lime storage tank	$1,000	$107,313	$108,313
Maintenance building	$5,250	$12,068	$17,318
Total	$6,250	$119,381	$125,631

Conversations with the Authority indicated that there are several capital improvements planned in the near-term to increase plant capacity, increase redundancy, update older or inadequate equipment, and increase efficiency. The current proposed locations of these improvements have been planned by the A/E currently tasked with the design to provide the best-fit with the space currently available. If these facilities were to be planned in a different location as a result of streambank erosion, additional capital costs would be incurred to facilitate additional real estate and infrastructure requirements. The approximate value of proposed capital improvements that could be impacted by streambank erosion are presented in Schedule C.

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[7] The final clarifier valve chamber is not immediately threatened by erosion, but would need to be relocated if the second stage final clarifier tank 1 is relocated.

[8] Not included in the revaluation report

Table 6 Plan B, Schedule C. Cost to demolish and reconstruct proposed plant facilities.

Schedule C			
Facility[9]	Additional Infrastructure Costs[10]	Construction Cost	Total Cost
Headworks building	$750,000	$3,000,000	$3,750,000
Second stage pump station	$250,000	$1,000,000	$1,250,000
20" ductile iron pipeline, 300 LF	$10,000	$40,000	$50,000
Total	$1,010,000	$4,040,000	$5,050,000

The cost to demolish and construct all facilities listed in Schedule A, and B, and to construct additional infrastructure to proposed facilities as listed in Schedule C is shown in Schedule D.

Table 7 Plan B, Schedule D. Total cost to implement Schedules A, B, and C.

Schedule D	
Schedule	Total Cost
Schedule A	$3,418,758
Schedule B	$125,631
Schedule C[11]	$1,010,000
Total	$4,554,390

7 Average Annual Cost

The average annual feasibility-level cost to construct, operate and maintain Plan A-1 and Plan B is shown in Table 8 and 9.

Table 8 Plan A-1 annual costs based on 50-year life at 3-1/8%

Plan A-1, Annual Costs of Least Costly Variation	
Interest & Amortization	$34,800
Inspections[12]	$800
Trash and debris removal[13]	$4,400
Vegetation maintenance[14]	$6,800
Total	$46,800

[9] Costs provided by the Pleasant Hills Authority
[10] Additional infrastructure/real estate costs estimated to be 25% of construction cost
[11] Only Schedule C additional infrastructure and real estate costs are estimated in Schedule D
[12] 2 per year, 4 hours per inspection
[13] 4 hours per month, 12 months per year
[14] 8 hours per day, 1 day per month for 6 months.

Table 9 Plan B annual costs based on relocation of Schedule A facilities and a 50-year life at 3-1/8%

Plan B Annual Costs	
Interest & Amortization	$139,200
Inspections and maintenance	$0 [15]
Total	$139,200

Plan A-1, is justified as it is the least cost construction alternative and costs less than relocating the threatened critical facilities, in accordance with ER 1105-2-100, Appendix F-23d (USACE, 2000).

8 Average Annual Benefits

The benefits of the streambank protection plan are based on the most likely action, other than streambank protection, that would be undertaken by the non-Federal entity, the Authority, in the absence of Federal action to protect the endangered facility. The most likely alternative to streambank protection is relocation of the component facilities. The annual benefits for the streambank protection plan, Plan A-1, are equal to the cost of Plan B that would be avoided with implementation of this plan, or $139,200. The annual net benefit is the difference between these benefits and annual cost of Plan A-1, or $92,400.

9 Economic Analysis

In accordance with Engineering Regulation 1105-2-100 (Appendix F, paragraph F-23d), the recommended plan is considered to be justified if it is the least cost of all alternative streambank protection plans and is less than the cost to relocate the threatened facilities. Plan A-1 meets these criteria and is therefore justified.

10 Recommended Plan

The recommended plan is the Streambank Protection Plan (Plan A-1) consisting of a concrete block wall in location 1 (295 FT) and location 2 (96 FT), rip rap in Section 1 (140 FT) and grout filled bags in location 2 (144 FT). This plan is the least costly of the plans and less costly than relocation as is required for justification. This plan would effectively correct the erosion condition that is threatening the structural integrity of the plant, without causing significant environmental or social impacts.

[15] The annual costs for the operation and maintenance of Plan B are assumed to be the same as current costs so the net difference is $0.

