COLUMBIA COUNTY

West End Flood Mitigation Study

FINAL REPORT

June 2022

VOLUME I

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BL Project #: 2021-5134-001

Executive Summary

Columbia County West End Flood Mitigation Study

Historic flooding in the municipalities of Montour Township, Hemlock Township and the Town of Bloomsburg located along the confluence of the Susquehanna River and Fishing Creek in Columbia County, Pennsylvania, has led to significant and repetitive flood losses at an increased frequency in these communities. Repetitive flooding in this area known as the "West End of Bloomsburg" has created a hardship on residents, businesses, the municipalities, and community at large. While progress has been made with the completion of over two (2) miles of earthen levees and flood wall systems in the Town of Bloomsburg, the West End of Bloomsburg and adjacent communities remain in need of flood mitigation strategies to reduce risk to loss of life and property damage, as well as build community resiliency to flooding events.

Realizing the need to address the Fishing Creek watershed with comprehensive flood mitigation strategies, Columbia County sought to develop flood mitigation strategies for the West End of Town of Bloomsburg and the surrounding areas. This flood mitigation study was completed to enable the County to capitalize on resources at the federal, state and county level to assist the County and local municipalities with implementation of impactful flood mitigation strategies proposed by the study.

The West End study area includes limited sections of three (3) municipalities that are located within the Floodplains of Fishing Creek including the Town of Bloomsburg, Hemlock Township, and Montour Township. This study outlines the various flood mitigation projects considered for each municipality that would be impactful, economically justified, technically feasible, and environmentally sound for securing funding for flood mitigation in all three municipalities.

The history of Susquehanna River and Fishing Creek flooding was reviewed to understand the flooding issues in the three communities. A detailed hydrologic and hydraulic (H&H) analysis of the Susquehanna River and Fishing Creek was then performed to assess flooding impacts in each community. Damages were calculated and utilized to review multiple non-structural and structural alternatives to d determine impacts to the communities in the study area. High water marks from historical flood events on Fishing Creek in 2006, 2011, and 2018 were relied upon when calibrating the Fishing Creek hydraulic model.

For the structural flood mitigation alternatives (levee/floodwall systems) which were found to create induced flooding, additional hydraulic modeling was performed to evaluate actions that could be taken to reduce the induced flooding. The hydraulic analysis was completed with a one-dimensional (1D) model which has a degree of uncertainty when determining the extent of induced flooding and evaluating mitigating alternatives. Additional analysis and coordination with state and federal agencies, specifically the Federal Emergency Management Agency (FEMA), United States Army Corps of Engineers (USACE), and Pennsylvania Department of Environmental Protection (PADEP), not included as part of this study, will be required if Columbia County desires to pursue a levee/floodwall system around the West End of Bloomsburg and the Fairgrounds. These actions would be necessary to resolve uncertainties inherent to one-dimensional modeling and construction of structures, such as a levee/floodwall system, within a regulated floodway.

After extensive outreach with stakeholders in each community, structural and non-structural flood mitigation alternatives were identified with the goal of minimizing risk to loss of life, property damages, and economic losses, while increasing flood resiliency of the communities in the study area. Non-structural mitigation options evaluated within each community included acquisition/demolitions, structure elevations, structure mitigation-reconstruction, and wet and dry flood proofing of commercial properties. Structural mitigation alternatives considered included levee/floodwall systems, bridge replacements, and modifications to the channel and floodplain of Fishing Creek. Opinions of costs were developed for the most impactful and technically feasible alternatives. Benefit-Cost Analyses were completed for both structural and non-structural alternatives.

Conclusions:

Findings from this study indicate that nonstructural flood mitigation alternatives are viable alternatives for Montour Township and Hemlock Township. Structural mitigation is not feasible for these municipalities since the low density of structures results in a low benefit to cost ratio. This is consistent with the current and projected goals of each community to pursue additional acquisitions of flood prone properties for removal from the floodplain.

Both types of mitigation are feasible for the Town of Bloomsburg. The nonstructural measures would include approximately 290 structures eligible for acquisition and demolition. This type of program is voluntary and the level of participation would be uncertain. The large floodway in the West End restricts the options for about 106 of the West End structures to only acquisition and demolition. Elevations or demolition/reconstruction of structures is not permitted in floodways.

The structural alternative, to construct a levee/floodwall system around the West End of Bloomsburg, is cost effective utilizing the FEMA Benefit-Cost Analysis (BCA) methodology. Cost effectiveness is defined by FEMA as having a Benefit-Cost Ratio (BCR) greater than one (1). The construction of a benched floodplain along a segment of Fishing Creek in Hemlock Township offers the most promising flood mitigation benefits when combined with a levee/floodwall system around the West End of Bloomsburg. Total project cost is approximately $29,000,000.

With completion of the West End Flood Mitigation Study, funding and implementation of the flood mitigation projects identified is the priority of Columbia County. Funding opportunities through the FEMA Building Resilient Infrastructure and Communities (BRIC) program and the FEMA Flood Mitigation Assistance (FMA) program as well as Pennsylvania state funding sources should be explored as potential funding sources for identified projects. Passage of the 2021 Infrastructure Investment and Jobs Act allocated several billion dollars toward the aforementioned FEMA programs.

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SECTION 1 – INTRODUCTION

1.1 General

The communities of Hemlock Township, Montour Township, and the West End of the Town of Bloomsburg experience frequent and devastating flooding from Fishing Creek and the Susquehanna River. Although the Susquehanna River has been the primary cause of record flood levels in the region, Fishing Creek is the flooding source of most concern to residents of these areas. The fast rising creek provides less warning than the Susquehanna River and brings with flooding fierce velocities, which in the past have pushed homes from their foundations. Residents experienced these impacts during Tropical Storm Lee in 2011 when Fishing Creek rushed through these communities and subsided only to have the Susquehanna River rise to records levels a few days later. Most recently, residents again experienced flooding from Fishing Creek in 2018 with several other storms threatening to swell the creek to flood stage and creating undue anxiety for residents.

Previously completed flood mitigation projects in Columbia County include the Phase 1 Flood Mitigation Project which protects the Autoneum facility, a large regional employer, and the Phase 2 Flood Mitigation Project providing protection to the Bloomsburg High School and many residences in the area. With the completion of these projects, Columbia County desires to continue their flood mitigation efforts in other areas of the county impacted by frequent flooding such as the West End of the Town of Bloomsburg, and neighboring communities Hemlock Township and Montour Township.

In addition to homes, small business, and commercial establishments in this region of the County, the study area also includes the Bloomsburg Fairgrounds where several high profile events and festivals take place each year producing significant benefits to the local economy. As a direct result of the severe flooding from Tropical Storm Lee and other storms, many businesses were forced to cease operations until floodwaters receded and damage from the storm was repaired. Therefore, in addition to the direct flood damage to private property, the economic impacts cause additional hardship to the residents of the area.

1.2 Study Area

The primary focus of the study was the communities located along both banks of Fishing Creek from the Railroad Street Bridge to Fishing Creek's confluence with the Susquehanna River (see Figure 1.1 below). The Townships of Hemlock and Montour are situated along the north bank of Fishing Creek whereas the West End of the Town of Bloomsburg and the Fairgrounds are located on the south bank of the creek. The remainder of the study area south of the creek is primarily comprised of open fields which serve as parking for Fairground events. Maps of the study area are provided in Appendices A & F of this report.

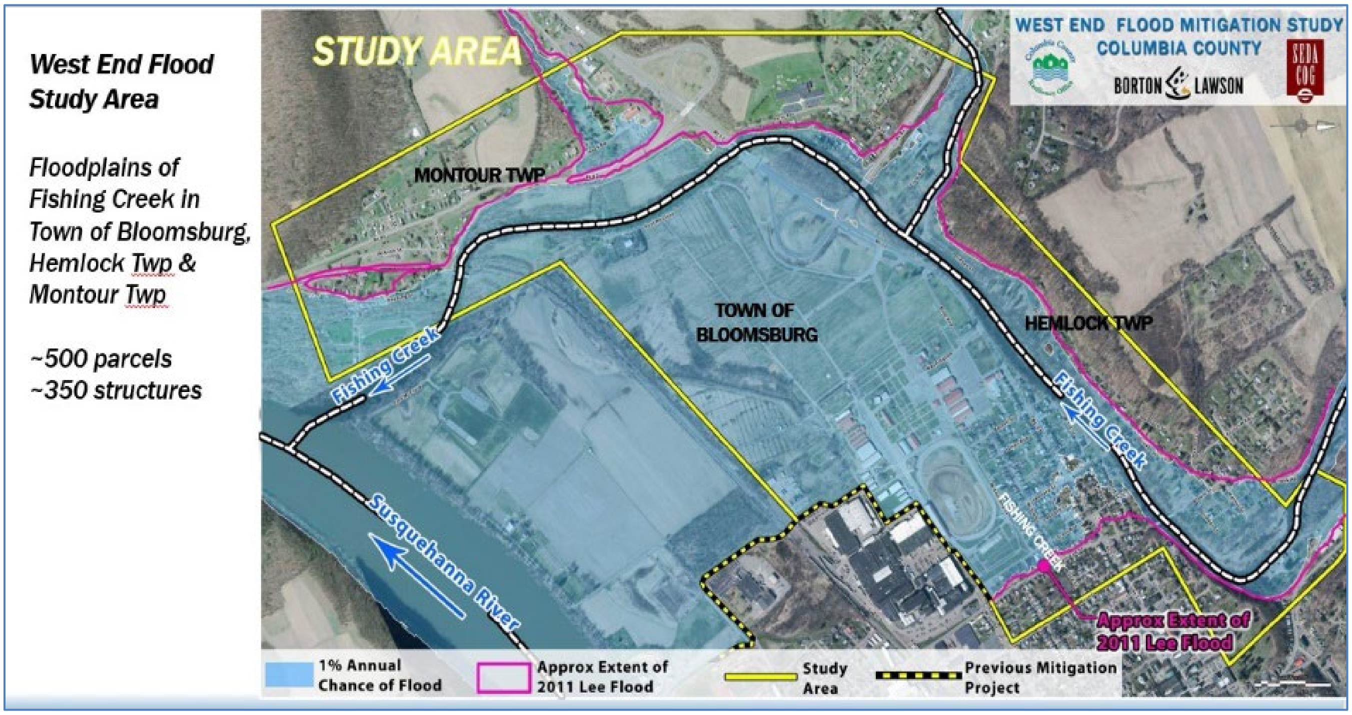

Figure 1.1 Study Area Map

1.3 Purpose and Goals

The purpose of the study is to formulate plans to mitigate the impact of flooding from the Susquehanna River and Fishing Creek in the West End of Bloomsburg, specifically Montour and Hemlock Townships and the Town of Bloomsburg. The primary water resources problem is recurrent destructive flooding. Flood damages are attributable to overbank and backwater flooding from the Susquehanna River and flooding along Fishing Creek. Past flood events have resulted in extensive damages to structures and their contents and have threatened public safety. In addition, floods have disrupted major transportation systems, requiring closure of roads, railroads, and the municipal airport. As indicated in Figure 1.1, extensive portions of the West End study area are within the 500-year floodplain of the Susquehanna River and Fishing Creek. The 500-year floodplain within the study area that was evaluated includes approximately 500 parcels and approximately 350 structures, primarily residential. The largest number of commercial structures within the study area are located within the Bloomsburg Fairgrounds area.

This study contains proposed flood mitigation actions and projects that if implemented would reduce future flood loss and support sustainable communities. Through this study, the proposals can be elevated to the county, state and regional level. The study and the recommendations in it, if adopted, will make the communities more disaster resilient thereby reducing long-term risks to loss of life and property damage from flooding.

This study is unique in that while it will meet the flood mitigation plan requirements of each municipality, it will also employ a watershed management approach through the related and concurrent Fishing Creek Watershed Study to ensure that final mitigation actions address both local jurisdictional needs and regional multi-jurisdictional needs. Flooding is a hazard that does not recognize political boundaries. To effectively manage the floodplains, mitigation funds need to be administered within politically defined boundaries. As political boundaries seldom coincide with watershed boundaries, this Plan encourages municipalities to consider their watershed and consult with the County and upstream and downstream neighbors when identifying mitigation actions. Local collaboration and partnerships are an effective and necessary means to reducing future flood losses.

There are two types of natural hazard mitigation plans (HMP) recognized by the Federal Emergency Management Agency (FEMA): a Flood Mitigation Plan and an All Hazards Mitigation Plan. As the name suggests, a Flood Mitigation Plan is specific to flooding. For participating municipalities, this Flood Mitigation Plan is an important and significant step towards update of the Columbia County All Hazards Mitigation Plan. It also is a stand-alone document that details regional, county-wide and municipal mitigation actions that when implemented will reduce future flood loss.

The purpose of the Flood Mitigation Plan is to enable participating municipalities to get one step closer to becoming eligible to compete for FEMA funding aimed at flood mitigation. Following a municipal or county-led process to expand this document into the All Hazards Mitigation Plan, municipalities will become eligible for future mitigation funding opportunities through FEMA's Hazard Mitigation Assistance (HMA) Grant Programs. The grant programs include the Flood Mitigation Assistance (FMA) program, the Building Resilient Infrastructure and Communities (BRIC) formally known as Pre-Disaster Mitigation (PDM) program, the Repetitive Flood Claims (RFC) program, the Severe Repetitive Loss (SRL) program and the post disaster Hazard Mitigation Grant Program (HMGP). As a note, an All Hazards Mitigation Plan is not required for the RFC program.

The objectives of this Flood Mitigation Plan are to:

- Increase the coordination and cooperation among intergovernmental entities in carrying out flood mitigation;
- Demonstrate a firm local commitment to flood mitigation;
- Leverage a wide array of funding opportunities to implement actions;
- Comply with federal legislative requirements for local mitigation plans;
- Protect life, safety and property by reducing the potential for future damages and economic losses that result from flooding;
- Safeguard essential public facilities and infrastructure;
- Promote a sustainable regional and local economy;
- Heighten public awareness of flood risk; and
- Support natural resource protection.

In summary, this study identified and determined the best structural and nonstructural project(s) to:

- Provide flood resiliency to reduce long-term risk to loss of life and property damage
- Reduce impacts of increasing insurance premiums
- Minimize flooding impacts on the community
- Identify possible funding sources for flood mitigation projects

The recommendations for nonstructural and structural flood mitigation projects have been developed in accordance with the step by step planning process as follows:

1. Specify water and related land resources problems and opportunities;
2. Inventory and forecast existing conditions;
3. Formulate alternative plans;
4. Evaluate alternative plans;
5. Develop benefit to cost for each alternative
6. Compare alternative plans; and
7. Select the recommended plans for each community.

The basis for selection of the recommended plans in this study is fully documented below. When any proposed flood mitigation measures would increase existing flood levels in neighboring areas, this study has evaluated measures to mitigate or protect neighboring areas from increased flood levels and associated flood damages. More information on increased flood impacts and mitigation recommendations are provided in this report.

1.4 Prior Studies, Reports, Existing Water Projects

The Susquehanna River Basin is subject to frequent and severe flooding. As such, the United States Army Corps of Engineers (USACE) has conducted numerous studies to identify comprehensive solutions to reduce flood damages throughout the basin. Each of the prior studies was reviewed to identify any and all information that could be used in the current feasibility study.

USACE Studies and Reports

The first known USACE report documenting Bloomsburg's flood problems was submitted to Congress in December 1934. A flood control project for Bloomsburg consisting of levees along the Susquehanna River was authorized by the Flood Control Act of 1936. The authorized plan was reevaluated in April 1942 and found to lack economic justification. As a result, the USACE recommended abandonment of the authorized project.

The Bloomsburg area was evaluated again in 1956, 1970 and 1980 as part of Susquehanna River basin studies conducted by the USACE. Flooding from Fishing Creek was not considered in any of the studies mentioned. Additionally, all of the studies reported a lack of economic justification to proceed with construction of a Federal flood damage reduction project at Bloomsburg.

Section 205 Reconnaissance Study Report - Bloomsburg, Pennsylvania Local Flood Protection, December 1983

The Baltimore District conducted a Section 205 reconnaissance study[1] in 1983. Previous USACE studies had found that providing flood protection for the entire town lacked economic justification, and that nearly all of the expected annual damages for the Town were found to occur in the area between Fishing Creek, the Susquehanna River, and Railroad Street. Therefore, the USACE 1983 reconnaissance study focused on providing protection for this more downstream, western end of the Town. The study evaluated three (3) structural alternatives, including two levee and floodwall alternatives that provided 100-year level of protection, and a third alternative that provided 500-year level of protection. None of the three plans evaluated as part of the reconnaissance study were found to be economically feasible, with the highest BCR being 0.6 to 1.

Section 205 Initial Appraisal - Bloomsburg, Pennsylvania, August 1994

By the early 1990s, changes to existing conditions in the study area since the time of the 1983 reconnaissance study prompted the Town of Bloomsburg to request a new USACE study to evaluate flood damage reduction measures. In 1994, the USACE completed an initial appraisal study under the Section 205 Continuing Authorities Program. With anticipated increased benefits and decreased construction costs, conservative preliminary calculations indicated that a BCR would range from 0.7 to 1.1. The expected improvement in the BCR warranted another, more thorough, investigation of a flood control project for the Town.

Based on the 1994 study, the cost for construction of a flood control project for Bloomsburg was estimated to range from $6.5 to $10 million (1994 dollars). In light of the $5 million dollar Federal cost-sharing limit at the time for Section 205 projects, it was anticipated a project could not be pursued through the Section 205 Program. Therefore, the 1994 Initial Appraisal Report stated that further study to determine the feasibility of constructing a Federal flood damage reduction project at Bloomsburg was warranted, but recommended that the reconnaissance study be pursued under the General Investigations (GI) Program, which is not subject to the cost limits of the Section 205 Continuing Authorities Program.

Section 905(b) (WRDA 86) Analysis - Bloomsburg Pennsylvania Flood Protection Reconnaissance Study, May 1998

A General Investigations reconnaissance study for Bloomsburg, Pennsylvania, flood damage reduction was authorized by a resolution adopted by the Committee on Transportation and Infrastructure of the United States House of Representatives on 14 September 1995. Federal funds were provided in 1998 for the USACE to undertake the reconnaissance phase evaluation.

The objectives of the reconnaissance phase were to:

1. determine if the water resource(s) problems warrant Federal participation in feasibility studies,
2. define the Federal interest,
3. complete a 905(b) Analysis (refers to Section 905(b) of the Water Resources Development Act of 1986) or a reconnaissance report,
4. prepare a project management plan (PMP) that outlines tasks and responsibilities for the feasibility phase of study,
5. assess the level of interest and support from non-Federal entities, and

6. negotiate and execute a feasibility cost sharing agreement (FCSA).

Achievement of the six objectives determines whether or not planning to develop a project should proceed to the more detailed feasibility stage. The reconnaissance phase is 100-percent Federally funded and the target for completion is 6-12 months from initial obligation of reconnaissance funds to a signed FCSA.

Past projects were examined with an emphasis on flood protection along the Susquehanna River. The 905(b) analysis evaluated structural alternatives previously considered in past reports, with nonstructural measures evaluated at a lower level of protection. Existing USACE dams that contribute to the reduction of Susquehanna River flooding at Bloomsburg were taken into consideration during this reconnaissance level evaluation. Flood forecast and warning systems for the Susquehanna River just upstream of Bloomsburg were already under consideration as part of the Wyoming Valley Levee Raising Project, so were not specifically examined as part of the Bloomsburg 905(b) Analysis. Further analysis of potential flood forecast and warning system modifications or improvements will be completed during the next phase of the project, preconstruction engineering and design phase (PED).

The 905(b) reconnaissance study determined that there was a Federal interest in proceeding to the feasibility phase of study for Bloomsburg, based on the strong likelihood that flood damage reduction measures for the Town would be economically justified. Following the successful Section 905(b) analysis, the Town of Bloomsburg and the USACE completed negotiations on the feasibility phase project study plan (PSP) in March 1999. The FCSA was executed in June 1999 and the Bloomsburg Flood Damage Reduction Feasibility Study was initiated in August 1999.

The FR/EIS investigated the feasibility of Federal action to address flooding problems and flood damage reduction opportunities for the Town of Bloomsburg. It was performed consistent with Federal water resources policies and practices, including *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G, 1983), the USACE *Planning Guidance Notebook* (ER-1105-2-100, 22 April 2000), and *Procedures for Implementing NEPA* (ER 200-2-2, 4 March 1988). Throughout the investigation, the USACE worked closely with the non-Federal sponsor, the Town of Bloomsburg, as well as the Pennsylvania Department of Environmental Protection (PADEP), to (1) describe the range of potential Federal participation in flood damage reduction projects and (2) explain the roles and responsibilities of the USACE and the non-Federal partner in project planning and implementation.

April 2005 – The Bloomsburg, Pennsylvania, Flood Damage Reduction Feasibility Study was conducted under the USACE General Investigations Program. The study was authorized by a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives, adopted 14 September 1995. The resolution states:

> *Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that, the Secretary of the Army review the report of the Chief of Engineers on the Susquehanna River, New York, Pennsylvania and Maryland, published as House Document No. 702, 77th Congress, to determine whether flood damage reduction measures should be implemented in the town of Bloomsburg, Pennsylvania…*

Under this study authorization, a reconnaissance report was completed in May 1998. The reconnaissance study concluded that there is Federal interest in addressing flooding problems in the Town of Bloomsburg. Based on preliminary analysis, the reconnaissance report identified at least one project that would be in the Federal interest. On the basis of these findings, the USACE and the Town of Bloomsburg, Pennsylvania entered into an agreement to perform a cost-shared feasibility study for a flood damage reduction project.

The purpose of the Bloomsburg Flood Damage Reduction Feasibility Study was to evaluate the feasibility of Federal participation in implementing solutions to problems and opportunities of flood damage reduction along the Susquehanna River and Fishing Creek. More specifically, the study:

- identified flooding problems associated with periodic flooding from storms along the Susquehanna River and Fishing Creek, particularly in the Town of Bloomsburg;
- evaluated the technical, economic, environmental, and institutional feasibility of Federal participation in the implementation of a flood damage reduction project; and
- determined if there is local support for implementation of the recommended plan.

As part of the plan formulation process, reconnaissance phase plans were re-evaluated, and other potential flood damage reduction measures were formulated in order to evaluate and select the plan that would maximize net contributions to National Economic Development (NED).

The recommended NED plan was developed to a level of engineering, economic, and environmental detail sufficient to proceed to the preconstruction engineering and design (PED) phase, pending recommendation by the Baltimore District, support by USACE Headquarters and the Assistant Secretary of the Army (Civil Works), and authorization of project construction by Congress. The project was dropped from further consideration due to funding issues related to more stringent federal criteria resulting from the Hurrican Katrina disaster in the southern U.S.

Other Federal Agency Studies

The Federal Emergency Management Agency's Federal Insurance Administration (FIA) completed a flood insurance study of Bloomsburg in 1979 in order to convert Bloomsburg to the regular program of the National Flood Insurance Program (NFIP).

Local Studies

In 1979, the Fernville-Scottown Survival Committee, a citizen’s flood control group in Bloomsburg, hired a consulting engineer to develop a flood control plan for the Bloomsburg side of Fishing Creek. The consultant recommended construction of an open-ended levee and floodwall along the Bloomsburg side of Fishing Creek and the removal of the Route 44 bridge in order to provide a 100-year level of protection. In 1980, the citizens group asked the same consultant to develop a plan to provide additional flood protection for the Town of Bloomsburg. The consultant developed a combination road and levee plan to provide 100-year protection for additional areas of the Town, primarily on the west side. This plan was designed to tie into the USACE previously-proposed open-ended levee and floodwall plan for the Bloomsburg side of Fishing Creek in order to provide a continuous system of protection. Projects described in both of these local studies were found to lack economic justification in the USACE 1983 Reconnaissance Study.

1.5 Existing Upstream Water Projects

Nine upstream USACE dams detain floodwaters from the Susquehanna River:

1.5.1 Almond Dam, located about 2 miles northwest of Hornell, New York, on Canacadea Creek;

1.5.2 Arkport Dam, located in Steuben County, New York, on the Canisteo River about 1 mile west of the village of Arkport and 5 miles upstream of Hornell, New York;

1.5.3 Aylesworth Creek Lake, located on Aylesworth Creek in Lackawanna County, Pennsylvania, about 10 miles upstream from Scranton, Pennsylvania.

1.5.4 Cowanesque Lake, located on the Cowanesque River approximately 2 miles above the confluence with the Tioga River at Lawrenceville, Pennsylvania.

1.5.4.1 East Sidney Lake, located on Ouleout Creek in Delaware County, New York;

1.5.5 Stillwater Reservoir, located about 9 miles north of Carbondale, Pennsylvania, on the Lackawanna River;

1.5.6 Tioga-Hammond Dams (two structures); located about 20 miles southwest of Elmira, New York, on the Tioga River and Crooked Creek; and

1.5.7 Whitney Point Dam, located on the Otselic River in Broome County, New York.

In addition to the upstream dams, thirty-two local flood protection projects have been constructed (or are currently being constructed) by the USACE along the North Branch of the Susquehanna River basin in New York and Pennsylvania.

The Wyoming Valley lies along the Susquehanna River in Luzerne and Lackawanna Counties in northeastern Pennsylvania. From 1891 to 2003, the Wyoming Valley experienced 57 significant floods along the Susquehanna River. In response to recurrent flood damages, Federally authorized flood damage reduction projects were constructed in the Wyoming Valley during the late 1930s, 1940s, and 1950s to protect against the flood of record up to that time (March 1936). The Federal flood damage reduction projects significantly reduced flood damages along this reach of the Susquehanna River.

In June 1972, Tropical Storm Agnes struck and established a new flood of record for the Susquehanna River basin. During this flood, the Susquehanna River overtopped the levee system in the Wyoming Valley, causing severe damage in the City of Wilkes-Barre and in other communities along the river.

Following Tropical Storm Agnes, the U.S. Congress authorized a project to increase the level of flood protection provided by the existing Wyoming Valley levee system, with limited additional project upgrades. The purpose of the Wyoming Valley Levee Raising Project is to provide protection against a recurrence of the storm of record Tropical Storm Agnes. The project consisted of raising existing levees and floodwalls between three and five feet. The project included a mitigation plan for 32 identified communities (one of which is Bloomsburg) subject to adverse flood impacts related to the Wyoming Valley Levee Raising Project. The levee and floodwall raising was completed in January 2003, but construction of related project elements is ongoing.

1.6 Columbia County Flood Risk Management System

The Columbia County Flood Risk Management system is a local flood risk management system established by Columbia County and the Town of Bloomsburg to mitigate the impacts of flooding. The project is owned by the County and operated, and maintained by the Columbia County Water Mitigation Authority.

The project was constructed in two phases. The first, completed in 2016, extends from Railroad and Fifth Street to West Eleventh Street about 500 feet west of Barton Street. The second phase, completed in December of 2020, extends from West Eleventh Street where the first project ties out to high ground, to Twelfth and Center Street, with a separate length of backwater levee 100 feet east of Catherine Street between Ninth and Tenth Streets.

Columbia County created the Columbia County Water Mitigation Authority by resolution to operate and maintain the entire Columbia County Flood Risk Management System. This action guaranteed all requirements shall be complied with for the constructed project, and specifically to maintain and operate or cause to be operated, without expense to the United States or State of Pennsylvania, all completed flood mitigation structures in accordance with the Code of Federal Regulation, 33 CFR Ch. II, Part 208.

Location

The Columbia County Flood Risk Management System is located approximately 250 feet north of the right bank of the Susquehanna River extending from 4.000 feet upstream of the confluence of Fishing creek with the Susquehanna River to 1,000 downstream of State Route 487 in the Town of Bloomsburg, Columbia County, Pennsylvania.

Brief Description

The project provides a system of levees and appurtenant works consisting of the following features:

- Approximately 12,000 feet of earthen and mechanically stabilized earth (MSE) levees,
- 2,300 feet of H-pile flood wall,
- six (6) stormwater and sanitary pump stations,
- fifteen (15) roadway and railroad closure structures,
- ten (10) drainage structures,
- and overhead and underground electrical transmission lines.

Construction History

Local authorities, with the assistance of Federal and State legislative officials, obtained grant funding, in addition to private funding, to engage an engineering consultant in 2014 to design a mile long flood risk mitigation project for two major community employers, Autoneum and Windsor Foods.

Autoneum, a private company, contributed $2,000,000 toward the construction cost. The construction of the system was completed in 2016.

Additional funding to extend the system upstream was secured to encompass the Bloomsburg Area School District campus, then extend to Catherine Street at Ninth Street to prevent backwater from entering the protected area. The school district was a major contributor to the cost of the extension project. The extended system of levees and floodwalls reduces flood risks for many residential and commercial structures in the Port Noble section of the Town. This system extension was completed in December of 2020, resulting in a two-mile long overall system constructed over a six year period.

The constructed Columbia County Flood Risk Management System has three distinct but connected segments designed to provide flood risk mitigation for the proposed update to the effective FEMA base flood elevation (BFE) to be adopted during or after the year 2021. The results of the USACE and FEMA study in 2013 after the Lee Flood (Year 2011) formed the basis for the proposed update of the BFE's utilized for design. The risk management levels provided for each system are described below.

System 1 - Constructed in 2016, System 1, shown on Figure 1.2, extends from a point 100 feet north of the intersection of Railroad and Fifth Street in a westerly direction. They system then continues along Sixth Street to the rear of the Autoneum manufacturing facility, then in a southerly direction crossing the SEDA-COG Railroad, south to West Eleventh Street, and east to high ground 400 feet west of Barton Street.

The system was designed with a top of system of 484.00 which equates to a river stage of 34.25 feet at the Bloomsburg gauge. The maximum flood of record, Tropical Storm Lee, occurred in 2011 with a river stage of 32.75 feet or Elevation 482.50 at the project location, which is about 1.5' lower than the top of system. FEMA, as of 2021, expects to update the BFE to a river stage of approximately 30.80 feet. This would equate to a freeboard of approximately 3.5 feet for System 1.

System 2 - Constructed in 2020, System 2, shown in Figure 1.3, extends from high ground approximately 300 feet north of West Eleventh Street and 400 feet west of Barton Street, then in a southerly direction. The system then continues east around the campus of the Bloomsburg Area School District to Railroad Street, then east to a tie out to high ground at the intersection of Twelfth and Center Street.

The top of system was constructed to an elevation of 485.00 at its western tie out to high ground where System 1 ends. The increase of one foot versus system 1 provides an increase in the freeboard versus System 1. System 2 features, such as extensive use of full earth levees, permitted higher levels of freeboard while meeting the design standards for the increased heights of system features.

System 3 - (Catherine Street) – System 3 shown in Figure 1.3 was constructed in 2020 under the same contract along a line 100 feet east of Catherine Street, starting 400 feet north of Ninth Street extending south, crossing Ninth Street and then 300 feet south to high ground at Elevation 486.00 approximately 100 feet south of Tenth Street. The updated BFE, 481.30 at this location results in a freeboard of approximately 4.7 feet. This system provides flood mitigation in a backwater area of the Susquehanna River. The system is 1300 feet from the right bank of the river. If a flood management project in the future extended System 2 upstream to a tie-out east of State Route 487, this backwater system would no longer be required.

In addition to the constructed systems, a flood forecasting and warning system serves to further reduce flood damage and loss of life in the Bloomsburg area. It was developed by the Susquehanna River Basin Commission (SRBC) in coordination with the National Weather Service and was deployed in 1980. The system has been continuously updated and enhanced to improve the advanced notice required for emergency operation of the Columbia County Flood Risk Mitigation System.

Local Cooperation

Local cooperation for the Columbia County Flood Risk Management System is not governed by the authorization laws as enacted by Congress since it is a local system funded by non - federal flood control sources, however, the County established a Water Mitigation Authority to operate and maintain the system all in accordance with the federal regulations for flood risk management projects.

Real Estate

System 1 - Autoneum, on behalf of Columbia County, acquired all necessary interests in the real estate and right-of-way required for System 1 of the project including 29-year easement leases for the levee system rights-of-way. The project also required the acquisition of real estate to accommodate wetland mitigation including 15-foot-wide access easements on the landside and flood side of the walls and levees.

Systems 2 & 3 -The Town of Bloomsburg and Bloomsburg Area School District granted or acquired all necessary interests in the real estate and right-of-way required for System 2 & 3 of the project including perpetual easements for the levee system rights-of-way.

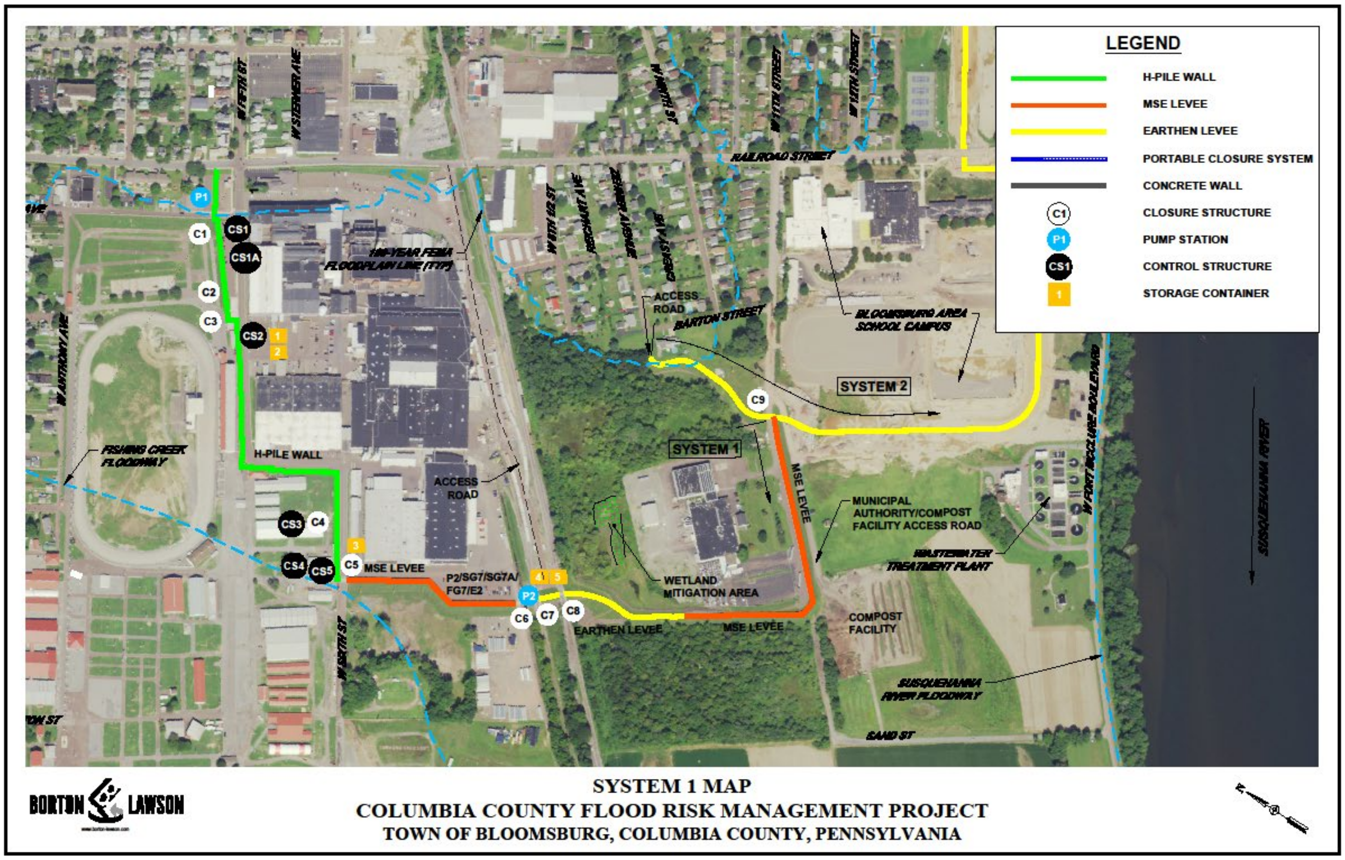

Figure 1.2 –System 1, Location Map

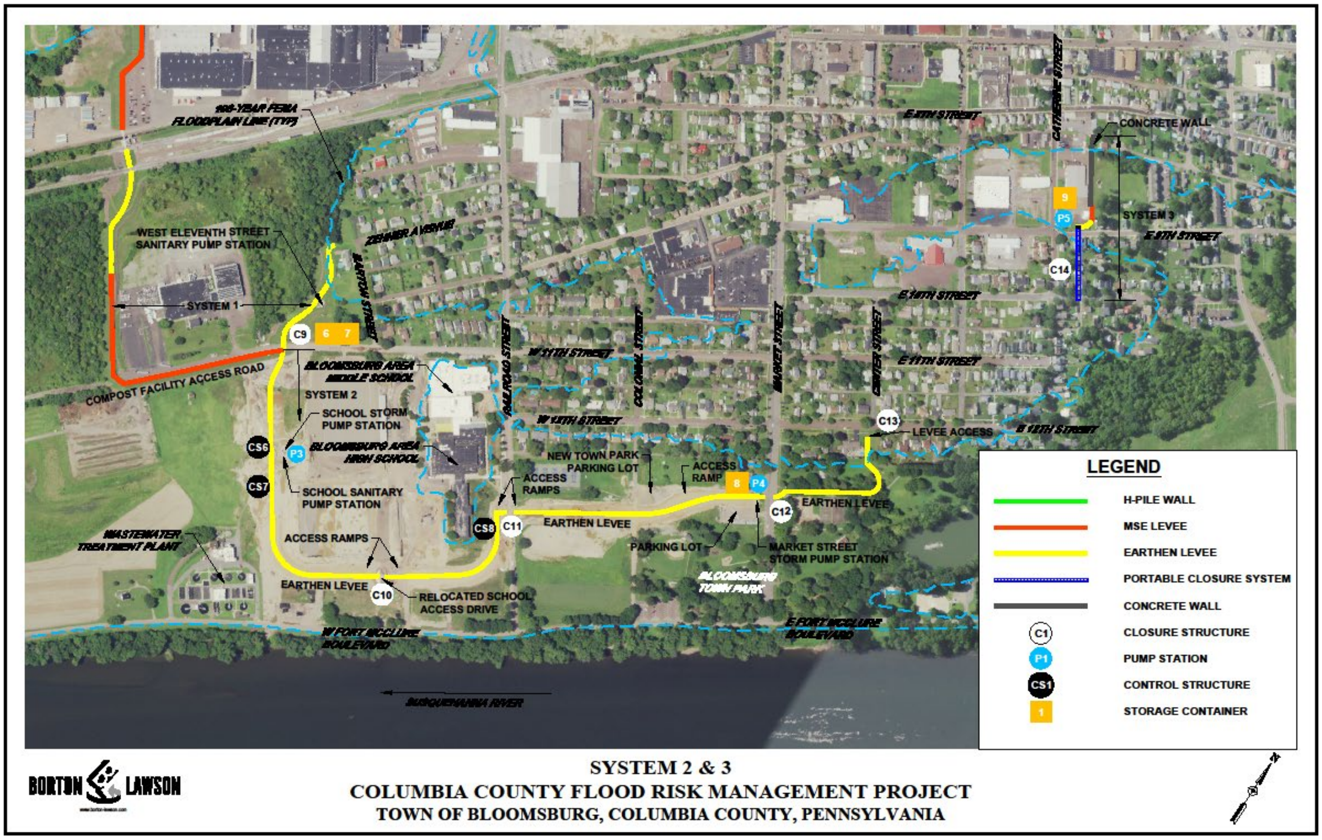

Figure 1.3 –Systems 2 and 3, Location Map

1.7 Scope of Study

The scope of this study addressed the following items:

- Inventory existing conditions;
- Perform building elevation summary;
- Gather community input on possible solutions;
- Assess flood reduction opportunities from upstream mitigation options identified in the separate Fishing Creek Watershed Study;
- Formulate alternatives for flood mitigation;
- Suggest funding alternatives.

The detailed scope as provided in the request for proposals for the study is further outlined below.

Detailed Scope:

- Feasibility of the construction of a potential flood control system,
- Hydraulic and hydrology assessment,
- Permits required,
- Project costs of identified mitigation projects,
- Documentation of needed easements,
- Surveying, mapping, and other plans as necessary to complete the mitigation study.

1. Gather and evaluate all existing data available from the County of Columbia, municipalities, industries, and others, including topographical data, hydrology, hydraulics, geotechnical, etc.

2. Conduct necessary survey(s) and fill any survey data gaps, establish the need of preliminary right-of-way requirements, including temporary and permanent easements and deed restrictions and delineate the prospective rights-of-way , and prepare conceptual designs for flood protection.

3. Perform Technical studies. Any biological assessment, wetland delineation, subsurface geotechnical investigation, and soil testing for hazardous materials were previously identified through the USACE study of 2005 and the need to perform additional work for these issues was not included in the scope.

4. Mitigation strategies were to include riparian buffers, wetland and floodplain restoration, flood control structures, buyouts, elevations, and the outcomes realized from these types of strategies, and land use/recreational opportunities in or near the floodway that is in compliance with local, state and federal floodplain regulations.

5. Feasibility of constructing a flood control system and/or other flood mitigation actions for the West End of Bloomsburg.

6. A detailed geomorphic, hydraulic, and hydrology assessment, identifying the potential impacts to upstream and downstream areas outside of the study area.

7. Identify areas prone to flooding (historic and predicted). Assess vulnerabilities under a range of flooding scenarios.

8. Recommend mitigation solutions to reduce or eliminate impacts or risks to the upstream and/or downstream areas impacted by proposed mitigation actions.

9. Identify other mitigation actions that will decrease flooding in the area, thereby lowering the risk to life and property. Show how the mitigation actions can work as a standalone project or as a larger project or with a combination of activities.

10. Estimate all costs and the benefits of each suggested design or solution. Detailed BCA for mitigation actions to enabling the governing body to make an informed decision when ranking potential projects based upon the return of investment of all potential mitigation strategies.

11. Listing of permits required for each action identified mitigation action.

12. Participate in public outreach by attending public participation meetings and presentations.

13. Coordinate and participate in community meetings required to complete this project.

    - An opening kickoff meeting with key stakeholders, which could include local and county officials, community groups, watershed groups, businesses, and landowners,

    - A project mid-way public meeting,

    - A final public meeting to deliver findings.

14. Technical reports

    - Final report to summarize the methods, community engagement, field work, findings, and suggested solutions. Includes an itemized list of potential projects identified as a result of the study, potential funding sources and an estimated timeline of completion and return on investment. The report would include electronic copies of any spatial GIS data.

1.8 Participating Jurisdictions

The West End study area included parts of Montour Township, Hemlock Township, and the Town of Bloomsburg in Columbia County, Pennsylvania. As such, the three communities and their businesses and residents were considered stakeholders in the study.

1.9 Report Organization

The main report summarizes the results of the study. Technical appendices, which present details of technical investigations conducted during the study, public meeting presentations, and all other relevant data are provided in a separate volume.

SECTION 2.0 - DESCRIPTION OF THE STUDY AREA / BASELINE CONDITIONS

2.1 LOCATION / DESCRIPTION OF THE STUDY AREA

Bloomsburg is located in the north central portion of the Commonwealth of Pennsylvania approximately 40 miles west of Scranton and 90 miles northwest of Harrisburg, Pennsylvania. The study area is in the Upper Susquehanna Basin along the North Branch of the Susquehanna River, approximately 8 miles above its confluence with the West Branch at Sunbury.

The primary focus of the study was the communities located along both banks of Fishing Creek from the Railroad Street Bridge to Fishing Creek's confluence with the Susquehanna River. The Townships of Hemlock and Montour are situated along the north bank of Fishing Creek whereas the West End of the Town of Bloomsburg and the Fairgrounds are located on the south bank of the creek. The remainder of the study area south of the creek is primarily comprised of open fields which serve as parking for Fairground events. Figure 2.1 below shows the study area.

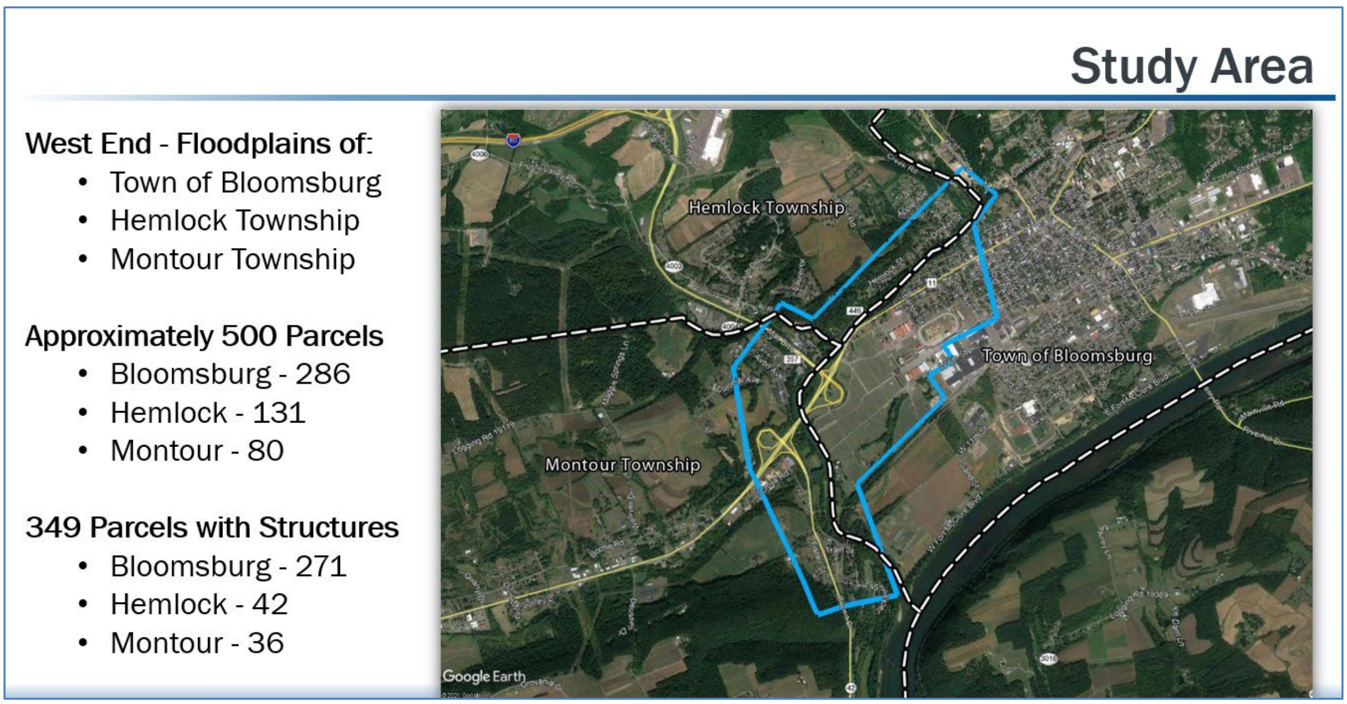

Figure 2.1 Study Area Location Map

Fishing Creek flows into the Susquehanna River and is generally aligned north to south downstream (south) of SR 0011 (Main Street). Upstream (north) of SR 0011 Fishing Creek bends to the east, flowing parallel to SR 0011, north of the roadway. Upstream of the Railroad Street Bridge, Fishing Creek turns back to the north. Given the proximity of the site to the Susquehanna River and Fishing Creek, the West End is subject to extensive flooding from the river and the creek.

The preliminary (2022) FEMA 100-Year Floodplain within the study area is primarily the backwater from the Susquehanna River; conversely, the 100-Year FEMA regulatory floodway in the study area is primarily due to overbank conveyance of Fishing Creek. The Fishing Creek floodway generally parallels the main channel of the creek but is substantially wider on the south side of the creek. This is because Fishing Creek tends to overtop its banks in the residential area of the West End and flows across Main Street into the open fields owned by the Fairgrounds. This area is low and flat allowing the floodway to spread out considerably on its path to the Susquehanna River.

Past flooding events have impacted property values and the density of housing units and commercial establishments. The flooding of the Storm Lee event in 2011 (Record Flood) and the Fishing Creek flood of 2018 prompted local and state legislative leaders to again request a study to address the repeated flooding issues with flood mitigation proposals.

On the north side of Fishing Creek, Montour and Hemlock Township have conducted buyout projects since the 2011 flooding, thereby mitigating flooding impact for those parcels.

With so many changes in the landscape of the West End since 2011, 2021 aerial mapping was obtained to ensure accuracy of mapping for this study,

2.2 CENSUS DATA

The study area is located in two census tracts; Montour and Hemlock Township are located in Census Tract 503 and the West End of Bloomsburg is located in Census Tract 512.

The two areas were evaluated using two techniques. The first is the FEMA Resilience Analysis and Planning Tool. The tool has 20 Community Resilience Indicators identified at the County level and the census tract level has 12 of the indicators. The indicators are show in the chart. Results for the two census tracts and the county are shown below.

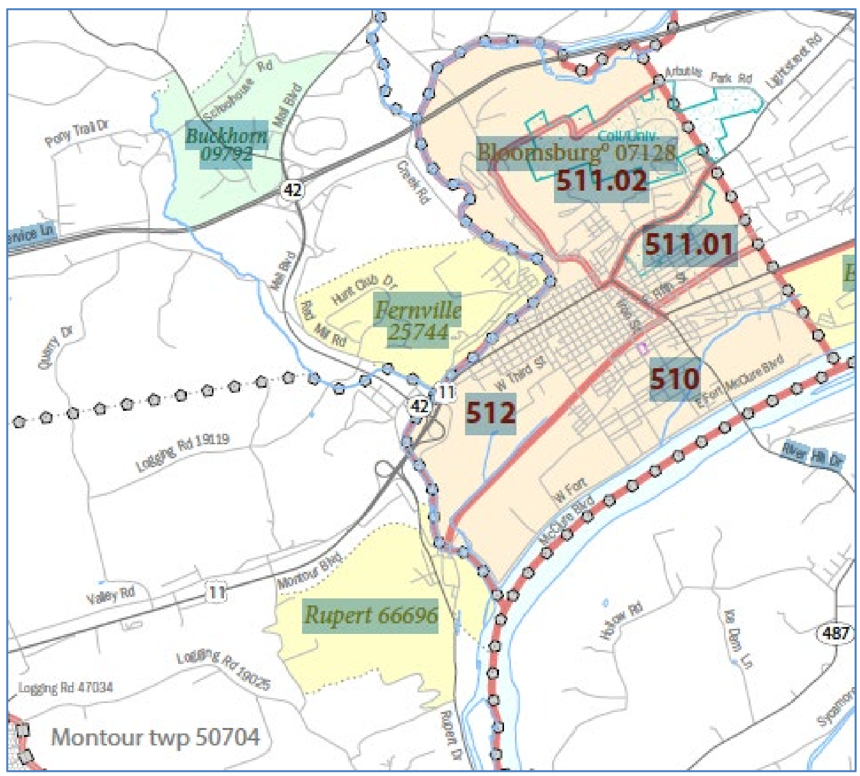

Figure 2.2 Census Tract Map (FEMA RAPT Tool)

A review of the Community Resilience Indicator Analysis (CRIA) Commonly Use indicators shows that the communities in the study area are ranked in the top three highest classifications representing an average to above average resilience.

Table 2.1 CRIA Indicators (FEMA RAPT Tool)

Population-Focused Indicators	Community-Focused Indicators
CRIA Commonly Used Indicators	CRIA Commonly Used Indicators
% Population without Health Insurance[a,b]	Connection to Civic/ Social Organizations
% Population Unemployed[a,b]	Hospital Capacity
% Population without a High School Education[a,b]	Medical Professional Capacity
% Population with a Disability[a,b]	Affiliation with a Religion
% Population without Access to a Vehicle[a,b]	Presence of Mobile Homes[a,b]
% Population with Home Ownership[a,b]	Public School Capacity
% Population over 65[a,b]	Population Change
% Population Single-Parent Households[a,b]	Hotel/Motel Capacity
% Population with Limited English Proficiency[a,b]	Rental Property Capacity[a,b]
Median Household Income[a,b]	
Gini Index: Income Inequality	
CRIA Aggregate Resilience Indicator[c]	

The Gini Index is a summary measure of income inequality. The Gini coefficient ranges from 0, indicating perfect equality (where everyone receives an equal share), to 1, perfect inequality (where only one recipient or group of recipients receives all the income).

Census Tract 503, Columbia County, Pennsylvania

Tract Population: 4,986

CRIA Indicators
Percent Age over 65: 17.99%
Percent with a Disability: 10.54%
Percent without HS Diploma: 8.38%
Percent Unemployment: 3.50%
Percent Lacking Health Insurance: 2.40%
Percent HH with Limited English Proficiency: 0.00%
Median HH Income: $64,518
Percent of Mobile Homes: 8.15%
Percent of Owner Occupied Housing: 79.06%
Percent of Single Parent HH: 10.33%
Vacant Rental Rate: 0.00%
Percent of HH without a Vehicle: 2.04%
Income Inequlity (GINI Index): 0.42

Figure 2.3 Census Tract 503 Summary (FEMA RAPT Tool)

Census Tract 512, Columbia County, Pennsylvania

Tract Population: 4,204

CRIA Indicators
Percent Age over 65: 15.98%
Percent with a Disability: 18.17%
Percent without HS Diploma: 11.73%
Percent Unemployment: 7.60%
Percent Lacking Health Insurance: 9.40%
Percent HH with Limited English Proficiency: 0.00%
Median HH Income: $32,318
Percent of Mobile Homes: 0.00%
Percent of Owner Occupied Housing: 20.06%
Percent of Single Parent HH: 26.50%
Vacant Rental Rate: 7.50%
Percent of HH without a Vehicle: 8.44%
Income Inequlity (GINI Index): 0.54

Figure 2.4 Census Tract 512 Summary (FEMA RAPT Tool)

Columbia, Pennsylvania

County Population: 65,715

<u>CRIA Indicators</u>
Percent Age over 65: 18.93%
Percent with a Disability: 13.91%
Percent without HS Diploma: 9.74%
Percent Unemployment: 4.60%
Percent Lacking Health Insurance: 4.40%
Percent HH with Limited English Proficiency: 0.36%
Median HH Income: $50,550
Percent of Mobile Homes: 8.70%

Percent of Mobile Homes: 8.70%
Percent of Owner Occupied Housing: 60.51%
Percent of Single Parent HH: 18.35%
Vacant Rental Rate: 7.30%
Percent of HH without a Vehicle: 6.53%
Income Inequality (GINI Index): 0.45
Percent of Religious Adherents: 46.50%
Health Diagnosing and Treating Practitioners per 1,000: 22.90
Public School per 5,000: 1.52
Hotels/Motels per 5,000: 0.53
Social and Civic Organizations per 10,000: 3.00
Hospitals per 10,000: 0.30
Population Change as a Standard Deviation: 0.40

Aggregate Resilience Indicator: 0.17

Figure 2.5 Columbia County CRIA Summary (FEMA RAPT Tool)

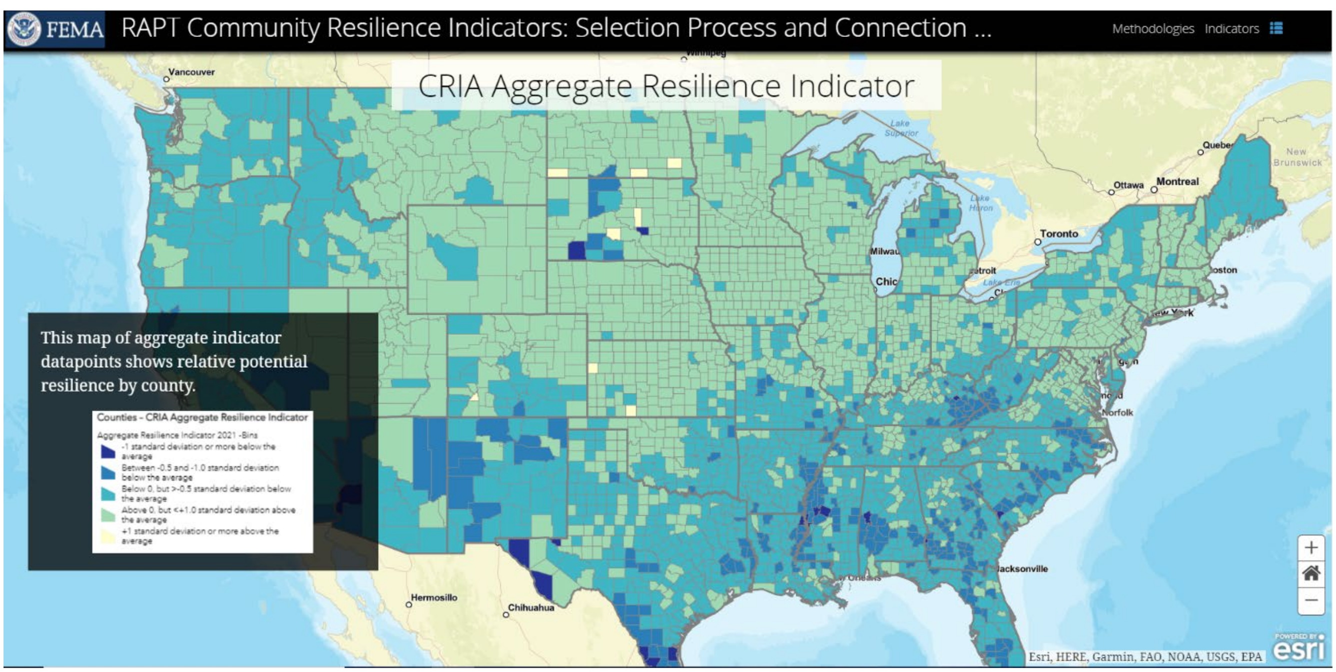

Figure 2.6 CRIA Aggregate Resilience Indicator (FEMA RAPT Tool)

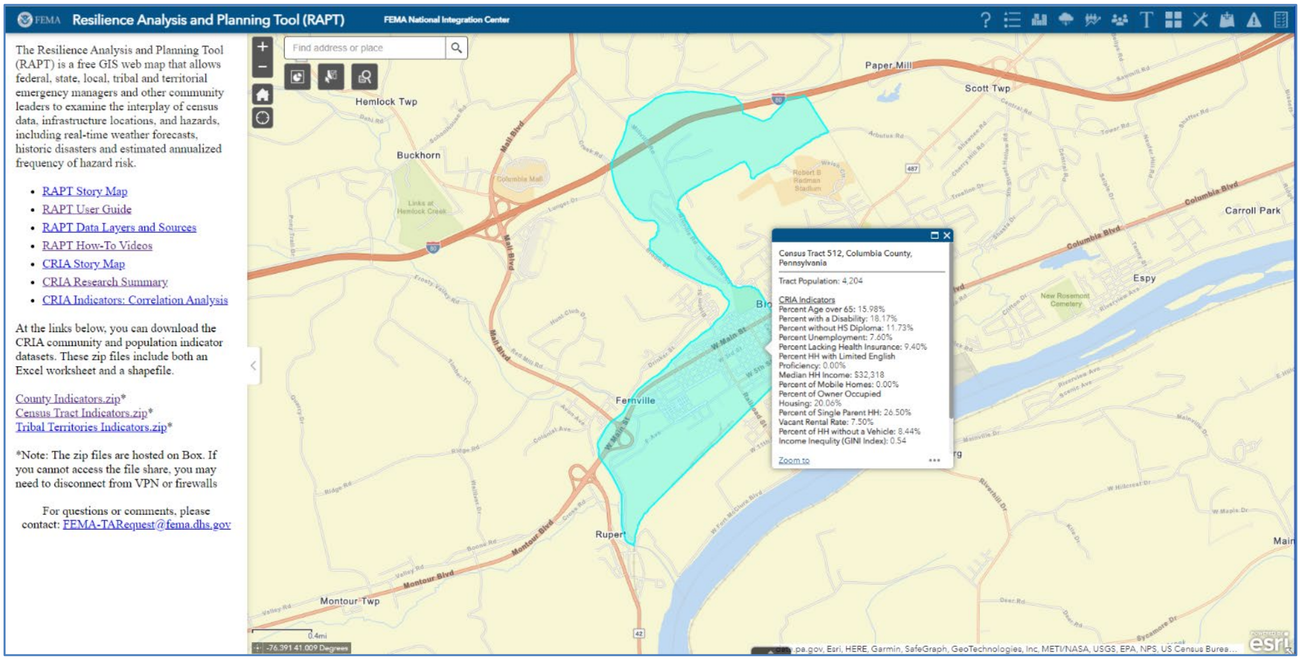

Figure 2.7 Census Tract 512 Location Map (FEMA RAPT Tool)

The second evaluation was the CDC's Social Vulnerability Index (SVI). The Montour/Hemlock Census tract (503) had a rating of 0.2376 (low level of vulnerability) and the Bloomsburg Census tract (512) had a rating of 0.3608 (low to moderate level of vulnerability). Details on the SVI are shown in Figures 2.8, 2.9 and 2.10 below.

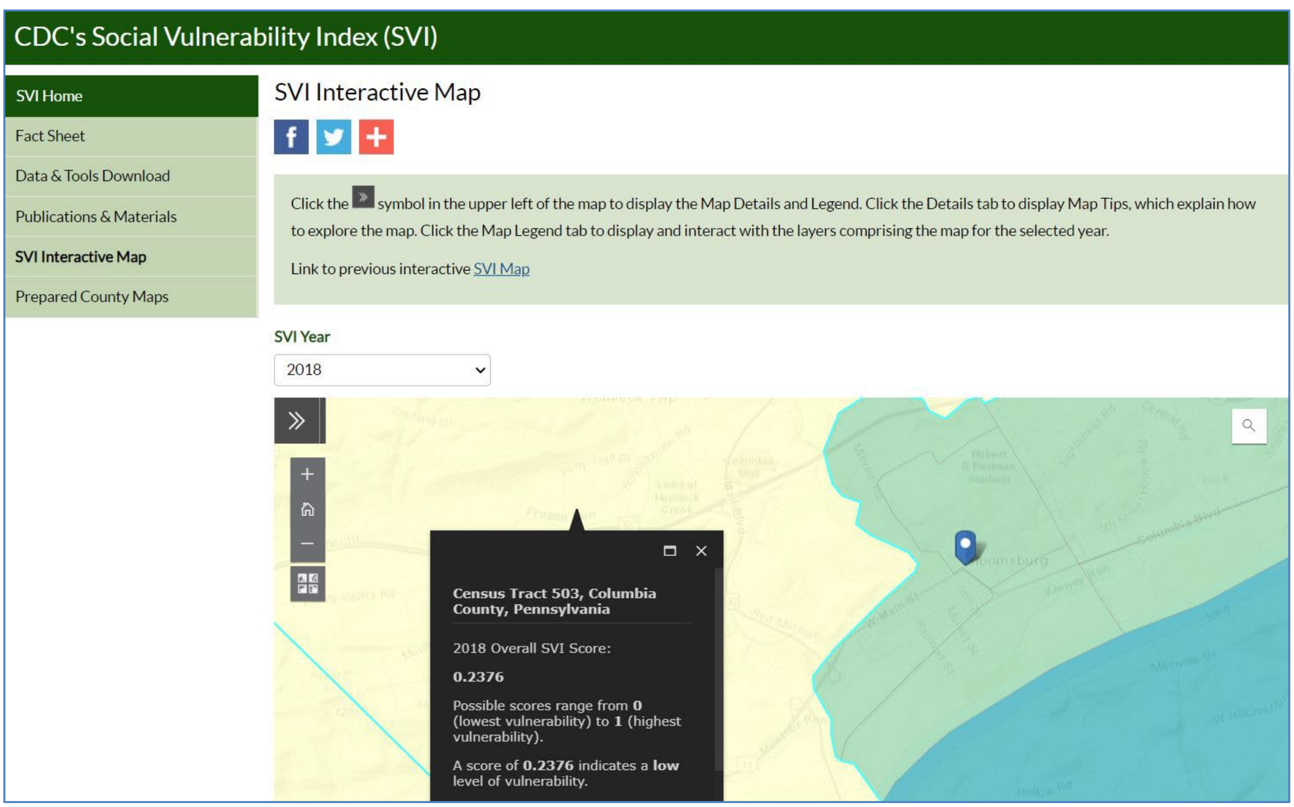

Figure 2.8 Census Tract 503 CDC Social Vulnerability Index (ATSDR CDC SVI)

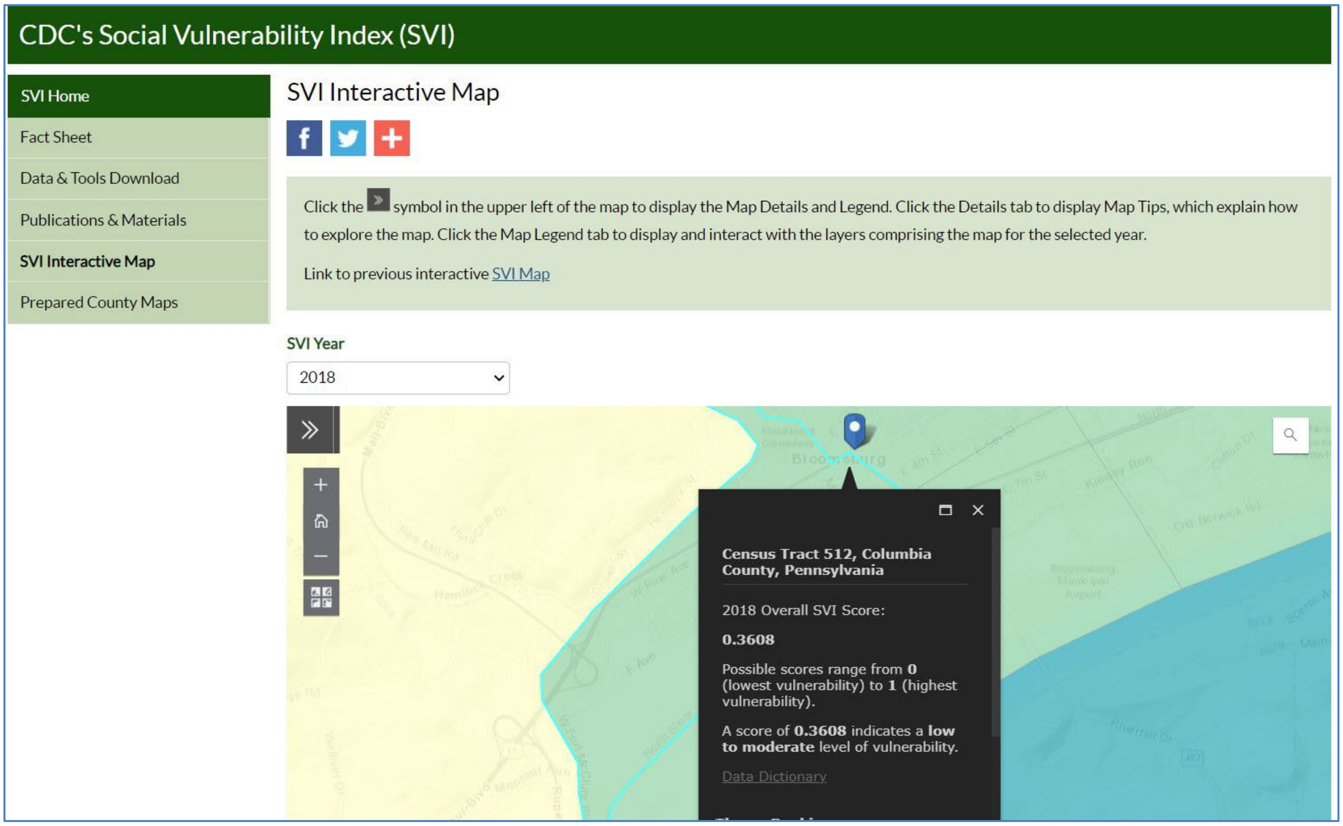

Figure 2.9 Census Tract 512 CDC Social Vulnerability Index (ATSDR CDC SVI)

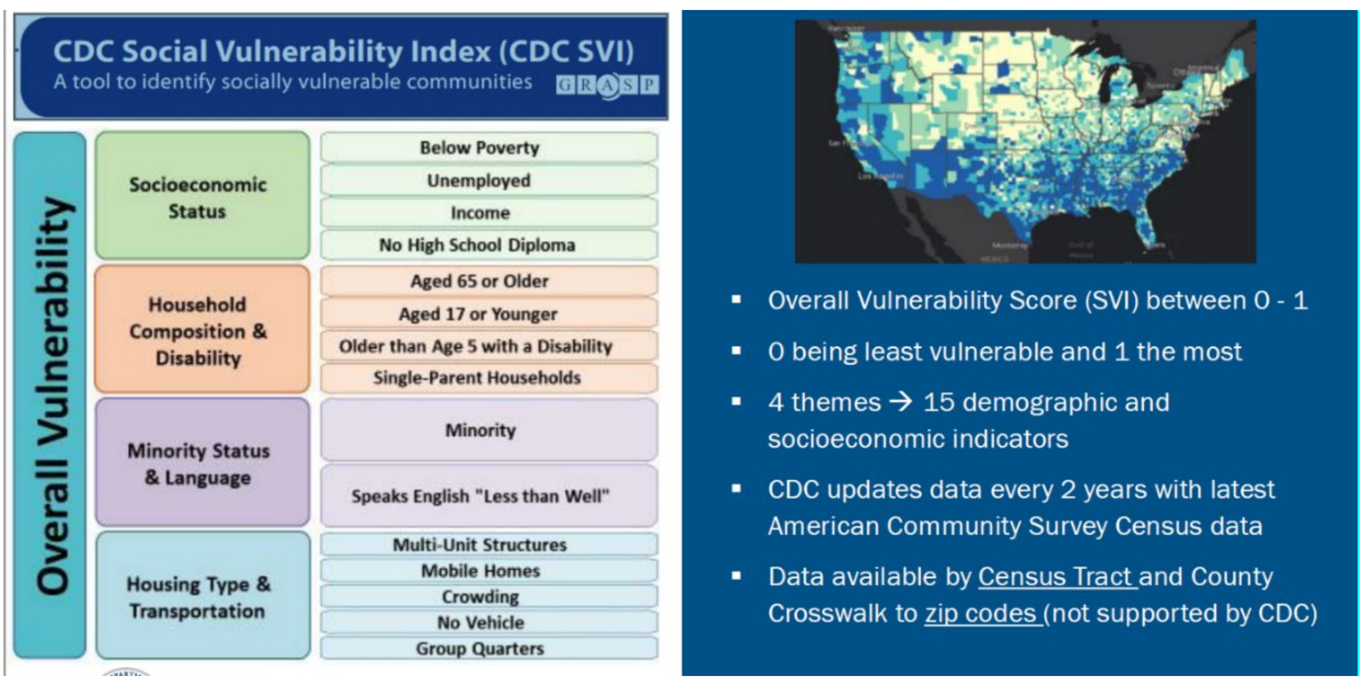

Figure 2.10 CDC Social Vulnerability Index Summary (CDC Schuylkill County PEMA HMGP)

A review of the FY 2021 ACS 5-Year 2011-2015 Low- and Moderate-Income Summary Data shows that the Town of Bloomsburg has a 59.14% Low-Moderate Income Percentage. The Community

Development Block Grant (CDBG) program requires that each CDBG funded activity must either principally benefit low- and moderate-income (LMI) persons, aid in the prevention or elimination of slums or blight, or meet a community development need having a particular urgency. Most activities funded by the CDBG program are designed to benefit low- and moderate-income (LMI) persons. This benefit may take the form of housing, jobs, and services. Additionally, activities may qualify for CDBG assistance if the activity will benefit all the residents of a primarily residential area where at least 51 percent of the residents are low- and moderate-income persons, i.e. area-benefit (LMA).

2.3 BASELINE CONDITIONS / AFFECTED ENVIRONMENT

In April 2005, “The Bloomsburg, Pennsylvania, Flood Damage Reduction Feasibility Study” was issued by the USACE. The study area for that study included generally the same area as this West End study. Data presented in the 2005 USACE study was utilized for this study, updated when necessary. The areal extent of lands that experienced flooding in 2011 is considered the study area. This section describes existing conditions and possible constraints on mitigation proposals.

The 2005 USACE Report is referenced and will not be re-written in this section for environmental conditions, which have not changed or for particular studies contained in that study which are not required for this study. Nearly two decades have elapsed since that study was completed and some environmental findings have changed since that time, and these new findings only are discussed in this section. The information below provides a baseline for measuring expected changes in the physical, environmental, cultural, social, and economic settings that would result from implementation of a flood damage reduction project in the study area.

Physical Setting (*See 2005 USACE Report for Physiography, Geomorphology, and Soils*)

Climate and Weather

Climate and weather patterns have changed over the last 20 years and so have some of the statistics for Bloomsburg since the 2005 USACE Report. In Bloomsburg, the summers remain warm and wet, while winters are cold and snowy, and it is partly cloudy year-round. Variations in temperatures and precipitation trends have changed over this period. Over the course of the year, the temperature typically varies from 21°F to 84°F and is rarely below 6°F or above 92°F. The warm season lasts for 3.7 months, from May 25 to September 15, with an average daily high temperature above 74°F. The hottest month of the year in Bloomsburg is July, with an average high of 83°F and low of 63°F. The cold season lasts for 3.2 months, from December 1 to March 6, with an average daily high temperature below 44°F. The coldest month of the year in Bloomsburg is January, with an average low of 22°F and high of 35°F.

A *wet day* in Bloomsburg is one with at least *0.04 inches* of liquid or liquid-equivalent precipitation. The chance of wet days in Bloomsburg varies throughout the year. The *wetter season* lasts *4.8 months*, from *April 2* to *August 29*, with a greater than *30%* chance of a given day being a wet day. The month with the most wet days in Bloomsburg is *June*, with an average of *11.5 days* with at least *0.04 inches* of precipitation. The *drier season* lasts *7.1 months*, from *August 29* to *April 2*. The month with the fewest wet days in Bloomsburg is *January*, with an average of *6.5 days* with at least *0.04 inches* of precipitation. The month with the most days of rain alone in Bloomsburg is June, with an average of 11.5 days.

Bloomsburg experiences *significant* seasonal variation in monthly rainfall. Rain falls throughout the year in Bloomsburg. The month with the most rain in Bloomsburg is *September*, with an average rainfall of *3.7 inches*. The month with the least rain in Bloomsburg is *February*, with an average rainfall of *1.6 inches*. Bloomsburg experiences significant seasonal variation in monthly snowfall as well. The snowy period of the year lasts for 5 months, from November to April, with a sliding 31-day snowfall of at least 1.0 inches. The month with the most snow in Bloomsburg is February, with an average snowfall of 7.1 inches. The snowless period of the year lasts for the other 7 months (weatherspark.com).

Water Resources

Below is a description of the existing water resources in the study area. State and federal surface water listings have changed some since the 2005 USACE Report and are discussed below. However, hydrogeology and groundwater studies were not part of this updated assessment and can be referenced in the 2005 USACE Report.

Surface Waters

Bloomsburg is within the Middle Susquehanna River subbasin. In the upper part of the subbasin, the Susquehanna River flows southeast through high, flat-topped plateaus separated by steep-sided valleys. Midway down the basin, the Lackawanna River joins the Susquehanna River before turning and flowing southwest toward Bloomsburg.

The Susquehanna River forms Bloomsburg's southern boundary and is the most prominent drainage feature, draining an area of approximately 10,576 square miles. Fishing Creek forms the northern and western boundary of the Town of Bloomsburg and drains an area of approximately 385 square miles at its confluence with the Susquehanna River. Fishing Creek and its tributaries - Huntington, Greene, Little Fishing, Spruce, and Hemlock Creeks - drain the northern nine townships of Columbia County southward to the bend of the Susquehanna River between Bloomsburg and Catawissa.

The middle Susquehanna River sub-basin is a mixture of urban and rural lands that include forest, agriculture, abandoned mines, and urban development. A section of this subbasin was heavily mined and remnants of mining activities (e.g., coal slag piles, abandoned mines, and acid mine drainage) still impact the water quality of many miles of streams and rivers throughout the Wyoming Valley (SRBC, 2002).

According to PADEP's eMAP website, Susquehanna River in this stretch of Bloomsburg also has an attaining use of "impaired" with the source cause being unknown with polychlorinated biphenyls (PCBs) and also having an unknown source of Mercury. Impairment status of Fishing Creek has changed for the better since the 2005 USACE Report. In the previous study, various reaches of Fishing Creek were listed on the PADEP 303(d) Impaired Streams and Rivers List (PADEP, 2002). Several reaches were listed for violations of Aquatic Life Use based on siltation from agriculture, road runoff, and removal of vegetation. Additionally, one reach of Fishing Creek (#20020111-1226-FIT) was listed for violations of Human Health Uses due to mercury. Little Fishing Creek, which flows into Fishing Creek at Bloomsburg, was also listed for violations related to Recreational Use due to pathogens. According to PADEP's eMAP website, Fishing Creek in the stretch of Bloomsburg has an attained use of supporting aquatic life, potable water use, and fish consumption; and it is not listed as impaired.

Biological Resources

Vegetation (*previously addressed in the 2005 USACE Report*)

Wetlands (*previously addressed in the 2005 USACE Report*)

Wetlands were noted in the 2005 USACE Report in the study area. An updated wetland delineation will need to be completed for any projects identified for advancement to preliminary design. Permitting involving anticipated wetland and stream impacts by any proposed structural components of a levee within Fishing Creek and its floodway, as well as any channel modifications to Fishing Creek. Early coordination with agencies such as the USACE, PADEP and PA Fish and Boat Commission (PFBC) will be key to the success of this project in order to ensure all regulatory compliance requirements are met.

Field investigations were conducted along the project area in June 2003 by others to assess and determine the presence/absence of wetlands. The specific area investigated included the footprints and vicinities of two levee alignment corridors under consideration. The wetlands investigation was conducted in accordance with the "Corps of Engineers Wetland Delineation Manual," Technical Report Y-87-1, and specific regulatory guidance modifications subsequently issued.

Within the expected areas of disturbance, wetlands were identified only along the southeastern side of the Bloomsburg Fairgrounds property and delineated using a global positioning system unit. The 11 mapped wetlands (labeled A through K) are shown in Figure 2-3 of the 2005 USACE Report. The wetlands were further characterized as palustrine emergent wetland (PEM), palustrine shrub-scrub wetland (PSS), and palustrine forested wetland (PFO) characterized according to their cover type (Cowardin, 1979). The hydrologic source for these wetlands appears to be from local surface runoff (from parking lots and landfills) and a surface and groundwater connection to Snyder's Run.

In November 2004, a forested wetland system was identified along Fishing Creek's floodplain across the creek from the water treatment plant. This is a typical forested floodplain wetland (PFO) several acres in size with hydrology from both groundwater and overbank flooding from the Creek.

Wildlife (*previously addressed in the 2005 USACE Report*)

Fish

The previous 2005 USACE Report discussed the fish collected during a survey of Fishing Creek in 1998. The species list indicated that a cool/coldwater fishery existed at that time, and that the coldwater fish, (e.g., trout) were stocked (unknown if natural reproduction was occurring). According to the current PADEP eMapPA, Fishing Creek is listed as a Warm Water Fishery with no special trout listings in the project area by the PFBC. However, Fishing Creek is known for its great flyfishing and many public access areas north of Interstate 80 along Fishing Creek, where the stream inhabits both wild trout and stocked trout.

The proposed earthen/MSE/sheet pile levee would have a slight negative effect on Fishing Creek within the building footprint as it would eliminate the riparian corridor on the left bank of the stream, in turn affecting fish and other wildlife inhabiting this stretch. Mitigation assessment protocols regulated by the governing agencies will allow for compensation in the watershed to make up for this alteration.

Threatened and Endangered Species

Except for the occasional transient species, no Federally listed endangered, threatened, or candidate species under U.S. Fish and Wildlife Service (USFWS) jurisdiction are known to exist in the project area (USFWS, 2000). Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required with the USFWS.

However, the Pennsylvania Natural Diversity Inventory (PNDI) indicated that there are potential impacts to state regulated species of special concern within the project area (PNDI, 2022). According to the Pennsylvania Department of Conservation and Natural Resources (PA DCNR), further review of the project is necessary to resolve the potential impact to a “sensitive species” resource with a current status of Special Concern Resource and to the Fassett Jeweled Shooting Star (*Primula fassettii*), a flowering plant with a current status of Threatened.

It is anticipated that a botanical survey will be required for this species, which is time sensitive and would need to occur during its flowering period in late April to May. Further inquiry into the unidentified species is required to determine if a habitat survey will be required.

PFBC requires further review of the project to resolve the potential impact to the Triangle Floater (*Alasmidonta undulata*). If in-stream work is to occur as a result of this project, a mussel study may be required. The study period is not time of year sensitive, however, safety concerns for the malacologist would deter the study from being performed in the winter months.

Air Quality (*See 2005 USACE Report for Air Quality*)

Cultural Resources

Borton Lawson submitted a project review to the PA Historical and Museum Commission for the Columbia County - West End Flood Mitigation Study (ER Project # 2021PR06578.001) and received a summary letter on November 8, 2021 requesting more information for their environmental review due the high probability for archaeological resources.

It was PHMC’s opinion that “a Phase IA archaeological study should be undertaken to assess this property’s potential for National Register significant archaeological resources. This study should consist of a thorough review of all available historic through recent maps and other documentary sources which may provide information on past land use within the project area. A geomorphological assessment of the project area is recommended at this stage as it will provide useful information on the total depth and overall integrity of potential archaeological deposits. If this research suggests that potentially significant archaeological resources may be present, it will be our opinion that a Phase I archaeological testing plan should be developed to identify such resources.”

The 2005 USACE Report has well documented findings from previous studies that will be utilized in the next phase of the project, as to not duplicate moneys and efforts. Historical and archaeological data does not expire and can be used for overlapping project areas. Additional studies outside of the initial APE are anticipated and will need to be addressed with similar studies. The next two sections below were taken from the 2005 USACE Report, addressing the actions that have been taken to date.

Archeological Investigations

Phase IA archaeological investigations were conducted by KAR in 1999 along the project area. The investigated portion runs from the Route 11 / Route 42 interchange, southeast across the Bloomsburg Fairgrounds parking area, and then generally northeast to the area adjacent to the now vacated Windsor Plant. KAR concluded that there was a high potential for significant archaeological resources in the tested area. The findings were reported to the PADEP and the State Historic Preservation Officer (SHPO) in a letter report, dated 16 July 1999 (KAR, 1999). The report recommended Phase IB testing of all undisturbed portions of the tested area.

The Phase IB investigation of the undisturbed portion of the Phase IA-tested area included a series of excavation units dug along two parallel transects within the project area in the vicinity of the Fairgrounds. Tests along each transect were spaced at 60-meter intervals and were staggered so that there was a test every 30 meters along the corridor. Additional test units were dug whenever suspected archaeological materials were identified.

Forty (40) units of the systematic sample were completed, plus five additional units to examine suspected archaeological materials. None of the latter has been found to meet minimum criteria for an archaeological site, as defined by the Bureau for Historic Preservation. The recovered materials include two chert flakes and one apparently worked piece of chert, found in the plow zones of three separate units in the systematic sample. None of the supplemental tests recovered any additional cultural material.

Further Phase I investigations of the remaining portions of the project area were proposed for spring 2005. The remaining portions to be tested include an area northeast of Windsor, and an area adjacent to the left descending bank of Fishing Creek.

Architectural Investigations

During the initial planning stages for this study, the USACE, PADEP and the Pennsylvania State Historic Preservation Office agreed that due to the uncertainty of the Area of Potential Effect (APE) for the project, it would be necessary to document, at least through a Phase I Level survey, all of the potentially affected historic properties up to a level of flooding equal to the 500-year event.

The following resources were identified within the original APE for this project:
The identification and documentation of National Register districts for the West Main Street portion of Bloomsburg, the Village of Fernville, and thirty individual structures located throughout the APE. Additionally, other new potential historic districts were identified, which consisted of the North Branch Canal workers housing district, a potential district of post-World War I housing, a potential district encompassing the village of Rupert, and individual forms to document the

bridges, rail, and canal resources, Bloomsburg Airport, the Irondale water treatment plant, and Bloomsburg Fairgrounds.
While most of the identified buildings and sites are not located within the project area, the Irondale water treatment plant (currently owned and operated by Suez Water Pennsylvania) is located immediately upstream of the project area.

Other Known Historic Sites

In addition to Bloomsburg's rich background in Native American history, as well as the industrial boom that lasted three-quarters of a century in the 1800's, all of which is discussed in the 2005 USACE Report, other very notable historic structures lie within or close to the project area.

Rupert's Covered Bridge, a historically significant bridge spanning Fishing Creek and located downstream of the project area on TR409, was added to the National Register of Historic Places in 1979 and is the oldest existing bridge in Columbia County. Leonard Rupert settled on Fishing Creek in 1788 and established a village and a ferry where the covered bridge was later built. At just over 185 feet in length, it is Columbia County's longest covered bridge. The bridge has Burr arches with multiple king-post trusses and vertical board siding. After 150 years of continuous use, the bridge was reinforced with steel I-beams and two concrete piers and is open to traffic with no restrictions.

One of the nonstructural mitigation options involves Fishing Creek channel modifications. A recent development is the proposed removal of Boone's Dam along Fishing Creek by its' current owner, Suez Water. Boone's Dam is not listed on PHMC's website as a landmark of historic significance. The dam was built in the 1850's to generate power to the mill that Samuel Boone constructed along Fishing Creek. The dam has been associated with the tranquil setting of the property and Boone's Dam Barn, which has been home to many families over the years, the most famous being artist David Armstrong. The current owners of The Barn at Boone's Dam own and operate a wedding venue. The removal of the dam would not impact the flood flows on Fishing Creek.

The study area is near the Delaware, Lackawanna & Western Railroad (also known as the DL&W or Lackawanna Railroad). This was a U.S. Class 1 railroad that connected Buffalo, New York, and Hoboken, New Jersey (and by ferry with New York City), a distance of about 400 miles (640 km). Incorporated in Pennsylvania in 1853 primarily for the purpose of providing a connection between the anthracite coal fields of Pennsylvania's Coal Region and the large markets for coal in New York City, the railroad gradually expanded both East and West, eventually linking Buffalo with New York City.

The Great Warrior Path is also a known historic resource within the project area, with its eligibility noted as undetermined. The Great Warrior Path travels from present day Athens (then known as Tioga) to Sunbury (then known as Shamokin). This path was used in both times of war and in times of peace. It was often frequented by Iroquois ambassadors who were traveling south.

Hazardous, Toxic and Radioactive Waste (HTRW) *(see 2005 USACE Report for Hazardous Sites)*

In previous studies within the project area, sites of potential concern were identified. In the URS 2003 report, sampling results revealed elevated concentrations of heavy metals in excess of applicable cleanup levels throughout the project area and volatile organics contamination within an area that passes through an inactive landfill (URS, 2003). Since the heavy metals that were detected are likely a local background condition and since much of the contaminated soil along the project area is considered historic fill, it is likely suitable for reuse during the construction of the flood protection elements from a regulatory perspective (URS, 2003).

Contaminated soil in the landfill area is unlike the material found elsewhere within the project area due to the presence of large amounts of debris and is unsuitable for reuse during construction.

The potential impact of underground storage tanks adjacent to the project area along Fishing Creek must be further defined to determine whether relocation or removal is necessary. There is little concern about potential human exposure to contaminants from drinking groundwater because nearly all residences near the proposed alignment are believed to utilize drinking water delivered by Suez Water Pennsylvania (USACE, 2003).

A Phase II Environmental Site Assessment (ESA) is recommended in the next phase of the project within the project limits in order to complete proper site characterization. The Phase II ESA would consist of a subsurface investigation to identify potential contamination sources that may affect the environmental integrity of the project. The results of the Phase II ESA may be used to ascertain the need for and extent of potential site remediation activities (i.e., Phase III ESA).

Socioeconomics

The Town of Bloomsburg is a rural and moderate density community characterized by attractive single-family residential neighborhoods, tree-lined streets and limited agricultural and industrial land use on the outskirts of town. Bloomsburg is the Columbia County seat and is the only incorporated town in Pennsylvania. The Town has a land area of 4.4 square miles and approximately 4,400 housing units. The Town of Bloomsburg had a population of 14,197 as of July 1, 2021. Bloomsburg ranks in the upper quartile for Population Density and Diversity Index when compared to the other cities, towns and Census Designated Places (CDPs) in Pennsylvania (HomeTownLocator.com).

The age distribution of Bloomsburg has a high proportion of persons in the 18- to 24-year-old category, which would be expected in a town with a moderately sized university. The median household income for Bloomsburg is $32,217. The economy of Bloomsburg employs about 5,300 people. The largest industries in Bloomsburg are Health Care & Social Assistance, Accommodation & Food Services, and Educational Services, and the highest paying industries are Transportation & Warehousing, & Utilities, Public Administration, and Manufacturing.

Environmental Justice

As stated in the 2005 USACE Report, “Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations (Executive Order, 1994), directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low- income populations.” According to PADEP eMapPA, the project area is located within an Environmental Justice Area, Census Block Group 2015, Tract 512, Block Group 5 (eMapPA, 2022).

Noise (*see 2005 USACE Report for Noise*)

Traffic (*see 2005 USACE Report for Traffic*)

Aesthetics (*see 2005 USACE Report for Aesthetics*)

The proposed West End Flood Mitigation structures of earth levee, MSE levee with retaining wall, sheet pile levee, pump station, and gate closures, all can fit into the surrounding landscape of the Town of Bloomsburg with the proper design.

Land Use (*see 2005 USACE Report for Land Use*)

Parks and Recreation

Several state, local, and private park facilities are located near the study area and have been discussed in the 2005 USACE Report. But the most immediate park that the project will affect in a positive way is the Bloomsburg Fairgrounds. The fairgrounds is a 248-acre facility located within Bloomsburg's town limits and includes a grandstand with an 8,000-person seating capacity, 78,000 square feet of exhibition buildings, an indoor arena, a covered band shell, a half-mile racetrack, and other large outdoor event amenities. The Bloomsburg Fair begins the third Saturday after Labor Day and draws over 650,000 people (2003 estimate) from all along the Eastern Seaboard. The Fairgrounds also attracts many trade shows and conventions throughout the year. This project would mitigate the flood risk to the fairgrounds each year in September.

2.4 Existing Infrastructure / Storm and Sanitary Sewers

The three communities in the study area have storm and sanitary sewer systems and related pump stations for the sanitary sewers.

For Montour and Hemlock Townships, the biggest impacts from past flooding were related to the sanitary pump stations being flooding thereby impacting the operation of the pump units and electrical gear.

For Bloomsburg, the sanitary sewer system is extensive throughout the residential and commercial area of the West End. Flood events interrupt the normal flows to the Bloomsburg Municipal Authorities treatment plant located on the Susquehanna River on Fort McClure Boulevard. Past flooding damages essentially require cleanup and minor repairs.

Storm sewers for the residential area drain to Fishing Creek. A total of five (5) outfalls exist along the creek bank from Railroad Street to the Route 11 Entrance to the Fairgrounds near the historic Barton House. The largest outfall, an 84-inch pipe serves interior stormwater runoff from the town primarily east of the project area. These outfalls would need control structures to prevent backwater during high flows in the creek and during high Susquehanna River stages. As stated later in this report, the storm water would be diverted to a new pump station near 6th Street if a levee/floodwall system was built in Bloomsburg.

Storm sewers in the extensive Fairgrounds complex were reviewed with the Fairgrounds maintenance staff but they are not documented and will require extensive surveying to determine location, type, and size for analysis during preliminary design of a structural system is pursued.

2.5 Subsurface Conditions

The average soil thickness for the area is approximately 20 feet with bedrock depths highly variable over the entire project area. Bedrock was encountered as shallow as 8 feet, while it was not encountered at depths greater than 30 feet in several borings.

Along Fishing Creek from approximately, foundation soils are moderately pervious to very pervious with little to no impervious blanket above. A layer of dense gravel exists at a depth of approximately 10 feet. The soils had varying amounts of fines (material passing No. 200 sieve), but most of the soils were classified as sands and gravels. Also along Fishing Creek, bedrock was encountered between depths of 16 feet to 32 feet. Borings along the Bloomsburg Fairgrounds portion of the alignment show a silt/clay blanket (average thickness of 4 feet) overlying a sand/gravel layer. Beneath this sand/gravel layer, highly weathered bedrock was encountered at depths of 10 feet to 20 feet.

Groundwater varies from 4 feet to 20 feet below the surface. It varies on a seasonal basis and is greatly influenced by the river and creek flows. Any deep excavations should consider dewatering techniques in the wet periods of the construction season.

Details of the geotechnical investigations performed for the 2005 USACE Study are included in Appendix B Geotechnical Engineering.

SECTION 3.0 - STUDY DEVELOPMENT PROCESS

3.1 Study Process

Borton Lawson conducted this flood mitigation study under the oversight of SEDA–Council of Governments (SEDA-COG), the study administrator for Columbia County, Pennsylvania. The study was conducted to meet the All Hazard Plan requirements for flood hazards. As such, the recommendations and implementation of any projects should be compatible with community or regional plans for all hazards mitigation.

Assessment of adverse environmental impacts of each flood mitigation option was conducted in accordance with the requirements of Federal and Commonwealth of Pennsylvania regulatory and resource agencies, including: the U.S. Environmental Protection Agency (USEPA), USFWS, PADEP, the PFBC, and the SHPO.

The report was developed using the best available information obtained from a wide variety of sources. Throughout the plan development process, a concerted effort was made to gather information from participating municipal and county agencies, as well as, stakeholders, federal and state agencies, members of the local business and industry community, and the citizens of the Plan area. Thus, the flood mitigation strategies contained within this plan have been developed through an extensive planning process involving local jurisdictions, citizens, county, and state, regional and federal officials. The six steps in the iterative plan formulation process were:

- Specify water and related land resources problems and opportunities;
- Inventory of existing conditions;
- Formulate alternative plans;
- Evaluate alternative plans;
- Compare alternative plans; and
- Select the recommended plan.

The basis for selection of the recommended plans for each community is documented below, including the rationale used in plan formulation and plan selection.

3.2 Flooding Problem

Recurrent flooding that occurs in the study area is a result of the morphology of the Susquehanna River and the regional topography. In the vicinity of Bloomsburg, the river has very little slope and has shallow banks. As a result, the river flows more slowly in this reach. During heavy rainfall events (or rapid snowmelts), the river quickly swells and overflows its banks. Floods along Fishing Creek, as well as along the Susquehanna River, are slow to recede due to the flat topography, thereby isolating areas and exacerbating property damage.

When the Susquehanna River overflows its banks, it hinders normal discharge from Fishing Creek to the mainstem of the Susquehanna, resulting in backwater flooding on Fishing Creek. When the Susquehanna River and Fishing Creek simultaneously rise above flood stage, overbank flooding can cover up to 33 percent of the landmass within the Town of Bloomsburg's boundaries. Monitoring of existing stream gauges upstream of Bloomsburg typically provides at least 4-hours advance warning of potential Susquehanna River floods; however, flooding on

Fishing Creek can happen quickly with little or no warning.

The official flood stage (where flooding starts to cause property damage) is reached when the Susquehanna River water level at the Bloomsburg gauge on the Route 487 bridge exceeds a stage of 19 feet, which equates to 470 feet above mean sea level. The base flood (a flood that has at least a one in 100 chance of occurring in any given year (also called the 100-year flood) is reached at a stage of 30.74 feet, or 481.40 feet above mean sea level at the Route 487 gauge.

3.3 Review and Incorporation of Existing Information

Existing data was utilized to formulate an understanding of the existing flooding conditions. This information included previous studies and flood mitigation project designs. The data was utilized for the early meetings with stakeholders which were geared towards a listening session to gain a better understanding of the expectations of residents and business owners with regard to their flooding problems.

The following categories of existing data were researched and evaluated for use during the study:

- ☐ Municipal plans and ordinances
- ☐ Previous USACE Studies including Geotechnical Data
- ☐ County Parcel Data - Property parcel information, flood zone classifications, etc.
- ☐ Flood damage reports
- ☐ Infrastructure mapping
- ☐ FEMA data/Flood Insurance Studies
- ☐ FEMA Flood Insurance Rate Maps (FIRMs)
- ☐ Utilities/Sewers Mapping

3.4 Stakeholder Outreach

Meetings were held with municipal officials at the beginning of the study to understand the impacts of flooding to their communities, confirm past mitigation actions, review possible mitigation alternatives (structural and nonstructural), and to identify specific actions that would make the community more flood resilient.

Montour Township

Montour Township is located on the western side of Fishing Creek in the study area. It is bordered on the west by Montour County. The Susquehanna River and Fishing Creek form the southern and eastern boundaries. The unincorporated community of Rupert is located in the Township. The population (2010) was 1,344.

As part of the Map Modernization Project, FEMA estimated that the municipality has 915 structures with 80 located in the Special Flood Hazard Area (SFHA). Approximately 7% of the population lives in the flood high hazard area.

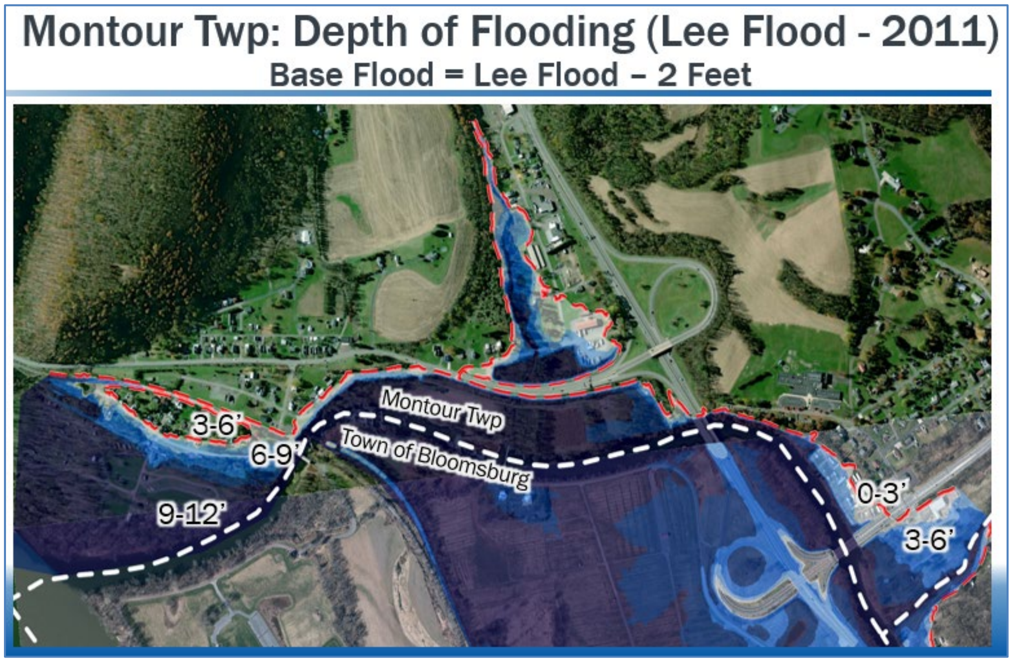

Figure 3.1 Lee Depth of Flooding in Montour Township

The study area consists of 63 properties located in the flood plain.

Following the 2011 Tropical Storm Lee flood event, the Township participated in the FEMA HMGP and acquired twelve properties, eleven of which were in the study area.

Additional properties are being acquired outside of the study area along Legion Road as part of the Department of Housing and Urban Development (HUD) Community Development Block Grant–Disaster Recovery (CDBG-DR) program.

Hemlock Township

Hemlock Township is located on the western side of Fishing Creek in the study area. Montour Township and Fishing Creek form the southern boundary and Mount Pleasant Township the eastern boundary. Madison Township forms the northern boundary. The population (2010) was 2,249. Fernville is located in the southeast corner abutting Fishing Creek.

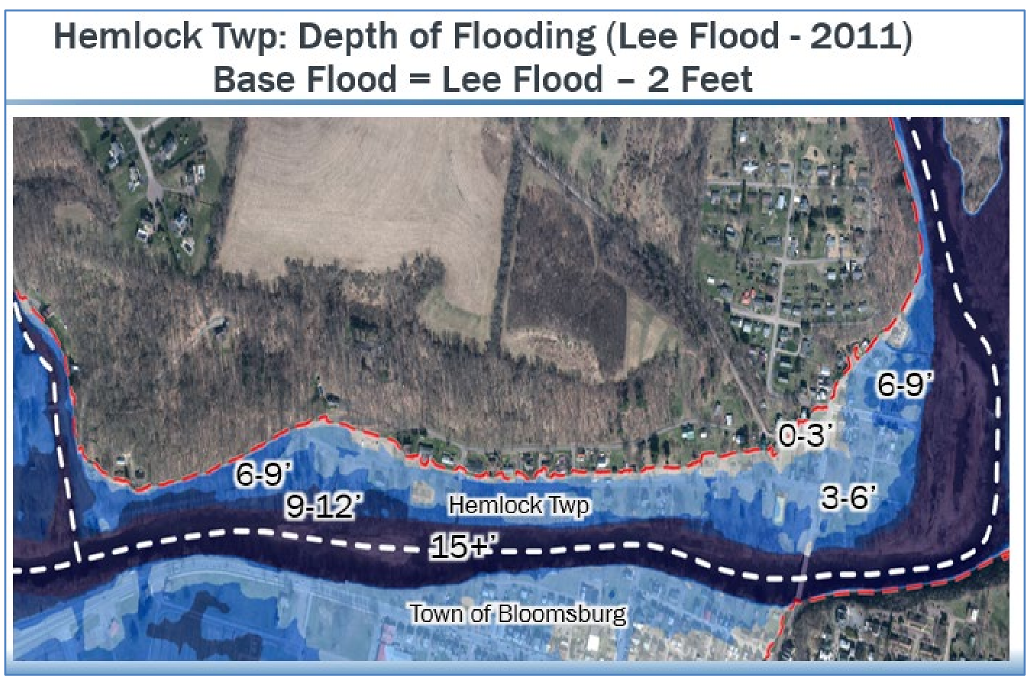

Figure 3.2 Lee Depth of Flooding in Hemlock Township

FEMA estimated that the municipality has 1,410 structures with 135 located in the SFHA. Approximately 10% of the population lives in the flood high hazard area. The study area consists of 126 properties located in the flood plain.

Hemlock Township has been active in the FEMA HMGP since 1983. Since the 2011 Flood event, the Township has acquired more than 40 properties using the FEMA HMGP program and the HUD CDBG-DR program. Future acquisitions are planned. Numerous properties have been elevated.

Town of Bloomsburg

The Town of Bloomsburg is located on the eastern side of Fishing Creek in the study area and is the county seat of Columbia County. It is bordered on the west and north by Fishing Creek and by the Susquehanna River on the south. Scott Township forms the eastern boundary. The population (2010) was 14,855. Bloomsburg University is located in the town.

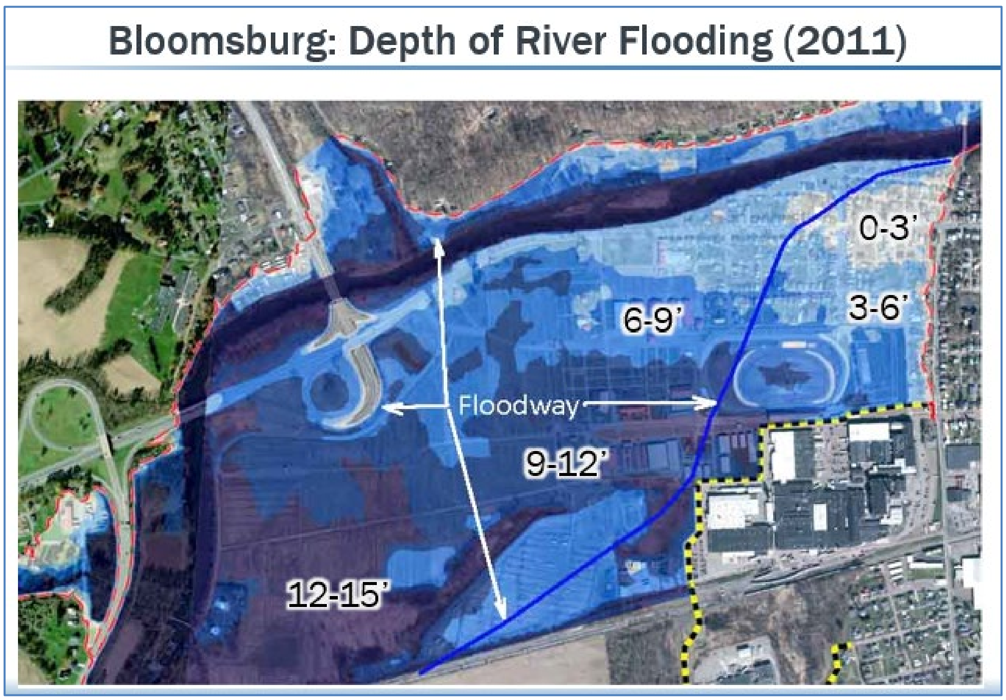

Figure 3.3 Lee Depth of Flooding in the Town of Bloomsburg

FEMA estimated that the municipality has 3,160 structures with 560 located in the SFHA. Approximately 8% of the population lives in the flood high hazard area.

The study area consists of 294 properties located in the flood plain, which includes 30 commercial properties and the Bloomsburg Fairgrounds.

The Town of Bloomsburg participated in FEMA HMGP buyouts following the 2011 flood when eleven properties were acquired and demolished. Several structures have been elevated since 2011. Recently additional properties have been identified for acquisition.

The Town participates in the FEMA Community Rating System (CRS) Program and currently is a Class 7 community which provides a 15% discount on flood insurance premiums.

Other Stakeholders

Meetings were held with community stakeholders to determine the impacts of flooding to their organizations and the overall area, learn of any mitigation actions completed since 2011, and identify problem areas that still needed to be addressed. Meetings were held with the Bloomsburg Fairgrounds, Bloomsburg Municipal Authority, Bloomsburg University, Bloomsburg School District and the Geisinger Health System, which operates the Bloomsburg Hospital.

Bloomsburg Fairgrounds

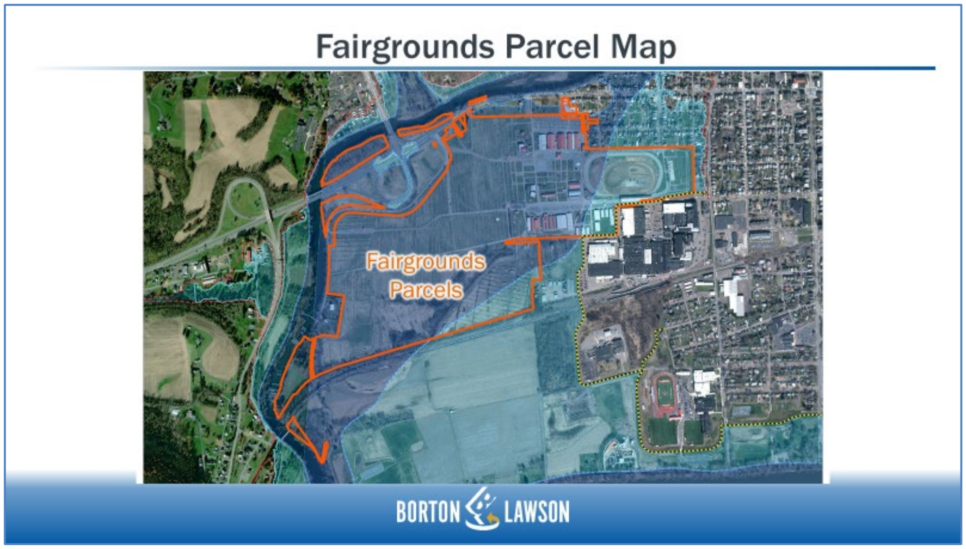

Figure 3.4 Town of Bloomsburg Fairgrounds Parcel Location

The Columbia County Agricultural, Horticultural and Mechanical Association, owner of the fairgrounds, is the largest property owner in the study area. Their holdings include 227 acres with parking for 20,000 vehicles, RV Parking (no facilities), a large racetrack, a one-half mile dirt racetrack, a grandstand with seating for 5,400 (under roof) and numerous exhibit halls, restrooms and barns. Overall 54 structures are located on the property.

3.5 Public Participation

Three (3) Public Meetings were held as part of the Study.

The first public meeting introduced the public to the project and provided information related to the Public Outreach Plan. Maps of the project area were available for viewing. Valuable information was collected from residents related to unique features in the project area and their project-related concerns through oral comments and written questions submitted via the project website.

The second public meeting was held to review the progress of the study and future work to be accomplished. It provided an opportunity for the public to provide comments on the project immediately before completion of the study.

The final public meeting was held in March of 2022 to provide an overview of the study findings and recommendations for nonstructural and structural flood mitigation alternatives. The following items were discussed.

- A description of the study area and scope,
- Completed flood mitigation work by the communities,
- Options analyzed,
- Results of the hydrologic and hydraulic modeling,
- Flood Mitigation recommendations for each community,
- Adverse impacts and mitigation options,
- Funding opportunities,
- Draft opinion of probable construction costs,

- Next Steps.

For further details of the meetings, see public meeting presentations in Appendix D.

3.6 Homeowner / Property Owner Surveys

The 2021 Floodplain Homeowner Survey was designed to capture input from property owners to inform the County's efforts and provide context to the Consultant's evaluation of flooding risks. Questions were developed to glean information on the following: attributes of the structures on study area properties, residents' "lived" experiences regarding flooding, damages experienced due to flooding, mitigation measures currently in place to reduce flooding damage, and impacts to daily life. In addition to collecting details regarding structure attributes and flooding history, a primary objective of the Homeowner Survey was to collect data to understand homeowners' plans or preferences for the future regarding relocation.

The Survey contained 19 questions and was designed to take 5-10 minutes to complete. The first four (4) included questions verifying the property owner's mailing address and the address of their property within the study area, to support tracking and documentation efforts. Questions five through nine (5-9) covered specific attributes of the structure on the property, including the use of the structure, the number of current inhabitants, the presence of a basement, the type of foundation on which the structure is built, and the number of stories. Questions 10 through 13 were designed to gather information on the property owner's past experiences with flooding, the types of property damage they have experienced due to flooding, and the types of measures they have put in place to prevent or reduce flooding. Questions 14 through 16 covered property owners' participation in flood insurance programs, the additional assistance needs of occupants in the case of flooding, and property owners' perceptions of the risk of flooding to the community. Questions 17 and 18 gauged respondents' interest in moving to a new location as a result of flooding, as well as any additional impacts to daily life they have experienced as a result of flooding. Lastly, Question 19 sought to identify what methods of communication would be most effective in reaching out to property owners regarding the West End Flood Mitigation Study in the future.

The Consultant Team identified 349 parcels in the Study Area on which a structure currently existed. A letter outlining the purpose of the survey and directions for its completion accompanied the survey. Each letter also included a Structure ID specific to each property that respondents were advised to include as the response to the first question of the survey, to support data analytics. The survey was kept open for approximately six weeks to allow property owners sufficient time to complete the survey and encourage a high response rate.

A total of 123 of the survey recipients returned a completed survey, which reflects a thirty-five percent (35%) response rate.

To better understand the history of flooding in the community, respondents were asked to identify if their properties have ever flooded from major storm events or nuisance flooding. Of the 122 respondents to this question, ninety-seven percent (97%) reported that their property has flooded in the past, and only three percent (3%) reported that their property has not flooded.

Survey Distribution

- Surveys were mailed on September 21, 2021, to the property owners of all 349 parcels in the Study Area. A letter outlining the purpose of the survey and directions for its completion accompanied the survey.
- Respondents could return their completed survey via mail or complete the survey online using the provided link and QR code.

Survey Response Rate

- 123 survey responses - Response Rate: ~35%

Figure 3.5 Survey Distribution and Response Information

Respondents were asked to identify the types of property damage that have been incurred to the structure on their property following flood events. Respondents were provided with the following list of types of property damage and were prompted to select all that applied:

- Basement or below grade flooding
- Finished first floor flooding
- Finished second floor flooding
- No property damage experienced due to a flood event

Eighty-nine percent (89%) reported that the structure on their property experienced basement or below grade flooding, and seventy-nine percent (79%) reported that structure on their property experienced finished first floor flooding. Only three percent (3%) of the respondents reported that the structure on their property had never experienced property damage due to a flood event.

Upon review of the survey results, key trends and themes gleaned from the experiences and perspectives of property owners in the Study Area have been identified:

- Sixty-three percent (63%) of the respondents reported that flooding from Fishing Creek was of greater concern to them than flooding from the Susquehanna River. Thirty-one percent (31%) identified flooding from both Fishing Creek and Susquehanna River to be of major concern.
- While ninety-seven percent (97%) of the respondents reported that their property had experienced flooding in the past, only fifty-eight percent (58%) reported that their property was insured for flooding.
- Eighty-eight percent (88%) of respondents consider flooding to be either a serious or extreme challenge for the community.
- Forty percent (40%) of respondents reported that they do not have any measures in place to prevent or reduce flooding or flood-related damage to their property.

- Forty-five percent (45%) of respondents reported having considered moving to another location to avoid losses and damage due to flooding, demonstrating that a significant proportion of the community may be interested in relocation.

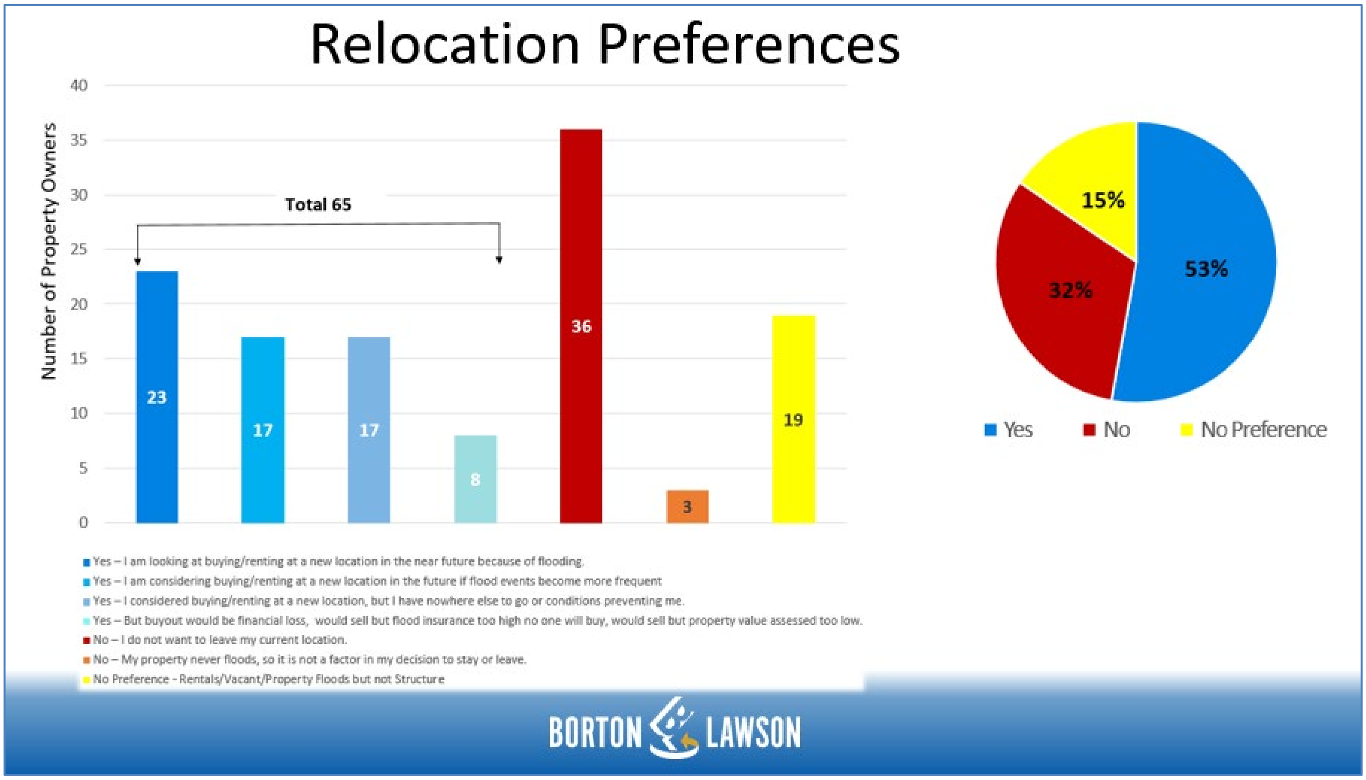

Figure 3.6 Summary of Responses from Relocation Survey Question

- The majority of respondents reported having witnessed a range of negative impacts to the community as a result of flooding, including loss of electricity, lack of clean drinking water, damage to personal possessions, and concerns for personal safety.

3.7 Summary of Stakeholder Meetings

The Study team Mitigation alternatives are classified into either structural (earthen levee/flood wall) or nonstructural (home acquisitions, elevation raisings, flood proofing, etc). The Study will evaluate induced flooding as a result of structural alternatives and financial impacts to the municipality as a result of nonstructural alternatives.

Municipal officials were provided a color-coded parcel map that identified approximate extents of Tropical Storm Lee flooding as well as vacant parcels, buyout parcels, and parcels located within the FEMA designated floodway and floodplain. Municipal officials were asked to provide feedback on the accuracy of the maps.

Montour Township

Study Area Properties

Buyouts (FEMA)	10	
Buyouts (Proposed)	1	
Floodway	7	
Floodplain (Zone AE)	24	
Vacant	19	
Mapped Out	2	
Total	**63**	
Commercial	6	9%
Residential	29	46%
Vacant	27	43%
No Land Use	1	2%
Total	**63**	

Property Values

Fair Market Value (Assessment)	$2.7 M
Assessed Value	$1.4 M
Fair Market Value (CLR)	$5.8 M

Taxes

Municipal	$14,733	19%
County	$13,823	18%
School	$49,777	64%
Total	**$78,333**	

The following items were discussed at the meeting:

- 9 Perry Avenue was identified for acquisition.
- The County building located on Perry Avenue has experienced frequent flooding damage and is currently not used except for the rear of the building which is still utilized by the maintenance department.
- Most of the mobile/manufactured homes located within the mobile/manufactured homes park on Perry Avenue were flooded as a result of Tropical Storm Lee. The preliminary FEMA mapping shows the SFHA increasing on this property.
- The Montour Township ordinance regulates the 500-year floodplain by requiring permits for any development within this zone.
- An evacuation plan is required from the RV park by the township ordinance. Regulations are not followed and an evacuation plan has not been provided as of this time.
- The Township is interested in buying out a property along Hemlock Creek where inoperable vehicles are stored on the property and near the creek.
- There are three (3) sanitary pump stations located within the study area that are impacted by flooding.
  - Pump Station on Hock Road becomes inundated and needs to be raised.

- ➢ Pump Station on Perry Avenue has had electrical components raised.
- ➢ Design has been completed to raise the electrical components of the pump station located near the campground.

Hemlock Township

Study Area Properties

Buyouts (FEMA)	37	
Buyouts (Proposed)	18	
Floodway	12	
Floodplain (Zone AE)	25	
Vacant	25	
Mapped Out	9	
Total	**126**	
Exempt	56	44%
Commercial	2	2%
Agricultural	1	1%
Residential	58	46%
Vacant	9	7%
Total	**126**	

Property Values

Fair Market Value (Assessment)	$3.1 M
Assessed Value	$1.5 M
Fair Market Value (CLR)	$7.9 M

Taxes

Municipal	$14,894	15%
County	$17,705	18%
School	$63,755	66%
Total	**$96,354**	

The following items were discussed at the meeting:

- A large number of buyouts occurred as part of an HMGP Project (~2013) after Tropical Storm Lee in 2011. Properties that withdrew or were administratively withdrawn include:
  - 24 William Street
  - 270 William Street
- It was asked if the properties within the study area are renters or owners. The Township replied that properties are primarily owner occupied.
- It is noted that many of the homes located along the upper side of Drinker Street, though situated on higher ground, still experience significant basement flooding. 399 Drinker Street was highlighted as experiencing basement flooding to the floor joists during Tropical Storm Lee.

- Evacuation Routes and Planning are a priority for the Township as many properties become isolated when Fishing Creek flooding occurs. Red Mill Road floods blocking evacuation to the west and Bloom Street/Creek Road floods blocking evacuation to the east.
- A potential solution could be the construction of a gated stone road connecting Hassert Lane to Laurel Drive to serve as an emergency evacuation route. Hemlock Township officials replied that there is an existing field road from Red Mill Road that has been used by emergency services to reach otherwise inaccessible areas. A deep gully between Hassert Lane and the Ferncliff Road community would prevent these residents from utilizing this potential evacuation route if Bloom Street is flooded unless a bridge or culvert was constructed across the gully.
- A solution providing an alternative exit route does not solve the issue of flooding along Creek Road. Township officials are interested in a plan to raise the profile of Creek Road above the floodplain.
- The implementation of a structural flood mitigation solution in the West End of Bloomsburg would result in induced flooding on the opposite bank in the community of Fernville. Induced flooding could impact homes which are not currently impacted or homes which have already been elevated. A structural option such as a floodwall or earthen levee would be required to include a mitigation component for impacted communities upstream and downstream of the project.
- Hemlock Township has a sewer co-op. A sanitary pump station located at Red Mill Road and Drinker Street has been elevated.

Town of Bloomsburg

Study Area Properties

Buyouts (FEMA)	11
Buyouts (Proposed)	1
Floodway	106
Floodplain (Zone AE)	118
Vacant	17
Mapped Out	0
Zone X	41
Total	**294**

Property Breakdown

Exempt	24	8%
Commercial	23	8%
Commercial Apartments	7	2%
Agricultural	1	
Residential	221	75%
Vacant	16	5%
No Land Use	2	
Total	**294**	

Property Values

Fair Market Value (Assessment)	$17.4 M
Assessed Value	$ 8.6 M
Fair Market Value (CLR)	$44.7 M

Taxes

Municipal	$157,730	24%
County	$110,278	17%
School	$397,119	60%
Total	**$665,128**	
Floodway	$341,345	51%
Floodplain	$242,283	36%
Zone X **(Not in Total)**	$ 73,234	11%
Total	**$583,628**	**87%**

The following items were discussed at the meeting:

- Bloomsburg differs from the other municipalities in that approximately 40 percent of the study area is located in the Floodway. In addition, the majority of the 226 acre Bloomsburg Fair parcel is located in the Floodway. No new construction or substantial improvement is allowed in the Floodway.
- The Town participates in the FEMA CRS program and is a Class 7 Community.
- The Town is very active in providing flood information to its citizens through its webpage, public meetings and mailings.
- The Town is concerned about the loss of tax revenue if properties are acquired and demolished.
- The Town expressed an interest in Mitigation Reconstruction for homes in the Floodplain.
- The Town indicated they would like a stream gauge on Fishing Creek to monitor stream flows and flood occurrences from Fishing Creek to the Town.

Bloomsburg Fairgrounds

The Fairgrounds leadership provided Economic studies held on the fairgrounds. The Bloomsburg Fair Assessment completed by the Bloomsburg University Center for Community Research and Consulting (2012) estimated the direct spending to the Fair was $26.8 million dollars. Using the economic multiplier for Columbia / Montour region the total economic impact was $30.5 million. The 2012 Covered Bridge Festival completed by the Research Media students at Bloomsburg University showed a direct economic impact of $8.6 million and an overall economic impact of $14.2 million dollars.

It was discussed that the depth of flooding was too deep to consider dry floodproofing methods.
The Fairgrounds advised that the Exhibition Halls had the utilities relocated above the BFE.

Several of the newer buildings were constructed with flood vents and in compliance with the Town's floodplain regulations.

The Fairgrounds would provide insurance information since the county parcel data does not provide individual values.

Other Stakeholders

Virtual meetings were held with representatives of Bloomsburg University, Bloomsburg Area School District and the Geisinger Healthcare System.

Bloomsburg University

The University had one property located on Main Street acquired and demolished following the 2011 Lee Flood event.

Flood events impact the University in multiple ways. Staff and students cannot travel to the University nor can supplies be delivered.

Water supply and electrical power disruptions last for days after the water recedes. They noted that the water company relocated some of its facilities to make the system more disaster resistant. The electrical substation was being relocated out of the flood plain.

The University operated a gauge on Fishing Creek in prior years but the program is no longer active.

Bloomsburg Area School District

A meeting was held with the Bloomsburg school district administrative staff. Key feedback we received from the school district was their primary concern with a loss of school tax revenue with the implementation of the flood mitigation alternative for property acquisition and demolition. The school district high school and middle school property has a recently constructed flood risk mitigation system (i.e levee system) around the perimeter of the property.

Geisinger Health System

Similar to Bloomsburg University, the major impact of flood events is the ability to access Geisinger facilities. The hospital is located in Bloomsburg and the main Geisinger Hospital is located approximately ten miles away via Route 11.

Since 2011, Geisinger has upgraded the water distribution system at the Bloomsburg Hospital. Also, a mass notification system using emails and texts was implemented to keep staff informed of changing conditions.

In summary, the common concerns were:

- Access;
  - Route 11 to Geisinger Danville
  - Staff
  - Supplies
- Loss of Utilities;
  - Electric
  - Water
- BASD and University – Impact to students;
- Municipalities, BASD – Loss of tax base;
- Fairgrounds – Loss of revenue, loss of service to community.

Since 2011, the following mitigation actions have been completed:

- Drinking water Treatment Plant was rebuilt;
- Upgrades made to the PPL Substation / Distribution System;

- 2 Levee Systems have been constructed.

3.8 Study Webpage & Study Contacts

As part of the public outreach a Study Webpage was hosted by SEDA-COG at https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigtion-studies.

A study email was hosted by Borton Lawson at floodstudy@Borton Lawson.com.

The web site allowed users to obtain information on Public Meetings, the project schedule, surveys and the ability to contact the study team for questions and comments via email.

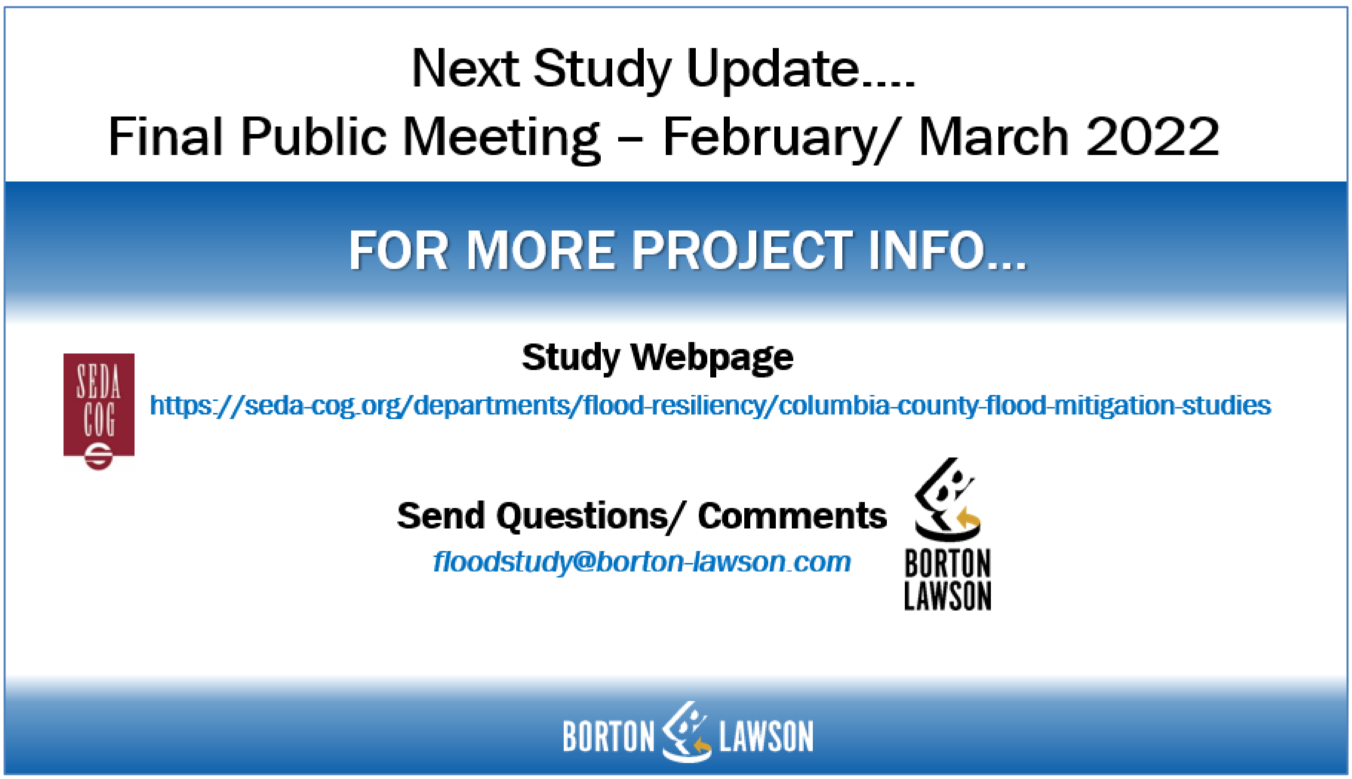

Figure 3.7 Study Webpage and Contact Information

SECTION 4 - FLOOD HAZARD IDENTIFICATION AND PROFILING

4.1 Location and Extent of the Flood Hazard

The preliminary (2022) FEMA FIRM for the West End study area shown below demonstrates the vast extents of the 100-year floodplain in this area. The floodplain shown is for a concurrent flooding event on the Susquehanna River and Fishing Creek. The wide floodway is due to Fishing Creek overbank flows at the base flood levels absent concurrent river flooding.

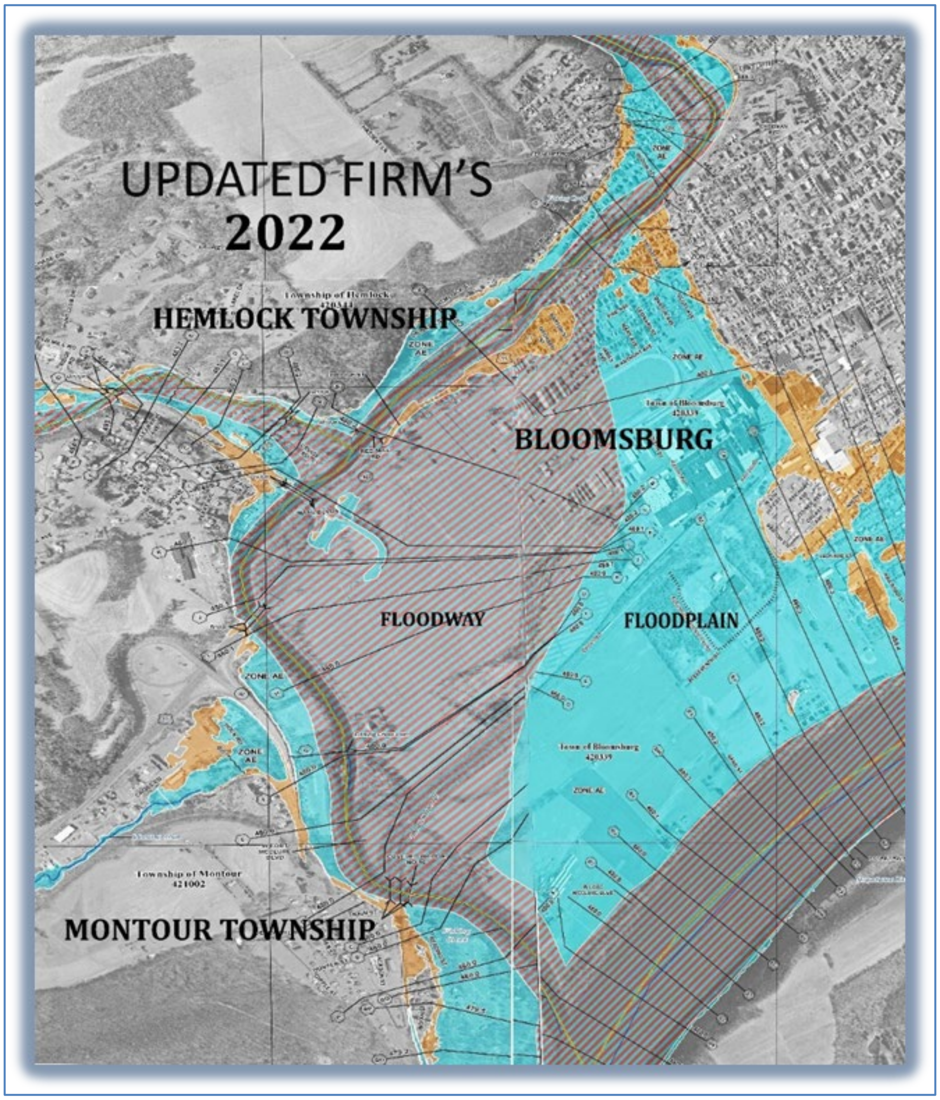

Figure 4.1 Preliminary FEMA FIRM in Study Area

4.2 Nature of the Flood Hazard / Types of Flooding

There are two sources of flooding in the West End study area of Bloomsburg. The first is backwater flooding from the Susquehanna River and the second is overbank flooding from Fishing Creek which tends to be a much more destructive flooding hazard due to the velocity of the floodwaters.

With the very large watershed of the river, over 10,500 square miles, the river usually lags by a day or two any flood events on Fishing Creek, which has a much smaller watershed of 355 square miles. In the FEMA Flood Insurance Study (FIS), the 100-year flood profile notes that BFE's in Fishing Creek are controlled by backwater from the Susquehanna River to approximately Leonard Street. Upstream of this point the FIS shows the BFE's on Fishing Creek exceed the BFE's on the Susquehanna River. Examination of the flooding data for the H&H analysis of this study revealed two recent cases when the flooding from Fishing Creek caused damages that were unrelated to the river level as the creek was cresting. The first was in the Storm Lee flooding of 2011. Fishing Creek flooded at record levels the day before the river crested. The overbank flows from Fishing Creek caused wide spread damage as shown in the History of Flooding section below. Severe damage at the Railroad Street bridge roadway approach (See Figure 4.2 below) and in the residential area of Fernville near and upstream of Railroad Street occurred a day before the river crested.

Figure 4.2 Fernville Side of Railroad Street Bridge – 2011 Tropical Storm Lee

In 2018, Fishing Creek recorded its fourth highest flooding level of all time. The Susquehanna River crested two days later but with little impact on the areas impacted by Fishing Creek.

These flood events, seven years apart, help explain why the residents of the West End fear flooding from Fishing Creek more so than flooding from the Susquehanna River, even though the Susquehanna River is responsible for 80% of the high stage flooding.

Any flood mitigation alternatives must consider both types of events, especially for high velocity out of bank creek flows as compared to the lake effect of river backwater.

4.3 History of Past Flooding

Communities along the Susquehanna River have long experienced floods of devastating proportions.

Native Americans first told of serious floods occurring about every 14 years along the Susquehanna River. Since the early 1800s the main stem Susquehanna River has flooded on average once every 20 years. Table 4.1 below ranks the top flood events for Fishing Creek and the Susquehanna River over the last 85 years.

Table 4.1 Ranking of Major Floods

Major Floods Ranked							
Fishing Creek @ West End of Town					**Susquehanna River**		
Return Period	COE Modelling Updated with Lee Event 2011	Rank	Date		Recurrence Interval	Rank (Floods after 1920)	Date
500 yr	*89,600*				**500 yr**		
350	78,700	1	**2011**		**250 yr**		
250 yr	*75,300*					1	**2011**
100 yr	*58,900*					2	**1972**
95	57,900	2	**2006**		**100 yr**		
50 yr	*48,200*					3	**2006**
45	43,400	3	**1972**		**50 yr**		
35	42,000	4	**2018**			4	**1936**
30	41,300	5	**1975**			5	**1975**
25 yr	*38,800*					6	**2004**
14	29,900	6	**1996**			7	**1996**
10 yr	*28,000*					8	**1940**
		7	1976		**25 yr**		

Stream flow data covers past 85 years.

The top 5 major floods on Fishing Creek have all occurred in the last 50 years (1972, 1975, 2006, 2011, 2018).

Generally, river flooding occurs at the same time as the creek flooding, except in 2018.

Creek flooding can precede river flooding, which happened in 2011.

Figure 4.3 shows high water marks on a barn at the Fairgrounds to demonstrate the frequency of flooding.

Bloomsburg Fairgrounds

High water marks on barn behind grandstand

35 floods impacted Fairgrounds over last 120 years

1972 (Agnes Flood) 6 inches higher than Base Flood, has essentially become the new reference for the "100-Year" Flood

Figure 4.3 High Water Marks at The Bloomsburg Fairgrounds

Figure 4.4 indicates the five (5) most severe events on Fishing Creek, four (4) were accompanied by high Susquehanna River flood levels.

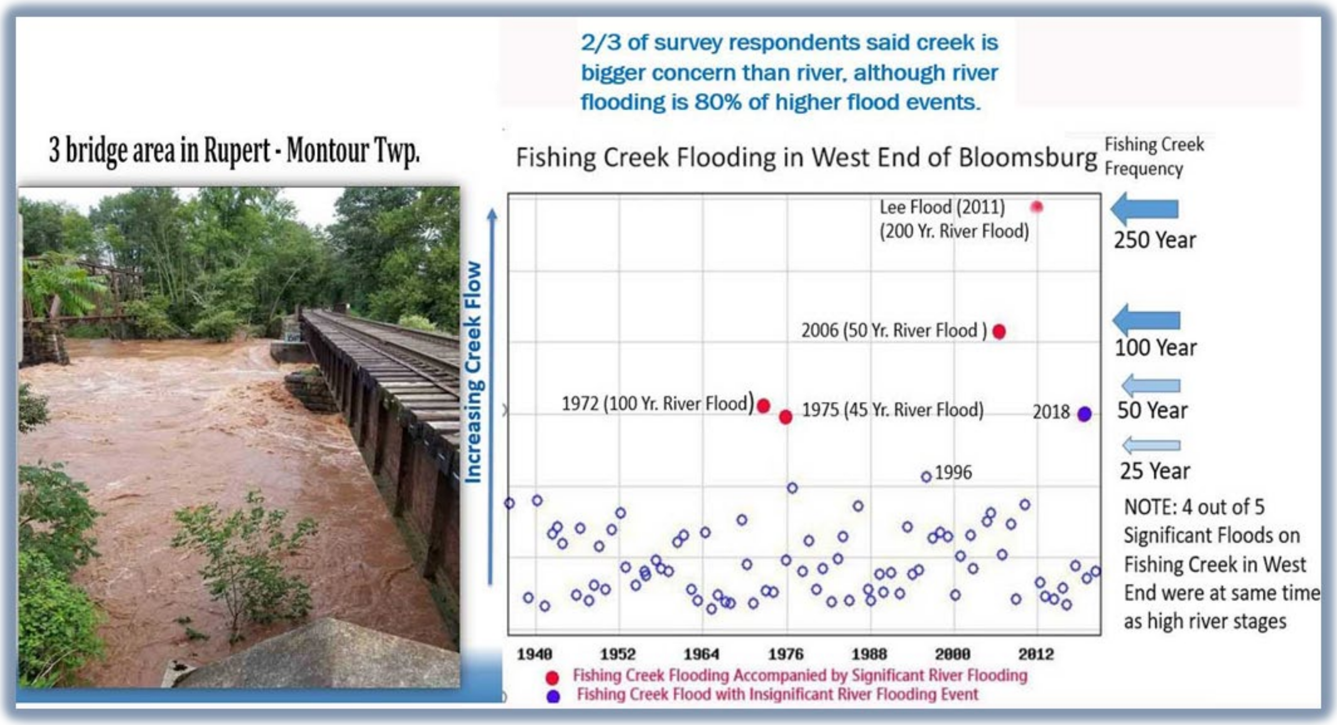

Figure 4.4 Fishing Creek Flooding Data

The Fishing Creek flooding of 2011 was devastating to the lower West End. Record Creek flooding preceded the river flooding. See Figure 4.5 below. The 2018 Creek flooding in the West End reinforced the residents' fears of creek flooding as their biggest concern. Water moves with a destructive velocity.

Figure 4.5 Year 2011 Fishing Creek Flood Damage at Route 11 near Route 42

4.4 Significant Historical Flood Events

The following is a summary of the most significant Susquehanna River and Fishing Creek floods that affected Bloomsburg and surrounding communities. The events are described in a time sequence, beginning with the most recent significant event.

August 2018 - Fishing Creek Flood

After several days of heavy precipitation in Columbia County and many other parts of Pennsylvania, Fishing Creek flowed over its banks in the West End of Bloomsburg. The creek flows were the fourth highest ever recorded and occurred only seven years after the record flooding of Tropical Storm Lee in 2011. Street flooding occurred in Bloomsburg and adjacent communities. Some properties below Railroad Street along Fishing Creek experienced basement flooding. Upstream of Railroad Street in Fernville, the water rose to within 3 feet of the 2011 flood levels.

The unique nature of this flood event on Fishing Creek was the relatively low level of the Susquehanna River flooding which crested at a 22.7 foot stage or 3 feet above flood activation stage. It was the 23rd highest crest on the river, two days after Fishing Creek crested at its 4th highest crest ever.

September 2011 - Storm Lee Flood

In September 2011, the remnants of Tropical Storm Lee dumped significant amounts of rain over nearly all central and eastern Pennsylvania resulting in some of the worst flooding in the region's history. The most severe flooding affected municipalities along the entire Susquehanna River including Bloomsburg, Danville, Wilkes-Barre, Sunbury, and Harrisburg. President Obama issued a major disaster declaration for the state of Pennsylvania on September 12, and it is estimated that over $1 billion dollars in losses resulted from the impacts of Tropical Storm Lee.

The Town of Bloomsburg and surrounding communities experienced major flooding in areas along the Susquehanna River (south), Fishing Creek (north and west), and the West End at the confluence of the Susquehanna River and Fishing Creek. The Susquehanna River in Bloomsburg crested at over 32.75 feet making Tropical Storm Lee the highest flood on record. A Geographic Information Systems (GIS) analysis estimated that 2,400 structures may have been damaged by flood waters.

The flooding of Tropical Storm Lee created a groundswell of support for flood mitigation projects in Columbia County that has resulted in completion of two flood mitigation systems since that time.

January 1996 Flood

Torrential rains and massive snowmelt from the Blizzard of 1996 caused the Susquehanna River to crest at 26.76 feet at Bloomsburg in January. The blizzard covered much of Pennsylvania with several feet of snow by 13 January. All Pennsylvania counties were included in a Presidential Disaster declared on 21 January in response to flooding from rapid melting of the snow. The flooding forced hundreds of Bloomsburg and Fernville residents to be evacuated, and flooding of the water treatment plant left residents without water for several days. The Federal Emergency Management Agency (FEMA) estimated that the agency provided over $2.2 million (1996 dollars) in aid to Columbia County as a result of the blizzard and subsequent flooding.

September 1975 - Storm Eloise Flood

The September 1975 flood was caused by Hurricane Eloise which was one of the deadliest Category 3 hurricanes ever recorded. The storm weakened rapidly after landfall and was downgraded to a tropical storm while over east central Alabama, and further downgraded to a tropical depression while over eastern Tennessee. The storm was downgraded to an extratropical depression while located over West Virginia, but the remnants of the storm merged with a stationary front over New York, Pennsylvania and Maryland on 23 September, producing major flooding throughout the Susquehanna River Basin. Bloomsburg's gauge registered a crest of 27.50 feet on 27 September, and parts of Main Street were covered with two feet of water.

June 1972 - Tropical Storm Agnes

Devastating floods occurred across the Mid-Atlantic region due to the remnants of Hurricane Agnes in late June 1972. Hurricane Agnes came onshore over the Florida Panhandle during the afternoon of 19 June. The storm weakened to a tropical depression over the Carolinas only to re-intensify to tropical storm strength as it reached the Virginia coast on 21 June. The storm then moved north, weakening to extra-tropical strength as it passed just west of New York City, and before curving to the west across central New York. The storm then looped back to the east, crossing northern Pennsylvania before dissipating.

The remnants of the storm moved slowly across Pennsylvania. Rainfall amounts throughout central Pennsylvania for the four-day period of 20 June to 24 June typically ranged from 8 to 10 inches. The heaviest rain (12 to 16 inches) fell in a corridor from Williamsport, Pennsylvania, south through Harrisburg and York. The heaviest reported 24-hour rainfall was recorded at Harrisburg, Pennsylvania, where 12.53 inches fell between 8:00pm on 21 June and 8:00pm on 22 June.
The heavy rains from Tropical Storm Agnes followed a relatively wet May, in which 3 to 4 inches of rain fell across the area, and grounds were nearly saturated. As a result, the Susquehanna River at Bloomsburg crested at 31.20 feet on 25 June, with an estimated discharge of 350,000 cubic feet per second (cfs).

Fifty deaths were attributed to Tropical Storm Agnes in Pennsylvania. In 1972 dollars, total damages from Tropical Storm Agnes reached over $3 billion dollars nationwide, with over $2 billion dollars in losses occurring in the Susquehanna River basin.

Agnes forced large-scale evacuations in Bloomsburg and produced widespread destruction of personal property. Residents returned to their homes one week after the flood crest to find flooded basements, saturated first and second floor drywall, ruined flooring and furnishings, no working utilities, raw sewage, and looming threats from electrical and natural gas fires. Curfews were in place, requiring the closure of some businesses. Fuel leakage and the threat of fire forced the Town to institute a smoking ban from the top of Scottown Hill to the 12th Street shopping area. Refuse disposal and burning was another storm-related problem that was compounded by flood-related closure of the Town's landfill.

March 1936 Flood

The March 1936 flood required massive rescue and relief efforts in the Bloomsburg region. Heavy snow accumulations melted rapidly as temperatures suddenly warmed in February. In addition to the rapid snowmelt and ice flows on the river, 17 March brought 24 hours of heavy rains. The flood crested at 27.8 feet on 19 March in Bloomsburg with an estimated peak flow of 232,000 cfs. Rail traffic was suspended. Magee Carpets was severely flooded, and damage was extensive, despite efforts to move more than 50 motors to the second floor and 24-hour operation of 14 large pumps.

Widespread flooding that caused major damage in several large river basins, including the Susquehanna and Ohio River basins in 1936, led Congress to pass the Flood Control Act of 1936, and later, the Flood Control Act of 1938.

March 1904 Flood (Ice Jam)

The 1904 March flood was a culmination of flooding events that began in January of that year. The river was clogged with ice in January. The rapid rise of water flooded lowlands all along the Susquehanna. Two weeks later, the river rose again. On 9 February, the Berwick Bridge was ripped away by floodwaters and portions were carried downstream to Mifflinville. Flood conditions eventually improved, and area residents believed that warm rains would help to disperse the ice and prevent further ice jam flooding. However, March gave rise to a third, and even more disastrous flood for the region. A notable impact of this flood was the deposition of multi-ton ice blocks in fields as far as one half-mile from the Susquehanna's banks.

Additional Flood Events

Other notable floods have been recorded at the Bloomsburg, Susquehanna River gauge in 1850, 1865, 1902, 1913, 1940, 1943, 1946, 1948, 1960, 1964, 1979, 1984, 2004 and 2005.
Based on the magnitudes of the floods and the flood-prone areas within the Town, it is likely that the study area would have been impacted.

4.5 Future Without-Project (Flood Mitigation) Conditions

In the absence of flood mitigation actions in the study area, flooding problems associated with storms over the Susquehanna River and Fishing Creek watersheds are expected to worsen due to changing climate patterns.

The no-action alternative (future with no project) reflects the continuation of existing economic, social, and environmental conditions and trends within the affected area. Implicit in taking no action would be enforcement of local floodplain management ordinances, and the continuation of flood insurance coverage for properties within the 100-year floodplain as is currently available to property owners through the NFIP.

The Town of Bloomsburg also participates in the CRS, an incentive program within the NFIP that rewards communities with discounts on flood insurance policies based on pro-active steps the community takes to reduce or avoid flood damage and foster comprehensive floodplain management within its boundaries. For CRS participating communities, flood insurance premium rates are discounted in increments of 5 percent. For example, a Class 1 community would receive a 45 percent premium discount, while a Class 9 community would receive a 5 percent discount (a Class 10 is not participating in the CRS and receives no discount). The CRS classes for local communities are based on 18 creditable activities, organized under four categories: (1) Public Information, (2) Mapping and Regulations, (3) Flood Damage Reduction, and (4) Flood Preparedness. Bloomsburg is rated as a Class 7 community, and flood insurance policy holders receive a 15-percent premium discount.

Failure to provide flood mitigation measures could with the occurrence of a significant flood, contribute to the loss of life, as well as physical property and environmental damage. Significant flooding can result in the overtopping of sewage treatment works, contamination of drinking water supplies, dispersion of HTRW and massive quantities of solid waste. Experience has shown that vast quantities of debris (homes, vehicles, mobile homes, etc.) and sediment must be removed from the floodplain after a flooding event. The physical removal of the debris from the floodplain typically involves large, heavy equipment and requires the removal of trees and vegetation to provide points of ingress and egress for the cleanup equipment. Hauling the collected debris to the local municipal landfill requires significant transportation resources, and involves huge quantities of solid waste that deplete available landfill space. In addition to debris removal, the preparation, placement, and removal of sandbags in attempts to reduce damages from flood events requires hundreds of volunteer and municipal man-hours at significant cost to the community.

Previous floods in Bloomsburg and its surrounding communities, especially the 2011 Lee Flooding from the Susquehanna River and Fishing Creek, have caused widespread damage to residential and commercial structures, industrial facilities, publicly owned facilities, municipal infrastructure, and vehicles. In areas with recurring flooding, homes tend to become more degraded over time because money that could have been used for general improvements is used for flood repairs. Over time, the market value of real estate property diminishes and negatively impacts local tax revenues. Recurring flooding also requires the expenditure of local tax revenues for flood-fighting, clean-up, infrastructure repair and emergency response. This diverts local revenues from infrastructure and recreation improvements from all of Bloomsburg, not just the flooded areas. Damage to commercial and industrial facilities ripple through the economy when businesses are forced to close, lay-off workers, and cease production for several weeks. In the long-run, permanent tax and employment losses will occur if owners of commercial and industrial facilities are no longer willing to endure recurrent flooding.

Existing conditions are not expected to undergo significant change during the period of analysis (2022-2072). The physical setting is expected to remain unchanged over the planning period, specifically: geology, physiography, topography, and soils. In addition, no significant changes are anticipated for cultural and historic resources, air quality, noise, HTRW, aesthetics, and infrastructure.

If flooding continues unmitigated, a change is expected in the density of housing and commercial establishments. This could have a significant impact on the tax base of each community, especially in Bloomsburg. Hemlock and Montour Townships have aggressively pursued buyouts and elevations to the point that future additional home buyouts will have a minor impact on the tax base for those municipalities.

4.6 Existing Conditions - Susquehanna River and Fishing Creek Flow Analysis

As the impacts of the Susquehanna River on the study area during Tropical Storm Lee and other historic floods are more documented and better understood, the development of the hydraulic model for the West End Flood Mitigation Study focused on the larger flood events caused by Fishing Creek with probabilities of occurrence of 1% or less. The FEMA Effective Hydraulic Model used to develop the regulatory FIRM and BFEs for Fishing Creek was created using HEC-2, which is a hydraulic modeling software developed by the USACE in 1968. This FEMA model was created in 1977 and has not been officially updated since.

Since the Effective Model of Fishing Creek was created by FEMA in 1977, additional data and information has become available which was applied to the model to obtain a more accurate hydraulic analysis. The following adjustments were made to create a more accurate hydraulic model of Fishing Creek.

An existing conditions model was created for this study using the USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) which superseded HEC-2 in 1995. The existing conditions model was created by transferring the original HEC-2 data into HEC-RAS and adding additional cross sections to the model at areas of interest. Cross section geomotries were revised using newly obtained aerial topography of the study area. Hydraulic parameters were adjusted to target high water marks identified from historical flood events, including Tropical Storm Lee as the flood of record.

Revisions to the existing model are outlined below.

Several iterations of proposed conditions modeling were performed with separate objectives:

1) Evaluate structural flood mitigation options (levees, floodwalls) for the West End of Bloomsburg which produce the greatest benefits to the community while resulting in the least amount of induced flooding in adjacent communities, and

2) Analyze mitigation actions aimed toward lowering any induced flooding to zero.

Each analysis is discussed below. A summary table containing the results of each alternative is provided in Appendix A-1.

1. SR 4003 Bridge Removal

The SR 4003 (Red Mill Road) Bridge incurred extensive damage in the Tropical Storm Lee Event and documentation obtained from the Pennsylvania Department of Transportation (PennDOT) regarding the damaged bridge indicates that the bridge collected substantial amounts of debris with an underwater inspection noting significant scour/erosion around the bridge's piers and footings.

Although the SR 4003 bridge over Fishing Creek was in place during Tropical Storm Lee, the bridge incurred significant structural damage such that the bridge was demolished by PennDOT after September 2011 and not replaced. Since the SR 4003 Bridge no longer exists, the bridge geometry was eliminated from the Existing Condition Model of Fishing Creek.

2. Railroad Street bridge Geometry Changes

The nearest upstream structure to the former location of the SR 4003 bridge is the SR 7210 Bridge, known locally as the Railroad Street Bridge. This structure was originally built in 1939 and replaced in 2010. The Effective FEMA Model includes the original structure consisting of two spans and one pier. The replacement structure consists of three spans with two piers and was modeled accordingly in the Existing Conditions Model.

3. Design Flows

The design flows used in the Effective FEMA Model were taken from the FEMA Flood Insurance Study (FIS) which has not been revised since the information was originally published in 1979. As a result, this data does not consider the Tropical Storm Lee flood of record, nor does it consider several other high flow events which occurred in the twenty years between 2000 and 2020. As discussed in detail in Appendix A of this report, a new hydrologic analysis was performed as part of the West End Flood Mitigation Study to ensure all recent flow events have been incorporated in determining present design flows. These newly computed flow rates were compared to flow rates derived by the USACE using similar methodologies following Tropical Storm Lee.

The flows selected for use in the Existing Conditions Model were taken from a USACE Study conducted in 2012 to incorporate data from the Tropical Storm Lee event. The flow value for the 100-year event at the confluence of Fishing Creek and the Susquehanna River differs from the FEMA effective flows by just 400 CFS. It is a more conservative value. This design flow is applied to the entirety of the model to avoid coding flow changes at Hemlock Creek and Montour Run and to maintain a constant, conservative design flow throughout the study area.

4. Ineffective Flow Areas

Ineffective flow areas are used to represent locations where water exists but there is no conveyance of flow due to an obstruction in the channel or floodplain. These were inserted into the Existing Conditions Model in those portions of the channel and floodplain that are blocked by railroad and/or bridge and roadway embankments. These areas were converted back to effective areas at a ratio of 1:1 upstream of the embankments and a ratio of 2:1 downstream of the embankments.

The stationing and elevations of ineffective flow areas around each of the bridge openings contained in the Existing Conditions Model were examined and adjusted to be consistent with the span of the bridge and the overtopping elevation where a significant amount of flow begins to overtop the bridge.

Ineffective flow areas are most prominent between the Route 42 bridge and the Route 11 Bridge due to the interchange situated in the floodway of Fishing Creek. This is also the point at which flow from Fishing Creek splits to either flow beneath Route 42 or across the fairgrounds property as shown in Figure 4.6.

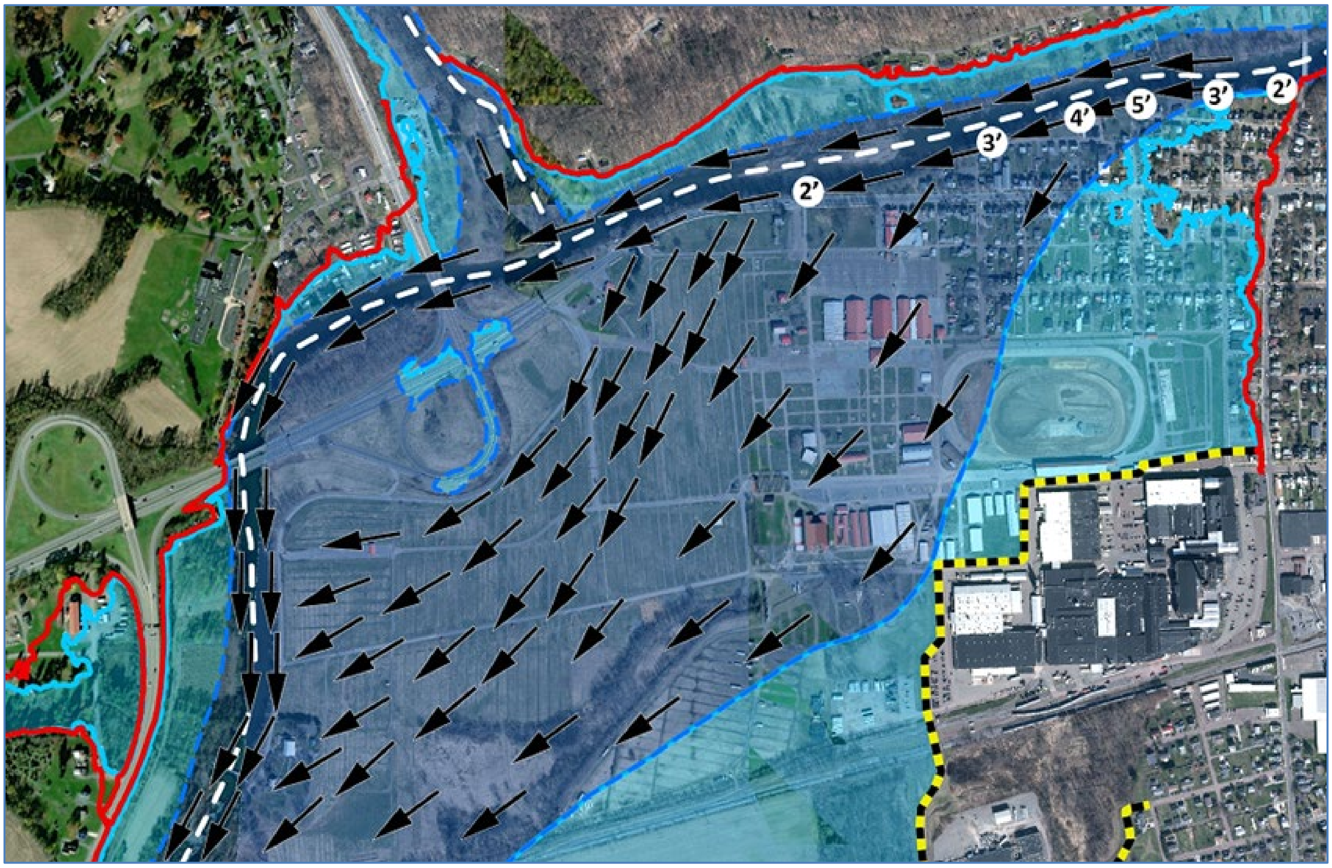

Figure 4.6 Flow Vectors of Fishing Creek and Floodway

5. Contraction/Expansion Coefficients

Contraction/expansion coefficients are used in one-dimensional hydraulic modeling to account for energy losses that occur when flow must transition into or out of a narrower cross section. Adjustments of the contraction/expansion coefficients were made to calibrate the model to known United States Geological Survey (USGS) high water marks existing in the adjacent floodplain in Hemlock Township or because the presence of islands within the channel have already been accounted for by increasing the Manning's Roughness Coefficient.

6. Manning's Roughness Coefficients

The Manning's Roughness Coefficient is a variable within the Manning's Equation used in open channel flow hydraulics to represent resistance or friction applied to flow by the channel. Manning's Roughness Coefficients for the main channel of Fishing Creek were mostly retained as coded in the effective FEMA model (0.035), except for the channel downstream of the Railroad Street Bridge. Downstream of the Railroad Street Bridge, the channel roughness was increased to a maximum value of 0.045 to reflect the presence of large, vegetated islands within the channel cross section. Accounting for vegetated islands by increasing Manning's Coefficient is reasoned to be a more appropriate method than using contraction/expansion coefficients because the model only focuses on high flows during which the existing islands are fully submerged, thus the streamflow experiences the islands as additional resistance in the channel rather than having to maneuver around them.

Similar upward adjustments to the Manning's Roughness Coefficients were made in the overbank areas of the creek to reflect heavily forested areas and dense residential development such as the West End of Bloomsburg.

Manning's Roughness Coefficients in the right floodplain in the Fernville area were reduced to reflect the considerable number of home acquisition/demolitions that have occurred since Tropical Storm Lee in 2011. The lot on which a demolished home once stood is required to be maintained perpetually as green space by the municipality.

7. Floodplain Geometry

Light Detection and Ranging (LIDAR) topographic data, collected in 2021 to support the West End Study, was used to develop the revised geometry within the floodplain. Existing cross sections from the effective FEMA model as well as any new cross sections added in the existing conditions model were updated using the new topographic data. The topographic data obtained was produced at a resolution of 1' contours and is generally accurate to within 12" in open, unobstructed areas.

The water surface elevation (WSE) at the time the LIDAR was captured obstructed capture of channel topography below the water surface. A bathymetric survey was performed between Barton Street and Red Mill Road to capture more details of the existing island that exists within the channel at this location. No other adjustments to the geometry of the main channel or the right overbank of the floodplain of the Fishing Creek were made.

8. Bridge Geometry

In addition to the topographic survey received from the aerial LIDAR, survey crews performed traditional survey of all bridge structures along Fishing Creek within the study area specifically for this project. Data collected include abutment and pier locations, low chord elevations, and parapet and deck elevations. This data was used to ensure the structure data in the Existing Conditions Model reflects current field conditions.

9. Bridge Modeling Approach

The high flow calculation methods for each of the bridges were reviewed and adjusted to be consistent with the way water was either flowing through, or over and around the bridges, as computed by the model. If much of the flow was computed to be on the floodplain during high flow, the calculation method was adjusted to use the energy equation. This is observed to be the case at Railroad Street Bridge where a large volume of flow is conveyed in the right overbank through the Fernville community.

Conversely, if the flow in the section was computed to be primarily in the main channel of the stream, and the bridge was either partially or fully submerged, the pressure/weir calculations should be used to model the high flows through the bridges.

10. Vertical Datum

The Effective FEMA Model is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29). However, the LIDAR topographic data used to update the floodplain topography within the study area is referenced to the North American Vertical Datum of 1988 (NAVD 88). In order to use a consistent vertical datum or reference elevation, the elevation data used in the Existing Conditions Model was adjusted from NGVD 1929 to NAVD 1988 by subtracting 0.71 feet from all elevation data in the model, including all cross-section elevations, ineffective flow elevations, and bridge geometry elevations.

In addition to the geometric data used in the Existing Conditions Model, the model's boundary conditions that represent the starting downstream water surface elevation from the Susquehanna River as it acts on the Fishing Creek, were also adjusted to the NGVD 1988 vertical datum by – subtracting 0.71 feet from the Effective Model's boundary conditions.

Water Surface Elevations calculated by the Existing Conditions Model are notably higher than those calculated by the FEMA Model, especially in the portion of the model upstream of the Route 11 bridge. The increase is primarily attributed to the presence of large ineffective flow regions which were added in the Existing Conditions Model around the Route 11/Route 42 Interchange as well as revised topographic data in the floodplain. While the disparity between the FEMA Model and Existing Conditions Model is great, existing high-water marks along Fishing Creek correlate very well to the model results for both the 100-year and Tropical Storm Lee events. Appendix F provides a comparison of calculated WSEs to historical observed WSEs for the 100-year and Tropical Storm Lee events. WSEs reported below Washington Street (XS 18.649) may be exaggerated as the limitations of the one-dimensional model do not accurately predict the volume of flow exiting Fishing Creek and flowing across the fairgrounds.

4.7 Analysis of Structural Flood Mitigation Alternatives

Several iterations of proposed conditions modeling were performed with separate objectives:

1) Evaluate structural flood mitigation options (levees, floodwalls) for the West End of Bloomsburg which produce the greatest benefits to the community while resulting in the least amount of induced flooding in adjacent communities, and

2) Analyze mitigation actions aimed toward lowering any induced flooding to zero.

Each analysis is discussed below. A summary table containing the results of each alternative is provided in Appendix A-1.

1. Levee Alternative A-1

Alternative A-1 consists of a levee system beginning at Railroad Street on the left bank of Fishing Creek. This conceptual alignment extends in a south-westerly direction along the bank of the creek before turning inland 90 degrees approximately 200 feet beyond Washington Street (see Figure 4.7 – Alternate 1 alignment is shown in red.). The alignment then proceeds across Gates 3, 4 and 5 of the Bloomsburg Fairgrounds and makes a second 90-degree bend at West 6th street where it ties into the existing flood wall constructed around the Autoneum manufacturing facility. The total length of the Alternative A-1 alignment is 6,200 feet and is comprised of full earthen levee, MSE levee, and concrete-encased sheet pile wall.

Modeling of alternative A-1 reveals that induced flooding depths incurred for the 100-year flood flow reaches a maximum of 2.33 feet near Leonard Street. Induced flooding tapers to zero at the point where the alignment turns to cross the fairgrounds. Above Railroad Street, minimal induced flooding is expected for the 100-year event; this is because the existing backwater created by the Railroad Street Bridge is roughly equivalent to the backwater created by this levee alternative for this event.

Induced flooding occurs because of the alignment obstructing a substantial portion of the regulated floodway. By definition, the regulated floodway is that portion of the channel and overbank areas required to convey the 100-year flood flow with less than 1' of corresponding increase in water surface elevation. By constricting the floodway, water surface elevations are increased in the channel to compensate for lost conveyance in the floodway.

2. Levee Alternative A-2

Alternative A-2 is nearly identical to Alternative A-1 in every aspect except for that the levee turns approximately 350 feet before Washington Street to create a jog in the alignment prior to connecting to the original path across the Fairgrounds. This alternative is designed to minimize the encroachment into the floodway by turning inland from Fishing Creek sooner. Induced flooding under Alternative A-2 is decreased by 0.1 feet during the 100-year flood event (to be verified by 2D modeling during preliminary design).

Figure 4.7 Rendering for Levee Alignment Alternatives A-1 & A-2

3. Levee Alternative A-3

Alternative A-3, shown in below Figure 4.8, involves a shortened levee alignment intended to remove a portion of the floodway in Bloomsburg while providing meaningful reduction of overbank flows along Fishing Creek. This alternative alignment terminates near Barton Street and does not transect the Fairgrounds property to connect to the Phase 1 Autoneum system.

Because Alternative 3 does not tie into the existing floodwall, this alignment does not protect the West End against flooding from the Susquehanna River. However, this alignment does mitigate flood risk from Fishing Creek and brings many residential properties out of the regulatory floodway allowing those residents broader options for nonstructural flood mitigation alternatives such as home elevation or mitigation reconstruction options.

Modeling of alternative A-3 reveals that induced flood depths incurred for the 100-year flood reaches a maximum of 1.46 feet near Leonard Street. Induced flooding tapers to 1.16 feet immediately upstream of the Railroad Street Bridge and and quickly ties back to existing upstream of Fernville.

This alternative was dropped from further consideration due to potential permitting issues.

Figure 4.8 Depiction of Impacts on Floodway Resulting from Alternative A-3

4. Benched Floodplain Alternative A-4

Alternative A-4 considers construction of a benched floodplain and extension of the Railroad Street Bridge into Hemlock Township. This solution was evaluated as an alternative to a structural levee system along the left bank of Fishing Creek.

A benched floodplain approximately 80-feet wide and 10-feet deep was modeled with the intent of providing additional conveyance capacity in Fishing Creek so that the full extent of the floodway through the West End of Bloomsburg is not required. The Railroad Street Bridge was also lengthened for an additional span of 80-feet to increase the effective waterway opening of the bridge. The increased waterway opening is found to reduce backwater upstream of the bridge by 2.6-feet and significantly reduce the overbank conveyance in the Fernville approach of the bridge.

The positive hydraulic benefits of this alternative are limited to the Fernville community of Hemlock Township and do not extend downstream of Railroad Street to the West End Community. This is because multiple locations along Fishing Creek can be considered flow-controlling. Removing one point of constriction at Railroad Street solves a backwater problem upstream; however, increasing conveyance capacity simply moves flow to the next point of constriction downstream. As a result, the West End of Bloomsburg experiences little benefit from this alternative.

5. Fishing Creek Modifications Alternative A-5

Other structural mitigation alternatives along with Alternative 4 above were evaluated in lieu of a levee system in the West End of Bloomsburg. These options are presented in Table 4.2 and demonstrate the ineffectiveness of these options in reducing water surface elevations in the West End of Bloomsburg.

Table 4.2 Reduction in Existing 100-Year Flood Levels for Various Alternatives

Modification Alternatives	Near Hock Road	@ Route 42	@ Leonard Street	Above Railroad Street Bridge
Remove Covered Bridge & Railroad Bridge	2.1 FEET	0.0 FEET	0.0 FEET	0.0 FEET
Remove Route 11 & Route 42 Interchange Ramp Fill	0.0 FEET	0.0 FEET	0.0 FEET	0.0 FEET
Remove Existing Island	0.0 FEET	0.0 FEET	1.0 FEET	0.4 FEET
Excavate Benched Floodplain & Modify Railroad St Bridge (A-4)	0.0 FEET	0.0 FEET	0.0 FEET	2.6 FEET
Remove Railroad Street Bridge	0.0 FEET	0.0 FEET	0.0 FEET	2.3 FEET

6. Induced Flooding Mitigation Alternative A-6

Several options were evaluated for their effectiveness in reducing water surface elevations with a levee system in place. This analysis was only performed for those alternatives which produced the greatest results as a standalone option.

Because induced flooding is created by a levee system due to a reduction of conveyance rather than backwater from a downstream impediment to flow, an alternative to mitigate the induced flooding was evaluated. The focus of this analysis was on an alternative which provided greater conveyance in the channel adjacent to the proposed levee alignment, namely a benched floodplain on the right bank with an extension of the Railroad Street Bridge into Hemlock Township/Fernville.

Implementing this option in conjunction with a levee system along the left bank of Fishing Creek mitigates the induced flooding from a maximum of 2.22-feet to a maximum of approximately 1.1-feet near Leonard Street.

This alternative merits additional study if the structural flood mitigation option for Bloomsburg advances to the design stage.

4.8 Hydraulic Modeling - Risk & Uncertainty

One-dimensional hydraulic modeling of Fishing Creek in the West End of Bloomsburg carries significant uncertainty due to proximity to the Susquehanna River and because of the vast floodplain and complicated flow patterns which exist. One-dimensional modeling limitations include the following:

- 1-D Model only calculates flow in one direction – perpendicular to the cross sections developed by the user. This is a poor assumption in a relatively flat floodplain where flow can easily change direction or pond in storage areas.

- 1-D Model assumes a constant water surface elevation along the entire length of the cross section and does not consider the great variation in water surface that occurs when a stream overtops its banks and flows across the terrain.

- 1-D Model does not effectively differentiate between flow through a bridge structure and flow around the structure in the overbank areas. This can be a significant source of error when selecting a bridge modeling approach.

- Gross assumptions are required when handling spatial changes in cover conditions and assignment of Manning's Roughness Coefficients in densely developed areas such as the West End of Bloomsburg.

Summary:

While 1-D modeling is capable of handling split flow conditions, these situations increase the complexity of the model and require an iterative process to balance energy. This modeling approach is only appropriate when there is a clear, defined flow path in the floodway. When a main channel spills into an unconfined floodplain where a single flow direction is not evident, a 2-D model is more appropriate. Such is the case with Fishing Creek.

4.9 Conclusions

Results of the one-dimensional hydraulic analysis of Fishing Creek indicate that a levee system in the West End will create induced flooding on the right bank of Fishing Creek opposite the proposed levee alignment. These results are expected as any levee alignment around the West End necessarily encroaches into the floodway of Fishing Creek and partially restricts conveyance of floodwaters in this area. Previous levee systems, such as the system around Autoneum, were constructed entirely outside the floodway where very little conveyance occurs resulting in little to no induced flooding.

An accurate determination of the magnitude of induced flooding caused by a levee system in the West End relies on a correct understanding of how much flow is moving through the floodway. That is, how much more flow must the channel convey when it is prevented from utilizing the floodway. The answer to this question determines the additional height of flooding, or induced flooding, that will occur in the channel.

Because a one-dimensional analysis assumes a constant water surface elevation for the channel and the floodplain, it is possible that the amount of flow conveyed by the floodway is being over estimated in the one-dimensional model. If that is the case, obstructing this flow is also likely to overestimate the induced flooding. For this reason, a more detailed two-dimensional analysis of the Fishing Creek floodplain is recommended if a levee system is to be the preferred alternative for flood mitigation in the West End.

Two-dimensional hydraulic analyses utilize a digital terrain model of the ground surface with a user-defined grid size as opposed to linear cross sections used in one-dimensional analysis. The result of this is that flow is calculated in every direction into and out of each individual grid. Two-dimensional modeling requires fewer assumptions and offers much greater representation of actual conditions when working with streams having very wide floodplains, sharp bends, and complicated flow patterns or multiple channels.

Using more advanced modeling approaches is critical toward accurately identifying existing flow in the floodplain, induced flooding caused by a levee system, and the scope, magnitude, and cost of mitigation activities necessary to lower induced flooding.

SECTION 5 - RISK ASSESSMENT

5.1 Flooding Impacts

Several analysis tools were developed for analyzing the flood risk for the three communities. They are:

Base Flood Floodplain vs Storm Lee Flood Limits,
Depth of Flooding Maps,
First Floor Flood Impact Maps.

The base flood floodplain and Tropical Storm Lee Flood limit map is shown below for the West End study area. This mapping was utilized to develop a GIS based inventory of parcels to be evaluated for flooding impacts.

Once the parcels were identified, the depth of flooding of the 2011 Lee flooding and the depth of flooding above the first floor elevation for each parcel was developed with field survey data.

The map shown in Figure 5.1 of the Storm Lee flood level was utilized since it is the current flood of record and it is about 2 feet above the 2022 updated BFE. This mapping facilitated assessment of the flooding impacts for each structure which was directly converted to damages utilizing the FEMA Flood Assessment Structure Tool (FAST).

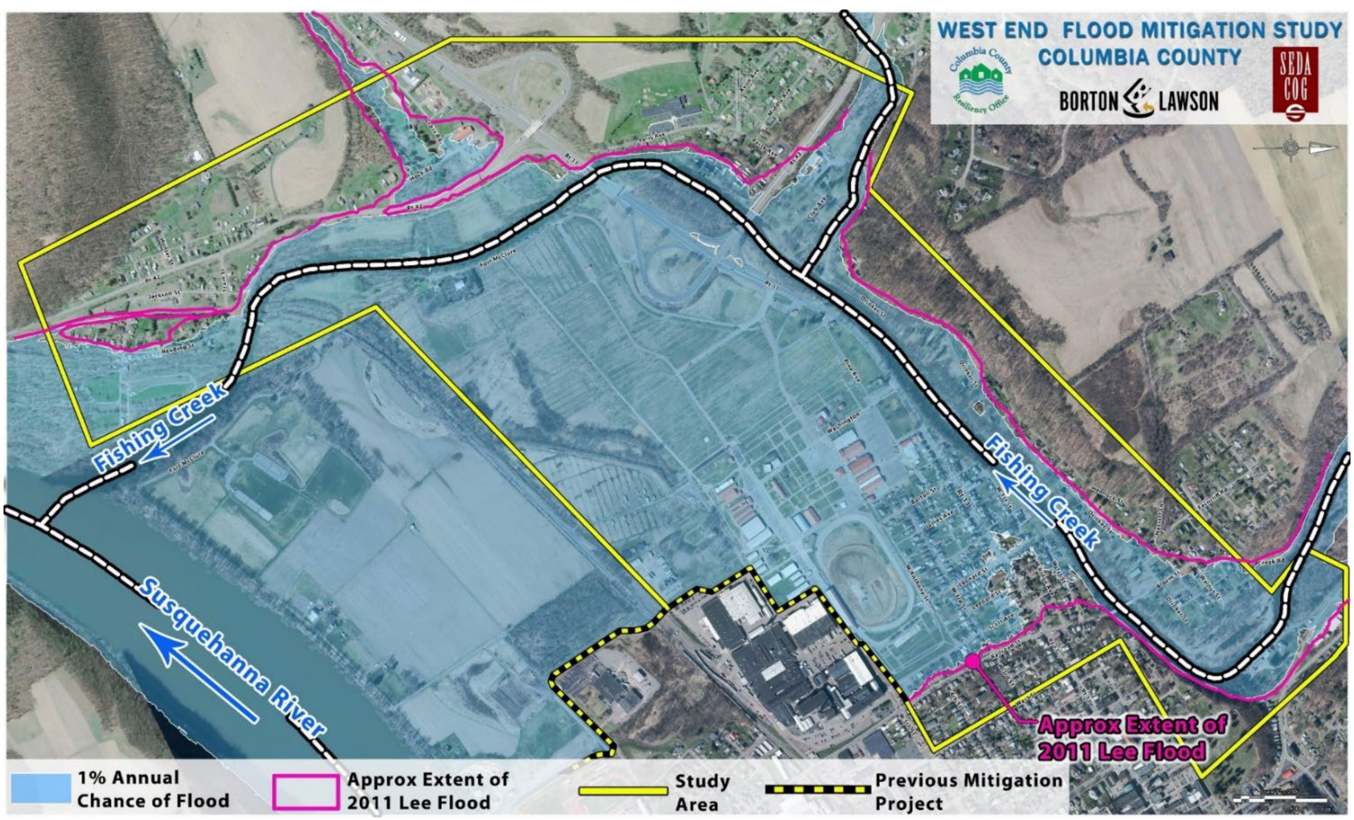

Figure 5.1 Map of Flood Extents, Study Area, and Previous Mitigation Projects

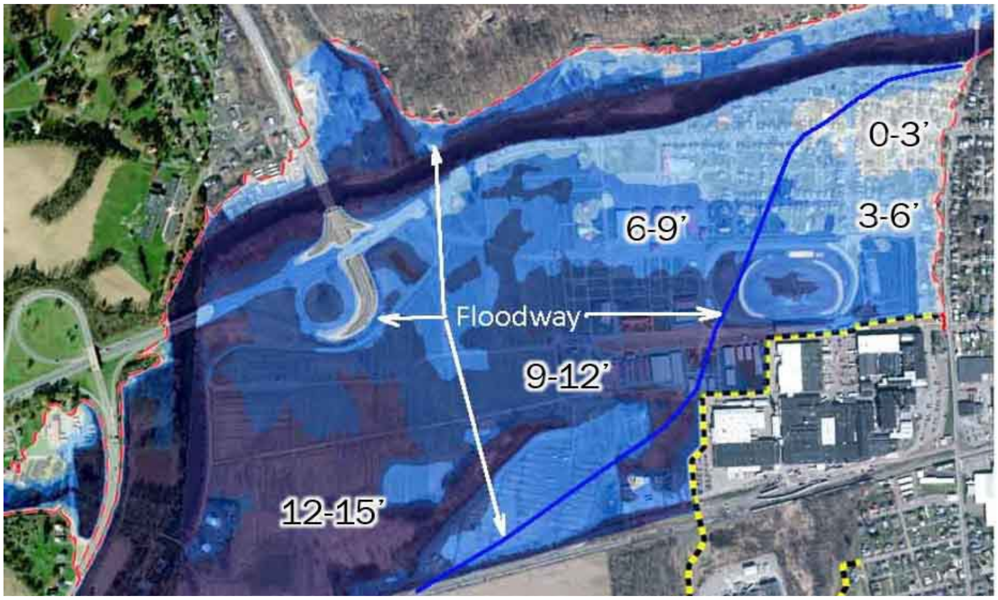

Figure 5.2 Extents and Depth of Flooding in Study Area

Flooding impacts for each community are outlined below:

Montour Township

Montour Township is affected by flooding in three areas in the study area.

- South of Reading Street near Rupert (SFHA-floodplain)
- Between Fishing Creek and Perry Avenue near Route 42 (SFHA-floodplain)
- Between Route 42 and Hemlock Creek (SFHA-floodplain)

A total of twenty-four properties were evaluated for flooding impacts. Fifteen (15) of the properties did not experience any flooding, 5 had basement flooding and 4 properties were flooded on the first flood. The majority of the flooding was in the Rupert area.

Hemlock Township

Hemlock Township is affected by flooding at two locations in the study area.

- Drinker Street from Bloom Street to Red Mill Avenue (SFHA-floodplain)
- From the Railroad Street Bridge along the bend in Fishing Creek in the area of Drinker and Walnut Streets (SFHA-floodplain)

Thirty-five structures were reviewed. Six (6) properties had been elevated and 14 did not have flooding. Three structures experienced basement flooding and a 17 had approximately three feet of water on the first floor.

Town of Bloomsburg

The Bloomsburg study area is bounded by Railroad Street, West Fifth Street and Fishing Creek to the north and the west and includes the Bloomsburg Fairgrounds. The Bloomsburg area is bisected by the flood way and the floodplain with a small area adjoining Railroad Street that is located in Zone X.

Nearly 300 properties were reviewed with 17 not being flooded. Sixteen (16) properties experienced basement flooding; one hundred seventy-four (174) had between zero and four feet of water on the first floor and ninety (90) had greater than four feet of flooding on the first floor. Figure 5.3 below shows modeled depth of flooding in structures, relative to first floor elevations from the 2011 Flood Lee, in the West End of Bloomsburg area.

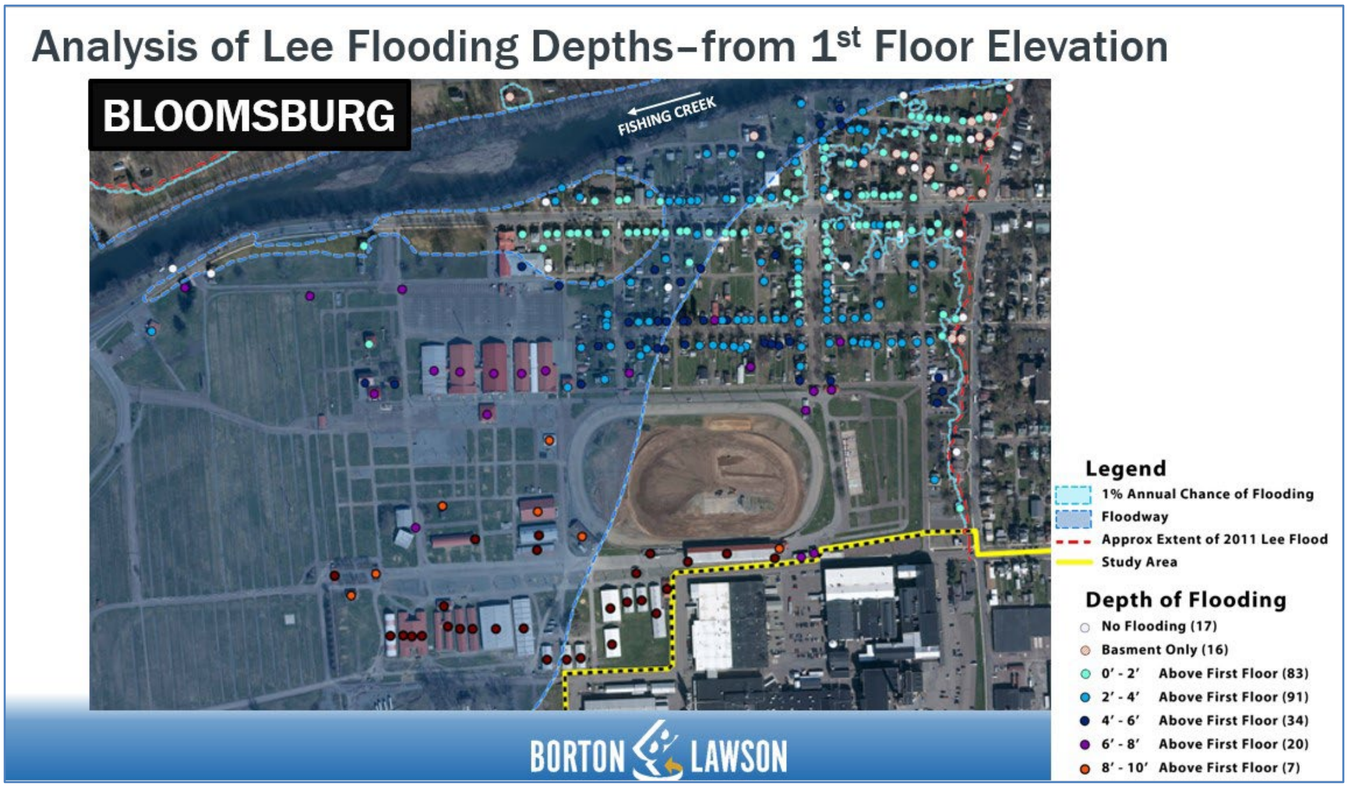

Figure 5.3 Modeled Depth of Flooding in Structures in West End of Bloomsburg from 2011 Flood Lee

Fairgrounds

The fairgrounds property is one of the most susceptible to flooding with a large area below elevation 472.00 which is 3 feet above activation stage for the existing Columbia County Flood Mitigation System. Approximately 35 floods have impacted the fairground over the past 120 years. The Fairgrounds has 54 buildings that are impacted by the base flood. Figure 5.3 above shows modeled depth of flooding in the Fairgrounds' structures from the 2011 Flood Lee.

5.2 Columbia County Hazard Mitigation Plan

The purpose of the Stafford Act, as amended by the Disaster Mitigation Act of 2000, is to reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters. Section 322 requires local governments to prepare a multi-hazard mitigation plan as a precondition for receiving FEMA mitigation project grants. The plans consist of a Community Profile, Planning Process, Capability Assessment, Risk Assessment, Mitigation Strategy and Plan Maintenance. The plans must be updated every five years. Columbia County last completed its Hazard Mitigation Plan in 2017. Work is underway to complete the 2022 Hazard Mitigation Plan.

The 2017 Plan included an analysis of ten natural hazards: drought, earthquake, flood/flash flood/ice jam, hurricane/tropical storm/nor'easter, pandemic, landslide, radon exposure, tornado/windstorm, wildfire, and winter storm and five human made hazards: dam failure, environmental hazards, levee failure, nuclear incidents, and utility interruption.

The 2017 plan generated 78 mitigation measures. The following actions are related to the communities in the study area. Work is underway to complete the 2022 Hazard Mitigation Plan. It is anticipated that the Plan will be completed later this year.

A Risk Factor ranking was completed for the fifteen identified hazards. The Risk Factor Values were developed by assigning varying degrees of risk to five categories for each of the hazards. The categories are probability, impact, special extent, warning time and duration. The table below shows the results. The Risk Factor value is based on the entire county. An evaluation of the three communities in the study area show that each has a greater risk than the county as a whole.

Table 5.1 Ranking of Hazard Types based on Risk Factor Methodology (Columbia County HMP)

Table 4.4-2: Ranking of hazard types based on Risk Factor methodology.

HAZARD RISK	HAZARD NATURAL (N) or MAN-MADE (M)	RISK ASSESSMENT CATEGORY					RISK FACTOR
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
HIGH	Flood, Flash Flood, Ice Jam (N)	4	3	3	2	3	3.2
	Environmental Hazards (M)	3	3	3	4	2	3.0
	Winter Storm (N)	4	2	4	1	2	2.9
	Tornado, Windstorm (N)	4	2	3	2	1	2.7
MODERATE	Nuclear Incident (M)	1	2	3	4	4	2.3
	Dam Failure (M)	1	3	2	4	2	2.2
	Drought (N)	2	1	4	1	4	2.2
	Utility Interruption (M)	2	1	3	3	2	2.0
LOW	Hurricane, Tropical Storm, Nor'easter (N)	2	2	2	1	2	1.9
	Landslide (N)	2	1	3	2	2	1.9
	Radon Exposure (N)	2	1	1	4	4	1.9
	Levee Failure (M)	1	2	1	4	3	1.8
	Pandemic (N)	2	1	2	1	4	1.8
	Wildfire (N)	2	1	2	3	1	1.7
	Earthquake (N)	1	1	1	4	1	1.3

5.3 Assessing Vulnerability (FAST Analysis)

A Scenario Analysis was completed for the study area. The analysis looks at the location of improvements in relation to the floodplain. Properties can be grouped into the following FEMA FIRM categories. The study evaluated the three main categories.

- Regulatory Floodway = High Vulnerability
- Floodplain (Zone A or AE) or SFHA = High Vulnerability
- Zone X (0.2%-annual-chance or "500-year" floodplain) = Moderate Vulnerability

The analysis was conducted using FEMA's Flood Assessment Structure Tool, or "FAST," which is an open source tool that can be used to rapidly analyze structure-level flood. For the analysis, structure data was obtained that included the following attributes: longitude and latitude, occupancy, building cost, building area, number of stories, foundation type, first floor elevation, depth of flooding.

Field surveys were conducted in October 2021 to obtain structure attributes for use in the FAST Tool. Approximately 350 structures were surveyed. Each structure was assigned a unique structure identification number. The data gathered included latitude and longitude, occupancy, building area, number of stories, foundation type and ground and first floor elevation. Assessment data provided additional data on the structure and a GIS analysis generated a depth of flooding model.

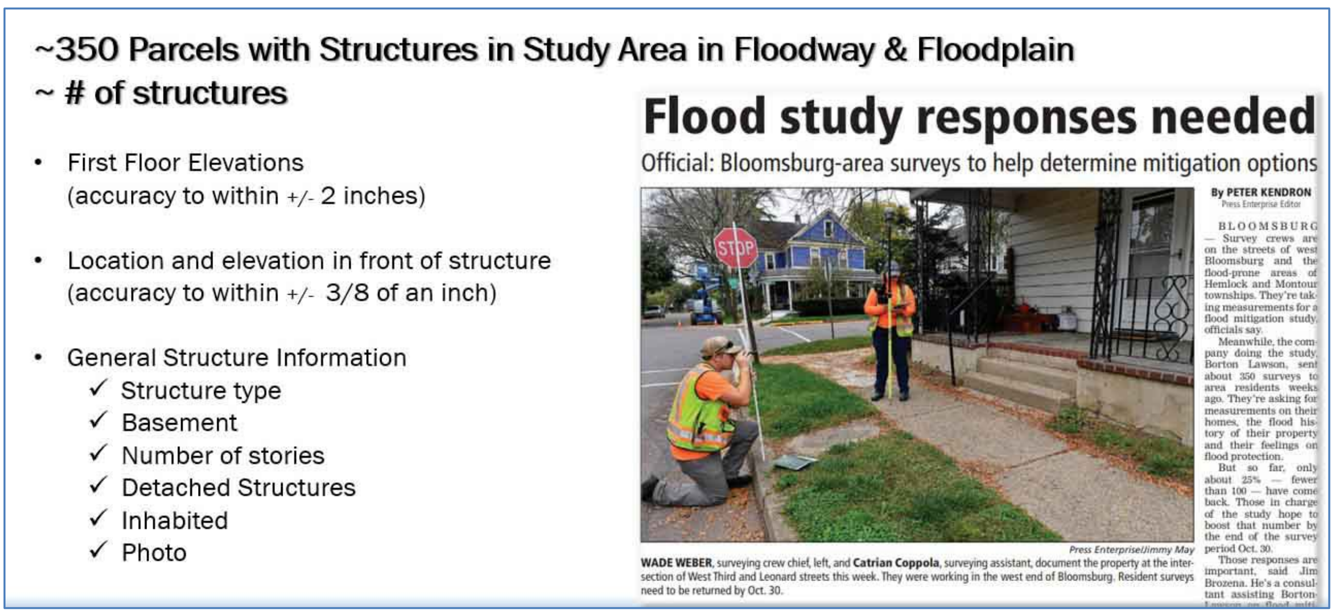

Figure 5.4 Summary of Structure Field Data Collected in Flood Study (Press Enterprise, October 15, 2021)

The FAST Tool provides outputs for each structure that include the depth of flooding, building damage percent, building loss in USD, content loss percent, and content loss in USD. In the table below, building percentage and contents damage are the damage incurred on an average structure. Building loss and contents loss are the total costs for the entire study area. This table displays the results for each of the communities for a Tropical Storm Lee flood event.

Table 5.2 Summary of FEMA FAST Outputs

Location	Category	Building Damage %	Building Loss $	Contents %	Contents $
Montour Township	Residential (5)	23%	$108,100	20%	$44,600
	Commercial (4)	20%	$556,400	40%	$482,400
Hemlock Township	Residential (18)	20%	$198,200	18%	$90,300
	Commercial (3)	23%	$26,300	46%	$43,000
Town of Bloomsburg	Residential (221)	23%	$5,969,500	24%	$3,069,900
	Commercial (68)	28%	$1,608,700	69%	$3,474,900

Susquehanna Flood Warning System Update

In 2003 the Wyoming Valley Levee Raising Project developed a Flood Warning and Response System (FWRS) ArcGIS tool covering the five-county area (Luzerne, Columbia, Montour, Northumberland and Snyder) that was impacted by flooding from the Susquehanna River. The system became obsolete.

Through a cooperative effort of the USACE, PEMA, SRBC, and the Luzerne County Flood Protection Authority (LCFPA) a Silver Jackets Inter-agency Nonstructural Project was completed that updated the system to working condition, make the system sustainable for future iterations of software and make the applicability of the system more universal. The recently completed Wyoming Valley Susquehanna River Flood Inundation Mapping (FIM) is an exceptional tool for emergency managers and updating this outdated GIS tool to use the FIM data will provide even more information to better identify flood hazards, prepare and execute flood response measures, alleviate loss of life and mitigate structure and contents damage. The tool will generate Flood Response/Action Tables that are customizable by the user, develop a query tool for flood impacts to specific buildings or infrastructure (such as structures with 4 feet or more of flooding, critical structures, etc.). The tool will include structure values and can estimate damages for the various flood stages on a structure-by-structure basis using finished floor elevations (FFE) or aggregated by county or municipality for damage assessment purposes. The tool can be used for "What-if" scenarios and assist floodplain managers administering its Flood Plain Ordinance (determining probable substantially damaged properties) after flood events.