Table 10 Total implementation and project feasibility-level costs of the least-cost-alterative

Item	First Cost, Rounded
Lands and Damages	$12,500
Construction Cost	$604,000
Planning, Engineering, and Design	$161,000
Construction Management	$60,000
Project First Cost	**$838,000**
Feasibility Studies	$150,000
Total Cost	**$988,000**

11 Environmental & Cultural Documentation and Coordination

Pursuant to the U.S. Fish & Wildlife Coordination Act of 1958, this project was initiated in accordance with the standing Programmatic Environmental Assessment (September 2006 through September 2016), in coordination with required resource agencies and publically circulated for 30 days. The specific project activities proposed are covered within the Programmatic Environmental Assessment, within which impacts to environmental resources were evaluated. Special Conditions are identified in Section II of the Environmental Assessment, and the current project will comply with those Special Conditions. This project will not result in significant environmental impacts, as summarized in the FONSI (2006) and supported by the Programmatic Environmental Assessment, located in Appendix L.

In order to satisfy Section 7 of the Endangered Species Act, a Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review was conducted again, more recently (August 31, 2015), which indicated no known Federal or state listed species or habitat in the proposed project area. Agencies included in this review included the PA Game Commission, the PA Department of Conservation & Natural Resources, the PA Fish & Boat Commission, and the U.S. Fish & Wildlife Service. Within Pennsylvania, the PNDI review also serves as notification of project initiation, in accordance with the special conditions contained within the Environmental Assessment; thus, no additional coordination is currently necessary for *this phase of study*.*

Section 106, National Historic Preservation Act (NHPA) compliance was also completed and although there is a high probability that prehistoric and historic archaeological resources are located in the project area, the PA State Historic Preservation Office (SHPO) indicated that the project should have no effect on such resources.

Again, all environmental documentation, including a signed & dated PNDI certification that lists all agencies coordinated with, and a signed & dated Memorandum for Record that specifies all environmental compliance actions for this specific project, is provided in Appendix L.

*While this report was prepared under the standing Programmatic Environmental Assessment, signed on 14 September 2006 and considered valid until 14 September 2016, it is acknowledged that construction might not occur in 2016. In this case, as necessary and legally mandated, the District will re-assess the project under the next Programmatic Environmental Assessment that the District is currently in the process of renewing for future Section 14 projects. For the record, however, it is not believed that there will be substantive, if any, changes, e.g., Sec.106 NHPA.

12 Real Estate Requirements

The Authority will serve as the local project sponsor for this project. A real estate plan for the project is included as .

Authority officials originally signed a satisfactory Letter of Intent on September 26, 2007 which permitted initiation of this study. This Letter of Intent was updated by letter dated March 26, 2014. The Authority is a legally constituted public body with full authority and legal capability to enter into a contract with the Federal Government to construct the proposed project, furnish the prescribed items of local cooperation and if necessary, pay damages. The Authority meets the requirements of Section 221 of the Flood Control Act of 1970, 42 USC § 1962-5b.

All of the required real estate interests are owned by the sponsor, the Authority, as part of the facility to be protected. Therefore, the project sponsor is not entitled to a credit towards its share of the project costs for the value of the required real estate interests it owns as part of the facility to be protected. However, the Authority is entitled to receive credit for all of its reasonable allocable and allowable administrative costs associated with the plan.

Administrative costs for this project are estimated at $10,000. This estimate includes costs for such creditable items as surveys, maps, appraisals, negotiations, title fees, attorney fees, and management costs.

13 Apportionment of Costs for the Recommended Plan

As shown in , the estimated project cost for the recommended plan was apportioned to the Federal and non-Federal interests in accordance with the Water Resources Development Act of 1986, as amended (PL-99-662). indicates that the Authority's share of the project cost is estimated at $329,000 and the Federal share would be $689,000, including feasibility study costs.

Federal implementation of the recommended plan would be subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, including but not limited to:

a. Federal Cost Limit: $1.5 million (in accordance with the Water Resources Development Act of 2007)
b. Cost Share: 65% Federal/35% non-Federal for design and implementation after signing the Project Partnership Agreement (PPA) and up to the per project limit of $1.5 million; sponsor will provide all Lands, Easements, Rights-of-Way, Relocation and Disposal Areas (LERRDs) and a minimum of 5% cash. Sponsor work-in-kind can be credited only after the PPA is signed and cannot trigger reimbursement.
c. No recreation features are permitted.
d. Operation, Maintenance, Repair, Replacement and Rehabilitation Costs are 100% non-Federal.

14 Local Participation

The Authority expressed their ability to meet the general obligations of feasibility study and the design and construction phases of this project by letter, most recently submitted March 26, 2014 () The Feasibility Cost Share Agreement was executed by the Authority and the District on June 24, 2015. The District sent the Authority the Model Project Partnership Agreement for Streambank Protection Projects on September 11, 2015 and a draft version of this report was sent electronically on October 9, 2015 during District Quality Control Review. The Authority confirmed their agreement with the tentatively recommended plan (A-1) and their intention to proceed into the Design and Implementation Phase by letter dated December 16, 2015 (Appendix R).

15 References

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