Unfortunately, the system is using the original datasets from the original program with the exception of West Pittston, Luzerne County, which served as a pilot project for updating the field data. The data developed by the surveys has been provided to the SRBC for inclusion in the model so that current information is available for the study area.

5.4 Analysis of Repetitive Loss Properties

Repetitive Loss and Severe Repetitive Loss properties are those properties that meet the definitions below.

- RL property: Any insurable building for which the NFIP paid two or more claims of more than $1,000 within any rolling 10-year period, since 1978. A RL property may or may not be currently insured by the NFIP.
- SRL property: Has at least four losses each exceeding $5,000, or when there are two or more losses where the building payments exceed the property value.

An inspection of the community records indicates the number of Repetitive Loss and Severe Repetitive Loss properties in each of the municipalities within the Study Area, summarized in the Table 5.3 below.

Table 5.3 Repetitive Loss, Severe Repetitive Loss, and Mitigated Properties (FEMA 2019 and 2017 data)

Community	Repetitive Loss	Severe Repetitive Loss	Mitigated
Montour Township	0	0	0
Hemlock Township	10	0	4
Town of Bloomsburg	84	3	15

All three communities have been active in the FEMA HMGP and the HUD CDBG-DR programs following the 2011 Lee Flood Event completing multiple acquisition/demolition and a limited number of elevation projects. Hemlock Township completed several HMGP acquisition projects in the 1980's.

5.5 Economic Analysis

The phrase "100-Year Flood" is a cause of confusion among the public, government officials, and insurers. Many continue to believe it is a description of a flood that occurs only once every 100 years. In fact, "100- Year Flood" is an abbreviated way of describing a flood of such magnitude that has a 1-percent (or 1 in 100) statistical probability of being equaled or exceeded in any given year. By definition, more than one 100-year flood event or base flood can occur within the span of a single year or one might not be witnessed during a 100-year timeframe.

Housing values in the floodplain are impacted by flood insurance requirements which consider the following: Based on probability theory, a building in the SFHA has a 26 % (or 1 in 4) chance of experiencing a 100-year flood over the entire life of a 30-year mortgage.

An economic analysis of the technically feasible alternatives was completed utilizing the FEMA Benefit-Cost Analysis (BCA) Tool to determine if the benefits of implementing the alternatives outweighed the costs.

BCA is a method that determines the future risk reduction benefits of a hazard mitigation project and compares those benefits to its costs. The result is a Benefit-Cost Ratio (BCR). A project is considered cost-effective when the BCR is 1.0 or greater.

Table 5.4 Chance of Flooding Over a Period of Years (FEMA)

Time Period	Flood Size 10-year	25-year	50-year	100-year
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

The analysis has been completed using the FEMA BCA Toolkit, Version 6.0. Data inputs include, latitude and longitude, hazard type mitigation type, costs, project useful life, FIS data including return intervals and discharges, SFHA information, structure elevations, building size, building replacement values, building characteristics including number of stories, basement and foundation type. FEMA Standard Values were used for Building Depth-Damage Functions.

Box A: **Benefit-Cost Analysis**

The Stafford Act requires every project funded by HMGP to be cost effective, as demonstrated by a Benefit-Cost Analysis (BCA). BCA involves estimating and comparing the expected costs and future benefits of a project; dividing a project's total net benefits by its total cost results in the benefit-cost ratio (BCR). A project is considered cost-effective when its BCR is greater or equal to 1.0.

Mitigation project "benefits" typically include avoided damage to structures, avoided deaths or injuries, and other quantifiable losses. Historically, ecosystem-wide environmental benefits were not included in the scope of BCA. However, in 2013, FEMA changed its BCA methodology for acquisition projects to facilitate and promote ecosystem-based management. Under the new methodology, environmental benefits can be added to a project's total net benefits if (and only if) the project in question already has a BCR of 0.75 or greater using traditional benefits. In other words, environmental benefits currently may be considered to "tip the scale" in favor of approval.

The environmental benefits of open space are estimated according to rates based on land area: green space is valued at $2.57/ft2/year; and riparian open space is valued at $12.29/ft2/year.

Sources: 44 C.F.R. 206.434(c)(5); FEMA, *Benefit-Cost Analysis*, http://www.fema.gov/benefit-cost-analysis (March 16, 2015); FEMA, Mitigation Policy FP-108-024-01, Consideration of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance (HMA) Programs (June 18, 2013), available at: https://www.fema.gov/media-library-data/20130726-1920-25045-4319/environmental_benefits_policy_june_18_2013_mitigation_policy_fp_108_024_01.pdf

Figure 5.5 Summary of Benefit Cost Analysis (FEMA)

In addition to the Benefit Cost Analysis, FEMA issued a Memorandum in 2013 titled *"Cost-Effectiveness Determinations for Acquisitions and Elevations in Special Flood Hazard Areas Using Pre-Calculated Benefits."* The memo was recently updated to adjust the values for inflation.

The updated values for use of pre-calculated benefits to determine cost effectiveness of elevations and acquisitions in SFHA are:

- Acquisitions: $323,000 per structure.
- Elevations (and Mitigation Reconstruction): $205,000 per structure.

SECTION 6 – TYPES OF FLOOD MITIGATION ALTERNATIVES

6.1 Strategy / Mitigation Categories

Nonstructural mitigation projects include:

- Residential Structures in Floodway – Acquisition / Demolition,
- Residential Structures in Floodplain – Acquisition / Demolition, Elevations or Mitigation Reconstruction,
- Commercial Buildings – Wet Floodproofing,
- Other – Emergency Access Roads, Floodproofing Wastewater / Utility Systems, Emergency Action Plans, Additional Stream Gauges, Ordinances.

Structural Mitigation Projects include:

- Levee / Floodwall Systems,
- Channel / Floodplain Modifications.

6.2 Nonstructural Flood Risk Management Measures

Nonstructural flood risk management measures are proven methods and techniques for reducing flood risk and flood damages. Effective for both short and long term flood risk and flood damage reduction, nonstructural measures can be very cost effective when compared to structural measures. An advantage of nonstructural measures is the ability of nonstructural measures to be sustainable over the long term with minimal costs while structural solutions have higher costs for the operation, maintenance, repair, rehabilitation, and replacement of the built infrastructure.

The following nonstructural measures are techniques used in reducing flood risk and the damages associated with flooding. The measures vary from removing an entire structure from the floodplain to purchase flood insurance for a structure which is located within the floodplain. The costs associated with implementing a measure vary. An example would be acquisition / demolition will eliminate all future damages associated with flooding while flood insurance will assist in the costs to repair a structure after a flood event but does not eliminate future flood damages to that structure.

Tables 6.1 and 6.2 are included at the end this section as references when assessing the options for mitigation projects.

Acquisition

Acquisition consists of buying the structure and the land. The structure is demolished and the land is deed restricted to prevent any future development of the parcel.

Elevation

Elevation raises an existing structure to an elevation where the first floor is equal to or greater than the BFE. In Pennsylvania, an additional eighteen inches (18”) is required above the BFE. The cost of elevating a structure beyond the minimum requirements is less expensive than the original lift due to the cost incurred for mobilizing equipment. Elevation can be performed using fill material, on extended foundation walls, on piers, post, piles and columns. Elevation can be done for slab on grade structures.

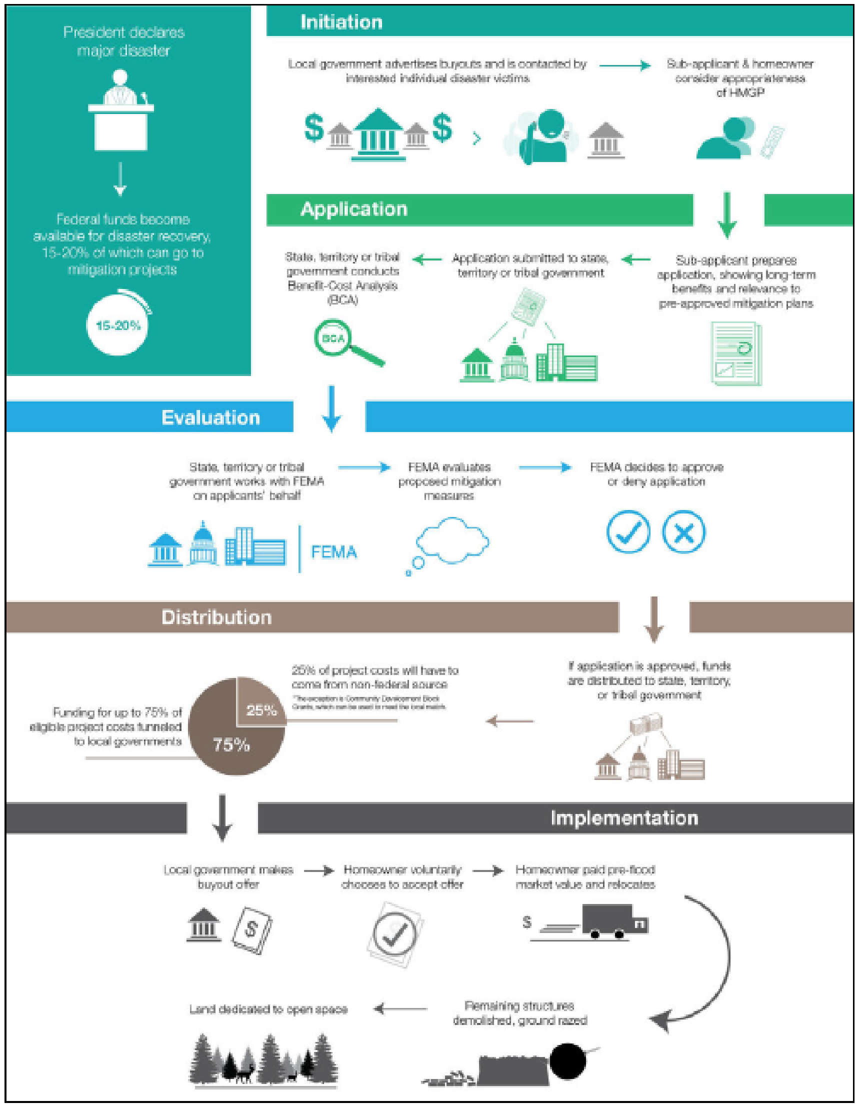

Figure 6.1 Process to Obtain CDBG-DR Funding

Relocation
Relocation requires physically moving the at-risk structure and buying the land upon which the structure is located. It makes sense when structures can be easily relocated from a high flood hazard area to an area that is located out of the floodplain.

Mitigation Reconstruction
Mitigation Reconstruction is the demolition of a flood damaged structure and reconstructing a new floodplain compliant home on the existing parcel. In some instances, the reconstruction takes place on a new site located outside of the floodplain.

Wet Floodproofing
Wet floodproofing is applicable as either a stand-alone measure or as a measure combined with other measures such as elevation. As a stand-alone measure, all construction materials and finishing materials need to be water resistant and all utilities must be elevated above the BFE. Wet floodproofing is applicable to commercial and industrial structures when combined with a flood warning and flood preparedness plan. This measure is generally not applicable to deep flood depths and high velocity flows.

Dry Floodproofing
Dry floodproofing consists of waterproofing the structure. This option is limited to commercial and industrial structures. This measure achieves flood risk reduction but it is not recognized by the NFIP for any flood insurance premium rate reduction since human interaction is required. Laboratory tests show that a “conventionally” built structure can generally only be dry flood proofed up to 3-feet in elevation. A structural analysis of the wall strength would be required if it was desired to achieve

higher protection. A sump pump should be installed as part of the measure. Closure panels are used at openings. This concept does not work with basements or crawl spaces.

Flood Warning System

Flood Warning Systems rely upon stream gauge, rain gauges, and hydrologic computer modeling to determine the impacts of flooding for areas of potential flood risk. A flood warning system is able to identify the amount of time available for residents to implement emergency measures to protect valuables or to evacuate the area during serious flood events.

Land Use Regulations

Land use regulations within a designated floodplain are effective tools in reducing flood risk and flood damage for newly constructed or substantially improved structures. The requirements are based on the NFIP. For example, land use regulations may identify where development can and cannot occur, or to what elevation structures should locate their lowest habitable floor.

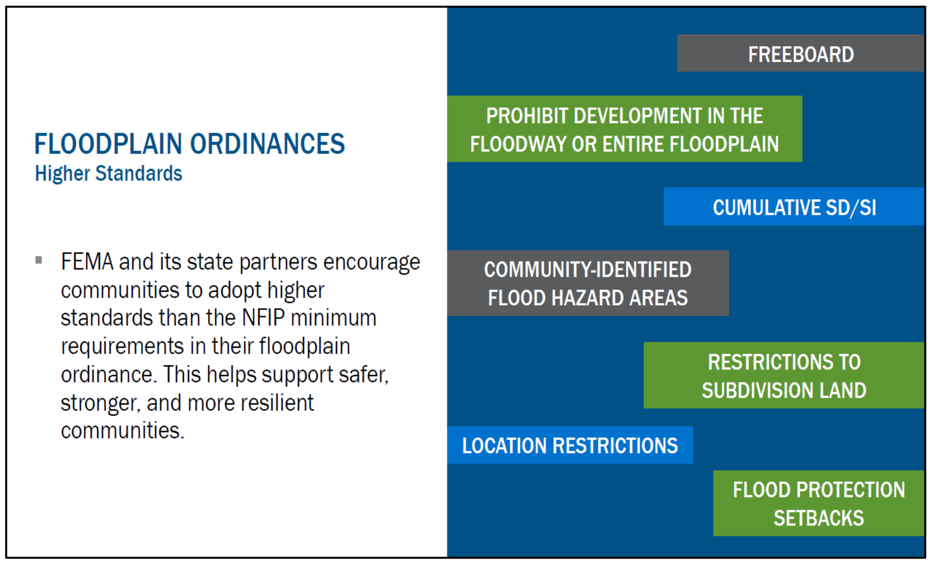

Figure 6.2 Floodplain Ordinances Overview (FEMA)

6.3 Guiding Principles

1. Preserve and restore floodplains where possible to recognize, preserve and restore the beneficial functions of floodplains for hazard reduction, water quality enhancement, wetland protection, wildlife habitat, riparian corridors, recreation, environmental relief, aesthetics and greenway areas.

2. Be prepared for floods by developing advanced floodplain mapping, detailed risk assessments, enhanced early warning systems, multiple emergency notification measures, understandable response plans, workable recovery plans, and ongoing storm monitoring.

3. Help people protect themselves from flood hazards through public interaction and involvement, available flood information, community outreach and education, self-help measures, flood proofing options, affordable flood insurance, and emergency preparedness.

4. Prevent adverse impacts and unwise uses in the floodplain through appropriate regulation and land use, open land preservation, acquisition of structures and relocation assistance programs, relocation of infrastructure (such as wastewater disposal plants), multi- objective

planning, prohibiting unacceptable encroachments, and establishing ongoing maintenance practices that preserve and enhance environmental functions.

5. Prevent adverse impacts from development and redevelopment by preparing regional stormwater management plans, adopting appropriate engineering standards into local ordinances, consistently administering and enforcing ordinances and providing long-term maintenance of facilities.

6. Acknowledge the values of structural flood control measures after a careful analysis of the ecological, economic, long-term operation and maintenance, and social costs and benefits of all mitigation options; identify those situations where a combination of structural solutions, structural modifications, and nonstructural solutions is the most beneficial option.

6.4 Economic Analysis

Economic impacts of flooding affect households, businesses and communities. The losses to households include personal items, household goods, vehicles, homes, and in some cases, lost wages or even lost jobs. Local businesses experience lost inventory, lost sales, and lost productivity and profits. Even firms not directly affected by flooding might lose sales if they were suppliers of goods and services to affected businesses or households. All aspects of public service delivery are affected. In some communities, wastewater and water facilities are compromised and must be restored. Affected municipalities need to repair roads and bridges, public lighting, public parks, and public buildings.

The community fiscal effects of infrastructure losses depend primarily on the amount of federal and state disaster assistance they obtain. Federal and state disaster assistance programs take the form of direct payments, grants, and no-interest or low-interest loans to individuals, businesses and communities. Under the Public Assistance Grant Program, FEMA awards grants to assist state and local governments and certain private nonprofit organizations with the response to and recovery from disasters. The program provides funding for debris removal, implementation of emergency protective measures and permanent restoration of infrastructure. The Individuals and Households Program can assist those affected flooding by providing temporary help with alternative housing and/or financial assistance with other disaster-related needs. Individual assistance can also be in the form of low-interest disaster loans from the U.S. Small Business Administration for homeowners, renters, businesses of all sizes, and non-profit organizations. Future studies may be able to begin to evaluate the economic impacts of past flood events to municipalities by tracking and comparing awarded Public Assistance, Individual Assistance and Small Business Loans by municipality.

In considering economic impacts of flooding, it would be remiss not to mention the impact to a community's tax base. Local property tax revenues decline if properties remain vacant, property values decline or affected properties are mitigated through acquisition.

6.5 Structural Systems

Structural systems are defined as flood mitigation features that change the physical environment. Examples are floodwalls, earth levees, and stream channel modifications.

Structural flood mitigation systems were considered in the 2005 USACE study; however, the study area, especially the West End and the Fernville areas, have changed since that timeframe. The 2011 Lee record flood and the subsequent 2018 Fishing Creek flood added a sense of urgency to review structural systems even though homes and businesses were acquired and removed from the floodplain after the 2011 Storm Lee event, especially near the Route 42 interchange and on the Hemlock Township (Fernville) side of the creek.

Hemlock Township and Montour Township

In Hemlock Township, on the Fernville side of Fishing Creek, a structural system (Floodwall) is not viable from an economic standpoint. The successful buyout program removed many repetitive loss properties. With far fewer homes along the creek, the benefit to cost ratio for any structural project would not exceed 1.0. During discussions with Hemlock Township, they indicated their focus was on continuing the buyout program and elevations, not structural system such as a levee or floodwall.

In Montour Township, the density of structures is not sufficient to justify a structural system.

For Bloomsburg general levee/floodwall alignment alternatives were developed based on the number of structures in the floodplain that would be located behind the alignment and the physical constraints imposed by structures. The Fishing Creek floodway will be encroached upon in a significant way for any alignment thus, the alignment of the levee is impacted by the flow area required for the floodway. Adjustments were made to minimize the induced flooding from the levee system, however, other forms of mitigation such as modification of the creek channel may be required to reduce the induced flooding to zero for permitting the project.

The floodwall or levee system alternative for the West End of Bloomsburg considered impacts to the Town tax base and the community fabric, present and future. Two (2) alignments were considered as shown and outlined below.

Alignment 1 shown in Figure 6.3 would be a levee and floodwall system extending along the left bank of the creek from the Railroad Street Bridge westward, then south to a point where it would turn east resulting in a U-shaped system tying out to high ground near Scott Avenue and W. Anthony Street. This alignment would avoid the Fairgrounds to minimize disruption to access points and the general operation of the facility. It was also thought to be more economical. Right-of Way constraints limited the type of system options to an H-pile or sheetpile floodwall from Route 11 to high ground near Railroad Street.

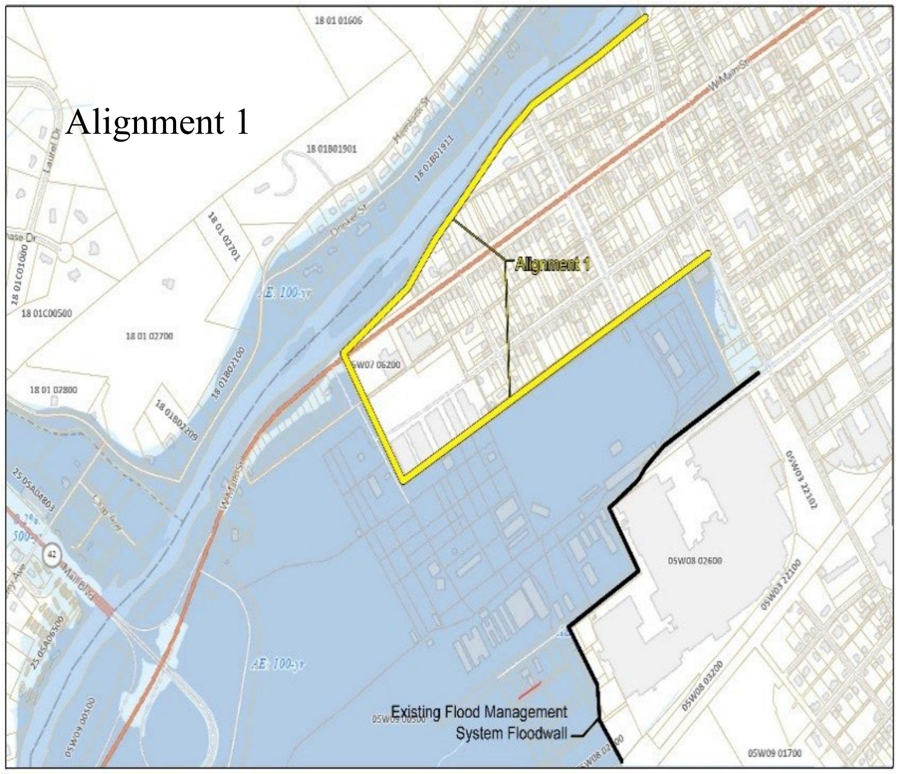

Figure 6.3 Proposed Levee Alignment 1

Alignment 2 (*pictured right)* extends through the Fairgrounds to tie into the first floodwall system in the vicinity of 6th Street. The Fairgrounds expressed interest in participating in this alignment due to the repeated flooding on their large parcel with 54 structures.

This alignment was not as limited as Alignment 1 with regard to right-of-way thus permitting the use of more economical earth and MSE levees.

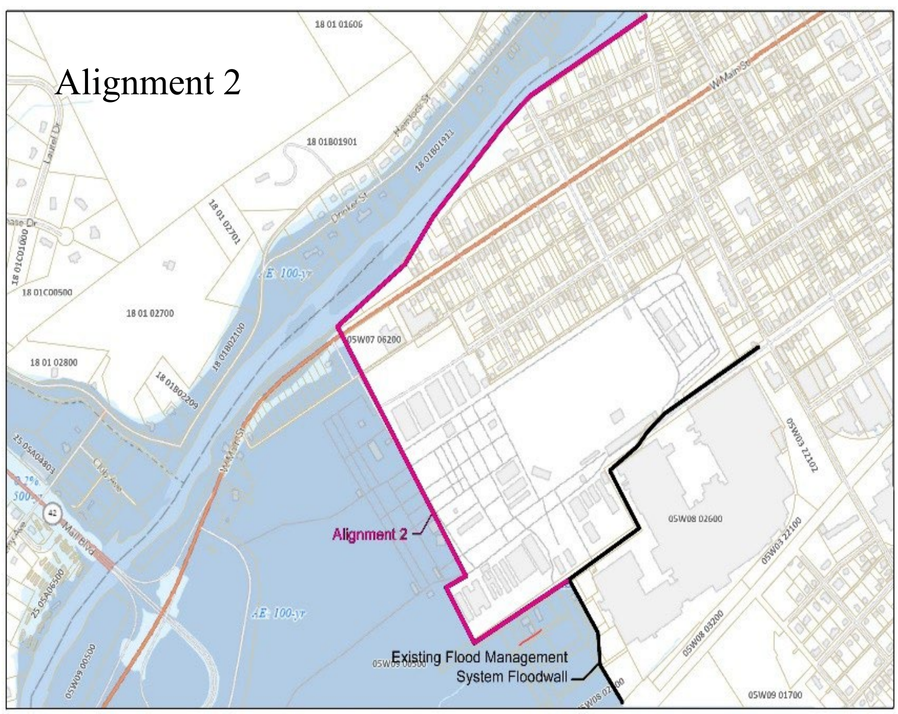

Figure 6.4 Proposed Levee Alignment 2

Opportunities to deal with interior stormwater runoff was considered more difficult with Alignment 1 since ponding areas are not available in the dense residential area. Alignment 2 has large relatively flat areas ideal for storing storm runoff to reduce the cost of pump facilities.

Unlike the previous two flood mitigation projects constructed nearby, utilities such as gas, water, communications, and electric do not pose any major challenges, including sanitary sewer systems or sanitary pump stations. Minor relocations may be necessary along the system alignments.

Prioritization Process

Prioritizing structural system alignments usually depends on the number and type of structures behind the system, available real estate, community support, permitting issues, and the total project cost.

Alignment #1 Considerations:

1. Restricted rights-of-way require sheet pile or H-pile floodwalls for significant length along the alignment. This increases the cost significantly.
2. Stormwater issues are more difficult to deal with since the Fairgrounds large land area is not available for management of stormwater flows.
3. Constructability issues along the restricted rights-of-way will increase cost.
4. The Fairgrounds has expressed a desire to be included behind the line of protection.
5. The benefit to cost ratio will be lower than 1.0.

Alignment #2 Considerations:

1. Less restricted rights-of-way reduce costs and eliminate most constructability issues.
2. Stormwater can be managed during flood events with one pump station versus two for Alternative #1.
3. The Fairgrounds buildings will be included in the project protection.
4. The benefit to cost ration is greater than 1.0.
5. The general community supports the proposal.

Based on the above considerations, Alternative 2 was chosen as the preferred alignment.

Fishing Creek Channel Modifications

Modifications to the Fishing Creek channel were considered a standalone structural project or a part of Alternative 2 for reduction of induced flooding along Fishing Creek.

General considerations:

- The Lee Flood is considered a 350-Year Flood on the Creek and a 200-Year Flood on the Susquehanna River.

- Modifications to the Fishing Creek channel cannot reduce the Base Flood and Storm Lee Flood Elevations to the degree necessary for Bloomsburg or Hemlock Township flood mitigation without a levee system, which is not economically feasible.

- Modifications to the approach roadway to the Railroad Street Bridge and a benched floodplain provide significant reduction for Fernville flooding in that reach of the stream. These modifications can also be utilized to mitigate some induced flooding from the levee on the Bloomsburg side.

- Dredging is not feasible. Rock in streambed prevents adequate excavation.

Figures 6.5 and 6.6 below show the bridge and channel modifications that are recommended for further study as structural systems for mitigation of induced flooding related to Alignment 2 (levee/floodwall system).

FEMA must provide an approved map revision and PADEP must issue a permit for any structural system impacting the floodplain or floodway.

This channel modification would be required along with community outreach to all impacted property owners to ensure that all induced flooding impacts are addressed to their satisfaction.

A detailed 2D H&H study is recommended to examine in detail the channel work necessary to maximize the reduction in the induced flooding along Fishing Creek.

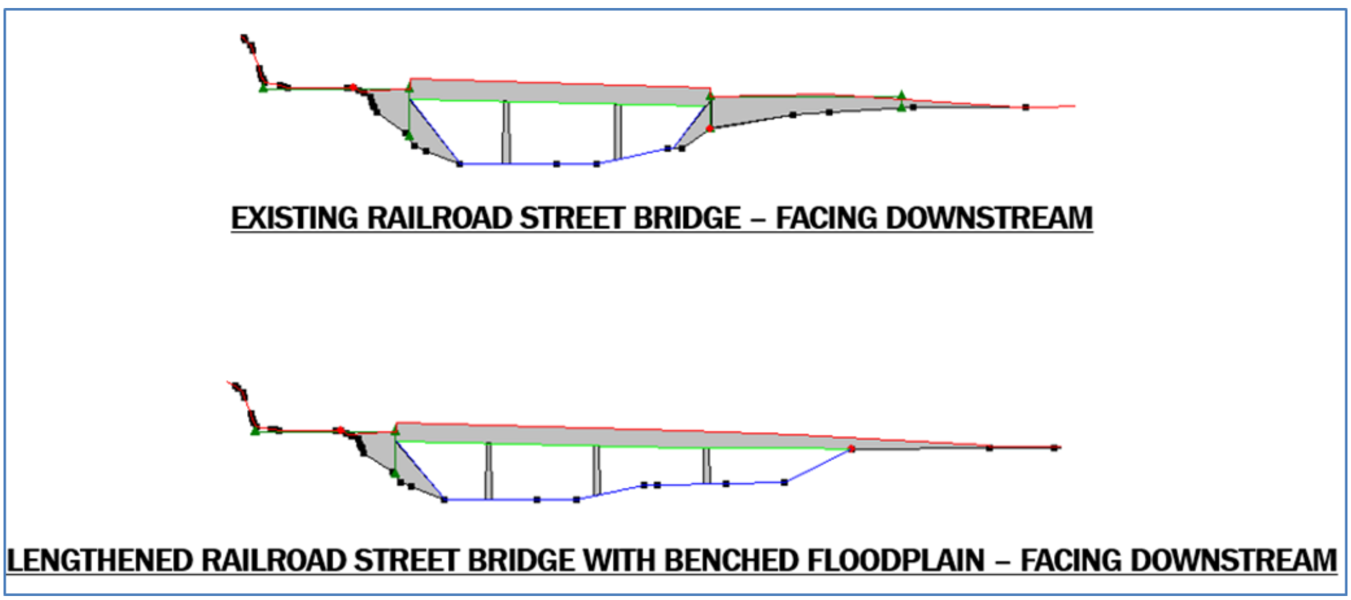

Figure 6.5 Existing Railroad Street Bridge and Proposed Modifications

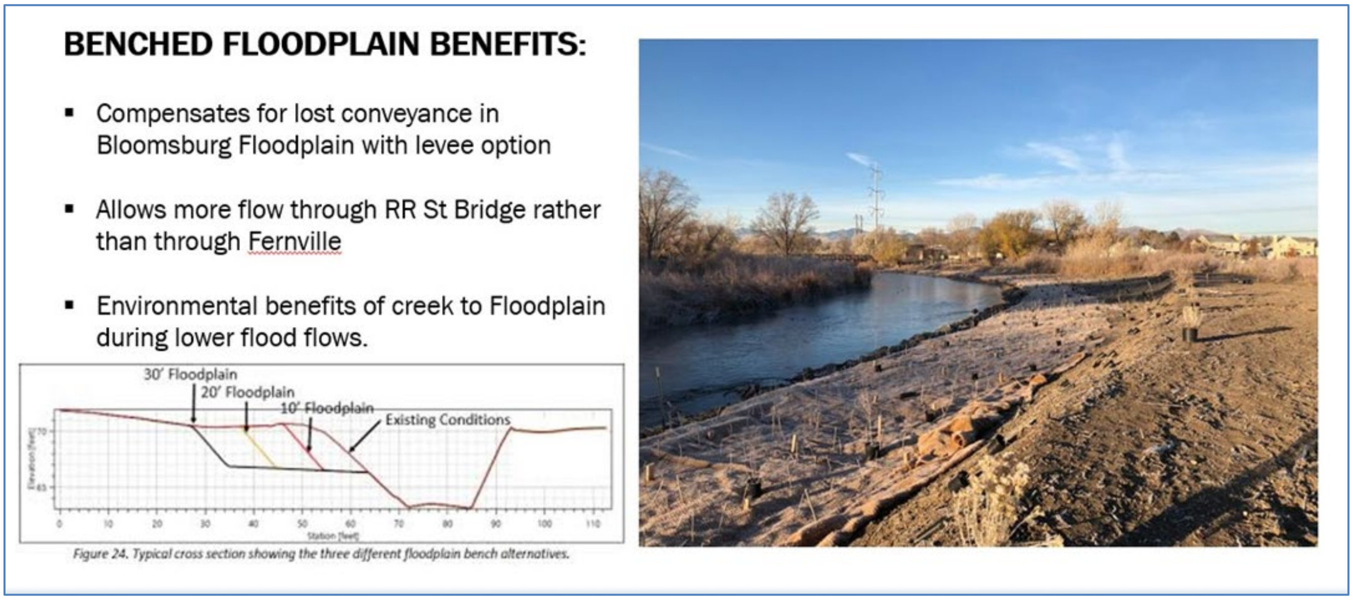

Figure 6.6 Benefits of Benched Floodplains

Table 6.1 Nonstructural Flood Risk Management Matrix
(USACE, https://www.usace.army.mil/Missions/Civil-Works/Project-Planning/nnc)

US Army Corps of Engineers

Nonstructural Flood Risk Management

National Nonstructural Committee

May 2019

NONSTRUCTURAL FLOOD RISK MANAGEMENT MATRIX

		PHYSICAL NONSTRUCTURAL MITIGATION MEASURES									
		Elevation									
		Extend Foundation	Piers	Posts	Columns	Piles	Fill (Compacted)	Relocation	Acquisition	Dry Flood Proofing	Wet Flood Proofing
Flooding Characteristics	**Flood Depth**										
	Shallow (less than 3 ft)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Moderate (3 to 6 feet)	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
	Deep (6 to 12 feet)	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
	Very Deep (more than 12 feet)	N	N	N	N	N	N	Y	Y	N	N
	Flood Velocity										
	Low (less than 3 feet per second)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Moderate (3 to 6 feet per second)	N	Y	Y	Y	Y	Y	Y	Y	N	N
	High (more than 6 feet per second)	N	Y	N	N	Y	N	Y	Y	N	N
	Flash Flooding										
	Yes (less than 1 hour warning)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
	No (more than 1 hour warning)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Debris / Ice Flow										
	Yes	N	Y	N	N	Y	Y	Y	Y	N	N
	No	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Site Characteristics	**Site Location**										
	Coastal Beach Front	N	N	N	N	Y	N	Y	Y	N	N
	Coastal Interior (Low Velocity)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Riverine Flood Plain	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Soil Type										
	Permeable	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
	Impermeable	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Building Characteristics	**Structure Foundation**										
	Slab on Grade (reinforced)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Crawl Space	N	N	N	N	N	Y	Y	Y	N	Y
	Basement	N	N	N	N	N	Y	Y	Y	N	Y
	Abandonment of Crawlspace / Basement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Structure Construction										
	Concrete, Stone, or Masonry	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Metal	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Wood	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Overall Structure Condition										
	Excellent to Fair	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Fair to Poor	N	N	N	N	N	N	N	Y	N	N
Community (Project Area) Benefits	**Economics**										
	Insurance Premium Reduction (Residential)	Y	Y	Y	Y	Y	Y	Y	Y	N	N
	Insurance Premium Reduction (Non-Residential)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
	Avoids Adverse Impact on Adjacent Property	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
	Reduction in Admin Costs of NFIP	N	N	N	N	N	Y	Y	Y	N	N
	Reduction in Emergency Costs	N	N	N	N	N	N	Y	Y	N	N
	Public Infrastructure Damage Reduced	N	N	N	N	N	N	Y	Y	N	N
	Intangible Benefits										
	Ecosystem Restoration Potential	N	N	N	N	N	N	Y	Y	N	N
	Recreation Potential	N	N	N	N	N	N	Y	Y	N	N
	Community (Project Are) Cohesion	Y	Y	Y	Y	Y	Y	N	N	Y	Y
	Flood Risk Eliminated	N	N	N	N	N	N	Y	Y	N	N

Table 6.2 Comparison of Structural & Nonstructural Flood Protection Approaches (USACE, Local Flood Proofing Programs, February 2005)

Comparison of Flood Protection Approaches		
Structural Flood Control	**Acquisition/Relocation**	**Flood Proofing**
Protects development without disrupting existing buildings or patterns of development	Disruptive: successful only if owners willing to sell and leave	Protects development with minimal disruption to existing buildings and development
Can disrupt natural water flows and/or destroy wildlife habitat	Does not disrupt natural water flows or damage wildlife habitat; can improve habitat	Does not disrupt natural water flows or damage wildlife habitat, but may affect local drainage
Can protect to any flood level	Generally most cost-effective for deep flooding and/or high velocity flooding	Some measures are only appropriate for low flood hazards
Can be the most cost-effective and practical solution for areas already densely developed.	Can be the most cost-effective solution in areas of damaged or low-cost buildings	Can be the most cost-effective solution in areas with low flood depths
Large capital expenditures often make this approach cost prohibitive or dependent on state or Federal assistance	Cost depends on property values, often done with state or Federal assistance	Many approaches can be afforded by the property owner
Protects streets and land in addition to buildings	Can remove all types of property that need protection from floods	Focuses on protecting buildings
Publicly owned, operated, and maintained, so more dependable over the long run	No operation and maintenance needed to keep flood protection benefits	Operation and maintenance dependent on every current and future occupant
Built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage	Only properties outside the cleared area are subject to damage from larger floods	Built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage
Can create a false sense of security as people protected by a project often believe that no flood can ever reach them	Damage level does not increase if flood levels increase	Can create false sense of security, especially if mainten-ance neglected or new owners not familiar with operation
May improve property values and encourage more development	Communities lose some tax base and utility customers (may be offset by using vacated land for parks or other assets)	Preserves tax base and may improve property values
Water supply and recreational uses can be incorporated into some projects' designs	Cleared out area can be converted to recreational, educational or ecosystem restoration uses	Preserves existing buildings and land uses. Compatible with existing ecosystem
Although it may be unintended, can promote more intensive development in the flood plain	May encourage more intensive development in adjacent areas as people want to be near parks that were created on vacated land	Should encourage property maintenance and preservation of existing development
Can have adverse flood plain and ecosystem impacts, e.g., higher flood stages and degraded ecosystem	May have positive flood plain and ecosystem impacts	Usually no change to flood plain or ecosystem

SECTION 7 – FLOOD MITIGATION ALTERNATIVES EVALUATED FOR EACH MUNICIPALITY

7.1 Montour Township

A total of twenty-four (24) properties were evaluated for flooding impacts utilizing first floor elevations, topography, and a flood depth model developed for the 2011 flood.

Fifteen (15) of the properties were projected to not experience any flooding, 5 projected for basement flooding and 4 properties were projected to flood on the first flood. The majority of the flooding was in the Rupert area.

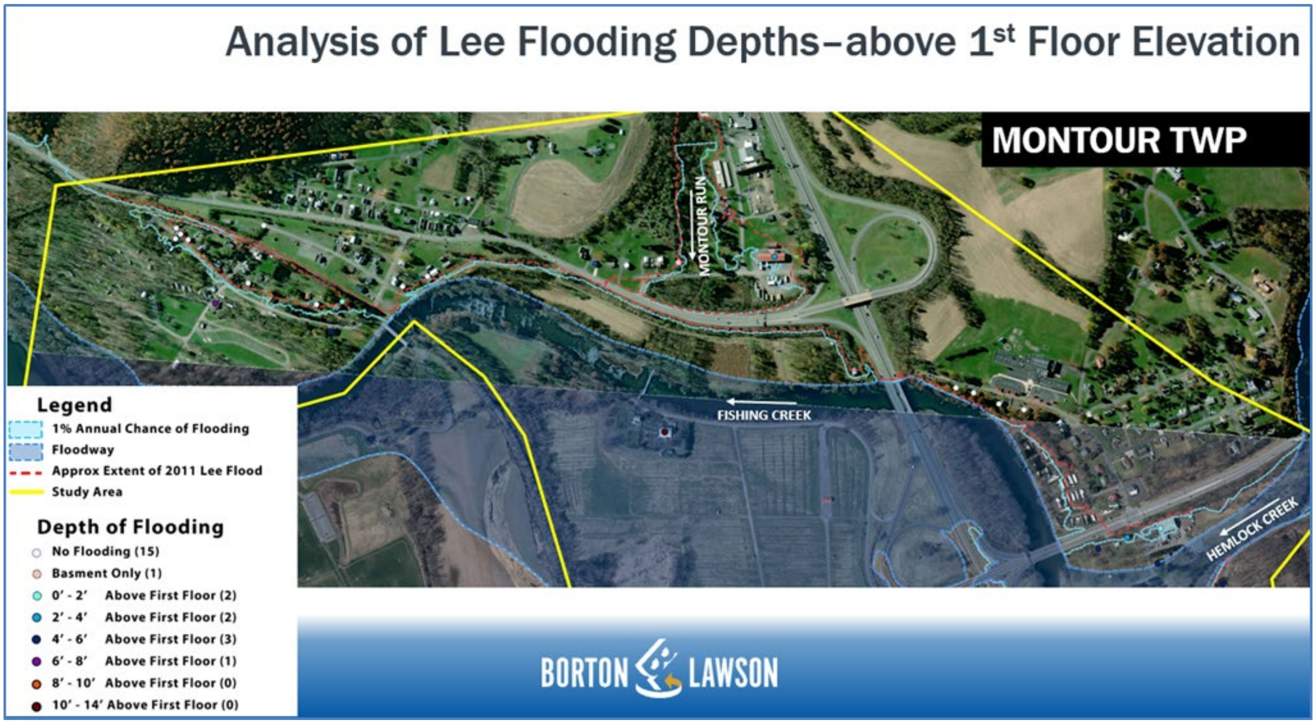

Figure 7.1 Modeled Depth of 2011 Lee Flooding in Structures in Montour Township

Mitigation Options

- Levees – Not Feasible
- Buyouts – Voluntary
- Elevations - Voluntary
- RV Park – Develop Flooding Emergency Action Plan
- Sanitary Pump Stations – Dry Floodproofing – Township recommendation
- Evaluate County Building for Floodproofing
- Ordinance Revisions – Floodplain Management
- Construct Emergency Access Route from Reading St to Jackson St across RR Montour Township. Provides evacuation and access route when floods at base flood or higher occur. See Figure 7.2 below.

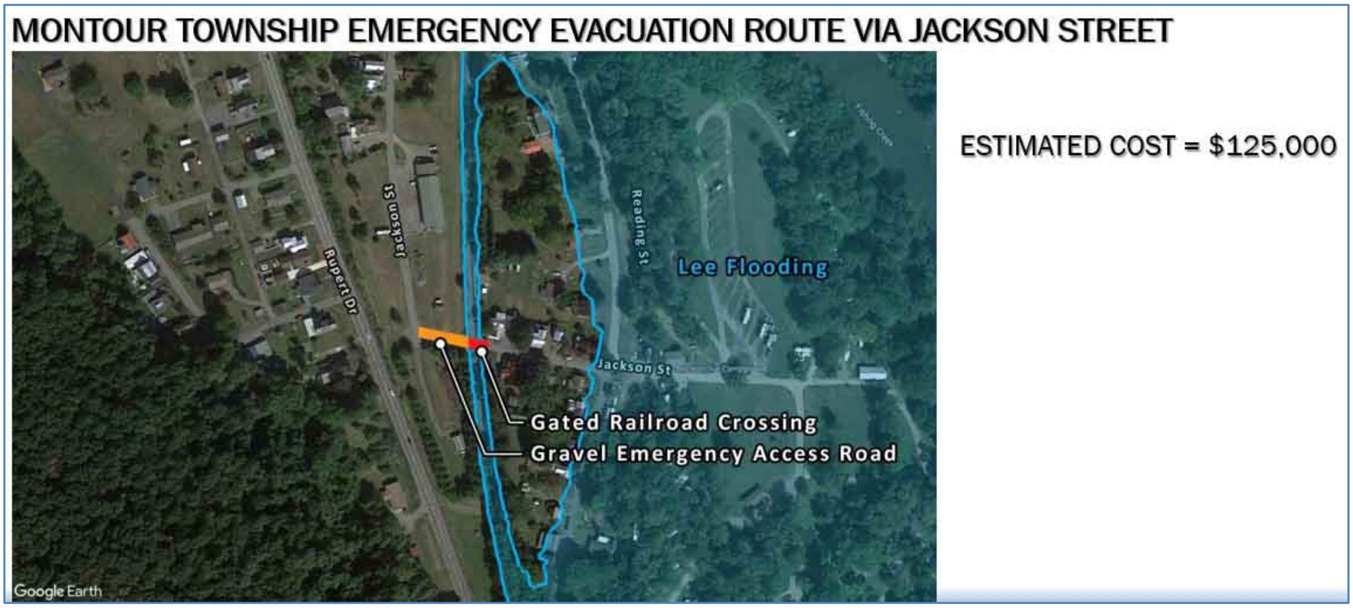

Figure 7.2 Montour Township Proposed Emergency Evacuation Route

Permits Required

Permits will be required for each project per Township ordinance. No large projects are proposed which would require larger more complex permitting.

Rights-of-way / Easements

The emergency access road on Jackson Street will require standard project permits and also an operating agreement between the Township and railroad authority.

7.2 Hemlock Township

Thirty-five (35) structures were evaluated for flooding impacts utilizing first floor elevations, topography, and a flood depth model developed for the 2011 flood.

Six (6) properties have been elevated and 14 did not have flooding. Three (3) structures were projected to experience basement flooding and 17 were projected to have approximately three feet of water on the first floor.

Mitigation Options

- Buyouts – Voluntary
- Elevations – Voluntary
- Emergency Access Road – Hassert to Laurel Street – The Township recommended reconstruction of Creek Road to provide an access during a flood event. An alternative was developed for access by connecting Hassert to Laurel Street (see Figure 7.3).
- Ordinance Revisions

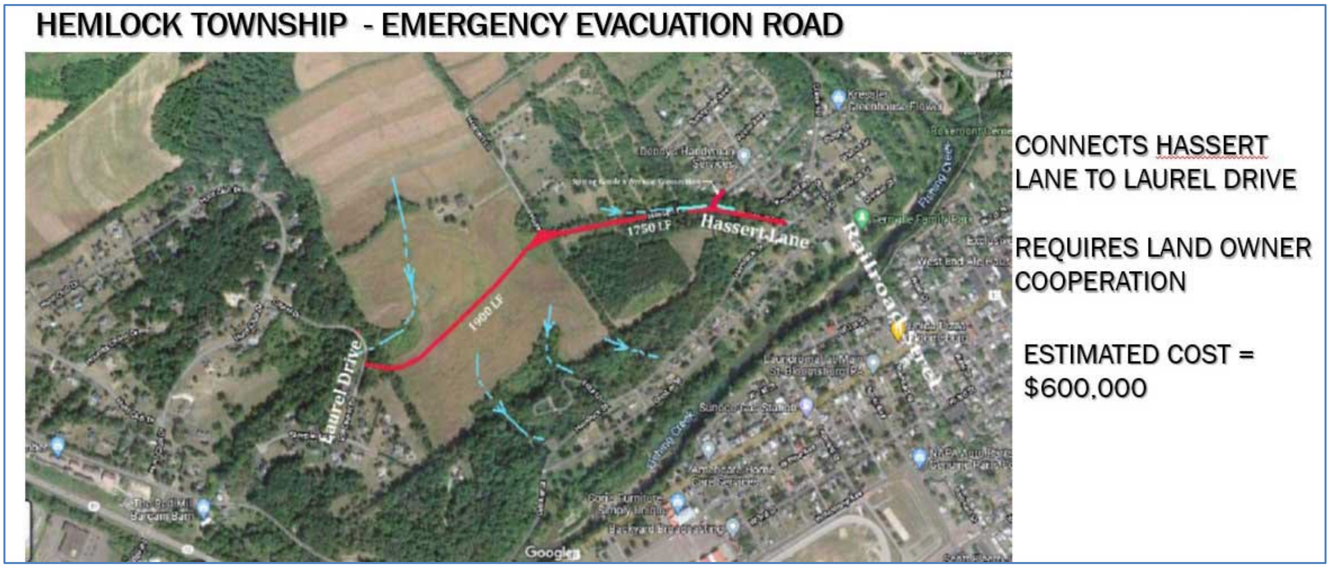

Figure 7.3 Proposed Emergency Evacuation Road for Hemlock Township

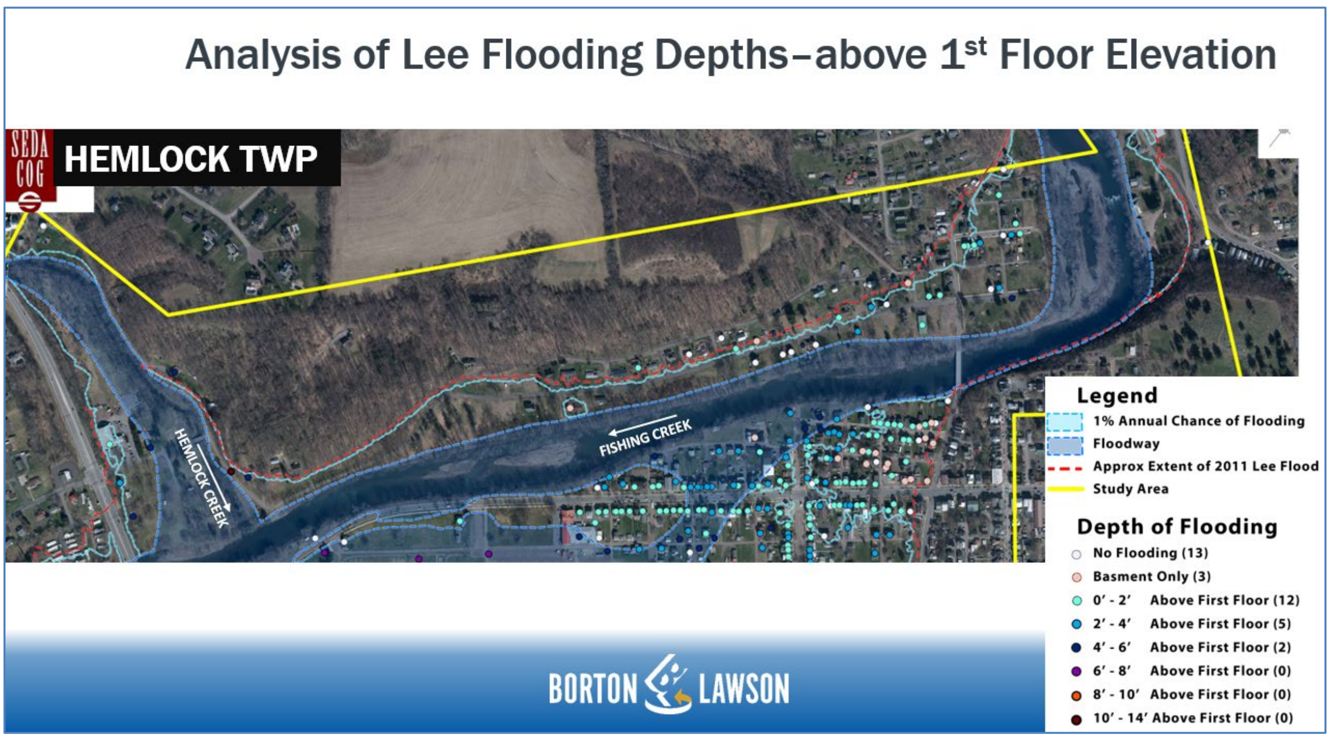

Figure 7.4 Modeled Depth of 2011 Lee Flooding in Structures in Hemlock Township

Structural Alternatives

Channel modifications to Fishing Creek in the area of Railroad Street, such as outlined in Section 6, could benefit homes in Fernville if further 2D H&H analysis is performed to verify and refine the conclusions reached in this study. If reduction of flooding levels up to two (2) feet can be achieved, it may be cost effective to consider this option. The benefits would accrue for the higher level flood events such as the base flood and events similar to the 2011 flooding.

7.3 Town of Bloomsburg

Nearly 300 properties were evaluated for flooding impacts utilizing first floor elevations, topography, and a flood depth model developed for the 2011 flood.

Evaluation projected the following:
- Seventeen (17) of the properties were not flooded;
- Sixteen (16) properties experienced basement flooding;
- One hundred seventy-four (174) had between zero (0') and four feet (4') of water on the first floor, and
- Ninety (90) had greater than four feet (4') of flooding on the first floor.

Mitigation Options – Nonstructural Alternatives

- Buyouts - Voluntary
- Elevations – Voluntary
- Mitigation Reconstruction
- Managed Retreat – Rebuild offsite
- Wet Floodproofing – Commercial Properties
- Utility Relocations
- Fishing Creek Gauge – Town recommendation: Requested the installation of additional stream gauge to enhance early notification for Fishing Creek flooding
- One (1) Emergency Siren Addition – in the residential area closest to Fishing Creek

Bloomsburg Fairgrounds
- Wet Floodproofing
- Utility Relocation
- Emergency Action Plan

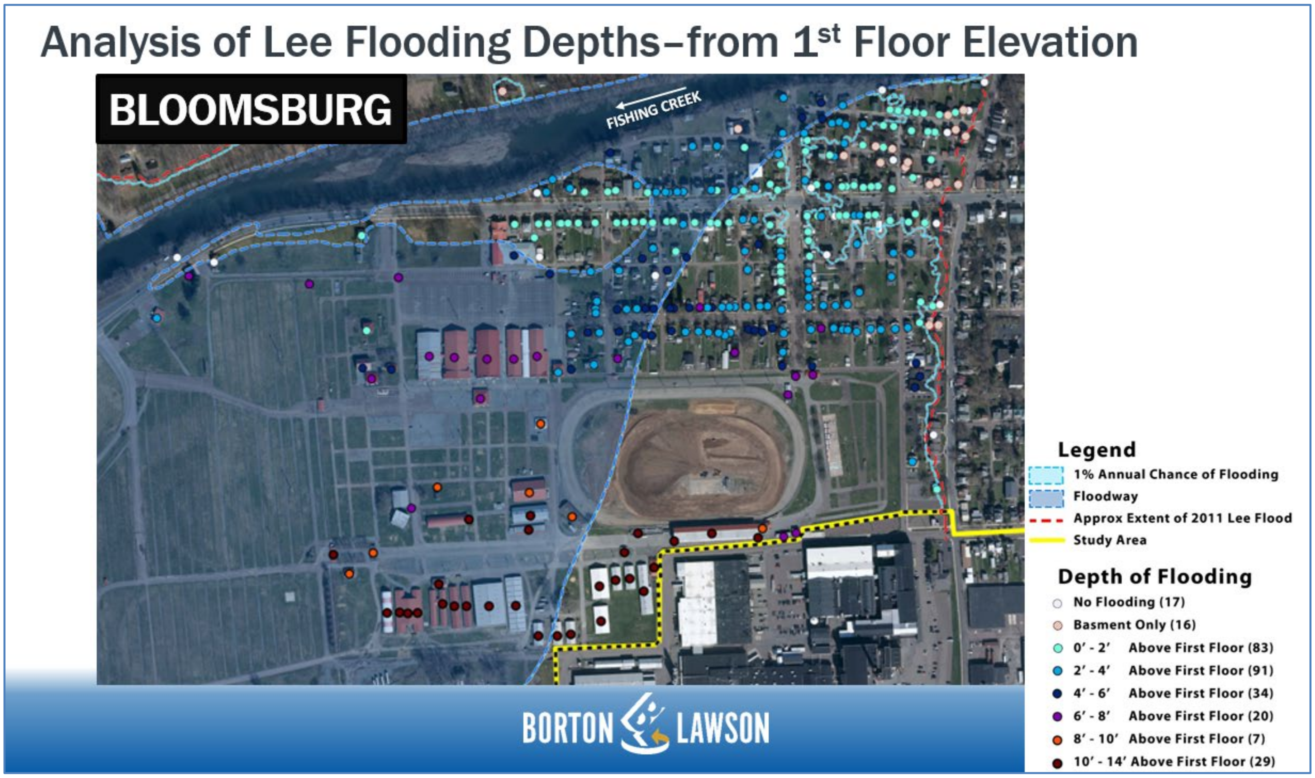

Figure 7.5 Modeled Depth of 2011 Lee Flooding in Structures in the Town of Bloomsburg

Structural Alternative

The recommended structural alternative is a flood mitigation system consisting of earth levees and a floodwall with a top of system elevation based on the Storm Lee flood levels plus approximately three (3) feet of freeboard which satisfies the FEMA requirements for the NFIP. The plan considered community requirements for minimizing the impacts from a system which would change the visual aesthetics in the community. To mitigate the visual impacts, the concept plans show various types of levees.

The overall system concept plan and various enlarged segments of the system are shown below. The system consists of the following components:

- **Earth levee** - 6,200 feet (1.2 miles)
- **Concrete capped sheet pile wall** - 1,700 feet (0.3 miles)
- **Roadway closure structures - (6)**
  - Route 11 - 5' Height
  - Gates 2 and 2A – Fairgrounds access - 7' Height
  - Gate 3 Fairgrounds – 10' Height
  - Gate 4 and 5 Fairgrounds -10' Height
- **Pump Station**

- Fairgrounds at 6th Street - Stormwater pump station

- **Induced flooding impacts:**
    - Upstream of Railroad Street – Negligible
    - Downstream of Railroad Street along levee length – 1.8 Feet

  Note: For permitting of project, induced flooding must be mitigated to zero increase or impacted structures must be provided flood protection.

- **Fishing Creek Channel Modifications for induced flooding mitigation**

Concept Drawings

Proposed concept drawings and levee sections are shown below in Figures 7.6 and 7.7. See Appendix E for larger scale plans.

Figure 7.6 Concept Design Plan

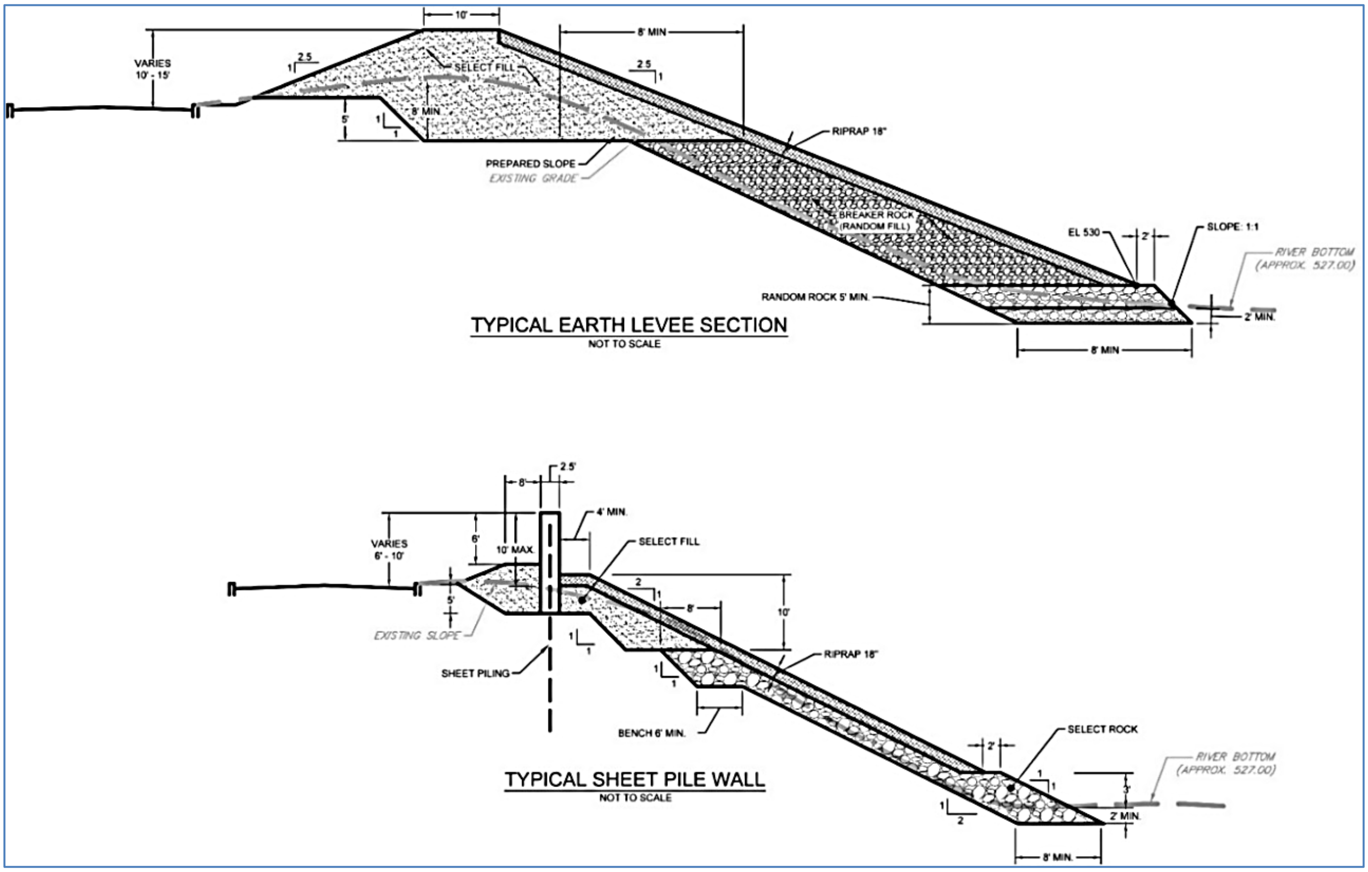

Figure 7.7 Concept Drawings of Typical Levee Sections

The proposed alignment is a schematic level concept without the benefit of detailed design documentation and analysis.

The Fishing Creek floodway will be encroached upon in a significant way. The flow depths through the floodway area are shallow however, a conveyance analysis performed to verify the induced flooding impacts resulted in about two (2) feet of increase in the base flood levels. This must be decreased through mitigation efforts to zero feet.

The alignment minimizes property takes, however, several properties will need to be acquired and as many as nine other properties will require partial takes for removal of garages and sheds along the levee alignment. Arriving at the proposed alignment considered the construction cost and the impact of reducing the tax base with property takes.

The system features represent the proper mix of context sensitive floodwall and levees on the most cost effective alignment for flood mitigation. A cost estimate for the proposed alignment was developed for the economic analysis. A summary of the estimate is included at the end of this section.

Levee / Floodwall System Description

The recommended project will consist of a system of earthen levees, MSE levees, concrete floodwalls, sheet pile floodwalls, road closure structures, and a storm water pump station. Earthen and MSE levees are proposed for the majority of the flood protection alignment. Riprap will be utilized to protect the waterside slopes of the system along Fishing Creek.

The system begins immediately to the East of Railroad Street where the earthen levee ties into high ground. The top of the system at this location is Elevation 491.00. The alignment proceeds westward across Railroad Street which is at Elev. 490.0 +/-. The roadway would be raised approximately one foot. The top of protection elevation descends from Elev. 491.00 at Railroad Street to Elev. 485.00 at the Route 11 closure structure.

On the west side of Railroad Street, an earthen levee with a landside toe drain extends downstream to Station 11+50. Through this reach the levee crest is 10' wide with a land side slope of 2.5 Horizontal to 1 Vertical (2.5H:1V) and a riverside side slope of 2H:1V. This reach of the system is through a residential area. The riverside toe will extend into the bed of the creek since severe erosion since the 2011 Lee Flood has caused loss of the bank along this reach of the creek. The riverside levee slope will be protected by 18 to 24" riprap.

A MSE levee then extends westward adjacent to Fishing Creek from Station (Sta.) 11+50 to 14+50. The MSE levee has a 12' wide crest with vertical wall faces, fall protection railings and a landside toe drain. The MSE levee will have a riverside slope of 2H:1V. This reach of the system is also through a residential area. The riverside toe will extend into the bed of the creek

Starting at Sta. 14+50 a sheet pile wall is proposed 4 feet from the top of bank to Sta. 22+50.
A concrete cap can be added to the sheet piling for additional strength and aesthetics.

This reach of the line of protection is on an alignment with minimal lateral clearance through the residential area. The riverside levee slope will be protected by 18 to 24" riprap.

Figure 7.8 Proposed Levee Design from Railroad Street to West 1st Street

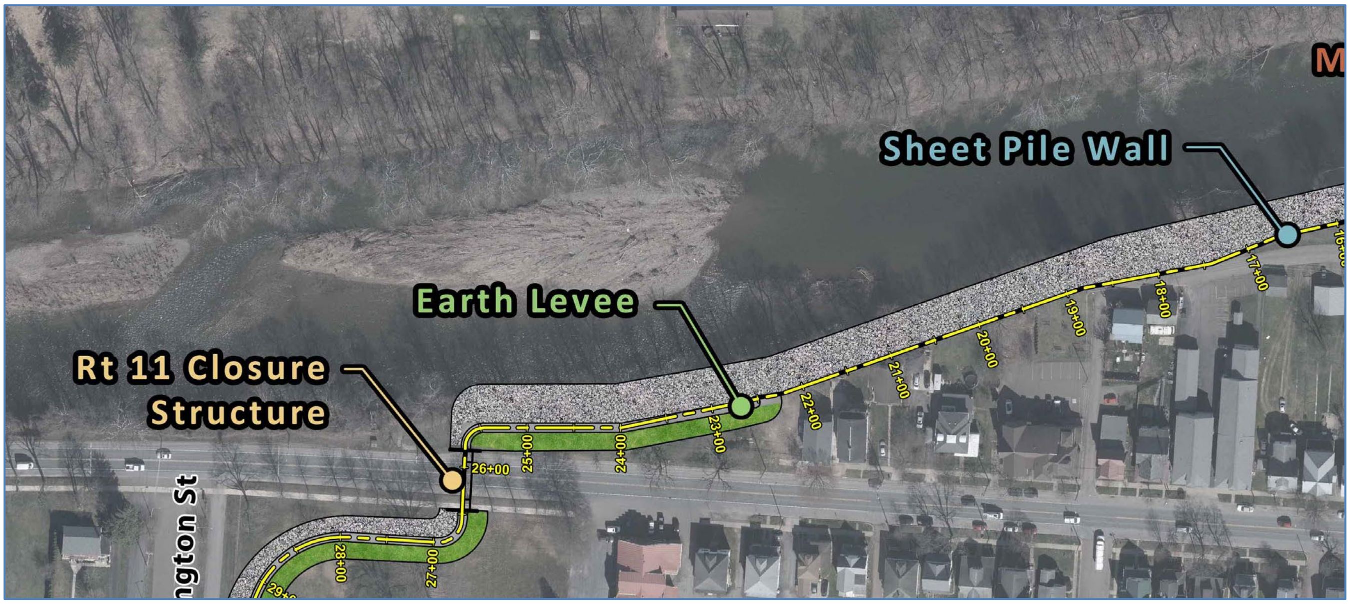

Figure 7.9 Proposed Levee Design Near Route 11 Closure Structure

Beginning at Sta. 22+50, an earth levee will extend to the Route 11 road closure structure abutment at Sta. 25+70. The stop log closure across route 11 is approximately 6 feet in height if the roadway is not raised. Being a state highway and also being in the floodplain, it was determined that the road should not be raised to lower the activation frequency.

On the south side of the closure, an earth levee begins at Sta. 26+50 extending to the Fairgrounds road closure structures 2 and 2A. The top of levee is at Elevation 485.00, about 6 to 7 feet in height. Flow velocities from the creek overbank flows during higher level flood events requires 24" riprap on the levee slope.

Closures 2 and 2A are proposed to be automatic Floodbreak type of closures since the creek flows in this area are fast rising compared to the river backwater which is also a source of flooding in the West End of Bloomsburg. To minimize the activation frequency, the ground level would be raised to elevation 478.00 as indicated on the concept plans.

Figure 7.10 Proposed Levee Design from Route 11 Closure to Gate 3 Closure

An MSE levee of varying heights is proposed from the abutment of closure 2A at Sta. 31+30 to the tie-in to a concrete floodwall at Sta. 59+95. The tie-in location is near Closure 5 of the Columbia County Levee System #1. This location is also the lowest ground elevation, approximately Elev. 470.5. With a top of system elevation of 485.00, the MSE levee would be about 14 feet in height. Extensive investigation of the embankment stability and underseepage potential will be required to determine the final width of the crest of the levee and the riverside earth slope which is assumed to be 3:1. Underseepage may require a deeper base trench (See MSE levee cross section in concept plans). Other options would be a slurry cutoff trench or sheeting.

The above stretch of MSE levee has three access road closure structures located at Sta. 40+35, Sta. 46+10, and Sta. 47+25. They are proposed stop log closures 10 feet in height. To minimize the erection time for each flood event, it is assumed most of the approximately 10 foot segments of stop logs between the steel column supports can remain in place until a major Fairgrounds event which would require removal to fully open the access points.

Figure 7.11 Proposed Levee Design from Gates 4 and 5 Closure to Tie-in Location

Interior Flooding

A stormwater pump station is proposed at approximately Sta. 51+25 to collect and discharge interior stormwater draining towards the levee from the Fairgrounds and the residential and commercial areas of the West End behind the levee system. Detailed drainage calculations will be required to develop a conveyance system which will collect the drainage which now exits to Fishing Creek via several storm sewers along to creek. These sewers extend along town streets from the edge of the Fairgrounds to Fishing Creek.

Connections to the systems would convey the excess flows during high rainfall periods to the combined overland and subsurface system directing the flows to the pump station at Sta. 51+25. The pump station is estimated to be a 20,000 gallons per minute (GPM) capacity if the very low area of the main promenade of the fairgrounds is utilized for storage at a 2 foot depth.

Other features consist of stormwater control structures at each storm sewer penetration of the system along Fishing Creek and at the Route 11 storm sewer system.

Geotechnical Conditions

The USACE report of 2005 provides a good understanding of the geotechnical conditions along the proposed levee / floodwall system alignment.

Several items such as recommendations for seepage control features, types of suitable floodwall systems along the bank of Fishing Creek, material sourcing, and soil parameters for engineering design are a few items to be determined by geotechnical engineers during the during the preliminary engineering and design phase.

Additional subsurface investigations should be undertaken to refine the design features and to identify any unknown foundation conditions. Seepage potential along the MSE levee has to be confirmed. Previously identified pervious subsurface soil strata along to bank of Fishing Creek will require testing and geotechnical recommendations. Also, subsurface conditions along the reach of the proposed sheet pile wall require additional investigation and analysis for acceptable driving conditions for PZ piling to the depths required for stability and seepage control.

The future investigations will consist of additional soil borings, soil testing, rock coring, test pits, and permeability tests. Samples recovered will be tested as required. Design of the recommended plan will be refined during design based on the additional information from the investigations.

Environmental Impacts

Impacts resulting from implementation of the recommended plan have been assessed as outlined in Section 2. Key environmental impacts include those related to biological resources (aquatic habitat), cultural resources, and visual resources. In general, the project would introduce a large-scale built element to the natural environment, potentially affecting view from and towards Fishing Creek.

The floodwalls can be designed with aesthetically pleasing architectural treatments. Design details that would minimize impacts, include the use of architectural construction materials and/or landscaping to blend the structures into the surrounding environment.

The project would involve placement of fill material in jurisdictional waters of the U.S. In addition, excavation in the creek would also be required for construction of the levee slopes. A joint permit will be required from the USACE for the project.

With the project still in the feasibility phase, there are still a number of unknown variables that may result in adverse effects through the future planning, design, and construction phases, however, the environmental investigations for this Study conclude those to be minimal and easily addressed through the design process. Permitting requirements are detailed in Section 8.0.

Mitigation of Adverse Flooding Impacts

Adverse impacts were outlined in Section 4.0. Fishing Creek channel modifications for elimination of induced flooding to meet FEMA requirements for a zero increase in the BFE after construction of the levee and floodwall system. The system alignment configured for this report is preliminary and would be refined in the design phase for the project. Opportunities for mitigation of impacts suggested below were deemed possible but not fully pursued during the modeling of the system due to the study level effort. The modeling results for Fishing Creek provided enough insight into the sensitivity of the creek levels to the alignment of the levee to provide a level of confidence that the possible mitigation levels below are realistic.

The following mitigation considerations for flood level reduction measures could be incorporated into the design of the recommended system.

1. Adjustment in Levee Alignment along Fishing Creek.
2. Expand floodplain channel along right descending bank of Fishing Creek (Fernville side) up and downstream of Railroad Street.
3. Railroad Street Bridge and approach roadway modifications.

Residual Damages

Although the recommended plan eliminates the 1 -percent floodplain throughout the West End of the community, it would not entirely eliminate every flood risk. Nonstructural solutions can be evaluated as a means of providing additional mitigation measures since structural flood mitigation systems can be overtopped by future record flooding.

The flood warning system which has been included in the recommended plan as a nonstructural measure will allow residents of the community to evacuate in a timely manner to avoid loss of life during a catostrphic flood event.

Another residual risk associated with the recommended plan is the risk related to the severity of local rainfall induced street flooding during a flood event. A 10 year rainfall was utilized for this Study to determine the pump station capacities. Further evaluation of the interior drainage system is recommended during project design.

Risk and Uncertainty

Risk and uncertainty is fundamental to all water resource planning projects. There is some project performance uncertainty in all studies, even with the risk assessment procedures.

This Study incorporated risk management framework principles and risk-informed planning into the plan formulation process. Specific examples include the following:

- As previously described, the probability of a flood occurring at the same time as a major rain storm is low. The hydraulic analysis for the Study included the evaluation of a 10 year rainfall event over the study area while the river is at flood stage.
- Other risks include unknowns that will be addressed in more detail during future design efforts, such as field investigations of geotechnical information, cultural resources, biological resources, and updates of available information about construction costs and property values for economic analyses. Subsequent technical, agency, and public reviews aid in identifying and assessing concerns regarding related project risks, and will assist in identifying ways to reduce them to acceptable levels during the design phase of the project. Opportunities for

value engineering should be considered during design to reduce the risks of missed opportunities for identifying more cost efficient project features, designs, and/or construction methods.

Resiliency, Overtopping

Under the risk-based framework, the top of the proposed system would be designed for the Lee flooding level plus three feet. Resiliency refers to how well the system performs in case of capacity exceedance or overtopping of the system. Resiliency of the system can be incorporated as a structural measure into a levee and floodwall design by eliminating features on the protected side of the levee or floodwall that would erode easily during flood events that exceed the top of levee / wall elevation. It can also address how well the community can recover from an overtopping event by limiting the destructive impacts from an overtopping event.

If the recommended system was constructed, a unique outcome would be its connection and relationship to the first and second levee systems built in Bloomsburg. It would create a three cell combined system.

From a resiliency standpoint, each cell would be independent of the other two systems. If one system failed during a flood event, the other two systems should not be impacted unless a sudden and catastrophic failure mode would result in a destructive flood wave.

See Figure 7.12 for the configuration of the combined systems. Each of the systems has a common leg with another system. This creates three (3) separate cells or systems for flood mitigation resiliency.

Levee superiority should be included in the design of the system top of protection elevations to facilitate overtopping at the extreme downstream location within the system limits. The overtopping reach is to provide a known initial exceedance location and to provide some warning or evacuation time before total system exceedance.

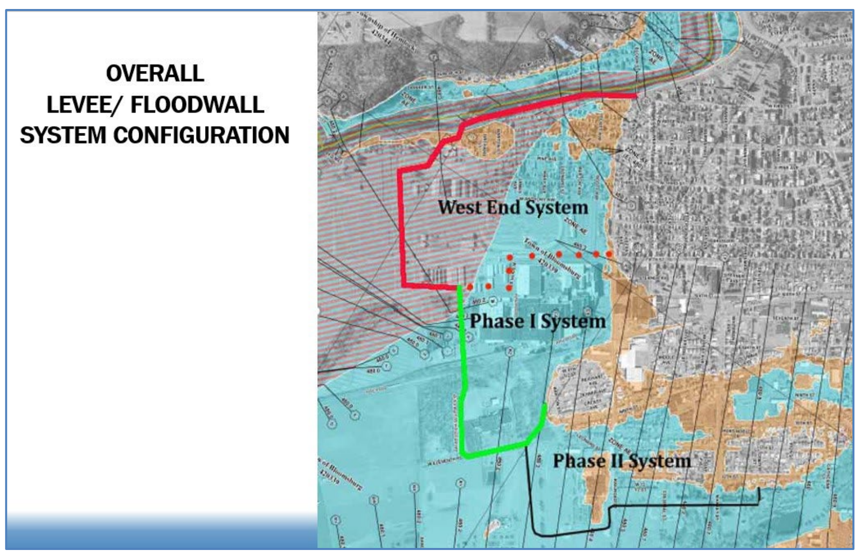

Figure 7.12 Overall System Configuration

Materials for Construction

Suitable borrow materials (including rip-rap) and soil fill material required for project construction are expected to be available from existing commercial sources. Excavated materials from project construction are expected to be reusable for random fill in the levee system. Soil and rock waste would be hauled off site for disposal at an approved waste facility. Haul routes are expected to consist primarily of existing public roads. Some roadway improvements and localized access roads would be required in addition to staging areas for contractor equipment and materials storage.

Consideration should also be given to utilization of excavated material from any Fishing Creek channel modification work.

Project Costs and Benefits

The project cost estimate (2022 price level) for the recommended system is summarized below. Additional detail is provided in Appendix D. The project first cost serves as the basis for providing the cost of the project for which funding is sought. It includes costs associated with engineering and design, construction, lands, easements, rights-of-way, utility relocations, sewer and road modifications, and a 25% contingency.

The BCR for the levee and floodwall system was calculated to be 1.05 to 1.17. There are additional benefits that could be added to this evaluation to increase the BCR including:

- damage costs to roadways and utilities that would be prevented with the construction of the levee system, and
- loss of income from commercial properties that could be prevented with the construction of the levee system.

Possible cost reduction opportunities are listed below:

- Further refinement of sewer system consolidations and pump statio ;
- Funding of project elements that can be completed separate from the Levee construction (e.g. sanitary and storm sewers and utilities);
- Economical slope protection meeting USACE requirements versus riprap.

The benefits of constructing a levee as a structural mitigation option are:

- Protects approximately 300 structures, including the Fairground Buildings, in the Floodway, Floodplain, and Zone X. Total protected property value is estimated at $44.7 Million (utilizing Columbia County assessed values multiplied by the Common Level Ratio factor published by the State for Columbia County).
- Maintaining tax base – approximately $657,000 in taxes.

Table 7.1 Total Project Cost Estimate

ITEM	COST
Construction – Levee & Floodwall System	$22,000,000
Induced Flooding Mitigation – Stream Benched Floodplain & Property Elevations	$3,000,000
Environmental / Cultural Resources	$500,000
Legal & Administration of Grant	$275,000
Engineering / Geotechnical	$2,300,000
Permitting	$300,000
Construction Inspection	$675,000
TOTAL	**$29,050,000**

Performance

Future impacts of climate change on hydrologic conditions such as the frequency and severity of flooding is the subject of much debate nationwide. It is prudent to assume the recent events warrant a system design which would mitigate a flood of record (2011 Lee flood).

The 1972 Agnes flood was estimated after the event to be a 350-year flood. It is now estimated to be close to the 100-year flood forty years later. The 2011 Lee flood (Flood of Record) is considered a 125 to 200 year flood, approximately 2 feet higher than the updated 100 year flood. Existing conditions and damages that have occurred in the recent past confirm the flooding problem would likely persist and possibly get worse in the future.

The concept levee was developed with estimated top of protection elevations set to mitigate risk for a recurrence of the preliminary (2022) BFE for the Susquehanna River and for USGS high water marks for the record Tropical Storm Lee flood (2011) along Fishing Creek. The top of protection profile was established by adding a minimum of four feet to the updated base flood surface profile after adjustments to reasonably reflect the impact of river channel features.

Operation and Maintenance

All structures and equipment constructed, erected, or installed by or with the help of the Federal and State Government or private entities would be the property of Columbia County. The County Water Mitigation Authority was established by Columbia County to operate, maintain, and replace any County flood mitigation project features when necessary.

Real Estate Requirements

Several properties along the alignment will require full takes to accommodate the levee and access easements. Two are located on West First Street between Barton Avenue and Leonard Street. Another is located at the top of the Fishing Creek bank opposite Orchard Street.

Other takes will be partial for accessory type structures such as garages and sheds.

Permits Required.

Permits required to construct the flood risk management system are anticipated to be the following:

- USACE / PADEP Joint Permit
- PADEP Sewage Planning
- PADEP Water Quality Management Permit
- PADEP Air Pollution Permit
- Town of Bloomsburg Zoning
- Town of Bloomsburg Building Permit

7.4 Benefit Cost Analysis

The FEMA BCA Tool was utilized to evaluate the cost effectiveness of the flood mitigation alternatives including acquisitions, elevations, mitigation reconstruction, and for the proposed levee/floodwall system.

Montour Township & Hemlock Township

The mitigation alternatives evaluated for Montour and Hemlock Townships included acquisition/demolition, elevations and mitigation reconstruction (demolish and rebuild).

Due to the low density of structures that remain in the floodway/floodplains in both municipalities, combined with the high cost of implementing a structural levee/floodwall system in this area, a structural option is not economically feasible.

Town of Bloomsburg

The mitigation alternatives evaluated for the Town of Bloomsburg included acquisition/demolition, elevations, mitigation reconstruction and the construction of a Levee/Floodwall system.

Acquisitions

FEMA will fund an acquisition/demolition on structures that meet certain criteria. This type of program is voluntary for property owners. The structure must be located in a SFHA (Floodway or Floodplain) or, if located outside of a SFHA, be classified as a RL or SRL property.

For Acquisitions, FEMA has a defined Pre-Calculated Benefit of $323,000 per structure. If the total cost for the acquisition/demolition project is less than $323,000, the project is considered cost effective and qualifies for FEMA funding. In this case, a BCA is <u>not</u> required to be completed to obtain FEMA funding.

If acquisition/demolition project costs for a structure are estimated to be greater than $323,000, FEMA funding may still be utilized; however, a BCR must be calculated utilizing FEMA's BCA Tool, and the BCR must be shown to be greater than 1 to qualify for FEMA funding.

Based on evaluation of County assessed property values and estimated administration and demolitions costs that would factor into the acquisition/demolition process, greater than 95% of properties, evaluated in aggregate, within the SFHAs within Montour, Hemlock and Bloomsburg would qualify for the FEMA Pre-Calculated Benefit for an acquisition/ demolition project.

There is a 25% local match required for utilizing FEMA funding through the FMA and BRIC programs, but no match required if HMGP funding is utilized.

In summary,

- Acquistions/Demolition FEMA Pre-Calculated Benefit: $323,000.
  Project deemed eligible when project cost is less than $323,000.

- If project cost is greater than $323,000 need to complete BCA and show BCR > 1.

- >90% Residential Properties in Floodway/Floodplain are estimated to qualify under FEMA Pre-Calculated Benefits.

- 25% Local Share required with FEMA FMA and BRIC programs; HMGP no local share.

Elevations/ Mitigation Reconstructions

FEMA will fund elevations and mitigation reconstruction on structures that meet certain criteria. Mitigation Reconstruction involves demolition of a structure with a complete rebuild, at an elevation above the PA Higher Regulatory Standard. The structure must be located in a SFHA (Floodway or Floodplain) or, if located outside of a SFHA, be classified as a RL or SRL property. This type of program is voluntary for property owners.

For elevations and mitigation reconstructions, FEMA has a defined Pre-Calculated Benefit of $205,000 per structure. If the total cost for the elevation or mitigation reconstruction project is less than $205,000, the project is considered cost effective and qualifies for FEMA funding. In this case, a BCA is <u>not</u> required to be completed to obtain FEMA funding.

If the elevation or mitigation reconstruction costs for a structure are estimated to be greater than $205,000, FEMA funding may still be utilized; however, a BCR must be calculated utilizing FEMA's BCA Tool, and the BCR must be shown to be greater than 1 to qualify for FEMA funding.

Elevations and mitigation reconstruction projects have a number of variables that have a direct impact on the cost of the project, such as the type and size of the home's existing foundation, the condition of the foundation, the required height for the elevation, and the size and finished detail of the re-built home (for mitigation reconstruction). Subsequently, due to the number of variables that impact cost for these types of projects, each home would need to be evaluated on a case-by-case to determine if it would qualify for the FEMA Pre-Calculated Benefit.

There is a 25% local match required for utilizing FEMA funding with the FMA and BRIC programs, but no match required if HMGP funding is utilized. With elevations and mitigation reconstruction, additional funding outside of FEMA programs is required if the homeowner desires a higher elevated home than FEMA will fund resulting in greater costs than covered by FEMA. FEMA will fund an elevation to the height of the BFE + 1.5 feet (PA Higher Regulatory Standard) or to the height of Best Available Data (Flood of Record Elevation).

In summary,

- Elevations & Mitigation Reconstruction, FEMA Pre-Calculated Benefit: $205,000 per structure.
  Project deemed eligible when project cost is less than $205,000.

- If project cost is greater than $205,000 need to complete BCA and show BCR > 1.

- 25% Local Share required with FEMA FMA and BRIC programs; HMGP no local share.

Levee/Floodwall System

A FEMA BCA was completed for the proposed levee and floodwall system to be located in the West End of Bloomsburg. The analysis showed the levee to be cost effective.

The following key data/criteria were utilized in the FEMA BCA Tool for this evaluation:

- Levee was modeled as a "Floodproofing" Mitigation Alternative.
- Levee Total Project Costs = $29 million (includes construction, design, real estate costs, permitting and induced flooding mitigation costs).
- Levee useful life = 75 years.
- Levee Estimated Annual Operating & Maintenance Costs = $75,000 per year.
- Residential Building Replacement Value (BRV) = $150/ square foot (SF).
- Commercial BRV = $150/ SF (with the exception of the Fairgrounds' buildings).
- Fairgrounds Buildings BRV = $100/ SF.
- Non-Residential Garages BRV = $100/ SF.
- Lowest Finished Floor Elevations (all Basements were entered as <u>unfinished</u>).

The BCR for the proposed levee using above criteria was calculated to be 1.05.

A number of benefits* (costs that would be prevented during a flood with the construction of a levee system) were <u>not</u> included in this BCA, but could be entered into the BCA for the levee project if needed or for future funding applications, include the following:

- Damage costs to roadways and utilities (sanitary, storm, gas, water, electric, traffic signals, etc.).
- Loss of income from commercial properties – there are 19 commercial properties located within the floodway & floodplain in Bloomsburg, with the Fairgrounds having the largest number of structures (54) impacted.
- Finished basements in residential or commercial properties.
- Volunteer efforts and expenses.

*Utilization of these benefits in the BCA requires submission to FEMA of supporting documentation. Adding benefits to the BCA should increase the BCR value for the proposed project assuming project costs are not increased.

A BCA for the proposed levee system was also completed using the same above criteria but with a reduced total project cost of $26 million, assuming engineering and permitting could be completed as a separate phase of the project, and therefore these costs could be subtracted from the $29 million. This produced a BCR of 1.17.

If FEMA BRIC funding were to be utilized for a levee project, a 25% local share would be required.

7.5 Flood Insurance

In October 2021 FEMA overhauled the NFIP to include a new pricing methodology. The new program is known as Risk Rating 2.0 – Equity in Action. The intent of the program is to allow policyholders to make more informed decisions on the purchase of flood insurance. The new program incorporates improved technology to develop individualized actuarial rates based on multiple flood risk variables.

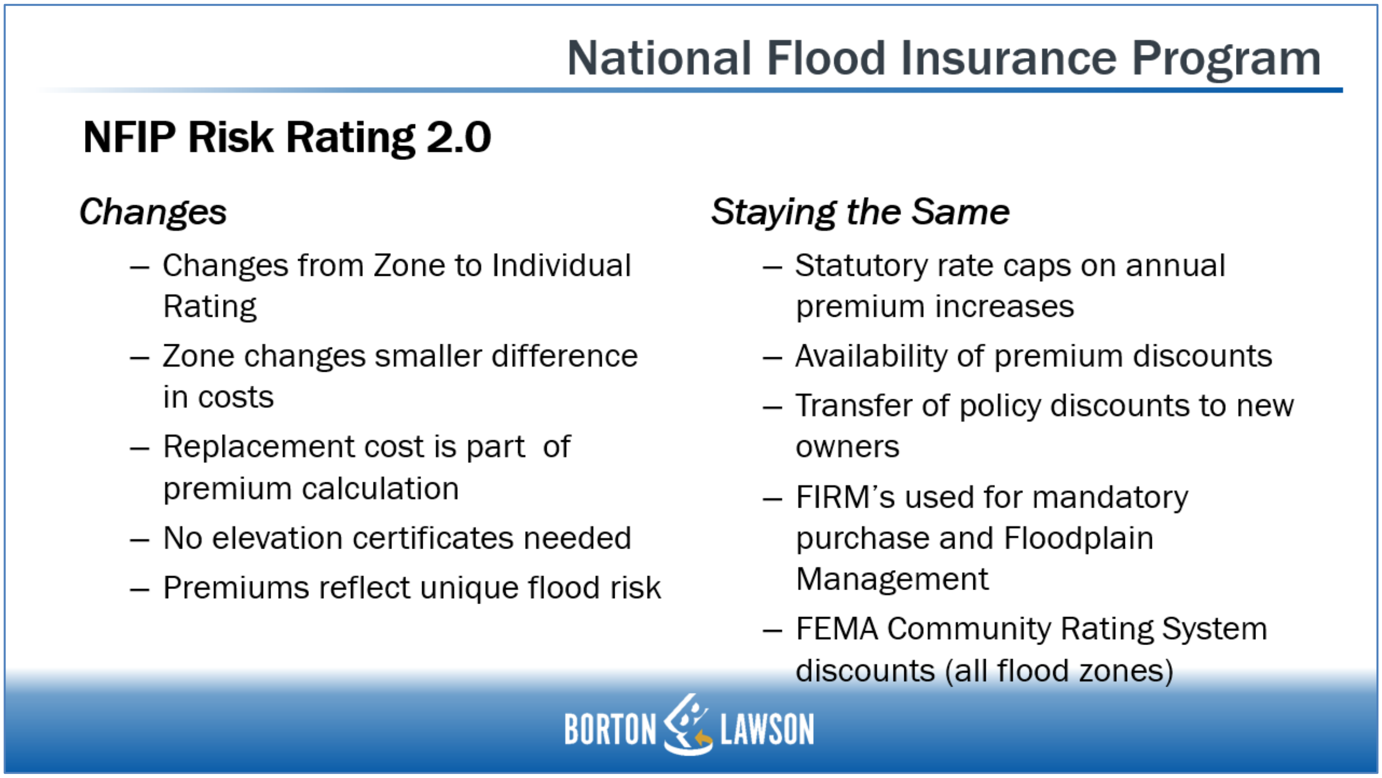

Figure 7.13 Summary of NFIP Risk Rating 2.0

SECTION 8 – STUDY FINDINGS

8.1 Study Summary

- Nonstructural flood mitigation is feasible for the three communities, Montour Township, Hemlock Township, and the Town of Bloomsburg.
- Structural flood mitigation is feasible for the West End of the Town of Bloomsburg. Benefit to Cost Ratio greater than 1.0.
- Flood Insurance – As of Summer 2022, all existing policies will be renewed under NFIP's Risk Rating 2.0 program.
- Flood Mitigation Alternatives – Nonstructural and Structural (Levee) Alternatives are cost effective when BCR>1.0. Some nonstructural alternatives will require individual analysis; this is more applicable for higher value properties.
- County and Municipalities will determine the mitigation alternatives that will be implemented.
- Challenges:
    - Acquisitions / Elevations / Mitigation-Reconstruction – Voluntary Program
    - Commercial Properties – Funding Options
    - Levee System
        - Further Analysis of flooding Impacts with 2D analysis
        - Mitigation of Induced Flooding
        - Permitting of levee in Floodway
        - Property takes on voluntary basis

8.2 Municipal Review

Adoption of any of the alternatives outlined in this study should be in line with current and future planning initiatives including the County Hazard Mitigation Plan. Funding opportunities for the larger projects may require community action to facilitate the grant application process.

8.3 Municipal Adoption Process

Adoption of any of the alternatives outlined in this study should be in line with current and future planning initiatives including the County Hazard Mitigation Plan. Funding opportunities for the larger projects may require community action to facilitate the grant application process.

8.4 Incorporation into Existing Planning Mechanisms

This report and its recommendations can in part or in its' entirety be adopted for incorporation into the County Hazard Mitigation Plan or community land use planning documents

8.5 Opportunities

- Recent progress towards flood mitigation in Columbia County provides momentum and optimism for future flood mitigation. Proven success helps with pursuit of funding.
- Community supports action.
- County committed to flood resiliency utilizing cost effective approach based on best practices.

- Timing for federal infrastructure funding requires near term action – Schedule is important.

8.6 Challenges

Community Actions - Each community has made significant progress with property acquisitions and demolition of flood prone properties. Hemlock and Montour Townships are expected to continue to prioritize acquisitions in the study area.

Small projects mentioned in this report, such as emergency access roads, require community action and funding.

Any modifications to the Fishing Creek channel to mitigate current flooding and mitigation of induced flooding related to the levee alternative for the Town of Bloomsburg will require coordinated actions to obtain state and federal stream encroachment permits.

Due to the significant amount of structures in the West End of Bloomsburg, a successful flood mitigation program will require voluntary participation in the program by a sufficient number of property owners.

Next Phase - Design - The next phase of design will be the preliminary engineering and design (PED) phase. Final design for the levee, MSE walls, floodwall, closure structures, roadway revisions, drainage control structures, and the stormwater pump station will be performed based on the additional new data and the information collected to date.

8.7 Next Steps

Nonstructural Alternatives

- Compare possible alternatives to current priorities
- Prioritize all alternatives
- Review chosen alternatives with legislative leaders for inclusion in local and county planning documents
- Secure funding (some may be continuation of current programs)

Structural Alternatives

- Perform 2D analysis of Fishing Creek to determine options for mitigation of stream flooding and permitting of levee in floodway.
- Consider funding for preliminary engineering to verify project details and cost.
- Coordinate with local and state legislators for funding of levee system in Bloomsburg.

8.8 Funding Opportunities

FEMA Grant Programs

Hazard Mitigation Grant Program (HMGP)

FEMA's HMGP provides funding to state and local governments to develop Hazard Mitigation Plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities. HMGP funding is available after a presidentially declared disaster. Total funding for the HMGP program is allocated based on the percentage of funds spent on Public and Individual Assistance for each Presidentially declared disaster.

The projects are cost shared 75% federal and 25% local. In Pennsylvania, the Commonwealth provides the non-federal share.

Homeowners cannot apply for a grant. The local community may apply for funding on their behalf.

To qualify for HMGP funding, state and local governments must develop and adopt hazard mitigation plans. The plans are required to be updated every five years.

Eligible Projects

Planning & Enforcement

- Developing and adopting hazard mitigation plans, which are required for state, local, tribal and territorial governments to receive funding for their hazard mitigation projects.
- Acquisition of hazard prone homes which enables owners to relocate to safer areas (acquisition).
- Post-disaster code enforcement.

Flood Protection

- Protecting homes and businesses with permanent barriers to prevent floodwater from entering (levees, floodwalls, floodproofing).
- Elevating structures above known flood levels to prevent and reduce losses (elevation).
- Reconstructing a damaged dwelling on an elevated foundation to prevent and reduce future flood losses. (Mitigation Reconstruction).
- Drainage improvement projects to reduce flooding (flood risk reduction projects).

Flood Mitigation Assistance (FMA) Grant

The FMA Program is a competitive grant program that provides funding to states and local communities. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the NFIP.

The projects are cost shared 75% federal and a 25% local share. For Severe Repetitive Loss Properties (SRL) the funding is 100% federal and for Repetitive Loss (RL) properties, the funding is 90%federal. Generally, between $160 million and $200 million is available in Flood Mitigation Assistance funding each year.

FEMA chooses recipients based on the applicant's ranking of the project and the eligibility and cost-effectiveness of the project.

FEMA requires state and local governments to develop and adopt Hazard Mitigation Plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for hazard mitigation assistance projects. The plans are required to be updated every five years.

Communities must be participating in the NFIP and must be insured under the NFIP.

The BRIC program is available annually and the grant period opens on September 30. Applications are due by January 28 of the following year. Awards are made on October 1.

Eligible Projects

Eligible individual flood mitigation projects include the following project types:

- Priority 1 (Project scoping, previously referred to as advanced assistance): conducting meetings, outreach, and coordination with subapplicants and community residents; developing or conducting engineering, environmental feasibility, and/or Benefit-Cost Analyses (BCA); undertaking activities that lead to development of project applications; evaluating facilities to identify mitigation actions; and using staff or resources to develop cost share strategies.
- Priority 2 (Community flood mitigation projects): eligible projects that benefit NFIP insured properties include, but are not limited to, localized flood control, floodwater storage and diversion, floodplain and stream restoration, stormwater management, and wetland restoration/creation.
- Priority 3 (Technical assistance): technical assistance to maintain a viable FMA program over time; to be eligible for technical assistance, the applicant must have received an prior FMA award of at least $1 million.
- Priority 4 (Flood hazard mitigation planning): Planning grants for the flood hazard component of State, Local, Territory, and Tribal (SLTT) Hazard Mitigation Plans and plan updates.
- Priority 5 (Individual flood mitigation projects): property acquisition and structure demolition/relocation; structure elevation; dry floodproofing of historical residential structures or nonresidential structures; nonstructural retrofitting of existing buildings and facilities; mitigation reconstruction; structural retrofitting of existing buildings.

Building Resilient Infrastructure and Communities (BRIC) Program

FEMA's new BRIC program provides funding for public infrastructure projects and mitigation efforts that bolster a community's flood resilience before a disaster strikes. In the FY2021 cycle, BRIC will award $1 billion in funding, split into 3 categories: State/Territory Allocation, Tribal Set-Aside, and a National Competition. BRIC replaces FEMA's Pre-Disaster Mitigation (PDM) program.

Mitigation projects that were eligible under PDM are still eligible under BRIC. While BRIC requires states to have had a Presidential Disaster Declaration issued in the last seven years in order to be eligible for funding, numerous major disaster declarations in recent years have led to Declarations being issued for all 50 states, therefore communities in all states and territories meet this eligibility requirement.

Communities must be participating in the NFIP.

The projects are cost shared 75% federal and a 25% local share.

The FMA BRIC program is available annually and the grant period opens on September 30. Applications are due by January 28 of the following year. Awards are made on October 1.

Eligible Projects

FEMA provides the following uses of assistance through the BRIC program:

Capability and capacity-building (C&CB) activities: Activities that enable recipients to identify mitigation actions and implement projects that reduce risks posed by natural hazards. Eligible activities include project scoping, partnerships, mitigation planning and planning-related activities, and adoption and implementation of building codes.

Mitigation projects: Projects designed to increase resilience and public safety, reduce injuries and loss of life, and reduce damage to property, critical services, facilities, and infrastructure from flooding. Examples include property acquisition and structure relocation, structure elevation, mitigation reconstruction, dry floodproofing of historic residential structures, dry floodproofing of non-residential structures, generators, and structural and nonstructural retrofitting of existing buildings.

HUD Grant Programs

Community Development Block Grant - Disaster Recovery (CDBG-DR)

CDBG-DR funding is particularly useful for small municipalities because of its broad list of eligible projects. Small municipalities needing funds to recover from a debilitating disaster may benefit from HUD Disaster Recovery grants. A subset of the CDBG Program, these grants provide crucial seed money and address the long-term recovery and restoration of infrastructure, housing, and economic activity, including mitigation and mitigation planning activities intended to reduce or eliminate damage from future disasters.

Requires Presidential Disaster Declaration.

Funding amount: Varies. In response to a natural disaster, Congress appropriates funds to HUD, which then allocates funds to eligible states and municipalities based on unmet recovery needs.

Cost share: This program has no cost share requirements.

Eligible activities: There are 27 eligible activities. Flood-related activities include open space acquisition; construction, repair, replacement, or relocation of public facilities; and improvements, such as dams or levees.

American Flood Coalition Funding Tool

The American Flood Coalition is a nonpartisan group organization consisting of cities, elected officials, military leaders, businesses, and civic groups that have come together to drive adaptation to the reality of higher seas, stronger storms, and more frequent flooding through national solutions that support flood-affected communities and protect our nation's residents, economy, and military installations.

The American Flood Coalition created the Flood Funding Finder—a first-of-its-kind, interactive website—to simplify the complex federal grants system and to help small communities identify and prioritize opportunities to fund flood resilience.

Hundreds of programs across 26 federal agencies were reviewed and the American Flood Coalition identified a set of federal funding opportunities that will provide assistance to projects in small communities that address flooding. This interactive tool is primarily targeted toward communities with populations of 50,000 or fewer, but communities of all sizes may find its information helpful.

The Flood Funding Finder also includes a set of filters to highlight specific program characteristics that are of interest to smaller communities:

- Gives special consideration for small communities
- Does not require a cost share or matching funds from smaller communities
- Allows in-kind services to contribute toward nonfederal cost share requirements
- Focuses on environmental restoration
- Requires a Presidential Disaster Declaration

The tool can be used by connecting to the following location:
https://floodcoalition.org/resources/floodfundingfinder/

Nonstructural Funding Opportunities

Funding opportunites for nonstructural mitigation options include:

- FEMA Grant programs
    - Hazard Mitigation Grant Program – HGMP
    - Flood Mitigation Assistance – FMA
    - Building Resilient Infrastructure and Communities – BRIC
- US Department of Housing and Urban Development – HUD CDBG-DR
- American Flood Coalition – Resources for flood mitigation funding information

Funding for structural mitigation options include:

- Building Resilient Infrastructure and Communities – BRIC
- Flood Mitigation Assistance – FMA
- Federal Infrastructure Bill – large amount of money avialable for flood mitigation and coastal restoration projects from storms
- State funding opportunities

COLUMBIA COUNTY

West End Flood Mitigation Study

APPENDICES

June 2022

VOLUME II

Prepared for: Columbia County
11 West Main Street County Annex
Bloomsburg, PA 17815

Submitted by: Borton-Lawson
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Wilkes-Barre, PA 18704

BL Project #: 2021-5134-001

VOLUME II
APPENDICES

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B. GEOTECHNICAL ENGINEERING

C. ENVIRONMENTAL AND REGULATORY COMPLIANCE

D. PUBLIC AND STAKEHOLDER OUTREACH

E. MITIGATION ALTERNATIVES – CONCEPT DRAWINGS

F. FLOODPLAIN, DEPTH OF FLOODING & DEPTH OF FIRST FLOOR FLOODING MAPS

G. BENEFIT COST ANALYSIS

H. OPINION OF PROBABLE COSTS

WEST END FLOOD MITIGATION STUDY

Appendix A

Hydrologic and Hydraulic Analysis

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A. Reference Materials

West End Mitigation Study Reference Materials

Fishing Creek in the vicinity of Town of Bloomsburg has been the topic of several flood studies over the last 20 years. Many of these studies and the reference data used to complete these analyses were reviewed as part of the hydraulic analysis for the flood protection proposed for this project and were incorporated into this study to improve the accuracy of the analysis. This study used data collected from the following sources to complete the analysis:

1. Reference: Columbia County Flood Insurance Study (Community Number 42037CV001A)
   Description: A report that documents how the regulatory floodplain was established using the regulatory floodplain model, how flows were developed for use in the model and how the flow changes in the river or stream based on location along the stream.

2. Reference: Columbia County Digital Flood Insurance Rate Maps (Map Numbers 42037C0240E, 42037C0243E, 42037C0330E, 42037C0335E,)
   Description: Maps showing the location, extent and in some cases the elevations of regulatory flooding (flooding that has a 1% probability of occurring in any given year) that occurs in a certain geographic area. In addition to regulatory flood elevations the map may also identify the floodway (that portion of the floodplain that must not be filled so as to not create a significant increase in the regulatory flood elevation). When provided in a digital format, the location of the floodplain and floodway is very accurate and the map is referred to as a D-FIRM.

3. Reference: Preliminary Columbia County Flood Insurance Study (Community Number 42037CV001B Version Number 2.3.3.3.)
   Description: A preliminary report that documents how the preliminary regulatory floodplain was proposed using the preliminary regulatory floodplain model, how preliminary flows were developed for use in the model and how the flow changes in the river or stream based on location along the stream.

4. Reference: Preliminary Columbia County Flood Insurance Rate Maps (Map Numbers 42037C0238F, 42037C0239F, 42037C0326F, 42037C0327F, Version Number 2.3.3.3)
   Description: Preliminary maps showing the location, extent and in some cases the elevations of the preliminary regulatory flooding (flooding that has a 1% probability of occurring in any given year) that occurs in a certain geographic area. In addition to the preliminary regulatory flood elevations the map may also identify the floodway (that portion of the floodplain that must not be filled so as to not create a significant increase in the regulatory flood elevation).

5. Reference: History Flood Insurance Study for Town of Bloomsburg, Columbia County, PA (Community Number 420339)

6. Reference: Susquehanna River Regulatory Floodplain Model

Description: A hydraulic model of the Susquehanna River developed using the river geometry (e.g. width, depth, shape and slope of the channel and floodplain) and bridge geometries to determine flood elevations for various flows in the river that are statistically projected to occur at a defined frequency.

7. Reference: Fishing Creek Regulatory Floodplain Model
Description: A hydraulic model of the Fishing Creek developed using the stream geometry (e.g. width, depth, shape and slope of the channel and floodplain) and bridge geometries to determine flood elevations for various flows in the river that are statistically projected to occur at a defined frequency.

8. Reference: Bloomsburg, PA Flood Risk Management Study (FRMS) Update of Hydrology and Hydraulic for Inclusion of Tropical Storm Lee Event, June 2012
Description: This report documents the process of the update, the results and how Tropical Storm Lee affected the H&H for the Bloomsburg FRMS.

9. Reference: National Weather Service Advanced Hydrologic Prediction Service
Description: Plots and data identifying flood stages on the Susquehanna River at Danville, Bloomsburg and Wilkes-Barre, Pennsylvania. The data provides a graphic representation of river flows plotted by time and is used to predict high water elevations on the river in order to initiate appropriate actions to protect the public, such as warning and evacuation notices.

10. Reference: The Towns of Bloomsburg, Columbia County, Pennsylvania, Flood Damage Reduction Project Report, August 2005;
Description: A report evaluating the feasibility of and environmental consequences of constructing a flood protection system in Bloomsburg, Pennsylvania. Several alternatives were investigated and evaluated to provide protection Hurricane Agnes level protection on the Susquehanna River and 100-year protection on the Fishing Creek.

11. Reference: Susquehanna River Flood Warning and Response System (PR 56), July 2003;
Description: A report describing the development of the Flood Warning Response System (FWRS) for 110 miles of the main stem of the Susquehanna River. The purpose of the FWRS is to provide an early warning system that maximizes response time to residents and emergency responders to flood conditions on the river.

12. Reference: Flood Recovery Report-Tropical Storm Lee-Wyoming Valley, June 2013
Description: A report documenting hydrologic and hydraulic changes to the models used to develop the 2003 FWRS. The FWRS was revised based on geometric changes that occurred along the river basin since the development of the FWRS, errors identified in the hydraulic model since the development of the FWRS and potential impacts to base flood elevations resulting from application of the hydrologic data collected for Tropical Storm Lee.

13. Reference: Fishing Creek near Bloomsburg, PA (Gage Number 01539000)

14. Reference: Fishing Creek-Orangeville, PA (Gage Number 01539008)

Description: Devices placed into streams which are used to measure the height (stages) of floodwaters in rivers and streams, and are able to correlate the height of the water to a flow in a stream or river. Several of these gages stopped functioning during Tropical Storm Lee or could not be used to accurately determine the flow since the elevations occurred at a height that was not encountered previously and as such were too high to accurately equate to a flow. For this analysis the stage (height of water at the gage) was given precedence or considered accurate. Streamflow was considered provisional or potentially not accurate. In addition to the elevation of the floodwaters, these gages were used to establish the timing of peak flows in the Susquehanna River and Fishing Creek.

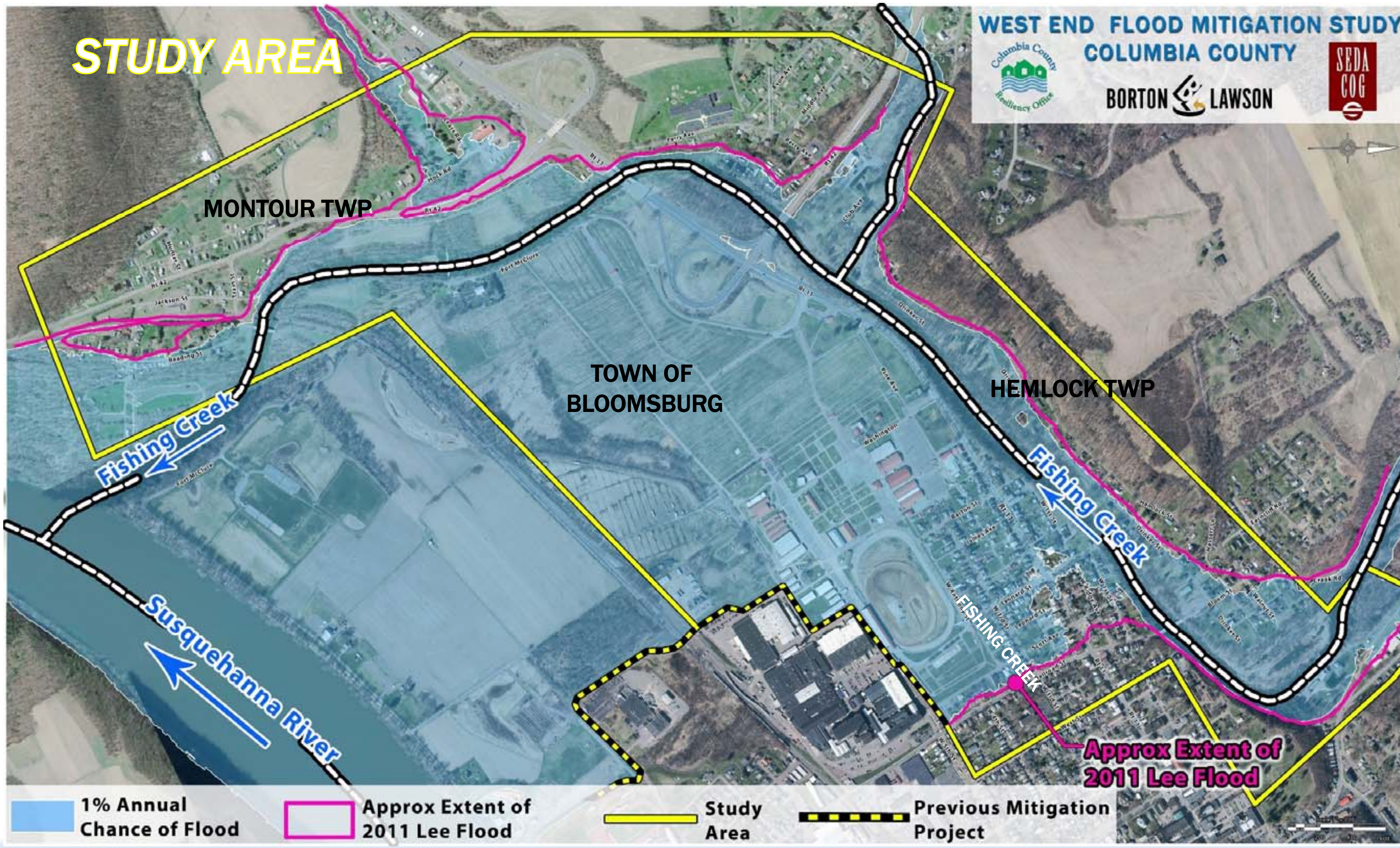
B. Figures

B.1 Location Map

West End Flood Study Area

Floodplains of Fishing Creek in Town of Bloomsburg, Hemlock Twp & Montour Twp

~500 parcels
~350 structures



B.2 Effective Flood Insurance Rate Map (FIRM)

consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevation** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0′ North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map is Universal Tranverse Mercator (UTM) zone 18. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the County of Columbia GIS Office, including hydrography and political boundaries. These files were compiled at a scale of 1:2400 based on the 2002 aerial photography produced by BAE Systems ADR. Additional information derived from other sources.

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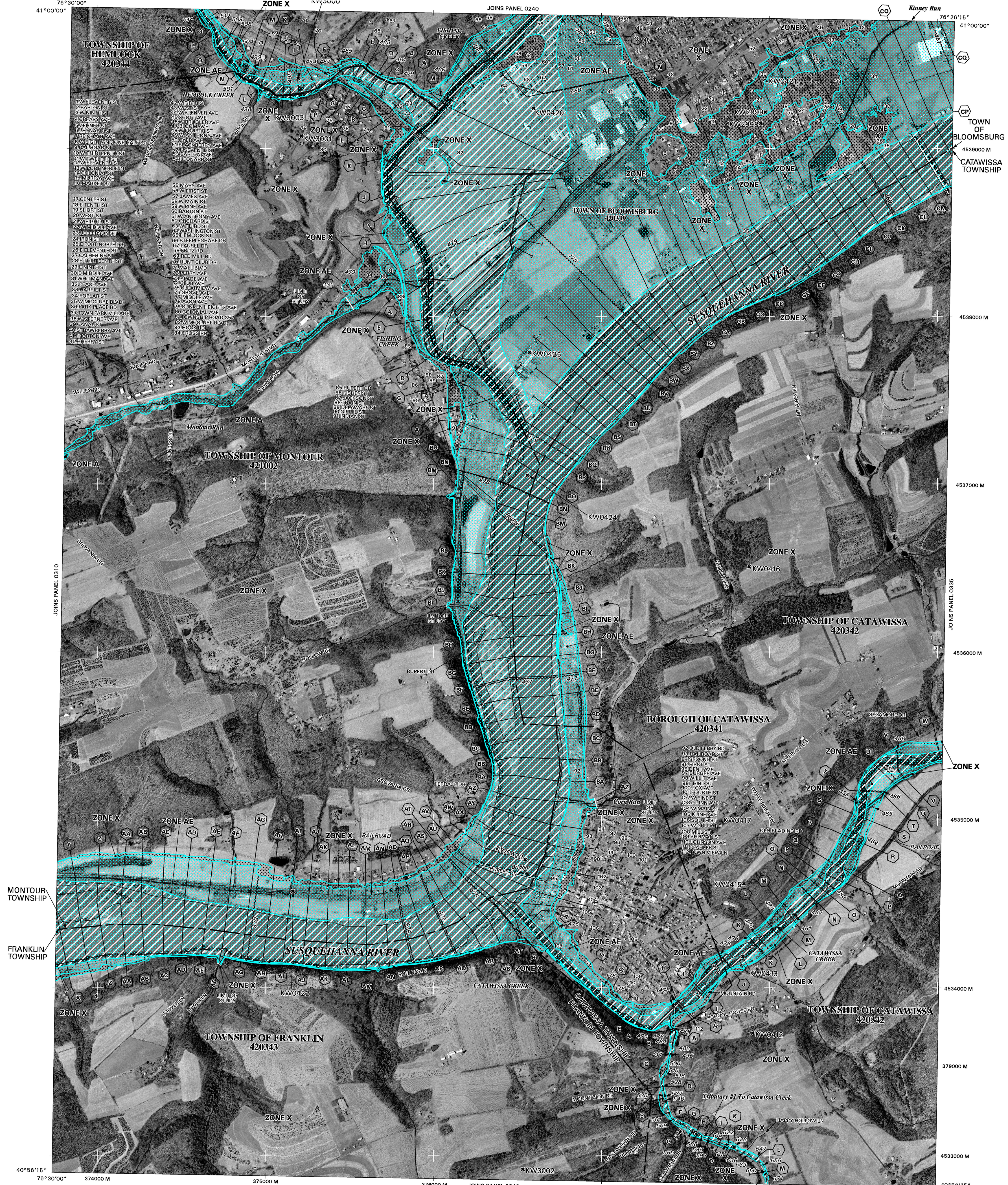
Phone: 800-358-9616
FAX: 800-358-9620
http://msc.fema.gov/

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.



ZONE X

that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
ZONE A99	Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross Section Line
23 - - - - 23	Transect Line
97°07′30″, 32°22′30″	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000M	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel).
• M1.5	River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 19, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

MAP SCALE 1″ = 1000′

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0330E

FIRM
FLOOD INSURANCE RATE MAP
COLUMBIA COUNTY,
PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 330 OF 470

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HEMLOCK TOWNSHIP OF	420344	0330	E
BLOOMSBURG, TOWN OF	420339	0330	E
CATAWISSA, TOWNSHIP OF	420342	0330	E
MONTOUR, TOWNSHIP OF	421002	0330	E
CATAWISSA, BOROUGH OF	420341	0330	E
FRANKLIN, TOWNSHIP OF	420343	0330	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42037C0330E

EFFECTIVE DATE:
AUGUST 19, 2008

consulted for possible updated or additional flood hazard information.

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that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
ZONE A99	Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

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OTHERWISE PROTECTED AREAS (OPAs)

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1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross Section Line
23 - - - - - - 23	Transect Line
97°07′30″, 32°22′30″	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000M	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel).
• M1.5	River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 19, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0240E

FIRM
FLOOD INSURANCE RATE MAP
COLUMBIA COUNTY,
PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 240 OF 470

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

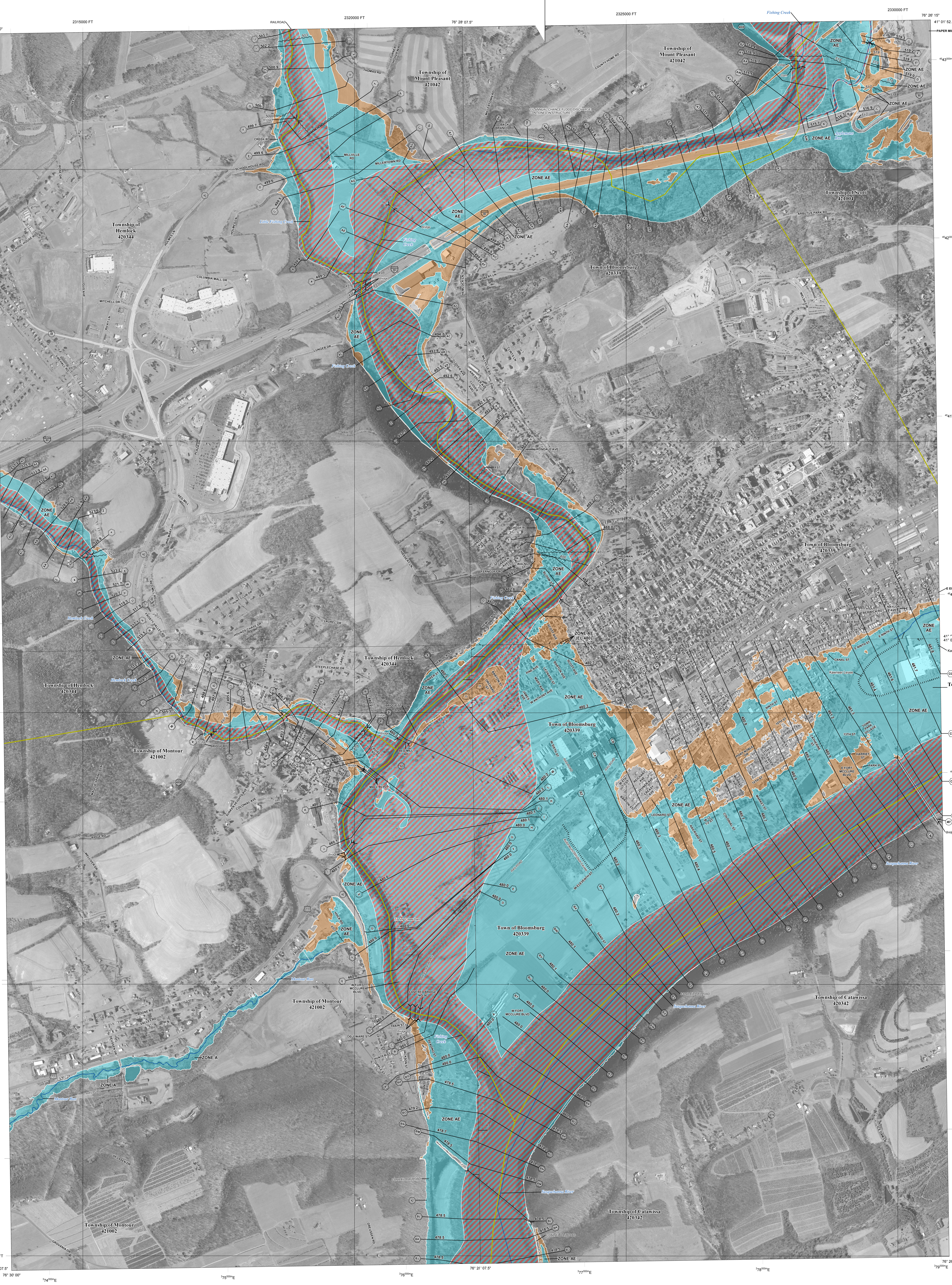
COMMUNITY	NUMBER	PANEL	SUFFIX
MOUNT PLEASANT, TOWNSHIP OF	421042	0240	E
HEMLOCK TOWNSHIP OF	420344	0240	E
SCOTT, TOWNSHIP OF	421004	0240	E
BLOOMSBURG, TOWN OF	420339	0240	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42037C0240E

EFFECTIVE DATE:
AUGUST 19, 2008

B.3 Preliminary Flood Insurance Rate Map (FIRM)



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Reduced Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	E 18.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was derived from digital orthophotography at a 1-foot resolution from photography dated 2010.

SCALE

Map Projection:
NAD 1983 StatePlane Pennsylvania North FIPS 3701 Feet;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 feet

0 125 250 500 meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

COLUMBIA COUNTY, PENNSYLVANIA
(All Jurisdictions)

FEMA

Panel Contains:

REVISED PRELIMINARY 8/28/2020

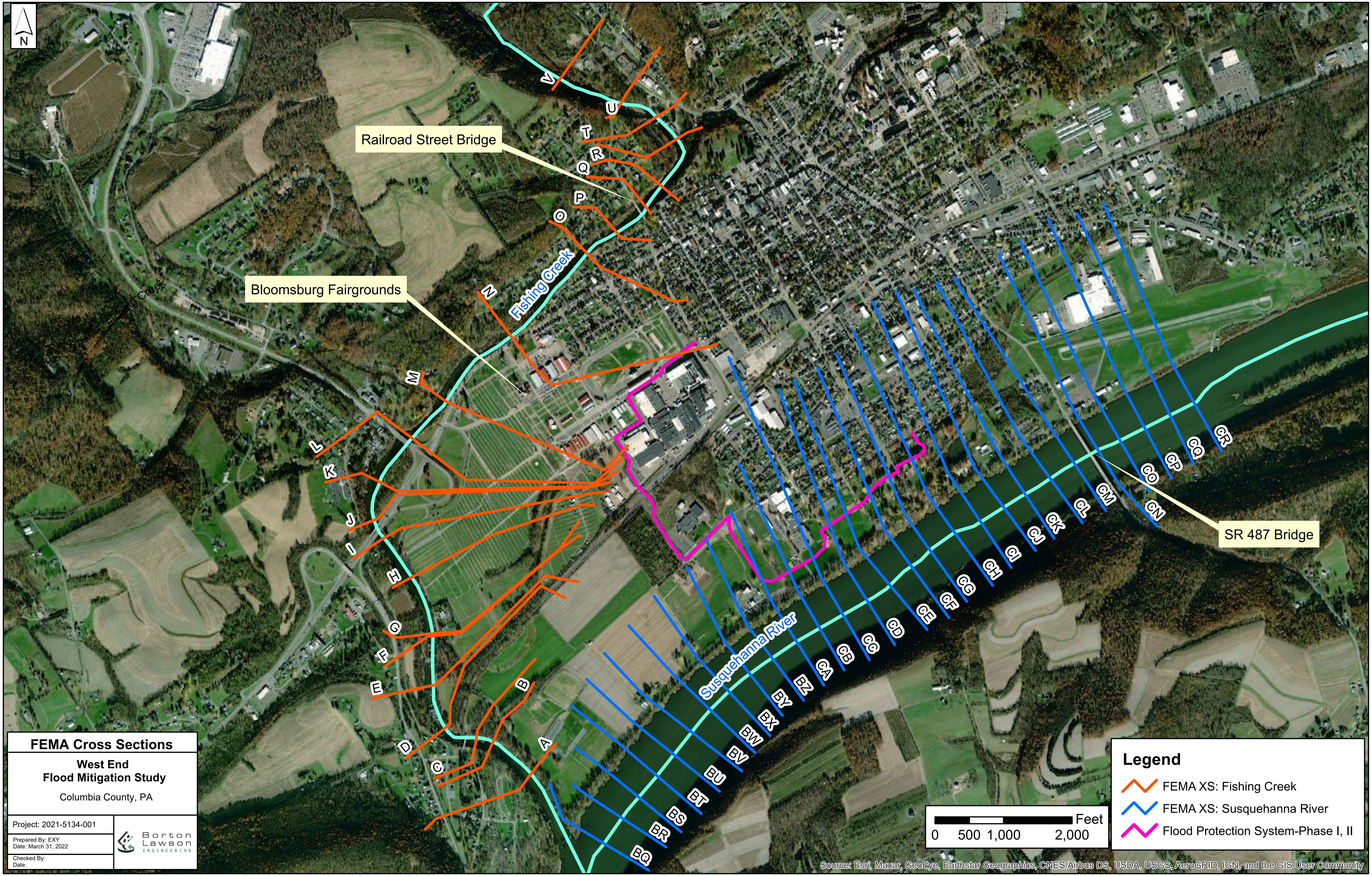
VERSION NUMBER
2.3.3.3

MAP NUMBER
42037C0326F

MAP REVISED

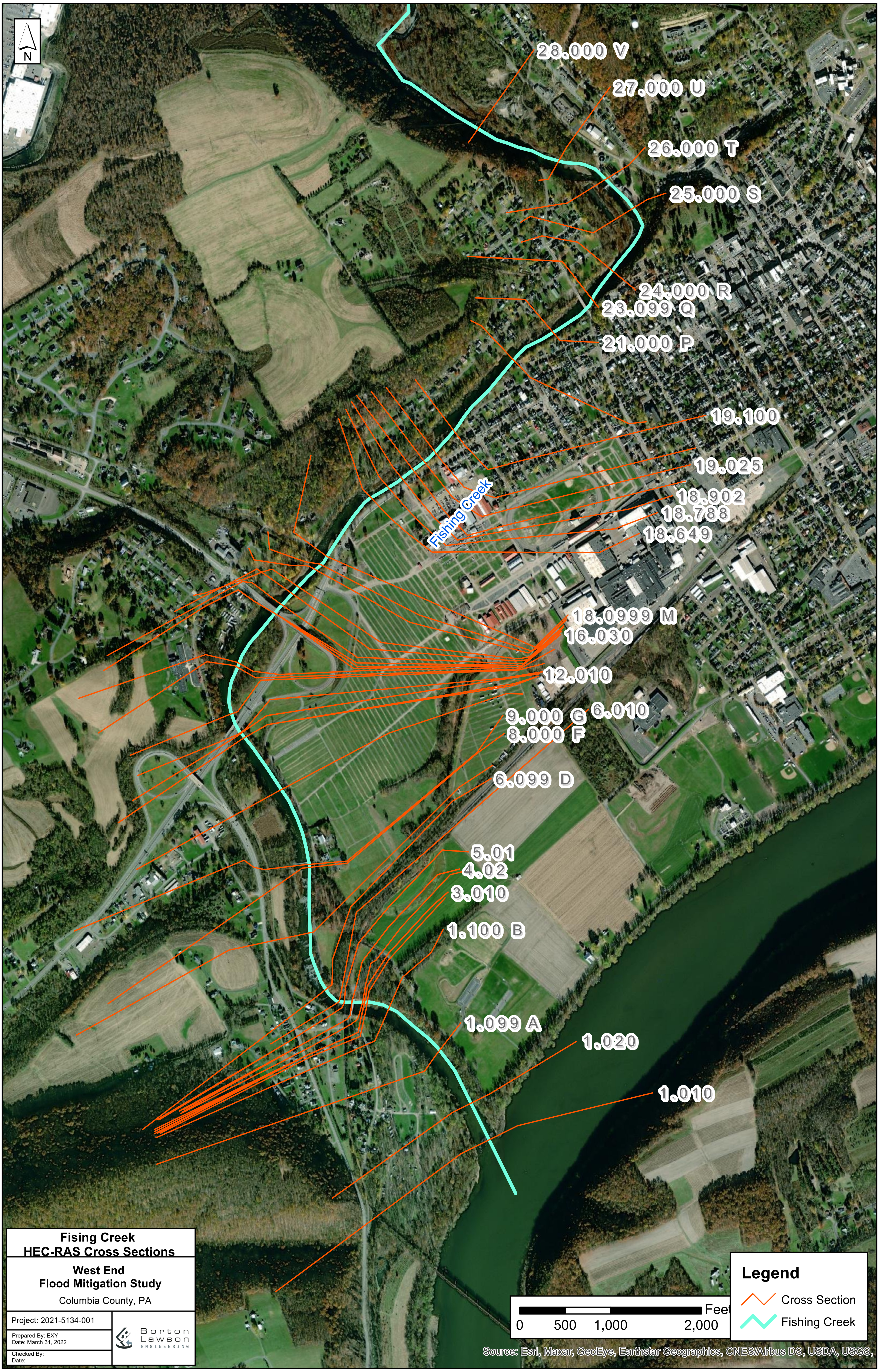
B.4 Susquehanna River and Fishing Creek Cross Section

B.4.a Susquehanna River and Fishing Creek FEMA Cross Section Map



N
Railroad Street Bridge
Bloomsburg Fairgrounds
Fishing Creek
Susquehanna River
SR 487 Bridge
A B C D E F G H I J K L M N O P Q R T U V
BQ BR BS BT BU BV BW BX BY BZ CA CB CC CD CE CF CG CH CI CJ CK CL CM CN CO CP CQ CR
FEMA Cross Sections
West End
Flood Mitigation Study
Columbia County, PA
Project: 2021-5134-001
Prepared By: EXY
Date: March 31, 2022
Checked By:
Date:
Borton Lawson ENGINEERING
Legend
FEMA XS: Fishing Creek
FEMA XS: Susquehanna River
Flood Protection System-Phase I, II
Feet
0 500 1,000 2,000
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

B.4.b Fishing Creek HEC-RAS Cross Section Map



N
28.000 V
27.000 U
26.000 T
25.000 S
24.000 R
23.099 Q
21.000 P
19.100
19.025
18.902
18.788
18.649
Fishing Creek
18.0999 M
16.030
12.010
9.000 G
6.010
8.000 F
6.099 D
5.01
4.02
3.010
1.100 B
1.099 A
1.020
1.010
Fising Creek
HEC-RAS Cross Sections
West End
Flood Mitigation Study
Columbia County, PA
Project: 2021-5134-001
Prepared By: EXY
Date: March 31, 2022
Checked By:
Date:
Borton
Lawson
ENGINEERING
0
500
1,000
2,000
Feet
Legend
Cross Section
Fishing Creek
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

B.5 Levee Alignment Figure (Alternative A-2)

Full Floodwall/ Levee System Bloomsburg 6,200 LF

Total Estimated Cost $29 million

C. Supporting Hydrologic Analysis

C.1 Summary of Hydrologic Analysis

Columbia County West End Flood Study
Recommendations for Analysis of Fishing Creek Flows

1. FEMA FIS Report

The preliminary Flood Insurance Study (FIS) for Columbia County, Pennsylvania was issued by FEMA in August 2020. FEMA conducted detailed hydrologic analyses for select areas along Fishing Creek in Columbia County; the results of these analyses are presented in the FIS. Annual peak flow data from the nearest stream gage on Fishing Creek (gage 01539000) located 5.5 miles upstream of the Town of Bloomsburg provided the basis for determining flood flow frequencies at these select areas. This stream gage has a drainage area of 274 square miles and has been active since 1939. The Hydrologic analysis of Fishing Creek determined flood flow frequency data by applying the standard Log-Pearson Type III statistical analysis (WRC) method to available gage data (37 years of record) or by utilizing regional regression equations for ungagged sites. The peak discharges at the confluence of Fishing Creek and the Susquehanna River for the 10-, 50-, 100- and 500-year events are included in Table 2.

The locations and peak discharges reported for Fishing Creek in the original FIS (1979) remain equivalent to the peak discharges reported in the Effective FIS (2008) and the Preliminary FIS (2020). FEMA has not performed a hydrologic study of Fishing Creek since the original FIS was published in 1979. The related pages from the 1979 FIS, 2008 Effective FIS, and 2020 Preliminary FIS are provided in Appendix A1, A2 and A3, respectively.

2. 2005 US Army Corps of Engineers (USACE) Flood Damage Reduction Feasibility Study

In 2005, the USACE conducted a Flood Damage Reduction Feasibility Study to evaluate a series of flood mitigation alternatives and determine environmental impacts. An H&H analysis performed as part of this study also relied on statistical analysis of the same Fishing Creek stream gage with the additional years of record included since the 1979 FEMA analysis was performed. USACE performed the statistical analysis of the peak flow data using their Hydrologic Engineering Center – Flood Frequency Analysis (HEC-FFA) program. The computed flows for the 2-, 5-, 10-, 25-, 50-, 100-, and 500-year events are included in Table 2. The period of record available at the time of this study (61 years of record) did not include the events of 2006 or the 2011 flood of record. Details of the analysis from the 2005 study are provided in Appendix A4.

3. 2012 US Army Corps of Engineers (USACE) Flood Risk Management Study

In 2012, the USACE prepared a Flood Risk Management Study (FRMS) for the purpose of updating the hydrology and hydraulics of Fishing Creek and the Susquehanna River to include the 2011 Tropical Storm Lee event. In this report, the peak discharge frequency analysis for Fishing Creek is presented. This analysis utilized the active USGS stream gage (# 01539000) of Fishing Creek (75 years of record). Additionally, the 2012 USACE study incorporated data from a non-active historical gage (# 01540000) formerly located at the Railroad Street Bridge in Bloomsburg. This historical stream gage monitored a drainage area of 355 square miles and was active from 1914 to 1931 (18-years). Both sets of gage data were used to analyze the peak discharge frequency on Fishing Creek at the project area. The gage data was analyzed using the

Hydraulic Engineering Center – Statistical Software Package (HEC-SSP) with regional skew; the results were then transposed to the project location using a direct drainage area relationship. The development of the peak discharges are presented in Table 2. Details of the analysis can be found in the extracted UASCE report in Appendix 5.

4. **Project Evaluation**

The active stream gage (# 01539000) on Fishing Creek upstream of the project area recorded an additional 8 years of data since the most recent USACE analysis was performed in 2012. Due to the gage having a longer period of record and USGS SIR 2019-5094 providing updated guidance for analysis of gaged streams, a revised analysis was performed to determine stream flows and recurrence intervals within the project area. USGS PeakFQ was used to evaluate the peak discharges using the data from 1936 to 2020 with weighted skew as recommended in USGS SIR 2019-5094. The results were then transposed to both Railroad Street and the confluence with the Susquehanna River using the procedure outlined in USGS SIR 2019-5094. The results are presented in Table 2 and the detailed PeakFQ output is provided in Appendix 6.

The differences between the USACE analysis performed in 2012 and the current PeakFQ analysis are noted below:

Table 1 – Method Comparison

Source	Software	Data	Equation	Skew Factors
USACE Flood Risk Management Study (June 2012)	HEC-SSP	Gage # 01540000 Peak Annual Flows (1914-1931) & Gage # 01539000 Peak Annual Flows (1936-2012)	$\frac{Q_{US}}{Q_{DS}} = \frac{DA_{US}}{DA_{DS}}$	Regional Skew
Current Project Evaluation (July 2021)	USGS Peak FQ	Gage # 01539000 Peak Annual Flows (1936-2020)	$\frac{Q_{DS}}{Q_{US}} = \left(\frac{DA_{DS}}{DA_{US}}\right)^B$	Weighted Skew

B - Basin Characteristics Coefficient from USGS SIR 2019-5094 Table 3

5. **Conclusion**

A comparison of the peak discharges from the FEMA FIS, the 2005 USACE Flood Damage Reduction Feasibility Study, the 2012 USACE Flood Risk Management Study, and the current project analysis utilizing the USGS PeakFQ software are presented in Table 2. The results of the comparison reveal strong consistencies for all events analyzed. The absence of historic flood events of 2011 and 2006 from the 2005 USACE FRMS period of record accounts for the difference in results between the 2005 study and the 2012 study.

Results of the current project evaluation using PeakFQ reveal that the flows calculated at Railroad Street vs. flows calculated at the confluence with the Susquehanna River differ by approximately 6%, which would not significantly alter the hydraulics within the project area. Therefore, flows determined at the confluence with the River should be applied through the subject reach in the West End of the Town of Bloomsburg.

Whereas the flows calculated at the confluence of the Susquehanna River utilizing PeakFQ are nearly identical to the flows presented in the 2012 USACE FRMS at the same location, the recommendation is to utilize these flows developed by the 2012 USACE FRMS as the project flows in the hydraulic analysis of Fishing Creek for analyses occurring between the confluence of Little Fishing Creek and the Susquehanna River. The following points are made as further justification for selection of the 2012 USACE flows:

- USACE 2012 study includes a greater period of record (98 years) and data from two gaging stations including a historic gaging station within the study area at Railroad Street.
- USACE 2012 flows are marginally larger than all other flows and thus are more conservative.
- USACE 2012 flows are published and available for use by others.
- USACE 2012 flows were produced by a Federal Agency giving them more credence when seeking eventual LOMR approval from FEMA.

Table 2 – Summary of Flow Calculations

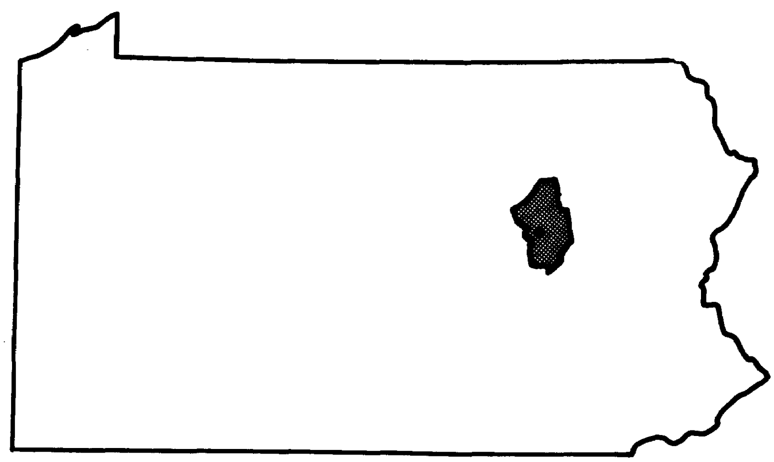
Source	Software	Location / Drainage Area (SM)	Peak Discharge (cfs)						
			2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
FEMA FIS* (1979, 2008, 2020)	Unknown	Confluence Susquehanna River / 385	-	-	24,300	-	45,700	58,500	102,000
USACE Flood Damage Reduction Feasibility Study (2005)	HEC-FFA	Confluence Susquehanna River / 385	10,700	17,600	23,300	31,800	39,100	47,400	71,600
USACE Flood Risk Management Study (June 2012)	HEC-SSP	Confluence Susquehanna River / 385	12,400	21,000	28,100	38,800	48,200	58,900	89,600
Current Project Evaluation (July 2021)	USGS Peak FQ	Confluence Susquehanna River / 385	11,300	19,300	26,300	37,200	47,000	58,600	93,500
	USGS Peak FQ	At Railroad St. Br. / 355	10,500	18,100	24,600	34,900	44,200	55,100	88,000

APPENDIX A1

Extracted from Historic FIS - 1979

FLOOD INSURANCE STUDY

TOWN OF BLOOMSBURG, PENNSYLVANIA
COLUMBIA COUNTY



NOVEMBER 1979

FEDERAL EMERGENCY MANAGEMENT AGENCY
FEDERAL INSURANCE ADMINISTRATION
COMMUNITY NUMBER -420339

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SUSQUEHANNA RIVER					
At mouth of Fishing Creek (western boundary of Town of Bloomsburg)	10,576	173,000	243,000	274,000	356,000
FISHING CREEK					
At mouth	385	24,300	45,700	58,500	102,000
At mouth of Little Fishing Creek	292	20,000	38,000	48,800	87,000
KINNEY RUN					
At mouth	2.74	246	285	297	*

*Not computed

Susquehanna River were computed from a downstream study; Fishing Creek and Kinney Run were computed by the critical depth method.

Cross sections were located at regular intervals along the stream length and at significant changes in ground relief, land use and land cover. Ground elevations for the cross sections were photogrammetrically obtained as the 1:2,400 scale base maps were compiled (Reference 11). The channel bottom elevations were taken from field-surveyed cross sections at an interval distance of not more than 1,000 feet. Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Reach lengths for the stream channels were measured along the centerline of the channel and between cross sections as scaled from the 1:2,400 maps (Reference 11). The overbank reach lengths were measured along the approximate centerline of the effective out-of-channel area as scaled from the 1:2,400 maps (Reference 11).

APPENDIX A2

Extracted of Effective FIS - 2008

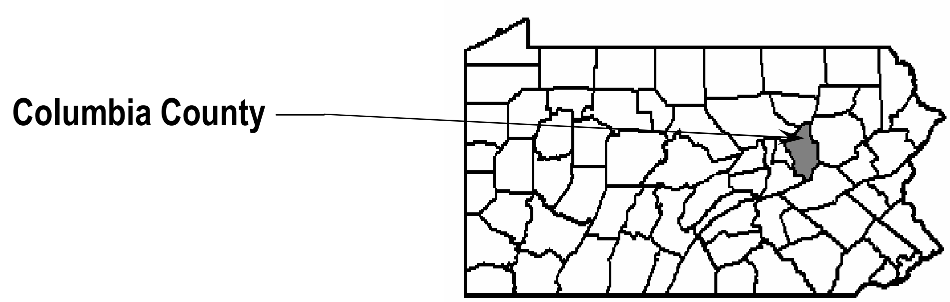
FLOOD INSURANCE STUDY

VOLUME 1 OF 2

COLUMBIA COUNTY, PENNSYLVANIA

ALL JURISDICTIONS

COMMUNITY NAME	COMMUNITY NUMBER	COMMUNITY NAME	COMMUNITY NUMBER
BEAVER, TOWNSHIP OF	421547	JACKSON, TOWNSHIP OF	421552
BENTON, BOROUGH OF	421543	LOCUST, TOWNSHIP OF	421001
BENTON, TOWNSHIP OF	421037	MADISON, TOWNSHIP OF	421553
BERWICK, BOROUGH OF	420338	MAIN, TOWNSHIP OF	421554
BLOOMSBURG, TOWN OF	420339	MIFFLIN, TOWNSHIP OF	421167
BRIAR CREEK, BOROUGH OF	420340	MILLVILLE, BOROUGH OF	421545
BRIAR CREEK, TOWNSHIP OF	421548	MONTOUR, TOWNSHIP OF	421002
CATAWISSA, BOROUGH OF	420341	MOUNT PLEASANT, TOWNSHIP OF	421042
CATAWISSA, TOWNSHIP OF	420342	NORTH CENTRE, TOWNSHIP OF	421555
CENTRALIA, BOROUGH OF	421544	ORANGE, TOWNSHIP OF	421003
CLEVELAND, TOWNSHIP OF	421000	ORANGEVILLE, BOROUGH OF	420345
CONYNGHAM, TOWNSHIP OF	421549	PINE, TOWNSHIP OF	421556
FISHING CREEK, TOWNSHIP OF	421550	ROARING CREEK, TOWNSHIP OF	421557
FRANKLIN, TOWNSHIP OF	420343	SCOTT, TOWNSHIP OF	421004
GREENWOOD, TOWNSHIP OF	421551	SOUTH CENTRE, TOWNSHIP OF	421137
HEMLOCK, TOWNSHIP OF	420344	STILLWATER, BOROUGH OF	421546
		SUGARLOAF, TOWNSHIP OF	421558



EFFECTIVE DATE: AUGUST 19, 2008

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

42037CV001A

Table 3 “Summary of Discharges”

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cubic feet per second)			
		10 Percent Annual Chance	2 Percent Annual Chance	1 Percent Annual Chance	0.2 Percent Annual Chance
Appleman's Run					
at ponding area upstream of New Route 487in Scott Township	1.7	1,078	1,568	1,938	2,641
at the confluence with Fishing Creek	2.4	390	470	510	630
Briar Creek					
at the confluence with East Branch Briar Creek	16.7	2,590	5,267	6,712	11,200
at the confluence with Susquehanna River	33.0	3,252	6,520	8,312	14,000
Catawissa Creek					
at the confluence with Susquehanna River	153.0	8,300	16,000	20,800	37,800
Catawissa Creek, Tributary No. 1					
at Legislative Route 19087 in Catawissa Township	1.2	365	900	1,300	3,000
at the confluence with Catawissa Creek	2.3	520	1,290	1,800	4,000
East Branch Briar Creek					
at upstream corporate limits of Berwick Borough	13.9	*	*	4,330	*
at the end of Eaton Street	14.2	*	*	4,415	*
at the downstream corporate limits of Berwick Borough	15.0	*	*	4,500	*
at the lower corporate limits of East Branch Briar Creek	15.1	*	*	4,500	*
at the confluence with Briar Creek	15.5	1,822	3,730	4,500	8,000
East Branch Fishing Creek					
at Jamison City in Sugarloaf Township	18.0	*	*	5,200	*
Fishing Creek					
at Grassmere Park in Sugarloaf Township	52.3	*	*	11,400	*
at the confluence with West Creek	71.1	7,080	12,900	16,200	24,400
at the upstream limits of Stillwater Borough	92.0	*	*	18,800	*
at the downstream corporate limits of Benton Township	93.2	8,510	15,100	18,600	27,400
above Raven Creek	93.5	*	*	19,000	*
at Zaher Bridge	109.0	*	*	23,900	*
at the downstream corporate limits of Stillwater Borough	109.0	*	*	23,900	*
above Confluence of Huntington Creek	114.0	*	*	24,900	*
at the downstream corporate limits of Fishing Creek Township	225.0	*	*	41,500	*
at western corporate limits of Orangeville Borough	236.4	17,200	32,900	42,400	77,000
at the confluence with ~~Susquehanna River~~ LITTLE FISHING CREEK	292.0	20,000	38,000	48,800	87,000
at the confluence with ~~Hemlock Creek~~ SUSQUEHANNA RIVER	385.0	24,300	45,700	58,500	102,000
Glen Brook					
at the downstream corporate limits of Berwick Borough	4.9	*	*	2,080	*
at the confluence with East Branch Briar Creek	5.0	*	*	2,080	*

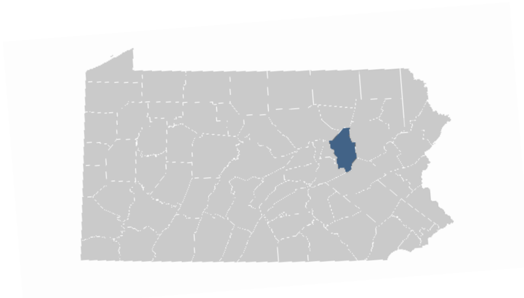
APPENDIX A3

Extracted of Preliminary FIS - 2020

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 3



COLUMBIA COUNTY, PENNSYLVANIA

ALL JURISDICTIONS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
BEAVER, TOWNSHIP OF	421547	LOCUST, TOWNSHIP OF	421001
BENTON, BOROUGH OF	421543	MADISON, TOWNSHIP OF	421553
BENTON, TOWNSHIP OF	421037	MAIN, TOWNSHIP OF	421554
BERWICK, BOROUGH OF	420338	MIFFLIN, TOWNSHIP OF	421167
BLOOMSBURG, TOWN OF	420339	MILLVILLE, BOROUGH OF	421545
BRIAR CREEK, BOROUGH OF	420340	MONTOUR, TOWNSHIP OF	421002
BRIAR CREEK, TOWNSHIP OF	421548	MOUNT PLEASANT, TOWNSHIP OF	421042
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CATAWISSA, TOWNSHIP OF	420342	ORANGE, TOWNSHIP OF	421003
CENTRALIA, BOROUGH OF*	421544	ORANGEVILLE, BOROUGH OF	420345
CLEVELAND, TOWNSHIP OF	421000	PINE, TOWNSHIP OF	421556
CONYNGHAM, TOWNSHIP OF	421549	ROARING CREEK, TOWNSHIP OF	421557
FISHING CREEK, TOWNSHIP OF	421550	SCOTT, TOWNSHIP OF	421004
FRANKLIN, TOWNSHIP OF	420343	SOUTH CENTRE, TOWNSHIP OF	421137
GREENWOOD, TOWNSHIP OF	421551	STILLWATER, BOROUGH OF	421546
HEMLOCK, TOWNSHIP OF	420344	SUGARLOAF, TOWNSHIP OF	421558
JACKSON, TOWNSHIP OF	421552		

*No Special Flood Hazards Identified

Revised Preliminary August 28, 2020

REVISED: TBD

FLOOD INSURANCE STUDY NUMBER
42037CV001B

Version Number 2.3.3.3

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Fishing Creek	Above confluence of Huntington Creek	114.0	*	*	*	24,900	*
Fishing Creek	At the downstream corporate limits of Fishing Creek Township	225.0	*	*	*	41,500	*
Fishing Creek	At western corporate limits of Orangeville Borough	236.4	17,200	*	*	42,400	77,000
Fishing Creek	At the confluence with Little Fishing Creek	292.0	20,000	*	38,000	48,800	87,000
Fishing Creek	At the confluence with Susquehanna River	385.0	24,300	*	45,700	58,500	102,000
Glen Brook	At the downstream corporate limits of Berwick Borough	4.9	*	*	*	2,080	*
Glen Brook	At the confluence with East Branch Briar Creek	5.0	*	*	*	2,080	*
Green Creek	Above confluence of Little Green Creek	10.3	*	*	*	3,000	*
Green Creek	At the confluence with Fishing Creek	36.8	4,950	*	10,400	14,000	27,900

*Not calculated for this Flood Risk Project

APPENDIX A4

Extracted of Corps
Flood Damage Reduction Project
Draft Integrated Feasibility Report & Environmental Impact Statement - 2005

US ARMY CORPS
OF ENGINEERS
BALTIMORE DISTRICT

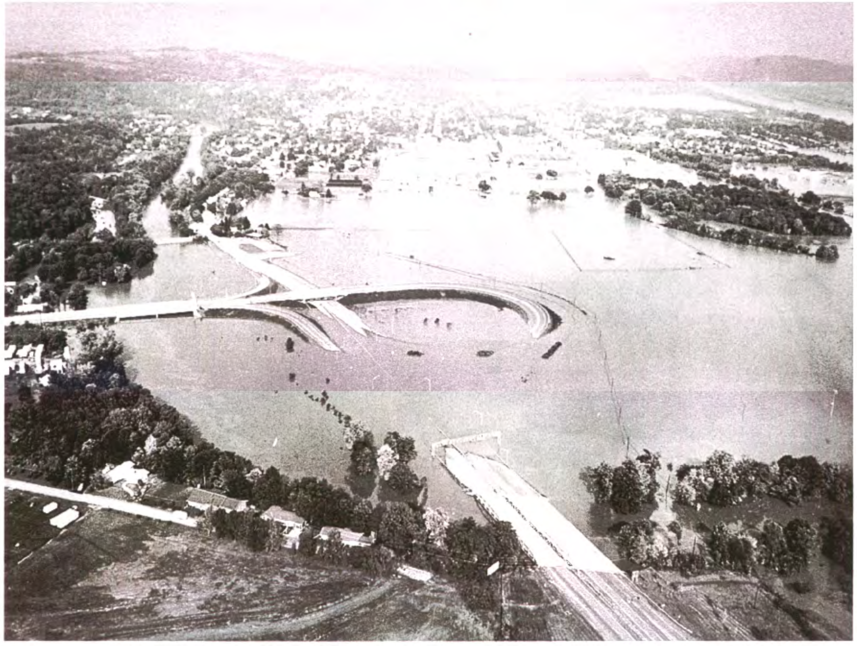
THE TOWN OF BLOOMSBURG,
PENNSYLVANIA

THE TOWN OF BLOOMSBURG, COLUMBIA COUNTY, PENNSYLVANIA

FLOOD DAMAGE REDUCTION PROJECT

DRAFT INTEGRATED FEASIBILITY REPORT & ENVIRONMENTAL IMPACT STATEMENT

Volume 1



April 2005

The differing recurrence interval assigned to the June 1972 (Agnes) flood event on the Susquehanna River at Bloomsburg (440-year) as compared to Fishing Creek at Bloomsburg (53-year) was a key consideration as the Corps completed this feasibility evaluation. Assignment of the different recurrence intervals is discussed in greater detail in the Hydrology & Hydraulics Attachment to the Engineering Appendix. The difference in recurrence intervals also is incorporated into the formulation of alternative protection levels, and formulation of the recommended plan presented in Sections 4 and 6 of this report.

3.3.2 Existing Conditions Flow Frequency

The Corps Hydrologic Engineering Center – Flood Frequency Analysis (HEC-FFA) program was used to estimate flood frequencies for Fishing Creek at Bloomsburg and for the Susquehanna River above the confluence with Fishing Creek at Bloomsburg. HEC-FFA is a standard Corps computer model that is used to compute flood frequencies in accordance with Corps guidelines. The flood frequencies that were produced are comparable to those shown in other agency studies. The HEC-FFA model results are shown in Tables 3-1 and 3-2. To check validity of the model results, they were compared to estimated flood flows computed by other agencies for three other studies:

- *Flood Insurance Study, Town of Bloomsburg, Pennsylvania.* FEMA, 1979. Methodology is based on flood flow statistics.
- *Comparison of Methods for Computing Streamflow Statistics for Pennsylvania Streams.* U.S. Geological Survey (USGS), 1999. Methodology is based on flood flow statistics.
- *Techniques for Estimating Magnitude and Frequency of Peak Flows for Pennsylvania Streams.* USGS, 2000. Methodology is based regression equations.

Because methods for estimating flood peaks vary based on numerous factors, including methodology and completeness of data, the various studies do not yield the same results. However, in each case, the estimated flows from other agencies were within the 5 percent and 95 percent confidence limits associated with the current HEC-FFA results.

Table 3-1
Comparison of Estimated Peak Discharges (cfs) for Fishing Creek at Bloomsburg

Recurrence Interval	Current Corps Analysis (385 sq. mi. drainage area)	1999 USGS Report (355 sq. mi. drainage area)	2000 USGS Report (355 sq. mi. drainage area)	1979 FEMA FIS (385 sq. mi. drainage area)
2 years	10,700	-	-	-
5 years	17,600	-	-	-
10 years	23,300	22,400	22,100	24,300
25 years	31,800	28,400	29,600	-
50 years	39,100	33,000	36,000	45,700
100 years	47,400	37,800	43,300	58,500
500 years	71,600	49,300	64,000	102,000

APPENDIX A5

Extracted of Corps
Flood Risk Management Study (FRMS)
Update of Hydrology and Hydraulics for Inclusion of
Tropical Storm Lee Event - 2012

Bloomsburg, PA Flood Risk Management Study (FRMS) Update of Hydrology and Hydraulics for Inclusion of Tropical Storm Lee Event

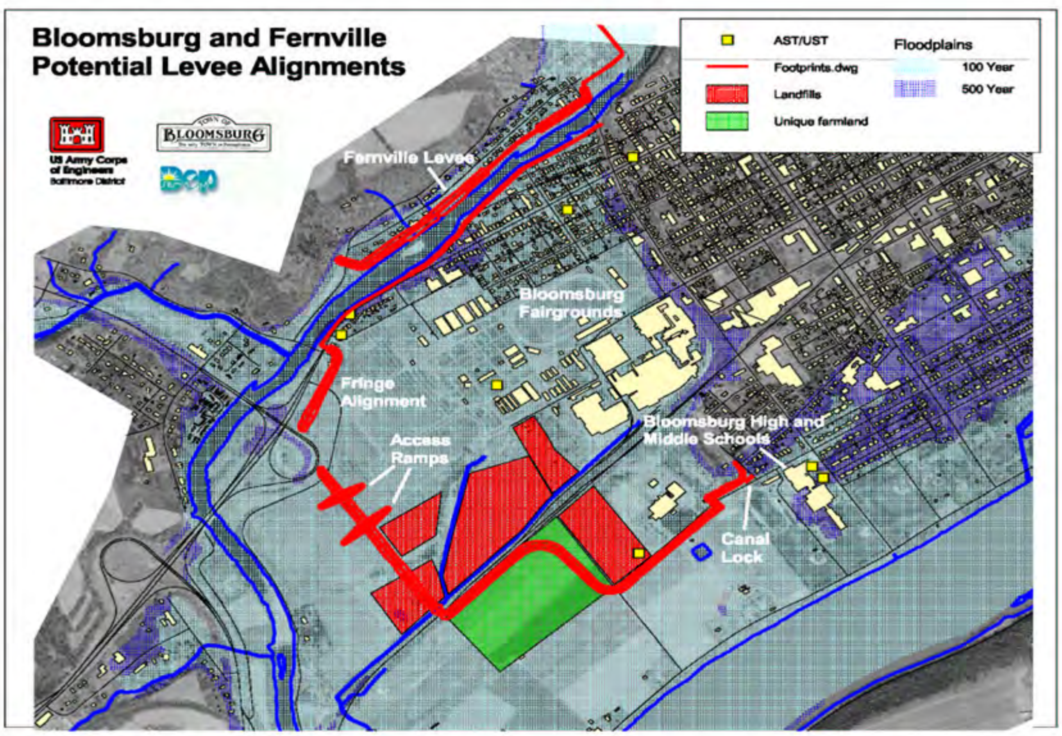
June 2012

Introduction:

The Bloomsburg flood risk management project is in the pre-construction engineering and design (PED) phase of design. The feasibility study evaluated an array of alternative plans based on reducing the flood damages in Bloomsburg along Fishing Creek and the Susquehanna River. To help in intermediate PED design decisions, the hydrology and hydraulics (H&H) portion of a risk and uncertainty (R&U) analysis was performed in October 2010 for the line of protection along Fishing Creek and the Susquehanna River. Since the completion of the risk and uncertainty analysis, Tropical Storm Lee (TSLee) occurred in September 2011, producing record breaking peak flows. The hydrology was updated to include the period of record up to this event to determine its effect on peak flow frequency on the Susquehanna River and Fishing Creek at Bloomsburg. The revised peak discharges were used to update the water surface profiles along the Susquehanna River and Fishing Creek in the project area. This report documents the process of the update, the results and how Tropical Storm Lee affected the H&H for the Bloomsburg FRMS. See Figure 1 for a map presenting the Bloomsburg line of protection (LOP).

FIGURE 1

Bloomsburg Flood Risk Management Project Line of Protection



Hydrology:

The subsequent years of record since the completion of the R&UA were added to the period of record for the applicable gage locations. Gage data were not directly available at Bloomsburg. The nearest gages on the Susquehanna River are at Danville, PA, approximately 10.3 miles downstream of the project area with a drainage area of 11220 square miles (sq mi) and at Wilkes-Barre, PA, approximately 39.5 miles upstream of the project area with a drainage area of 9960 sq mi. The period of record for the Danville gage was increased to 1900-2011 (112 years). The historic period of record for the Wilkes-Barre gage was increased to 1865-2011 (147 years). These gages were used to develop a peak flow frequency curve for the Susquehanna River at the Bloomsburg project area (drainage area = 10560 sq mi). Fishing Creek has a gage located 5.5 miles north of Bloomsburg with a drainage area of 274 sq mi. The period of record for the gage was increased by two years to 1936, 1939-2011 (75 years). A discontinued gage also existed on Fishing Creek from 1914-1931 (18 years). It was located near the Railroad Street Bridge in Bloomsburg with a drainage area of 355 sq mi. Both sets of gage data were used to analyze the peak flow frequency on Fishing Creek at the Bloomsburg project area (drainage area = 385 sq mi).

Fishing Creek Peak Flow Frequency Analysis:

The peak flow values for the entire period of record from both of the U.S. Geological Survey (USGS) gages on Fishing Creek were transposed to the project location downstream (385 sq mi) by using a drainage area relationship as presented in equation (Eq.) 1.

$$Q_{U/S}/Q_{D/S} = (DA_{U/S}/DA_{D/S}) \qquad \text{(Eq. 1)}$$

The peak flow data is presented in Table 1.

TABLE 1
Fishing Creek at Bloomsburg, PA
at USGS gages # 01539000 (DA=274 mi^2) and # 01540000 (DA=355 mi^2)
and at Bloomsburg FRMS Project Site (DA=385 mi^2)
Years of Record 1914-1931, 1936, 1939-2011

Date	Peak Discharge at USGS gage DA = 355 mi^2 (cfs)	Peak Discharge at Project Site DA = 385 mi^2 (cfs)	Date	Peak Discharge at USGS gage DA = 274 mi^2 (cfs)	Peak Discharge at Project Site DA = 385 mi^2 (cfs)
3/28/1914	10600	11500	3/10/1964	13600	19100
2/25/1915	14000	15200	2/8/1965	2860	4020
7/26/1916	19700	21400	2/14/1966	4760	6690
3/28/1917	6920	7500	3/15/1967	3900	5480
10/30/1917	16700	18100	11/3/1967	3730	5240
7/21/1919	4770	5170	6/16/1969	15300	21500
3/13/1920	11800	12800	4/3/1970	9100	12800
12/14/1920	10000	10800	2/27/1971	3650	5130
6/6/1922	13000	14100	6/22/1972	30900	43400
7/29/1923	13200	14300	12/6/1972	5520	7760
9/30/1924	23000	24900	12/21/1973	5250	7380
2/12/1925	15000	16300	9/26/1975	29400	41300
11/13/1925	6380	6920	10/18/1975	9700	13600
11/16/1926	21500	23300	10/9/1976	19700	27700
7/6/1928	16900	18300	3/27/1978	8120	11400
5/3/1929	17100	18500	3/5/1979	12300	17300
11/18/1929	5630	6110	3/21/1980	5550	7800
3/29/1931	3720	4030	2/2/1981	8430	11800
Date	Peak Discharge at USGS gage DA = 274 mi^2 (cfs)	Peak Discharge at Project Site DA = 385 mi^2 (cfs)	6/6/1982	3980	5590
			4/16/1983	9920	13900
			12/13/1983	13000	18300
			11/29/1984	4040	5680
3/18/1936	17600	24700	3/15/1986	17200	24200
12/10/1938	4420	6210	9/13/1987	5720	8040
3/31/1940	18100	25400	2/2/1988	4030	5660
4/6/1941	3340	4690	5/7/1989	7680	10800
5/23/1942	13400	18800	10/20/1989	5220	7330
12/30/1942	14300	20100	12/4/1990	7960	11200
11/9/1943	12000	16900	3/27/1992	5070	7120
9/19/1945	4790	6730	4/11/1993	14300	20100
5/28/1946	14200	20000	11/28/1993	7660	10800
7/22/1947	4150	5830	11/28/1994	8270	11600
4/15/1948	6120	8600	1/19/1996	21300	29900
12/30/1948	11700	16400	12/2/1996	12700	17800
1/7/1950	5560	7810	1/9/1998	13600	19100
12/4/1950	14000	19700	1/24/1999	13000	18300
3/11/1952	16200	22800	2/28/2000	4860	6830
11/22/1952	8660	12200	12/17/2000	10200	14300
4/17/1954	6140	8630	5/14/2002	13200	18500
8/19/1955	8070	11300	10/12/2002	8600	12100
10/16/1955	7540	10600	9/18/2004	15200	21400
4/6/1957	9610	13500	4/3/2005	16300	22900
12/21/1957	8430	11800	6/28/2006	41200	57900
1/22/1959	8130	11400	11/16/2006	10400	14600
4/4/1960	12200	17100	3/5/2008	14800	20800
2/26/1961	13200	18500	12/12/2008	4330	6080
4/8/1962	5540	7780	1/25/2010	17500	24600
3/27/1963	4050	5690	9/8/2011	56000	78700

A peak flow frequency curve was developed for Fishing Creek at the FRMS project site using the program HEC-SSP (Hydraulic Engineering Center – Statistical Software Package) version 1.1. Since Fishing Creek is unaffected by regulation, the Log-Pearson Type III distribution was used. The regional skew coefficient was determined from a map developed for the North Atlantic Division for a study of the affects of Tropical Storm Agnes in the Susquehanna and Potomac River Basins in June 1972. The study report is titled "Hydrologic Study, Tropical Storm Agnes, North Atlantic Division, December 1975".

The regional skew for Fishing Creek at the Bloomsburg FRMS project site is 0.45, with the mean square error of the map equal to 0.2. These values along with the natural flows were input into HEC-SSP to determine a peak flow frequency curve. The resulting statistics are presented in Table 2. The peak flow frequency curve is presented in Figure 2. Table 3 presents a comparison of the peak flow frequency with and without the additional two years of record which includes Tropical Storm Lee. The addition of these 2 events to the period of record caused a 17.8% increase in the 100 year discharge.

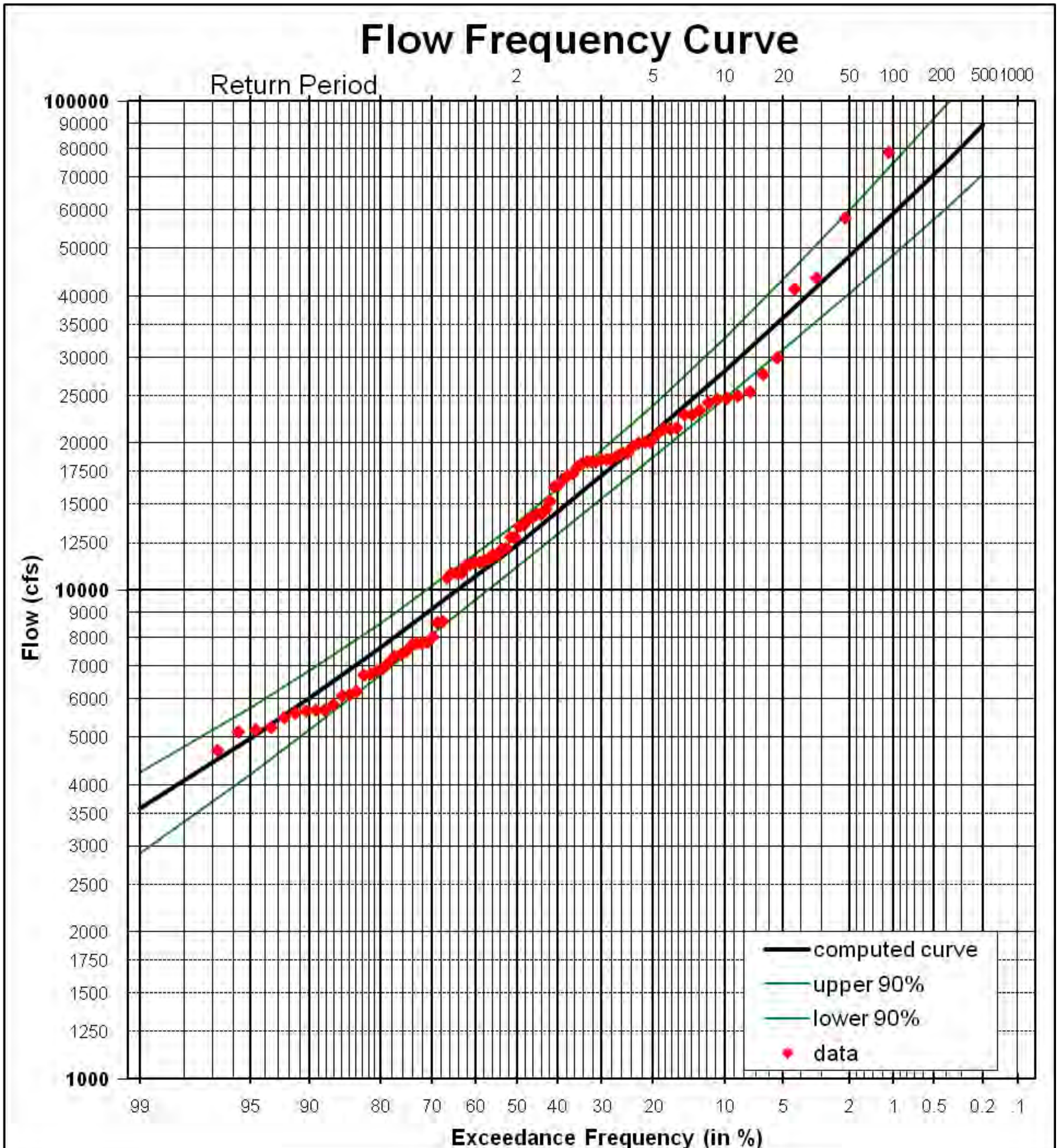
TABLE 2

HEC-SSP Results

Fishing Creek at Bloomsburg, PA FRMS Project Site DA = 385 sq mi				
Computed Curve	Expected Probability	Percent Chance Exceedance	Confidence Limits 0.05	Confidence Limits 0.95
Flow, cfs			Flow, cfs	
89578	---	0.2	119989	70928
75305	---	0.4	98657	60646
58902	---	1	74828	48558
48225	---	2	59791	40491
38822	---	4	46928	33215
28064	---	10	32761	24620
20956	---	20	23830	18707
12379	---	50	13733	11148
7622	---	80	8545	6693
6011	---	90	6834	5168
4981	---	95	5740	4201
3569	---	99	4229	2899

Log Transform: Flow, cfs		Number of Events	
Mean	4.105	Historic events	0
Standard Dev	0.262	High Outliers	0
Station Skew	0.239	Low Outliers	0
Regional Skew	0.450	Zero or Missing	0
Weighted Skew	0.291	Systemic Events	92
Adopted Skew	0.291	Historic Period	98

FIGURE 2



Frequency Statistics

Log Transform of Flow, cfs		Number of Events		Fishing Creek at Bloomsburg
Mean	4.105	Historic Events	0	Drainage Area = 385 sq mi
Standard Dev	0.262	High Outliers	0	
Station Skew	0.239	Low Outliers	0	Period of Record
Regional Skew	0.450	Zero or Missing	0	1914-1931, 1936, 1939-2011
Weighted Skew	0.291	Systematic Events	92	
Adopted Skew	0.291	Historic Period	98	May 2012

TABLE 3

Fishing Creek at Bloomsburg, PA FRMS Project Site DA = 385 sq mi			
Flood Event	Percent Chance Exceedance	Q from Oct 2010 R&U - No TSLee	Q with TSLee (cfs)
500 yr	0.2	71300	89600
250 yr	0.4	61600	75300
100 yr	1	50000	58900
50 yr	2	42000	48200
25 yr	4	34800	38800
10 yr	10	26100	28100
5 yr	20	20000	21000
2 yr	50	12200	12400

Susquehanna River Peak Flow Frequency Analysis:

The stream gage at Wilkes-Barre, PA is located on the Susquehanna River upstream of Bloomsburg and the gage at Danville, PA is located downstream of Bloomsburg. These gages were used to develop a peak flow frequency curve on the Susquehanna River at the Bloomsburg project area. Additional years of record since the October 2010 R&U analysis were added to the gage data. However, the gage at Wilkes-Barre malfunctioned and a peak for the TSLee event was not recorded. The discharge for TSLee at Wilkes-Barre was estimated by the Corps of Engineers (COE) using the rating curve at the gage derived from the Wyoming Valley LFP HEC-2 model. The USGS published a provisional discharge that is still being evaluated as of the date of this analysis. The peak flow frequency analysis for the Susquehanna River at Wilkes-Barre and Bloomsburg was performed with both the USGS provisional discharge and the COE estimated discharge. Both sets of results will be presented. When the TSLee discharge is finalized, this analysis may need to be recomputed. The gage data for these gages is presented in Tables 4 and 5.

APPENDIX A6

Project Evaluations - 2021

```
1
  Program PeakFq           U. S. GEOLOGICAL SURVEY            Seq.002.000
  Version 7.3        Annual peak flow frequency analysis      Run Date / Time
  10/25/2019                                                   07/21/2021 09:09

                            --- PROCESSING OPTIONS ---

                     Plot option         = Graphics device
                     Basin char output   = None
                     Print option        = Yes
                     Debug print         = No
                     Input peaks listing = Long
                     Input peaks format  = WATSTORE peak file

                     Input files used:
                        peaks (ascii)  - C:\Users\exy\PKFQ\USGS 01539000.TXT

                        specifications - C:\Users\exy\PKFQ\PKFQWPSF.TMP

                     Output file(s):
                        main - C:\Users\exy\PKFQ\USGS 01539000.PRT



  ***  User responsible for assessment and interpretation of the following analysis
 ***

1


  Program PeakFq           U. S. GEOLOGICAL SURVEY            Seq.001.001
  Version 7.3        Annual peak flow frequency analysis      Run Date / Time
  10/25/2019                                                   07/21/2021 09:09

           Station - 01539000  Fishing Creek near Bloomsburg, PA


                      TABLE 1 - INPUT DATA SUMMARY

                 Number of peaks in record           =       83
                 Peaks not used in analysis          =        0
                 Gaged peaks in analysis             =       82
                 Historic peaks in analysis          =        1
                 Beginning Year                      =     1936
                 Ending Year                         =     2020
                 Historical Period Length            =       85
                 Skew option                         =   WEIGHTED
                 Regional skew                       =    0.350
                      Standard error                 =    0.425
                      Mean Square error              =    0.181
```

```
Gage base discharge                    =      0.0
User supplied high outlier threshold =   --
User supplied PILF (LO) criterion    =   --
Plotting position parameter          =     0.00
Type of analysis                            EMA
PILF (LO) Test Method                      MGBT
Perceptible Ranges:
    Start Year  End Year  Lower Bound  Upper Bound
          1936      2020          0.0          INF    DEFAULT

          1936      1938      17600.0          INF    HISTORIC 1

Interval Data                    =   None Specified
```

TABLE 2 - DIAGNOSTIC MESSAGE AND PILF RESULTS

WCF002J-CALCS COMPLETED. RETURN CODE = 2
EMA002W-CONFIDENCE INTERVALS ARE NOT EXACT IF HISTORIC PERIOD > 0

MULTIPLE GRUBBS-BECK TEST RESULTS
MULTIPLE GRUBBS-BECK PILF THRESHOLD   N/A
NUMBER OF PILFS IDENTIFIED   0

Kendall's Tau Parameters

	TAU	P-VALUE	MEDIAN SLOPE	No. of PEAKS
GAGED PEAKS	0.064	0.398	15.800	82

1

```
Program PeakFq           U. S. GEOLOGICAL SURVEY            Seq.001.002
Version 7.3         Annual peak flow frequency analysis      Run Date / Time
10/25/2019                                                    07/21/2021 09:09
```

Station - 01539000 Fishing Creek near Bloomsburg, PA

TABLE 3 - ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

LOGARITHMIC

	MEAN	STANDARD DEVIATION	SKEW
EMA WITHOUT REG SKEW	3.9478	0.2691	0.454
EMA WITH REG SKEW	3.9478	0.2691	0.419

EMA ESTIMATE OF MSE OF SKEW WITHOUT REG SKEW 0.0898
EMA ESTIMATE OF MSE OF SKEW W/GAGED PEAKS ONLY (AT-SITE) 0.0902

TABLE 4 - ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	<- EMA ESTIMATE -> WITH REG SKEW	WITHOUT REG SKEW	<- FOR EMA ESTIMATE WITH REG SKEW -> LOG VARIANCE OF EST.	<-CONFIDENCE LIMITS-> 5.0% LOWER	95.0% UPPER
0.9950	2292.	2339.	0.0046	1697.0	2870.0
0.9900	2544.	2585.	0.0034	1962.0	3086.0
0.9500	3463.	3487.	0.0015	2912.0	3958.0
0.9000	4142.	4155.	0.0011	3594.0	4670.0
0.8000	5219.	5217.	0.0009	4625.0	5853.0
0.6667	6570.	6553.	0.0009	5851.0	7375.0
0.5000	8492.	8462.	0.0010	7546.0	9590.0
0.4292	9489.	9455.	0.0010	8416.0	10760.0
0.2000	14690.	14670.	0.0014	12830.0	17240.0
0.1000	20070.	20090.	0.0022	17110.0	24770.0
0.0400	28530.	28710.	0.0039	23350.0	38580.0
0.0200	36210.	36600.	0.0058	28590.0	53050.0
0.0100	45210.	45890.	0.0082	34320.0	72200.0
0.0050	55730.	56840.	0.0112	40600.0	97470.0
0.0020	72400.	74310.	0.0160	49820.0	143500.0

*Note: If Station Skew option is selected then EMA ESTIMATE WITH REG SKEW will display values for and be equal to EMA ESTIMATE WITHOUT REG SKEW.

1

Station - 01539000 Fishing Creek near Bloomsburg, PA

TABLE 5 - INPUT DATA LISTING

WATER PEAK PEAKFQ FLOW INTERVALS (WHERE LOWER BOUND NOT = UPPER BOUND)

YEAR	VALUE	CODES	LOWER BOUND	UPPER BOUND	REMARKS
-1936	17600.0	H			
1939	4420.0				
1940	18100.0				
1941	3340.0				
1942	13400.0				
1943	14300.0				
1944	12000.0				
1945	4790.0				
1946	14200.0				
1947	4150.0				
1948	6120.0				
1949	11700.0				
1950	5560.0				
1951	14000.0				
1952	16200.0				
1953	8660.0				
1954	6140.0				
1955	8070.0				
1956	7540.0				
1957	9610.0				
1958	8430.0				
1959	8130.0				
1960	12200.0				
1961	13200.0				
1962	5540.0				
1963	4050.0				
1964	13600.0				
1965	2860.0				
1966	4760.0				
1967	3900.0				
1968	3730.0				
1969	15300.0				
1970	9100.0				
1971	3650.0				
1972	30900.0				
1973	5520.0				
1974	5250.0				
1975	29400.0				
1976	9700.0				
1977	19700.0				
1978	8120.0				
1979	12300.0				
1980	5550.0				
1981	8430.0				
1982	3980.0				
1983	9920.0				
1984	13000.0				
1985	4040.0				
1986	17200.0				

1987	5720.0
1988	4030.0
1989	7680.0
1990	5220.0
1991	7960.0
1992	5070.0
1993	14300.0
1994	7660.0
1995	8270.0
1996	21300.0
1997	12700.0
1998	13600.0
1999	13000.0
2000	4860.0
2001	10200.0
2002	13200.0
2003	8600.0
2004	15200.0
2005	16300.0
2006	41200.0
2007	10400.0
2008	14800.0
2009	4330.0
2010	17500.0
2011	56000.0
2012	6590.0
2013	4630.0
2014	4340.0
2015	5860.0
2016	3580.0
2017	9000.0
2018	29900.0
2019	7150.0
2020	8190.0

Explanation of peak discharge qualification codes

PeakFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
O	O	Opportunistic peak
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation

-8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Version 7.3 Annual peak flow frequency analysis Run Date / Time
10/25/2019 07/21/2021 09:09

Station - 01539000 Fishing Creek near Bloomsburg, PA

TABLE 6 - EMPIRICAL FREQUENCY CURVES -- HIRSCH-STEDINGER PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	EMA ESTIMATE	FLOW INTERVALS (WHERE LOWER BOUND NOT = UPPER BOUND) LOWER BOUND	UPPER BOUND
2011	56000.0	0.0106		
2006	41200.0	0.0212		
1972	30900.0	0.0318		
2018	29900.0	0.0423		
1975	29400.0	0.0529		
1996	21300.0	0.0635		
1977	19700.0	0.0741		
1940	18100.0	0.0847		
-1936	17600.0	0.0953		
2010	17500.0	0.1178		
1986	17200.0	0.1297		
2005	16300.0	0.1416		
1952	16200.0	0.1535		
1969	15300.0	0.1655		
2004	15200.0	0.1774		
2008	14800.0	0.1893		
1943	14300.0	0.2132		
1993	14300.0	0.2012		
1946	14200.0	0.2251		
1951	14000.0	0.2370		
1964	13600.0	0.2608		
1998	13600.0	0.2489		
1942	13400.0	0.2728		
1961	13200.0	0.2966		
2002	13200.0	0.2847		
1984	13000.0	0.3205		
1999	13000.0	0.3085		
1997	12700.0	0.3324		
1979	12300.0	0.3443		
1960	12200.0	0.3562		

1944	12000.0	0.3681
1949	11700.0	0.3801
2007	10400.0	0.3920
2001	10200.0	0.4039
1983	9920.0	0.4158
1976	9700.0	0.4278
1957	9610.0	0.4397
1970	9100.0	0.4516
2017	9000.0	0.4635
1953	8660.0	0.4754
2003	8600.0	0.4874
1958	8430.0	0.5112
1981	8430.0	0.4993
1995	8270.0	0.5231
2020	8190.0	0.5351
1959	8130.0	0.5470
1978	8120.0	0.5589
1955	8070.0	0.5708
1991	7960.0	0.5827
1989	7680.0	0.5947
1994	7660.0	0.6066
1956	7540.0	0.6185
2019	7150.0	0.6304
2012	6590.0	0.6424
1954	6140.0	0.6543
1948	6120.0	0.6662
2015	5860.0	0.6781
1987	5720.0	0.6900
1950	5560.0	0.7020
1980	5550.0	0.7139
1962	5540.0	0.7258
1973	5520.0	0.7377
1974	5250.0	0.7497
1990	5220.0	0.7616
1992	5070.0	0.7735
2000	4860.0	0.7854
1945	4790.0	0.7974
1966	4760.0	0.8093
2013	4630.0	0.8212
1939	4420.0	0.8331
2014	4340.0	0.8450
2009	4330.0	0.8570
1947	4150.0	0.8689
1963	4050.0	0.8808
1985	4040.0	0.8927
1988	4030.0	0.9047
1982	3980.0	0.9166
1967	3900.0	0.9285
1968	3730.0	0.9404
1971	3650.0	0.9523

2016	3580.0	0.9643
1941	3340.0	0.9762
1965	2860.0	0.9881

1

Station - 01539000 Fishing Creek near Bloomsburg, PA

TABLE 7 - EMA REPRESENTATION OF DATA

WATER	<----- OBSERVED ---->		<-------- EMA ------->		<---- USER-ENTERED PERCEPTIBLE RANGES ->		<-------- FINAL PERCEPTIBLE RANGES ->	
YEAR	Q_LOWER	Q_UPPER	Q_LOWER	Q_UPPER	LOWER	UPPER	LOWER	UPPER
1936	17600.0	17600.0	17600.0	17600.0	17600.0	INF	17600.0	INF
1937	0.0	17600.0	0.0	17600.0	17600.0	INF	17600.0	INF
1938	0.0	17600.0	0.0	17600.0	17600.0	INF	17600.0	INF
1939	4420.0	4420.0	4420.0	4420.0	0.0	INF	0.0	INF
1940	18100.0	18100.0	18100.0	18100.0	0.0	INF	0.0	INF
1941	3340.0	3340.0	3340.0	3340.0	0.0	INF	0.0	INF
1942	13400.0	13400.0	13400.0	13400.0	0.0	INF	0.0	INF
1943	14300.0	14300.0	14300.0	14300.0	0.0	INF	0.0	INF
1944	12000.0	12000.0	12000.0	12000.0	0.0	INF	0.0	INF
1945	4790.0	4790.0	4790.0	4790.0	0.0	INF	0.0	INF
1946	14200.0	14200.0	14200.0	14200.0	0.0	INF	0.0	INF
1947	4150.0	4150.0	4150.0	4150.0	0.0	INF	0.0	INF
1948	6120.0	6120.0	6120.0	6120.0	0.0	INF	0.0	INF
1949	11700.0	11700.0	11700.0	11700.0	0.0	INF	0.0	INF
1950	5560.0	5560.0	5560.0	5560.0	0.0	INF		

```
0.0         INF
   1951    14000.0    14000.0    14000.0    14000.0          0.0         INF
0.0         INF
   1952    16200.0    16200.0    16200.0    16200.0          0.0         INF
0.0         INF
   1953     8660.0     8660.0     8660.0     8660.0          0.0         INF
0.0         INF
   1954     6140.0     6140.0     6140.0     6140.0          0.0         INF
0.0         INF
   1955     8070.0     8070.0     8070.0     8070.0          0.0         INF
0.0         INF
   1956     7540.0     7540.0     7540.0     7540.0          0.0         INF
0.0         INF
   1957     9610.0     9610.0     9610.0     9610.0          0.0         INF
0.0         INF
   1958     8430.0     8430.0     8430.0     8430.0          0.0         INF
0.0         INF
   1959     8130.0     8130.0     8130.0     8130.0          0.0         INF
0.0         INF
   1960    12200.0    12200.0    12200.0    12200.0          0.0         INF
0.0         INF
   1961    13200.0    13200.0    13200.0    13200.0          0.0         INF
0.0         INF
   1962     5540.0     5540.0     5540.0     5540.0          0.0         INF
0.0         INF
   1963     4050.0     4050.0     4050.0     4050.0          0.0         INF
0.0         INF
   1964    13600.0    13600.0    13600.0    13600.0          0.0         INF
0.0         INF
   1965     2860.0     2860.0     2860.0     2860.0          0.0         INF
0.0         INF
   1966     4760.0     4760.0     4760.0     4760.0          0.0         INF
0.0         INF
   1967     3900.0     3900.0     3900.0     3900.0          0.0         INF
0.0         INF
   1968     3730.0     3730.0     3730.0     3730.0          0.0         INF
0.0         INF
   1969    15300.0    15300.0    15300.0    15300.0          0.0         INF
0.0         INF
   1970     9100.0     9100.0     9100.0     9100.0          0.0         INF
0.0         INF
   1971     3650.0     3650.0     3650.0     3650.0          0.0         INF
0.0         INF
   1972    30900.0    30900.0    30900.0    30900.0          0.0         INF
0.0         INF
   1973     5520.0     5520.0     5520.0     5520.0          0.0         INF
0.0         INF
   1974     5250.0     5250.0     5250.0     5250.0          0.0         INF
0.0         INF
   1975    29400.0    29400.0    29400.0    29400.0          0.0         INF
```

							0.0	INF
1976	9700.0	9700.0	9700.0	9700.0	0.0	INF	0.0	INF
1977	19700.0	19700.0	19700.0	19700.0	0.0	INF	0.0	INF
1978	8120.0	8120.0	8120.0	8120.0	0.0	INF	0.0	INF
1979	12300.0	12300.0	12300.0	12300.0	0.0	INF	0.0	INF
1980	5550.0	5550.0	5550.0	5550.0	0.0	INF	0.0	INF
1981	8430.0	8430.0	8430.0	8430.0	0.0	INF	0.0	INF
1982	3980.0	3980.0	3980.0	3980.0	0.0	INF	0.0	INF
1983	9920.0	9920.0	9920.0	9920.0	0.0	INF	0.0	INF
1984	13000.0	13000.0	13000.0	13000.0	0.0	INF	0.0	INF
1985	4040.0	4040.0	4040.0	4040.0	0.0	INF	0.0	INF
1986	17200.0	17200.0	17200.0	17200.0	0.0	INF	0.0	INF
1987	5720.0	5720.0	5720.0	5720.0	0.0	INF	0.0	INF
1988	4030.0	4030.0	4030.0	4030.0	0.0	INF	0.0	INF
1989	7680.0	7680.0	7680.0	7680.0	0.0	INF	0.0	INF
1990	5220.0	5220.0	5220.0	5220.0	0.0	INF	0.0	INF
1991	7960.0	7960.0	7960.0	7960.0	0.0	INF	0.0	INF
1992	5070.0	5070.0	5070.0	5070.0	0.0	INF	0.0	INF
1993	14300.0	14300.0	14300.0	14300.0	0.0	INF	0.0	INF
1994	7660.0	7660.0	7660.0	7660.0	0.0	INF	0.0	INF
1995	8270.0	8270.0	8270.0	8270.0	0.0	INF	0.0	INF
1996	21300.0	21300.0	21300.0	21300.0	0.0	INF	0.0	INF
1997	12700.0	12700.0	12700.0	12700.0	0.0	INF	0.0	INF
1998	13600.0	13600.0	13600.0	13600.0	0.0	INF	0.0	INF
1999	13000.0	13000.0	13000.0	13000.0	0.0	INF	0.0	INF
2000	4860.0	4860.0	4860.0	4860.0	0.0	INF		

```
0.0        INF
   2001    10200.0    10200.0    10200.0    10200.0         0.0         INF
0.0        INF
   2002    13200.0    13200.0    13200.0    13200.0         0.0         INF
0.0        INF
   2003     8600.0     8600.0     8600.0     8600.0         0.0         INF
0.0        INF
   2004    15200.0    15200.0    15200.0    15200.0         0.0         INF
0.0        INF
   2005    16300.0    16300.0    16300.0    16300.0         0.0         INF
0.0        INF
   2006    41200.0    41200.0    41200.0    41200.0         0.0         INF
0.0        INF
   2007    10400.0    10400.0    10400.0    10400.0         0.0         INF
0.0        INF
   2008    14800.0    14800.0    14800.0    14800.0         0.0         INF
0.0        INF
   2009     4330.0     4330.0     4330.0     4330.0         0.0         INF
0.0        INF
   2010    17500.0    17500.0    17500.0    17500.0         0.0         INF
0.0        INF
   2011    56000.0    56000.0    56000.0    56000.0         0.0         INF
0.0        INF
   2012     6590.0     6590.0     6590.0     6590.0         0.0         INF
0.0        INF
   2013     4630.0     4630.0     4630.0     4630.0         0.0         INF
0.0        INF
   2014     4340.0     4340.0     4340.0     4340.0         0.0         INF
0.0        INF
   2015     5860.0     5860.0     5860.0     5860.0         0.0         INF
0.0        INF
   2016     3580.0     3580.0     3580.0     3580.0         0.0         INF
0.0        INF
   2017     9000.0     9000.0     9000.0     9000.0         0.0         INF
0.0        INF
   2018    29900.0    29900.0    29900.0    29900.0         0.0         INF
0.0        INF
   2019     7150.0     7150.0     7150.0     7150.0         0.0         INF
0.0        INF
   2020     8190.0     8190.0     8190.0     8190.0         0.0         INF
0.0        INF
1


 End PeakFQ analysis.
   Stations processed :       1
   Number of errors   :       0
   Stations skipped   :       0
   Station years      :      83
```

```
Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4,  or *.)
(2, 4, and * records are ignored.)

 For the station below, the following records were ignored:

 FINISHED PROCESSING STATION:  01539000       USGS Fishing Creek near Bloomsburg


 For the station below, the following records were ignored:

 FINISHED PROCESSING STATION:
```

BORTON-LAWSON
3897 Adler Place
Bethlehem, PA 18107
(484) 821-0470 - Fax (484) 821-0474
www.borton-lawson.com

JOB		2021-5134-002	
SHEET NO	1	OF	1
CALCULATED BY	EXY	DATE	7/21/2021
CHECKED BY		DATE	
SCALE		NTS	

TRANSPOSED STREAM FLOW FROM USGS GAGE TO PROJECT LOCATION

USGS STREAM GAGE PROPERTIES

Gage Number	01539000	Fishing Creek near Bloomsburg PA
Years Data Recorded	1936-2020	
Gage Drainage Area (SM)	274	
USGS SIR 2019-5094 Region	Region	3

Frequency Coefficients from Table 3 of SIR 2019-5094	
2	0.8366
5	0.8058
10	0.7916
25	0.7782
50	0.7707
100	0.7644
200	0.7592
500	0.7531

LOCATION - CONFLUENCE WITH SUSQUEHANNA RIVER

Drainage Area (SM)	385
Drainage Area Ratio (Project DA/gage DA)	1.41
Acceptable Drainage Area Ratio (Between 0.5 and 1.5)	Yes

Weighted Skew

TRANSPOSING EQUATION

Per DM-2 Section 10.6.C & SIR 2019-5094

$$(Q/Q_G)=(A/A_G)^B$$

Where:

Q	=	Peak discharge at project site
A	=	Basin area above project site
Q_G	=	Peak discharge at stream gage
A_G	=	Basin area above stream gage
B	=	Frequency coefficient from SIR 2019-5094 Table 3

Design Storm	Annual Exceedance Probability	Flow at Gage (Bulletin 17 C)	**Flow at Project Location**
(years)	(%)	(cfs)	**(cfs)**
1	0.9950	2,292	**3,046**
1.01	0.9900	2,544	**3,381**
1.05	0.9500	3,463	**4,603**
1.11	0.9000	4,142	**5,505**
1.25	0.8000	5,219	**6,937**
1.50	0.6667	6,570	**8,733**
2	0.5000	8,492	**11,287**
2.33	0.4292	9,489	**12,481**
5	0.2000	14,690	**19,322**
10	0.1000	20,070	**26,271**
25	0.0400	28,530	**37,175**
50	0.0200	36,210	**47,062**
100	0.0100	45,210	**58,633**
200	0.0050	55,730	**72,149**
500	0.0020	72,400	**93,536**

BORTON-LAWSON
3897 Adler Place
Bethlehem, PA 18107
(484) 821-0470 - Fax (484) 821-0474
www.borton-lawson.com

JOB			2021-5134-002
SHEET NO	1	OF	1
CALCULATED BY	EXY	DATE	7/21/2021
CHECKED BY		DATE	
SCALE		NTS	

TRANSPOSED STREAM FLOW FROM USGS GAGE TO PROJECT LOCATION

USGS STREAM GAGE PROPERTIES

Gage Number	01539000	Fishing Creek near Bloomsburg PA
Years Data Recorded	1936-2020	
Gage Drainage Area (SM)	274	
USGS SIR 2019-5094 Region	Region	3

LOCATION - RAILROAD STREET BRIDGE

Drainage Area (SM)	355
Drainage Area Ratio (Project DA/gage DA)	1.30
Acceptable Drainage Area Ratio (Between 0.5 and 1.5)	Yes

Frequency Coefficients from Table 3 of SIR 2019-5094	
2	0.8366
5	0.8058
10	0.7916
25	0.7782
50	0.7707
100	0.7644
200	0.7592
500	0.7531

Weighted Skew

TRANSPOSING EQUATION

Per DM-2 Section 10.6.C & SIR 2019-5094

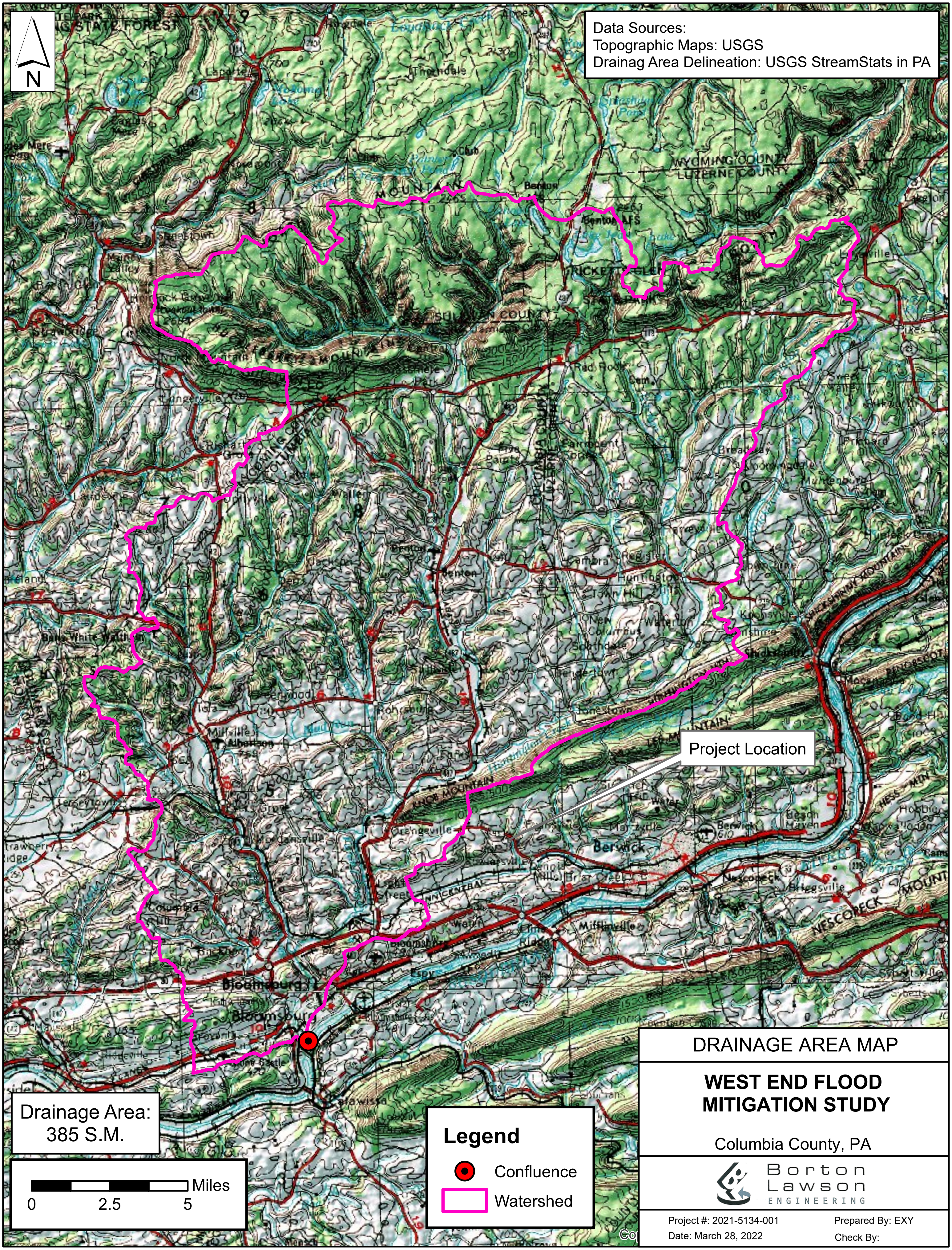
$$(Q/Q_G)=(A/A_G)^B$$

Where:

- Q = Peak discharge at project site
- A = Basin area above project site
- Q_G = Peak discharge at stream gage
- A_G = Basin area above stream gage
- B = Frequency coefficient from SIR 2019-5094 Table 3

Design Storm (years)	Annual Exceedance Probability (%)	Flow at Gage (Bulletin 17 C) (cfs)	**Flow at Project Location (cfs)**
1	0.9950	2,292	**2,847**
1.01	0.9900	2,544	**3,159**
1.05	0.9500	3,463	**4,301**
1.11	0.9000	4,142	**5,144**
1.25	0.8000	5,219	**6,482**
1.50	0.6667	6,570	**8,160**
2	0.5000	8,492	**10,547**
2.33	0.4292	9,489	**11,691**
5	0.2000	14,690	**18,099**
10	0.1000	20,070	**24,637**
25	0.0400	28,530	**34,901**
50	0.0200	36,210	**44,209**
100	0.0100	45,210	**55,108**
200	0.0050	55,730	**67,839**
500	0.0020	72,400	**87,992**

C.2 Drainage Area Map



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D. Fishing Creek Hydraulic Analysis

D.1 HEC-2 Data of Fishing Creek

1

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*****************************************          * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*   SEPT 1971 VERSION,  UPDATED JUNE 1974  *       * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT       *
*   ERROR CORRECTIONS 01 THRU 09R2         *       * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS,        *
*   MODIFICATIONS 52 THRU 58               *       * DEPARTMENT OF THE ARMY.                                     *
*   MBJ UPDATED  07/20/76   0830           *       * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC.     *
*                                          *       * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES     *
*   TODAYS DATE IS 02/28/77      16.58     *       * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE      *
*                                          *       * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.          *
*****************************************          * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
     2.723 SECONDS
```

FISHING CREEK
MULTIPLE PROFILES
1.01 – 50.0

T1 SUSQUEHANNA RIVER BASIN COMMISSION
T2 BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3 FISHING CREEK 10 YEAR FLOOD

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.0	0.0	0.0	0.	456.100	0.0

Known WSEL for 10-yr flow

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	58500.000	102000.000	0.0	0.0	0.0	0.0
NC	0.050	0.070	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4900.000	5243.000
X1	1.010	94.000	4960.000	5243.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	480.000	1000.000	479.800	1010.000	473.300	1030.000	474.000	1040.000	474.300	1059.000
GR	474.300	1077.000	473.900	1100.000	473.600	1159.000	473.800	1239.000	474.100	1347.000
GR	473.500	1450.000	473.800	1539.000	473.900	1613.000	470.700	1652.000	468.400	1712.000
GR	468.300	1729.000	468.800	1752.000	469.700	1798.000	470.200	1846.000	472.500	1863.000
GR	473.700	1895.000	472.200	1908.000	471.800	1951.000	471.500	2037.000	472.100	2122.000
GR	471.800	2176.000	469.900	2221.000	468.000	2285.000	469.000	2325.000	471.500	2388.000
GR	472.100	2466.000	472.500	2555.000	471.700	2658.000	472.500	2790.000	473.000	2852.000
GR	471.200	3001.000	472.400	3079.000	472.100	3114.000	470.200	3194.000	471.300	3278.000
GR	470.800	3350.000	471.500	3464.000	471.300	3546.000	471.700	3662.000	471.800	3745.000
GR	472.600	3859.000	472.300	3979.000	471.800	4090.000	472.000	4114.000	474.100	4421.000
GR	474.000	4498.000	470.300	4561.000	469.800	4636.000	467.200	4685.000	465.900	4746.000
GR	464.600	4798.000	463.000	4844.000	463.700	4857.000	463.700	4874.000	459.900	4891.000
GR	455.800	4924.000	455.500	4960.000	454.500	4979.000	448.200	5089.000	448.200	5089.000
GR	448.200	5181.000	454.500	5207.000	457.000	5217.000	461.300	5243.000	465.300	5283.000
GR	466.000	5317.000	466.800	5415.000	467.300	5499.000	468.100	5597.000	470.100	5657.000
GR	471.800	5732.000	473.600	5760.000	470.500	5791.000	470.700	5807.000	475.100	5827.000
GR	475.400	5851.000	477.200	5885.000	482.400	5932.000	485.500	5973.000	484.800	5995.000
GR	484.600	6022.000	485.100	6053.000	483.900	6122.000	483.700	6177.000	481.100	6187.000
GR	481.100	6198.000	483.100	6210.000	484.900	6228.000	486.900	6272.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4830.000	5283.000
X1	1.020	0.0	0.0	0.0	450.000	450.000	450.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4656.000	5285.000
X1	1.000	0.0	0.0	0.0	670.000	630.000	680.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4530.000	5509.000
X1	1.100	94.000	5236.000	5509.000	650.000	510.000	700.000	0.0	0.0	0.0
GR	486.000	1.000	473.200	1000.000	473.000	1417.000	474.100	1484.000	473.000	1637.000
GR	472.000	1729.000	471.600	1805.000	471.400	1931.000	471.800	2024.000	473.300	2039.000
GR	470.400	2053.000	469.400	2647.000	470.700	2737.000	471.500	2875.000	471.600	3043.000
GR	470.400	3208.000	470.100	3247.000	471.500	3306.000	472.800	3319.000	473.400	3338.000
GR	470.100	3368.000	469.800	3432.000	469.800	3481.000	470.400	3567.000	469.900	3669.000
GR	469.900	3714.000	468.300	3787.000	469.900	3834.000	469.900	3873.000	468.700	3906.000

2

GR	466.300	3975.000	465.200	4037.000	465.600	4143.000	466.000	4228.000	468.600	4541.000
GR	465.900	4833.000	467.300	4871.000	467.800	4919.000	473.500	4938.000	474.100	4947.000
GR	474.100	4957.000	474.000	4968.000	472.100	4997.000	470.500	5050.000	470.200	5118.000
GR	469.700	5189.000	466.800	5236.000	460.700	5263.000	449.400	5265.000	449.400	5282.000
GR	479.400	5282.000	479.400	5290.000	449.400	5290.000	449.400	5325.000	479.400	5325.000
GR	479.400	5333.000	449.400	5333.000	449.400	5368.000	479.400	5368.000	479.400	5376.000
GR	449.400	5376.000	449.400	5411.000	479.400	5411.000	479.400	5419.000	449.400	5419.000
GR	449.400	5454.000	479.400	5454.000	479.400	5462.000	449.400	5462.000	449.400	5488.000
GR	454.800	5493.000	462.900	5501.000	466.300	5509.000	469.900	5549.000	468.600	5605.000
GR	475.100	5757.000	477.800	5896.000	482.500	5973.000	483.900	6022.000	484.300	6036.000
GR	482.700	6046.000	482.900	6062.000	483.900	6105.000	486.300	6153.000	485.500	6157.000
GR	485.800	6181.000	487.200	6204.000	488.600	6235.000	490.800	6254.000	490.800	6275.000
GR	493.700	6297.000	496.400	6403.000	496.400	6443.000	495.800	6448.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4160.000	5545.000
X1	2.000	95.000	5349.000	5545.000	350.000	170.000	230.000	0.0	0.0	0.0
GR	485.000	1.000	468.500	1000.000	471.100	1126.000	470.800	1178.000	470.200	1216.000
GR	470.700	1265.000	473.000	1339.000	473.500	1405.000	473.900	1470.000	474.800	1548.000
GR	475.400	1624.000	476.000	1663.000	477.400	1714.000	476.200	1764.000	474.900	1810.000
GR	473.600	1835.000	473.400	1863.000	472.800	1984.000	471.100	2159.000	471.400	2295.000
GR	471.900	2382.000	471.800	2491.000	471.400	2572.000	470.400	2664.000	469.400	2754.000
GR	468.100	2873.000	468.700	2978.000	468.200	3088.000	468.200	3204.000	467.800	3316.000
GR	467.800	3434.000	469.400	3553.000	468.500	3660.000	468.200	3791.000	469.300	3914.000
GR	468.100	4059.000	467.300	4189.000	466.800	4338.000	465.900	4478.000	466.800	4596.000
GR	466.400	4721.000	466.900	4769.000	467.000	4799.000	467.200	4826.000	467.100	4834.000
GR	465.000	4857.000	455.400	4886.000	461.700	4906.000	465.400	4941.000	469.200	4958.000
GR	469.200	4972.000	467.000	4988.000	466.300	5049.000	466.300	5127.000	466.400	5207.000
GR	466.400	5259.000	465.900	5308.000	460.600	5349.000	456.800	5361.000	454.800	5368.000
GR	446.000	5397.000	446.000	5451.000	446.000	5516.000	454.800	5533.000	460.900	5545.000
GR	470.600	5560.000	473.700	5610.000	474.800	5661.000	475.400	5703.000	475.400	5726.000
GR	475.400	5741.000	476.600	5785.000	480.000	5840.000	481.300	5888.000	481.700	5926.000
GR	482.400	5959.000	484.900	5972.000	485.100	5987.000	485.100	6012.000	484.900	6020.000
GR	485.700	6038.000	489.600	6072.000	490.400	6110.000	491.100	6129.000	491.900	6155.000
GR	492.600	6203.000	498.500	6239.000	499.000	6271.000	499.700	6308.000	499.700	6323.000
GR	496.800	6343.000	496.800	6356.000	496.800	6362.000	504.900	6376.000	510.200	6388.000
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.010	68.000	5527.000	5689.000	50.000	125.000	125.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	464.500	476.100	0.0
GR	485.000	1.000	467.100	1032.000	465.600	1048.000	467.200	1062.000	468.400	1128.000
GR	469.600	1200.000	468.300	1256.000	470.100	1276.000	471.800	1335.000	472.700	1362.000
GR	473.700	1407.000	472.700	1461.000	472.800	1521.000	473.800	1562.000	475.300	1623.000
GR	475.700	1663.000	476.000	1726.000	475.200	1778.000	474.800	1861.000	468.700	1880.000
GR	468.800	1898.000	469.200	1941.000	470.100	2019.000	471.500	2111.000	470.900	2199.000
GR	470.800	2307.000	471.700	2432.000	471.700	2533.000	471.600	2629.000	470.200	2740.000
GR	469.800	2835.000	469.900	2959.000	467.600	3084.000	469.000	3183.000	469.400	3303.000
GR	468.400	3399.000	468.600	3482.000	468.700	3588.000	468.700	3754.000	468.900	3909.000
GR	466.400	4042.000	464.500	4136.000	464.900	4204.000	465.800	4296.000	466.200	4427.000
GR	466.700	4547.000	467.300	4681.000	467.300	4776.000	466.800	4807.000	466.600	4839.000
GR	466.500	4863.000	466.500	4882.000	466.500	4925.000	466.600	4983.000	466.900	5065.000
GR	466.300	5140.000	466.600	5223.000	466.400	5239.000	467.600	5387.000	466.000	5439.000
GR	458.000	5486.000	449.500	5527.000	449.500	5527.000	449.500	5689.000	449.500	5689.000
GR	455.000	5700.000	476.100	5761.000	485.400	6002.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.020	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
BT	9.000	5387.000	467.600	467.600	5439.000	469.600	466.000	5486.000	474.500	458.000
BT	5527.000	478.600	449.500	5527.000	478.600	473.500	5689.000	479.000	473.500	5689.000
BT	479.000	449.500	5700.000	479.000	455.000	5761.000	476.100	476.100	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.100	0.0	0.0	0.0	21.000	21.000	21.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000

X1	3.200	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	464.500	476.100	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.010	39.000	5880.000	6100.000	400.000	10.000	30.000	0.0	0.0	0.0
GR	480.000	1.000	466.000	1000.000	470.000	1530.000	471.000	3025.000	470.000	3525.000
GR	470.000	4330.000	474.000	4500.000	470.000	4590.000	465.000	4820.000	465.000	4920.000
GR	464.000	5000.000	460.000	5150.000	460.500	5160.000	460.000	5165.000	459.000	5180.000
GR	460.000	5195.000	460.000	5300.000	457.000	5380.000	460.000	5700.000	466.100	5765.000
GR	466.100	5785.000	465.000	5805.000	460.000	5880.000	448.300	5920.000	448.300	6075.000
GR	455.000	6082.000	475.000	6100.000	483.000	6200.000	485.000	6305.000	486.500	6330.000
GR	490.000	6415.000	495.000	6460.000	500.000	6520.000	501.000	6580.000	500.000	6638.000
GR	504.900	6650.000	505.000	6690.000	510.000	6800.000	515.000	6875.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.020	0.0	0.0	0.0	15.000	15.000	15.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	470.000	475.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
SB	1.250	1.500	3.000	0.0	133.000	16.000	4100.000	1.900	451.000	451.000
X1	4.100	0.0	0.0	0.0	17.000	17.000	17.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	476.000	474.100	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	475.000	0.0
BT	29.000	1.000	480.000	0.0	1000.000	475.500	0.0	1785.000	474.700	0.0
BT	1960.000	474.100	0.0	2141.000	474.600	0.0	2473.000	474.200	0.0	4029.000
BT	475.300	0.0	4554.000	478.100	0.0	4758.000	478.500	0.0	4813.000	479.300
BT	0.0	4887.000	479.800	0.0	4941.000	480.200	0.0	5018.000	480.500	0.0
BT	5053.000	480.700	0.0	5140.000	480.900	0.0	5243.000	481.000	0.0	5333.000
BT	481.200	0.0	5415.000	481.500	0.0	5525.000	482.100	0.0	5551.000	482.600
BT	0.0	5581.000	482.500	0.0	5676.000	482.900	0.0	5878.000	482.900	0.0
BT	5885.000	483.000	0.0	6028.000	483.000	0.0	6064.000	483.300	0.0	6099.000
BT	483.900	0.0	6118.000	484.100	0.0	6134.000	485.200	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.200	0.0	0.0	0.0	66.000	66.000	66.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	471.000	475.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3540.000	5918.000
X1	5.010	70.000	5603.000	5918.000	5.000	5.000	5.000	0.0	0.0	0.0
BT	12.000	5603.000	482.200	482.200	5603.000	482.200	479.400	5625.000	482.300	479.500
BT	5625.000	482.300	482.300	5718.000	483.200	483.200	5718.000	483.200	478.200	5815.000
BT	483.800	478.800	5815.000	483.800	483.800	5821.000	483.800	483.800	5821.000	483.800
BT	478.800	5918.000	484.300	479.300	5918.000	484.300	484.300	0.0	0.0	0.0
GR	480.000	1.000	471.000	1000.000	471.000	3536.000	471.100	3683.000	471.200	3987.000
GR	472.900	4580.000	474.000	4696.000	475.100	4779.000	475.700	4979.000	476.400	5054.000
GR	476.500	5055.000	477.000	5095.000	477.500	5157.000	478.600	5240.000	479.300	5295.000
GR	479.900	5358.000	480.300	5401.000	481.400	5467.000	481.900	5511.000	482.000	5572.000
GR	482.200	5603.000	467.000	5603.000	467.000	5603.000	467.000	5625.000	467.000	5625.000
GR	482.300	5625.000	483.200	5718.000	456.100	5718.000	456.100	5718.000	453.100	5750.000
GR	448.400	5783.000	443.400	5815.000	443.400	5815.000	483.800	5815.000	483.800	5821.000
GR	442.800	5821.000	442.800	5821.000	448.600	5853.000	450.200	5886.000	466.100	5918.000
GR	466.100	5918.000	484.300	5918.000	483.400	6009.000	479.200	6028.000	481.200	6068.000
GR	481.600	6093.000	485.500	6119.000	487.200	6148.000	490.100	6180.000	494.700	6209.000
GR	496.600	6241.000	496.600	6260.000	501.500	6287.000	501.500	6341.000	502.300	6388.000
GR	500.300	6406.000	498.600	6423.000	498.600	6441.000	505.000	6460.000	506.300	6473.000
GR	506.300	6495.000	507.100	6525.000	509.500	6587.000	511.200	6633.000	514.400	6652.000
GR	515.400	6668.000	516.300	6719.000	521.300	6794.000	525.200	6844.000	531.000	6889.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3540.000	5918.000
X1	5.100	0.0	0.0	0.0	18.000	18.000	18.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2980.000	5821.000
X1	6.010	94.000	5593.000	5821.000	5.000	5.000	5.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	467.200	475.000	0.0
GR	480.000	1.000	471.500	1000.000	471.400	1152.000	471.800	1242.000	471.800	1327.000

GR	470.400	1483.000	469.000	1604.000	467.500	1724.000	467.900	1842.000	469.300	1944.000
GR	469.600	2079.000	468.600	2256.000	469.200	2444.000	469.300	2587.000	468.500	2684.000
GR	467.500	2745.000	466.500	2758.000	465.800	2764.000	460.600	2808.000	465.800	2834.000
GR	467.700	2843.000	472.000	2866.000	471.400	2923.000	470.700	3042.000	464.100	3074.000
GR	464.200	3084.000	467.300	3101.000	468.300	3141.000	469.700	3191.000	468.800	3265.000
GR	467.400	3316.000	466.200	3336.000	466.200	3392.000	466.200	3465.000	469.000	3516.000
GR	469.500	3594.000	468.700	3675.000	468.800	3845.000	469.100	3977.000	469.000	4107.000
GR	468.300	4221.000	468.000	4370.000	467.900	4483.000	467.800	4567.000	467.600	4625.000
GR	466.300	4674.000	465.900	4721.000	465.200	4756.000	462.200	4772.000	464.800	4787.000
GR	465.700	4800.000	466.400	4832.000	466.600	4880.000	467.000	4939.000	467.400	5013.000
GR	467.400	5090.000	467.100	5179.000	467.500	5250.000	467.700	5292.000	468.000	5378.000
GR	468.100	5443.000	468.400	5486.000	467.900	5496.000	467.900	5519.000	468.300	5537.000
GR	467.100	5574.000	465.800	5593.000	459.400	5602.000	455.800	5608.000	454.800	5614.000
GR	451.500	5632.000	451.500	5685.000	451.500	5685.000	454.800	5751.000	455.100	5758.000
GR	455.100	5770.000	454.800	5778.000	452.600	5791.000	454.800	5804.000	456.100	5811.000
GR	472.700	5821.000	478.800	5835.000	478.800	5851.000	478.200	5863.000	479.500	5870.000
GR	482.500	5905.000	488.300	5953.000	492.800	5993.000	495.200	6023.000	497.100	6057.000
GR	499.300	6071.000	499.300	6083.000	496.800	6088.000	502.000	6108.000	0.0	0.0
NC	0.050	0.070	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2980.000	5821.000
X1	6.000	0.0	0.0	0.0	110.000	290.000	205.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2840.000	5394.000
X1	7.000	95.000	5136.000	5394.000	80.000	780.000	680.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.000	1211.000	471.400	1323.000	470.400	1455.000
GR	469.900	1556.000	469.300	1640.000	469.200	1654.000	467.200	1672.000	466.700	1728.000
GR	466.300	1861.000	469.100	1977.000	469.800	2101.000	468.700	2200.000	468.900	2308.000
GR	469.100	2429.000	467.600	2538.000	468.200	2660.000	466.900	2720.000	466.200	2745.000
GR	465.800	2763.000	467.500	2785.000	472.300	2816.000	472.100	2856.000	470.600	2929.000
GR	470.300	2978.000	469.500	3024.000	463.300	3045.000	465.300	3058.000	467.000	3093.000
GR	467.700	3145.000	468.100	3195.000	468.800	3274.000	467.200	3304.000	466.200	3315.000
GR	459.100	3393.000	466.200	3511.000	467.200	3527.000	467.200	3570.000	467.300	3597.000
GR	466.600	3605.000	464.000	3637.000	466.600	3661.000	467.200	3666.000	467.800	3730.000
GR	468.000	3836.000	468.500	3936.000	469.400	4021.000	469.900	4108.000	467.800	4225.000
GR	467.900	4330.000	468.200	4409.000	468.100	4486.000	468.000	4597.000	466.900	4663.000
GR	465.100	4706.000	460.500	4725.000	465.300	4740.000	466.500	4793.000	467.700	4825.000
GR	467.100	4861.000	465.400	4886.000	465.300	4924.000	467.800	4945.000	467.500	5026.000
GR	468.300	5074.000	468.700	5112.000	468.800	5136.000	460.600	5151.000	456.300	5157.000
GR	454.900	5166.000	454.300	5170.000	454.300	5246.000	454.300	5314.000	454.900	5319.000
GR	455.700	5325.000	457.100	5343.000	460.500	5360.000	468.400	5394.000	467.500	5439.000
GR	465.900	5457.000	464.500	5475.000	465.300	5495.000	465.800	5531.000	470.200	5554.000
GR	473.700	5592.000	481.600	5613.000	482.900	5636.000	483.300	5686.000	484.800	5703.000
GR	487.600	5724.000	492.600	5756.000	497.400	5777.000	503.600	5802.000	503.600	5823.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2480.000	5042.000
X1	8.000	66.000	4717.000	5042.000	270.000	740.000	725.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.400	1220.000	471.000	1339.000	470.300	1423.000
GR	469.600	1566.000	469.200	1623.000	468.400	1667.000	468.400	1772.000	467.800	1925.000
GR	467.700	2068.000	468.300	2233.000	467.600	2370.000	468.000	2480.000	470.100	2552.000
GR	470.700	2651.000	471.000	2719.000	471.200	2819.000	464.500	2871.000	465.100	2884.000
GR	465.500	2949.000	465.800	3019.000	465.900	3127.000	465.900	3252.000	465.200	3372.000
GR	464.800	3449.000	465.300	3500.000	466.200	3603.000	466.900	3715.000	466.800	3873.000
GR	466.300	4018.000	466.200	4129.000	466.300	4205.000	466.400	4240.000	466.500	4285.000
GR	466.500	4335.000	468.000	4381.000	468.500	4435.000	469.500	4498.000	470.500	4571.000
GR	470.700	4653.000	470.500	4678.000	470.300	4691.000	464.500	4708.000	464.500	4717.000
GR	457.700	4719.000	456.900	4729.000	456.000	4740.000	456.000	4850.000	456.000	4979.000
GR	456.900	4983.000	459.000	4992.000	464.300	5009.000	467.600	5042.000	467.800	5103.000
GR	466.100	5160.000	464.900	5201.000	461.400	5233.000	460.300	5246.000	458.700	5264.000
GR	460.300	5265.000	470.300	5270.000	475.900	5282.000	483.000	5299.000	484.400	5309.000
GR	484.700	5331.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2465.000	5042.000
X1	9.000	66.000	4680.000	4999.000	20.000	30.000	30.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.300	1222.000	471.000	1339.000	470.400	1422.000
GR	469.600	1570.000	469.200	1622.000	468.500	1668.000	468.300	1772.000	467.700	1924.000

GR	467.600	2052.000	468.000	2216.000	467.500	2376.000	468.100	2486.000	470.100	2552.000
GR	470.900	2649.000	471.300	2715.000	471.200	2815.000	464.700	2855.000	465.400	2888.000
GR	465.700	2955.000	466.000	3018.000	466.100	3123.000	465.800	3250.000	465.100	3374.000
GR	464.800	3450.000	465.400	3508.000	466.200	3605.000	466.700	3719.000	467.000	3875.000
GR	466.300	4028.000	466.100	4128.000	466.200	4206.000	466.400	4244.000	466.500	4287.000
GR	466.600	4326.000	468.400	4387.000	468.800	4449.000	469.900	4507.000	471.000	4567.000
GR	470.700	4612.000	470.700	4647.000	470.500	4656.000	470.500	4680.000	468.800	4688.000
GR	461.700	4700.000	461.800	4700.000	460.700	4704.000	460.000	4707.000	456.000	4718.000
GR	456.000	4940.000	460.700	4957.000	461.400	4974.000	466.000	4999.000	467.200	5021.000
GR	467.500	5067.000	466.900	5143.000	466.200	5187.000	466.200	5223.000	464.100	5229.000
GR	465.500	5242.000	470.400	5266.000	474.600	5276.000	479.700	5286.000	485.400	5301.000
GR	485.100	5323.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1830.000	4761.000
X1	10.000	73.000	4497.000	4761.000	845.000	795.000	860.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.200	1135.000	471.100	1222.000	470.600	1316.000
GR	469.600	1448.000	469.200	1562.000	467.900	1661.000	466.700	1792.000	466.000	1867.000
GR	465.200	2008.000	465.000	2171.000	464.600	2182.000	464.600	2251.000	464.800	2269.000
GR	464.800	2310.000	463.600	2328.000	464.500	2346.000	464.400	2387.000	464.400	2446.000
GR	464.400	2497.000	464.700	2522.000	465.400	2566.000	467.100	2607.000	467.400	2655.000
GR	468.300	2740.000	470.400	2828.000	471.000	2876.000	470.200	2948.000	468.900	3054.000
GR	467.700	3131.000	466.500	3207.000	467.000	3258.000	467.200	3340.000	467.500	3460.000
GR	467.700	3573.000	468.000	3648.000	467.500	3710.000	467.400	3776.000	467.200	3826.000
GR	467.200	3858.000	467.200	3910.000	467.600	3980.000	467.800	4050.000	468.000	4120.000
GR	468.000	4189.000	468.800	4272.000	468.400	4371.000	468.400	4429.000	467.800	4470.000
GR	467.500	4497.000	465.800	4501.000	461.400	4511.000	460.900	4519.000	456.700	4583.000
GR	456.700	4609.000	456.700	4670.000	460.900	4694.000	462.800	4705.000	464.900	4726.000
GR	469.700	4761.000	469.900	4789.000	468.600	4869.000	468.400	4964.000	468.200	5031.000
GR	468.100	5072.000	465.600	5087.000	469.400	5099.000	475.600	5108.000	485.100	5131.000
GR	494.500	5152.000	494.600	5172.000	494.500	5193.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1720.000	4911.000
X1	11.000	77.000	4716.000	4911.000	300.000	600.000	675.000	0.0	0.0	0.0
GR	485.000	1.000	471.100	1052.000	471.300	1132.000	471.000	1223.000	470.200	1312.000
GR	469.100	1392.000	468.800	1458.000	467.900	1468.000	465.500	1477.000	462.200	1489.000
GR	465.500	1522.000	466.400	1531.000	466.800	1558.000	466.800	1594.000	465.900	1662.000
GR	465.800	1737.000	465.300	1870.000	465.300	1954.000	464.900	2032.000	464.500	2050.000
GR	464.500	2138.000	464.800	2196.000	464.900	2218.000	464.100	2230.000	464.600	2237.000
GR	464.600	2279.000	464.600	2367.000	465.100	2381.000	468.100	2418.000	469.900	2459.000
GR	469.800	2519.000	470.700	2612.000	470.600	2676.000	470.700	2761.000	471.600	2891.000
GR	471.700	2917.000	470.500	2961.000	470.200	3014.000	470.200	3111.000	469.300	3199.000
GR	467.900	3351.000	467.900	3435.000	467.000	3461.000	468.500	3491.000	468.400	3549.000
GR	468.500	3660.000	469.200	3804.000	469.400	3923.000	469.800	4009.000	469.200	4091.000
GR	468.500	4231.000	467.900	4311.000	467.100	4412.000	466.000	4418.000	468.200	4430.000
GR	469.000	4508.000	468.800	4582.000	468.800	4636.000	467.700	4688.000	465.600	4716.000
GR	461.900	4722.000	460.200	4728.000	459.400	4731.000	459.400	4809.000	459.400	4887.000
GR	460.200	4889.000	462.300	4896.000	467.600	4911.000	464.800	4931.000	473.500	4943.000
GR	475.800	4971.000	477.500	5027.000	478.500	5104.000	480.900	5166.000	485.600	5232.000
GR	487.600	5268.000	489.300	5303.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1720.000	4911.000
X1	11.100	0.0	0.0	0.0	195.000	15.000	75.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.600	484.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1670.000	5092.000
X1	12.010	80.000	4900.000	5092.000	5.000	5.000	5.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.600	484.000	0.0
BT	6.000	4900.000	480.000	473.900	4992.000	482.100	475.400	4992.000	482.100	461.700
BT	4998.000	482.100	461.700	4998.000	482.100	475.400	5092.000	484.200	476.900	0.0
GR	485.000	1.000	471.400	1177.000	470.500	1269.000	469.300	1364.000	466.700	1417.000
GR	468.200	1438.000	468.000	1469.000	465.500	1481.000	465.500	1541.000	466.200	1553.000
GR	465.800	1605.000	465.600	1656.000	465.600	1734.000	466.100	1763.000	466.100	1842.000
GR	466.000	1935.000	465.000	1990.000	464.500	2003.000	464.500	2083.000	464.800	2110.000
GR	464.900	2141.000	464.600	2161.000	464.600	2200.000	464.600	2279.000	465.000	2313.000
GR	467.200	2362.000	468.900	2422.000	470.500	2474.000	470.500	2544.000	470.500	2681.000

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GR	470.700	2827.000	471.000	2942.000	471.000	3022.000	470.800	3079.000	470.300	3153.000
GR	470.500	3182.000	470.800	3200.000	470.100	3213.000	469.000	3292.000	469.200	3385.000
GR	469.700	3473.000	469.900	3553.000	470.700	3631.000	474.000	3648.000	474.000	3692.000
GR	471.700	3715.000	472.100	3736.000	475.100	3766.000	476.700	3827.000	478.000	3866.000
GR	477.200	3907.000	475.000	3986.000	473.300	4061.000	473.300	4154.000	472.900	4238.000
GR	472.200	4317.000	471.800	4404.000	471.800	4470.000	471.600	4516.000	472.100	4530.000
GR	472.100	4547.000	480.000	4900.000	460.000	4900.000	452.900	4940.000	454.900	4992.000
GR	461.700	4992.000	461.700	4998.000	461.700	4998.000	456.900	5040.000	463.300	5092.000
GR	484.200	5092.000	485.400	5425.000	485.500	5448.000	485.700	5507.000	488.400	5577.000
GR	490.900	5629.000	497.700	5654.000	502.400	5677.000	507.400	5709.000	507.400	5731.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1670.000	5092.000
X1	12.100	0.0	0.0	0.0	110.000	110.000	110.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1650.000	5148.000
X1	13.100	95.000	4937.000	5148.000	5.000	5.000	5.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
GR	485.000	1.000	471.300	1084.000	470.800	1185.000	470.200	1277.000	468.900	1359.000
GR	467.300	1402.000	465.700	1423.000	466.800	1448.000	467.000	1469.000	465.500	1489.000
GR	464.300	1505.000	465.500	1537.000	466.000	1551.000	466.200	1576.000	465.900	1618.000
GR	465.700	1690.000	465.700	1758.000	466.000	1841.000	465.800	1869.000	466.000	1909.000
GR	465.700	1948.000	464.700	1974.000	464.600	2028.000	464.800	2037.000	464.300	2055.000
GR	464.500	2069.000	464.400	2131.000	464.900	2151.000	465.000	2215.000	465.100	2247.000
GR	469.000	2288.000	469.900	2336.000	470.700	2367.000	470.700	2419.000	470.000	2470.000
GR	470.000	2626.000	470.000	2748.000	470.300	2858.000	470.800	2934.000	471.000	3003.000
GR	471.100	3038.000	470.700	3071.000	470.700	3137.000	470.800	3176.000	470.700	3216.000
GR	470.300	3263.000	469.600	3326.000	469.300	3347.000	469.800	3382.000	470.100	3488.000
GR	471.500	3551.000	474.200	3563.000	474.200	3586.000	473.700	3590.000	474.800	3606.000
GR	473.000	3620.000	474.600	3645.000	486.600	3683.000	486.600	3710.000	485.000	3726.000
GR	480.700	3756.000	476.900	3798.000	474.900	3826.000	472.800	3885.000	472.700	3965.000
GR	472.900	4063.000	474.000	4125.000	475.400	4146.000	476.000	4163.000	474.800	4186.000
GR	473.400	4237.000	472.800	4301.000	472.800	4345.000	473.600	4370.000	473.200	4417.000
GR	472.800	4472.000	472.000	4503.000	471.800	4554.000	470.200	4640.000	469.700	4768.000
GR	470.100	4852.000	469.500	4902.000	463.300	4937.000	465.400	4952.000	460.500	4961.000
GR	460.000	4962.000	460.000	5046.000	460.000	5128.000	460.500	5129.000	463.100	5133.000
GR	474.600	5148.000	495.300	5182.000	499.200	5208.000	500.600	5378.000	512.500	5551.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1630.000	5148.000
X1	13.200	0.0	0.0	0.0	100.000	195.000	115.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
NC	0.050	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1620.000	4976.000
X1	14.000	95.000	4717.000	4967.000	20.000	720.000	635.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
GR	485.000	1.000	471.200	1094.000	470.800	1227.000	469.300	1325.000	466.900	1405.000
GR	465.500	1423.000	466.600	1445.000	466.900	1466.000	465.700	1482.000	465.500	1512.000
GR	466.100	1558.000	466.100	1617.000	466.200	1678.000	466.000	1741.000	466.200	1796.000
GR	465.400	1876.000	465.200	1935.000	464.900	1960.000	464.700	1996.000	464.100	2010.000
GR	464.300	2026.000	464.300	2087.000	464.600	2149.000	464.800	2197.000	465.700	2221.000
GR	468.300	2269.000	470.400	2315.000	470.500	2387.000	470.200	2428.000	469.900	2522.000
GR	469.800	2629.000	469.900	2748.000	470.100	2826.000	470.600	2919.000	470.700	2993.000
GR	470.700	3028.000	471.000	3108.000	470.600	3174.000	470.300	3274.000	469.500	3385.000
GR	471.500	3450.000	472.000	3530.000	474.600	3545.000	474.600	3570.000	473.800	3577.000
GR	474.600	3585.000	473.100	3599.000	474.500	3612.000	476.400	3633.000	487.600	3658.000
GR	485.800	3709.000	479.200	3737.000	474.400	3800.000	472.200	3865.000	471.100	3939.000
GR	471.000	4019.000	472.600	4103.000	474.100	4139.000	475.800	4169.000	473.400	4199.000
GR	473.100	4238.000	474.400	4284.000	474.700	4317.000	474.400	4370.000	474.200	4424.000
GR	472.900	4496.000	471.800	4541.000	468.800	4642.000	466.700	4691.000	465.500	4717.000
GR	464.900	4722.000	460.700	4730.000	456.000	4739.000	456.000	4824.000	456.000	4893.000
GR	460.800	4913.000	463.400	4923.000	465.700	4967.000	466.500	5035.000	475.200	5062.000
GR	490.400	5097.000	488.200	5113.000	491.200	5140.000	489.200	5154.000	488.000	5172.000
GR	500.800	5194.000	508.900	5234.000	510.000	5273.000	511.500	5284.000	511.500	5310.000
GR	512.500	5364.000	512.900	5492.000	512.900	5562.000	509.700	5599.000	513.300	5668.000

NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1545.000	4621.000
X1	16.010	90.000	4430.000	4621.000	44.000	714.000	684.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	480.700	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	475.300	3700.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4428.000	458.000	4430.000
GR	458.000	4538.000	458.000	4621.000	461.200	4636.000	463.200	4643.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	4721.000
X1	16.020	92.000	4530.000	4721.000	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	0.0	0.0
BT	12.000	4115.000	494.600	494.600	4115.000	494.600	491.500	4210.000	493.100	490.000
BT	4210.000	493.100	493.100	4530.000	488.500	488.500	4530.000	488.500	484.600	4624.000
BT	487.100	483.300	4624.000	487.100	487.100	4627.000	487.000	487.000	4627.000	487.000
BT	483.200	4721.000	485.700	481.800	4721.000	485.700	485.700	0.0	0.0	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.800	3521.000	475.300	3547.000	472.300	3578.000	472.300	3653.000	477.100	3669.000
GR	481.000	3691.000	493.700	3769.000	494.900	3795.000	495.400	3872.000	496.100	3993.000
GR	495.200	4096.000	494.600	4115.000	475.400	4115.000	475.400	4210.000	493.100	4210.000
GR	488.500	4530.000	458.000	4530.000	458.000	4624.000	487.100	4624.000	487.000	4627.000
GR	458.000	4627.000	458.000	4721.000	485.700	4721.000	484.600	4849.000	484.300	5134.000
GR	484.100	5192.000	480.900	5241.000	481.200	5272.000	482.900	5353.000	484.700	5440.000
GR	489.200	5463.000	501.300	5520.000	504.100	5560.000	505.700	5599.000	504.000	5619.000
GR	504.000	5639.000	510.400	5658.000	513.800	5793.000	514.000	5879.000	515.200	5940.000
GR	516.000	5965.000	516.000	5982.000	516.500	6021.000	517.500	6114.000	518.600	6156.000
GR	520.500	6232.000	525.100	6325.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	4721.000
X1	16.030	0.0	0.0	0.0	76.000	76.000	76.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1545.000	4621.000
X1	16.040	90.000	4430.000	4621.000	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	480.900	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000

GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	475.300	3700.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4428.000	458.000	4430.000
GR	458.000	4538.000	458.000	4621.000	461.200	4636.000	463.200	4643.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1585.000	4661.000
X1	16.000	95.000	4392.000	4661.000	60.000	60.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	0.0	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	472.300	3578.000	472.300	3653.000	471.600	3743.000
GR	470.500	3832.000	469.800	3914.000	469.700	3993.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4436.000	459.000	4442.000
GR	459.000	4538.000	459.000	4628.000	461.200	4636.000	463.200	4642.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.010	67.000	3984.000	4154.000	758.000	678.000	738.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.600	472.200	0.0
GR	485.000	1.000	471.300	1039.000	470.700	1095.000	470.200	1179.000	469.900	1234.000
GR	468.300	1317.000	468.400	1424.000	467.100	1467.000	467.500	1517.000	470.800	1551.000
GR	473.300	1572.000	474.700	1629.000	473.700	1688.000	472.800	1758.000	469.900	1811.000
GR	468.900	1872.000	468.700	1949.000	468.500	2033.000	468.800	2162.000	468.700	2264.000
GR	468.800	2343.000	469.700	2393.000	470.600	2480.000	471.100	2582.000	471.200	2724.000
GR	471.500	2851.000	471.900	2953.000	472.000	3003.000	472.100	3043.000	472.100	3083.000
GR	472.100	3100.000	472.200	3111.000	471.000	3243.000	470.700	3362.000	470.400	3504.000
GR	470.300	3632.000	471.100	3700.000	472.600	3780.000	474.700	3849.000	478.500	3894.000
GR	478.500	3917.000	465.900	3984.000	465.900	3984.000	459.000	4001.000	459.000	4038.000
GR	459.000	4038.000	459.000	4042.000	459.000	4042.000	459.000	4096.000	459.000	4096.000
GR	459.000	4100.000	459.000	4100.000	459.000	4145.000	464.300	4154.000	464.300	4154.000
GR	473.500	4200.000	473.500	4221.000	473.100	4257.000	473.300	4299.000	474.500	4359.000
GR	479.700	4396.000	484.100	4432.000	486.700	4446.000	491.600	4485.000	499.600	4508.000
GR	512.900	4530.000	525.000	4556.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.020	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.600	0.0	0.0
BT	18.000	3917.000	478.500	478.500	3984.000	478.800	465.900	3984.000	478.800	474.000
BT	4001.000	478.900	474.000	4038.000	479.000	474.000	4038.000	479.000	459.000	4042.000
BT	479.000	459.000	4042.000	479.000	475.500	4096.000	479.300	475.500	4096.000	479.300
BT	459.000	4100.000	479.300	459.000	4100.000	479.300	474.000	4145.000	479.500	474.000
BT	4154.000	479.500	474.000	4154.000	479.500	464.300	4200.000	475.000	473.500	4221.000
BT	474.300	473.500	4257.000	473.100	473.100	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.030	0.0	0.0	0.0	27.000	27.000	[illegible]	0.0	0.0	0.0

X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	0.0	0.0
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.040	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	473.100	0.0
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.000	67.000	3917.000	4154.000	55.000	55.000	55.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.800	0.0	0.0
GR	485.000	1.000	471.300	1039.000	470.700	1095.000	470.200	1179.000	469.900	1234.000
GR	468.300	1317.000	468.400	1424.000	467.100	1467.000	467.500	1517.000	470.800	1551.000
GR	473.300	1572.000	474.700	1629.000	473.700	1688.000	472.800	1758.000	469.900	1811.000
GR	468.900	1872.000	468.700	1949.000	468.500	2033.000	468.800	2162.000	468.700	2264.000
GR	468.800	2343.000	469.700	2393.000	470.600	2480.000	471.100	2582.000	471.200	2724.000
GR	471.500	2851.000	471.900	2953.000	472.000	3003.000	472.100	3043.000	472.100	3083.000
GR	472.100	3100.000	472.200	3111.000	471.000	3243.000	470.700	3362.000	470.400	3504.000
GR	470.300	3632.000	471.100	3700.000	472.600	3780.000	474.700	3849.000	478.500	3894.000
GR	478.500	3917.000	465.900	3984.000	465.900	3984.000	459.000	4001.000	459.000	4038.000
GR	459.000	4038.000	459.000	4042.000	459.000	4042.000	459.000	4096.000	459.000	4096.000
GR	459.000	4100.000	459.000	4100.000	459.000	4145.000	464.300	4154.000	464.300	4154.000
GR	473.500	4200.000	473.500	4221.000	473.100	4257.000	473.300	4299.000	474.500	4359.000
GR	479.700	4396.000	484.100	4432.000	486.700	4446.000	491.600	4485.000	499.600	4508.000
GR	512.900	4530.000	525.000	4556.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.080	0.035	0.500	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2650.000	4535.000
X1	19.000	80.000	4140.000	4525.000	1750.000	1500.000	1283.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	476.300	0.0	0.0
GR	483.800	1000.000	481.300	1049.000	479.300	1136.000	478.600	1211.000	477.800	1252.000
GR	476.600	1291.000	474.900	1327.000	474.400	1383.000	473.800	1544.000	474.600	1611.000
GR	474.700	1650.000	475.300	1723.000	478.600	1741.000	475.300	1790.000	474.200	1805.000
GR	474.200	1870.000	474.200	1991.000	474.400	2084.000	474.800	2248.000	474.800	2447.000
GR	473.200	2622.000	471.600	2660.000	472.600	2758.000	473.400	2821.000	471.600	2850.000
GR	471.900	2919.000	472.100	3003.000	472.000	3118.000	472.100	3224.000	472.200	3274.000
GR	472.400	3349.000	474.100	3566.000	474.600	3610.000	474.800	3689.000	475.700	3772.000
GR	476.500	3867.000	478.000	3975.000	479.000	4096.000	479.000	4140.000	474.900	4162.000
GR	470.700	4174.000	465.600	4187.000	462.500	4198.000	462.100	4199.000	462.100	4252.000
GR	462.100	4309.000	462.500	4310.000	465.000	4317.000	465.900	4327.000	465.500	4349.000
GR	462.500	4360.000	462.100	4361.000	462.100	4370.000	462.100	4370.000	462.500	4383.000
GR	462.800	4392.000	462.500	4401.000	460.700	4447.000	460.700	4447.000	460.700	4476.000
GR	462.500	4484.000	465.000	4495.000	473.700	4525.000	473.800	4588.000	474.700	4607.000
GR	475.900	4641.000	476.900	4687.000	478.800	4735.000	478.800	4752.000	474.900	4762.000
GR	475.400	4779.000	477.200	4804.000	477.700	4823.000	485.200	4866.000	491.200	4889.000
GR	491.200	4906.000	500.200	4916.000	510.000	4932.000	517.200	4949.000	526.200	4972.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2070.000	3291.000
X1	19.100	0.0	0.0	0.0	750.000	800.000	805.000	0.650	1.200	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	477.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	20.000	58.000	2998.000	3282.000	750.000	800.000	805.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	478.300	0.0	0.0
GR	508.100	1000.000	507.300	1046.000	504.500	1093.000	501.300	1171.000	494.400	1248.000
GR	490.700	1306.000	487.000	1348.000	486.600	1371.000	485.200	1383.000	483.700	1410.000
GR	479.700	1450.000	477.800	1570.000	477.400	1622.000	478.600	1663.000	480.500	1730.000
GR	480.100	1784.000	479.500	1851.000	478.600	1910.000	478.800	1968.000	479.100	2001.000
GR	479.100	2029.000	479.700	2094.000	480.400	2181.000	480.200	2240.000	480.200	2269.000
GR	480.300	2360.000	480.500	2458.000	480.500	2521.000	480.500	2578.000	480.800	2649.000
GR	480.100	2719.000	479.300	2793.000	477.800	2858.000	477.100	2935.000	477.700	2976.000
GR	480.500	2998.000	475.700	3049.000	465.200	3067.000	463.200	3076.000	461.400	3084.000
GR	461.400	3142.000	461.400	3197.000	463.200	3211.000	464.600	3222.000	469.800	3257.000
GR	478.800	3282.000	477.800	3330.000	477.100	3390.000	477.100	3411.000	477.800	3425.000
GR	482.500	3469.000	485.900	3495.000	489.700	3527.000	497.300	3564.000	498.500	3587.000

GR	500.100	3596.000	514.500	3619.000	525.600	3641.000	0.0	0.0	0.0	0.0
NC	0.070	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	21.000	54.000	2225.000	2592.000	600.000	600.000	525.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	523.900	1000.000	524.000	1050.000	523.700	1124.000	523.400	1182.000	520.100	1223.000
GR	517.900	1244.000	510.600	1277.000	500.700	1302.000	498.600	1315.000	494.800	1342.000
GR	490.500	1354.000	489.700	1398.000	488.800	1439.000	485.200	1462.000	483.500	1543.000
GR	482.900	1650.000	482.900	1713.000	482.700	1744.000	482.200	1846.000	481.800	1953.000
GR	481.000	2033.000	480.100	2077.000	479.600	2111.000	479.000	2174.000	480.100	2202.000
GR	480.300	2225.000	475.500	2236.000	465.400	2247.000	463.800	2257.000	462.800	2263.000
GR	462.800	2314.000	462.800	2360.000	463.800	2376.000	464.800	2391.000	464.900	2414.000
GR	467.500	2443.000	472.300	2481.000	474.000	2527.000	477.700	2592.000	477.700	2673.000
GR	478.700	2712.000	478.900	2734.000	479.400	2778.000	481.100	2819.000	482.800	2855.000
GR	489.600	2889.000	493.800	2931.000	499.400	2966.000	499.400	3006.000	500.200	3046.000
GR	501.500	3106.000	505.500	3138.000	515.200	3177.000	525.300	3203.000	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
X1	23.010	39.000	1299.000	1497.000	600.000	455.000	445.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	488.000	481.500	0.0
GR	542.800	1000.000	542.100	1020.000	540.000	1060.000	536.900	1119.000	526.400	1139.000
GR	520.500	1169.000	512.700	1198.000	510.400	1225.000	500.600	1267.000	490.800	1283.000
GR	480.200	1299.000	471.500	1318.000	466.200	1324.000	464.200	1331.000	458.300	1353.000
GR	458.300	1416.000	458.300	1442.000	464.200	1488.000	465.300	1497.000	473.500	1516.000
GR	479.100	1569.000	480.100	1593.000	482.300	1647.000	482.700	1720.000	482.800	1764.000
GR	482.800	1788.000	483.000	1876.000	483.200	1943.000	483.800	2001.000	484.200	2075.000
GR	484.600	2124.000	488.600	2164.000	491.000	2205.000	498.000	2235.000	499.800	2250.000
GR	505.200	2286.000	514.900	2330.000	524.200	2390.000	525.000	2437.000	0.0	0.0
SB	0.900	1.500	2.600	0.0	131.000	5.000	4200.000	1.200	459.000	459.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
X1	23.020	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	485.000	482.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	489.000	482.500	0.0
BT	6.000	1285.000	489.000	0.0	1590.000	488.000	0.0	1720.000	482.500	0.0
BT	1940.000	483.000	0.0	2120.000	484.500	0.0	2200.000	491.000	0.0	0.0
NC	0.070	0.080	0.035	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
X1	23.000	39.000	1299.000	1569.000	55.000	55.000	55.000	0.0	0.0	0.0
GR	542.800	1000.000	542.100	1020.000	540.000	1060.000	536.900	1119.000	526.400	1139.000
GR	520.500	1169.000	512.700	1198.000	510.400	1225.000	500.600	1267.000	490.800	1283.000
GR	480.200	1299.000	471.500	1318.000	466.200	1324.000	464.200	1331.000	458.300	1353.000
GR	458.300	1416.000	458.300	1442.000	464.200	1488.000	465.300	1497.000	473.500	1516.000
GR	479.100	1569.000	480.100	1593.000	482.300	1647.000	482.700	1720.000	482.800	1764.000
GR	482.800	1788.000	483.000	1876.000	483.200	1943.000	483.800	2001.000	484.200	2075.000
GR	484.600	2124.000	488.600	2164.000	491.000	2205.000	498.000	2235.000	499.800	2250.000
GR	505.200	2286.000	514.900	2330.000	524.200	2390.000	525.000	2437.000	0.0	0.0
NC	0.070	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1239.000	1472.000
X1	24.000	46.000	1239.000	1472.000	380.000	280.000	370.000	0.0	0.0	0.0
GR	549.400	1000.000	549.600	1016.000	556.500	1046.000	564.400	1097.000	569.200	1128.000
GR	573.800	1148.000	570.700	1166.000	559.900	1185.000	550.700	1205.000	525.200	1216.000
GR	499.600	1227.000	487.000	1239.000	486.300	1248.000	473.700	1259.000	470.000	1267.000
GR	465.200	1279.000	462.800	1285.000	462.800	1346.000	462.800	1405.000	465.200	1416.000
GR	467.300	1426.000	470.000	1446.000	474.900	1472.000	475.900	1500.000	479.800	1539.000
GR	483.100	1598.000	483.100	1639.000	483.900	1689.000	484.200	1745.000	484.000	1789.000
GR	484.100	1808.000	484.200	1845.000	484.200	1874.000	484.400	1906.000	484.400	1970.000
GR	484.600	2032.000	484.600	2121.000	484.900	2167.000	485.800	2220.000	485.800	2240.000
GR	489.400	2260.000	492.300	2326.000	497.100	2358.000	509.000	2394.000	515.300	2415.000
GR	525.100	2445.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.035	0.500	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1365.000	1890.000

X1	25.000	44.000	1394.000	1624.000	920.000	250.000	750.000	0.0	0.0	0.0
GR	574.600	1000.000	550.300	1035.000	525.000	1066.000	499.800	1094.000	488.300	1116.000
GR	488.300	1132.000	486.300	1144.000	479.700	1164.000	477.500	1180.000	477.600	1256.000
GR	479.300	1278.000	476.500	1316.000	475.700	1377.000	474.700	1394.000	469.200	1401.000
GR	467.000	1413.000	465.200	1423.000	465.200	1470.000	465.200	1515.000	467.000	1521.000
GR	469.700	1530.000	473.200	1557.000	475.200	1610.000	477.800	1624.000	478.000	1803.000
GR	478.000	1817.000	474.000	1830.000	474.000	1895.000	480.700	1924.000	480.700	1936.000
GR	482.400	1979.000	483.100	2085.000	484.100	2160.000	484.200	2273.000	484.400	2372.000
GR	484.400	2410.000	484.800	2460.000	486.600	2476.000	486.600	2492.000	491.700	2511.000
GR	493.000	2528.000	500.100	2549.000	511.500	2573.000	524.900	2599.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1445.000	1940.000
X1	26.000	44.000	1462.000	1634.000	440.000	450.000	450.000	0.0	0.0	0.0
GR	525.000	1000.000	514.300	1038.000	514.000	1058.000	507.300	1077.000	507.300	1099.000
GR	504.700	1113.000	502.200	1125.000	502.200	1140.000	495.300	1164.000	491.600	1185.000
GR	490.500	1206.000	484.800	1216.000	484.200	1245.000	481.800	1286.000	483.000	1324.000
GR	485.500	1339.000	486.700	1398.000	487.000	1408.000	484.200	1420.000	480.900	1438.000
GR	475.800	1462.000	472.100	1469.000	468.000	1479.000	465.500	1485.000	465.500	1530.000
GR	465.500	1561.000	468.000	1584.000	469.400	1596.000	474.100	1613.000	477.200	1634.000
GR	477.600	1817.000	475.300	1833.000	474.000	1850.000	474.000	1910.000	475.300	1919.000
GR	484.300	2003.000	484.400	2046.000	484.600	2120.000	489.400	2154.000	489.400	2173.000
GR	490.000	2183.000	500.000	2202.000	509.900	2220.000	524.300	2253.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	1830.000
X1	27.000	34.000	1602.000	1830.000	600.000	325.000	540.000	0.0	0.0	0.0
GR	521.000	1000.000	521.000	1016.000	517.300	1033.000	505.100	1071.000	499.100	1099.000
GR	498.700	1135.000	492.600	1173.000	487.400	1235.000	487.500	1267.000	487.500	1306.000
GR	485.900	1320.000	476.600	1337.000	476.600	1474.000	476.000	1514.000	475.700	1561.000
GR	475.300	1602.000	473.700	1621.000	469.800	1633.000	468.900	1641.000	467.800	1652.000
GR	467.800	1719.000	467.800	1791.000	468.900	1798.000	470.500	1808.000	474.900	1830.000
GR	480.400	1858.000	482.300	1879.000	484.200	1900.000	485.700	1913.000	485.700	1932.000
GR	489.600	1940.000	499.500	1967.000	513.100	1989.000	525.100	2012.000	0.0	0.0
NC	0.080	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2100.000
X1	28.000	38.000	1877.000	2095.000	915.000	950.000	940.000	0.0	0.0	0.0
GR	525.100	1000.000	516.600	1051.000	506.500	1080.000	499.900	1107.000	496.200	1147.000
GR	493.000	1199.000	490.400	1226.000	490.400	1245.000	490.400	1258.000	490.100	1323.000
GR	488.700	1365.000	485.700	1397.000	499.400	1416.000	502.300	1444.000	505.800	1484.000
GR	510.700	1542.000	515.700	1586.000	515.000	1604.000	500.500	1661.000	500.000	1678.000
GR	481.000	1716.000	477.700	1747.000	474.900	1804.000	472.500	1835.000	475.500	1877.000
GR	472.700	1921.000	471.200	1943.000	470.500	1951.000	468.500	1974.000	468.500	2004.000
GR	468.500	2044.000	470.500	2056.000	471.900	2065.000	475.500	2076.000	485.700	2095.000
GR	485.700	2106.000	500.500	2124.000	524.900	2140.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	29.000	46.000	2154.000	2293.000	730.000	800.000	790.000	0.0	0.0	0.0
GR	529.700	1000.000	525.700	1032.000	521.900	1062.000	520.100	1100.000	517.100	1157.000
GR	514.800	1212.000	496.000	1246.000	496.000	1258.000	500.800	1282.000	490.800	1311.000
GR	490.800	1324.000	484.600	1337.000	484.200	1375.000	485.300	1420.000	485.000	1460.000
GR	485.500	1478.000	484.900	1493.000	485.500	1512.000	482.200	1538.000	478.700	1599.000
GR	478.600	1658.000	481.200	1707.000	481.500	1758.000	480.600	1787.000	478.200	1839.000
GR	477.000	1908.000	476.600	2020.000	476.600	2073.000	474.400	2092.000	475.100	2119.000
GR	474.800	2154.000	473.100	2171.000	472.000	2185.000	470.100	2208.000	470.100	2232.000
GR	470.100	2281.000	472.000	2288.000	473.100	2293.000	480.400	2306.000	488.300	2323.000
GR	488.500	2338.000	499.400	2355.000	512.700	2369.000	524.400	2382.000	535.400	2400.000
GR	549.700	2418.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	30.000	36.000	1923.000	2321.000	350.000	420.000	410.000	0.0	0.0	0.0
GR	524.800	1000.000	521.400	1090.000	512.600	1188.000	499.000	1228.000	497.700	1257.000
GR	494.600	1290.000	490.600	1310.000	490.200	1329.000	485.800	1370.000	482.000	1431.000
GR	478.000	1518.000	482.700	1633.000	480.100	1694.000	477.900	1751.000	481.300	1799.000

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GR	481.900	1859.000	482.000	1923.000	480.500	1967.000	476.800	2013.000	475.600	2057.000
GR	474.000	2099.000	473.900	2119.000	475.200	2159.000	475.500	2181.000	474.400	2201.000
GR	474.000	2210.000	471.000	2246.000	474.000	2281.000	475.000	2296.000	496.300	2321.000
GR	496.300	2339.000	497.100	2345.000	500.200	2348.000	524.400	2370.000	541.200	2389.000
GR	550.700	2407.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	31.000	49.000	1765.000	2007.000	310.000	620.000	575.000	0.0	0.0	0.0
GR	524.500	1000.000	520.500	1080.000	513.100	1145.000	501.200	1188.000	500.000	1227.000
GR	497.300	1254.000	491.700	1284.000	490.800	1306.000	485.600	1353.000	481.800	1385.000
GR	478.800	1447.000	480.200	1485.000	482.200	1537.000	481.600	1635.000	481.400	1716.000
GR	480.200	1765.000	474.900	1789.000	474.900	1805.000	475.400	1816.000	476.600	1828.000
GR	475.800	1852.000	475.100	1865.000	472.900	1906.000	472.900	1918.000	472.900	1943.000
GR	475.100	1972.000	476.100	1985.000	480.900	2007.000	480.900	2046.000	480.500	2095.000
GR	478.700	2135.000	480.500	2160.000	481.600	2203.000	484.300	2265.000	486.100	2309.000
GR	487.000	2334.000	485.400	2354.000	483.200	2384.000	478.700	2423.000	476.100	2433.000
GR	477.400	2443.000	480.200	2466.000	486.100	2488.000	487.900	2499.000	487.900	2518.000
GR	489.800	2524.000	500.300	2536.000	524.500	2566.000	550.000	2604.000	0.0	0.0
NC	0.0	0.070	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
X1	32.000	53.000	1313.000	1427.000	770.000	350.000	630.000	0.0	0.0	0.0
GR	524.900	1000.000	518.300	1055.000	514.200	1111.000	505.100	1157.000	501.000	1198.000
GR	499.900	1207.000	499.000	1222.000	499.400	1240.000	502.200	1250.000	492.300	1273.000
GR	492.300	1280.000	486.200	1299.000	478.300	1313.000	474.500	1323.000	470.800	1333.000
GR	470.800	1367.000	470.800	1407.000	474.500	1418.000	477.600	1427.000	480.800	1459.000
GR	482.200	1506.000	481.900	1526.000	481.100	1552.000	480.800	1563.000	482.900	1580.000
GR	483.500	1608.000	483.900	1640.000	485.400	1694.000	485.800	1721.000	485.400	1746.000
GR	483.900	1769.000	481.900	1788.000	481.600	1799.000	485.600	1814.000	488.500	1846.000
GR	486.200	1860.000	485.300	1910.000	483.900	1969.000	480.400	1987.000	482.400	2006.000
GR	482.400	2023.000	480.300	2042.000	480.100	2070.000	479.200	2099.000	480.500	2121.000
GR	482.100	2158.000	494.600	2187.000	495.200	2210.000	499.700	2219.000	515.000	2242.000
GR	529.600	2263.000	539.000	2289.000	550.700	2318.000	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1280.000	2246.000
X1	33.000	57.000	1403.000	1581.000	475.000	175.000	380.000	0.0	0.0	0.0
GR	526.200	1000.000	516.800	1063.000	511.800	1111.000	503.200	1151.000	499.100	1193.000
GR	491.700	1208.000	491.700	1227.000	485.700	1248.000	480.700	1258.000	483.100	1269.000
GR	483.500	1298.000	483.500	1337.000	482.500	1353.000	482.200	1387.000	480.200	1403.000
GR	476.800	1408.000	475.200	1416.000	469.000	1446.000	469.000	1480.000	469.000	1500.000
GR	475.200	1553.000	476.600	1565.000	480.400	1581.000	482.400	1607.000	482.300	1630.000
GR	481.900	1649.000	485.400	1683.000	485.800	1718.000	486.000	1813.000	485.800	1831.000
GR	484.200	1856.000	482.900	1873.000	483.000	1891.000	485.800	1904.000	488.400	1931.000
GR	485.900	1955.000	484.900	1969.000	484.700	1985.000	483.100	1999.000	480.900	2028.000
GR	481.700	2059.000	480.800	2082.000	480.300	2114.000	480.000	2131.000	482.300	2157.000
GR	480.700	2175.000	484.900	2198.000	484.900	2222.000	485.500	2277.000	485.700	2320.000
GR	485.900	2342.000	496.900	2370.000	497.000	2396.000	499.200	2407.000	524.100	2440.000
GR	535.100	2466.000	550.700	2509.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	34.000	50.000	1764.000	1977.000	250.000	525.000	480.000	0.0	0.0	0.0
GR	530.400	1000.000	526.400	1071.000	522.900	1129.000	514.500	1170.000	500.600	1189.000
GR	497.200	1218.000	499.900	1229.000	492.300	1250.000	492.300	1274.000	484.100	1290.000
GR	480.700	1301.000	482.600	1320.000	483.600	1389.000	483.700	1468.000	483.500	1540.000
GR	483.900	1566.000	480.800	1586.000	480.600	1604.000	484.200	1616.000	483.600	1649.000
GR	483.900	1689.000	484.200	1720.000	484.200	1747.000	483.900	1764.000	480.700	1782.000
GR	477.000	1793.000	475.400	1797.000	475.400	1864.000	475.400	1932.000	477.000	1938.000
GR	479.100	1945.000	486.100	1962.000	488.500	1977.000	486.800	1985.000	486.600	2010.000
GR	484.800	2021.000	485.100	2047.000	485.500	2078.000	486.300	2130.000	486.600	2211.000
GR	487.100	2243.000	490.500	2270.000	490.500	2288.000	494.100	2299.000	504.700	2321.000
GR	505.300	2341.000	509.000	2356.000	525.100	2379.000	535.500	2397.000	550.000	2428.000
QT	5.000	24300.000	45700.000	58500.000	58500.000	102000.000	0.0	0.0	0.0	0.0
NC	0.080	0.060	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0

X1	35.000	56.000	2118.000	2287.000	575.000	775.000	720.000	0.0	0.0	0.0
GR	530.100	1000.000	500.400	1028.000	495.300	1050.000	494.900	1101.000	489.000	1119.000
GR	489.000	1140.000	492.100	1149.000	492.100	1167.000	485.700	1181.000	483.700	1200.000
GR	484.800	1216.000	482.800	1235.000	483.700	1255.000	483.800	1284.000	485.600	1317.000
GR	485.800	1357.000	486.300	1443.000	486.400	1525.000	486.300	1616.000	486.300	1695.000
GR	485.700	1737.000	485.300	1793.000	484.900	1812.000	484.400	1831.000	486.400	1856.000
GR	487.700	1875.000	487.700	1907.000	486.900	1936.000	484.100	1960.000	485.900	1999.000
GR	487.200	2033.000	486.900	2058.000	485.400	2095.000	484.600	2118.000	478.000	2133.000
GR	477.600	2134.000	477.600	2198.000	477.600	2260.000	478.000	2262.000	479.900	2268.000
GR	488.700	2287.000	489.200	2319.000	488.900	2358.000	489.300	2397.000	491.100	2439.000
GR	491.300	2489.000	491.600	2528.000	493.900	2577.000	497.300	2627.000	503.600	2677.000
GR	503.600	2694.000	504.800	2705.000	519.800	2733.000	536.100	2772.000	544.200	2797.000
GR	549.700	2810.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.060	0.038	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2870.000	3220.000
X1	36.000	28.000	2870.000	3198.000	900.000	720.000	740.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	510.000	0.0	0.0
GR	535.000	1000.000	500.000	1070.000	495.000	1088.000	493.600	1095.000	495.000	1102.000
GR	497.500	1120.000	495.000	1130.000	490.000	1130.000	489.000	1200.000	495.000	1220.000
GR	495.000	1248.000	490.000	1255.000	497.000	1440.000	495.000	1530.000	495.000	1565.000
GR	486.000	2870.000	485.000	2990.000	480.000	3015.000	474.200	3045.000	474.200	3150.000
GR	480.000	3175.000	485.000	3198.000	490.000	3215.000	495.000	3250.000	500.000	3275.000
GR	520.000	3380.000	525.000	3410.000	535.000	3425.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.100	39.000	2629.000	3130.000	60.000	60.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	494.100	517.400	0.0
GR	510.000	1000.000	513.000	1282.000	508.300	1292.000	494.100	1325.000	508.700	1325.000
GR	508.700	1328.000	494.100	1328.000	494.100	1368.000	509.000	1368.000	509.000	1371.000
GR	494.100	1371.000	509.400	1405.000	514.200	1415.000	526.800	2610.000	517.400	2629.000
GR	486.000	2682.000	485.000	2718.000	518.200	2718.000	518.200	2723.000	485.000	2723.000
GR	484.900	2756.000	476.000	2858.000	519.900	2858.000	519.900	2863.000	476.000	2863.000
GR	475.000	2875.000	475.000	2900.000	478.000	2937.000	490.000	2985.000	491.000	2995.000
GR	494.000	2998.000	521.200	2998.000	521.200	3003.000	494.000	3003.000	505.000	3024.000
GR	503.000	3070.000	522.500	3110.000	532.000	3130.000	535.000	3420.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.200	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
BT	8.000	1282.000	513.000	513.000	1292.000	513.100	508.300	1405.000	514.200	509.400
BT	1415.000	514.200	514.200	2610.000	526.800	526.800	2629.000	527.000	517.400	3110.000
BT	531.800	522.500	3130.000	532.000	532.000	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.300	0.0	0.0	0.0	130.000	130.000	130.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.400	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	494.100	532.000	0.0
NC	0.045	0.080	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2265.000	2630.000
X1	38.000	22.000	2265.000	2624.000	65.000	75.000	100.000	0.0	0.0	0.0
GR	520.000	2200.000	495.500	2265.000	495.500	2265.000	490.600	2300.000	481.600	2322.000
GR	479.400	2328.000	477.500	2337.000	476.500	2342.000	476.500	2473.000	476.500	2582.000
GR	477.500	2585.000	479.000	2589.000	480.100	2593.000	482.900	2605.000	486.600	2624.000
GR	499.200	2650.000	512.400	2678.000	509.200	2702.000	514.800	2713.000	524.800	2735.000
GR	534.200	2752.000	549.400	2775.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2151.000	2850.000
X1	39.000	39.000	2151.000	2391.000	200.000	150.000	315.000	0.0	0.0	0.0
GR	520.000	1960.000	490.000	2035.000	486.500	2090.000	486.900	2122.000	489.200	2151.000
GR	487.100	2169.000	483.700	2191.000	479.500	2203.000	479.000	2211.000	478.500	2219.000
GR	478.500	2271.000	478.500	2335.000	479.000	2337.000	480.400	2343.000	484.900	2366.000
GR	485.500	2391.000	484.800	2432.000	484.300	2455.000	483.500	2518.000	484.100	2556.000

GR	484.400	2618.000	483.800	2677.000	483.200	2717.000	481.100	2739.000	478.400	2747.000
GR	477.600	2749.000	477.600	2776.000	477.600	2800.000	478.400	2803.000	479.600	2809.000
GR	485.900	2837.000	499.300	2863.000	514.700	2890.000	513.000	2913.000	516.100	2917.000
GR	520.500	2931.000	530.400	2952.000	539.000	2974.000	549.400	2991.000	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
NC	0.0	0.045	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2465.000
X1	40.000	49.000	1905.000	2072.000	415.000	380.000	410.000	0.0	0.0	0.0
GR	520.000	1405.000	490.000	1485.000	487.900	1725.000	488.100	1732.000	488.100	1732.000
GR	487.700	1786.000	486.900	1851.000	485.800	1905.000	484.300	1916.000	480.200	1930.000
GR	479.300	1937.000	478.600	1942.000	478.600	1986.000	478.600	2035.000	479.300	2042.000
GR	480.200	2051.000	485.400	2072.000	487.300	2114.000	486.900	2181.000	487.100	2249.000
GR	487.400	2346.000	488.100	2415.000	487.700	2506.000	486.500	2583.000	486.000	2710.000
GR	485.400	2829.000	485.300	2882.000	486.300	2933.000	485.200	2991.000	484.500	3032.000
GR	485.800	3096.000	486.800	3128.000	485.400	3152.000	481.100	3165.000	479.500	3173.000
GR	478.900	3176.000	478.900	3208.000	478.900	3240.000	479.500	3244.000	480.300	3248.000
GR	489.300	3259.000	500.800	3273.000	519.800	3292.000	521.000	3301.000	521.000	3319.000
GR	523.000	3328.000	531.200	3341.000	540.100	3359.000	549.600	3371.000	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
NC	0.045	0.045	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1525.000	2730.000
X1	41.000	57.000	1904.000	2096.000	470.000	390.000	460.000	0.0	0.0	0.0
GR	510.000	1250.000	495.000	1295.000	493.000	1500.000	492.800	1654.000	492.400	1740.000
GR	489.500	1817.000	488.200	1856.000	485.800	1875.000	485.100	1904.000	483.700	1921.000
GR	480.900	1928.000	479.400	1932.000	478.800	1934.000	478.800	1998.000	478.800	2058.000
GR	479.400	2063.000	480.300	2071.000	490.000	2096.000	485.700	2114.000	487.000	2130.000
GR	487.500	2214.000	488.700	2298.000	488.100	2367.000	488.000	2423.000	485.800	2583.000
GR	488.000	2712.000	488.700	2835.000	488.500	2925.000	488.100	3009.000	487.600	3108.000
GR	487.000	3185.000	485.300	3220.000	486.400	3256.000	486.900	3343.000	486.600	3432.000
GR	486.300	3552.000	486.600	3637.000	486.600	3705.000	487.200	3801.000	487.200	3839.000
GR	487.500	3861.000	484.600	3876.000	482.000	3886.000	478.800	3897.000	478.000	3899.000
GR	478.000	3923.000	478.000	3942.000	478.800	3946.000	480.100	3953.000	490.200	3974.000
GR	502.100	3995.000	520.900	4011.000	520.900	4027.000	522.000	4036.000	527.300	4047.000
GR	537.600	4068.000	551.200	4087.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.042	0.500	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
X1	42.010	37.000	1955.000	2125.000	100.000	250.000	250.000	0.0	0.0	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
X1	42.020	37.000	1955.000	2106.000	25.000	25.000	25.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	492.500	491.900	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
SB	0.0	1.500	2.500	0.0	151.000	0.0	1786.000	0.0	0.0	0.0
X1	42.100	0.0	0.0	0.0	25.000	25.000	25.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	493.000	492.000	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	492.600	492.000	0.0

BT	34.000	1000.000	511.600	0.0	1027.000	511.800	0.0	1042.000	510.800	0.0
BT	1053.000	509.800	0.0	1073.000	505.400	0.0	1100.000	492.600	0.0	1113.000
BT	494.000	0.0	1125.000	494.000	0.0	1145.000	494.000	0.0	1218.000	494.000
BT	0.0	1308.000	494.000	0.0	1413.000	494.000	0.0	1543.000	494.000	0.0
BT	1582.000	494.700	0.0	1640.000	495.200	0.0	1695.000	495.400	0.0	1771.000
BT	495.700	0.0	1815.000	495.800	0.0	1955.000	496.000	482.200	1955.000	496.000
BT	493.000	2106.000	494.900	491.900	2106.000	494.900	479.200	2125.000	494.600	0.0
BT	2400.000	492.000	0.0	2905.000	490.000	0.0	3330.000	492.500	0.0	3570.000
BT	490.000	0.0	3580.000	485.000	0.0	3585.000	481.900	0.0	3640.000	481.900
BT	0.0	3690.000	484.000	0.0	3785.000	485.000	0.0	3860.000	490.000	0.0
BT	3980.000	500.000	0.0	4005.000	520.200	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
X1	42.200	37.000	1955.000	2125.000	50.000	50.000	50.000	0.0	0.0	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.045	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1520.000	2980.000
X1	43.000	59.000	2146.000	2442.000	230.000	230.000	230.000	0.0	0.0	0.0
GR	509.500	1000.000	509.500	1010.000	508.500	1023.000	504.600	1043.000	506.700	1064.000
GR	509.500	1073.000	509.500	1098.000	507.200	1108.000	500.400	1124.000	492.800	1159.000
GR	492.900	1183.000	493.300	1263.000	493.700	1324.000	493.900	1384.000	493.700	1463.000
GR	493.700	1535.000	493.100	1607.000	493.500	1677.000	493.900	1744.000	494.100	1829.000
GR	493.400	1902.000	492.900	1937.000	493.600	1965.000	493.100	2011.000	487.000	2023.000
GR	487.000	2059.000	486.500	2085.000	484.800	2112.000	486.900	2138.000	486.900	2146.000
GR	484.500	2159.000	482.800	2202.000	481.600	2217.000	481.000	2224.000	481.000	2279.000
GR	481.000	2333.000	481.700	2335.000	484.300	2342.000	485.200	2373.000	486.300	2419.000
GR	487.500	2442.000	487.400	2468.000	487.200	2475.000	490.000	3020.000	493.000	3040.000
GR	493.000	3065.000	490.000	3085.000	488.000	3150.000	486.500	3550.000	485.000	4030.000
GR	482.500	4085.000	482.500	4115.000	485.000	4135.000	490.000	4400.000	495.000	4450.000
GR	505.000	4475.000	507.000	4480.000	507.000	4495.000	510.000	4510.000	0.0	0.0
QT	6.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
NC	0.0	0.050	0.0	0.600	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1495.000	2540.000
X1	44.000	61.000	2114.000	2355.000	275.000	700.000	415.000	0.0	0.0	0.0
GR	507.800	1000.000	507.800	1013.000	506.700	1024.000	503.100	1050.000	506.200	1065.000
GR	507.800	1073.000	507.800	1098.000	507.000	1112.000	491.000	1149.000	492.000	1163.000
GR	495.200	1190.000	495.400	1277.000	495.700	1342.000	495.700	1407.000	495.800	1518.000
GR	496.200	1596.000	495.600	1649.000	493.900	1711.000	493.300	1807.000	493.600	1875.000
GR	494.600	1933.000	495.300	1974.000	495.300	2008.000	495.500	2064.000	494.700	2088.000
GR	494.900	2088.000	488.900	2114.000	485.600	2141.000	483.400	2160.000	482.000	2173.000
GR	480.600	2186.000	480.600	2231.000	480.600	2259.000	482.000	2288.000	482.700	2303.000
GR	482.000	2312.000	481.500	2319.000	481.500	2321.000	481.500	2330.000	482.000	2332.000
GR	483.700	2337.000	490.300	2355.000	490.900	2403.000	491.200	2491.000	491.700	2570.000
GR	492.700	2611.000	494.200	2623.000	495.300	2635.000	495.300	2661.000	495.700	2682.000
GR	498.300	2703.000	498.300	2731.000	501.300	2759.000	501.300	2803.000	506.500	2828.000
GR	509.100	2860.000	522.000	2881.000	511.300	2921.000	512.200	2970.000	513.500	3010.000
GR	525.200	3031.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.095	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2674.000
X1	45.000	40.000	2431.000	2674.000	395.000	425.000	420.000	0.0	0.0	0.0
GR	535.200	1000.000	520.700	1031.000	509.200	1060.000	506.500	1065.000	506.500	1305.000
GR	506.500	1386.000	506.500	1411.000	505.600	1422.000	492.300	1461.000	493.300	1495.000
GR	495.400	1536.000	495.800	1608.000	495.900	1701.000	496.100	1790.000	495.800	1874.000
GR	495.500	1931.000	494.600	1985.000	495.200	2040.000	495.500	2113.000	495.700	2201.000
GR	496.100	2318.000	496.100	2379.000	495.800	2431.000	493.500	2444.000	487.800	2463.000

GR	485.200	2470.000	483.000	2478.000	481.500	2483.000	481.500	2545.000	481.500	2602.000
GR	483.000	2608.000	484.000	2612.000	486.300	2631.000	489.300	2652.000	499.400	2674.000
GR	505.400	2683.000	505.400	2704.000	516.200	2729.000	525.800	2773.000	531.500	2851.000
NC	0.040	0.100	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	2560.000
X1	46.000	35.000	2374.000	2560.000	530.000	570.000	565.000	0.0	0.0	0.0
GR	535.200	1000.000	504.600	1085.000	504.500	1342.000	500.900	1358.000	495.600	1405.000
GR	495.700	1470.000	496.100	1522.000	496.200	1626.000	496.400	1725.000	496.500	1805.000
GR	496.800	1866.000	496.300	1935.000	495.600	1993.000	494.700	2102.000	493.800	2187.000
GR	492.700	2255.000	491.700	2321.000	490.600	2374.000	488.700	2391.000	484.700	2399.000
GR	483.800	2411.000	482.200	2433.000	482.200	2467.000	482.200	2503.000	483.800	2530.000
GR	484.100	2535.000	488.100	2553.000	490.300	2560.000	497.800	2581.000	497.800	2592.000
GR	519.200	2611.000	519.200	2633.000	520.200	2638.000	529.900	2651.000	535.200	2660.000
NC	0.060	0.100	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1570.000	2350.000
X1	47.000	48.000	2160.000	2327.000	325.000	660.000	630.000	0.0	0.0	0.0
GR	535.200	1000.000	520.500	1031.000	510.000	1055.000	503.800	1072.000	503.800	1200.000
GR	503.800	1282.000	501.800	1298.000	497.200	1317.000	497.200	1364.000	497.100	1434.000
GR	497.000	1519.000	496.700	1600.000	496.800	1680.000	496.100	1749.000	495.600	1835.000
GR	495.000	1913.000	494.100	1940.000	491.300	1997.000	485.800	2010.000	485.200	2018.000
GR	484.900	2022.000	484.900	2024.000	484.900	2027.000	485.200	2031.000	486.900	2051.000
GR	488.600	2071.000	490.900	2095.000	489.200	2124.000	487.900	2160.000	485.500	2191.000
GR	485.300	2203.000	484.900	2212.000	484.000	2234.000	484.000	2250.000	484.000	2283.000
GR	484.900	2296.000	485.900	2310.000	492.300	2327.000	491.500	2344.000	488.000	2359.000
GR	484.600	2382.000	485.900	2400.000	492.400	2418.000	498.300	2440.000	498.300	2460.000
GR	521.300	2480.000	521.300	2509.000	535.500	2528.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1580.000	2175.000
X1	48.000	38.000	1994.000	2172.000	570.000	620.000	610.000	0.0	0.0	0.0
GR	535.400	1000.000	526.200	1021.000	512.500	1049.000	503.500	1067.000	503.500	1279.000
GR	501.400	1289.000	497.800	1313.000	499.000	1354.000	498.300	1397.000	498.100	1479.000
GR	498.600	1563.000	496.700	1625.000	494.100	1704.000	492.300	1767.000	492.500	1843.000
GR	491.900	1871.000	487.500	1893.000	488.000	1914.000	487.400	1928.000	489.400	1942.000
GR	491.600	1969.000	489.900	1994.000	487.900	2001.000	486.800	2009.000	486.000	2014.000
GR	486.000	2076.000	486.000	2133.000	486.800	2138.000	488.200	2148.000	489.100	2172.000
GR	496.600	2190.000	497.000	2211.000	499.500	2219.000	514.200	2234.000	530.900	2251.000
GR	530.900	2266.000	531.700	2276.000	534.700	2284.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	15.400	0.0	0.0	0.0	0.0	0.0
X1	49.000	40.000	1781.000	1998.000	549.000	555.000	555.000	0.0	0.0	0.0
GR	534.700	1000.000	520.300	1028.000	503.900	1069.000	503.900	1100.000	503.900	1200.000
GR	503.900	1294.000	503.900	1315.000	501.200	1333.000	497.600	1361.000	494.000	1378.000
GR	492.400	1401.000	492.000	1455.000	491.100	1482.000	491.300	1510.000	495.300	1522.000
GR	495.800	1532.000	495.200	1544.000	491.900	1557.000	489.800	1571.000	491.000	1593.000
GR	491.900	1635.000	492.900	1695.000	494.700	1739.000	493.000	1781.000	491.100	1810.000
GR	488.500	1835.000	487.000	1846.000	486.300	1850.000	486.300	1913.000	486.300	1974.000
GR	487.000	1978.000	488.100	1985.000	492.600	1998.000	499.200	2015.000	499.200	2034.000
GR	514.300	2061.000	514.500	2081.000	516.100	2099.000	524.800	2122.000	535.300	2179.000
NC	0.080	0.095	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	50.000	32.000	1987.000	2190.000	420.000	468.000	465.000	0.0	0.0	0.0
GR	525.000	1222.000	505.500	1262.000	505.500	1300.000	505.500	1400.000	505.500	1500.000
GR	505.500	1675.000	505.000	1680.000	495.000	1703.000	494.000	1778.000	490.000	1813.000
GR	487.000	1828.000	487.000	1848.000	490.000	1869.000	492.600	1910.000	492.100	1948.000
GR	492.800	1968.000	490.200	1987.000	488.900	2020.000	488.400	2043.000	487.500	2059.000
GR	486.200	2081.000	486.200	2106.000	486.200	2150.000	487.500	2155.000	489.100	2163.000
GR	491.000	2190.000	500.800	2218.000	500.800	2233.000	522.100	2258.000	522.100	2276.000
GR	535.000	2292.000	550.900	2310.000	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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*  SEPT 1971 VERSION,  UPDATED JUNE 1974  *     * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT     *
*  ERROR CORRECTIONS 01 THRU 09R2         *     * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS,     *
*  MODIFICATIONS 52 THRU 58               *     * DEPARTMENT OF THE ARMY.                                   *
*  MBJ UPDATED   07/20/76   0830          *     * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC. *
*                                         *     * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES *
*  TODAYS DATE IS 03/01/77    18.13       *     * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE  *
*                                         *     * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.       *
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   2.857 SECONDS
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FISHING CREEK
MULTIPLE PROFILES
50.0 – 100.0

T1 SUSQUEHANNA RIVER BASIN COMMISSION
T2 BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3 FISHING CREEK 10 YEAR FLOOD

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.0	0.0	0.0	0.	499.023	0.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
NC	0.080	0.095	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	50.000	32.000	1987.000	2190.000	420.000	468.000	465.000	0.0	0.0	0.0
GR	525.000	1222.000	505.500	1262.000	505.500	1300.000	505.500	1400.000	505.500	1500.000
GR	505.500	1675.000	505.000	1680.000	495.000	1703.000	494.000	1778.000	490.000	1813.000
GR	487.000	1828.000	487.000	1848.000	490.000	1869.000	492.600	1910.000	492.100	1948.000
GR	492.800	1968.000	490.200	1987.000	488.900	2020.000	488.400	2043.000	487.500	2059.000
GR	486.200	2081.000	486.200	2106.000	486.200	2150.000	487.500	2155.000	489.100	2163.000
GR	491.000	2190.000	500.800	2218.000	500.800	2233.000	522.100	2258.000	522.100	2276.000
GR	535.000	2292.000	550.900	2310.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1657.000	0.055	1914.000	0.036	2052.000	0.095	2234.000	0.0
X1	51.000	34.000	1914.000	2052.000	205.000	230.000	225.000	0.0	0.0	0.0
GR	535.000	1000.000	521.200	1024.000	506.000	1039.000	506.000	1300.000	506.000	1633.000
GR	506.000	1657.000	504.100	1670.000	495.300	1691.000	493.100	1711.000	492.700	1744.000
GR	490.300	1759.000	488.400	1766.000	490.200	1779.000	491.500	1801.000	490.200	1823.000
GR	490.200	1848.000	490.300	1876.000	490.100	1914.000	488.500	1935.000	488.000	1963.000
GR	486.100	2003.000	488.000	2042.000	490.000	2052.000	492.500	2078.000	492.500	2098.000
GR	491.100	2112.000	500.700	2134.000	500.700	2146.000	516.000	2168.000	516.000	2185.000
GR	518.900	2190.000	527.400	2200.000	535.100	2212.000	550.000	2234.000	0.0	0.0
NC	0.060	0.060	0.060	0.100	0.500	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1925.000	0.060	2051.000	0.036	2297.000	0.085	2421.000	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	52.000	29.000	2051.000	2297.000	223.000	217.000	225.000	0.0	0.0	0.0
GR	535.400	1000.000	525.800	1042.000	510.000	1064.000	506.500	1073.000	506.500	1925.000
GR	505.800	1937.000	494.900	1963.000	493.300	1982.000	492.400	2017.000	491.200	2032.000
GR	492.800	2051.000	491.100	2068.000	490.100	2085.000	489.800	2091.000	489.300	2101.000
GR	489.300	2164.000	489.200	2232.000	489.800	2234.000	490.900	2238.000	492.300	2253.000
GR	492.900	2278.000	497.900	2297.000	501.900	2314.000	501.900	2328.000	512.100	2347.000
GR	512.100	2365.000	524.400	2379.000	535.400	2398.000	550.200	2421.000	0.0	0.0
NC	0.060	0.060	0.060	0.100	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	4.400	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1897.000	0.050	1952.000	0.036	2147.000	0.080	2265.000	0.0
X1	52.100	17.000	1952.000	2147.000	297.000	251.000	275.000	0.0	0.0	0.0
GR	525.000	1000.000	507.500	1022.000	507.500	1897.000	505.000	1911.000	500.000	1923.000

GR	495.000	1952.000	489.600	1971.000	489.600	2136.000	495.000	2147.000	500.000	2177.000
GR	505.000	2217.000	509.000	2227.000	509.000	2246.000	510.000	2247.000	515.000	2248.000
GR	520.000	2255.000	525.000	2265.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	2057.000	0.040	2107.000	0.036	2309.000	0.070	2466.000	0.0
FT	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	53.000	27.000	2107.000	2309.000	298.000	252.000	275.000	0.0	0.0	0.0
GR	550.100	1000.000	524.900	1019.000	508.400	1030.000	508.400	1080.000	508.400	2000.000
GR	508.400	2035.000	508.400	2057.000	507.500	2068.000	504.400	2084.000	501.200	2107.000
GR	492.500	2125.000	491.000	2131.000	489.900	2135.000	489.900	2206.000	489.900	2270.000
GR	491.000	2276.000	492.200	2283.000	500.400	2309.000	501.600	2330.000	502.700	2351.000
GR	502.700	2358.000	506.300	2374.000	506.300	2393.000	509.100	2400.000	525.300	2419.000
GR	534.100	2437.000	549.900	2466.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.100	2088.000	0.050	2148.000	0.038	2343.000	0.080	2520.000	0.0
X1	54.000	26.000	2146.000	2343.000	813.000	797.000	805.000	0.0	0.0	0.0
GR	549.800	1000.000	526.300	1013.000	512.600	1028.000	512.300	1029.000	512.300	2088.000
GR	510.800	2097.000	507.700	2117.000	504.900	2148.000	495.600	2156.000	493.500	2163.000
GR	491.500	2169.000	491.500	2239.000	491.500	2312.000	493.500	2317.000	495.800	2323.000
GR	502.300	2343.000	505.000	2368.000	505.700	2383.000	505.700	2396.000	514.400	2409.000
GR	514.400	2426.000	524.300	2454.000	527.000	2467.000	535.200	2483.000	544.600	2507.000
GR	550.100	2520.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.055	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1802.000	0.040	1848.000	0.036	2043.000	0.070	2229.000	0.0
X1	55.000	29.000	1848.000	2043.000	659.000	662.000	655.000	0.0	0.0	0.0
GR	550.000	1000.000	525.800	1014.000	513.800	1028.000	513.800	1100.000	513.800	1500.000
GR	513.800	1771.000	513.800	1802.000	512.500	1812.000	507.300	1831.000	504.100	1848.000
GR	497.600	1863.000	497.000	1868.000	495.300	1875.000	491.800	1889.000	491.800	1947.000
GR	491.800	2013.000	495.300	2022.000	496.900	2026.000	502.700	2043.000	504.700	2068.000
GR	505.500	2094.000	505.500	2126.000	508.600	2135.000	508.600	2146.000	515.100	2157.000
GR	526.000	2180.000	526.000	2197.000	537.300	2209.000	549.900	2229.000	0.0	0.0
NC	0.055	0.095	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1645.000	0.050	1668.000	0.036	1865.000	0.070	2218.000	0.0
X1	56.000	32.000	1668.000	1865.000	374.000	368.000	380.000	0.0	0.0	0.0
GR	549.800	1000.000	525.100	1012.000	516.300	1019.000	516.300	1300.000	516.300	1617.000
GR	516.300	1645.000	515.800	1651.000	510.200	1668.000	499.700	1702.000	498.700	1706.000
GR	496.000	1712.000	491.700	1738.000	496.000	1763.000	496.400	1770.000	496.000	1776.000
GR	491.700	1806.000	496.000	1836.000	497.400	1852.000	502.400	1865.000	506.100	1890.000
GR	505.800	1932.000	505.400	1968.000	505.900	2010.000	506.400	2054.000	506.700	2102.000
GR	510.700	2115.000	510.700	2131.000	515.600	2147.000	515.600	2164.000	525.700	2172.000
GR	540.200	2196.000	550.500	2218.000	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1406.000	0.060	1529.000	0.036	1774.000	0.060	2339.000	0.0
X1	57.000	35.000	1529.000	1774.000	530.000	500.000	500.000	0.0	0.0	0.0
GR	550.000	1000.000	537.200	1013.000	524.900	1027.000	520.500	1032.000	520.500	1406.000
GR	519.500	1421.000	519.000	1432.000	519.200	1456.000	519.800	1466.000	519.800	1494.000
GR	518.600	1509.000	510.700	1529.000	506.100	1548.000	500.800	1576.000	499.800	1582.000
GR	498.600	1589.000	493.400	1636.000	498.600	1681.000	499.100	1701.000	501.000	1748.000
GR	506.000	1774.000	506.800	1822.000	507.600	1902.000	506.700	1970.000	506.600	2014.000
GR	507.200	2036.000	508.800	2079.000	511.000	2124.000	510.600	2147.000	508.800	2168.000
GR	504.100	2186.000	505.200	2194.000	515.400	2211.000	515.400	2306.000	550.400	2339.000
NC	0.090	0.055	0.036	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	58.000	53.000	2032.000	2216.000	685.000	645.000	705.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	575.000	1000.000	566.700	1023.000	549.900	1067.000	537.400	1086.000	535.400	1090.000
GR	533.800	1094.000	533.800	1300.000	533.800	1548.000	533.800	1572.000	532.400	1585.000
G	525.700	1601.000	515.500	1616.000	506.100	1639.000	505.300	1653.000	501.300	1664.000
GR	500.000	1668.000	500.000	1670.000	500.000	1675.000	501.300	1678.000	504.100	1684.000
GR	506.000	1704.000	506.600	1753.000	508.400	1811.000	509.500	1882.000	509.300	1942.000
GR	507.400	1978.000	506.400	2015.000	506.100	2032.000	502.000	2045.000	500.800	2052.000
GR	496.500	2075.000	496.500	2113.000	496.500	2113.000	500.800	2170.000	501.300	2177.000
GR	501.900	2197.000	507.000	2216.000	508.300	2237.000	511.200	2266.000	510.600	2306.000

GR	510.900	2366.000	512.600	2417.000	512.600	2481.000	513.700	2552.000	515.400	2593.000
GR	511.600	2614.000	514.600	2625.000	520.700	2636.000	520.700	2800.000	525.100	2804.000
GR	550.600	2837.000	562.300	2857.000	575.600	2878.000	0.0	0.0	0.0	0.0
NC	0.100	0.055	0.036	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	40.400	0.0	0.0	0.0	0.0	0.0
X1	59.000	69.000	3263.000	3437.000	400.000	330.000	360.000	0.0	0.0	0.0
GR	575.400	1000.000	565.700	1042.000	552.500	1086.000	543.400	1119.000	543.400	1200.000
GR	543.400	1600.000	543.400	1800.000	543.400	2140.000	543.400	2171.000	542.500	2180.000
GR	539.400	2200.000	542.700	2219.000	543.200	2230.000	543.200	2258.000	540.500	2267.000
GR	535.300	2280.000	525.600	2297.000	514.300	2325.000	507.700	2337.000	505.500	2343.000
GR	502.000	2349.000	501.500	2350.000	501.500	2356.000	501.500	2361.000	502.000	2363.000
GR	503.900	2369.000	505.700	2386.000	505.100	2429.000	505.700	2492.000	506.000	2556.000
GR	505.700	2619.000	506.300	2687.000	506.500	2770.000	508.300	2845.000	508.500	2926.000
GR	508.500	3001.000	509.300	3081.000	508.200	3110.000	509.500	3131.000	508.900	3149.000
GR	508.500	3188.000	507.300	3204.000	505.500	3208.000	506.000	3222.000	507.800	3248.000
GR	508.000	3263.000	504.600	3278.000	501.500	3293.000	498.000	3310.000	498.000	3352.000
GR	498.000	3414.000	501.500	3418.000	504.300	3420.000	507.200	3437.000	508.400	3473.000
GR	510.800	3512.000	511.500	3574.000	511.500	3613.000	513.900	3644.000	514.700	3673.000
GR	515.700	3703.000	515.200	3730.000	513.200	3743.000	514.200	3749.000	523.800	3761.000
GR	523.800	3950.000	550.300	3982.000	562.100	4004.000	574.800	4031.000	0.0	0.0
NC	0.100	0.055	0.038	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	60.000	30.000	4190.000	4378.000	460.000	410.000	410.000	0.0	0.0	0.0
GR	574.800	1000.000	550.300	2496.000	515.400	3371.000	515.500	3393.000	514.900	3422.000
GR	512.700	3483.000	512.400	3539.000	512.000	3596.000	511.500	3654.000	510.900	3713.000
GR	509.000	3751.000	507.200	3774.000	505.800	3813.000	505.100	3838.000	509.800	3867.000
GR	511.100	3933.000	511.200	3992.000	511.700	4064.000	511.100	4120.000	509.600	4141.000
GR	506.500	4160.000	506.000	4190.000	504.700	4212.000	502.500	4225.000	495.900	4262.000
GR	495.900	4295.000	495.900	4338.000	502.500	4364.000	505.900	4378.000	528.000	4379.000
NC	0.0	0.0	0.0	0.400	0.600	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	4141.000	0.039	4378.000	0.060	4721.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	60.100	75.000	3944.000	4378.000	80.000	35.000	41.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	525.000	516.500	0.0
GR	574.800	1000.000	550.300	2496.000	550.300	2525.000	526.100	2534.000	520.600	2561.000
GR	520.400	2600.000	518.200	2669.000	517.500	2749.000	517.000	2835.000	517.500	2888.000
GR	519.600	2928.000	520.800	2949.000	520.300	2957.000	513.700	2977.000	506.900	2991.000
GR	504.900	2999.000	503.200	3006.000	503.200	3007.000	503.200	3009.000	504.900	3013.000
GR	509.000	3024.000	518.900	3058.000	517.500	3070.000	518.700	3096.000	519.700	3130.000
GR	517.900	3151.000	515.900	3169.000	513.000	3178.000	503.200	3209.000	503.200	3230.000
GR	513.000	3338.000	514.200	3351.000	515.400	3371.000	515.500	3393.000	514.900	3422.000
GR	512.700	3483.000	512.400	3539.000	512.000	3596.000	511.500	3654.000	510.900	3713.000
GR	509.000	3751.000	507.200	3774.000	505.800	3813.000	505.100	3838.000	509.800	3867.000
GR	511.100	3933.000	511.200	3944.000	511.200	3944.000	511.700	4064.000	511.100	4123.000
GR	511.100	4123.000	509.600	4141.000	506.500	4160.000	506.000	4190.000	504.700	4212.000
GR	502.500	4225.000	495.900	4262.000	495.900	4262.000	495.900	4295.000	495.900	4334.000
GR	495.900	4338.000	502.500	4364.000	505.900	4378.000	505.900	4378.000	507.400	4395.000
GR	508.900	4440.000	509.700	4518.000	510.400	4560.000	512.400	4601.000	512.400	4618.000
GR	514.200	4627.000	524.300	4633.000	550.000	4668.000	560.600	4694.000	575.300	4721.000
NH	3.000	0.100	4141.000	0.039	4378.000	0.060	4721.000	0.0	0.0	0.0
SB	1.200	1.500	2.900	0.0	467.000	74.000	6760.000	0.670	504.500	504.500
X1	60.200	0.0	0.0	0.0	12.000	12.000	12.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	524.500	517.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	530.000	517.500	0.0
BT	28.000	3012.000	537.900	0.0	3118.000	537.000	0.0	3197.000	536.500	0.0
BT	3259.000	535.900	0.0	3303.000	535.400	0.0	3357.000	534.900	0.0	3457.000
BT	533.800	0.0	3569.000	532.300	0.0	3668.000	531.700	0.0	3836.000	530.400
BT	0.0	3944.000	530.000	511.200	3944.000	530.000	524.500	4123.000	529.600	524.100
BT	4123.000	529.600	520.600	4262.000	529.200	520.200	4262.000	529.200	521.700	4378.000
BT	528.000	519.300	4378.000	528.000	505.900	4500.000	526.700	0.0	4653.000	525.300
BT	0.0	4817.000	523.300	0.0	4917.000	522.300	0.0	5056.000	520.600	0.0
BT	5105.000	519.700	0.0	5209.000	518.200	0.0	5276.000	517.500	0.0	5336.000

BT	517.500	0.0	5376.000	525.700	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.050	0.039	0.400	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3538.000	4375.000
X1	62.000	44.000	3596.000	3809.000	306.000	495.000	417.000	0.0	0.0	0.0
GR	540.600	1000.000	529.700	3488.000	529.700	3488.000	529.700	3510.000	524.100	3518.000
GR	511.200	3538.000	509.300	3555.000	509.400	3583.000	509.700	3596.000	505.800	3604.000
GR	505.000	3611.000	504.500	3615.000	504.500	3681.000	504.500	3739.000	505.000	3746.000
GR	505.500	3752.000	508.000	3781.000	507.900	3788.000	505.600	3792.000	505.600	3801.000
GR	508.600	3809.000	509.300	3826.000	507.700	3845.000	505.500	3861.000	507.400	3872.000
GR	511.200	3887.000	511.400	3911.000	512.500	3949.000	512.200	4012.000	511.200	4089.000
GR	511.200	4172.000	511.300	4253.000	510.200	4285.000	506.300	4313.000	506.200	4332.000
GR	505.800	4344.000	506.200	4352.000	506.200	4396.000	511.600	4428.000	511.600	4442.000
GR	513.500	4448.000	525.300	4463.000	549.300	4482.000	575.100	4512.000	0.0	0.0
NC	0.100	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	13.400	0.0	0.0	0.0	0.0	0.0
X1	63.000	58.000	3392.000	3623.000	545.000	1180.000	544.000	0.0	0.0	0.0
GR	535.400	3142.000	525.900	3161.000	512.100	3187.000	511.100	3217.000	511.800	3258.000
GR	511.900	3317.000	513.800	3356.000	514.000	3392.000	508.200	3406.000	505.600	3411.000
GR	505.000	3412.000	505.000	3419.000	505.600	3423.000	507.000	3435.000	508.000	3447.000
GR	507.000	3479.000	505.800	3493.000	505.000	3502.000	505.000	3540.000	505.000	3583.000
GR	505.800	3586.000	509.000	3596.000	512.300	3623.000	512.500	3678.000	511.000	3701.000
GR	511.200	3739.000	511.000	3787.000	509.800	3803.000	508.000	3810.000	507.200	3813.000
GR	508.000	3827.000	509.000	3845.000	508.300	3867.000	508.300	3883.000	510.300	3898.000
GR	513.600	3944.000	514.000	3975.000	513.200	4106.000	512.400	4287.000	511.900	4508.000
GR	512.600	4646.000	512.400	4831.000	511.500	5003.000	511.300	5094.000	512.000	5162.000
GR	510.600	5208.000	507.300	5277.000	506.200	5295.000	507.900	5318.000	506.900	5352.000
GR	507.000	5363.000	509.200	5373.000	509.200	5395.000	509.900	5402.000	525.200	5421.000
GR	550.900	5444.000	567.500	5453.000	575.700	5465.000	0.0	0.0	0.0	0.0
NC	0.100	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	64.000	52.000	2562.000	2803.000	400.000	750.000	499.000	0.0	0.0	0.0
GR	539.000	2205.000	539.000	2218.000	518.600	2244.000	514.800	2290.000	513.400	2424.000
GR	511.700	2498.000	513.300	2520.000	512.000	2562.000	509.700	2588.000	508.100	2622.000
GR	507.000	2634.000	505.300	2652.000	505.300	2700.000	505.300	2741.000	507.000	2754.000
GR	508.800	2768.000	511.100	2803.000	510.300	2861.000	511.100	2902.000	512.400	2969.000
GR	511.000	3040.000	510.900	3110.000	510.200	3169.000	508.700	3209.000	506.700	3231.000
GR	511.100	3260.000	512.400	3310.000	515.100	3441.000	515.000	3563.000	515.400	3680.000
GR	510.400	3774.000	509.600	3800.000	508.900	3819.000	509.700	3847.000	511.200	3908.000
GR	511.100	3997.000	510.900	4095.000	510.100	4202.000	509.800	4271.000	509.600	4340.000
GR	509.400	4363.000	508.900	4376.000	509.600	4385.000	509.900	4408.000	513.500	4420.000
GR	513.500	4440.000	515.000	4448.000	527.300	4468.000	546.200	4515.000	546.200	4548.000
GR	554.900	4573.000	575.500	4627.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	65.000	83.000	2131.000	2313.000	392.000	325.000	380.000	0.0	0.0	0.0
GR	569.800	1000.000	567.200	1052.000	564.800	1116.000	558.100	1214.000	551.800	1307.000
GR	549.100	1381.000	545.900	1416.000	540.300	1435.000	543.200	1467.000	542.300	1508.000
GR	544.100	1532.000	544.100	1554.000	537.800	1576.000	532.800	1607.000	525.300	1656.000
GR	522.300	1675.000	523.900	1693.000	523.900	1711.000	520.200	1728.000	515.500	1766.000
GR	513.900	1770.000	511.900	1778.000	511.000	1782.000	511.000	1788.000	511.000	1796.000
GR	511.900	1797.000	515.700	1802.000	517.400	1814.000	517.900	1840.000	516.800	1868.000
GR	516.200	1947.000	515.700	2051.000	515.400	2105.000	510.600	2131.000	509.100	2135.000
GR	507.500	2142.000	500.200	2174.000	500.200	2187.000	500.200	2187.000	507.500	2241.000
GR	508.900	2253.000	509.700	2279.000	511.000	2313.000	511.000	2368.000	511.700	2441.000
GR	513.200	2508.000	512.400	2573.000	511.100	2634.000	512.500	2663.000	512.300	2782.000
GR	514.000	2869.000	514.800	2987.000	514.900	3075.000	510.900	3134.000	509.500	3154.000
GR	510.200	3215.000	509.800	3260.000	511.100	3292.000	511.400	3405.000	511.800	3503.000
GR	511.800	3595.000	510.400	3692.000	509.900	3754.000	509.000	3783.000	507.900	3795.000
GR	509.000	3810.000	509.500	3864.000	510.300	3900.000	514.300	3909.000	514.300	3931.000
GR	515.000	3937.000	526.000	3954.000	536.000	3981.000	527.300	4012.000	524.600	4022.000
GR	527.500	4031.000	534.400	4046.000	550.200	4080.000	551.400	4095.000	556.400	4115.000
GR	557.300	4132.000	569.400	4159.000	575.200	4178.000	0.0	0.0	0.0	0.0
NC	0.060	0.070	0.042	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	66.000	82.000	1832.000	1995.000	350.000	337.000	350.000	0.0	0.0	0.0
GR	575.200	1000.000	572.000	1059.000	567.100	1123.000	563.700	1187.000	559.900	1262.000
GR	555.000	1327.000	549.700	1355.000	549.700	1381.000	547.400	1412.000	545.700	1454.000
GR	543.000	1482.000	535.100	1503.000	534.400	1540.000	530.000	1574.000	526.400	1585.000
GR	525.700	1605.000	523.900	1620.000	523.500	1626.000	520.800	1633.000	514.200	1645.000
GR	511.500	1650.000	510.500	1652.000	510.500	1659.000	510.500	1665.000	511.400	1666.000
GR	514.000	1671.000	519.400	1680.000	519.400	1707.000	518.100	1717.000	516.900	1751.000
GR	516.600	1802.000	516.300	1832.000	512.300	1842.000	509.300	1850.000	508.000	1855.000
GR	505.700	1863.000	505.700	1890.000	505.700	1890.000	508.000	1920.000	508.500	1929.000
GR	509.000	1962.000	510.500	1995.000	511.200	2039.000	512.000	2111.000	512.800	2158.000
GR	513.200	2182.000	512.500	2235.000	512.200	2277.000	510.700	2318.000	515.500	2358.000
GR	517.400	2390.000	516.900	2437.000	516.500	2499.000	515.400	2556.000	513.300	2636.000
GR	511.900	2661.000	512.500	2739.000	512.500	2821.000	512.500	2912.000	512.400	3043.000
GR	512.100	3119.000	512.000	3241.000	511.600	3354.000	510.800	3410.000	510.100	3477.000
GR	509.800	3519.000	509.800	3541.000	509.600	3564.000	508.700	3571.000	509.200	3578.000
GR	512.200	3593.000	515.900	3606.000	515.900	3623.000	518.800	3631.000	526.100	3645.000
GR	535.700	3669.000	544.000	3697.000	546.300	3736.000	549.700	3769.000	559.200	3809.000
GR	569.900	3859.000	574.100	3881.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.070	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	67.000	89.000	2461.000	2664.000	635.000	400.000	680.000	0.0	0.0	0.0
GR	610.200	1000.000	606.200	1100.000	601.600	1167.000	596.800	1234.000	590.600	1303.000
GR	584.700	1364.000	574.100	1407.000	573.300	1474.000	570.500	1499.000	568.600	1510.000
GR	566.900	1517.000	566.100	1526.000	565.300	1533.000	558.100	1544.000	554.500	1562.000
GR	554.600	1594.000	554.800	1608.000	549.100	1655.000	546.600	1684.000	541.700	1709.000
GR	537.500	1730.000	530.700	1738.000	530.700	1758.000	523.800	1773.000	524.000	1787.000
GR	515.800	1798.000	512.700	1805.000	512.000	1816.000	511.000	1822.000	512.000	1831.000
GR	513.000	1840.000	515.000	1864.000	516.600	1882.000	516.600	1905.000	518.600	1927.000
GR	521.000	1964.000	515.700	1985.000	512.800	2008.000	512.700	2053.000	513.700	2085.000
GR	514.400	2123.000	514.800	2184.000	515.500	2214.000	515.500	2229.000	514.700	2240.000
GR	514.200	2272.000	513.200	2314.000	510.300	2371.000	512.400	2390.000	511.600	2413.000
GR	512.600	2434.000	514.400	2461.000	512.900	2475.000	511.800	2496.000	510.100	2512.000
GR	506.000	2550.000	506.000	2574.000	506.000	2597.000	510.100	2638.000	511.300	2651.000
GR	513.900	2664.000	514.300	2691.000	513.900	2740.000	513.500	2777.000	512.900	2822.000
GR	512.200	2874.000	511.900	2968.000	512.000	3056.000	512.800	3153.000	513.000	3236.000
GR	513.700	3290.000	514.600	3373.000	514.700	3450.000	514.300	3542.000	514.700	3617.000
GR	514.800	3672.000	515.200	3712.000	514.800	3737.000	514.700	3795.000	514.800	3861.000
GR	515.300	3924.000	517.100	3948.000	517.100	3969.000	519.200	3978.000	525.800	3993.000
GR	540.500	4019.000	555.300	4045.000	567.300	4097.000	573.500	4121.000	0.0	0.0
NC	0.075	0.045	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	68.000	68.000	2127.000	2327.000	300.000	1150.000	725.000	0.0	0.0	0.0
GR	600.000	1000.000	597.500	1048.000	593.400	1085.000	585.700	1125.000	575.500	1169.000
GR	555.200	1205.000	555.200	1242.000	557.800	1262.000	555.400	1283.000	553.900	1299.000
GR	550.400	1312.000	538.000	1324.000	526.700	1340.000	521.600	1347.000	521.500	1363.000
GR	523.200	1375.000	520.600	1391.000	515.300	1414.000	513.400	1420.000	512.600	1428.000
GR	512.000	1433.000	512.600	1438.000	514.000	1448.000	513.300	1454.000	512.700	1460.000
GR	513.900	1469.000	515.400	1491.000	516.200	1534.000	516.000	1604.000	515.900	1659.000
GR	515.500	1700.000	515.600	1738.000	515.300	1785.000	515.300	1846.000	515.800	1888.000
GR	516.600	1956.000	516.200	2023.000	515.600	2071.000	514.800	2127.000	513.300	2162.000
GR	513.200	2199.000	513.000	2213.000	506.500	2250.000	513.000	2287.000	513.900	2295.000
GR	515.500	2327.000	515.900	2390.000	516.200	2459.000	516.200	2547.000	515.700	2627.000
GR	516.000	2677.000	516.200	2778.000	516.400	2856.000	516.600	2959.000	516.700	3056.000
GR	517.300	3080.000	518.000	3118.000	521.000	3150.000	523.900	3160.000	523.900	3171.000
GR	523.900	3179.000	524.800	3189.000	536.400	3209.000	549.100	3221.000	574.500	3266.000
GR	599.800	3307.000	616.400	3343.000	626.000	3386.000	0.0	0.0	0.0	0.0
NC	0.100	0.055	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	69.000	74.000	1851.000	2191.000	220.000	378.000	425.000	0.0	0.0	0.0
GR	599.700	1000.000	593.500	1047.000	585.100	1092.000	575.900	1121.000	565.400	1146.000
GR	560.800	1150.000	560.400	1175.000	556.600	1189.000	555.900	1202.000	551.700	1213.000
GR	546.500	1224.000	524.800	1253.000	520.900	1293.000	520.900	1322.000	520.900	1341.000
GR	517.000	1363.000	515.200	1382.000	514.300	1393.000	513.600	1398.000	513.000	1404.000

GR	513.600	1409.000	514.200	1415.000	515.300	1429.000	515.600	1453.000	515.300	1468.000
GR	513.900	1480.000	513.400	1489.000	514.500	1496.000	515.400	1500.000	515.400	1524.000
GR	518.500	1548.000	520.400	1570.000	520.700	1591.000	519.500	1621.000	519.200	1643.000
GR	517.900	1704.000	517.200	1751.000	516.400	1772.000	516.500	1802.000	517.100	1825.000
GR	516.900	1851.000	515.600	1862.000	514.500	187[illegible].000	513.000	1896.000	513.000	2019.000
GR	513.000	2153.000	514.500	2164.000	514.900	2167.000	517.000	2191.000	518.000	2252.000
GR	519.000	2305.000	519.000	2365.000	518.700	2444.000	518.400	2516.000	517.900	2612.000
GR	518.300	2725.000	518.900	2767.000	519.400	2854.000	520.500	2941.000	522.500	2983.000
GR	525.500	3029.000	530.700	3050.000	531.000	3062.000	532.200	3076.000	539.100	3094.000
GR	551.100	3124.000	551.300	3183.000	560.200	3220.000	561.300	3261.000	572.100	3280.000
GR	574.400	3302.000	584.800	3333.000	597.000	3380.000	599.100	3406.000	0.0	0.0
NC	0.100	0.055	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	70.000	79.000	1960.000	211[illegible].000	640.000	920.000	641.000	0.0	0.0	0.0
GR	600.200	1000.000	593.600	1020.000	584.800	1033.000	583.900	1056.000	557.800	1080.000
GR	557.800	1095.000	556.400	1103.000	550.400	1120.000	537.400	1150.000	522.400	1177.000
GR	520.500	1190.000	516.100	1195.000	515.100	1202.000	514.200	1209.000	515.100	1214.000
GR	516.200	1226.000	517.200	1259.000	518.100	1300.000	520.400	1331.000	520.900	1381.000
GR	520.700	1430.000	520.000	1464.000	519.300	1497.000	521.500	1519.000	521.500	1530.000
GR	515.300	1550.000	516.100	1573.000	517.000	1596.000	521.100	1638.000	522.100	1720.000
GR	521.900	1786.000	521.500	1850.000	519.500	1880.000	515.600	1897.000	517.100	1906.000
GR	520.000	1918.000	520.600	1932.000	521.100	1953.000	520.600	1960.000	516.800	1969.000
GR	515.400	1975.000	510.000	2000.000	510.000	2032.000	510.000	2066.000	515.400	2089.000
GR	517.400	2098.000	520.300	2114.000	516.200	2139.000	518.800	2171.000	516.800	2202.000
GR	516.700	2234.000	516.000	2241.000	514.700	2255.000	515.900	2264.000	517.200	2274.000
GR	520.000	2299.000	520.800	2335.000	521.500	2411.000	521.800	2503.000	522.000	2611.000
GR	522.100	2732.000	522.000	2859.000	522.200	2971.000	522.500	3063.000	523.000	3157.000
GR	522.700	3209.000	526.200	3239.000	526.200	3254.000	526.200	3262.000	529.700	3273.000
GR	540.900	3284.000	550.200	3303.000	557.200	3338.000	564.000	3371.000	575.500	3419.000
GR	577.000	3439.000	585.200	3464.000	591.600	3486.000	598.400	3503.000	0.0	0.0
NC	0.060	0.050	0.042	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1850.000	2900.000
X1	71.000	47.000	2253.000	2467.000	480.000	440.000	501.000	0.0	0.0	0.0
GR	599.100	1000.000	592.700	1041.000	584.600	1058.000	584.600	1079.000	576.000	1087.000
GR	560.900	1106.000	560.900	1115.000	556.200	1127.000	545.600	1149.000	535.500	1181.000
GR	525.500	1207.000	525.500	1300.000	525.500	1500.000	525.500	1800.000	525.500	2198.000
GR	525.500	2209.000	520.600	2218.000	516.500	2230.000	515.300	2233.000	516.500	2245.000
GR	517.300	2253.000	517.000	2263.000	516.500	2272.000	512.500	2341.000	512.500	2367.000
GR	512.500	2435.000	516.500	2457.000	518.300	2467.000	520.800	2497.000	521.900	2530.000
GR	522.400	2581.000	522.900	2641.000	523.000	2725.000	522.900	2799.000	523.100	2858.000
GR	523.100	2922.000	523.400	3063.000	523.700	3166.000	523.900	3273.000	526.400	3287.000
GR	526.400	3307.000	528.600	3315.000	548.500	3346.000	563.200	3374.000	578.200	3398.000
GR	590.500	3443.000	600.200	3477.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.050	0.044	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	72.000	64.000	2430.000	2718.000	410.000	734.000	790.000	0.0	0.0	0.0
GR	600.100	1000.000	588.400	1014.000	577.900	1032.000	578.800	1048.000	560.900	1064.000
GR	560.900	1074.000	555.300	1086.000	544.500	1106.000	527.100	1123.000	527.100	1200.000
GR	527.100	1400.000	527.100	1700.000	527.100	2000.000	527.100	2278.000	526.300	2289.000
GR	521.600	2312.000	521.300	2335.000	518.700	2352.000	516.000	2359.000	515.000	2362.000
GR	515.000	2392.000	516.000	2396.000	517.400	2403.000	520.800	2419.000	522.000	2430.000
GR	520.400	2438.000	519.400	2445.000	519.000	2450.000	512.300	2484.000	519.000	2524.000
GR	519.700	2531.000	519.700	2538.000	519.000	2546.000	518.400	2554.000	519.000	2577.000
GR	519.500	2596.000	519.500	2624.000	519.500	2649.000	519.000	2669.000	518.200	2703.000
GR	519.000	2710.000	519.900	2718.000	520.600	2748.000	520.600	2773.000	519.400	2801.000
GR	519.000	2820.000	518.400	2847.000	519.000	2856.000	519.900	2869.000	523.700	2905.000
GR	523.800	2952.000	523.900	3043.000	524.200	3143.000	524.600	3231.000	525.200	3307.000
GR	525.900	3350.000	528.100	3362.000	528.100	3379.000	529.700	3384.000	550.000	3402.000
GR	564.100	3420.000	580.500	3445.000	590.800	3476.000	599.400	3508.000	0.0	0.0
NC	0.050	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	73.000	56.000	2690.000	2855.000	950.000	490.000	575.000	0.0	0.0	0.0
GR	575.500	1000.000	569.500	1013.000	569.500	1023.000	564.400	1035.000	558.100	1047.000

GR	558.100	1056.000	549.100	1067.000	540.800	1088.000	536.600	1096.000	530.900	1106.000
GR	530.900	2446.000	525.300	2462.000	523.800	2474.000	519.700	2493.000	517.400	2500.000
GR	516.400	2503.000	516.400	2525.000	517.400	2537.000	518.300	2547.000	521.200	2575.000
GR	521.700	2614.000	521.000	2657.000	520.900	2690.000	520.200	2705.000	517.000	2773.000
GR	517.000	2773.000	517.000	2793.000	520.200	2834.000	521.800	2855.000	521.900	2906.000
GR	522.000	2966.000	523.100	3036.000	520.800	3080.000	521.500	3114.000	520.200	3154.000
GR	518.500	3206.000	520.200	3246.000	521.200	3285.000	521.300	3325.000	520.300	3371.000
GR	519.400	3388.000	524.700	3406.000	525.700	3457.000	526.000	3537.000	525.800	3624.000
GR	526.000	3747.000	526.200	3853.000	526.900	3951.000	527.400	3978.000	530.200	3999.000
GR	530.200	4015.000	53[illegible].700	4022.000	550.200	4034.000	575.100	4063.000	584.800	4081.000
GR	600.400	4098.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2291.000	3436.000
X1	74.000	58.000	2556.000	2796.000	970.000	230.000	640.000	0.0	0.0	0.0
GR	574.500	1000.000	566.200	1040.000	561.600	1052.000	560.100	1089.000	558.600	1161.000
GR	557.200	1209.000	556.500	1229.000	556.500	1291.000	556.500	1414.000	555.800	1491.000
GR	555.400	1595.000	552.300	1660.000	549.000	1716.000	526.200	1750.000	526.200	1933.000
GR	526.400	2014.000	526.900	2079.000	525.600	2096.000	525.900	2120.000	526.300	2154.000
GR	526.600	2205.000	525.900	2291.000	525.400	2402.000	524.900	2493.000	521.000	2510.000
GR	521.900	2536.000	523.200	2556.000	522.700	2562.000	521.000	2568.000	518.400	2576.000
GR	518.400	2656.000	518.400	2721.000	521.000	2738.000	523.100	2752.000	525.500	2796.000
GR	525.100	2839.000	520.700	2883.000	521.000	2909.000	524.700	2943.000	525.600	2969.000
GR	524.400	2999.000	520.900	3029.000	525.500	3063.000	525.700	3104.000	525.800	3173.000
GR	526.200	3262.000	526.500	3366.000	526.900	3465.000	527.300	3574.000	527.800	3698.000
GR	530.300	3789.000	531.000	3804.000	531.000	3821.000	531.900	3828.000	538.800	3835.000
GR	549.800	3849.000	574.400	3890.000	600.900	3917.000	0.0	0.0	0.0	0.0
NC	0.050	0.055	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	75.000	57.000	2589.000	2803.000	790.000	320.000	640.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.900	1000.000	590.300	1043.000	583.900	1061.000	579.100	1074.000	577.000	1094.000
GR	571.500	1134.000	562.800	1157.000	565.300	1180.000	562.300	1241.000	560.200	1260.000
GR	557.400	1326.000	555.300	1404.000	552.200	1501.000	551.000	1621.000	550.500	1711.000
GR	550.200	1769.000	550.300	1771.000	550.700	1805.000	550.500	1946.000	549.300	1986.000
GR	545.200	2023.000	534.300	2072.000	532.100	2085.000	532.100	2100.000	532.100	2150.000
GR	532.100	2174.000	530.600	2206.000	530.300	2282.000	528.500	2397.000	527.200	2504.000
GR	528.200	2569.000	529.400	2589.000	525.700	2601.000	524.000	2607.000	521.500	2612.000
GR	516.000	2623.000	516.000	2702.000	516.000	2759.000	521.500	2790.000	523.900	2803.000
GR	526.300	2834.000	526.600	2906.000	526.800	3009.000	527.100	3167.000	527.200	3316.000
GR	527.400	3460.000	528.000	3479.000	528.000	3500.000	529.400	3553.000	530.000	3605.000
GR	531.600	3630.000	531.700	3646.000	534.200	3672.000	535.000	3679.000	545.200	3699.000
GR	554.500	3715.000	571.000	3740.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.040	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	77.010	48.000	2343.000	2573.000	120.000	150.000	130.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	531.500	530.200	0.0
GR	625.300	1000.000	610.500	1049.000	598.400	1086.000	586.200	1125.000	580.300	1135.000
GR	580.300	1144.000	547.100	1199.000	550.300	1226.000	550.300	1247.000	548.800	1276.000
GR	553.200	1313.000	553.100	1391.000	551.700	1491.000	549.700	1548.000	549.700	1574.000
GR	549.800	1610.000	546.500	1647.000	545.900	1706.000	543.500	1746.000	535.500	1783.000
GR	531.000	1904.000	528.600	1970.000	528.200	2094.000	528.500	2262.000	533.800	2290.000
GR	533.800	2309.000	530.800	2343.000	523.700	2363.000	522.000	2367.000	517.500	2380.000
GR	517.500	2450.000	517.500	2503.000	522.000	2530.000	523.600	2540.000	524.600	2573.000
GR	525.400	2637.000	525.900	2754.000	526.100	2882.000	526.600	3099.000	526.900	3158.000
GR	527.200	3252.000	528.900	3276.000	542.200	3309.000	549.700	3332.000	562.900	3349.000
GR	574.700	3364.000	584.200	3378.000	600.100	3391.000	0.0	0.0	0.0	0.0
SB	0.900	1.500	3.000	0.0	160.000	6.000	3320.000	2.000	517.500	517.500
X1	77.020	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	535.100	530.700	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	532.000	530.700	0.0
BT	23.000	1614.000	545.500	0.0	1686.000	542.000	0.0	1746.000	539.700	0.0
BT	1796.000	537.400	0.0	1870.000	535.600	0.0	1950.000	534.600	0.0	2025.000

BT	532.800	0.0	2085.000	532.000	0.0	2225.000	534.700	0.0	2384.000	539.000
BT	0.0	2487.000	539.000	0.0	2607.000	539.000	0.0	2786.000	537.400	0.0
BT	2984.000	534.900	0.0	3144.000	533.600	0.0	3223.000	533.100	0.0	3285.000
BT	532.800	0.0	3354.000	531.100	0.0	3403.000	531.000	0.0	3506.000	530.700
BT	0.0	3516.000	530.700	0.0	3527.000	532.500	0.0	3553.000	549.000	0.0
NC	0.040	0.040	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	18.400	0.0	0.0	0.0	0.0	0.0
X1	77.000	48.000	2343.000	2573.000	80.000	40.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	625.300	1000.000	610.500	1049.000	598.400	1086.000	586.200	1125.000	580.300	1135.000
GR	580.300	1144.000	547.100	1199.000	550.300	1226.000	550.300	1247.000	548.800	1276.000
GR	553.200	1313.000	553.100	1391.000	551.700	1491.000	549.700	1548.000	549.700	1574.000
GR	549.800	1610.000	546.500	1647.000	545.900	1706.000	543.500	1746.000	535.500	1783.000
GR	531.000	1904.000	528.600	1970.000	528.200	2094.000	528.500	2262.000	533.800	2290.000
GR	533.800	2309.000	530.800	2343.000	523.700	2363.000	522.000	2367.000	517.500	2380.000
GR	517.500	2450.000	517.500	2503.000	522.000	2530.000	523.600	2540.000	524.600	2573.000
GR	525.400	2637.000	525.900	2754.000	526.100	2882.000	526.600	3099.000	526.900	3158.000
GR	527.200	3252.000	528.900	3276.000	542.200	3309.000	549.700	3332.000	562.900	3349.000
GR	574.700	3364.000	584.200	3378.000	600.100	3391.000	0.0	0.0	0.0	0.0
NC	0.040	0.040	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	15.400	0.0	0.0	0.0	0.0	0.0
X1	78.000	45.000	1739.000	1955.000	740.000	710.000	735.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1033.000	549.900	1071.000	537.500	1096.000	537.500	1100.000
GR	537.500	1150.000	537.500	1158.000	536.800	1166.000	534.900	1183.000	534.900	1216.000
GR	532.700	1220.000	528.300	1232.000	526.800	1262.000	527.300	1320.000	527.300	1368.000
GR	527.900	1412.000	527.000	1457.000	527.400	1509.000	529.200	1564.000	530.100	1658.000
GR	530.000	1721.000	527.900	1739.000	525.000	1754.000	521.600	1768.000	522.900	1780.000
GR	521.200	1787.000	519.300	1795.000	519.300	1872.000	519.300	1940.000	521.200	1945.000
GR	524.300	1955.000	526.200	1984.000	525.800	2056.000	526.000	2126.000	525.100	2214.000
GR	525.100	2269.000	526.600	2327.000	529.000	2396.000	529.000	2464.000	529.300	2507.000
GR	529.900	2548.000	530.000	2563.000	550.700	2593.000	575.100	2625.000	600.000	2655.000
ET	0.0	0.0	0.0	0.0	16.400	0.0	0.0	0.0	0.0	0.0
X1	79.000	40.000	1602.000	1823.000	755.000	620.000	710.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1070.000	550.600	1132.000	536.100	1168.000	536.100	1184.000
GR	536.100	1203.000	536.000	1227.000	533.400	1248.000	533.000	1271.000	530.100	1342.000
GR	529.200	1411.000	529.200	1464.000	531.000	1531.000	531.000	1597.000	530.000	1602.000
GR	525.000	1610.000	522.000	1626.000	520.200	1636.000	520.200	1684.000	520.200	1711.000
GR	522.000	1753.000	522.500	1764.000	523.500	1792.000	526.200	1823.000	523.700	1844.000
GR	523.900	1854.000	529.500	1885.000	530.700	1907.000	529.400	1950.000	529.500	2015.000
GR	530.000	2063.000	529.800	2109.000	529.100	2152.000	528.000	2197.000	528.700	2257.000
GR	529.600	2294.000	530.100	2308.000	550.300	2343.000	575.300	2380.000	600.100	2428.000
NC	0.040	0.040	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	80.000	32.000	1449.000	1767.000	460.000	412.000	430.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1064.000	550.000	1125.000	539.000	1142.000	539.000	1152.000
GR	539.000	1178.000	535.000	1198.000	533.400	1261.000	532.000	1329.000	531.000	1366.000
GR	531.400	1420.000	531.400	1449.000	525.000	1463.000	522.700	1476.000	518.800	1499.000
GR	518.800	1527.000	518.800	1688.000	522.700	1718.000	523.900	1728.000	525.200	1737.000
GR	527.400	1767.000	529.400	1792.000	531.700	1802.000	531.900	1846.000	529.400	1898.000
GR	527.900	1918.000	527.100	1936.000	529.800	1953.000	530.500	1963.000	564.400	1997.000
GR	588.700	2025.000	600.000	2045.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.090	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1424.000	1815.000
X1	81.000	36.000	1424.000	1815.000	365.000	340.000	350.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.000	1000.000	575.100	1086.000	572.600	1108.000	554.400	1133.000	554.500	1155.000
GR	539.800	1180.000	539.800	1210.000	537.900	1222.000	535.900	1235.000	534.800	1273.000
GR	531.700	1304.000	530.500	1356.000	531.600	1405.000	534.400	1424.000	530.500	1431.000
GR	524.800	1451.000	523.500	1455.000	523.500	1466.000	524.800	1483.000	525.400	1491.000
GR	527.100	1511.000	528.800	1533.000	524.800	1549.000	523.500	1554.000	523.500	1625.000
GR	523.500	1690.000	524.800	1768.000	525.000	1780.000	527.600	1797.000	529.300	1815.000

GR	532.200	1845.000	534.000	1867.000	534.500	1880.000	550.000	1915.000	575.000	1951.000
GR	600.000	1997.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.090	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.075	1432.000	0.045	1507.000	0.090	1582.000	0.041	1738.000	0.100
NH	1842.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1265.000	1738.000
X1	82.000	33.000	1582.000	1738.000	690.000	660.000	685.000	0.0	0.0	0.0
GR	600.100	1000.000	586.800	1038.000	574.500	1068.000	558.000	1114.000	543.800	1141.000
GR	544.100	1168.000	535.800	1198.000	535.800	1220.000	535.800	1268.000	535.700	1310.000
GR	535.700	1355.000	529.700	1376.000	527.700	1411.000	529.100	1422.000	527.900	1432.000
GR	526.200	1446.000	523.100	1471.000	526.200	1497.000	527.300	1507.000	527.900	1520.000
GR	526.800	1548.000	529.700	1582.000	527.200	1607.000	526.200	1624.000	522.800	1673.000
GR	522.800	1673.000	522.800	1727.000	526.200	1733.000	528.500	1738.000	537.800	1764.000
GR	550.100	1780.000	575.400	1807.000	600.600	1842.000	0.0	0.0	0.0	0.0
NC	0.055	0.100	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.055	1124.000	0.045	1212.000	0.100	1865.000	0.039	1990.000	0.100
NH	2058.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1135.000	1990.000
X1	83.000	44.000	1865.000	1990.000	935.000	957.000	950.000	0.0	0.0	0.0
GR	600.300	1000.000	598.000	1015.000	569.700	1039.000	552.600	1070.000	552.600	1092.000
GR	537.600	1115.000	537.600	1124.000	528.000	1140.000	528.000	1149.000	528.000	1168.000
GR	528.000	1185.000	528.900	1188.000	534.500	1212.000	535.400	1250.000	535.300	1284.000
GR	535.400	1312.000	536.400	1327.000	534.600	1349.000	527.000	1352.000	524.500	1366.000
GR	527.000	1381.000	528.900	1392.000	532.300	1432.000	532.000	1465.000	527.800	1489.000
GR	527.800	1505.000	532.800	1529.000	531.800	1566.000	532.300	1592.000	532.700	1636.000
GR	533.200	1659.000	533.300	1713.000	532.900	1770.000	531.500	1833.000	532.800	1865.000
GR	527.000	1878.000	523.000	1888.000	523.000	1923.000	523.000	1954.000	527.000	1966.000
GR	528.900	1971.000	534.200	1990.000	550.400	2030.000	575.300	2058.000	0.0	0.0
NH	5.000	0.085	1260.000	0.045	1338.000	0.100	1992.000	0.041	2191.000	0.100
NH	2268.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1175.000	2191.000
X1	84.000	53.000	1992.000	2191.000	490.000	730.000	700.000	0.0	0.0	0.0
GR	600.800	1000.000	574.400	1040.000	550.100	1084.000	544.100	1099.000	544.100	1130.000
GR	538.100	1158.000	536.700	1170.000	534.600	1195.000	532.800	1232.000	533.100	1260.000
GR	530.000	1274.000	529.100	1290.000	528.400	1302.000	529.100	1309.000	530.500	1325.000
GR	531.700	1338.000	533.800	1361.000	532.100	1369.000	534.400	1387.000	533.600	1408.000
GR	535.500	1427.000	535.700	1458.000	535.400	1481.000	530.700	1488.000	531.700	1499.000
GR	534.400	1522.000	534.300	1564.000	533.200	1608.000	532.200	1620.000	534.000	1642.000
GR	534.000	1692.000	532.900	1729.000	530.500	1748.000	533.200	1771.000	533.900	1790.000
GR	533.300	1826.000	532.000	1842.000	534.500	1869.000	536.300	1891.000	536.400	1930.000
GR	535.800	1979.000	534.300	1992.000	529.700	2003.000	528.000	2010.000	525.000	2022.000
GR	525.000	2118.000	525.000	2173.000	528.000	2178.000	529.900	2181.000	532.800	2191.000
GR	550.100	2228.000	575.400	2246.000	599.600	2268.000	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1260.000	2255.000
X1	85.000	58.000	2026.000	2255.000	210.000	250.000	245.000	0.0	0.0	0.0
GR	599.600	1000.000	574.400	1042.000	548.600	1096.000	548.200	1106.000	544.300	1141.000
GR	542.000	1147.000	542.000	1158.000	542.000	1191.000	535.200	1200.000	534.500	1219.000
GR	530.400	1230.000	538.700	1243.000	537.000	1268.000	534.300	1291.000	534.700	1343.000
GR	535.400	1425.000	534.900	1465.000	533.700	1496.000	535.100	1518.000	536.200	1529.000
GR	533.000	1544.000	532.000	1567.000	531.200	1576.000	530.400	1585.000	531.200	1593.000
GR	532.900	1611.000	534.000	1658.000	534.500	1719.000	531.900	1752.000	531.300	1781.000
GR	530.700	1806.000	531.300	1810.000	532.600	1818.000	534.700	1848.000	535.900	1888.000
GR	534.500	1914.000	533.500	1928.000	535.600	1948.000	536.100	1977.000	534.700	1997.000
GR	536.000	2020.000	534.800	2026.000	530.700	2035.000	529.100	2046.000	526.500	2063.000
GR	526.500	2099.000	526.500	2125.000	529.100	2148.000	530.100	2156.000	532.500	2174.000
GR	532.200	2189.000	530.000	2208.000	529.300	2224.000	530.100	2236.000	534.000	2255.000
GR	551.600	2294.000	574.200	2329.000	600.100	2366.000	0.0	0.0	0.0	0.0
NC	0.070	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	534.000	0.038	541.000	0.042	543.000	0.042	543.800	0.040
NV	543.900	0.040	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1265.000	1915.000

X1	86.000	31.000	1777.000	1915.000	1038.000	895.000	905.000	0.0	0.0	0.0
GR	600.100	1000.000	575.500	1046.000	568.100	1064.000	554.600	1082.000	554.600	1107.000
GR	536.100	1149.000	535.900	1161.000	535.100	1167.000	536.100	1174.000	536.000	1257.000
GR	536.200	1318.000	539.100	1333.000	536.000	1343.000	536.000	1437.000	535.500	1527.000
GR	534.700	1581.000	534.100	1612.000	535.700	1646.000	537.100	1711.000	537.100	1757.000
GR	533.500	1777.000	532.100	1812.000	531.000	1833.000	526.500	1871.000	531.000	1908.000
GR	533.200	1915.000	551.100	1955.000	562.900	1986.000	564.200	2001.000	575.300	2025.000
GR	600.500	2083.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	536.000	0.038	542.000	0.042	542.500	0.042	544.400	0.040
NV	544.500	0.040	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1276.000	1919.000
X1	87.000	27.000	1623.000	1919.000	250.000	260.000	270.000	0.0	0.0	0.0
GR	600.400	1000.000	574.400	1035.000	558.800	1065.000	558.800	1090.000	536.800	1132.000
GR	536.000	1144.000	535.600	1152.000	536.000	1160.000	535.500	1252.000	535.900	1328.000
GR	540.700	1350.000	540.700	1358.000	535.500	1371.000	535.900	1501.000	536.400	1574.000
GR	536.900	1623.000	532.700	1656.000	531.600	1678.000	530.800	1694.000	530.800	1785.000
GR	530.800	1904.000	531.600	1907.000	532.800	1910.000	537.000	1919.000	550.400	1946.000
GR	575.000	1973.000	600.100	2000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.087	0.038	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	536.000	0.038	543.000	0.045	545.000	0.045	545.700	0.043
NV	545.800	0.043	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1178.000	1855.000
X1	88.000	34.000	1410.000	1604.000	925.000	860.000	920.000	0.0	0.0	0.0
GR	600.100	1000.000	574.700	1047.000	551.100	1087.000	551.100	1111.000	536.600	1140.000
GR	536.100	1147.000	536.700	1154.000	537.700	1234.000	539.000	1308.000	540.600	1353.000
GR	540.400	1384.000	538.400	1410.000	535.700	1424.000	534.000	1428.000	532.200	1434.000
GR	530.700	1438.000	530.700	1496.000	530.700	1552.000	532.200	1560.000	534.300	1570.000
GR	537.300	1604.000	537.700	1658.000	537.900	1711.000	535.800	1726.000	534.500	1737.000
GR	534.000	1742.000	534.000	1763.000	534.000	1779.000	534.500	1781.000	536.500	1791.000
GR	541.500	1841.000	550.200	1877.000	575.100	1914.000	599.900	1946.000	0.0	0.0
NC	0.060	0.080	0.038	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	538.000	0.038	544.000	0.045	546.500	0.045	547.400	0.043
NV	547.500	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1241.000	1845.000
X1	89.000	32.000	1487.000	1699.000	766.000	754.000	760.000	0.0	0.0	0.0
GR	603.500	1000.000	574.700	1065.000	555.800	1127.000	554.300	1146.000	554.300	1159.000
GR	554.300	1168.000	538.500	1201.000	538.000	1208.000	538.800	1215.000	539.500	1322.000
GR	539.100	1438.000	539.500	1487.000	536.800	1500.000	534.600	1542.000	534.000	1562.000
GR	532.600	1609.000	532.600	1615.000	532.600	1648.000	534.000	1667.000	534.900	1678.000
GR	538.500	1699.000	538.500	1751.000	534.900	1780.000	534.500	1790.000	534.300	1795.000
GR	534.300	1802.000	534.300	1808.000	534.500	1811.000	535.200	1820.000	550.100	1860.000
GR	575.600	1894.000	599.800	1932.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	538.000	0.038	544.500	0.045	547.000	0.045	547.700	0.043
NV	547.800	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1221.000	1795.000
X1	90.000	24.000	1471.000	1726.000	150.000	150.000	150.000	0.0	0.0	0.0
GR	601.600	1000.000	585.100	1057.000	554.700	1122.000	554.700	1140.000	539.900	1174.000
GR	539.200	1185.000	539.700	1194.000	539.500	1254.000	538.700	1365.000	539.700	1441.000
GR	539.700	1471.000	535.800	1504.000	534.500	1513.000	533.800	1518.000	533.800	1600.000
GR	533.800	1658.000	534.500	1678.000	534.900	1689.000	539.000	1726.000	537.100	1762.000
GR	536.500	1781.000	549.200	1819.000	575.500	1850.000	599.200	1912.000	0.0	0.0
NC	0.060	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	539.000	0.038	546.000	0.045	548.500	0.045	549.300	0.043
NV	549.400	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1273.000	1704.000
X1	91.000	22.000	1520.000	1704.000	910.000	908.000	905.000	0.0	0.0	0.0
GR	590.300	1000.000	575.500	1039.000	549.300	1091.000	549.300	1112.000	548.500	1130.000
GR	546.600	1176.000	544.800	1218.000	543.200	1333.000	542.700	1451.000	543.200	1501.000

GR	544.100	1520.000	538.000	1537.000	536.000	1544.000	532.700	1554.000	532.700	1617.000
GR	532.700	1680.000	537.000	1696.000	539.100	1704.000	542.000	1728.000	549.900	1757.000
GR	575.800	1808.000	600.200	1854.000	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	541.500	0.038	548.000	0.045	551.000	0.045	551.700	0.043
NV	551.800	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	92.000	30.000	1785.000	1975.000	935.000	900.000	905.000	0.0	0.0	0.0
GR	585.400	1000.000	577.700	1069.000	569.200	1140.000	560.400	1164.000	554.900	1199.000
GR	555.300	1227.000	555.300	1248.000	555.300	1263.000	549.600	1291.000	548.900	1353.000
GR	547.600	1438.000	545.100	1498.000	542.300	1567.000	543.100	1635.000	545.500	1696.000
GR	545.800	1737.000	544.900	1776.000	543.900	1785.000	540.000	1794.000	537.000	1804.000
GR	532.400	1818.000	532.400	1877.000	532.400	1936.000	537.000	1951.000	538.700	1956.000
GR	542.700	1975.000	545.700	1995.000	557.600	2020.000	575.600	2039.000	599.300	2087.000
NC	0.070	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	542.000	0.038	549.000	0.045	552.000	0.045	552.900	0.043
NV	553.000	0.043	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	3.400	0.0	0.0	0.0	0.0	0.0
X1	93.000	34.000	1722.000	1858.000	765.000	803.000	795.000	0.0	0.0	0.0
GR	585.200	1000.000	575.700	1044.000	574.000	1068.000	563.200	1108.000	560.900	1122.000
GR	560.600	1139.000	557.000	1151.000	554.600	1169.000	552.000	1177.000	552.000	1223.000
GR	551.800	1242.000	551.800	1314.000	552.000	1353.000	551.200	1370.000	548.000	1402.000
GR	544.800	1441.000	544.500	1520.000	545.600	1569.000	549.900	1590.000	542.300	1611.000
GR	541.100	1633.000	543.100	1649.000	547.600	1691.000	544.700	1722.000	539.800	1743.000
GR	538.000	1755.000	533.000	1790.000	533.000	1802.000	533.000	1841.000	538.000	1852.000
GR	540.900	1858.000	561.700	1876.000	575.000	1890.000	599.700	1923.000	0.0	0.0
NC	0.070	0.110	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.040	543.500	0.040	550.000	0.055	554.000	0.055	554.800	0.045
NV	554.900	0.045	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	94.000	30.000	1820.000	1930.000	435.000	448.000	445.000	0.0	0.0	0.0
GR	595.100	1000.000	585.800	1096.000	578.300	1196.000	569.500	1227.000	564.300	1240.000
GR	564.300	1254.000	559.300	1286.000	552.000	1304.000	553.500	1338.000	550.300	1368.000
GR	547.300	1430.000	547.900	1509.000	550.200	1540.000	550.500	1567.000	546.600	1598.000
GR	545.400	1667.000	544.000	1706.000	545.100	1767.000	545.100	1792.000	540.300	1820.000
GR	539.500	1828.000	538.500	1839.000	534.000	1884.000	534.000	1884.000	534.000	1910.000
GR	538.500	1924.000	540.500	1930.000	549.400	1942.000	574.500	1970.000	600.400	1993.000
NC	0.070	0.110	0.042	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.042	545.500	0.042	552.000	0.060	555.000	0.060	556.000	0.050
NV	556.100	0.050	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1489.000	2150.000
X1	95.000	41.000	1782.000	2147.000	115.000	520.000	380.000	0.0	0.0	0.0
GR	594.800	1000.000	585.800	1086.000	577.500	1166.000	574.400	1199.000	568.500	1208.000
GR	568.500	1223.000	559.600	1265.000	552.000	1286.000	553.400	1323.000	550.200	1348.000
GR	548.700	1425.000	548.600	1478.000	551.800	1503.000	550.200	1518.000	546.400	1548.000
GR	546.400	1622.000	546.500	1691.000	547.400	1747.000	545.000	1782.000	540.900	1803.000
GR	538.700	1820.000	536.700	1835.000	538.700	1848.000	540.400	1858.000	540.700	1866.000
GR	538.800	1877.000	531.700	1904.000	538.800	1928.000	540.200	1933.000	544.800	1958.000
GR	541.700	1985.000	539.700	2013.000	539.200	2032.000	534.000	2073.000	539.200	2129.000
GR	540.200	2137.000	542.900	2147.000	547.400	2164.000	563.600	2190.000	576.100	2208.000
GR	600.000	2242.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.042	545.500	0.042	552.000	0.060	555.500	0.060	556.300	0.050
NV	556.400	0.050	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1405.000	2290.000
X1	96.000	42.000	1562.000	1819.000	140.000	200.000	300.000	0.0	0.0	0.0
GR	595.000	1000.000	585.100	1076.000	579.900	1134.000	578.100	1156.000	574.600	1181.000
GR	563.100	1207.000	559.600	1226.000	552.100	1257.000	553.100	1289.000	550.700	1321.000
GR	548.900	1390.000	549.400	1405.000	551.900	1420.000	551.900	1430.000	547.900	1469.000
GR	546.900	1497.000	545.200	1562.000	540.600	1584.000	542.800	1630.000	541.400	1664.000
GR	540.100	1679.000	537.900	1705.000	537.900	1735.000	537.900	1782.000	540.100	1796.000
GR	541.500	1805.000	544.700	1819.000	545.900	1845.000	544.700	1910.000	544.300	1945.000
GR	544.900	2044.000	543.600	2131.000	544.500	2210.000	543.800	2243.000	540.300	2261.000

GR	539.700	2264.000	540.300	2275.000	540.800	2284.000	542.000	2303.000	550.200	2328.000
GR	575.000	2360.000	599.700	2401.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.039	546.000	0.039	552.500	0.055	556.000	0.055	556.700	0.047
NV	556.800	0.047	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1368.000	2360.000
X1	97.000	45.000	1368.000	1478.000	530.000	250.000	540.000	0.0	0.0	0.0
GR	624.900	1000.000	618.700	1079.000	617.400	1103.000	611.000	1143.000	599.600	1219.000
GR	592.100	1263.000	574.100	1299.000	553.600	1315.000	553.600	1344.000	551.300	1349.000
GR	550.400	1368.000	541.000	1384.000	538.200	1389.000	538.200	1423.000	538.200	1467.000
GR	541.000	1471.000	544.500	1478.000	546.800	1505.000	545.100	1543.000	545.400	1559.000
GR	547.400	1614.000	546.500	1660.000	546.500	1697.000	546.600	1710.000	545.200	1738.000
GR	544.400	1777.000	542.300	1834.000	541.800	1893.000	541.500	1929.000	541.800	1937.000
GR	543.000	1971.000	545.100	2008.000	550.400	2044.000	551.300	2109.000	549.800	2177.000
GR	547.400	2233.000	546.400	2307.000	544.800	2392.000	544.200	2403.000	545.000	2428.000
GR	545.500	2456.000	554.700	2484.000	575.500	2540.000	587.500	2593.000	595.700	2633.000
NV	6.000	0.039	546.000	0.039	553.000	0.055	556.000	0.055	557.000	0.045
NV	557.100	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1113.000	2360.000
X1	98.000	47.000	1113.000	1243.000	300.000	140.000	300.000	0.0	0.0	0.0
GR	624.600	1000.000	600.400	1031.000	574.900	1054.000	555.800	1071.000	555.800	1101.000
GR	551.900	1113.000	541.600	1122.000	538.000	1126.000	538.000	1161.000	538.000	1171.000
GR	541.600	1197.000	543.100	1208.000	546.100	1243.000	547.800	1289.000	549.000	1319.000
GR	547.600	1379.000	549.000	1437.000	549.000	1519.000	548.200	1628.000	547.800	1697.000
GR	545.800	1720.000	545.800	1756.000	546.200	1798.000	544.100	1815.000	543.900	1828.000
GR	543.700	1838.000	543.900	1841.000	544.700	1851.000	545.700	1906.000	549.400	1929.000
GR	549.700	1973.000	550.700	2009.000	550.700	2076.000	549.400	2159.000	548.000	2253.000
GR	546.500	2312.000	545.200	2361.000	546.100	2400.000	546.900	2426.000	546.500	2435.000
GR	545.500	2445.000	546.100	2452.000	551.300	2501.000	575.100	2569.000	588.500	2634.000
GR	593.800	2672.000	599.900	2707.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.039	547.000	0.039	553.500	0.055	556.500	0.055	557.300	0.045
NV	557.400	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	99.000	52.000	1489.000	1681.000	420.000	180.000	340.000	0.0	0.0	0.0
GR	625.100	1000.000	599.000	1026.000	575.600	1061.000	557.400	1073.000	557.400	1101.000
GR	555.600	1117.000	549.000	1148.000	547.400	1162.000	548.200	1170.000	548.500	1241.000
GR	550.100	1349.000	547.500	1389.000	547.200	1420.000	547.300	1489.000	545.000	1508.000
GR	542.100	1522.000	540.600	1529.000	540.600	1574.000	540.600	1616.000	542.100	1626.000
GR	544.200	1639.000	547.900	1681.000	547.100	1733.000	547.100	1799.000	546.500	1902.000
GR	548.000	1984.000	546.000	2022.000	545.600	2074.000	545.600	2149.000	545.800	2210.000
GR	547.000	2240.000	546.900	2270.000	545.200	2276.000	543.300	2282.000	545.200	2289.000
GR	546.500	2294.000	548.400	2310.000	549.000	2372.000	549.100	2465.000	547.800	2565.000
GR	546.300	2674.000	546.300	2793.000	547.800	2829.000	551.000	2871.000	554.900	2901.000
GR	554.200	2911.000	555.100	2917.000	561.000	2949.000	566.000	2976.000	575.900	3016.000
GR	587.400	3081.000	599.600	3154.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	547.000	0.037	554.000	0.055	557.000	0.055	557.700	0.045
NV	557.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	100.000	57.000	2217.000	2371.000	800.000	620.000	550.000	0.0	0.0	0.0
GR	599.900	1000.000	570.600	1051.000	550.400	1091.000	551.300	1149.000	551.300	1257.000
GR	552.000	1350.000	552.000	1439.000	552.500	1524.000	553.300	1543.000	552.700	1567.000
GR	550.700	1591.000	549.400	1635.000	550.100	1692.000	550.600	1743.000	550.700	1813.000
GR	550.400	1940.000	551.100	2058.000	551.100	2124.000	551.600	2171.000	550.400	2201.000
GR	548.100	2217.000	545.100	2223.000	543.000	2230.000	541.500	2235.000	541.500	2282.000
GR	541.500	2319.000	543.000	2329.000	544.600	2339.000	548.000	2371.000	548.100	2440.000
GR	547.000	2481.000	547.000	2536.000	546.400	2610.000	550.700	2662.000	551.000	2740.000
GR	551.000	2823.000	550.300	2880.000	549.600	2982.000	548.800	2993.000	549.700	3000.000
GR	555.100	3046.000	557.000	3107.000	566.100	3141.000	566.100	3154.000	571.000	3173.000
GR	572.500	3201.000	575.400	3236.000	576.300	3325.000	576.400	3442.000	575.300	3636.000
GR	575.200	3785.000	575.400	3907.000	580.500	4013.000	590.200	4207.000	594.700	4337.000

GR	594.700	4361.000	595.100	4369.000	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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*  SEPT 1971 VERSION,  UPDATED JUNE 1974  *        * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT   *
*  ERROR CORRECTIONS 01 THRU 09R2         *        * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS.    *
*  MODIFICATIONS 52 THRU 58               *        * DEPARTMENT OF THE ARMY.                                 *
*  MBJ UPDATED  07/20/76   0830           *        * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC. *
*                                         *        * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES *
*  TODAYS DATE IS 04/25/77    17.53       *        * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE  *
*                                         *        * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.      *
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    2.733 SECONDS
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FISHING CREEK

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T1      SUSQUEHANNA RIVER BASIN COMMISSION
T2      BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3      FISHING CREEK 10 YEAR FLOOD
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MULTIPLE PROFILES

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.0	0.0	0.0	0.	553.092	0.0

100.0 - 145.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
NC	0.070	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	6.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
NV	6.000	0.037	547.000	0.037	554.000	0.055	557.000	0.055	557.700	0.045
NV	557.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	100.000	57.000	2217.000	2371.000	800.000	620.000	550.000	0.0	0.0	0.0
GR	599.900	1000.000	570.600	1051.000	550.400	1091.000	551.300	1149.000	551.300	1257.000
GR	552.000	1350.000	552.000	1439.000	552.500	1524.000	553.300	1543.000	552.700	1567.000
GR	550.700	1591.000	549.400	1635.000	550.100	1692.000	550.600	1743.000	550.700	1813.000
GR	550.400	1940.000	551.100	2058.000	551.100	2124.000	551.600	2171.000	550.400	2201.000
GR	548.100	2217.000	545.100	2223.000	543.000	2230.000	541.500	2235.000	541.500	2282.000
GR	541.500	2319.000	543.000	2329.000	544.600	2339.000	548.000	2371.000	548.100	2440.000
GR	547.000	2481.000	547.000	2536.000	546.400	2610.000	550.700	2662.000	551.000	2740.000
GR	551.000	2823.000	550.300	2880.000	549.600	2982.000	548.800	2993.000	549.700	3000.000
GR	555.100	3046.000	557.000	3107.000	566.100	3141.000	566.100	3154.000	571.000	3173.000
GR	572.500	3201.000	575.400	3236.000	576.300	3325.000	576.400	3442.000	575.300	3636.000
GR	575.200	3785.000	575.400	3907.000	580.500	4013.000	590.200	4207.000	594.700	4337.000
GR	594.700	4361.000	595.100	4369.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.070	0.037	0.100	0.400	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.040	547.500	0.040	554.000	0.055	557.000	0.055	557.900	0.045
NV	558.000	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1246.000	2703.000
X1	101.000	52.000	2153.000	2331.000	215.000	200.000	180.000	0.0	0.0	0.0
GR	599.800	1000.000	575.300	1028.000	550.500	1078.000	550.900	1121.000	552.100	1223.000
GR	552.300	1319.000	552.600	1431.000	552.000	1568.000	552.600	1637.000	555.300	1667.000
GR	555.500	1690.000	553.500	1727.000	553.500	1817.000	550.400	1955.000	552.300	2048.000
GR	550.600	2130.000	549.800	2153.000	544.700	2162.000	543.300	2168.000	542.800	2171.000
GR	542.800	2237.000	542.800	2300.000	543.300	2305.000	544.200	2313.000	548.900	2331.000
GR	551.600	2369.000	552.000	2431.000	552.600	2502.000	551.800	2637.000	550.400	2761.000
GR	549.400	2813.000	549.000	2828.000	549.800	2844.000	554.200	2895.000	558.100	2942.000
GR	570.700	2983.000	570.700	2990.000	578.300	3017.000	578.400	3051.000	577.300	3091.000
GR	577.600	3184.000	578.000	3266.000	575.800	3331.000	575.900	3421.000	576.300	3502.000
GR	579.500	3593.000	586.000	3790.000	589.300	3872.000	592.800	3995.000	594.700	4055.000
GR	594.700	4082.000	595.100	4094.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.070	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

NV	6.000	0.036	549.500	0.036	556.000	0.055	558.000	0.055	558.900	0.045
NV	559.000	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1334.000	2491.000
X1	102.000	53.000	2116.000	2391.000	695.000	665.000	740.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	551.000	555.000	0.0
GR	599.900	1000.000	575.500	1065.000	551.300	1122.000	552.500	1209.000	552.800	1304.000
GR	553.800	1405.000	553.700	1511.000	554.400	1603.000	552.900	1630.000	554.200	1654.000
GR	554.200	1672.000	551.700	1680.000	552.600	1720.000	553.300	1791.000	552.700	1850.000
GR	553.900	1909.000	554.700	1939.000	554.000	1992.000	554.900	2030.000	555.400	2083.000
GR	555.400	2116.000	550.200	2138.000	551.000	2151.000	549.800	2162.000	546.400	2169.000
GR	544.700	2175.000	542.300	2183.000	542.300	2238.000	542.300	2321.000	544.700	2332.000
GR	546.300	2339.000	550.500	2362.000	558.600	2391.000	556.800	2480.000	555.100	2573.000
GR	553.600	2633.000	552.800	2725.000	560.600	2753.000	575.200	2791.000	578.300	2810.000
GR	578.300	2825.000	578.400	2972.000	579.100	3065.000	579.400	3179.000	579.600	3273.000
GR	579.800	3355.000	581.400	3421.000	583.100	3434.000	583.100	3456.000	586.200	3491.000
GR	592.600	3521.000	594.300	3571.000	600.700	3646.000	0.0	0.0	0.0	0.0
NC	0.080	0.070	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.036	550.000	0.036	556.000	0.053	558.500	0.053	559.400	0.045
NV	559.500	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1351.000	2397.000
X1	103.000	49.000	2102.000	2357.000	280.000	290.000	285.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	553.000	555.000	0.0
GR	600.600	1000.000	585.700	1072.000	570.400	1127.000	554.600	1186.000	554.700	1253.000
GR	554.800	1350.000	555.200	1443.000	555.200	1534.000	555.100	1609.000	556.800	1637.000
GR	555.800	1660.000	555.600	1717.000	551.900	1727.000	551.400	1744.000	553.500	1755.000
GR	552.900	1829.000	551.900	1883.000	552.300	1923.000	553.400	1994.000	555.300	2052.000
GR	556.600	2065.000	556.600	2085.000	553.000	2102.000	548.800	2128.000	545.500	2138.000
GR	545.000	2140.000	545.000	2228.000	545.000	2318.000	545.500	2320.000	547.900	2332.000
GR	558.800	2357.000	557.300	2471.000	555.500	2597.000	554.100	2710.000	553.100	2772.000
GR	553.100	2793.000	559.500	2814.000	562.000	2870.000	562.000	3002.000	565.300	3025.000
GR	574.500	3109.000	576.700	3118.000	576.700	3138.000	579.700	3158.000	589.900	3251.000
GR	589.900	3268.000	594.600	3293.000	594.900	3350.000	600.200	3428.000	0.0	0.0
NC	0.080	0.100	0.037	0.100	0.700	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	550.500	0.037	557.000	0.053	559.000	0.053	560.200	0.045
NV	560.300	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	4.400	0.0	0.0	0.0	0.0	0.0
X1	104.000	41.000	2193.000	2405.000	330.000	450.000	380.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.200	1000.000	590.000	1139.000	583.600	1202.000	575.300	1264.000	567.700	1318.000
GR	560.500	1361.000	558.600	1418.000	557.900	1511.000	559.000	1656.000	557.700	1732.000
GR	558.400	1754.000	558.800	1769.000	559.200	1820.000	559.900	1873.000	559.900	1902.000
GR	558.000	1951.000	555.600	2004.000	553.900	2063.000	552.200	2122.000	554.600	2141.000
GR	557.500	2155.000	557.500	2175.000	555.700	2193.000	550.600	2216.000	548.800	2222.000
GR	546.500	2228.000	543.000	2236.000	543.000	2293.000	543.000	2352.000	546.500	2367.000
GR	549.500	2380.000	555.300	2405.000	556.000	2455.000	558.900	2484.000	564.700	2530.000
GR	568.400	2577.000	569.200	2632.000	577.900	2651.000	586.500	2697.000	596.500	2755.000
GR	600.500	2795.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.800	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	550.500	0.037	557.000	0.052	560.000	0.052	560.700	0.045
NV	560.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
X1	106.010	24.000	1913.000	2059.000	150.000	137.000	145.000	0.0	-0.500	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	556.000	559.200	0.0
GR	600.800	1000.000	590.600	1136.000	585.000	1199.000	583.900	1262.000	579.600	1321.000
GR	562.800	1367.000	560.200	1437.000	560.300	1454.000	560.100	1551.000	558.900	1633.000
GR	556.100	1674.000	555.900	1731.000	555.900	1756.000	555.100	1800.000	555.000	1869.000
GR	550.300	1913.000	541.500	1963.000	541.500	2044.000	549.000	2059.000	570.300	2097.000
GR	570.800	2105.000	571.100	2121.000	574.400	2128.000	601.600	2167.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
SB	0.900	1.500	3.000	0.0	144.000	7.500	1815.000	0.0	544.500	544.500
X1	106.020	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0

X2	0.0	0.0	1.000	557.900	557.100	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	557.100	562.000	0.0
BT	12.000	1325.000	579.400	0.0	1373.000	561.800	0.0	1444.000	560.200	0.0
BT	1504.000	560.500	0.0	1645.000	557.100	0.0	1668.000	557.100	0.0	1794.000
BT	557.500	0.0	1857.000	557.900	0.0	1925.000	562.000	0.0	2069.000	562.000
BT	0.0	2102.000	563.000	0.0	2125.000	563.200	0.0	2155.000	575.100	0.0
NC	0.045	0.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
X1	106.000	0.0	0.0	0.0	125.000	90.000	100.000	0.0	0.500	0.0
NC	0.050	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	107.000	29.000	1837.000	2071.000	570.000	810.000	755.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.300	1000.000	589.700	1122.000	580.500	1282.000	574.600	1310.000	560.600	1321.000
GR	558.500	1358.000	557.000	1419.000	555.800	1471.000	557.600	1499.000	557.600	1538.000
GR	557.600	1634.000	557.700	1703.000	556.800	1738.000	554.300	1769.000	554.900	1797.000
GR	561.400	1837.000	555.500	1858.000	550.400	1891.000	549.600	1936.000	549.000	1946.000
GR	547.000	1978.000	547.000	2006.000	547.000	2043.000	549.000	2056.000	550.400	2066.000
GR	557.000	2071.000	575.700	2087.000	575.700	2109.000	599.900	2138.000	0.0	0.0
NC	0.060	0.060	0.041	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	108.000	24.000	1703.000	1919.000	200.000	415.000	350.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	599.300	1000.000	589.100	1084.000	580.400	1148.000	574.200	1181.000	560.500	1239.000
GR	558.100	1303.000	558.100	1388.000	557.400	1491.000	554.700	1556.000	553.500	1622.000
GR	553.100	1663.000	561.100	1703.000	550.800	1738.000	549.800	1767.000	549.500	1775.000
GR	546.500	1836.000	549.500	1891.000	550.600	1905.000	555.100	1919.000	560.700	2009.000
GR	562.100	2048.000	562.100	2070.000	575.700	2081.000	600.700	2117.000	0.0	0.0
NC	0.055	0.080	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	109.000	27.000	1458.000	1709.000	250.000	410.000	365.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.500	1000.000	575.000	1121.000	560.200	1189.000	559.700	1229.000	558.600	1304.000
GR	559.000	1371.000	556.900	1387.000	553.900	1418.000	554.200	1435.000	562.500	1458.000
GR	550.400	1487.000	550.000	1492.000	550.000	1496.000	550.000	1582.000	550.000	1701.000
GR	550.500	1703.000	552.100	1709.000	552.400	1761.000	559.700	1783.000	560.300	1849.000
GR	560.900	1950.000	555.600	1969.000	565.600	2008.000	565.600	2019.000	565.600	2028.000
GR	574.500	2049.000	600.400	2101.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	110.000	33.000	1095.000	1378.000	500.000	570.000	580.000	0.0	0.0	0.0
GR	605.300	1000.000	604.000	1009.000	585.200	1038.000	575.200	1054.000	565.300	1073.000
GR	555.800	1095.000	553.700	1101.000	552.500	1108.000	549.800	1124.000	549.800	1147.000
GR	549.800	1175.000	552.500	1201.000	554.100	1217.000	552.800	1266.000	552.200	1303.000
GR	551.500	1328.000	551.000	1346.000	551.500	1357.000	552.000	1369.000	554.000	1378.000
GR	552.900	1391.000	555.500	1421.000	556.000	1464.000	556.000	1506.000	555.100	1529.000
GR	560.300	1589.000	560.400	1654.000	560.700	1734.000	555.600	1754.000	570.500	1789.000
GR	570.500	1809.000	575.000	1820.000	599.400	1854.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	111.000	33.000	1327.000	1507.000	570.000	410.000	550.000	0.0	0.0	0.0
GR	625.000	1000.000	600.000	1033.000	575.000	1065.000	557.500	1099.000	554.900	1112.000
GR	554.600	1119.000	554.600	1119.000	554.600	1119.000	554.900	1145.000	555.400	1186.000
GR	558.000	1229.000	559.900	1245.000	555.100	1270.000	557.500	1284.000	555.200	1309.000
GR	554.900	1327.000	554.500	1342.000	551.700	1392.000	554.500	1456.000	555.100	1466.000
GR	556.700	1507.000	556.400	1570.000	557.600	1625.000	556.500	1709.000	557.200	1787.000
GR	560.700	1841.000	561.300	1856.000	560.200	1880.000	570.200	1921.000	570.200	1940.000
GR	574.600	1944.000	600.300	1975.000	625.200	2024.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.100	1433.000	0.041	1625.000	0.100	1666.000	0.050	1713.000	0.100

NH	2115.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1169.000	1940.000
X1	112.000	31.000	1433.000	1625.000	330.000	375.000	405.000	0.0	0.0	0.0
GR	624.800	1000.000	600.200	1030.000	574.700	1055.000	556.800	1102.000	557.900	1170.000
GR	561.200	1241.000	560.100	1328.000	556.400	1340.000	557.700	1372.000	557.300	1433.000
GR	556.000	1457.000	553.100	1496.000	553.100	1496.000	553.100	1590.000	556.000	1610.000
GR	558.300	1625.000	560.600	1656.000	556.000	1666.000	553.100	1672.000	553.100	1685.000
GR	553.100	1685.000	556.000	1703.000	557.500	1713.000	560.400	1803.000	561.000	1879.000
GR	562.500	1978.000	570.500	1998.000	570.500	2018.000	574.300	2036.000	599.300	2077.000
GR	624.700	2115.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1160.000	1830.000
NH	5.000	0.100	1400.000	0.041	1535.000	0.100	1719.000	0.050	1770.000	0.100
NH	1978.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	113.000	38.000	1400.000	1535.000	95.000	250.000	100.000	0.0	0.0	0.0
GR	624.700	1000.000	600.600	1029.000	574.800	1056.000	557.100	1099.000	560.000	1140.000
GR	561.100	1205.000	561.400	1257.000	560.300	1349.000	558.400	1400.000	557.200	1430.000
GR	556.400	1438.000	551.500	1477.000	551.500	1477.000	551.500	1496.000	556.400	1529.000
GR	557.200	1535.000	560.800	1560.000	560.600	1600.000	560.400	1640.000	558.100	1659.000
GR	556.500	1670.000	552.200	1699.000	556.300	1712.000	558.700	1719.000	558.300	1740.000
GR	556.700	1748.000	556.200	1750.000	556.200	1754.000	556.200	1761.000	556.700	1762.000
GR	560.000	1770.000	560.300	1800.000	560.900	1840.000	570.500	1852.000	570.500	1874.000
GR	575.000	1889.000	600.400	1936.000	624.800	1978.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1256.000	2000.000
NH	5.000	0.100	1278.000	0.041	1424.000	0.100	1920.000	0.050	1982.000	0.100
NH	2118.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	114.000	39.000	1278.000	1424.000	460.000	660.000	550.000	0.0	0.0	0.0
GR	625.300	1000.000	598.900	1046.000	575.500	1099.000	560.200	1172.000	560.600	1180.000
GR	560.500	1189.000	561.400	1225.000	560.300	1254.000	558.500	1278.000	558.000	1288.000
GR	557.600	1295.000	558.000	1302.000	558.400	1311.000	557.700	1315.000	551.700	1349.000
GR	551.700	1360.000	551.700	1390.000	557.700	1409.000	558.800	1413.000	560.000	1424.000
GR	565.000	1454.000	565.500	1486.000	565.000	1518.000	563.100	1604.000	565.300	1660.000
GR	566.300	1741.000	564.100	1810.000	562.400	1875.000	559.500	1920.000	558.400	1930.000
GR	556.000	1952.000	556.000	1952.000	556.000	1977.000	558.400	1982.000	570.500	2003.000
GR	577.700	2022.000	574.800	2040.000	598.900	2070.000	624.100	2118.000	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1189.000	2230.000
NH	5.000	0.100	1189.000	0.041	1342.000	0.100	2150.000	0.050	2220.000	0.100
NH	2386.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	115.000	35.000	1189.000	1342.000	480.000	255.000	510.000	0.0	0.0	0.0
GR	625.300	1000.000	615.300	1079.000	611.800	1110.000	599.500	1132.000	574.300	1175.000
GR	565.000	1189.000	560.100	1196.000	559.500	1208.000	555.500	1251.000	559.500	1300.000
GR	560.200	1312.000	565.300	1342.000	566.100	1382.000	566.400	1455.000	565.800	1520.000
GR	566.100	1590.000	566.500	1655.000	567.100	1734.000	566.300	1801.000	563.400	1850.000
GR	564.100	1875.000	563.700	1935.000	563.000	2020.000	561.500	2100.000	559.500	2150.000
GR	558.600	2157.000	555.000	2180.000	558.600	2209.000	560.000	2220.000	562.300	2232.000
GR	570.500	2259.000	570.500	2280.000	574.800	2296.000	600.100	2320.000	625.300	2386.000
NC	0.080	0.080	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1283.000	2705.000
NH	5.000	0.080	1283.000	0.041	1375.000	0.100	2639.000	0.050	2691.000	0.100
NH	2942.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	116.000	56.000	1283.000	1375.000	250.000	280.000	265.000	0.0	0.0	0.0
GR	624.800	1000.000	624.200	1012.000	623.500	1021.000	620.000	1038.000	615.100	1087.000
GR	605.200	1150.000	604.400	1165.000	604.100	1172.000	600.000	1196.000	575.400	1238.000
GR	562.400	1283.000	561.500	1290.000	560.600	1294.000	553.000	1331.000	553.000	1331.000
GR	553.000	1346.000	560.600	1366.000	563.800	1375.000	567.000	1399.000	566.600	1423.000
GR	565.800	1459.000	567.700	1493.000	570.100	1541.000	570.500	1620.000	570.300	1674.000
GR	568.400	1747.000	567.800	1794.000	565.400	1850.000	564.000	1903.000	563.400	1950.000
GR	564.100	1988.000	564.400	2052.000	564.800	2112.000	565.200	2192.000	565.100	2308.000
GR	564.700	2351.000	564.400	2402.000	564.000	2444.000	563.100	2509.000	563.800	2542.000

GR	562.300	2569.000	560.800	2611.000	559.700	2639.000	559.600	2641.000	558.000	2647.000
GR	556.000	2662.000	556.000	2670.000	559.000	2684.000	560.300	2691.000	570.700	2730.000
GR	570.700	2750.000	571.800	2783.000	575.300	2804.000	599.600	2835.000	610.900	2880.000
GR	625.300	2942.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.080	2303.000	0.041	2473.000	0.080	3802.000	0.050	3870.000	0.080
NH	3992.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2303.000	3870.000
X1	117.000	67.000	2303.000	2473.000	650.000	175.000	525.000	0.0	0.0	0.0
GR	624.600	1000.000	620.100	1071.000	600.400	1120.000	600.400	1150.000	600.200	1166.000
GR	595.300	1207.000	592.400	1241.000	589.800	1281.000	589.800	1295.000	584.900	1402.000
GR	588.300	1416.000	588.400	1450.000	586.000	1481.000	585.300	1562.000	575.400	1595.000
GR	573.200	1644.000	572.600	1662.000	572.600	1820.000	571.500	1833.000	571.500	1922.000
GR	571.500	1963.000	571.500	2048.000	571.500	2070.000	571.500	2080.000	570.500	2103.000
GR	570.100	2164.000	568.300	2203.000	568.300	2266.000	567.500	2303.000	565.300	2351.000
GR	564.200	2356.000	562.000	2359.000	553.700	2370.000	553.700	2381.000	553.700	2381.000
GR	562.000	2402.000	564.300	2410.000	565.100	2420.000	570.000	2473.000	570.300	2522.000
GR	571.100	2580.000	570.300	2620.000	570.100	2700.000	569.400	2755.000	568.800	2830.000
GR	560.600	2894.000	566.400	2943.000	565.800	2990.000	566.000	3040.000	567.500	3100.000
GR	566.000	3150.000	567.500	3201.000	566.500	3400.000	566.500	3600.000	565.800	3788.000
GR	565.000	3802.000	560.500	3814.000	559.200	3822.000	557.000	3835.000	557.000	3842.000
GR	557.000	3856.000	559.200	3858.000	572.500	3870.000	572.500	3890.000	575.000	3904.000
GR	574.800	3931.000	625.300	3992.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.080	2041.000	0.039	2242.000	0.080	3615.000	0.050	3723.000	0.090
NH	3835.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2041.000	3723.000
X1	118.000	48.000	2041.000	2242.000	270.000	250.000	265.000	0.0	0.0	0.0
GR	625.200	1000.000	616.300	1041.000	604.300	1102.000	604.100	1108.000	604.100	1142.000
GR	601.300	1151.000	595.100	1205.000	592.800	1267.000	592.800	1277.000	591.100	1296.000
GR	586.200	1391.000	586.200	1422.000	584.300	1439.000	582.500	1501.000	581.800	1551.000
GR	574.800	1591.000	573.800	1600.000	574.900	1603.000	576.100	1621.000	574.200	1644.000
GR	570.100	1682.000	574.100	1722.000	574.100	1743.000	572.800	1762.000	570.500	1800.000
GR	572.300	1891.000	572.100	1903.000	570.900	1958.000	572.100	2000.000	571.900	2041.000
GR	570.100	2050.000	564.500	2068.000	562.500	2072.000	560.700	2077.000	560.700	2210.000
GR	570.000	2242.000	570.500	2455.000	570.000	2668.000	566.000	3348.000	568.000	3595.000
GR	568.000	3615.000	560.000	3644.000	558.000	3670.000	558.000	3705.000	568.000	3723.000
GR	575.000	3736.000	575.000	3760.000	625.000	3835.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	119.000	60.000	1892.000	2103.000	435.000	390.000	420.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	573.100	560.000	0.0
GR	625.300	1000.000	611.100	1104.000	605.400	1166.000	603.500	1179.000	603.500	1195.000
GR	600.300	1275.000	594.800	1325.000	592.500	1371.000	589.700	1412.000	586.200	1468.000
GR	580.300	1544.000	579.800	1551.000	579.800	1603.000	579.800	1607.000	579.800	1635.000
GR	577.200	1644.000	577.200	1681.000	577.000	1690.000	574.600	1712.000	572.500	1751.000
GR	572.500	1763.000	570.500	1810.000	571.100	1881.000	573.100	1892.000	565.400	1917.000
GR	563.400	1928.000	561.400	1940.000	561.400	1982.000	561.400	2022.000	563.400	2037.000
GR	564.200	2044.000	572.500	2103.000	571.300	2211.000	570.000	2350.000	567.900	2709.000
GR	566.700	2944.000	567.600	3022.000	568.100	3167.000	567.900	3182.000	562.300	3209.000
GR	560.700	3214.000	559.200	3219.000	559.200	3230.000	559.200	3238.000	560.700	3247.000
GR	561.900	3254.000	567.500	3282.000	567.000	3396.000	566.800	3437.000	566.400	3593.000
GR	564.700	3672.000	560.800	3727.000	559.700	3735.000	560.300	3743.000	574.500	3772.000
GR	574.500	3792.000	576.300	3802.000	582.600	3812.000	599.300	3828.000	626.100	3874.000
FT	0.0	0.0	0.0	0.0	16.400	0.0	0.0	0.0	0.0	0.0
X1	120.000	53.000	1379.000	1569.000	795.000	660.000	765.000	0.0	0.0	0.0
GR	625.600	1000.000	616.300	1029.000	614.100	1068.000	611.200	1087.000	611.000	1099.000
GR	597.500	1140.000	597.300	1163.000	595.700	1166.000	594.700	1201.000	593.100	1252.000
GR	576.500	1296.000	576.500	1308.000	576.500	1314.000	576.500	1340.000	575.200	1379.000
GR	568.900	1401.000	565.800	1418.000	563.000	1433.000	563.000	1468.000	563.000	1500.000
GR	565.800	1520.000	566.900	1528.000	573.500	1569.000	572.900	1720.000	572.000	1912.000
GR	569.800	2206.000	566.000	2380.000	567.300	2417.000	564.600	2440.000	563.400	2444.000
GR	560.800	2453.000	560.800	2460.000	560.800	2460.000	563.400	2473.000	564.200	2480.000

GR	568.200	2499.000	567.400	2609.000	568.100	2690.000	565.300	2804.000	564.400	2829.000
GR	566.300	2851.000	568.300	3022.000	566.100	3198.000	565.600	3262.000	562.700	3314.000
GR	560.800	3319.000	561.500	3323.000	562.700	3388.000	573.100	3431.000	573.300	3451.000
GR	576.700	3459.000	599.400	3483.000	626.100	3535.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	121.000	45.000	1244.000	1379.000	850.000	780.000	840.000	0.0	0.0	0.0
GR	625.400	1000.000	612.100	1052.000	601.900	1105.000	599.700	1127.000	599.200	1157.000
GR	580.400	1187.000	580.400	1194.000	568.900	1244.000	564.500	1249.000	564.000	1250.000
GR	564.000	1311.000	564.000	1370.000	564.500	1371.000	570.000	1379.000	572.800	1404.000
GR	571.400	1563.000	570.500	1748.000	571.200	1897.000	572.800	1953.000	574.100	2109.000
GR	572.800	2212.000	570.800	2325.000	567.700	2364.000	564.800	2390.000	564.000	2399.000
GR	562.100	2418.000	564.000	2437.000	564.800	2445.000	567.200	2477.000	566.800	2550.000
GR	564.600	2616.000	566.900	2667.000	567.500	2802.000	568.000	2998.000	567.200	3145.000
GR	568.200	3398.000	570.600	3434.000	568.300	3442.000	566.800	3449.000	567.300	3455.000
GR	577.900	3472.000	577.900	3488.000	580.100	3500.000	601.300	3522.000	624.700	3561.000
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	122.000	51.000	1261.000	1352.000	720.000	650.000	715.000	0.0	0.0	0.0
GR	624.300	1000.000	605.300	1067.000	602.800	1074.000	602.800	1094.000	582.700	1128.000
GR	582.600	1135.000	581.100	1150.000	572.800	1176.000	576.700	1231.000	574.800	1252.000
GR	573.400	1261.000	570.500	1267.000	565.000	1278.000	565.000	1303.000	565.000	1325.000
GR	570.500	1342.000	573.600	1352.000	575.200	1383.000	576.700	1432.000	573.800	1530.000
GR	575.500	1575.000	576.100	1789.000	575.600	1982.000	574.800	2066.000	574.100	2200.000
GR	573.800	2301.000	571.900	2450.000	568.900	2533.000	563.200	2567.000	570.800	2590.000
GR	567.100	2603.000	565.500	2609.000	563.000	2619.000	563.000	2628.000	563.000	2638.000
GR	565.500	2648.000	568.100	2658.000	572.300	2710.000	568.800	2750.000	569.200	2879.000
GR	567.200	3066.000	568.300	3188.000	570.100	3358.000	578.200	3412.000	581.300	3448.000
GR	580.200	3464.000	580.300	3483.000	598.100	3512.000	598.100	3530.000	599.800	3537.000
GR	624.700	3597.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	42400.000	87000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	17.400	0.0	0.0	0.0	0.0	0.0
X1	123.000	43.000	1328.000	1502.000	550.000	600.000	545.000	0.0	0.0	0.0
GR	624.800	1000.000	610.300	1039.000	608.200	1073.000	603.100	1105.000	594.600	1199.000
GR	594.600	1222.000	594.800	1239.000	574.600	1278.000	573.900	1311.000	573.300	1328.000
GR	571.100	1335.000	567.000	1350.000	567.000	1408.000	567.000	1470.000	571.100	1478.000
GR	575.200	1487.000	578.300	1502.000	576.100	1575.000	574.100	1648.000	573.500	1950.000
GR	574.000	2200.000	573.500	2450.000	574.200	2738.000	573.500	2922.000	572.000	3100.000
GR	570.700	3132.000	567.000	3147.000	564.700	3156.000	564.700	3167.000	564.700	3178.000
GR	567.000	3188.000	568.800	3195.000	573.100	3218.000	571.400	3300.000	571.500	3400.000
GR	573.100	3550.000	582.100	3580.000	582.100	3601.000	582.100	3629.000	583.500	3675.000
GR	584.100	3709.000	599.800	3738.000	624.800	3778.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	17200.000	32900.000	42400.000	42400.000	77000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	123.500	34.000	1328.000	1545.000	300.000	1500.000	300.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	573.300	579.000	0.0
GR	624.800	1000.000	610.300	1039.000	608.200	1073.000	603.100	1105.000	594.600	1199.000
GR	594.600	1222.000	594.800	1239.000	574.600	1278.000	573.900	1311.000	573.300	1328.000
GR	571.100	1335.000	567.000	1350.000	567.000	1408.000	567.000	1470.000	571.100	1478.000
GR	575.200	1487.000	581.000	1545.000	580.000	1580.000	575.000	1880.000	573.500	2580.000
GR	575.000	2700.000	573.500	2850.000	575.000	2930.000	572.000	3170.000	575.000	3500.000
GR	580.000	3700.000	578.000	4100.000	580.000	4270.000	580.000	4470.000	590.000	4680.000
GR	590.000	4710.000	595.000	5450.000	600.000	5580.000	625.000	5700.000	0.0	0.0
NC	0.080	0.080	0.039	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	124.000	39.000	1266.000	1556.000	320.000	350.000	320.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	592.800	579.500	0.0
GR	629.300	1000.000	611.800	1056.000	599.800	1075.000	583.000	1096.000	583.000	1109.000

GR	575.300	1127.000	580.500	1160.000	577.100	1179.000	575.700	1187.000	580.300	1196.000
GR	592.800	1266.000	590.700	1310.000	589.300	1326.000	580.700	1350.000	575.700	1371.000
GR	571.800	1387.000	568.000	1403.000	568.000	1443.000	568.000	1502.000	571.800	1513.000
GR	574.100	1520.000	585.500	1556.000	587.000	1856.000	582.500	2101.000	581.000	2400.000
GR	575.000	2700.000	573.000	2830.000	575.000	2930.000	580.000	3300.000	580.000	3480.000
GR	577.500	3650.000	580.000	3730.000	581.000	4050.000	585.000	4480.000	590.000	4530.000
GR	590.000	4560.000	595.000	5200.000	600.000	5330.000	625.000	5520.000	0.0	0.0
X1	124.100	0.0	0.0	0.0	115.000	350.000	115.000	0.0	0.600	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	593.400	580.100	0.0
NC	0.080	0.080	0.041	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	126.010	39.000	1269.000	1425.000	115.000	350.000	115.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	591.000	581.500	0.0
GR	630.400	1000.000	630.200	1009.000	624.400	1029.000	600.500	1100.000	594.200	1108.000
GR	580.700	1138.000	581.700	1238.000	581.700	1251.000	575.900	1269.000	575.900	1269.000
GR	568.000	1334.000	568.000	1347.000	568.000	1393.000	576.600	1408.000	577.600	1425.000
GR	577.600	1425.000	580.000	1440.000	580.000	3590.000	592.000	3618.000	592.000	3638.000
GR	592.300	3655.000	593.900	3691.000	594.100	3814.000	594.500	3913.000	594.700	4001.000
GR	594.800	4071.000	594.900	4144.000	594.800	4231.000	594.500	4333.000	594.600	4430.000
GR	594.900	4481.000	597.600	4558.000	598.900	4653.000	598.900	4744.000	599.800	4782.000
GR	603.800	4843.000	609.600	4901.000	620.500	4960.000	630.200	5032.000	0.0	0.0
SB	0.900	1.500	3.000	0.0	106.000	6.000	2470.000	1.280	568.000	568.000
X1	126.020	0.0	0.0	0.0	80.000	80.000	80.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	584.700	585.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	593.100	585.500	0.0
BT	42.000	1157.000	595.300	0.0	1184.000	590.500	0.0	1216.000	594.200	0.0
BT	1239.000	594.200	0.0	1335.000	593.700	0.0	1508.000	592.500	0.0	1594.000
BT	592.100	0.0	1667.000	591.900	0.0	1716.000	591.700	0.0	1813.000	591.500
BT	0.0	1883.000	591.200	0.0	1932.000	590.700	0.0	2043.000	589.500	0.0
BT	2184.000	589.200	0.0	2312.000	588.500	0.0	2418.000	587.900	0.0	2567.000
BT	587.100	0.0	2727.000	586.700	0.0	2814.000	586.400	0.0	2912.000	586.100
BT	0.0	3051.000	585.900	0.0	3161.000	585.500	0.0	3374.000	585.500	0.0
BT	3497.000	585.500	0.0	3612.000	585.500	0.0	3745.000	585.500	0.0	3869.000
BT	586.100	0.0	3967.000	586.600	0.0	4057.000	588.000	0.0	4210.000	592.000
BT	0.0	4227.000	592.300	0.0	4263.000	593.900	0.0	4386.000	594.100	0.0
BT	4485.000	594.500	0.0	4573.000	594.700	0.0	4643.000	594.800	0.0	4716.000
BT	594.900	0.0	4803.000	594.800	0.0	4905.000	594.500	0.0	5002.000	594.600
BT	0.0	5053.000	594.900	0.0	5130.000	597.600	0.0	0.0	0.0	0.0
NC	0.100	0.060	0.039	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	127.000	42.000	1103.000	1254.000	900.000	100.000	835.000	0.0	0.0	0.0
GR	630.400	1000.000	607.500	1047.000	582.800	1087.000	582.800	1103.000	575.700	1117.000
GR	574.500	1127.000	570.500	1160.000	570.500	1176.000	570.500	1179.000	574.500	1228.000
GR	575.400	1239.000	578.900	1254.000	581.000	1295.000	580.900	1392.000	581.900	1524.000
GR	580.500	1632.000	581.300	1674.000	580.100	1730.000	579.600	1805.000	584.500	1895.000
GR	584.500	3065.000	592.000	3093.000	592.000	3113.000	592.300	3702.000	593.900	3738.000
GR	594.100	3861.000	594.500	3960.000	594.700	4048.000	594.800	4118.000	594.900	4191.000
GR	594.800	4278.000	594.500	4380.000	594.600	4477.000	594.900	4528.000	597.600	4605.000
GR	598.900	4700.000	598.900	4791.000	599.800	4829.000	603.800	4890.000	609.600	4948.000
GR	620.500	5007.000	630.200	5079.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	128.000	50.000	1111.000	1250.000	750.000	350.000	750.000	0.0	0.0	0.0
GR	650.300	1000.000	625.600	1027.000	600.200	1066.000	583.400	1092.000	583.400	1111.000
GR	576.200	1129.000	572.000	1139.000	572.000	1189.000	572.000	1226.000	576.200	1244.000
GR	577.600	1250.000	581.200	1278.000	582.300	1323.000	583.100	1394.000	583.300	1454.000
GR	583.500	1509.000	580.100	1522.000	580.100	1580.000	580.300	1642.000	580.600	1721.000
GR	582.200	1801.000	583.100	1877.000	583.800	1892.000	583.000	1905.000	580.100	1960.000
GR	580.700	2025.000	582.800	2066.000	585.500	2116.000	585.500	2551.000	592.000	2579.000
GR	592.000	2599.000	592.300	3188.000	593.900	3224.000	594.100	3347.000	594.500	3446.000
GR	594.700	3534.000	594.800	3604.000	594.900	3677.000	594.800	3764.000	594.500	3866.000

GR	594.600	3963.000	594.900	4014.000	597.600	4091.000	598.900	4186.000	598.900	4277.000
GR	599.800	4315.000	603.800	4376.000	609.600	4434.000	620.500	4493.000	630.200	4565.000
NC	0.100	0.090	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	129.000	44.000	1144.000	1265.000	390.000	475.000	415.000	0.0	0.0	0.0
GR	650.300	1000.000	625.600	1039.000	599.000	1083.000	585.300	1103.000	585.300	1122.000
GR	578.500	1144.000	576.600	1158.000	573.500	1180.000	573.500	1200.000	573.500	1220.000
GR	576.500	1251.000	577.900	1265.000	579.800	1298.000	581.600	1332.000	579.100	1357.000
GR	578.400	1377.000	581.000	1424.000	581.500	1476.000	582.400	1503.000	580.100	1532.000
GR	581.100	1578.000	582.700	1649.000	581.900	1707.000	582.300	1815.000	582.500	2002.000
GR	583.900	2092.000	584.300	2225.000	582.700	2302.000	592.200	2346.000	592.200	2368.000
GR	594.100	2383.000	594.400	2511.000	594.700	2689.000	594.800	2835.000	594.900	2933.000
GR	594.800	3081.000	594.900	3151.000	598.000	3242.000	598.100	3344.000	598.400	3415.000
GR	602.500	3479.000	609.900	3551.000	621.500	3632.000	630.600	3736.000	0.0	0.0
NC	0.100	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	130.000	57.000	1066.000	1180.000	620.000	880.000	632.000	0.0	0.0	0.0
GR	650.500	1000.000	625.600	1015.000	600.200	1024.000	589.400	1042.000	589.100	1057.000
GR	584.200	1066.000	578.000	1073.000	572.000	1104.000	578.000	1141.000	579.200	1154.000
GR	583.000	1180.000	578.700	1200.000	583.200	1237.000	584.700	1281.000	584.700	1355.000
GR	584.500	1416.000	584.900	1487.000	584.600	1564.000	584.900	1612.000	584.900	1669.000
GR	585.800	1719.000	585.400	1781.000	586.100	1827.000	587.500	1887.000	586.400	1946.000
GR	587.000	2001.000	587.400	2058.000	587.700	2118.000	584.800	2193.000	584.400	2270.000
GR	584.100	2372.000	585.300	2468.000	585.800	2561.000	586.100	2660.000	586.300	2765.000
GR	586.100	2803.000	595.300	2827.000	595.300	2850.000	595.300	2885.000	595.300	2975.000
GR	603.800	3000.000	605.200	3052.000	606.400	3133.000	604.900	3207.000	604.900	3255.000
GR	606.000	3276.000	607.800	3382.000	608.100	3450.000	609.700	3514.000	610.800	3589.000
GR	614.000	3633.000	614.800	3660.000	616.400	3686.000	622.200	3747.000	627.700	3772.000
GR	636.400	3800.000	649.800	3853.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	131.000	69.000	1943.000	2075.000	500.000	550.000	800.000	0.0	0.0	0.0
GR	635.100	1000.000	624.900	1024.000	607.000	1073.000	589.400	1113.000	589.400	1122.000
GR	579.700	1137.000	577.000	1141.000	579.700	1150.000	582.900	1161.000	586.600	1191.000
GR	586.600	1296.000	586.900	1417.000	586.900	1546.000	588.000	1631.000	588.200	1755.000
GR	589.500	1841.000	589.000	1923.000	584.700	1943.000	581.600	1955.000	577.000	1974.000
GR	577.000	2002.000	577.000	2019.000	581.600	2063.000	582.800	2075.000	584.900	2103.000
GR	584.900	2161.000	584.900	2218.000	583.700	2244.000	584.600	2282.000	582.000	2304.000
GR	584.700	2325.000	586.700	2348.000	585.500	2377.000	585.100	2396.000	586.600	2416.000
GR	588.000	2435.000	585.600	2455.000	587.000	2487.000	587.000	2535.000	586.400	2581.000
GR	586.400	2640.000	587.400	2701.000	587.800	2774.000	588.600	2822.000	587.700	2937.000
GR	587.900	3006.000	587.900	3076.000	590.200	3138.000	583.800	3189.000	588.200	3227.000
GR	596.600	3251.000	596.600	3256.000	600.700	3273.000	600.200	3302.000	600.800	3330.000
GR	604.400	3350.000	605.600	3412.000	606.900	3526.000	608.000	3618.000	612.500	3751.000
GR	612.900	3824.000	613.500	3882.000	613.300	3897.000	613.800	3923.000	614.900	3967.000
GR	615.700	3988.000	625.200	4030.000	636.500	4072.000	650.600	4135.000	0.0	0.0
NC	0.050	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	132.000	69.000	2301.000	2492.000	340.000	250.000	550.000	0.0	0.0	0.0
GR	637.400	1000.000	614.800	1033.000	589.700	1090.000	589.700	1102.000	582.400	1117.000
GR	580.500	1121.000	582.400	1131.000	585.400	1148.000	586.800	1200.000	587.300	1269.000
GR	588.200	1344.000	588.100	1451.000	588.500	1585.000	589.700	1688.000	589.600	1768.000
GR	587.400	1847.000	586.900	1878.000	589.600	1930.000	588.400	2005.000	587.400	2086.000
GR	586.600	2132.000	587.400	2146.000	589.400	2198.000	589.800	2284.000	589.400	2391.000
GR	586.600	2315.000	584.500	2322.000	580.000	2339.000	584.500	2360.000	586.000	2371.000
GR	586.300	2372.000	584.500	2379.000	580.000	2395.000	580.000	2417.000	580.000	2430.000
GR	584.500	2470.000	586.000	2483.000	586.800	2492.000	587.400	2565.000	588.300	2597.000
GR	587.200	2684.000	585.600	2715.000	588.000	2755.000	587.500	2819.000	589.200	2872.000
GR	590.200	2941.000	590.800	3001.000	590.600	3089.000	590.400	3130.000	587.100	3173.000
GR	587.600	3194.000	606.000	3254.000	606.600	3332.000	607.600	3373.000	606.000	3386.000
GR	606.000	3413.000	605.600	3422.000	608.300	3455.000	608.700	3538.000	609.900	3595.000
GR	612.200	3670.000	614.800	3803.000	616.700	3905.000	617.200	4005.000	618.200	4036.000

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GR	595.300	2837.000	595.200	2930.000	595.100	2970.000	593.800	2989.000	592.000	3002.000
GR	586.000	3045.000	586.000	3075.000	586.000	3076.000	592.000	3150.000	593.500	3168.000
GR	593.800	3215.000	605.000	3270.000	605.200	3290.000	608.000	3297.000	611.100	3346.000
GR	612.900	3447.000	614.600	3509.000	614.600	3547.000	615.500	3568.000	616.800	3621.000
GR	619.700	3665.000	619.700	3677.000	622.000	3700.000	637.000	3746.000	649.300	3795.000
NC	0.060	0.050	0.039	0.100	0.300	0.0	0.0	0.0	599.376	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	137.000	52.000	2476.000	2678.000	310.000	580.000	600.000	0.0	0.0	0.0
GR	637.700	1000.000	624.800	1058.000	600.300	1100.000	596.200	1117.000	596.200	1140.000
GR	594.100	1192.000	594.600	1307.000	594.700	1413.000	594.800	1519.000	594.400	1620.000
GR	594.800	1706.000	593.200	1725.000	592.700	1791.000	593.100	1828.000	590.200	1847.000
GR	590.200	1861.000	592.600	1878.000	593.700	1891.000	592.800	1922.000	594.300	1967.000
GR	594.300	2028.000	594.800	2090.000	595.500	2150.000	595.500	2222.000	595.300	2296.000
GR	595.100	2367.000	595.200	2431.000	594.800	2476.000	593.600	2489.000	592.400	2503.000
GR	586.500	2572.000	592.400	2637.000	595.300	2678.000	595.900	2777.000	595.700	2867.000
GR	595.100	2898.000	594.100	2930.000	592.900	2949.000	594.400	2961.000	596.200	3004.000
GR	600.300	3069.000	601.300	3128.000	605.300	3192.000	605.300	3205.000	607.100	3246.000
GR	610.300	3304.000	612.200	3389.000	612.200	3415.000	614.400	3459.000	615.600	3515.000
GR	630.200	3588.000	649.700	3653.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1375.000	2535.000
X1	138.000	56.000	1999.000	2180.000	365.000	650.000	615.000	0.0	0.0	0.0
GR	639.000	1000.000	624.800	1062.000	598.500	1101.000	597.700	1128.000	592.200	1159.000
GR	594.100	1212.000	595.200	1289.000	594.900	1374.000	594.500	1449.000	594.500	1559.000
GR	593.900	1624.000	594.800	1689.000	594.100	1770.000	592.200	1788.000	591.000	1803.000
GR	590.200	1818.000	594.900	1844.000	595.500	1897.000	593.900	1912.000	595.100	1950.000
GR	594.800	1999.000	593.900	2012.000	592.900	2021.000	588.500	2075.000	592.900	2146.000
GR	593.300	2158.000	594.700	2180.000	594.800	2191.000	593.100	2199.000	588.800	2218.000
GR	593.100	2234.000	594.400	2239.000	595.100	2255.000	595.100	2292.000	595.500	2369.000
GR	595.000	2449.000	593.000	2464.000	594.700	2478.000	596.100	2530.000	600.300	2602.000
GR	595.600	2657.000	596.200	2709.000	600.800	2790.000	600.500	2882.000	600.300	2956.000
GR	600.100	3027.000	596.800	3088.000	596.800	3134.000	596.800	3167.000	598.300	3180.000
GR	594.200	3196.000	606.600	3220.000	606.600	3254.000	619.400	3287.000	630.100	3328.000
GR	650.200	3393.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1285.000	2370.000
X1	139.000	54.000	1518.000	1724.000	585.000	490.000	590.000	0.0	0.0	0.0
GR	642.700	1000.000	625.800	1657.000	600.800	1094.000	600.800	1111.000	595.600	1132.000
GR	598.300	1169.000	600.200	1232.000	599.800	1273.000	600.300	1328.000	598.900	1401.000
GR	600.500	1451.000	599.800	1489.000	599.400	1518.000	596.400	1542.000	594.200	1564.000
GR	593.400	1571.000	589.000	1611.000	589.000	1626.000	589.000	1665.000	593.400	1696.000
GR	594.800	1706.000	596.100	1724.000	595.600	1755.000	595.500	1784.000	593.600	1801.000
GR	591.600	1817.000	593.600	1825.000	595.800	1834.000	595.400	1866.000	595.100	1917.000
GR	594.000	1947.000	594.200	1962.000	595.300	1998.000	597.800	2070.000	600.300	2138.000
GR	600.500	2168.000	600.500	2189.000	600.900	2251.000	600.100	2336.000	597.000	2389.000
GR	597.300	2423.000	600.300	2477.000	600.800	2545.000	600.100	2659.000	597.500	2733.000
GR	595.900	2828.000	596.000	2887.000	598.400	2900.000	595.700	2907.000	606.200	2928.000
GR	606.200	2957.000	609.200	2962.000	625.600	2982.000	649.900	3025.000	0.0	0.0
NC	0.085	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1310.000	2355.000
X1	140.000	53.000	1396.000	1587.000	375.000	335.000	385.000	0.0	0.0	0.0
GR	649.900	1000.000	637.000	1049.000	625.100	1097.000	598.200	1157.000	598.500	1187.000
GR	597.700	1207.000	601.100	1229.000	601.100	1246.000	600.300	1268.000	601.100	1346.000
GR	600.900	1376.000	598.800	1396.000	594.500	1407.000	593.500	1416.000	589.500	1455.000
GR	589.500	1471.000	589.500	1508.000	593.500	1532.000	594.400	1537.000	593.500	1543.000
GR	591.600	1553.000	591.600	1553.000	591.600	1557.000	593.500	1568.000	594.600	1574.000
GR	597.500	1587.000	595.700	1610.000	595.900	1669.000	598.000	1726.000	596.400	1812.000
GR	595.500	1851.000	595.600	1925.000	600.200	2013.000	601.000	2068.000	600.300	2141.000
GR	599.400	2218.000	598.400	2269.000	596.500	2296.000	597.700	2342.000	601.300	2408.000
GR	601.600	2492.000	601.200	2558.000	600.100	2632.000	598.100	2733.000	596.400	2833.000
GR	597.200	2886.000	599.900	2897.000	597.000	2905.000	605.100	2923.000	605.100	2955.000
GR	607.300	2959.000	625.600	2995.000	650.500	3023.000	0.0	0.0	0.0	0.0

NC	0.080	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	17200.000	32900.000	42400.000	42400.000	77000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1128.000	2315.000
X1	141.000	46.000	1252.000	1408.000	940.000	620.000	890.000	0.0	0.0	0.0
GR	650.500	1000.000	634.300	1044.000	606.300	1104.000	606.300	1114.000	594.300	1127.000
GR	592.100	1129.000	594.300	1160.000	594.900	1169.000	596.400	1203.000	597.400	1221.000
GR	595.200	1252.000	594.100	1264.000	590.500	1303.000	590.500	1316.000	590.500	1356.000
GR	594.100	1379.000	595.400	1388.000	602.800	1408.000	601.700	1441.000	601.100	1497.000
GR	602.200	1571.000	601.100	1641.000	600.000	1731.000	597.500	1791.000	595.600	1839.000
GR	596.100	1880.000	600.400	1943.000	600.800	2051.000	601.500	2161.000	602.500	2263.000
GR	602.700	2351.000	603.000	2451.000	601.900	2563.000	600.500	2644.000	598.800	2769.000
GR	598.300	2845.000	599.900	2878.000	598.000	2885.000	604.100	2917.000	604.100	2939.000
GR	604.100	2946.000	604.100	2985.000	607.400	2994.000	607.400	3009.000	625.900	3043.000
GR	650.700	3093.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.095	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1220.000	2335.000
X1	142.000	50.000	1277.000	1446.000	365.000	350.000	365.000	0.0	0.0	0.0
GR	650.600	1000.000	638.400	1061.000	629.100	1104.000	625.500	1136.000	601.100	1184.000
GR	601.100	1210.000	595.700	1227.000	597.100	1248.000	597.200	1277.000	595.200	1298.000
GR	594.800	1306.000	592.000	1353.000	592.000	1353.000	592.000	1387.000	594.800	1412.000
GR	595.700	1420.000	598.400	1446.000	598.400	1501.000	596.400	1512.000	599.100	1534.000
GR	598.500	1566.000	598.700	1597.000	598.700	1655.000	598.100	1718.000	598.200	1787.000
GR	598.700	1847.000	599.100	1928.000	600.100	1999.000	598.700	2065.000	600.200	2103.000
GR	600.700	2197.000	601.300	2298.000	601.700	2453.000	602.000	2563.000	601.900	2662.000
GR	601.700	2763.000	600.600	2869.000	599.600	2924.000	601.400	2949.000	603.000	2965.000
GR	599.800	2974.000	603.700	3000.000	604.700	3024.000	604.700	3039.000	604.700	3190.000
GR	614.800	3209.000	614.800	3222.000	625.400	3239.000	637.300	3277.000	649.900	3314.000
NC	0.0	0.0	0.0	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	143.010	50.000	1222.000	1385.000	260.000	267.000	267.000	0.0	-0.700	0.0
GR	650.000	1000.000	637.800	1058.000	626.700	1115.000	625.700	1179.000	604.800	1204.000
GR	604.800	1214.000	598.500	1222.000	595.800	1228.000	592.000	1236.000	592.000	1272.000
GR	592.000	1272.000	595.800	1330.000	596.900	1351.000	600.000	1385.000	601.400	1444.000
GR	602.600	1460.000	601.800	1477.000	601.800	1509.000	602.200	1608.000	602.700	1650.000
GR	602.700	1755.000	602.200	1807.000	602.600	1835.000	601.600	1864.000	602.100	1921.000
GR	602.200	2003.000	602.600	2102.000	602.800	2223.000	602.400	2319.000	602.000	2433.000
GR	602.800	2523.000	603.700	2656.000	604.900	2739.000	604.900	2815.000	606.300	2882.000
GR	607.100	2911.000	610.300	2925.000	610.300	2935.000	610.300	2940.000	610.300	2959.000
GR	612.400	2980.000	612.400	3008.000	613.500	3066.000	613.700	3115.000	614.200	3156.000
GR	614.700	3238.000	615.200	3325.000	616.300	3367.000	627.300	3403.000	650.100	3463.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	143.000	0.0	0.0	0.0	260.000	268.000	268.000	0.0	0.700	0.0
NC	0.0	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	144.000	66.000	1606.000	1796.000	570.000	330.000	600.000	0.0	0.0	0.0
GR	650.100	1000.000	636.400	1067.000	629.200	1126.000	625.800	1163.000	604.[illegible]00	[illegible]5.000
GR	604.800	1208.000	599.400	1229.000	598.400	1245.000	597.900	1254.000	598.500	[illegible]0.000
GR	599.600	1271.000	602.200	1328.000	601.600	1379.000	599.300	1419.000	602.900	1[illegible]3.000
GR	600.400	1482.000	598.900	1506.000	599.200	1526.000	602.300	1566.000	601.600	1606.000
GR	598.900	1638.000	598.000	1646.000	597.000	1656.000	597.000	1700.000	597.000	1754.000
GR	598.000	1759.000	599.600	1767.000	603.500	1796.000	603.500	1831.000	604.400	1888.000
GR	604.000	1939.000	604.600	2008.000	603.000	2068.000	602.100	2106.000	596.300	2143.000
GR	596.700	2169.000	604.900	2186.000	603.200	2246.000	602.100	2309.000	603.000	2397.000
GR	603.500	2480.000	603.400	2545.000	603.500	2625.000	605.600	2678.000	606.600	2756.000
GR	607.900	2840.000	609.000	2932.000	608.800	2982.000	611.000	3006.000	611.000	3014.000
GR	611.000	3034.000	614.400	3049.000	614.400	3070.000	616.000	3091.000	616.900	3149.000
GR	617.300	3229.000	617.100	3301.000	615.600	3313.000	616.300	3349.000	618.800	3422.000
GR	617.600	3489.000	618.300	3571.000	620.100	3621.000	622.900	3644.000	633.100	3683.000
GR	650.100	3732.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	145.000	56.000	1669.000	1860.000	375.000	620.000	560.000	0.0	0.0	0.0
GR	650.100	1000.000	639.700	1050.000	637.100	1080.000	630.700	1135.000	622.400	1188.000
GR	608.200	1211.000	608.200	1226.000	599.300	1247.000	597.800	1251.000	597.800	1255.000
GR	599.300	1273.000	601.300	1298.000	604.500	1354.000	604.100	1414.000	604.800	1431.000
GR	600.400	1450.000	599.300	1476.000	604.500	1502.000	604.700	1572.000	604.400	1618.000
GR	604.100	1669.000	600.500	1690.000	599.000	1699.000	597.800	1707.000	597.800	1771.000
GR	597.800	1810.000	599.000	1821.000	600.200	1832.000	604.400	1860.000	604.400	1912.000
GR	609.400	2011.000	608.400	2061.000	608.400	2099.000	608.800	2128.000	607.700	2230.000
GR	607.300	2340.000	608.400	2419.000	611.400	2477.000	610.600	2552.000	611.000	2637.000
GR	613.000	2695.000	613.300	2730.000	613.500	2825.000	614.400	2923.000	616.100	3010.000
GR	616.700	3106.000	616.700	3146.000	614.900	3167.000	616.400	3181.000	617.900	3241.000
GR	618.700	3313.000	621.200	3401.000	624.600	3500.000	629.200	3557.000	634.500	3629.000
GR	649.900	3723.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	36.30	130.00	513.00	532.00	475.00	24300.00	491.37	5194.89	492.31	312.44	0.0	0.0	0.0
	36.30	130.00	513.00	532.00	475.00	45700.00	494.83	8153.49	496.64	365.82	0.0	0.0	0.0
	36.30	130.00	513.00	532.00	475.00	58500.00	496.80	10007.84	499.01	381.85	0.0	0.0	0.0
	36.30	130.00	513.00	532.00	475.00	102000.00	502.40	16074.20	505.77	427.53	0.0	0.0	0.0
	36.40	10.00	0.0	0.0	475.00	24300.00	491.40	5213.40	492.33	312.51	0.0	0.0	0.0
	36.40	10.00	0.0	0.0	475.00	45700.00	494.87	8184.41	496.67	366.10	0.0	0.0	0.0
	36.40	10.00	0.0	0.0	475.00	58500.00	496.85	10044.53	499.05	382.16	0.0	0.0	0.0
	36.40	10.00	0.0	0.0	475.00	102000.00	502.46	16126.57	505.81	427.89	0.0	0.0	0.0
	38.00	100.00	0.0	0.0	476.50	24300.00	492.14	9932.24	492.58	346.49	0.0	0.0	0.0
	38.00	100.00	0.0	0.0	476.50	45700.00	496.21	14895.58	497.10	380.71	0.0	0.0	0.0
WE	38.00	100.00	0.0	0.0	476.50	58500.00	498.40	18317.72	499.54	391.05	0.0	0.0	0.0
	38.00	100.00	0.0	0.0	476.50	102000.00	504.51	29442.75	506.44	420.17	0.0	0.0	0.0
	39.00	315.00	0.0	0.0	477.60	24300.00	492.57	9473.18	492.81	821.36	0.0	0.0	0.0
WF	39.00	315.00	0.0	0.0	477.60	45700.00	497.10	17774.74	497.47	841.49	0.0	0.0	0.0
	39.00	315.00	0.0	0.0	477.60	58500.00	499.54	23146.87	499.97	852.26	0.0	0.0	0.0
	39.00	315.00	0.0	0.0	477.60	102000.00	506.45	41619.26	507.06	881.66	0.0	0.0	0.0
	40.00	410.00	0.0	0.0	478.60	24300.00	492.89	16807.83	492.96	1786.08	0.0	0.0	0.0
	40.00	410.00	0.0	0.0	478.60	45700.00	497.53	37058.72	497.61	1804.09	0.0	0.0	0.0
WG	40.00	410.00	0.0	0.0	478.60	58500.00	500.01	50628.57	500.10	1813.74	0.0	0.0	0.0
	40.00	410.00	0.0	0.0	478.60	102000.00	507.08	98514.19	507.19	1839.82	0.0	0.0	0.0
	41.00	460.00	0.0	0.0	478.00	24300.00	492.99	18660.50	493.04	2471.42	0.0	0.0	0.0
	41.00	460.00	0.0	0.0	478.00	45700.00	497.61	44677.93	497.67	2699.92	0.0	0.0	0.0
WH	41.00	460.00	0.0	0.0	478.00	58500.00	500.10	63092.50	500.15	2711.76	0.0	0.0	0.0
	41.00	460.00	0.0	0.0	478.00	102000.00	507.17	130072.00	507.23	2740.82	0.0	0.0	0.0
	42.01	250.00	0.0	0.0	477.00	24300.00	493.01	8779.41	493.24	1888.58	0.0	0.0	0.0
	42.01	250.00	0.0	0.0	477.00	45700.00	497.63	26593.81	497.74	2862.30	0.0	0.0	0.0
	42.01	250.00	0.0	0.0	477.00	58500.00	500.11	41802.78	500.20	2896.01	0.0	0.0	0.0
	42.01	250.00	0.0	0.0	477.00	102000.00	507.18	102388.44	507.26	2924.02	0.0	0.0	0.0
	42.02	25.00	0.0	0.0	477.00	24300.00	493.03	8885.16	493.26	1890.22	0.0	0.0	0.0
	42.02	25.00	0.0	0.0	477.00	45700.00	497.64	26730.49	497.75	2862.37	0.0	0.0	0.0
	42.02	25.00	0.0	0.0	477.00	58500.00	500.12	41937.76	500.21	2896.02	0.0	0.0	0.0
	42.02	25.00	0.0	0.0	477.00	102000.00	507.18	102521.31	507.26	2924.03	0.0	0.0	0.0
	42.10	25.00	492.00	493.00	477.00	24300.00	493.08	6756.94	493.30	1897.50	0.0	0.0	0.0
	42.10	25.00	492.00	493.00	477.00	45700.00	497.65	20949.54	497.76	2862.33	0.0	0.0	0.0
	42.10	25.00	492.00	493.00	477.00	58500.00	500.12	34587.50	500.22	2896.00	0.0	0.0	0.0
	42.10	25.00	492.00	493.00	477.00	102000.00	507.54	106134.69	507.62	2926.07	0.0	0.0	0.0
	42.20	50.00	0.0	0.0	477.00	24300.00	493.13	9048.16	493.34	1904.68	0.0	0.0	0.0
	42.20	50.00	0.0	0.0	477.00	45700.00	497.68	26753.40	497.79	2862.72	0.0	0.0	0.0
	42.20	50.00	0.0	0.0	477.00	58500.00	500.14	41924.42	500.23	2896.07	0.0	0.0	0.0
	42.20	50.00	0.0	0.0	477.00	102000.00	507.55	106071.94	507.62	2926.09	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	43.00	230.00	0.0	0.0	481.00	24300.00	493.39	19580.02	493.43	2708.79	0.0	0.0	0.0
	43.00	230.00	0.0	0.0	481.00	45700.00	497.79	47251.38	497.83	3320.94	0.0	0.0	0.0
WI	43.00	230.00	0.0	0.0	481.00	58500.00	500.22	67731.44	500.26	3338.24	0.0	0.0	0.0
	43.00	230.00	0.0	0.0	481.00	102000.00	507.60	148684.81	507.64	3430.94	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	20000.00	493.42	4755.85	494.17	599.29	0.0	0.0	0.0
WJ	44.00	415.00	0.0	0.0	480.60	38000.00	497.79	11566.20	498.35	1565.57	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	48800.00	500.23	18298.09	500.63	1621.36	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	87000.00	507.60	49163.30	507.85	1797.10	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	20000.00	494.02	3531.23	495.31	274.49	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	38000.00	497.95	7280.82	499.25	1226.39	0.0	0.0	0.0
WK	45.00	420.00	0.0	0.0	481.50	48800.00	500.34	11911.60	501.19	1238.01	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	87000.00	507.62	34045.30	508.09	1646.20	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	20000.00	495.87	4691.17	496.69	695.42	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	38000.00	499.68	11196.98	500.26	1224.90	0.0	0.0	0.0
WL	46.00	565.00	0.0	0.0	482.20	48800.00	501.38	15602.67	501.92	1239.34	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	87000.00	508.02	40554.98	508.40	1525.57	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	20000.00	497.13	5987.73	497.52	1021.70	0.0	0.0	0.0
WM	47.00	630.00	0.0	0.0	484.00	38000.00	500.36	10842.91	500.86	1157.83	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	48800.00	501.89	13850.42	502.46	1165.89	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	87000.00	508.20	30704.48	508.70	1408.68	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	20000.00	497.80	5331.98	498.30	624.38	0.0	0.0	0.0
WN	48.00	610.00	0.0	0.0	486.00	38000.00	501.04	9549.41	501.75	929.21	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	48800.00	502.57	12099.34	503.36	938.65	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	87000.00	508.58	25991.78	509.32	1171.42	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	20000.00	498.62	6123.05	498.98	660.47	0.0	0.0	0.0
WO	49.00	555.00	0.0	0.0	486.30	38000.00	501.95	10698.42	502.54	710.94	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	48800.00	503.48	13178.26	504.19	723.82	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	87000.00	509.14	25334.20	509.99	995.87	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	20000.00	499.02	5851.13	499.53	519.18	0.0	0.0	0.0
WP	50.00	465.00	0.0	0.0	486.20	38000.00	502.33	9503.86	503.28	548.67	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11412.67	505.05	553.87	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	87000.00	509.22	20198.79	510.89	988.51	0.0	0.0	0.0

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
1.010	24300.000	457.302	0.0	0.0	0.0	306.922	0.0	0.0
1.010	45700.000	460.697	3.395	0.0	0.0	351.926	-45.004	0.0
1.010	58500.000	462.239	1.542	0.0	0.0	371.863	-64.941	0.0
1.010	102000.000	467.641	5.402	0.0	0.0	864.156	-557.234	0.0
1.020	24300.000	461.105	0.0	3.803	0.0	356.227	0.0	450.000
1.020	45700.000	465.016	3.911	4.319	0.0	498.984	-142.758	450.000
1.020	58500.000	466.984	1.968	4.745	0.0	750.832	-394.605	450.000
1.020	102000.000	472.805	5.821	5.164	0.0	3811.156	-3454.930	450.000
1.000	24300.000	462.443	0.0	1.339	0.0	374.895	0.0	680.000
1.000	45700.000	466.626	4.182	1.610	0.0	681.844	-306.949	680.000
1.000	58500.000	468.694	2.069	1.711	0.0	1052.117	-677.223	680.000
1.000	102000.000	474.246	5.552	1.441	0.0	4771.719	-4396.824	680.000
1.100	24300.000	463.430	0.0	0.987	0.0	211.359	0.0	700.000
1.100	45700.000	467.666	4.236	1.040	0.0	1019.195	-807.836	700.000
1.100	58500.000	470.087	2.421	1.392	0.0	2361.301	-2149.941	700.000
1.100	102000.000	475.631	5.544	1.385	0.0	4935.129	-4723.770	700.000

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	20.00	805.00	0.0	0.0	461.40	24300.00	477.97	6973.33	478.91	254.86	0.0	0.0	0.0
	20.00	805.00	0.0	0.0	461.40	45700.00	479.60	8533.63	481.91	1147.95	0.0	0.0	0.0
VO	20.00	805.00	0.0	0.0	461.40	58500.00	480.81	10256.30	483.48	2014.26	0.0	0.0	0.0
	20.00	805.00	0.0	0.0	461.40	102000.00	483.60	16973.63	486.76	2066.44	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	24300.00	478.89	7882.23	479.50	504.95	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	45700.00	481.86	12255.23	483.04	898.54	0.0	0.0	0.0
VP	21.00	525.00	0.0	0.0	462.80	58500.00	483.31	15009.24	484.74	1281.43	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	102000.00	485.83	21013.59	488.37	1412.21	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	24300.00	479.15	9636.12	479.93	195.70	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	45700.00	482.13	12866.25	483.95	343.94	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	58500.00	483.46	14422.87	486.00	669.83	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	102000.00	485.45	17163.32	491.33	833.48	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	24300.00	479.18	9662.04	479.96	195.77	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	45700.00	482.92	13768.22	484.57	544.78	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	58500.00	484.64	16099.46	486.81	832.15	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	102000.00	485.94	18101.68	491.43	847.13	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	24300.00	479.42	9415.52	480.04	275.86	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	45700.00	483.42	14284.44	484.73	670.08	0.0	0.0	0.0
VQ	23.00	55.00	0.0	0.0	458.30	58500.00	485.42	17415.54	487.04	841.12	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	102000.00	489.70	25880.07	492.38	898.11	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	24300.00	479.48	7312.45	480.46	281.83	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	45700.00	483.43	11208.77	485.40	409.45	0.0	0.0	0.0
VR	24.00	370.00	0.0	0.0	462.80	58500.00	485.37	13574.36	487.81	946.12	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	102000.00	489.89	21320.65	493.26	1035.02	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	24300.00	480.54	6366.38	481.43	761.89	0.0	0.0	0.0
VS	25.00	750.00	0.0	0.0	465.20	45700.00	486.05	15047.50	486.84	1326.33	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	58500.00	488.70	21180.36	489.44	1384.59	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	102000.00	494.43	38335.12	495.27	1427.94	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	24300.00	481.16	5861.21	482.37	537.07	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	45700.00	486.39	12148.86	487.75	891.35	0.0	0.0	0.0
VT	26.00	450.00	0.0	0.0	465.50	58500.00	488.95	16448.24	490.31	942.09	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	102000.00	494.60	28636.33	496.27	1023.77	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	24300.00	482.39	8177.28	483.05	553.55	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	45700.00	487.41	15303.75	488.37	631.89	0.0	0.0	0.0
VU	27.00	540.00	0.0	0.0	467.80	58500.00	489.77	19453.89	490.88	733.77	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	102000.00	495.17	30914.83	496.88	798.17	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	24300.00	483.24	6423.10	484.17	378.89	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	45700.00	488.12	11791.41	489.58	436.38	0.0	0.0	0.0
VV	28.00	940.00	0.0	0.0	468.50	58500.00	490.40	14875.47	492.17	592.05	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	102000.00	495.72	23818.45	498.50	687.84	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	20.00	805.00	0.0	0.0	461.40	24300.00	477.97	6973.33	478.91	254.86	0.0	0.0	0.0
	20.00	805.00	0.0	0.0	461.40	45700.00	479.60	8533.63	481.91	1147.95	0.0	0.0	0.0
VO	20.00	805.00	0.0	0.0	461.40	58500.00	480.81	10256.30	483.48	2014.26	0.0	0.0	0.0
	20.00	805.00	0.0	0.0	461.40	102000.00	483.60	16973.63	486.76	2066.44	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	24300.00	478.89	7882.23	479.50	504.95	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	45700.00	481.86	12255.23	483.04	898.54	0.0	0.0	0.0
VP	21.00	525.00	0.0	0.0	462.80	58500.00	483.31	15009.24	484.74	1281.43	0.0	0.0	0.0
	21.00	525.00	0.0	0.0	462.80	102000.00	485.83	21013.59	488.37	1412.21	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	24300.00	479.15	9636.12	479.93	195.70	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	45700.00	482.13	12866.25	483.95	343.94	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	58500.00	483.46	14422.87	486.00	669.83	0.0	0.0	0.0
	23.01	445.00	0.0	0.0	458.30	102000.00	485.45	17163.32	491.33	833.48	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	24300.00	479.18	9662.04	479.96	195.77	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	45700.00	482.92	13768.22	484.57	544.78	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	58500.00	484.64	16099.46	486.81	832.15	0.0	0.0	0.0
	23.02	30.00	482.50	485.00	458.30	102000.00	485.94	18101.68	491.43	847.13	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	24300.00	479.42	9415.52	480.04	275.86	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	45700.00	483.42	14284.44	484.73	670.08	0.0	0.0	0.0
VQ	23.00	55.00	0.0	0.0	458.30	58500.00	485.42	17415.54	487.04	841.12	0.0	0.0	0.0
	23.00	55.00	0.0	0.0	458.30	102000.00	489.70	25880.07	492.38	898.11	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	24300.00	479.48	7312.45	480.46	281.83	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	45700.00	483.43	11208.77	485.40	409.45	0.0	0.0	0.0
VR	24.00	370.00	0.0	0.0	462.80	58500.00	485.37	13574.36	487.81	946.12	0.0	0.0	0.0
	24.00	370.00	0.0	0.0	462.80	102000.00	489.89	21320.65	493.26	1035.02	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	24300.00	480.54	6366.38	481.43	761.89	0.0	0.0	0.0
VS	25.00	750.00	0.0	0.0	465.20	45700.00	486.05	15047.50	486.84	1326.33	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	58500.00	488.70	21180.36	489.44	1384.59	0.0	0.0	0.0
	25.00	750.00	0.0	0.0	465.20	102000.00	494.43	38335.12	495.27	1427.94	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	24300.00	481.16	5861.21	482.37	537.07	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	45700.00	486.39	12148.86	487.75	891.35	0.0	0.0	0.0
VT	26.00	450.00	0.0	0.0	465.50	58500.00	488.95	16448.24	490.31	942.09	0.0	0.0	0.0
	26.00	450.00	0.0	0.0	465.50	102000.00	494.60	28636.33	496.27	1023.77	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	24300.00	482.39	8177.28	483.05	553.55	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	45700.00	487.41	15303.75	488.37	631.89	0.0	0.0	0.0
VU	27.00	540.00	0.0	0.0	467.80	58500.00	489.77	19453.89	490.88	733.77	0.0	0.0	0.0
	27.00	540.00	0.0	0.0	467.80	102000.00	495.17	30914.83	496.88	798.17	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	24300.00	483.24	6423.10	484.17	378.89	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	45700.00	488.12	11791.41	489.58	436.38	0.0	0.0	0.0
VV	28.00	940.00	0.0	0.0	468.50	58500.00	490.40	14875.47	492.17	592.05	0.0	0.0	0.0
	28.00	940.00	0.0	0.0	468.50	102000.00	495.7[illegible]	23818.45	498.50	687.84	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	29.00	790.00	0.0	0.0	470.10	24300.00	484.52	7132.73	485.19	838.93	0.0	0.0	0.0
	29.00	790.00	0.0	0.0	470.10	45700.00	489.87	15560.60	490.53	1014.20	0.0	0.0	0.0
VW	29.00	790.00	0.0	0.0	470.10	58500.00	492.43	20790.27	493.10	1037.87	0.0	0.0	0.0
	29.00	790.00	0.0	0.0	470.10	102000.00	498.71	36545.99	499.56	1096.26	0.0	0.0	0.0
	30.00	410.00	0.0	0.0	471.00	24300.00	485.19	7962.98	485.63	928.21	0.0	0.0	0.0
VX	30.00	410.00	0.0	0.0	471.00	45700.00	490.36	18310.19	490.83	992.64	0.0	0.0	0.0
	30.00	410.00	0.0	0.0	471.00	58500.00	492.87	24675.47	493.38	1018.34	0.0	0.0	0.0
	30.00	410.00	0.0	0.0	471.00	102000.00	499.14	44271.82	499.82	1119.38	0.0	0.0	0.0
	31.00	575.00	0.0	0.0	472.90	24300.00	485.69	7104.00	486.25	1082.99	0.0	0.0	0.0
	31.00	575.00	0.0	0.0	472.90	45700.00	490.69	16636.99	491.21	1218.06	0.0	0.0	0.0
VY	31.00	575.00	0.0	0.0	472.90	58500.00	493.18	22809.90	493.70	1251.78	0.0	0.0	0.0
	31.00	575.00	0.0	0.0	472.90	102000.00	499.49	42351.91	500.12	1303.01	0.0	0.0	0.0
	32.00	630.00	0.0	0.0	470.80	24300.00	486.13	5277.31	487.61	824.15	0.0	0.0	0.0
	32.00	630.00	0.0	0.0	470.80	45700.00	490.90	11567.86	492.16	894.07	0.0	0.0	0.0
VZ	32.00	630.00	0.0	0.0	470.80	58500.00	493.34	15834.91	494.53	913.49	0.0	0.0	0.0
	32.00	630.00	0.0	0.0	470.80	102000.00	499.59	29746.50	500.87	991.37	0.0	0.0	0.0
	33.00	380.00	0.0	0.0	469.00	24300.00	487.49	8880.27	488.10	1086.11	0.0	0.0	0.0
	33.00	380.00	0.0	0.0	469.00	45700.00	491.85	16975.86	492.53	1149.47	0.0	0.0	0.0
WA	33.00	380.00	0.0	0.0	469.00	58500.00	494.17	22434.83	494.86	1160.05	0.0	0.0	0.0
	33.00	380.00	0.0	0.0	469.00	102000.00	500.36	40615.66	501.15	1228.49	0.0	0.0	0.0
	34.00	480.00	0.0	0.0	475.40	24300.00	487.78	5509.39	488.72	957.67	0.0	0.0	0.0
	34.00	480.00	0.0	0.0	475.40	45700.00	492.16	12406.11	493.02	1018.80	0.0	0.0	0.0
WB	34.00	480.00	0.0	0.0	475.40	58500.00	494.45	17182.77	495.30	1055.67	0.0	0.0	0.0
	34.00	480.00	0.0	0.0	475.40	102000.00	500.60	33437.45	501.54	1123.46	0.0	0.0	0.0
	35.00	720.00	0.0	0.0	477.60	24300.00	489.15	4887.21	490.27	1223.95	0.0	0.0	0.0
WC	35.00	720.00	0.0	0.0	477.60	45700.00	493.15	11412.07	494.01	1454.67	0.0	0.0	0.0
	35.00	720.00	0.0	0.0	477.60	58500.00	495.37	16453.04	496.12	1548.90	0.0	0.0	0.0
	35.00	720.00	0.0	0.0	477.60	102000.00	501.51	35357.77	502.16	1633.50	0.0	0.0	0.0
	36.00	740.00	0.0	0.0	474.20	24300.00	490.99	6931.46	491.69	351.93	0.0	0.0	0.0
WD	36.00	740.00	0.0	0.0	474.20	45700.00	494.18	10675.12	495.64	374.24	0.0	0.0	0.0
	36.00	740.00	0.0	0.0	474.20	58500.00	496.03	13175.85	497.87	385.17	0.0	0.0	0.0
	36.00	740.00	0.0	0.0	474.20	102000.00	501.33	21565.77	504.34	412.02	0.0	0.0	0.0
	36.10	60.00	0.0	0.0	475.00	24300.00	490.93	4855.63	491.95	310.65	0.0	0.0	0.0
	36.10	60.00	0.0	0.0	475.00	45700.00	494.03	7448.52	496.08	319.62	0.0	0.0	0.0
	36.10	60.00	0.0	0.0	475.00	58500.00	495.85	9094.88	498.39	374.12	0.0	0.0	0.0
	36.10	60.00	0.0	0.0	475.00	102000.00	501.07	14527.16	504.98	416.64	0.0	0.0	0.0
	36.20	10.00	513.00	532.00	475.00	24300.00	490.96	4872.24	491.98	310.93	0.0	0.0	0.0
	36.20	10.00	513.00	532.00	475.00	45700.00	494.10	7503.98	496.13	319.85	0.0	0.0	0.0
	36.20	10.00	513.00	532.00	475.00	58500.00	495.93	9168.10	498.44	374.75	0.0	0.0	0.0
	36.20	10.00	513.00	532.00	475.00	102000.00	501.19	14658.96	505.05	417.59	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	43.00	230.00	0.0	0.0	481.00	24300.00	493.39	19580.02	493.43	2708.79	0.0	0.0	0.0
	43.00	230.00	0.0	0.0	481.00	45700.00	497.79	47251.38	497.83	3320.94	0.0	0.0	0.0
WI	43.00	230.00	0.0	0.0	481.00	58500.00	500.22	67731.44	500.26	3338.24	0.0	0.0	0.0
	43.00	230.00	0.0	0.0	481.00	102000.00	507.60	148684.81	507.64	3430.94	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	20000.00	493.42	4755.85	494.17	599.29	0.0	0.0	0.0
WJ	44.00	415.00	0.0	0.0	480.60	38000.00	497.79	11566.20	498.35	1565.57	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	48800.00	500.23	18298.09	500.63	1621.36	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	87000.00	507.60	49163.30	507.85	1797.10	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	20000.00	494.02	3531.23	495.31	274.49	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	38000.00	497.95	7280.82	499.25	1226.39	0.0	0.0	0.0
WK	45.00	420.00	0.0	0.0	481.50	48800.00	500.34	11911.60	501.19	1238.01	0.0	0.0	0.0
	45.00	420.00	0.0	0.0	481.50	87009.00	507.62	34045.30	508.09	1646.20	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	20000.00	495.87	4691.17	496.69	695.42	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	38000.00	499.68	11196.98	500.26	1224.90	0.0	0.0	0.0
WL	46.00	565.00	0.0	0.0	482.20	48800.00	501.38	15602.67	501.92	1239.34	0.0	0.0	0.0
	46.00	565.00	0.0	0.0	482.20	87000.00	508.02	40554.98	508.40	1525.57	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	20000.00	497.13	5987.73	497.52	1021.70	0.0	0.0	0.0
WM	47.00	630.00	0.0	0.0	484.00	38000.00	500.36	10842.91	500.86	1157.83	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	48800.00	501.89	13850.42	502.46	1165.89	0.0	0.0	0.0
	47.00	630.00	0.0	0.0	484.00	87000.00	508.20	30704.48	508.70	1408.68	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	20000.00	497.80	5331.98	498.30	624.38	0.0	0.0	0.0
WN	48.00	610.00	0.0	0.0	486.00	38000.00	501.04	9549.41	501.75	929.21	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	48800.00	502.57	12099.34	503.36	938.65	0.0	0.0	0.0
	48.00	610.00	0.0	0.0	486.00	87000.00	508.58	25991.78	509.32	1171.42	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	20000.00	498.62	6123.05	498.98	660.47	0.0	0.0	0.0
WO	49.00	555.00	0.0	0.0	486.30	38000.00	501.95	10698.42	502.54	710.94	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	48800.00	503.48	13178.26	504.19	723.82	0.0	0.0	0.0
	49.00	555.00	0.0	0.0	486.30	87000.00	509.14	25334.20	509.99	995.87	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	20000.00	499.02	5851.13	499.53	519.18	0.0	0.0	0.0
WP	50.00	465.00	0.0	0.0	486.20	38000.00	502.33	9503.86	503.28	543.67	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11412.67	505.05	553.87	0.0	0.0	0.0
	50.00	465.00	0.0	0.0	486.20	87000.00	509.22	20198.79	510.89	988.51	0.0	0.0	0.0

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
1.010	24300.000	457.302	0.0	0.0	0.0	306.922	0.0	0.0
1.010	45700.000	460.697	3.395	0.0	0.0	351.926	-45.004	0.0
1.010	58500.000	462.239	1.542	0.0	0.0	371.863	-64.941	0.0
1.010	102000.000	467.641	5.402	0.0	0.0	864.156	-557.234	0.0
1.020	24300.000	461.105	0.0	3.803	0.0	356.227	0.0	450.000
1.020	45700.000	465.016	3.911	4.319	0.0	498.984	-142.758	450.000
1.020	58500.000	466.984	1.968	4.745	0.0	750.832	-394.605	450.000
1.020	102000.000	472.805	5.821	5.164	0.0	3811.156	-3454.930	450.000
1.000	24300.000	462.443	0.0	1.339	0.0	374.895	0.0	680.000
1.000	45700.000	466.626	4.182	1.610	0.0	681.844	-306.949	680.000
1.000	58500.000	468.694	2.069	1.711	0.0	1052.117	-677.223	680.000
1.000	102000.000	474.246	5.552	1.441	0.0	4771.719	-4396.824	680.000
1.100	24300.000	463.430	0.0	0.987	0.0	211.359	0.0	700.000
1.100	45700.000	467.666	4.236	1.040	0.0	1019.195	-807.836	700.000
1.100	58500.000	470.087	2.421	1.392	0.0	2561.301	-2149.941	700.000
1.100	102000.000	475.631	5.544	1.385	0.0	4935.129	-4723.770	700.000

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	10.00	860.00	0.0	0.0	456.70	24300.00	469.21	8209.09	469.48	3214.88	0.0	0.0	0.0
	10.00	860.00	0.0	0.0	456.70	45700.00	474.17	34647.36	474.23	4419.25	0.0	0.0	0.0
VH	10.00	860.00	0.0	0.0	456.70	58500.00	476.18	51415.77	476.24	4658.92	0.0	0.0	0.0
	10.00	860.00	0.0	0.0	456.70	102000.00	478.57	75543.38	478.66	4945.16	0.0	0.0	0.0
	11.00	675.00	0.0	0.0	459.40	24300.00	469.65	7571.29	469.96	2822.57	0.0	0.0	0.0
VI	11.00	675.00	0.0	0.0	459.40	45700.00	474.23	29686.05	474.32	4137.62	0.0	0.0	0.0
	11.00	675.00	0.0	0.0	459.40	58500.00	476.23	44880.45	476.30	4321.93	0.0	0.0	0.0
	11.00	675.00	0.0	0.0	459.40	102000.00	478.64	67234.38	478.74	4626.09	0.0	0.0	0.0
	11.10	75.00	0.0	0.0	459.40	24300.00	469.83	8019.23	470.10	2902.64	0.0	0.0	0.0
	11.10	75.00	0.0	0.0	459.40	45700.00	474.27	29692.20	474.36	4098.54	0.0	0.0	0.0
	11.10	75.00	0.0	0.0	459.40	58500.00	476.26	44730.84	476.33	4248.57	0.0	0.0	0.0
	11.10	75.00	0.0	0.0	459.40	102000.00	478.68	67012.31	478.78	4431.33	0.0	0.0	0.0
	12.01	5.00	480.00	476.90	452.90	24300.00	469.78	8010.18	470.17	1583.37	0.0	0.0	0.0
	12.01	5.00	480.00	476.90	452.90	45700.00	474.24	23517.72	474.39	3640.96	0.0	0.0	0.0
	12.01	5.00	480.00	476.90	452.90	58500.00	476.25	32609.55	476.34	4036.19	0.0	0.0	0.0
	12.01	5.00	480.00	476.90	452.90	102000.00	478.67	48848.30	478.79	4484.27	0.0	0.0	0.0
	12.10	110.00	480.00	476.90	452.90	24300.00	469.90	8268.83	470.27	1656.89	0.0	0.0	0.0
	12.10	110.00	480.00	476.90	452.90	45700.00	474.28	23716.88	474.43	3648.17	0.0	0.0	0.0
	12.10	110.00	480.00	476.90	452.90	58500.00	476.29	32774.10	476.37	4041.75	0.0	0.0	0.0
	12.10	110.00	480.00	476.90	452.90	102000.00	478.72	49181.27	478.84	4489.82	0.0	0.0	0.0
	13.10	5.00	0.0	0.0	460.00	24300.00	469.88	6419.80	470.31	1497.76	0.0	0.0	0.0
	13.10	5.00	0.0	0.0	460.00	45700.00	474.31	22842.24	474.44	4013.98	0.0	0.0	0.0
	13.10	5.00	0.0	0.0	460.00	58500.00	476.28	35740.82	476.38	4304.26	0.0	0.0	0.0
	13.10	5.00	0.0	0.0	460.00	102000.00	478.71	56102.19	478.85	4537.01	0.0	0.0	0.0
	13.20	115.00	0.0	0.0	460.00	24300.00	470.08	6806.98	470.47	2031.35	0.0	0.0	0.0
	13.20	115.00	0.0	0.0	460.00	45700.00	474.35	23140.77	474.48	4024.42	0.0	0.0	0.0
VJ	13.20	115.00	0.0	0.0	460.00	58500.00	476.31	35992.40	476.41	4307.58	0.0	0.0	0.0
	13.20	115.00	0.0	0.0	460.00	102000.00	478.74	56377.83	478.89	4539.81	0.0	0.0	0.0
	14.00	635.00	0.0	0.0	456.00	24300.00	470.53	10671.93	470.76	2348.04	0.0	0.0	0.0
VK	14.00	635.00	0.0	0.0	456.00	45700.00	474.43	27160.61	474.56	3882.43	0.0	0.0	0.0
	14.00	635.00	0.0	0.0	456.00	58500.00	476.35	39976.17	476.45	4236.61	0.0	0.0	0.0
	14.00	635.00	0.0	0.0	456.00	102000.00	478.79	60476.95	478.94	4472.95	0.0	0.0	0.0
	16.01	684.00	0.0	0.0	458.00	24300.00	470.01	5101.14	471.75	191.00	0.0	0.0	0.0
	16.01	684.00	0.0	0.0	458.00	45700.00	474.41	19099.80	474.74	2997.67	0.0	0.0	0.0
	16.01	684.00	0.0	0.0	458.00	58500.00	476.32	27905.69	476.58	3794.65	0.0	0.0	0.0
	16.01	684.00	0.0	0.0	458.00	102000.00	478.74	42490.75	479.08	4030.29	0.0	0.0	0.0
	16.02	10.00	485.70	494.60	458.00	24300.00	469.99	4308.39	471.79	188.00	0.0	0.0	0.0
	16.02	10.00	485.70	494.60	458.00	45700.00	474.50	17391.58	474.75	2981.61	0.0	0.0	0.0
	16.02	10.00	485.70	494.60	458.00	58500.00	476.39	25448.70	476.59	3277.09	0.0	0.0	0.0
	16.02	10.00	485.70	494.60	458.00	102000.00	478.83	38458.67	479.10	3479.08	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	16.03	76.00	485.70	494.60	458.00	24300.00	470.33	4496.94	472.03	188.00	0.0	0.0	0.0
	16.03	76.00	485.70	494.60	458.00	45700.00	474.55	17572.71	474.81	2986.45	0.0	0.0	0.0
	16.03	76.00	485.70	494.60	458.00	58500.00	476.44	25623.45	476.63	3280.08	0.0	0.0	0.0
	16.03	76.00	485.70	494.60	458.00	102000.00	478.88	38747.91	479.15	3483.15	0.0	0.0	0.0
	16.04	10.00	0.0	0.0	458.00	24300.00	470.44	5406.33	472.07	191.00	0.0	0.0	0.0
	16.04	10.00	0.0	0.0	458.00	45700.00	474.51	19524.54	474.83	3008.09	0.0	0.0	0.0
	16.04	10.00	0.0	0.0	458.00	58500.00	476.40	28320.40	476.65	3802.30	0.0	0.0	0.0
	16.04	10.00	0.0	0.0	458.00	102000.00	478.84	43186.66	479.18	4040.24	0.0	0.0	0.0
	16.00	60.00	0.0	0.0	459.00	24300.00	471.37	6396.10	472.24	484.27	0.0	0.0	0.0
	16.00	60.00	0.0	0.0	459.00	45700.00	474.70	22673.95	474.87	3907.63	0.0	0.0	0.0
VL	16.00	60.00	0.0	0.0	459.00	58500.00	476.54	33240.89	476.68	4282.23	0.0	0.0	0.0
	16.00	60.00	0.0	0.0	459.00	102000.00	479.02	51088.25	479.22	4606.56	0.0	0.0	0.0
	18.01	738.00	0.0	0.0	459.00	24300.00	471.97	4684.69	474.01	170.00	0.0	0.0	0.0
	18.01	738.00	0.0	0.0	459.00	45700.00	474.96	16309.48	475.35	3517.08	0.0	0.0	0.0
	18.01	738.00	0.0	0.0	459.00	58500.00	476.75	24640.36	477.03	3696.41	0.0	0.0	0.0
	18.01	738.00	0.0	0.0	459.00	102000.00	479.30	39747.53	479.63	3960.64	0.0	0.0	0.0
	18.02	10.00	473.10	478.50	459.00	24300.00	471.81	4223.67	474.12	207.55	0.0	0.0	0.0
	18.02	10.00	473.10	478.50	459.00	45700.00	475.15	14042.07	475.37	3536.27	0.0	0.0	0.0
	18.02	10.00	473.10	478.50	459.00	58500.00	476.91	20408.50	477.05	3711.95	0.0	0.0	0.0
	18.02	10.00	473.10	478.50	459.00	102000.00	479.49	32798.59	479.66	3976.00	0.0	0.0	0.0
	18.03	27.00	473.10	478.50	459.00	24300.00	471.96	4305.51	474.21	208.29	0.0	0.0	0.0
	18.03	27.00	473.10	478.50	459.00	45700.00	475.18	14130.20	475.40	3538.75	0.0	0.0	0.0
	18.03	27.00	473.10	478.50	459.00	58500.00	476.93	20489.92	477.07	3713.83	0.0	0.0	0.0
	18.03	27.00	473.10	478.50	459.00	102000.00	479.52	32698.94	479.68	3977.82	0.0	0.0	0.0
	18.04	10.00	0.0	0.0	459.00	24300.00	472.36	4930.77	474.27	170.00	0.0	0.0	0.0
	18.04	10.00	0.0	0.0	459.00	45700.00	475.09	16852.07	475.45	3530.19	0.0	0.0	0.0
	18.04	10.00	0.0	0.0	459.00	58500.00	476.85	25144.52	477.11	3706.09	0.0	0.0	0.0
	18.04	10.00	0.0	0.0	459.00	102000.00	479.42	40520.93	479.74	3970.20	0.0	0.0	0.0
	18.00	55.00	0.0	0.0	459.00	24300.00	472.96	5329.98	474.44	250.85	0.0	0.0	0.0
VM	18.00	55.00	0.0	0.0	459.00	45700.00	475.21	16977.10	475.50	3542.27	0.0	0.0	0.0
	18.00	55.00	0.0	0.0	459.00	58500.00	476.94	25137.30	477.15	3714.62	0.0	0.0	0.0
	18.00	55.00	0.0	0.0	459.00	102000.00	479.51	40743.24	479.78	3978.16	0.0	0.0	0.0
VN	19.00	1283.00	0.0	0.0	460.70	24300.00	475.81	9824.07	476.27	506.47	0.0	0.0	0.0
	19.00	1283.00	0.0	0.0	460.70	45700.00	476.40	13584.41	477.11	3060.95	0.0	0.0	0.0
	19.00	1283.00	0.0	0.0	460.70	58500.00	477.89	18708.96	478.50	3342.07	0.0	0.0	0.0
	19.00	1283.00	0.0	0.0	460.70	102000.00	480.63	31599.27	481.30	3761.78	0.0	0.0	0.0
	19.10	805.00	0.0	0.0	461.90	24300.00	476.36	5780.23	477.59	304.98	0.0	0.0	0.0
	19.10	805.00	0.0	0.0	461.90	45700.00	477.45	8446.05	479.23	1966.14	0.0	0.0	0.0
	19.10	805.00	0.0	0.0	461.90	58500.00	478.79	11320.66	480.41	2136.32	0.0	0.0	0.0
	19.10	805.00	0.0	0.0	461.90	102000.00	481.57	19474.87	483.27	2436.67	0.0	0.0	0.0

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

Fishing Creek

FISHING CREEK 500 YEAR F

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
1.01	0.0	0.0	0.0	448.20	24300.00	457.30	2566.21	460.35	306.92	0.0	0.0	456.10
1.01	0.0	0.0	0.0	448.20	45700.00	460.70	5143.94	464.88	351.93	0.0	0.0	459.20
1.01	0.0	0.0	0.0	448.20	58500.00	462.24	6680.32	467.10	371.86	0.0	0.0	460.70
1.01	0.0	0.0	0.0	448.20	102000.00	467.64	14085.07	473.02	864.16	0.0	0.0	464.90
1.02	450.00	0.0	0.0	448.20	24300.00	461.10	5514.29	462.18	356.23	0.0	0.0	0.0
1.02	450.00	0.0	0.0	448.20	45700.00	465.02	10048.25	466.76	498.98	0.0	0.0	0.0
1.02	450.00	0.0	0.0	448.20	58500.00	466.98	12966.91	468.98	750.83	0.0	0.0	0.0
1.02	450.00	0.0	0.0	448.20	102000.00	472.80	27515.61	474.47	3811.16	0.0	0.0	0.0
1.00	680.00	0.0	0.0	448.20	24300.00	462.44	6909.70	463.25	374.89	0.0	0.0	0.0
VA 1.00	680.00	0.0	0.0	448.20	45700.00	466.63	12393.20	467.93	681.84	0.0	0.0	0.0
1.00	680.00	0.0	0.0	448.20	58500.00	468.69	16061.32	470.14	1052.12	0.0	0.0	0.0
1.00	680.00	0.0	0.0	448.20	102000.00	474.25	34813.15	475.26	4771.72	0.0	0.0	0.0
	1130											
VB 1.10	700.00	0.0	0.0	449.40	24300.00	463.43	4321.27	464.69	211.36	0.0	0.0	0.0
1.10	700.00	0.0	0.0	449.40	45700.00	467.67	6777.68	469.74	1019.20	0.0	0.0	0.0
1.10	700.00	0.0	0.0	449.40	58500.00	470.09	10181.03	471.51	2361.30	0.0	0.0	0.0
1.10	700.00	0.0	0.0	449.40	102000.00	475.63	35958.11	475.89	4935.13	0.0	0.0	0.0
	1830											
VC 2.00	230.00	0.0	0.0	446.00	24300.00	464.15	7890.28	465.09	298.09	0.0	0.0	0.0
2.00	230.00	0.0	0.0	446.00	45700.00	469.16	15207.13	470.26	2767.23	0.0	0.0	0.0
2.00	230.00	0.0	0.0	446.00	58500.00	471.15	22346.64	471.92	3443.27	0.0	0.0	0.0
2.00	230.00	0.0	0.0	446.00	102000.00	475.73	52697.01	476.08	5055.29	0.0	0.0	0.0
	2060											
3.01	125.00	0.0	0.0	449.50	24300.00	463.94	5567.88	465.62	162.00	0.0	0.0	0.0
3.01	125.00	0.0	0.0	449.50	45700.00	469.30	14404.26	470.37	3062.35	0.0	0.0	0.0
3.01	125.00	0.0	0.0	449.50	58500.00	471.42	22891.14	472.03	4087.02	0.0	0.0	0.0
3.01	125.00	0.0	0.0	449.50	102000.00	475.86	55237.27	476.13	5121.92	0.0	0.0	0.0
	2180											
3.02	10.00	467.60	476.10	449.50	24300.00	463.97	5903.88	465.64	274.92	0.0	0.0	0.0
3.02	10.00	467.60	476.10	449.50	45700.00	468.97	11942.30	470.73	2881.20	0.0	0.0	0.0
3.02	10.00	467.60	476.10	449.50	58500.00	471.30	20190.35	472.16	4083.86	0.0	0.0	0.0
3.02	10.00	467.60	476.10	449.50	102000.00	476.01	45652.81	476.16	5242.07	0.0	0.0	0.0
	2190											
3.10	21.00	467.60	476.10	449.50	24300.00	464.02	5944.90	465.68	275.45	0.0	0.0	0.0
3.10	21.00	467.60	476.10	449.50	45700.00	469.61	13720.84	470.89	3252.44	0.0	0.0	0.0
3.10	21.00	467.60	476.10	449.50	58500.00	471.33	20288.28	472.18	4094.98	0.0	0.0	0.0
3.10	21.00	467.60	476.10	449.50	102000.00	476.02	45725.74	476.18	5242.60	0.0	0.0	0.0
	2211											
3.20	10.00	0.0	0.0	449.50	24300.00	464.04	5624.71	465.70	162.00	0.0	0.0	0.0
3.20	10.00	0.0	0.0	449.50	45700.00	470.52	18733.04	471.11	3599.83	0.0	0.0	0.0
3.20	10.00	0.0	0.0	449.50	58500.00	471.77	24756.82	472.29	4389.82	0.0	0.0	0.0
3.20	10.00	0.0	0.0	449.50	102000.00	475.97	56349.91	476.23	5160.92	0.0	0.0	0.0
	2231											
4.01	30.00	0.0	0.0	448.30	24300.00	465.96	13867.36	466.19	1292.23	0.0	0.0	0.0
4.01	30.00	0.0	0.0	448.30	45700.00	471.16	31917.61	471.31	5279.79	0.0	0.0	0.0
4.01	30.00	0.0	0.0	448.30	58500.00	472.31	39567.16	472.47	5438.82	0.0	0.0	0.0
4.01	30.00	0.0	0.0	448.30	102000.00	476.22	77106.00	476.34	5844.68	0.0	0.0	0.0

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK 500 YEAR F

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	50.00	465.00	0.0	0.0	486.20	20000.00	499.02	5850.17	499.53	519.18	0.0	0.0	499.02
	50.00	465.00	0.0	0.0	486.20	38000.00	502.33	9502.17	503.28	548.66	0.0	0.0	502.33
	50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11411.62	505.05	553.87	0.0	0.0	503.83
	50.00	465.00	0.0	0.0	486.20	87000.00	509.22	20195.80	510.89	988.50	0.0	0.0	509.22
	51.00	225.00	0.0	0.0	486.10	20000.00	499.23	5628.93	499.82	448.99	0.0	0.0	0.0
	51.00	225.00	0.0	0.0	486.10	38000.00	502.59	9255.66	503.68	475.12	0.0	0.0	0.0
WQ	51.00	225.00	0.0	0.0	486.10	48800.00	504.11	11155.47	505.51	481.02	0.0	0.0	0.0
	51.00	225.00	0.0	0.0	486.10	87000.00	509.61	20230.42	511.30	1123.39	0.0	0.0	0.0
	52.00	225.00	0.0	0.0	489.30	20000.00	499.42	4462.52	500.34	351.21	0.0	0.0	0.0
	52.00	225.00	0.0	0.0	489.30	38000.00	502.76	7711.87	504.41	385.36	0.0	0.0	0.0
VR	52.00	225.00	0.0	0.0	489.30	48800.00	504.27	9428.89	506.37	391.76	0.0	0.0	0.0
	52.00	225.00	0.0	0.0	489.30	87000.00	509.63	17778.59	512.21	1277.45	0.0	0.0	0.0
	52.10	275.00	0.0	0.0	489.60	20000.00	499.87	3708.13	501.48	252.39	0.0	0.0	0.0
WS	52.10	275.00	0.0	0.0	489.60	38000.00	503.19	6175.45	506.18	287.16	0.0	0.0	0.0
	52.10	275.00	0.0	0.0	489.60	48800.00	504.67	7462.70	508.51	302.55	0.0	0.0	0.0
	52.10	275.00	0.0	0.0	489.60	87000.00	510.14	14044.09	514.86	1228.34	0.0	0.0	0.0
WT	53.00	275.00	0.0	0.0	489.90	20000.00	500.66	3510.68	502.46	205.39	0.0	0.0	0.0
	53.00	275.00	0.0	0.0	489.90	38000.00	504.18	5937.87	507.48	278.95	0.0	0.0	0.0
	53.00	275.00	0.0	0.0	489.90	48800.00	505.78	7289.76	509.92	294.84	0.0	0.0	0.0
	53.00	275.00	0.0	0.0	489.90	87000.00	512.07	15685.10	515.89	1375.92	0.0	0.0	0.0
	54.00	805.00	0.0	0.0	491.50	20000.00	503.32	3933.17	504.82	203.08	0.0	0.0	0.0
	54.00	805.00	0.0	0.0	491.50	38000.00	507.75	7009.94	510.33	282.40	0.0	0.0	0.0
WU	54.00	805.00	0.0	0.0	491.50	48800.00	509.86	8835.27	512.97	299.20	0.0	0.0	0.0
	54.00	805.00	0.0	0.0	491.50	87000.00	514.51	14241.43	519.29	1400.39	0.0	0.0	0.0
	55.00	655.00	0.0	0.0	491.80	20000.00	504.95	4681.07	506.25	232.57	0.0	0.0	0.0
	55.00	655.00	0.0	0.0	491.80	38000.00	509.89	8743.36	511.91	326.67	0.0	0.0	0.0
WV	55.00	655.00	0.0	0.0	491.80	48800.00	512.26	11203.93	514.60	339.30	0.0	0.0	0.0
	55.00	655.00	0.0	0.0	491.80	87000.00	518.42	20890.88	521.10	1141.40	0.0	0.0	0.0
	56.00	380.00	0.0	0.0	491.70	20000.00	505.36	3368.20	507.42	201.34	0.0	0.0	0.0
	56.00	380.00	0.0	0.0	491.70	38000.00	510.54	7385.30	512.83	447.53	0.0	0.0	0.0
	56.00	380.00	0.0	0.0	491.70	48800.00	513.09	10193.99	515.40	479.61	0.0	0.0	0.0
	56.00	380.00	0.0	0.0	491.70	87000.00	519.20	19518.49	521.81	1150.16	0.0	0.0	0.0
	57.00	500.00	0.0	0.0	493.40	20000.00	507.51	3515.91	509.15	511.62	0.0	0.0	0.0
	57.00	500.00	0.0	0.0	493.40	38000.00	512.73	9164.80	513.99	682.68	0.0	0.0	0.0
WX	57.00	500.00	0.0	0.0	493.40	48800.00	515.20	13059.20	516.39	693.07	0.0	0.0	0.0
	57.00	500.00	0.0	0.0	493.40	87000.00	521.40	26311.04	522.67	1280.68	0.0	0.0	0.0
	58.00	705.00	0.0	0.0	496.50	20000.00	509.90	4078.10	511.14	623.31	0.0	0.0	0.0
	58.00	705.00	0.0	0.0	496.50	38000.00	513.93	8429.84	515.33	959.27	0.0	0.0	0.0
WY	58.00	705.00	0.0	0.0	496.50	48800.00	516.20	12022.93	517.46	1012.91	0.0	0.0	0.0
	58.00	705.00	0.0	0.0	496.50	87000.00	522.31	25498.41	523.45	1195.48	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	59.00	360.00	0.0	0.0	498.00	20000.00	511.27	5651.68	511.83	1223.05	0.0	0.0	0.0
	59.00	360.00	0.0	0.0	498.00	38000.00	515.39	12295.75	515.91	1402.52	0.0	0.0	0.0
WZ	59.00	360.00	0.0	0.0	498.00	48800.00	517.44	16693.35	517.96	1435.84	0.0	0.0	0.0
	59.00	360.00	0.0	0.0	498.00	87000.00	523.28	32753.92	523.84	1457.61	0.0	0.0	0.0
	60.00	410.00	0.0	0.0	495.90	20000.00	511.69	5254.02	512.60	744.49	0.0	0.0	0.0
XA	60.00	410.00	0.0	0.0	495.90	38000.00	515.61	9547.96	516.86	1012.75	0.0	0.0	0.0
	60.00	410.00	0.0	0.0	495.90	48800.00	517.60	12437.23	518.92	1062.[illegible]3	0.0	0.0	0.0
	60.00	410.00	0.0	0.0	495.90	87000.00	523.33	23244.46	524.81	1206.53	0.0	0.0	0.0
	60.10	41.00	0.0	0.0	495.90	20000.00	511.83	5324.96	512.68	434.00	0.0	0.0	0.0
	60.10	41.00	0.0	0.0	495.90	38000.00	515.85	8947.50	516.98	434.00	0.0	0.0	0.0
	60.10	41.00	0.0	0.0	495.90	48800.00	518.50	14227.79	519.22	685.55	0.0	0.0	0.0
	60.10	41.00	0.0	0.0	495.90	87000.00	524.10	24684.68	525.08	688.89	0.0	0.0	0.0
	60.20	12.00	517.50	524.50	495.90	20000.00	512.43	5791.12	513.14	434.00	0.0	0.0	0.0
	60.20	12.00	517.50	524.50	495.90	38000.00	517.52	12697.63	518.06	684.97	0.0	0.0	0.0
	60.20	12.00	517.50	524.50	495.90	48800.00	519.46	15840.39	520.07	686.13	0.0	0.0	0.0
	60.20	12.00	517.50	524.50	495.90	87000.00	525.92	43335.99	526.16	2100.32	0.0	0.0	0.0
	62.00	417.00	0.0	0.0	504.50	20000.00	513.32	4288.14	513.88	912.78	0.0	0.0	0.0
XB	62.00	417.00	0.0	0.0	504.50	38000.00	518.10	12194.24	518.51	926.53	0.0	0.0	0.0
	62.00	417.00	0.0	0.0	504.50	48800.00	520.09	16570.73	520.53	932.15	0.0	0.0	0.0
	62.00	417.00	0.0	0.0	504.50	87000.00	526.01	32844.04	526.58	948.29	0.0	0.0	0.0
	63.00	544.00	0.0	0.0	505.00	20000.00	514.88	6589.90	515.05	2226.41	0.0	0.0	0.0
	63.00	544.00	0.0	0.0	505.00	38000.00	518.98	19021.09	519.09	2239.23	0.0	0.0	0.0
XC	63.00	544.00	0.0	0.0	505.00	48800.00	520.93	26891.23	521.04	2245.33	0.0	0.0	0.0
	63.00	544.00	0.0	0.0	505.00	87000.00	526.86	57420.71	526.98	2263.39	0.0	0.0	0.0
	64.00	499.00	0.0	0.0	505.30	20000.00	515.44	7418.92	515.57	2166.42	0.0	0.0	0.0
XD	64.00	499.00	0.0	0.0	505.30	38000.00	519.24	18835.68	519.35	2211.71	0.0	0.0	0.0
	64.00	499.00	0.0	0.0	505.30	48800.00	521.15	26329.00	521.26	2217.24	0.0	0.0	0.0
	64.00	499.00	0.0	0.0	505.30	87000.00	527.01	55667.27	527.14	2234.25	0.0	0.0	0.0
	65.00	380.00	0.0	0.0	500.20	20000.00	515.67	7188.19	515.84	1919.24	0.0	0.0	0.0
XE	65.00	380.00	0.0	0.0	500.20	38000.00	519.37	17951.28	519.51	2209.15	0.0	0.0	0.0
	65.00	380.00	0.0	0.0	500.20	48800.00	521.26	25308.73	521.39	2223.61	0.0	0.0	0.0
	65.00	380.00	0.0	0.0	500.20	87000.00	527.09	54847.42	527.23	2329.69	0.0	0.0	0.0
	66.00	350.00	0.0	0.0	505.70	20000.00	516.01	4889.63	516.23	1665.79	0.0	0.0	0.0
XF	66.00	350.00	0.0	0.0	505.70	38000.00	519.56	12621.41	519.73	1997.19	0.0	0.0	0.0
	66.00	350.00	0.0	0.0	505.70	48800.00	521.41	18073.69	521.58	2004.54	0.0	0.0	0.0
	66.00	350.00	0.0	0.0	505.70	87000.00	527.18	40525.39	527.35	2065.09	0.0	0.0	0.0
	67.00	680.00	0.0	0.0	506.00	20000.00	516.86	5069.21	517.10	2075.81	0.0	0.0	0.0
XG	67.00	680.00	0.0	0.0	506.00	38000.00	520.01	12575.97	520.20	2168.35	0.0	0.0	0.0
	67.00	680.00	0.0	0.0	506.00	48800.00	521.77	18083.60	521.94	2193.85	0.0	0.0	0.0
	67.00	680.00	0.0	0.0	506.00	87000.00	527.41	41293.14	527.58	2230.69	0.0	0.0	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
68.00	725.00	0.0	0.0	506.50	20000.00	518.48	3339.49	518.90	1723.01	0.0	0.0	0.0
68.00	725.00	0.0	0.0	506.50	38000.00	520.95	8381.73	521.30	1760.56	0.0	0.0	0.0
XH 68.00	725.00	0.0	0.0	506.50	48800.00	522.48	12535.21	522.82	1799.83	0.0	0.0	0.0
68.00	725.00	0.0	0.0	506.50	87000.00	527.77	32097.71	528.08	1855.65	0.0	0.0	0.0
69.00	425.00	0.0	0.0	513.00	20000.00	519.69	3265.41	520.34	1474.25	0.0	0.0	0.0
69.00	425.00	0.0	0.0	513.00	38000.00	521.62	6262.80	522.42	1678.96	0.0	0.0	0.0
XI 69.00	425.00	0.0	0.0	513.00	48800.00	522.95	8976.00	523.68	1717.83	0.0	0.0	0.0
69.00	425.00	0.0	0.0	513.00	87000.00	527.95	23427.34	528.50	1790.13	0.0	0.0	0.0
70.00	641.00	0.0	0.0	510.00	20000.00	521.98	3476.67	522.78	1371.68	0.0	0.0	0.0
70.00	641.00	0.0	0.0	510.00	38000.00	524.09	6618.85	524.91	2047.01	0.0	0.0	0.0
XJ 70.00	641.00	0.0	0.0	510.00	48800.00	525.11	8759.41	525.90	2057.61	0.0	0.0	0.0
70.00	641.00	0.0	0.0	510.00	87000.00	529.13	20295.18	529.72	2106.31	0.0	0.0	0.0
71.00	501.00	0.0	0.0	512.50	20000.00	523.44	3571.67	524.55	863.49	0.0	0.0	0.0
71.00	501.00	0.0	0.0	512.50	38000.00	525.54	6025.97	527.10	2075.27	0.0	0.0	0.0
XK 71.00	501.00	0.0	0.0	512.50	48800.00	526.48	7741.78	528.04	2102.83	0.0	0.0	0.0
71.00	501.00	0.0	0.0	512.50	87000.00	529.94	17604.98	530.97	2121.64	0.0	0.0	0.0
XL 72.00	790.00	0.0	0.0	512.30	20000.00	525.90	5098.60	526.20	1058.77	0.0	0.0	0.0
72.00	790.00	0.0	0.0	512.30	38000.00	528.50	10016.85	528.85	2258.60	0.0	0.0	0.0
72.00	790.00	0.0	0.0	512.30	48800.00	529.41	12549.10	529.81	2262.33	0.0	0.0	0.0
72.00	790.00	0.0	0.0	512.30	87000.00	531.83	21014.11	532.39	2267.52	0.0	0.0	0.0
73.00	575.00	0.0	0.0	516.40	20000.00	526.79	6163.20	527.00	1478.33	0.0	0.0	0.0
XM 73.00	575.00	0.0	0.0	516.40	38000.00	529.35	11501.62	529.63	1542.14	0.0	0.0	0.0
73.00	575.00	0.0	0.0	516.40	48800.00	530.30	13958.73	530.66	1568.74	0.0	0.0	0.0
73.00	575.00	0.0	0.0	516.40	87000.00	532.95	23231.28	533.39	2920.98	0.0	0.0	0.0
74.00	640.00	0.0	0.0	518.40	20000.00	527.46	4145.34	527.97	1866.18	0.0	0.0	0.0
XN 74.00	640.00	0.0	0.0	518.40	38000.00	530.00	9750.55	530.39	2033.68	0.0	0.0	0.0
74.00	640.00	0.0	0.0	518.40	48800.00	531.01	12744.30	531.43	2078.28	0.0	0.0	0.0
74.00	640.00	0.0	0.0	518.40	87000.00	533.70	22481.63	534.24	2091.01	0.0	0.0	0.0
XO 75.00	640.00	0.0	0.0	516.00	20000.00	528.46	4476.62	529.40	925.18	0.0	0.0	0.0
75.00	640.00	0.0	0.0	516.00	38000.00	530.52	7424.92	531.80	1388.28	0.0	0.0	0.0
75.00	640.00	0.0	0.0	516.00	48800.00	531.47	9244.13	532.85	1440.67	0.0	0.0	0.0
75.00	640.00	0.0	0.0	516.00	87000.00	534.10	15781.79	535.73	1597.89	0.0	0.0	0.0
77.01	130.00	0.0	0.0	517.50	20000.00	528.48	3144.06	530.10	223.48	0.0	0.0	0.0
77.01	130.00	0.0	0.0	517.50	38000.00	531.79	10835.11	532.27	1348.04	0.0	0.0	0.0
77.01	130.00	0.0	0.0	517.50	48800.00	532.80	13651.52	533.35	1394.59	0.0	0.0	0.0
77.01	130.00	0.0	0.0	517.50	87000.00	535.46	22659.11	536.26	1508.08	0.0	0.0	0.0
77.02	50.00	530.70	535.10	517.50	20000.00	528.65	3241.79	530.21	223.95	0.0	0.0	0.0
77.02	50.00	530.70	535.10	517.50	38000.00	534.09	17728.61	534.31	1468.00	0.0	0.0	0.0
77.02	50.00	530.70	535.10	517.50	48800.00	535.35	22272.90	535.61	1505.11	0.0	0.0	0.0
77.02	50.00	530.70	535.10	517.50	87000.00	538.66	36599.73	539.06	1531.82	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	77.00	60.00	0.0	0.0	517.50	20000.00	530.40	7159.10	530.68	935.55	0.0	0.0	0.0
	77.00	60.00	0.0	0.0	517.50	38000.00	534.12	17817.79	534.34	1468.77	0.0	0.0	0.0
XP	77.00	60.00	0.0	0.0	517.50	48800.00	535.38	22378.24	535.64	1505.92	0.0	0.0	0.0
	77.00	60.00	0.0	0.0	517.50	87000.00	538.69	36758.78	539.09	1532.06	0.0	0.0	0.0
	78.00	735.00	0.0	0.0	519.30	20000.00	530.98	7783.10	531.21	1339.76	0.0	0.0	0.0
XQ	78.00	735.00	0.0	0.0	519.30	38000.00	534.45	17392.54	534.68	1352.63	0.0	0.0	0.0
	78.00	735.00	0.0	0.0	519.30	48800.00	535.73	21869.45	536.00	1395.74	0.0	0.0	0.0
	78.00	735.00	0.0	0.0	519.30	87000.00	539.09	35953.09	539.51	1483.42	0.0	0.0	0.0
	79.00	710.00	0.0	0.0	520.20	20000.00	531.40	4646.56	532.05	1000.01	0.0	0.0	0.0
XR	79.00	710.00	0.0	0.0	520.20	38000.00	534.71	10769.27	535.28	1078.61	0.0	0.0	0.0
	79.00	710.00	0.0	0.0	520.20	48800.00	535.99	13902.55	536.61	1091.13	0.0	0.0	0.0
	79.00	710.00	0.0	0.0	520.20	87000.00	539.36	24140.11	540.22	1164.12	0.0	0.0	0.0
	80.00	430.00	0.0	0.0	518.80	20000.00	532.21	6755.07	532.60	645.80	0.0	0.0	0.0
	80.00	430.00	0.0	0.0	518.80	38000.00	535.16	11081.36	535.83	770.47	0.0	0.0	0.0
XS	80.00	430.00	0.0	0.0	518.80	48800.00	536.40	13372.29	537.22	777.91	0.0	0.0	0.0
	80.00	430.00	0.0	0.0	518.80	87000.00	539.65	20567.15	541.03	831.19	0.0	0.0	0.0
	81.00	350.00	0.0	0.0	523.50	20000.00	532.47	3889.77	533.19	420.92	0.0	0.0	0.0
XT	81.00	350.00	0.0	0.0	523.50	38000.00	535.48	7359.31	536.54	632.85	0.0	0.0	0.0
	81.00	350.00	0.0	0.0	523.50	48800.00	536.73	9134.52	538.02	655.43	0.0	0.0	0.0
	81.00	350.00	0.0	0.0	523.50	87000.00	539.97	14662.88	542.12	712.63	0.0	0.0	0.0
	82.00	685.00	0.0	0.0	522.80	20000.00	534.22	3829.19	535.08	393.81	0.0	0.0	0.0
XU	82.00	685.00	0.0	0.0	522.80	38000.00	537.27	6409.77	538.76	569.85	0.0	0.0	0.0
	82.00	685.00	0.0	0.0	522.80	48800.00	538.63	7825.70	540.46	577.30	0.0	0.0	0.0
	82.00	685.00	0.0	0.0	522.80	87000.00	542.21	12269.86	545.25	594.91	0.0	0.0	0.0
	83.00	950.00	0.0	0.0	523.00	20000.00	536.52	4564.94	537.23	869.95	0.0	0.0	0.0
	83.00	950.00	0.0	0.0	523.00	38000.00	540.32	8930.98	541.14	894.30	0.0	0.0	0.0
	83.00	950.00	0.0	0.0	523.00	48800.00	542.07	11415.58	542.97	901.29	0.0	0.0	0.0
	83.00	950.00	0.0	0.0	523.00	87000.00	546.98	19837.42	548.20	920.92	0.0	0.0	0.0
	84.00	700.00	0.0	0.0	525.00	20000.00	537.71	6233.23	538.12	1040.12	0.0	0.0	0.0
	84.00	700.00	0.0	0.0	525.00	38000.00	541.46	11725.80	541.98	1067.20	0.0	0.0	0.0
	84.00	700.00	0.0	0.0	525.00	48800.00	543.23	14902.75	543.82	1079.28	0.0	0.0	0.0
	84.00	700.00	0.0	0.0	525.00	87000.00	548.28	25863.48	549.08	1135.59	0.0	0.0	0.0
	85.00	245.00	0.0	0.0	526.50	20000.00	537.95	4368.08	538.50	1055.1[illegible]	0.0	0.0	0.0
	85.00	245.00	0.0	0.0	526.50	38000.00	541.72	9544.31	542.30	1080.72	0.0	0.0	0.0
	85.00	245.00	0.0	0.0	526.50	48800.00	543.50	12620.32	544.12	1132.95	0.0	0.0	0.0
	85.00	245.00	0.0	0.0	526.50	87000.00	548.56	23423.44	549.37	1190.31	0.0	0.0	0.0
	86.00	905.00	0.0	0.0	526.50	20000.00	540.00	3777.87	540.89	790.08	0.0	0.0	0.0
	86.00	905.00	0.0	0.0	526.50	38000.00	543.45	7473.92	544.31	805.59	0.0	0.0	0.0
	86.00	905.00	0.0	0.0	526.50	48800.00	545.05	9935.07	546.05	812.80	0.0	0.0	0.0
	86.00	905.00	0.0	0.0	526.50	87000.00	549.92	18397.72	551.21	834.72	0.0	0.0	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
87.00	270.00	0.0	0.0	530.80	20000.00	541.00	6631.46	541.33	803.06	0.0	0.0	0.0
87.00	270.00	0.0	0.0	530.80	38000.00	544.30	11377.15	544.77	816.02	0.0	0.0	0.0
87.00	270.00	0.0	0.0	530.80	48800.00	545.92	14869.37	546.50	822.38	0.0	0.0	0.0
87.00	270.00	0.0	0.0	530.80	87000.00	550.78	26078.31	551.65	841.12	0.0	0.0	0.0
88.00	920.00	0.0	0.0	530.70	20000.00	541.92	4415.89	542.66	713.38	0.0	0.0	0.0
88.00	920.00	0.0	0.0	530.70	38000.00	545.49	7894.71	546.30	735.30	0.0	0.0	0.0
88.00	920.00	0.0	0.0	530.70	46800.00	547.02	10252.64	548.00	744.71	0.0	0.0	0.0
88.00	920.00	0.0	0.0	530.70	87000.00	551.85	18415.45	553.19	793.71	0.0	0.0	0.0
89.00	760.00	0.0	0.0	532.60	20000.00	543.53	4713.52	544.13	651.88	0.0	0.0	0.0
89.00	760.00	0.0	0.0	532.60	38000.00	547.24	8495.34	547.94	669.60	0.0	0.0	0.0
89.00	760.00	0.0	0.0	532.60	48800.00	548.75	10881.20	549.63	676.81	0.0	0.0	0.0
89.00	760.00	0.0	0.0	532.60	87000.00	553.53	19029.58	554.84	694.96	0.0	0.0	0.0
90.00	150.00	0.0	0.0	533.80	20000.00	543.80	4896.19	544.39	637.79	0.0	0.0	0.0
90.00	150.00	0.0	0.0	533.80	38000.00	547.52	8667.79	548.24	657.48	0.0	0.0	0.0
90.00	150.00	0.0	0.0	533.80	48800.00	549.03	11121.40	549.94	665.45	0.0	0.0	0.0
90.00	150.00	0.0	0.0	533.80	87000.00	553.79	19355.23	555.17	682.32	0.0	0.0	0.0
91.00	905.00	0.0	0.0	532.70	20000.00	545.11	4093.27	546.39	528.64	0.0	0.0	0.0
91.00	905.00	0.0	0.0	532.70	38000.00	549.14	7129.58	550.54	638.75	0.0	0.0	0.0
91.00	905.00	0.0	0.0	532.70	48800.00	550.60	9157.83	552.26	669.95	0.0	0.0	0.0
91.00	905.00	0.0	0.0	532.70	87000.00	555.43	16527.96	557.51	689.05	0.0	0.0	0.0
92.00	905.00	0.0	0.0	532.40	20000.00	547.18	5586.03	547.98	550.09	0.0	0.0	0.0
92.00	905.00	0.0	0.0	532.40	38000.00	551.59	9635.30	552.47	726.19	0.0	0.0	0.0
92.00	905.00	0.0	0.0	532.40	48800.00	553.16	12283.77	554.22	737.20	0.0	0.0	0.0
92.00	905.00	0.0	0.0	532.40	87000.00	558.14	21425.23	559.51	842.20	0.0	0.0	0.0
93.00	795.00	0.0	0.0	533.00	20000.00	548.09	3794.82	549.65	449.47	0.0	0.0	0.0
93.00	795.00	0.0	0.0	533.00	38000.00	552.78	6992.73	554.31	693.70	0.0	0.0	0.0
93.00	795.00	0.0	0.0	533.00	48800.00	554.29	8905.57	556.11	699.67	0.0	0.0	0.0
93.00	795.00	0.0	0.0	533.00	87000.00	559.25	15923.11	561.46	730.39	0.0	0.0	0.0
94.00	445.00	0.0	0.0	534.00	20000.00	549.33	3539.00	551.01	505.83	0.0	0.0	0.0
94.00	445.00	0.0	0.0	534.00	38000.00	554.66	6974.16	555.67	650.44	0.0	0.0	0.0
94.00	445.00	0.0	0.0	534.00	48800.00	555.92	9244.63	557.42	654.93	0.0	0.0	0.0
94.00	445.00	0.0	0.0	534.00	87000.00	560.84	16095.78	562.79	678.70	0.0	0.0	0.0
95.00	380.00	0.0	0.0	531.70	20000.00	551.25	9337.79	551.48	821.03	0.0	0.0	0.0
95.00	380.00	0.0	0.0	531.70	38000.00	555.87	13375.89	556.14	902.30	0.0	0.0	0.0
95.00	380.00	0.0	0.0	531.70	48800.00	557.52	18644.06	557.89	909.52	0.0	0.0	0.0
95.00	380.00	0.0	0.0	531.70	87000.00	562.73	30767.39	563.30	938.38	0.0	0.0	0.0
96.00	300.00	0.0	0.0	537.90	20000.00	551.39	7225.17	551.66	999.76	0.0	0.0	0.0
96.00	300.00	0.0	0.0	537.90	38000.00	556.15	12326.14	556.37	1095.39	0.0	0.0	0.0
96.00	300.00	0.0	0.0	537.90	48800.00	557.76	16632.36	558.09	1104.17	0.0	0.0	0.0
96.00	300.00	0.0	0.0	537.90	87000.00	563.03	28402.56	563.52	1137.20	0.0	0.0	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
97.00	540.00	0.0	0.0	538.20	20000.00	551.72	5527.68	552.11	1126.86	0.0	0.0	0.0
97.00	540.00	0.0	0.0	538.20	38000.00	556.55	10950.47	556.78	1176.26	0.0	0.0	0.0
97.00	540.00	0.0	0.0	538.20	48800.00	558.15	14174.32	558.49	1181.84	0.0	0.0	0.0
97.00	540.00	0.0	0.0	538.20	87000.00	563.46	24740.03	563.94	1200.30	0.0	0.0	0.0
98.00	300.00	0.0	0.0	538.00	20000.00	551.96	4655.14	552.49	1390.14	0.0	0.0	0.0
98.00	300.00	0.0	0.0	538.00	38000.00	556.80	10641.71	557.02	1446.61	0.0	0.0	0.0
98.00	300.00	0.0	0.0	538.00	48800.00	558.38	14386.18	558.72	1452.58	0.0	0.0	0.0
98.00	300.00	0.0	0.0	53[illegible]0	87000.00	563.75	26673.84	564.16	1472.62	0.0	0.0	0.0
99.00	340.00	0.0	0.0	540.60	20000.00	552.65	7050.38	552.84	1752.86	0.0	0.0	0.0
99.00	340.00	0.0	0.0	540.60	38000.00	557.14	14849.52	557.25	1824.75	0.0	0.0	0.0
99.00	340.00	0.0	0.0	540.60	48800.00	558.77	19991.29	558.93	1864.74	0.0	0.0	0.0
99.00	340.00	0.0	0.0	540.60	87000.00	564.14	36800.40	564.36	1897.42	0.0	0.0	0.0
100.00	550.00	0.0	0.0	541.50	20000.00	553.09	4985.94	553.61	1930.39	0.0	0.0	0.0
100.00	550.00	0.0	0.0	541.50	38000.00	557.59	13391.61	557.73	2032.45	0.0	0.0	0.0
100.00	550.00	0.0	0.0	541.50	48800.00	559.17	18853.70	559.35	2041.46	0.0	0.0	0.0
100.00	550.00	0.0	0.0	541.50	87000.00	564.52	38856.79	564.71	2072.06	0.0	0.0	0.0

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
50.000	20000.000	499.023	0.0	0.0	0.0	519.177	0.0	465.000
50.000	38000.000	502.333	3.310	0.0	0.0	548.665	-29.488	465.000
50.000	48800.000	503.831	1.498	0.0	0.0	553.869	-34.692	465.000
50.000	87000.000	509.217	5.386	0.0	0.0	988.503	-469.327	465.000
51.000	20000.000	499.226	0.0	0.203	0.0	448.995	0.0	225.000
51.000	38000.000	502.591	3.365	0.258	0.0	475.120	-26.125	225.000
51.000	48800.000	504.115	1.524	0.284	0.0	481.018	-32.023	225.000
51.000	87000.000	509.607	5.492	0.390	0.0	1123.391	-674.396	225.000
52.000	20000.000	499.415	0.0	0.189	0.0	351.213	0.0	225.000
52.000	38000.000	502.761	3.346	0.170	0.0	385.358	-34.146	225.000
52.000	48800.000	504.267	1.506	0.152	0.0	391.756	-40.543	225.000
52.000	87000.000	509.627	5.361	0.021	0.0	1277.448	-926.235	225.000
52.100	20000.000	499.873	0.0	0.458	0.0	252.395	0.0	275.000
52.100	38000.000	503.188	3.315	0.427	0.0	287.161	-34.766	275.000
52.100	48800.000	504.667	1.479	0.401	0.0	302.549	-50.154	275.000
52.100	87000.000	510.136	5.468	0.508	0.0	1228.341	-975.947	275.000
53.000	20000.000	500.656	0.0	0.783	0.0	205.386	0.0	275.000
53.000	38000.000	504.176	3.519	0.988	0.0	278.953	-73.568	275.000
53.000	48800.000	505.782	1.606	1.114	0.0	294.840	-89.454	275.000
53.000	87000.000	512.069	6.287	1.933	0.0	1375.919	-1170.533	275.000
54.000	20000.000	503.318	0.0	2.662	0.0	203.076	0.0	805.000
54.000	38000.000	507.749	4.431	3.574	0.0	282.398	-79.322	805.000
54.000	48800.000	509.860	2.111	4.079	0.0	299.196	-96.119	805.000
54.000	87000.000	514.505	4.645	2.437	0.0	1400.390	-1197.314	805.000
55.000	20000.000	504.948	0.0	1.629	0.0	232.571	0.0	655.000
55.000	38000.000	509.893	4.945	2.144	0.0	326.667	-94.097	655.000
55.000	48800.000	512.257	2.364	2.397	0.0	339.302	-106.731	655.000
55.000	87000.000	518.420	6.163	3.915	0.0	1141.396	-908.826	655.000
56.000	20000.000	505.358	0.0	0.410	0.0	201.345	0.0	380.000
56.000	38000.000	510.540	5.182	0.647	0.0	447.528	-246.183	380.000
56.000	48800.000	513.095	2.554	0.837	0.0	479.611	-278.267	380.000
56.000	87000.000	519.198	6.103	0.777	0.0	1150.158	-948.813	380.000

ORANGE, PA

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK 500 YEAR F

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	100.00	550.00	0.0	0.0	541.50	20000.00	553.09	4977.08	553.61	1929.98	0.0	0.0	553.09
	100.00	550.00	0.0	0.0	541.50	38000.00	557.59	13391.27	557.73	2032.45	0.0	0.0	557.59
	100.00	550.00	0.0	0.0	541.50	48800.00	559.17	18851.92	559.35	2041.46	0.0	0.0	559.17
	100.00	550.00	0.0	0.0	541.50	87000.00	564.52	38857.89	564.71	2072.06	0.0	0.0	564.52
	101.00	180.00	0.0	0.0	542.80	20000.00	553.15	3551.99	554.27	1620.82	0.0	0.0	0.0
YN	101.00	180.00	0.0	0.0	542.80	38000.00	557.73	10641.75	557.97	1874.07	0.0	0.0	0.0
	101.00	180.00	0.0	0.0	542.80	48800.00	559.25	15580.47	559.56	1885.41	0.0	0.0	0.0
	101.00	180.00	0.0	0.0	542.80	87000.00	564.59	33880.44	564.86	1913.50	0.0	0.0	0.0
	102.00	740.00	0.0	0.0	542.30	20000.00	555.13	5244.39	555.82	1363.92	0.0	0.0	0.0
	102.00	740.00	0.0	0.0	542.30	38000.00	558.71	8703.69	559.12	1641.69	0.0	0.0	0.0
	102.00	740.00	0.0	0.0	542.30	48800.00	559.95	12496.16	560.48	1649.06	0.0	0.0	0.0
	102.00	740.00	0.0	0.0	542.30	87000.00	565.02	26570.58	565.51	1674.81	0.0	0.0	0.0
	103.00	285.00	0.0	0.0	545.00	20000.00	555.46	4491.00	556.37	1227.78	0.0	0.0	0.0
	103.00	285.00	0.0	0.0	545.00	38000.00	559.22	8120.93	559.72	1644.35	0.0	0.0	0.0
	103.00	285.00	0.0	0.0	545.00	48800.00	560.35	11293.14	561.00	1668.56	0.0	0.0	0.0
	103.00	285.00	0.0	0.0	545.00	87000.00	565.31	24852.39	565.85	1879.11	0.0	0.0	0.0
	104.00	380.00	0.0	0.0	543.00	20000.00	556.17	4123.73	557.41	425.82	0.0	0.0	0.0
	104.00	380.00	0.0	0.0	543.00	38000.00	560.05	5767.86	561.52	1118.48	0.0	0.0	0.0
	104.00	380.00	0.0	0.0	543.00	48800.00	560.93	7695.59	562.94	1141.62	0.0	0.0	0.0
	104.00	380.00	0.0	0.0	543.00	87000.00	565.60	15416.47	567.48	1210.91	0.0	0.0	0.0
	106.01	145.00	0.0	0.0	541.00	20000.00	556.44	4622.26	557.87	397.29	0.0	0.0	0.0
	106.01	145.00	0.0	0.0	541.00	38000.00	560.57	6025.65	562.46	666.88	0.0	0.0	0.0
	106.01	145.00	0.0	0.0	541.00	48800.00	561.36	7531.61	564.17	689.58	0.0	0.0	0.0
	106.01	145.00	0.0	0.0	541.00	87000.00	565.81	12767.59	569.41	732.51	0.0	0.0	0.0
	106.02	30.00	557.10	557.90	541.00	20000.00	557.87	5114.97	558.89	434.96	0.0	0.0	0.0
	106.02	30.00	557.10	557.90	541.00	38000.00	562.04	8219.80	563.51	709.28	0.0	0.0	0.0
	106.02	30.00	557.10	557.90	541.00	48800.00	562.76	8985.06	564.83	718.69	0.0	0.0	0.0
	106.02	30.00	557.10	557.90	541.00	87000.00	565.83	12792.79	569.41	732.60	0.0	0.0	0.0
	106.00	100.00	0.0	0.0	541.50	20000.00	558.13	5201.99	559.07	431.08	0.0	0.0	0.0
YR	106.00	100.00	0.0	0.0	541.50	38000.00	562.91	10004.92	563.85	717.17	0.0	0.0	0.0
	106.00	100.00	0.0	0.0	541.50	48800.00	564.22	12000.70	565.35	723.02	0.0	0.0	0.0
	106.00	100.00	0.0	0.0	541.50	87000.00	568.93	21112.14	570.35	744.32	0.0	0.0	0.0
	107.00	755.00	0.0	0.0	547.00	20000.00	559.44	3623.28	560.70	229.10	0.0	0.0	0.0
YS	107.00	755.00	0.0	0.0	547.00	38000.00	564.18	10688.35	564.82	739.93	0.0	0.0	0.0
	107.00	755.00	0.0	0.0	547.00	48800.00	565.64	13315.87	566.40	746.55	0.0	0.0	0.0
	107.00	755.00	0.0	0.0	547.00	87000.00	570.32	23440.31	571.40	764.57	0.0	0.0	0.0
	108.00	350.00	0.0	0.0	546.50	20000.00	560.56	4024.37	561.67	301.91	0.0	0.0	0.0
	108.00	350.00	0.0	0.0	546.50	38000.00	564.60	10971.55	565.19	850.43	0.0	0.0	0.0
YT	108.00	350.00	0.0	0.0	546.50	48800.00	566.11	13687.47	566.80	858.02	0.0	0.0	0.0
	108.00	350.00	0.0	0.0	546.50	87000.00	570.84	24001.68	571.80	881.87	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	109.00	365.00	0.0	0.0	550.00	20000.00	561.79	5545.20	562.37	533.42	0.0	0.0	0.0
4U	109.00	365.00	0.0	0.0	550.00	38000.00	564.98	10704.90	565.63	838.51	0.0	0.0	0.0
	109.00	365.00	0.0	0.0	550.00	48800.00	566.49	13316.17	567.27	870.00	0.0	0.0	0.0
	109.00	365.00	0.0	0.0	550.00	87000.00	571.21	23235.77	572.29	902.86	0.0	0.0	0.0
	110.00	580.00	0.0	0.0	549.80	20000.00	562.63	6365.51	563.04	691.35	0.0	0.0	0.0
4V	110.00	580.00	0.0	0.0	549.80	38000.00	565.66	10214.59	566.41	705.29	0.0	0.0	0.0
	110.00	580.00	0.0	0.0	549.80	48800.00	567.19	12511.01	568.13	711.89	0.0	0.0	0.0
	110.00	580.00	0.0	0.0	549.80	87000.00	571.82	20553.51	573.32	751.73	0.0	0.0	0.0
	111.00	550.00	0.0	0.0	551.70	20000.00	563.29	4652.00	563.75	804.92	0.0	0.0	0.0
4W	111.00	550.00	0.0	0.0	551.70	38000.00	566.56	8363.54	567.29	824.69	0.0	0.0	0.0
	111.00	550.00	0.0	0.0	551.70	48800.00	568.20	10558.88	569.06	834.59	0.0	0.0	0.0
	111.00	550.00	0.0	0.0	551.70	87000.00	573.08	18373.93	574.36	873.89	0.0	0.0	0.0
SKIPPED	112.00	405.00	0.0	0.0	553.10	20000.00	563.95	4893.94	564.43	898.41	0.0	0.0	0.0
	112.00	405.00	0.0	0.0	553.10	38000.00	567.34	9074.78	568.02	915.77	0.0	0.0	0.0
	112.00	405.00	0.0	0.0	553.10	48800.00	569.03	11583.23	569.81	924.43	0.0	0.0	0.0
	112.00	405.00	0.0	0.0	553.10	87000.00	574.05	20599.93	575.14	978.13	0.0	0.0	0.0
	113.00	100.00	0.0	0.0	551.50	20000.00	564.05	3441.67	564.95	761.83	0.0	0.0	0.0
4X	113.00	100.00	0.0	0.0	551.50	38000.00	567.44	6696.40	568.57	774.29	0.0	0.0	0.0
	113.00	100.00	0.0	0.0	551.50	48800.00	569.12	8662.97	570.38	780.47	0.0	0.0	0.0
	113.00	100.00	0.0	0.0	551.50	87000.00	574.10	15771.31	575.75	828.28	0.0	0.0	0.0
	114.00	550.00	0.0	0.0	551.70	20000.00	565.69	3938.64	566.64	792.84	0.0	0.0	0.0
4Y	114.00	550.00	0.0	0.0	551.70	38000.00	569.07	7264.72	570.29	870.84	0.0	0.0	0.0
	114.00	550.00	0.0	0.0	551.70	48800.00	570.75	9348.90	572.08	882.01	0.0	0.0	0.0
	114.00	550.00	0.0	0.0	551.70	87000.00	575.73	16999.74	577.38	925.23	0.0	0.0	0.0
	115.00	510.00	0.0	0.0	555.00	20000.00	567.17	3473.31	567.88	1062.30	0.0	0.0	0.0
4Z	115.00	510.00	0.0	0.0	555.00	38000.00	570.64	7306.04	571.42	1100.02	0.0	0.0	0.0
	115.00	510.00	0.0	0.0	555.00	48800.00	572.33	9725.49	573.15	1108.86	0.0	0.0	0.0
	115.00	510.00	0.0	0.0	555.00	87000.00	577.35	18751.20	578.33	1128.64	0.0	0.0	0.0
	116.00	265.00	0.0	0.0	553.00	20000.00	568.03	3920.73	568.69	1180.50	0.0	0.0	0.0
ZA	116.00	265.00	0.0	0.0	553.00	38000.00	571.48	8118.11	572.10	1521.73	0.0	0.0	0.0
	116.00	265.00	0.0	0.0	553.00	48800.00	573.19	10925.59	573.79	1545.66	0.0	0.0	0.0
	116.00	265.00	0.0	0.0	553.00	87000.00	578.28	21781.24	578.88	1574.72	0.0	0.0	0.0
	117.00	525.00	0.0	0.0	553.70	20000.00	569.11	3214.70	569.72	1354.57	0.0	0.0	0.0
ZB	117.00	525.00	0.0	0.0	553.70	38000.00	572.38	8078.34	572.78	2047.35	0.0	0.0	0.0
	117.00	525.00	0.0	0.0	553.70	48800.00	574.02	11774.34	574.36	2272.73	0.0	0.0	0.0
	117.00	525.00	0.0	0.0	553.70	87000.00	578.99	27784.17	579.27	2353.04	0.0	0.0	0.0
ZC	118.00	265.00	0.0	0.0	558.00	20000.00	569.95	4384.34	570.44	1242.37	0.0	0.0	0.0
	118.00	265.00	0.0	0.0	558.00	38000.00	572.82	9078.27	573.31	2022.69	0.0	0.0	0.0
	118.00	265.00	0.0	0.0	558.00	48800.00	574.35	12622.48	574.80	2099.04	0.0	0.0	0.0
	118.00	265.00	0.0	0.0	558.00	87000.00	579.16	27956.08	579.55	2200.19	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK	
	119.00	420.00	0.0	0.0	559.20	20000.00	570.98	4888.68	571.22	1713.08	0.0	0.0	0.0	
	119.00	420.00	0.0	0.0	559.20	38000.00	573.71	10074.74	573.96	2041.78	0.0	0.0	0.0	
ZD	119.00	420.00	0.0	0.0	559.20	48800.00	575.10	13608.56	575.37	2087.97	0.0	0.0	0.0	
	119.00	420.00	0.0	0.0	559.20	87000.00	579.64	28433.60	579.94	2171.77	0.0	0.0	0.0	
	120.00	765.00	0.0	0.0	560.80	20000.00	572.09	5643.13	572.23	1704.16	0.0	0.0	0.0	
	120.00	765.00	0.0	0.0	560.80	38000.00	574.70	10804.24	574.88	2073.55	0.0	0.0	0.0	
ZE	120.00	765.00	0.0	0.0	560.80	48800.00	576.02	14201.91	576.23	2103.10	0.0	0.0	0.0	
	120.00	765.00	0.0	0.0	560.80	87000.00	580.33	28373.93	580.59	2177.03	0.0	0.0	0.0	
	121.00	840.00	0.0	0.0	562.10	20000.00	572.99	6152.30	573.15	2016.73	0.0	0.0	0.0	
	121.00	840.00	0.0	0.0	562.10	38000.00	575.59	11807.78	575.78	2253.36	0.0	0.0	0.0	
ZF	121.00	840.00	0.0	0.0	562.10	48800.00	576.88	15358.18	577.10	2261.07	0.0	0.0	0.0	
	121.00	840.00	0.0	0.0	562.10	87000.00	581.05	29648.05	581.31	2315.03	0.0	0.0	0.0	
	122.00	715.00	0.0	0.0	563.00	20000.00	573.98	3840.40	574.25	1275.00	0.0	0.0	0.0	
	122.00	715.00	0.0	0.0	563.00	38000.00	576.51	7526.62	576.85	2218.73	0.0	0.0	0.0	
ZG	122.00	715.00	0.0	0.0	563.00	48800.00	577.76	10122.26	578.11	2248.59	0.0	0.0	0.0	
	122.00	715.00	0.0	0.0	563.00	87000.00	581.75	21370.39	582.11	2341.89	0.0	0.0	0.0	
	123.00	545.00	0.0	0.0	564.70	20000.00	575.48	3594.05	576.01	2172.58	0.0	0.0	0.0	
	123.00	545.00	0.0	0.0	564.70	38000.00	577.88	7943.32	578.28	2278.23	0.0	0.0	0.0	
ZH	123.00	545.00	0.0	0.0	564.70	48800.00	579.01	10671.24	579.42	2300.24	0.0	0.0	0.0	
	123.00	545.00	0.0	0.0	564.70	87000.00	582.66	21890.57	583.08	2384.99	0.0	0.0	0.0	
	123.50	300.00	0.0	0.0	567.00	17200.00	576.84	2265.67	578.90	229.89	0.0	0.0	0.0	
	123.50	300.00	0.0	0.0	567.00	32900.00	579.79	9750.49	580.01	2875.64	0.0	0.0	0.0	
	123.50	300.00	0.0	0.0	567.00	42400.00	580.90	12851.13	581.11	3218.24	0.0	0.0	0.0	
	123.50	300.00	0.0	0.0	567.00	77000.00	584.27	25985.20	584.49	3300.21	0.0	0.0	0.0	
	124.00	320.00	0.0	0.0	568.00	17200.00	578.67	2264.57	580.82	175.92	0.0	0.0	0.0	
	124.00	320.00	0.0	0.0	568.00	32900.00	580.24	4528.66	581.77	1557.18	0.0	0.0	0.0	
ZI	124.00	320.00	0.0	0.0	568.00	42400.00	581.33	5994.19	582.78	1945.82	0.0	0.0	0.0	
	124.00	320.00	0.0	0.0	568.00	77000.00	584.64	13094.85	585.63	2670.95	0.0	0.0	0.0	
	124.10	115.00	0.0	0.0	568.60	17200.00	579.42	2325.87	581.49	177.07	0.0	0.0	0.0	
	124.10	115.00	0.0	0.0	568.60	32900.00	581.90	5943.82	582.78	1935.69	0.0	0.0	0.0	
ZJ	124.10	115.00	0.0	0.0	568.60	42400.00	582.94	7730.90	583.80	2259.84	0.0	0.0	0.0	
	124.10	115.00	0.0	0.0	568.60	77000.00	585.65	14270.98	586.49	2735.53	0.0	0.0	0.0	
	126.01	115.00	0.0	0.0	568.00	17200.00	580.05	2138.46	582.38	156.00	0.0	0.0	0.0	
	126.01	115.00	0.0	0.0	568.00	32900.00	582.56	5125.66	583.84	2326.96	0.0	0.0	0.0	
	126.01	115.00	0.0	0.0	568.00	42400.00	583.65	7182.86	584.68	2329.50	0.0	0.0	0.0	DS BR
	126.01	115.00	0.0	0.0	568.00	77000.00	586.42	14039.98	587.30	2335.98	0.0	0.0	0.0	
	126.02	80.00	585.50	584.70	568.00	17200.00	580.51	2320.69	582.62	156.00	0.0	0.0	0.0	
	126.02	80.00	585.50	584.70	568.00	32900.00	586.88	15399.75	587.02	2337.06	0.0	0.0	0.0	
	126.02	80.00	585.50	584.70	568.00	42400.00	587.48	17223.13	587.67	2338.46	0.0	0.0	0.0	US BR
	126.02	80.00	585.50	584.70	568.00	77000.00	590.05	26054.29	590.34	2344.45	0.0	0.0	0.0	

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	127.00	835.00	0.0	0.0	570.50	17200.00	584.43	4235.55	585.06	809.41	0.0	0.0	0.0
2K	127.00	835.00	0.0	0.0	570.50	32900.00	587.11	9018.06	587.60	1994.71	0.0	0.0	0.0
	127.00	835.00	0.0	0.0	570.50	42400.00	587.76	10617.04	588.35	1998.18	0.0	0.0	0.0
	127.00	835.00	0.0	0.0	570.50	77000.00	590.36	18410.50	591.07	2012.11	0.0	0.0	0.0
	128.00	750.00	0.0	0.0	572.00	17200.00	585.45	4739.81	585.99	1026.32	0.0	0.0	0.0
	128.00	750.00	0.0	0.0	572.00	32900.00	587.77	7967.91	588.51	1475.56	0.0	0.0	0.0
2L	128.00	750.00	0.0	0.0	572.00	42400.00	588.52	9239.14	589.44	1479.91	0.0	0.0	0.0
	128.00	750.00	0.0	0.0	572.00	77000.00	591.01	14237.68	592.39	1494.51	0.0	0.0	0.0
	129.00	415.00	0.0	0.0	573.50	17200.00	586.11	4407.63	586.61	1216.01	0.0	0.0	0.0
	129.00	415.00	0.0	0.0	573.50	32900.00	588.63	7667.13	589.30	1231.32	0.0	0.0	0.0
2M	129.00	415.00	0.0	0.0	573.50	42400.00	589.57	9119.10	590.40	1237.10	0.0	0.0	0.0
	129.00	415.00	0.0	0.0	573.50	77000.00	592.43	14157.87	593.73	1277.19	0.0	0.0	0.0
	130.00	632.00	0.0	0.0	572.00	17200.00	587.38	3006.64	588.31	1664.74	0.0	0.0	0.0
2N	130.00	632.00	0.0	0.0	572.00	32900.00	590.24	6836.91	590.88	1773.15	0.0	0.0	0.0
	130.00	632.00	0.0	0.0	572.00	42400.00	591.48	9079.75	592.11	1778.53	0.0	0.0	0.0
	130.00	632.00	0.0	0.0	572.00	77000.00	595.05	17012.97	595.73	1793.79	0.0	0.0	0.0
	131.00	800.00	0.0	0.0	577.00	17200.00	589.42	4637.05	589.76	2018.39	0.0	0.0	0.0
2O	131.00	800.00	0.0	0.0	577.00	32900.00	591.66	9154.80	591.99	2129.03	0.0	0.0	0.0
	131.00	800.00	0.0	0.0	577.00	42400.00	592.80	12110.71	593.14	2134.88	0.0	0.0	0.0
	131.00	800.00	0.0	0.0	577.00	77000.00	596.26	23380.60	596.63	2152.61	0.0	0.0	0.0
	132.00	550.00	0.0	0.0	580.00	17200.00	590.16	3542.92	590.53	1918.11	0.0	0.0	0.0
	132.00	550.00	0.0	0.0	580.00	32900.00	592.25	7825.96	592.59	2124.96	0.0	0.0	0.0
2P	132.00	550.00	0.0	0.0	580.00	42400.00	593.33	10720.20	593.67	2130.94	0.0	0.0	0.0
	132.00	550.00	0.0	0.0	580.00	77000.00	596.68	22193.71	597.05	2149.46	0.0	0.0	0.0
	133.00	560.00	0.0	0.0	580.80	17200.00	591.25	3737.28	591.52	2452.26	0.0	0.0	0.0
	133.00	560.00	0.0	0.0	580.80	32900.00	593.04	7716.44	593.32	2582.09	0.0	0.0	0.0
2Q	133.00	560.00	0.0	0.0	580.80	42400.00	594.03	10545.95	594.30	2618.27	0.0	0.0	0.0
	133.00	560.00	0.0	0.0	580.80	77000.00	597.23	22570.49	597.51	2736.70	0.0	0.0	0.0
	134.00	865.00	0.0	0.0	581.00	17200.00	592.49	2846.93	592.90	2161.12	0.0	0.0	0.0
	134.00	865.00	0.0	0.0	581.00	32900.00	593.99	5199.51	594.49	2243.04	0.0	0.0	0.0
2R	134.00	865.00	0.0	0.0	581.00	42400.00	594.82	6816.21	595.34	2274.60	0.0	0.0	0.0
	134.00	865.00	0.0	0.0	581.00	77000.00	597.70	14017.38	598.23	2318.45	0.0	0.0	0.0
	135.00	625.00	0.0	0.0	585.00	17200.00	594.68	2931.17	595.06	1736.95	0.0	0.0	0.0
	135.00	625.00	0.0	0.0	585.00	32900.00	596.35	5431.23	596.82	2283.48	0.0	0.0	0.0
2S	135.00	625.00	0.0	0.0	585.00	42400.00	597.13	6934.07	597.65	2287.90	0.0	0.0	0.0
	135.00	625.00	0.0	0.0	585.00	77000.00	599.61	12969.76	600.23	2302.02	0.0	0.0	0.0
	136.00	575.00	0.0	0.0	586.00	17200.00	595.91	4226.84	596.13	2092.76	0.0	0.0	0.0
	136.00	575.00	0.0	0.0	586.00	32900.00	597.67	7476.76	597.98	2114.10	0.0	0.0	0.0
2T	136.00	575.00	0.0	0.0	586.00	42400.00	598.49	9298.87	598.85	2124.04	0.0	0.0	0.0
	136.00	575.00	0.0	0.0	586.00	77000.00	600.93	15781.73	601.47	2146.58	0.0	0.0	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
2U	137.00	600.00	0.0	0.0	586.50	17200.00	596.76	3132.46	597.15	1898.25	0.0	0.0	0.0
	137.00	600.00	0.0	0.0	586.50	32900.00	598.54	6579.27	598.94	1933.71	0.0	0.0	0.0
	137.00	600.00	0.0	0.0	586.50	42400.00	599.38	8614.41	599.81	1950.40	0.0	0.0	0.0
	137.00	600.00	0.0	0.0	586.50	77000.00	601.87	16117.42	602.43	2039.58	0.0	0.0	0.0
2V	138.00	615.00	0.0	0.0	588.50	17200.00	598.07	4235.67	598.28	1698.22	0.0	0.0	0.0
	138.00	615.00	0.0	0.0	588.50	32900.00	599.72	7491.29	600.04	1828.56	0.0	0.0	0.0
	138.00	615.00	0.0	0.0	588.50	42400.00	600.55	9448.60	600.92	2029.66	0.0	0.0	0.0
	138.00	615.00	0.0	0.0	588.50	77000.00	603.01	16979.70	603.51	2118.75	0.0	0.0	0.0
2W	139.00	590.00	0.0	0.0	589.00	17200.00	599.04	2969.52	599.69	995.24	0.0	0.0	0.0
	139.00	590.00	0.0	0.0	589.00	32900.00	600.80	5247.36	601.69	1778.55	0.0	0.0	0.0
	139.00	590.00	0.0	0.0	589.00	42400.00	601.65	6854.02	602.57	1826.18	0.0	0.0	0.0
	139.00	590.00	0.0	0.0	589.00	77000.00	604.08	12879.05	605.13	1834.63	0.0	0.0	0.0
2X	140.00	385.00	0.0	0.0	589.50	17200.00	600.15	3967.95	600.60	1215.62	0.0	0.0	0.0
	140.00	385.00	0.0	0.0	589.50	32900.00	602.15	7473.77	602.69	1768.28	0.0	0.0	0.0
	140.00	385.00	0.0	0.0	589.50	42400.00	602.99	5410.84	603.58	1771.99	0.0	0.0	0.0
	140.00	385.00	0.0	0.0	589.50	77000.00	605.34	16170.23	606.15	1814.38	0.0	0.0	0.0
2Y	141.00	890.00	0.0	0.0	590.50	17200.00	601.68	3728.18	602.25	1282.33	0.0	0.0	0.0
	141.00	890.00	0.0	0.0	590.50	32900.00	603.71	6735.21	604.38	1798.12	0.0	0.0	0.0
	141.00	890.00	0.0	0.0	590.50	42400.00	604.59	8544.65	605.30	1870.47	0.0	0.0	0.0
	141.00	890.00	0.0	0.0	590.50	77000.00	607.08	15044.27	607.95	1890.80	0.0	0.0	0.0
2Z	142.00	365.00	0.0	0.0	592.00	17200.00	602.59	4724.35	602.88	1806.39	0.0	0.0	0.0
	142.00	365.00	0.0	0.0	592.00	32900.00	604.70	9479.43	605.00	2013.10	0.0	0.0	0.0
	142.00	365.00	0.0	0.0	592.00	42400.00	605.61	12101.39	605.94	2016.60	0.0	0.0	0.0
	142.00	365.00	0.0	0.0	592.00	77000.00	608.18	21225.65	608.63	2026.47	0.0	0.0	0.0
	143.01	267.00	0.0	0.0	591.30	17200.00	602.76	2737.78	604.04	1406.49	0.0	0.0	0.0
	143.01	267.00	0.0	0.0	591.30	32900.00	604.93	6072.07	605.85	1647.23	0.0	0.0	0.0
	143.01	267.00	0.0	0.0	591.30	42400.00	605.86	8077.52	606.75	1689.75	0.0	0.0	0.0
	143.01	267.00	0.0	0.0	591.30	77000.00	608.46	15286.77	609.40	1721.22	0.0	0.0	0.0
AAA	143.00	268.00	0.0	0.0	592.00	17200.00	604.16	3581.33	604.89	1472.52	0.0	0.0	0.0
	143.00	268.00	0.0	0.0	592.00	32900.00	605.77	6334.58	606.61	1653.66	0.0	0.0	0.0
	143.00	268.00	0.0	0.0	592.00	42400.00	606.62	8181.22	607.48	1691.41	0.0	0.0	0.0
	143.00	268.00	0.0	0.0	592.00	77000.00	609.13	15216.01	610.09	1721.09	0.0	0.0	0.0
AAB	144.00	600.00	0.0	0.0	596.30	17200.00	605.66	4103.61	605.96	1489.16	0.0	0.0	0.0
	144.00	600.00	0.0	0.0	596.30	32900.00	607.37	6915.74	607.83	1614.65	0.0	0.0	0.0
	144.00	600.00	0.0	0.0	596.30	42400.00	608.16	8488.36	608.72	1671.90	0.0	0.0	0.0
	144.00	600.00	0.0	0.0	596.30	77000.00	610.49	14156.03	611.32	1814.17	0.0	0.0	0.0
AAC	145.00	560.00	0.0	0.0	597.80	17200.00	606.53	2689.69	607.53	724.26	0.0	0.0	0.0
	145.00	560.00	0.0	0.0	597.80	32900.00	608.28	4247.29	610.07	1013.04	0.0	0.0	0.0
	145.00	560.00	0.0	0.0	597.80	42400.00	609.10	5208.13	611.22	1203.16	0.0	0.0	0.0
	145.00	560.00	0.0	0.0	597.80	77000.00	611.57	9150.38	614.20	1448.28	0.0	0.0	0.0

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
100.000	20000.000	553.092	0.0	0.0	0.0	1929.977	0.0	550.000
100.000	38000.000	557.591	4.499	0.0	0.0	2032.448	-102.470	550.000
100.000	48800.000	559.167	1.576	0.0	0.0	2041.458	-111.481	550.000
100.000	87000.000	564.521	5.354	0.0	0.0	2072.065	-142.087	550.000
101.000	20000.000	553.146	0.0	0.055	0.0	1620.818	0.0	180.000
101.000	38000.000	557.726	4.580	0.135	0.0	1874.074	-253.256	180.000
101.000	48800.000	559.254	1.528	0.088	0.0	1885.409	-264.591	180.000

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*  SEPT 1971 VERSION.  UPDATED JUNE 1974       *     * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT    *
*  ERROR CORRECTIONS 01 THRU 0982              *     * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS.     *
*  MODIFICATIONS 52 THRU 58                    *     * DEPARTMENT OF THE ARMY.                                  *
*  MBJ UPDATED  07/20/76  0830                 *     * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC. *
*                                              *     * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES  *
*  TODAYS DATE IS 03/01/77    16.08            *     * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE   *
*                                              *     * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.       *
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   2.880 SECONDS
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HEC-2 Datum: NGVD29
FIS Datum: NAVD88
NAVD88 = NGVD29 - 0.71

FISHING CREEK
FLOODWAY
1.01 - 50.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

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T1      SUSQUEHANNA RIVER BASIN COMMISSION
T2      BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3      FISHING CREEK - 100 YEAR FLOOD
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Known WSEL for 100-yr flow

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	460.700	0.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

100-yr flow

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	58500.000	102000.000	0.0	0.0	0.0	0.0
NC	0.050	0.070	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4900.000	5243.000
X1	1.010	94.000	4960.000	5243.000	0.0	0.0	0.0	0.0	0.0	0.0
GR	480.000	1000.000	479.800	1010.000	473.300	1030.000	474.000	1040.000	474.300	1059.000
GR	474.300	1077.000	473.900	1100.000	473.600	1159.000	473.800	1239.000	474.100	1347.000
GR	473.500	1450.000	473.800	1539.000	473.900	1613.000	470.700	1652.000	468.400	1712.000
GR	468.300	1729.000	468.800	1752.000	469.700	1798.000	470.200	1846.000	472.500	1863.000
GR	473.700	1895.000	472.200	1908.000	471.800	1951.000	471.500	2037.000	472.100	2122.000
GR	471.800	2176.000	469.900	2221.000	468.000	2285.000	469.000	2325.000	471.500	2388.000
GR	472.100	2466.000	472.500	2555.000	471.700	2658.000	472.500	2790.000	473.000	2852.000
GR	471.200	3001.000	472.400	3079.000	472.100	3114.000	470.200	3194.000	471.300	3278.000
GR	470.800	3350.000	471.500	3464.000	471.300	3546.000	471.700	3662.000	471.800	3745.000
GR	472.600	3859.000	472.300	3979.000	471.800	4090.000	472.000	4114.000	474.100	4421.000
GR	474.000	4498.000	470.300	4561.000	469.800	4636.000	467.200	4685.000	465.900	4746.000
GR	464.600	4798.000	463.000	4844.000	463.700	4857.000	463.700	4874.000	459.900	4891.000
GR	455.800	4924.000	455.500	4960.000	454.500	4979.000	448.200	5089.000	448.200	5089.000
GR	448.200	5181.000	454.500	5207.000	457.000	5217.000	461.300	5243.000	465.300	5283.000
GR	466.000	5317.000	466.800	5415.000	467.300	5499.000	468.100	5597.000	470.100	5657.000
GR	471.800	5732.000	473.600	5760.000	470.500	5791.000	470.700	5807.000	475.100	5827.000
GR	475.400	5851.000	477.200	5885.000	482.400	5932.000	485.500	5973.000	484.800	5995.000
GR	484.600	6022.000	485.100	6053.000	483.900	6122.000	483.700	6177.000	481.100	6187.000
GR	481.100	6198.000	483.100	6210.000	484.900	6228.000	486.900	6272.000	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4830.000	5283.000
X1	1.020	0.0	0.0	0.0	450.000	450.000	450.000	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4656.000	5285.000
FIS XS A X1	1.000	0.0	0.0	0.0	670.000	630.000	680.000	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4530.000	5509.000
FIS XS B X1	1.100	94.000	5236.000	5509.000	650.000	510.000	700.000	0.0	0.0	0.0
GR	486.000	1.000	473.200	1000.000	473.000	1417.000	474.100	1484.000	473.000	1637.000
GR	472.000	1729.000	471.600	1805.000	471.400	1931.000	471.800	2024.000	473.300	2039.000
GR	470.400	2053.000	469.400	2647.000	470.700	2737.000	471.500	2875.000	471.600	3043.000
GR	470.400	3208.000	470.100	3247.000	471.500	3306.000	472.800	3319.000	473.400	3338.000
GR	470.100	3368.000	469.800	3432.000	469.800	3481.000	470.400	3567.000	469.900	3669.000
GR	469.900	3714.000	468.300	3787.000	469.900	3834.000	469.900	3873.000	468.700	3906.000

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GR	466.300	3975.000	465.200	4037.000	465.600	4143.000	466.000	4228.000	468.600	4541.000
GR	465.900	4833.000	467.300	4871.000	467.800	4919.000	473.500	4938.000	474.100	4947.000
GR	474.100	4957.000	474.000	4968.000	472.100	4997.000	470.500	5050.000	470.200	5118.000
GR	469.700	5189.000	466.800	5236.000	460.700	5263.000	449.400	5265.000	449.400	5282.000
GR	479.400	5282.000	479.400	5290.000	449.400	5290.000	449.400	5325.000	479.400	5325.000
GR	479.400	5333.000	449.400	5333.000	449.400	5368.000	479.400	5368.000	479.400	5376.000
GR	449.400	5376.000	449.400	5411.000	479.400	5411.000	479.400	5419.000	449.400	5419.000
GR	449.400	5454.000	479.400	5454.000	479.400	5462.000	449.400	5462.000	449.400	5488.000
GR	454.800	5493.000	462.900	5501.000	466.300	5509.000	469.900	5549.000	468.600	5605.000
GR	475.100	5757.000	477.800	5896.000	482.500	5973.000	483.900	6022.000	484.300	6036.000
GR	482.700	6046.000	482.900	6062.000	483.900	6105.000	486.300	6153.000	485.500	6157.000
GR	485.800	6181.000	487.200	6204.000	488.600	6235.000	490.800	6254.000	490.800	6275.000
GR	493.700	6297.000	496.400	6403.000	496.400	6443.000	495.800	6448.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4160.000	5545.000

FIS XS C

X1	2.000	95.000	5349.000	5545.000	350.000	170.000	230.000	0.0	0.0	0.0
GR	485.000	1.000	468.500	1000.000	471.100	1126.000	470.800	1178.000	470.200	1216.000
GR	470.700	1265.000	473.000	1339.000	473.500	1405.000	473.900	1470.000	474.800	1548.000
GR	475.400	1624.000	476.000	1663.000	477.400	1714.000	476.200	1764.000	474.900	1810.000
GR	473.600	1835.000	473.400	1863.000	472.800	1984.000	471.100	2159.000	471.400	2295.000
GR	471.900	2382.000	471.800	2491.000	471.400	2572.000	470.400	2664.000	469.400	2754.000
GR	468.100	2873.000	468.700	2978.000	468.200	3088.000	468.200	3204.000	467.800	3316.000
GR	467.800	3434.000	469.400	3553.000	468.500	3660.000	468.200	3791.000	469.300	3914.000
GR	468.100	4059.000	467.300	4189.000	466.800	4338.000	465.900	4478.000	466.800	4596.000
GR	466.400	4721.000	466.900	4769.000	467.000	4799.000	467.200	4826.000	467.100	4834.000
GR	465.000	4857.000	455.400	4886.000	461.700	4906.000	465.400	4941.000	469.200	4958.000
GR	469.200	4972.000	467.000	4988.000	466.300	5049.000	466.300	5127.000	466.400	5207.000
GR	466.400	5259.000	465.900	5308.000	460.600	5349.000	456.800	5361.000	454.800	5368.000
GR	446.000	5397.000	446.000	5451.000	446.000	5516.000	454.800	5533.000	460.900	5545.000
GR	470.600	5560.000	473.700	5610.000	474.800	5661.000	475.400	5703.000	475.400	5726.000
GR	475.400	5741.000	476.600	5785.000	480.000	5840.000	481.300	5888.000	481.700	5926.000
GR	482.400	5959.000	484.900	5972.000	485.100	5987.000	485.100	6012.000	484.900	6020.000
GR	485.700	6038.000	489.600	6072.000	490.400	6110.000	491.100	6129.000	491.900	6155.000
GR	492.600	6203.000	498.500	6239.000	499.000	6271.000	499.700	6308.000	499.700	6323.000
GR	496.800	6343.000	496.800	6356.000	496.800	6362.000	504.900	6376.000	510.200	6388.000
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.010	68.000	5527.000	5689.000	50.000	125.000	125.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	464.500	476.100	0.0
GR	485.000	1.000	467.100	1032.000	465.600	1048.000	467.200	1062.000	468.400	1128.000
GR	469.600	1200.000	468.300	1256.000	470.100	1276.000	471.800	1335.000	472.700	1362.000
GR	473.700	1407.000	472.700	1461.000	472.800	1521.000	473.800	1562.000	475.300	1623.000
GR	475.700	1663.000	476.000	1726.000	475.200	1778.000	474.800	1861.000	468.700	1880.000
GR	468.800	1898.000	469.200	1941.000	470.100	2019.000	471.500	2111.000	470.900	2199.000
GR	470.800	2307.000	471.700	2432.000	471.700	2533.000	471.600	2629.000	470.200	2740.000
GR	469.800	2835.000	469.900	2959.000	467.600	3084.000	469.000	3183.000	469.400	3303.000
GR	468.400	3399.000	468.600	3482.000	468.700	3588.000	468.700	3754.000	468.900	3909.000
GR	466.400	4042.000	464.500	4136.000	464.900	4204.000	465.800	4296.000	466.200	4427.000
GR	466.700	4547.000	467.300	4681.000	467.300	4776.000	466.800	4807.000	466.600	4839.000
GR	466.500	4863.000	466.500	4882.000	466.500	4925.000	466.600	4983.000	466.900	5065.000
GR	466.300	5140.000	466.600	5223.000	466.400	5289.000	467.600	5387.000	466.000	5439.000
GR	458.000	5486.000	449.500	5527.000	449.500	5527.000	449.500	5689.000	449.500	5689.000
GR	455.000	5700.000	476.100	5761.000	485.400	6002.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.020	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
BT	9.000	5387.000	467.600	467.600	5439.000	469.600	466.000	5486.000	474.500	458.000
BT	5527.000	478.600	449.500	5527.000	478.600	473.500	5689.000	479.000	473.500	5689.000
BT	479.000	449.500	5700.000	479.000	455.000	5761.000	476.100	476.100	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000
X1	3.100	0.0	0.0	0.0	21.000	21.000	21.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	4140.000	5689.000

X1	3.200	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	464.500	476.100	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.010	39.000	5880.000	6100.000	400.000	10.000	30.000	0.0	0.0	0.0
GR	480.000	1.000	466.000	1000.000	470.000	1530.000	471.000	3025.000	470.000	3525.000
GR	470.000	4330.000	474.000	4500.000	470.000	4590.000	465.000	4820.000	465.000	4920.000
GR	464.000	5000.000	460.000	5150.000	460.500	5160.000	460.000	5165.000	459.000	5180.000
GR	460.000	5195.000	460.000	5300.000	457.000	5380.000	460.000	5700.000	466.100	5765.000
GR	466.100	5785.000	465.000	5805.000	460.000	5880.000	448.300	5920.000	448.300	6075.000
GR	455.000	6082.000	475.000	6100.000	483.000	6200.000	485.000	6305.000	486.500	6330.000
GR	490.000	6415.000	495.000	6460.000	500.000	6520.000	501.000	6580.000	500.000	6638.000
GR	504.900	6650.000	505.000	6690.000	510.000	6800.000	515.000	6875.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.020	0.0	0.0	0.0	15.000	15.000	15.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	470.000	475.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
SB	1.250	1.500	3.000	0.0	133.000	16.000	4100.000	1.900	451.000	451.000
X1	4.100	0.0	0.0	0.0	17.000	17.000	17.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	476.000	474.100	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	475.000	0.0
BT	29.000	1.000	480.000	0.0	1000.000	475.500	0.0	1785.000	474.700	0.0
BT	1960.000	474.100	0.0	2141.000	474.600	0.0	2473.000	474.200	0.0	4029.000
BT	475.300	0.0	4554.000	478.100	0.0	4758.000	478.500	0.0	4813.000	479.300
BT	0.0	4887.000	479.800	0.0	4941.000	480.200	0.0	5018.000	480.500	0.0
BT	5053.000	480.700	0.0	5140.000	480.900	0.0	5243.000	481.000	0.0	5333.000
BT	481.200	0.0	5415.000	481.500	0.0	5525.000	482.100	0.0	5551.000	482.600
BT	0.0	5581.000	482.500	0.0	5676.000	482.900	0.0	5878.000	482.900	0.0
BT	5885.000	483.000	0.0	6028.000	483.000	0.0	6064.000	483.300	0.0	6099.000
BT	483.900	0.0	6118.000	484.100	0.0	6134.000	485.200	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3850.000	6100.000
X1	4.200	0.0	0.0	0.0	66.000	66.000	66.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	471.000	475.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3540.000	5918.000
X1	5.010	70.000	5603.000	5918.000	5.000	5.000	5.000	0.0	0.0	0.0
BT	12.000	5603.000	482.200	482.200	5603.000	482.200	479.400	5625.000	482.300	479.500
BT	5625.000	482.300	482.300	5718.000	483.200	483.200	5718.000	483.200	478.200	5815.000
BT	483.800	478.800	5815.000	483.800	483.800	5821.000	483.800	483.800	5821.000	483.800
BT	478.800	5918.000	484.300	479.300	5918.000	484.300	484.300	0.0	0.0	0.0
GR	480.000	1.000	471.000	1000.000	471.000	3536.000	471.100	3683.000	471.200	3987.000
GR	472.900	4580.000	474.000	4696.000	475.100	4779.000	475.700	4979.000	476.400	5054.000
GR	476.500	5055.000	477.000	5095.000	477.500	5157.000	478.600	5240.000	479.300	5295.000
GR	479.900	5358.000	480.300	5401.000	481.400	5467.000	481.900	5511.000	482.000	5572.000
GR	482.200	5603.000	467.000	5603.000	467.000	5603.000	467.000	5625.000	467.000	5625.000
GR	482.300	5625.000	483.200	5718.000	456.100	5718.000	456.100	5718.000	453.100	5750.000
GR	448.400	5783.000	443.400	5815.000	443.400	5815.000	483.800	5815.000	483.800	5821.000
GR	442.800	5821.000	442.800	5821.000	448.600	5853.000	450.200	5886.000	466.100	5918.000
GR	466.100	5918.000	484.300	5918.000	483.400	6009.000	479.200	6028.000	481.200	6068.000
GR	481.600	6093.000	485.500	6119.000	487.200	6148.000	490.100	6180.000	494.700	6209.000
GR	496.600	6241.000	496.600	6260.000	501.500	6287.000	501.500	6341.000	502.300	6388.000
GR	500.300	6406.000	498.600	6423.000	498.600	6441.000	505.000	6460.000	506.300	6473.000
GR	506.300	6495.000	507.100	6525.000	509.500	6587.000	511.200	6633.000	514.400	6652.000
GR	515.400	6668.000	516.300	6719.000	521.300	6794.000	525.200	6844.000	531.000	6889.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3540.000	5918.000
X1	5.100	0.0	0.0	0.0	18.000	18.000	18.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2980.000	5821.000
X1	6.010	94.000	5593.000	5821.000	5.000	5.000	5.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	467.200	475.000	0.0
GR	480.000	1.000	471.500	1000.000	471.400	1152.000	471.800	1242.000	471.800	1327.000

GR	470.400	1483.000	469.000	1604.000	467.500	1724.000	467.900	1842.000	469.300	1944.000
GR	469.600	2079.000	468.600	2256.000	469.200	2444.000	469.300	2587.000	468.500	2684.000
GR	467.500	2745.000	466.500	2758.000	465.800	2764.000	460.600	2808.000	465.800	2834.000
GR	467.700	2843.000	472.000	2866.000	471.400	2923.000	470.700	3042.000	464.100	3074.000
GR	464.200	3084.000	467.300	3101.000	468.300	3141.000	469.700	3191.000	468.800	3265.000
GR	467.400	3316.000	466.200	3336.000	466.200	3392.000	466.200	3465.000	469.000	3516.000
GR	469.500	3594.000	468.700	3675.000	468.800	3845.000	469.100	3977.000	469.000	4107.000
GR	468.300	4221.000	468.000	4370.000	467.900	4483.000	467.800	4567.000	467.600	4625.000
GR	466.300	4674.000	465.900	4721.000	465.200	4756.000	462.200	4772.000	464.800	4787.000
GR	465.700	4800.000	466.400	4832.000	466.600	4880.000	467.000	4939.000	467.400	5013.000
GR	467.400	5090.000	467.100	5179.000	467.500	5250.000	467.700	5292.000	468.000	5378.000
GR	468.100	5443.000	468.400	5486.000	467.900	5496.000	467.900	5519.000	468.300	5537.000
GR	467.100	5574.000	465.800	5593.000	459.400	5602.000	455.800	5608.000	454.800	5614.000
GR	451.500	5632.000	451.500	5685.000	451.500	5685.000	454.800	5751.000	455.100	5758.000
GR	455.100	5770.000	454.800	5778.000	452.600	5791.000	454.800	5804.000	456.100	5811.000
GR	472.700	5821.000	478.800	5835.000	478.800	5851.000	478.200	5863.000	479.500	5870.000
GR	482.500	5905.000	488.300	5953.000	492.800	5993.000	495.200	6023.000	497.100	6057.000
GR	499.300	6071.000	499.300	6083.000	496.800	6088.000	502.000	6108.000	0.0	0.0
NC	0.050	0.070	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2980.000	5821.000
FIS XS D										
X1	6.000	0.0	0.0	0.0	110.000	290.000	205.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2840.000	5394.000
FIS XS E										
X1	7.000	95.000	5136.000	5394.000	80.000	780.000	680.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.000	1211.000	471.400	1323.000	470.400	1455.000
GR	469.900	1556.000	469.300	1640.000	469.200	1654.000	467.200	1672.000	466.700	1728.000
GR	466.300	1861.000	469.100	1977.000	469.800	2101.000	468.700	2200.000	468.900	2308.000
GR	469.100	2429.000	467.600	2538.000	468.200	2660.000	466.900	2720.000	466.200	2745.000
GR	465.800	2763.000	467.500	2785.000	472.300	2816.000	472.100	2856.000	470.600	2929.000
GR	470.300	2978.000	469.500	3024.000	463.300	3045.000	465.300	3058.000	467.000	3093.000
GR	467.700	3145.000	468.100	3195.000	468.800	3274.000	467.200	3304.000	466.200	3315.000
GR	459.100	3393.000	466.200	3511.000	467.200	3527.000	467.200	3570.000	467.300	3597.000
GR	466.600	3605.000	464.000	3637.000	466.600	3661.000	467.200	3666.000	467.800	3730.000
GR	468.000	3836.000	468.500	3936.000	469.400	4021.000	469.900	4108.000	467.800	4225.000
GR	467.900	4330.000	468.200	4409.000	468.100	4486.000	468.000	4597.000	466.900	4663.000
GR	465.100	4706.000	460.500	4725.000	465.300	4740.000	466.500	4793.000	467.700	4825.000
GR	467.100	4861.000	465.400	4886.000	465.300	4924.000	467.800	4945.000	467.500	5026.000
GR	468.300	5074.000	468.700	5112.000	468.800	5136.000	460.600	5151.000	456.300	5157.000
GR	454.900	5166.000	454.300	5170.000	454.300	5246.000	454.300	5314.000	454.900	5319.000
GR	455.700	5325.000	457.100	5343.000	460.500	5360.000	468.400	5394.000	467.500	5439.000
GR	465.900	5457.000	464.500	5475.000	465.300	5495.000	465.800	5531.000	470.200	5554.000
GR	473.700	5592.000	481.600	5613.000	482.900	5636.000	483.300	5686.000	484.800	5703.000
GR	487.600	5724.000	492.600	5756.000	497.400	5777.000	503.600	5802.000	503.600	5823.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2480.000	5042.000
FIS XS F										
X1	8.000	66.000	4717.000	5042.000	270.000	740.000	725.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.400	1220.000	471.000	1339.000	470.300	1423.000
GR	469.600	1566.000	469.200	1623.000	468.400	1667.000	468.400	1772.000	467.800	1925.000
GR	467.700	2068.000	468.300	2233.000	467.600	2370.000	468.000	2480.000	470.100	2552.000
GR	470.700	2651.000	471.000	2719.000	471.200	2819.000	464.500	2871.000	465.100	2884.000
GR	465.500	2949.000	465.800	3019.000	465.900	3127.000	465.900	3252.000	465.200	3372.000
GR	464.800	3449.000	465.300	3500.000	466.200	3603.000	466.900	3715.000	466.800	3873.000
GR	466.300	4018.000	466.200	4129.000	466.300	4205.000	466.400	4240.000	466.500	4285.000
GR	466.500	4335.000	468.000	4381.000	468.500	4435.000	469.500	4498.000	470.500	4571.000
GR	470.700	4653.000	470.500	4678.000	470.300	4691.000	464.500	4708.000	464.500	4717.000
GR	457.700	4719.000	456.900	4729.000	456.000	4740.000	456.000	4850.000	456.000	4979.000
GR	456.900	4983.000	459.000	4992.000	464.300	5009.000	467.600	5042.000	467.800	5103.000
GR	466.100	5160.000	464.900	5201.000	461.400	5233.000	460.300	5246.000	458.700	5264.000
GR	460.300	5265.000	470.300	5270.000	475.900	5282.000	483.000	5299.000	484.400	5309.000
GR	484.700	5331.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2465.000	5042.000
FIS XS G										
X1	9.000	66.000	4680.000	4999.000	20.000	30.000	30.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.300	1222.000	471.000	1339.000	470.400	1422.000
GR	469.600	1570.000	469.200	1622.000	468.500	1668.000	468.300	1772.000	467.700	1924.000

GR	467.600	2052.000	468.000	2216.000	467.500	2376.000	468.100	2486.000	470.100	2552.000
GR	470.900	2649.000	471.300	2715.000	471.200	2815.000	464.700	2855.000	465.400	2888.000
GR	465.700	2955.000	466.000	3018.000	466.100	3123.000	465.800	3250.000	465.100	3374.000
GR	464.800	3450.000	465.400	3508.000	466.200	3605.000	466.700	3719.000	467.000	3875.000
GR	466.300	4028.000	466.100	4128.000	466.200	4206.000	466.400	4244.000	466.500	4287.000
GR	466.600	4326.000	468.400	4387.000	468.800	4449.000	469.900	4507.000	471.000	4567.000
GR	470.700	4612.000	470.700	4647.000	470.500	4656.000	470.500	4680.000	468.800	4686.000
GR	461.700	4700.000	461.800	4700.000	460.700	4704.000	460.000	4707.000	456.000	4718.000
GR	456.000	4940.000	460.700	4957.000	461.400	4974.000	466.000	4999.000	467.200	5021.000
GR	467.500	5067.000	466.900	5143.000	466.200	5187.000	466.200	5223.000	464.100	5229.000
GR	465.500	5242.000	470.400	5266.000	474.600	5276.000	479.700	5286.000	485.400	5301.000
GR	485.100	5323.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1830.000	4761.000

FIS XS H

X1	10.000	73.000	4497.000	4761.000	845.000	795.000	860.000	0.0	0.0	0.0
GR	480.000	1.000	471.500	1000.000	471.200	1135.000	471.100	1222.000	470.600	1316.000
GR	469.600	1448.000	469.200	1562.000	467.900	1661.000	466.700	1792.000	466.000	1867.000
GR	465.200	2008.000	465.000	2171.000	464.600	2182.000	464.600	2251.000	464.800	2269.000
GR	464.800	2310.000	463.600	2328.000	464.500	2346.000	464.400	2387.000	464.400	2446.000
GR	464.400	2497.000	464.700	2522.000	465.400	2566.000	467.100	2607.000	467.400	2655.000
GR	468.300	2740.000	470.400	2828.000	471.000	2876.000	470.200	2948.000	468.900	3054.000
GR	467.700	3131.000	466.500	3207.000	467.000	3258.000	467.200	3340.000	467.500	3460.000
GR	467.700	3573.000	468.000	3648.000	467.500	3710.000	467.400	3776.000	467.200	3826.000
GR	467.200	3858.000	467.200	3910.000	467.600	3980.000	467.800	4050.000	468.000	4120.000
GR	468.000	4189.000	468.800	4272.000	468.400	4371.000	468.400	4429.000	467.800	4470.000
GR	467.500	4497.000	465.800	4501.000	461.400	4511.000	460.900	4519.000	456.700	4583.000
GR	456.700	4609.000	456.700	4670.000	460.900	4694.000	462.800	4705.000	464.900	4726.000
GR	469.700	4761.000	469.900	4789.000	468.600	4869.000	468.400	4964.000	468.200	5031.000
GR	468.100	5072.000	465.600	5087.000	469.400	5099.000	475.600	5108.000	485.100	5131.000
GR	494.500	5152.000	494.600	5172.000	494.500	5193.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1720.000	4911.000

FIS XS I

X1	11.000	77.000	4716.000	4911.000	300.000	600.000	675.000	0.0	0.0	0.0
GR	485.000	1.000	471.100	1052.000	471.300	1132.000	471.000	1223.000	470.200	1312.000
GR	469.100	1392.000	468.800	1458.000	467.900	1468.000	465.500	1477.000	462.200	1489.000
GR	465.500	1522.000	466.400	1531.000	466.800	1558.000	466.800	1594.000	465.900	1662.000
GR	465.800	1737.000	465.300	1870.000	465.300	1954.000	464.900	2032.000	464.500	2050.000
GR	464.500	2138.000	464.800	2196.000	464.900	2218.000	464.100	2230.000	464.600	2237.000
GR	464.600	2279.000	464.600	2367.000	465.100	2381.000	468.100	2418.000	469.900	2459.000
GR	469.800	2519.000	470.700	2612.000	470.600	2676.000	470.700	2761.000	471.600	2891.000
GR	471.700	2917.000	470.500	2961.000	470.200	3014.000	470.200	3111.000	469.300	3199.000
GR	467.900	3351.000	467.900	3435.000	467.000	3461.000	468.500	3491.000	468.400	3549.000
GR	468.500	3660.000	469.200	3804.000	469.400	3923.000	469.800	4009.000	469.200	4091.000
GR	468.500	4231.000	467.900	4311.000	467.100	4412.000	466.000	4418.000	468.200	4430.000
GR	469.000	4508.000	468.800	4582.000	468.800	4636.000	467.700	4688.000	465.600	4716.000
GR	461.900	4722.000	460.200	4728.000	459.400	4731.000	459.400	4809.000	459.400	4887.000
GR	460.200	4889.000	462.300	4896.000	467.600	4911.000	464.800	4931.000	473.500	4943.000
GR	475.800	4971.000	477.500	5027.000	478.500	5104.000	480.900	5166.000	485.600	5232.000
GR	487.600	5268.000	489.300	5303.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1720.000	4911.000
X1	11.100	0.0	0.0	0.0	195.000	15.000	75.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.600	484.000	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1670.000	5092.000
X1	12.010	80.000	4900.000	5092.000	5.000	5.000	5.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.600	484.000	0.0
BT	6.000	4900.000	480.000	473.900	4992.000	482.100	475.400	4992.000	482.100	461.700
BT	4998.000	482.100	461.700	4998.000	482.100	475.400	5092.000	484.200	476.900	0.0
GR	485.000	1.000	471.400	1177.000	470.500	1269.000	469.300	1364.000	466.700	1417.000
GR	468.200	1438.000	468.000	1469.000	465.500	1481.000	465.500	1541.000	466.200	1553.000
GR	465.800	1605.000	465.600	1656.000	465.600	1734.000	466.100	1763.000	466.100	1842.000
GR	466.000	1935.000	465.000	1990.000	464.500	2003.000	464.500	2083.000	464.800	2110.000
GR	464.900	2141.000	464.600	2161.000	464.600	2200.000	464.600	2279.000	465.000	2313.000
GR	467.200	2[illegible]62.000	468.900	2422.000	470.500	2474.000	470.500	2544.000	470.500	2681.000

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	GR	470.700	2827.000	471.000	2942.000	471.000	3022.000	470.800	3079.000	470.300	3153.000
	GR	470.500	3182.000	470.800	3200.000	470.100	3213.000	469.000	3292.000	469.200	3385.000
	GR	469.700	3473.000	469.900	3553.000	470.700	3631.000	474.000	3648.000	474.000	3692.000
	GR	471.700	3715.000	472.100	3736.000	475.100	3766.000	476.700	3827.000	478.000	3866.000
	GR	477.200	3907.000	475.000	3986.000	473.300	4061.000	473.300	4154.000	472.900	4238.000
	GR	472.200	4317.000	471.800	4404.000	471.800	4470.000	471.600	4516.000	472.100	4530.000
	GR	472.100	4547.000	480.000	4900.000	460.000	4900.000	452.900	4940.000	454.900	4992.000
	GR	461.700	4992.000	461.700	4998.000	461.700	4998.000	456.900	5040.000	463.300	5092.000
	GR	484.200	5092.000	485.400	5425.000	485.500	5448.000	485.700	5507.000	488.400	5577.000
	GR	490.900	5629.000	497.700	5654.000	502.400	5677.000	507.400	5709.000	507.400	5731.000
	FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1670.000	5092.000
	X1	12.100	0.0	0.0	0.0	110.000	110.000	110.000	0.0	0.0	0.0
	X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
	FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1650.000	5148.000
	X1	13.100	95.000	4937.000	5148.000	5.000	5.000	5.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
	GR	485.000	1.000	471.300	1084.000	470.800	1185.000	470.200	1277.000	468.900	1359.000
	GR	467.300	1402.000	465.700	1423.000	466.800	1448.000	467.000	1469.000	465.500	1489.000
	GR	464.300	1505.000	465.500	1537.000	466.000	1551.000	466.200	1576.000	465.900	1618.000
	GR	465.700	1690.000	465.700	1758.000	466.000	1841.000	465.800	1869.000	466.000	1909.000
	GR	465.700	1948.000	464.700	1974.000	464.600	2028.000	464.800	2037.000	464.300	2055.000
	GR	464.500	2069.000	464.400	2131.000	464.900	2151.000	465.000	2215.000	465.100	2247.000
	GR	469.000	2288.000	469.900	2336.000	470.700	2367.000	470.700	2419.000	470.000	2470.000
	GR	470.000	2626.000	470.000	2748.000	470.300	2858.000	470.800	2934.000	471.000	3003.000
	GR	471.100	3038.000	470.700	3071.000	470.700	3137.000	470.800	3176.000	470.700	3216.000
	GR	470.300	3263.000	469.600	3326.000	469.300	3347.000	469.800	3382.000	470.100	3488.000
	GR	471.500	3551.000	474.200	3563.000	474.200	3586.000	473.700	3590.000	474.800	3606.000
	GR	473.000	3620.000	474.600	3645.000	486.600	3683.000	486.600	3710.000	485.000	3726.000
	GR	480.700	3756.000	476.900	3798.000	474.900	3826.000	472.800	3885.000	472.700	3965.000
	GR	472.900	4063.000	474.000	4125.000	475.400	4146.000	476.000	4163.000	474.800	4186.000
	GR	473.400	4237.000	472.800	4301.000	472.800	4345.000	473.600	4370.000	473.200	4417.000
	GR	472.800	4472.000	472.000	4503.000	471.800	4554.000	470.200	4640.000	469.700	4768.000
	GR	470.100	4852.000	469.500	4902.000	468.300	4937.000	465.400	4952.000	460.500	4961.000
	GR	460.000	4962.000	460.000	5046.000	460.000	5128.000	460.500	5129.000	463.100	5133.000
	GR	474.600	5148.000	495.300	5182.000	499.200	5208.000	500.600	5378.000	512.500	5551.000
	FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1630.000	5148.000
FIS XS J	X1	13.200	0.0	0.0	0.0	100.000	195.000	115.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
	NC	0.050	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1620.000	4976.000
FIS XS K	X1	14.000	95.000	4717.000	4967.000	20.000	720.000	635.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	469.000	0.0	0.0
	GR	485.000	1.000	471.200	1094.000	470.800	1227.000	469.300	1325.000	466.900	1405.000
	GR	465.500	1423.000	466.600	1445.000	466.900	1466.000	465.700	1482.000	465.500	1512.000
	GR	466.100	1558.000	466.100	1617.000	466.200	1678.000	466.000	1741.000	466.200	1796.000
	GR	465.400	1876.000	465.200	1935.000	464.900	1960.000	464.700	1996.000	464.100	2010.000
	GR	464.300	2026.000	464.300	2087.000	464.600	2149.000	464.800	2197.000	465.700	2221.000
	GR	468.300	2269.000	470.400	2315.000	470.500	2387.000	470.200	2428.000	469.900	2522.000
	GR	469.800	2629.000	469.900	2748.000	470.100	2826.000	470.600	2919.000	470.700	2993.000
	GR	470.700	3028.000	471.000	3108.000	470.600	3174.000	470.300	3274.000	469.500	3385.000
	GR	471.500	3450.000	472.000	3530.000	474.600	3545.000	474.600	3570.000	473.800	3577.000
	GR	474.600	3585.000	473.100	3599.000	474.500	3612.000	476.400	3633.000	487.600	3658.000
	GR	485.800	3709.000	479.200	3737.000	474.400	3800.000	472.200	3865.000	471.100	3939.000
	GR	471.000	4019.000	472.600	4103.000	474.100	4139.000	475.800	4169.000	473.400	4199.000
	GR	473.100	4238.000	474.400	4284.000	474.700	4317.000	474.400	4370.000	474.200	4424.000
	GR	472.900	4496.000	471.800	4541.000	468.800	4642.000	466.700	4691.000	465.500	4717.000
	GR	464.900	4722.000	460.700	4730.000	456.000	4739.000	456.000	4824.000	456.000	4893.000
	GR	460.800	4913.000	463.400	4923.000	465.700	4967.000	466.500	5035.000	475.200	5062.000
	GR	490.400	5097.000	488.200	5113.000	491.200	5140.000	489.200	5154.000	488.000	5172.000
	GR	500.800	5194.000	508.900	5234.000	510.000	5273.000	511.500	5284.000	511.500	5310.000
	GR	512.500	5364.000	512.900	5492.000	512.900	5562.000	509.700	5599.000	513.300	5668.000

NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1545.000	4621.000
X1	16.010	90.000	4430.000	4621.000	44.000	714.000	684.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	480.700	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	475.300	3700.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4428.000	458.000	4430.000
GR	458.000	4538.000	458.000	4621.000	461.200	4636.000	463.200	4643.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	4721.000
X1	16.020	92.000	4530.000	4721.000	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	0.0	0.0
BT	12.000	4115.000	494.600	494.600	4115.000	494.600	491.500	4210.000	493.100	490.000
BT	4210.000	493.100	493.100	4530.000	488.500	488.500	4530.000	488.500	484.600	4624.000
BT	487.100	483.300	4624.000	487.100	487.100	4627.000	487.000	487.000	4627.000	487.000
BT	483.200	4721.000	485.700	481.800	4721.000	485.700	485.700	0.0	0.0	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.800	3521.000	475.300	3547.000	472.300	3578.000	472.300	3653.000	477.100	3669.000
GR	481.000	3691.000	493.700	3769.000	494.900	3795.000	495.400	3872.000	496.100	3993.000
GR	495.200	4096.000	494.600	4115.000	475.400	4115.000	475.400	4210.000	493.100	4210.000
GR	488.500	4530.000	458.000	4530.000	458.000	4624.000	487.100	4624.000	487.000	4627.000
GR	458.000	4627.000	458.000	4721.000	485.700	4721.000	484.600	4849.000	484.300	5134.000
GR	484.100	5192.000	480.900	5241.000	481.200	5272.000	482.900	5353.000	484.700	5440.000
GR	489.200	5463.000	501.300	5520.000	504.100	5560.000	505.700	5599.000	504.000	5619.000
GR	504.000	5639.000	510.400	5658.000	513.800	5793.000	514.000	5879.000	515.200	5940.000
GR	516.000	5965.000	516.000	5982.000	516.500	6021.000	517.500	6114.000	518.600	6156.000
GR	520.500	6232.000	525.100	6325.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	4721.000
X1	16.030	0.0	0.0	0.0	76.000	76.000	76.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1545.000	4621.000
X1	16.040	0.000	4430.000	4621.000	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	480.900	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000

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GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	475.300	3700.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4428.000	458.000	4430.000
GR	458.000	4538.000	458.000	4621.000	461.200	4636.000	463.200	4643.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1585.000	4661.000
FIS XS L X1	16.000	95.000	4392.000	4661.000	60.000	60.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.200	0.0	0.0
GR	485.000	1.000	471.300	1070.000	470.900	1175.000	469.100	1287.000	466.200	1367.000
GR	466.200	1396.000	468.700	1411.000	466.600	1427.000	465.300	1438.000	467.000	1454.000
GR	467.100	1475.000	467.400	1506.000	466.900	1533.000	466.900	1589.000	466.200	1664.000
GR	465.700	1801.000	465.900	1870.000	466.100	1901.000	465.400	1921.000	464.700	1939.000
GR	464.700	1974.000	466.400	1995.000	469.300	2034.000	469.900	2110.000	469.700	2150.000
GR	468.700	2196.000	469.500	2223.000	470.200	2257.000	470.500	2323.000	470.200	2360.000
GR	470.100	2440.000	469.600	2538.000	469.600	2634.000	469.800	2765.000	470.000	2842.000
GR	470.900	2914.000	471.400	2955.000	471.700	3098.000	472.400	3244.000	471.500	3306.000
GR	471.000	3370.000	471.500	3425.000	471.000	3454.000	471.500	3473.000	472.600	3492.000
GR	475.300	3521.000	475.300	3547.000	472.300	3578.000	472.300	3653.000	471.600	3743.000
GR	470.500	3832.000	469.800	3914.000	469.700	3993.000	475.200	4053.000	476.100	4073.000
GR	476.100	4143.000	479.600	4198.000	485.200	4243.000	485.500	4261.000	475.200	4299.000
GR	471.000	4344.000	469.300	4392.000	465.000	4425.000	461.200	4436.000	459.000	4442.000
GR	459.000	4538.000	459.000	4628.000	461.200	4636.000	463.200	4642.000	465.400	4661.000
GR	466.000	4741.000	466.500	4800.000	471.800	4883.000	473.300	4957.000	475.500	5038.000
GR	477.200	5119.000	477.200	5138.000	480.500	5197.000	482.700	5262.000	482.200	5286.000
GR	479.700	5308.000	482.100	5350.000	484.800	5472.000	489.600	5509.000	501.000	5543.000
GR	506.400	5565.000	506.600	5667.000	505.400	5694.000	505.700	5707.000	510.700	5730.000
GR	512.000	5784.000	512.600	5847.000	514.000	5887.000	515.500	5954.000	517.700	6033.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.010	67.000	3984.000	4154.000	758.000	678.000	738.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.600	472.200	0.0
GR	485.000	1.000	471.300	1039.000	470.700	1095.000	470.200	1179.000	469.900	1234.000
GR	468.300	1317.000	468.400	1424.000	467.100	1467.000	467.500	1517.000	470.800	1551.000
GR	473.300	1572.000	474.700	1629.000	473.700	1688.000	472.800	1758.000	469.900	1811.000
GR	468.900	1872.000	468.700	1949.000	468.500	2033.000	468.800	2162.000	468.700	2264.000
GR	468.800	2343.000	469.700	2393.000	470.600	2480.000	471.100	2582.000	471.200	2724.000
GR	471.500	2851.000	471.900	2953.000	472.000	3003.000	472.100	3043.000	472.100	3083.000
GR	472.100	3100.000	472.200	3111.000	471.000	3243.000	470.700	3362.000	470.400	3504.000
GR	470.300	3632.000	471.100	3700.000	472.600	3780.000	474.700	3849.000	478.500	3894.000
GR	478.500	3917.000	465.900	3984.000	465.900	3984.000	459.000	4001.000	459.000	4038.000
GR	459.000	4038.000	459.000	4042.000	459.000	4042.000	459.000	4096.000	459.000	4096.000
GR	459.000	4100.000	459.000	4100.000	459.000	4145.000	464.300	4154.000	464.300	4154.000
GR	473.500	4200.000	473.500	4221.000	473.100	4257.000	473.300	4299.000	474.500	4359.000
GR	479.700	4396.000	484.100	4432.000	486.700	4446.000	491.600	4485.000	499.600	4508.000
GR	512.900	4530.000	525.000	4556.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.020	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.600	0.0	0.0
BT	18.000	3917.000	478.500	478.500	3984.000	478.800	465.900	3984.000	478.800	474.000
BT	4001.000	478.900	474.000	4038.000	479.000	474.000	4038.000	479.000	459.000	4042.000
BT	479.000	459.000	4042.000	479.000	475.500	4096.000	479.300	475.500	4096.000	479.300
BT	459.000	4100.000	479.300	459.000	4100.000	479.300	474.000	4145.000	479.500	474.000
BT	4154.000	479.500	474.000	4154.000	479.500	464.300	4200.000	475.000	473.500	4221.000
BT	474.300	473.500	4257.000	473.100	473.100	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.030	0.0	0.0	0.0	27.000	27.000	27.000	0.0	0.0	0.0

	X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	0.0	0.0
	NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
	X1	18.040	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	473.100	0.0
	NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
FIS XS M	X1	18.000	67.000	3917.000	4154.000	55.000	55.000	55.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.800	0.0	0.0
	GR	485.000	1.000	471.300	1039.000	470.700	1095.000	470.200	1179.000	469.900	1234.000
	GR	468.300	1317.000	468.400	1424.000	467.100	1467.000	467.500	1517.000	470.800	1551.000
	GR	473.300	1572.000	474.700	1629.000	473.700	1688.000	472.800	1758.000	469.900	1811.000
	GR	468.900	1872.000	468.700	1949.000	468.500	2033.000	468.800	2162.000	468.700	2264.000
	GR	468.800	2343.000	469.700	2393.000	470.600	2480.000	471.100	2582.000	471.200	2724.000
	GR	471.500	2851.000	471.900	2953.000	472.000	3003.000	472.100	3043.000	472.100	3083.000
	GR	472.100	3100.000	472.200	3111.000	471.000	3243.000	470.700	3362.000	470.400	3504.000
	GR	470.300	3632.000	471.100	3700.000	472.600	3780.000	474.700	3849.000	478.500	3894.000
	GR	478.500	3917.000	465.900	3984.000	465.900	3984.000	459.000	4001.000	459.000	4038.000
	GR	459.000	4038.000	459.000	4042.000	459.000	4042.000	459.000	4096.000	459.000	4096.000
	GR	459.000	4100.000	459.000	4100.000	459.000	4145.000	464.300	4154.000	464.300	4154.000
	GR	473.500	4200.000	473.500	4221.000	473.100	4257.000	473.300	4299.000	474.500	4359.000
	GR	479.700	4396.000	484.100	4432.000	486.700	4446.000	491.600	4485.000	499.600	4508.000
	GR	512.900	4530.000	525.000	4556.000	0.0	0.0	0.0	0.0	0.0	0.0
	NC	0.070	0.080	0.035	0.500	0.700	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2650.000	4535.000
FIS XS N	X1	19.000	80.000	4140.000	4525.000	1750.000	1500.000	1283.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	476.300	0.0	0.0
	GR	483.800	1000.000	481.300	1049.000	479.300	1136.000	478.600	1211.000	477.800	1252.000
	GR	476.600	1291.000	474.900	1327.000	474.400	1383.000	473.800	1544.000	474.600	1611.000
	GR	474.700	1650.000	475.300	1723.000	478.600	1741.000	475.300	1790.000	474.200	1805.000
	GR	474.200	1870.000	474.200	1991.000	474.400	2084.000	474.800	2248.000	474.800	2447.000
	GR	473.200	2622.000	471.600	2660.000	472.600	2758.000	473.400	2821.000	471.600	2850.000
	GR	471.900	2919.000	472.100	3003.000	472.000	3118.000	472.100	3224.000	472.200	3274.000
	GR	472.400	3349.000	474.100	3566.000	474.600	3610.000	474.800	3689.000	475.700	3772.000
	GR	476.500	3867.000	478.000	3975.000	479.000	4096.000	479.000	4140.000	474.900	4162.000
	GR	470.700	4174.000	465.600	4187.000	462.500	4198.000	462.100	4199.000	462.100	4252.000
	GR	462.100	4309.000	462.500	4310.000	465.000	4317.000	465.900	4327.000	465.500	4349.000
	GR	462.500	4360.000	462.100	4361.000	462.100	4370.000	462.100	4370.000	462.500	4383.000
	GR	462.800	4392.000	462.500	4401.000	460.700	4447.000	460.700	4447.000	460.700	4476.000
	GR	462.500	4484.000	465.000	4495.000	473.700	4525.000	473.800	4588.000	474.700	4607.000
	GR	475.900	4641.000	476.900	4687.000	478.800	4735.000	478.800	4752.000	474.900	4762.000
	GR	475.400	4779.000	477.200	4804.000	477.700	4823.000	485.200	4866.000	491.200	4889.000
	GR	491.200	4906.000	500.200	4916.000	510.000	4932.000	517.200	4949.000	526.200	4972.000
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2070.000	3291.000
	X1	19.100	0.0	0.0	0.0	750.000	800.000	805.000	0.650	1.200	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	477.000	0.0	0.0
	ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
FIS XS O	X1	20.000	58.000	2998.000	3282.000	750.000	800.000	805.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	478.300	0.0	0.0
	GR	508.100	1000.000	507.300	1046.000	504.500	1093.000	501.300	1171.000	494.400	1248.000
	GR	490.700	1306.000	487.000	1348.000	486.600	1371.000	485.200	1383.000	483.700	1410.000
	GR	479.700	1450.000	477.800	1570.000	477.400	1622.000	478.600	1663.000	480.500	1730.000
	GR	480.100	1784.000	479.500	1851.000	478.600	1910.000	478.800	1968.000	479.100	2001.000
	GR	479.100	2029.000	479.700	2094.000	480.400	2181.000	480.200	2240.000	480.200	2269.000
	GR	480.300	2360.000	480.500	2458.000	480.500	2521.000	480.500	2578.000	480.800	2649.000
	GR	480.100	2719.000	479.300	2793.000	477.800	2858.000	477.100	2935.000	477.700	2976.000
	GR	480.500	2998.000	475.700	3049.000	465.200	3067.000	463.200	3076.000	461.400	3084.000
	GR	461.400	3142.000	461.400	3197.000	463.200	3211.000	464.600	3222.000	469.800	3257.000
	GR	478.800	3282.000	477.800	3330.000	477.100	3390.000	477.100	3411.000	477.800	3425.000
	GR	482.500	3469.000	485.900	3495.000	489.700	3527.000	497.300	3564.000	498.500	3587.000

Duplicated Page - same as Page 69

X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	0.0	0.0
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.040	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.700	473.100	0.0
NC	0.060	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	4154.000
X1	18.000	67.000	3917.000	4154.000	55.000	55.000	55.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	474.800	0.0	0.0
GR	485.000	[illegible]	471.800	[illegible]	470.700	1095.000	470.200	1179.000	469.900	1234.000
GR	468.300	1317.000	468.400	1424.000	467.100	1467.000	467.500	1517.000	470.800	1551.000
GR	473.300	1572.000	474.700	1629.000	473.700	1688.000	472.800	1758.000	469.900	1811.000
GR	468.900	1872.000	468.700	1949.000	468.500	2033.000	468.800	2162.000	468.700	2264.000
GR	468.800	2343.000	469.700	2393.000	470.600	2480.000	471.100	2582.000	471.200	2724.000
GR	471.500	2851.000	471.900	2953.000	472.000	3003.000	472.100	3043.000	472.100	3083.000
GR	472.100	3100.000	472.200	3111.000	471.000	3243.000	470.700	3362.000	470.400	3504.000
GR	470.300	3632.000	471.100	3700.000	472.600	3780.000	474.700	3849.000	478.500	3894.000
GR	478.500	3917.000	465.900	3984.000	465.900	3984.000	459.000	4001.000	459.000	4038.000
GR	459.000	4038.000	459.000	4042.000	459.000	4042.000	459.000	4096.000	459.000	4096.000
GR	459.000	4100.000	459.000	4100.000	459.000	4145.000	464.300	4154.000	464.300	4154.000
GR	473.500	4200.000	473.500	4221.000	473.100	4257.000	473.300	4299.000	474.500	4359.000
GR	479.700	4396.000	484.100	4432.000	486.700	4446.000	491.600	4485.000	499.600	4508.000
GR	512.900	4530.000	525.000	4556.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.080	0.035	0.500	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2650.000	4535.000
X1	19.000	80.000	4140.000	4525.000	1750.000	1500.000	1283.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	476.300	0.0	0.0
GR	483.800	1000.000	481.300	1049.000	479.300	1136.000	478.600	1211.000	477.800	1252.000
GR	476.600	1291.000	474.900	1327.000	474.400	1383.000	473.800	1544.000	474.600	1611.000
GR	474.700	1650.000	475.300	1723.000	478.600	1741.000	475.300	1790.000	474.200	1805.000
GR	474.200	1870.000	474.200	1991.000	474.400	2084.000	474.800	2248.000	474.800	2447.000
GR	473.200	2622.000	471.600	2660.000	472.600	2758.000	473.400	2821.000	471.600	2850.000
GR	471.900	2919.000	472.100	3003.000	472.000	3118.000	472.100	3224.000	472.200	3274.000
GR	472.400	3349.000	474.100	3566.000	474.600	3610.000	474.800	3689.000	475.700	3772.000
GR	476.500	3867.000	478.000	3975.000	479.000	4096.000	479.000	4140.000	474.900	4162.000
GR	470.700	4174.000	465.600	4187.000	462.500	4198.000	462.100	4199.000	462.100	4252.000
GR	462.100	4309.000	462.500	4310.000	465.000	4317.000	465.900	4327.000	465.500	4349.000
GR	462.500	4360.000	462.100	4361.000	462.100	4370.000	462.100	4370.000	462.500	4383.000
GR	462.800	4392.000	462.500	4401.000	460.700	4447.000	460.700	4447.000	460.700	4476.000
GR	462.500	4484.000	465.000	4495.000	473.700	4525.000	473.800	4588.000	474.700	4607.000
GR	475.900	4641.000	476.900	4687.000	478.800	4735.000	478.800	4752.000	474.900	4762.000
GR	475.400	4779.000	477.200	4804.000	477.700	4823.000	485.200	4866.000	491.200	4889.000
GR	491.200	4906.000	500.200	4916.000	510.000	4932.000	517.200	4949.000	526.200	4972.000
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2070.000	3291.000
X1	19.100	0.0	0.0	0.0	750.000	800.000	805.000	0.650	1.200	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	477.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	20.000	58.000	2998.000	3282.000	750.000	800.000	805.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	478.300	0.0	0.0
GR	508.100	1000.000	507.300	1046.000	504.500	1093.000	501.300	1171.000	494.400	1248.000
GR	490.700	1306.000	487.000	1348.000	486.600	1371.000	485.200	1383.000	483.700	1410.000
GR	479.700	1450.000	477.800	1570.000	477.400	1622.000	478.600	1663.000	480.500	1730.000
GR	480.100	1784.000	479.500	1851.000	478.600	1910.000	478.800	1968.000	479.100	2001.000
GR	479.100	2029.000	479.700	2094.000	480.400	2181.000	480.200	2240.000	480.200	2269.000
GR	480.300	2360.000	480.500	2458.000	480.500	2521.000	480.500	2578.000	480.800	2649.000
GR	480.100	2719.000	479.300	2793.000	477.800	2858.000	477.100	2935.000	477.700	2976.000
GR	480.500	2998.000	475.700	3049.000	465.200	3067.000	463.200	3076.000	461.400	3084.000
GR	461.400	3142.000	461.400	3197.000	463.200	3211.000	464.600	3222.000	469.800	3257.000
GR	478.800	3282.000	477.800	3330.000	477.100	3390.000	477.100	3411.000	477.800	3425.000
GR	482.500	3469.000	485.900	3495.000	489.700	3527.000	497.300	3564.000	498.500	3587.000

	GR	500.100	3596.000	514.500	3619.000	525.600	3641.000	0.0	0.0	0.0	0.0
	NC	0.070	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
FIS XS P	X1	21.000	54.000	2225.000	2592.000	600.000	600.000	525.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	GR	523.900	1000.000	524.000	1050.000	523.700	1124.000	523.400	1182.000	520.100	1223.000
	GR	517.900	1244.000	510.600	1277.000	500.700	1302.000	498.600	1315.000	494.800	1342.000
	GR	490.500	1354.000	489.700	1398.000	488.800	1439.000	485.200	1462.000	483.500	1543.000
	GR	482.900	1650.000	482.900	1713.000	482.700	1744.000	482.200	1846.000	481.800	1953.000
	GR	481.000	2033.000	480.100	2077.000	479.600	2111.000	479.000	2174.000	480.100	2202.000
	GR	480.300	2225.000	475.500	2236.000	465.400	2247.000	463.800	2257.000	462.800	2263.000
	GR	462.800	2314.000	462.800	2360.000	463.800	2376.000	464.800	2391.000	464.900	2414.000
	GR	467.500	2443.000	472.300	2481.000	474.000	2527.000	477.700	2592.000	477.700	2673.000
	GR	478.700	2712.000	478.900	2734.000	479.400	2778.000	481.100	2819.000	482.800	2855.000
	GR	489.600	2889.000	493.800	2931.000	499.400	2966.000	499.400	3006.000	500.200	3046.000
	GR	501.500	3106.000	505.500	3138.000	515.200	3177.000	525.300	3203.000	0.0	0.0
	NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
	X1	23.010	39.000	1299.000	1497.000	600.000	455.000	445.000	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	488.000	481.500	0.0
	GR	542.800	1000.000	542.100	1020.000	540.000	1060.000	536.900	1119.000	526.400	1139.000
	GR	520.500	1169.000	512.700	1198.000	510.400	1225.000	500.600	1267.000	490.800	1283.000
	GR	480.200	1299.000	471.500	1318.000	466.200	1324.000	464.200	1331.000	458.300	1353.000
	GR	458.300	1416.000	458.300	1442.000	464.200	1488.000	465.300	1497.000	473.500	1516.000
	GR	479.100	1569.000	480.100	1593.000	482.300	1647.000	482.700	1720.000	482.800	1764.000
	GR	482.800	1788.000	483.000	1876.000	483.200	1943.000	483.800	2001.000	484.200	2075.000
	GR	484.600	2124.000	488.600	2164.000	491.000	2205.000	498.000	2235.000	499.800	2250.000
	GR	505.200	2286.000	514.900	2330.000	524.200	2390.000	525.000	2437.000	0.0	0.0
	SB	0.900	1.500	2.600	0.0	131.000	5.000	4200.000	1.200	459.000	459.000
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
	X1	23.020	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0
	X2	0.0	0.0	1.000	485.000	482.500	0.0	0.0	0.0	0.0	0.0
	X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	489.000	482.500	0.0
	BT	6.000	1285.000	489.000	0.0	1590.000	488.000	0.0	1720.000	482.500	0.0
	BT	1940.000	483.000	0.0	2120.000	484.500	0.0	2200.000	491.000	0.0	0.0
	NC	0.070	0.080	0.035	0.300	0.500	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1299.000	1575.000
FIS XS Q	X1	23.000	39.000	1299.000	1569.000	55.000	55.000	55.000	0.0	0.0	0.0
	GR	542.800	1000.000	542.100	1020.000	540.000	1060.000	536.900	1119.000	526.400	1139.000
	GR	520.500	1169.000	512.700	1198.000	510.400	1225.000	500.600	1267.000	490.800	1283.000
	GR	480.200	1299.000	471.500	1318.000	466.200	1324.000	464.200	1331.000	458.300	1353.000
	GR	458.300	1416.000	458.300	1442.000	464.200	1488.000	465.300	1497.000	473.500	1516.000
	GR	479.100	1569.000	480.100	1593.000	482.300	1647.000	482.700	1720.000	482.800	1764.000
	GR	482.800	1788.000	483.000	1876.000	483.200	1943.000	483.800	2001.000	484.200	2075.000
	GR	484.600	2124.000	488.600	2164.000	491.000	2205.000	498.000	2235.000	499.800	2250.000
	GR	505.200	2286.000	514.900	2330.000	524.200	2390.000	525.000	2437.000	0.0	0.0
	NC	0.070	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1239.000	1472.000
FIS XS R	X1	24.000	46.000	1239.000	1472.000	380.000	280.000	370.000	0.0	0.0	0.0
	GR	549.400	1000.000	549.600	1016.000	556.500	1046.000	564.400	1097.000	569.200	1128.000
	GR	573.800	1148.000	570.700	1166.000	559.900	1185.000	550.700	1205.000	525.200	1216.000
	GR	499.600	1227.000	487.000	1239.000	486.300	1248.000	473.700	1259.000	470.000	1267.000
	GR	465.200	1279.000	462.800	1285.000	462.800	1346.000	462.800	1405.000	465.200	1416.000
	GR	467.300	1426.000	470.000	1446.000	474.900	1472.000	475.900	1500.000	479.800	1539.000
	GR	483.100	1598.000	483.100	1639.000	483.900	1689.000	484.200	1745.000	484.000	1789.000
	GR	484.100	1808.000	484.200	1845.000	484.200	1874.000	484.400	1906.000	484.400	1970.000
	GR	484.600	2032.000	484.600	2121.000	484.900	2167.000	485.800	2220.000	485.800	2240.000
	GR	489.400	2260.000	492.300	2326.000	497.100	2358.000	509.000	2394.000	515.300	2415.000
	GR	525.100	2445.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NC	0.080	0.080	0.035	0.500	0.700	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1365.000	1890.000

FIS XS S

X1	25.000	44.000	1394.000	1624.000	920.000	250.000	750.000	0.0	0.0	0.0
GR	574.600	1000.000	550.300	1035.000	525.000	1066.000	499.800	1094.000	488.300	1116.000
GR	488.300	1132.000	486.300	1144.000	479.700	1164.000	477.500	1180.000	477.600	1256.000
GR	479.300	1278.000	476.500	1316.000	475.700	1377.000	474.700	1394.000	469.200	1401.000
GR	467.000	1413.000	465.200	1423.000	465.200	1470.000	465.200	1515.000	467.000	1521.000
GR	469.700	1530.000	473.200	1557.000	475.200	1610.000	477.800	1624.000	478.000	1803.000
GR	478.000	1817.000	474.000	1830.000	474.000	1895.000	480.700	1924.000	480.700	1936.000
GR	482.400	1979.000	483.100	2085.000	484.100	2160.000	484.200	2273.000	484.400	2372.000
GR	484.400	2410.000	484.800	2460.000	486.600	2476.000	486.600	2492.000	491.700	2511.000
GR	493.000	2528.000	500.100	2549.000	511.500	2573.000	524.900	2599.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1445.000	1940.000

FIS XS T

X1	26.000	44.000	1462.000	1634.000	440.000	450.000	450.000	0.0	0.0	0.0
GR	525.000	1000.000	514.300	1038.000	514.000	1058.000	507.300	1077.000	507.300	1099.000
GR	504.700	1113.000	502.200	1125.000	502.200	1140.000	495.300	1164.000	491.600	1185.000
GR	490.500	1206.000	484.800	1216.000	484.200	1245.000	481.800	1286.000	483.000	1324.000
GR	485.500	1339.000	486.700	1398.000	487.000	1408.000	484.200	1420.000	480.900	1438.000
GR	475.800	1462.000	472.100	1469.000	468.000	1479.000	465.500	1485.000	465.500	1530.000
GR	465.500	1561.000	468.000	1584.000	469.400	1596.000	474.100	1613.000	477.200	1634.000
GR	477.600	1817.000	475.300	1833.000	474.000	1850.000	474.000	1910.000	475.300	1919.000
GR	484.300	2003.000	484.400	2046.000	484.600	2120.000	489.400	2154.000	489.400	2173.000
GR	490.000	2183.000	500.000	220[illegible].000	509.900	2220.000	524.300	2253.000	0.0	0.0
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	1830.000

FIS XS U

X1	27.000	34.000	1602.000	1830.000	600.000	325.000	540.000	0.0	0.0	0.0
GR	521.000	1000.000	521.000	1016.000	517.300	1033.000	505.100	1071.000	499.100	1099.000
GR	498.700	1135.000	492.600	1173.000	487.400	1235.000	487.500	1267.000	487.500	1306.000
GR	485.900	1320.000	476.600	1337.000	476.600	1474.000	476.000	1514.000	475.700	1561.000
GR	475.300	1602.000	473.700	1621.000	469.800	1633.000	468.900	1641.000	467.800	1652.000
GR	467.800	1719.000	467.800	1791.000	468.900	1798.000	470.500	1808.000	474.900	1830.000
GR	480.400	1858.000	482.300	1879.000	484.200	1900.000	485.700	1913.000	485.700	1932.000
GR	489.600	1940.000	499.500	1967.000	513.100	1989.000	525.100	2012.000	0.0	0.0
NC	0.080	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2100.000

FIS XS V

X1	28.000	38.000	1877.000	2095.000	915.000	950.000	940.000	0.0	0.0	0.0
GR	525.100	1000.000	516.600	1051.000	506.500	1080.000	499.900	1107.000	496.200	1147.000
GR	493.000	1199.000	490.400	1226.000	490.400	1245.000	490.400	1258.000	490.100	1323.000
GR	488.700	1365.000	485.700	1397.000	499.400	1416.000	502.300	1444.000	505.800	1484.000
GR	510.700	1542.000	515.700	1586.000	515.000	1604.000	500.500	1661.000	500.000	1678.000
GR	481.000	1716.000	477.700	1747.000	474.900	1804.000	472.500	1835.000	475.500	1877.000
GR	472.700	1921.000	471.200	1943.000	470.500	1951.000	468.500	1974.000	468.500	2004.000
GR	468.500	2044.000	470.500	2056.000	471.900	2065.000	475.500	2076.000	485.700	2095.000
GR	485.700	2106.000	500.500	2124.000	524.900	2140.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0

FIS XS W

X1	29.000	46.000	2154.000	2293.000	730.000	800.000	790.000	0.0	0.0	0.0
GR	529.700	1000.000	525.700	1032.000	521.900	1062.000	520.100	1100.000	517.100	1157.000
GR	514.800	1212.000	496.000	1246.000	496.000	1258.000	500.800	1282.000	490.800	1311.000
GR	490.800	1324.000	484.600	1337.000	484.200	1375.000	485.300	1420.000	485.000	1460.000
GR	485.500	1478.000	484.900	1493.000	485.500	1512.000	482.200	1538.000	478.700	1599.000
GR	478.600	1658.000	481.200	1707.000	481.500	1758.000	480.600	1787.000	478.200	1839.000
GR	477.000	1908.000	476.600	2020.000	476.600	2073.000	474.400	2092.000	475.100	2119.000
GR	474.800	2154.000	473.100	2171.000	472.000	2185.000	470.100	2208.000	470.100	2232.000
GR	470.100	2281.000	472.000	2288.000	473.100	2293.000	480.400	2306.000	488.300	2323.000
GR	488.500	2338.000	499.400	2355.000	512.700	2369.000	524.400	2382.000	535.400	2400.000
GR	549.700	2418.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0

FIS XS X

X1	30.000	36.000	1923.000	2321.000	350.000	420.000	410.000	0.0	0.0	0.0
GR	524.800	1000.000	521.400	1090.000	512.600	1188.000	499.000	1228.000	497.700	1257.000
GR	494.600	1290.000	490.600	1310.000	490.200	1329.000	485.800	1370.000	482.000	1431.000
GR	478.000	1518.000	482.700	1633.000	480.100	1694.000	477.900	1751.000	481.300	1799.000

	GR	481.900	1859.000	482.000	1923.000	480.500	1967.000	476.800	2013.000	475.600	2057.000
	GR	474.000	2099.000	473.900	2119.000	475.200	2159.000	475.500	2181.000	474.400	2201.000
	GR	474.000	2210.000	471.000	2246.000	474.000	2281.000	475.000	2296.000	496.300	2321.000
	GR	496.300	2339.000	497.100	2345.000	500.200	2348.000	524.400	2370.000	541.200	2389.000
	GR	550.700	2407.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NC	0.0	0.0	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
FIS XS Y	X1	31.000	49.000	1765.000	2007.000	310.000	620.000	575.000	0.0	0.0	0.0
	GR	524.500	1000.000	520.500	1080.000	513.100	1145.000	501.200	1188.000	500.000	1227.000
	GR	497.300	1254.000	491.700	1284.000	490.800	1306.000	485.600	1353.000	481.800	1385.000
	GR	478.800	1447.000	480.200	1485.000	482.200	1537.000	481.600	1635.000	481.400	1716.000
	GR	480.200	1765.000	474.900	1789.000	474.900	1805.000	475.400	1816.000	476.600	1828.000
	GR	475.800	1852.000	475.100	1865.000	472.900	1906.000	472.900	1918.000	472.900	1943.000
	GR	475.100	1972.000	476.100	1985.000	480.900	2007.000	480.900	2046.000	480.500	2095.000
	GR	478.700	2135.000	480.500	2160.000	481.600	2203.000	484.300	2265.000	486.100	2309.000
	GR	487.000	2334.000	485.400	2354.000	483.200	2384.000	478.700	2423.000	476.100	2433.000
	GR	477.400	2443.000	480.200	2466.000	486.100	2488.000	487.900	2499.000	487.900	2518.000
	GR	489.800	2524.000	500.300	2536.000	524.500	2566.000	550.000	2604.000	0.0	0.0
	NC	0.0	0.070	0.0	0.300	0.500	0.0	0.0	0.0	0.0	0.0
FIS XS Z	X1	32.000	53.000	1313.000	1427.000	770.000	350.000	630.000	0.0	0.0	0.0
	GR	524.900	1000.000	518.300	1055.000	514.200	1111.000	505.100	1157.000	501.000	1198.000
	GR	499.900	1207.000	499.000	1222.000	499.400	1240.000	502.200	1250.000	492.300	1273.000
	GR	492.300	1280.000	486.200	1299.000	478.300	1313.000	474.500	1323.000	470.800	1333.000
	GR	470.800	1367.000	470.800	1407.000	474.500	1418.000	477.600	1427.000	480.800	1459.000
	GR	482.200	1506.000	481.900	1526.000	481.100	1552.000	480.800	1563.000	482.900	1580.000
	GR	483.500	1608.000	483.900	1640.000	485.400	1694.000	485.800	1721.000	485.400	1746.000
	GR	483.900	1769.000	481.900	1788.000	481.600	1799.000	485.600	1814.000	488.500	1846.000
	GR	486.200	1860.000	485.300	1910.000	483.900	1969.000	480.400	1987.000	482.400	2006.000
	GR	482.400	2023.000	480.300	2042.000	480.100	2070.000	479.200	2099.000	480.500	2121.000
	GR	482.100	2158.000	494.600	2187.000	495.200	2210.000	499.700	2219.000	515.000	2242.000
	GR	529.600	2263.000	539.000	2289.000	550.700	2318.000	0.0	0.0	0.0	0.0
	NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1280.000	2246.000
FIS XS AA	X1	33.000	57.000	1403.000	1581.000	475.000	175.000	380.000	0.0	0.0	0.0
	GR	526.200	1000.000	516.800	1063.000	511.800	1111.000	503.200	1151.000	499.100	1193.000
	GR	491.700	1208.000	491.700	1227.000	485.700	1248.000	480.700	1258.000	483.100	1269.000
	GR	483.500	1298.000	483.500	1337.000	482.500	1353.000	482.200	1387.000	480.200	1403.000
	GR	476.800	1408.000	475.200	1416.000	469.000	1446.000	469.000	1480.000	469.000	1500.000
	GR	475.200	1553.000	476.600	1565.000	480.400	1581.000	482.400	1607.000	482.300	1630.000
	GR	481.900	1649.000	485.400	1683.000	485.800	1718.000	486.000	1813.000	485.800	1831.000
	GR	484.200	1856.000	482.900	1873.000	483.000	1891.000	485.800	1904.000	488.400	1931.000
	GR	485.900	1955.000	484.900	1969.000	484.700	1985.000	483.100	1999.000	480.900	2028.000
	GR	481.700	2059.000	480.800	2082.000	480.300	2114.000	480.000	2131.000	482.300	2157.000
	GR	480.700	2175.000	484.900	2198.000	484.900	2222.000	485.500	2277.000	485.700	2320.000
	GR	485.900	2342.000	496.900	2370.000	497.000	2396.000	499.200	2407.000	524.100	2440.000
	GR	535.100	2466.000	550.700	2509.000	0.0	0.0	0.0	0.0	0.0	0.0
	NC	0.0	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
FIS XS AB	X1	34.000	50.000	1764.000	1977.000	250.000	525.000	480.000	0.0	0.0	0.0
	GR	530.400	1000.000	526.400	1071.000	522.900	1129.000	514.500	1170.000	500.600	1189.000
	GR	497.200	1218.000	499.900	1229.000	492.300	1250.000	492.300	1274.000	484.100	1290.000
	GR	480.700	1301.000	482.600	1320.000	483.600	1389.000	483.700	1468.000	483.500	1540.000
	GR	483.900	1566.000	480.800	1586.000	480.600	1604.000	484.200	1616.000	483.600	1649.000
	GR	483.900	1689.000	484.200	1720.000	484.200	1747.000	483.900	1764.000	480.700	1782.000
	GR	477.000	1793.000	475.400	1797.000	475.400	1864.000	475.400	1932.000	477.000	1938.000
	GR	479.100	1945.000	486.100	1962.000	488.500	1977.000	486.800	1985.000	486.600	2010.000
	GR	484.800	2021.000	485.100	2047.000	485.500	2078.000	486.300	2130.000	486.600	2211.000
	GR	487.100	2243.000	490.500	2270.000	490.500	2288.000	494.100	2299.000	504.700	2321.000
	GR	505.300	2341.000	509.000	2356.000	525.100	2379.000	535.500	2397.000	550.000	2428.000
	QT	5.000	24300.000	45700.000	58500.000	58500.000	102000.000	0.0	0.0	0.0	0.0
	NC	0.080	0.060	0.035	0.100	0.300	0.0	0.0	0.0	0.0	0.0
	ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0

FIS XS AC

X1	35.000	56.000	2118.000	2287.000	575.000	775.000	720.000	0.0	0.0	0.0
GR	530.100	1000.000	500.400	1028.000	495.300	1050.000	494.900	1101.000	489.000	1119.000
GR	489.000	1140.000	492.100	1149.000	492.100	1167.000	485.700	1181.000	483.700	1200.000
GR	484.800	1216.000	482.800	1235.000	483.700	1255.000	483.800	1284.000	485.600	1317.000
GR	485.800	1357.000	486.300	1443.000	486.400	1525.000	486.300	1616.000	486.300	1695.000
GR	485.700	1737.000	485.300	1793.000	484.900	1812.000	484.400	1831.000	486.400	1856.000
GR	487.700	1875.000	487.700	1907.000	486.900	1936.000	484.100	1960.000	485.900	1999.000
GR	487.200	2033.000	486.900	2058.000	485.400	2095.000	484.600	2118.000	478.000	2133.000
GR	477.600	2134.000	477.600	2198.000	477.600	2260.000	478.000	2262.000	479.900	2268.000
GR	488.700	2287.000	489.200	2319.000	488.900	2358.000	489.300	2397.000	491.100	2439.000
GR	491.300	2489.000	491.600	2528.000	493.900	2577.000	497.300	2627.000	503.600	2677.000
GR	503.600	2694.000	504.800	2705.000	519.800	2733.000	536.100	2772.000	544.200	2797.000
GR	549.700	2810.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.060	0.038	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2870.000	3220.000

FIS XS AD

X1	36.000	28.000	2870.000	3198.000	900.000	720.000	740.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	510.000	0.0	0.0
GR	535.000	1000.000	500.000	1070.000	495.000	1088.000	493.600	1095.000	495.000	1102.000
GR	497.500	1120.000	495.000	1130.000	490.000	1130.000	489.000	1200.000	495.000	1220.000
GR	495.000	1248.000	490.000	1255.000	497.000	1440.000	495.000	1530.000	495.000	1565.000
GR	486.000	2870.000	485.000	2990.000	480.000	3015.000	474.200	3045.000	474.200	3150.000
GR	480.000	3175.000	485.000	3198.000	490.000	3215.000	495.000	3250.000	500.000	3275.000
GR	520.000	3380.000	525.000	3410.000	535.000	3425.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.100	39.000	2629.000	3130.000	60.000	60.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	494.100	517.400	0.0
GR	510.000	1000.000	513.000	1282.000	508.300	1292.000	494.100	1325.000	508.700	1325.000
GR	508.700	1328.000	494.100	1328.000	494.100	1368.000	509.000	1368.000	509.000	1371.000
GR	494.100	1371.000	509.400	1405.000	514.200	1415.000	526.800	2610.000	517.400	2629.000
GR	486.000	2682.000	485.000	2718.000	518.200	2718.000	518.200	2723.000	485.000	2723.000
GR	484.000	2756.000	476.000	2858.000	519.900	2858.000	519.900	2863.000	476.000	2863.000
GR	475.000	2875.000	475 000	2900.000	478.000	2937.000	490.000	2985.000	491.000	2995.000
GR	494.000	2998.000	521.200	2998.000	521.200	3003.000	494.000	3003.000	505.000	3024.000
GR	503.000	3070.000	522.500	3110.000	532.000	3130.000	535.000	3420.000	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.200	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
BT	8.000	1282.000	513.000	513.000	1292.000	513.100	508.300	1405.000	514.200	509.400
BT	1415.000	514.200	514.200	2610.000	526.800	526.800	2629.000	527.000	517.400	3110.000
BT	531.800	522.500	3130.000	532.000	532.000	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.300	0.0	0.0	0.0	130.000	130.000	130.000	0.0	0.0	0.0
X2	0.0	0.0	0.0	0.0	0.0	0.0	1.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2629.000	3130.000
X1	36.400	0.0	0.0	0.0	10.000	10.000	10.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	494.100	532.000	0.0
NC	0.045	0.080	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2265.000	2630.000
X1	38.000	22.000	2265.000	2624.000	65.000	75.000	100.000	0.0	0.0	0.0
GR	520.000	2200.000	495.500	2265.000	495.500	2265.000	490.600	2300.000	481.600	2322.000
GR	479.400	2328.000	477.500	2337.000	476.500	2342.000	476.500	2473.000	476.500	2582.000
GR	477.500	2585.000	479.000	2589.000	480.100	2593.000	482.900	2605.000	486.600	2624.000
GR	499.200	2650.000	512.400	2678.000	509.200	2702.000	514.800	2713.000	524.800	2735.000
GR	534.200	2752.000	549.400	2775.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2151.000	2850.000
X1	39.000	39.000	2151.000	2391.000	200.000	150.000	315.000	0.0	0.0	0.0
GR	520.000	1960.000	490.000	2035.000	486.500	2090.000	486.900	2122.000	489.200	2151.000
GR	487.100	2169.000	483.700	2191.000	479.500	2203.000	479.000	2211.000	478.500	2219.000
GR	478.500	2271.000	478.500	2335.000	479.000	2337.000	480.400	2343.000	484.900	2366.000
GR	485.500	2391.000	484.800	2432.000	484.300	2455.000	483.500	2518.000	484.100	2556.000

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GR	484.400	2618.000	483.800	2677.000	483.200	2717.000	481.100	2739.000	478.400	2747.000
GR	477.600	2749.000	477.600	2776.000	477.600	2800.000	478.400	2803.000	479.600	2809.000
GR	485.900	2837.000	499.300	2863.000	514.700	2890.000	513.000	2913.000	516.100	2917.000
GR	520.500	2931.000	530.400	2952.000	539.600	2974.000	549.400	2991.000	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
NC	0.0	0.045	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2465.000

FIS XS AE

X1	40.000	49.000	1905.000	2072.000	415.000	380.000	410.000	0.0	0.0	0.0
GR	520.000	1405.000	490.000	1485.000	487.900	1725.000	488.100	1732.000	488.100	1732.000
GR	487.700	1786.000	486.900	1851.000	485.800	1905.000	484.300	1916.000	480.200	1930.000
GR	479.300	1937.000	478.600	1942.000	478.600	1986.000	478.600	2035.000	479.300	2042.000
GR	480.200	2051.000	485.400	2072.000	487.300	2114.000	486.900	2181.000	487.100	2249.000
GR	487.400	2346.000	488.100	2415.000	487.700	2506.000	486.500	2583.000	486.000	2710.000
GR	485.400	2829.000	485.300	2882.000	486.300	2933.000	485.200	2991.000	484.500	3032.000
GR	485.800	3096.000	486.800	3128.000	485.400	3152.000	481.100	3165.000	479.500	3173.000
GR	478.900	3176.000	478.900	3208.000	478.900	3240.000	479.500	3244.000	480.300	3248.000
GR	489.300	3259.000	500.800	3273.000	519.800	3292.000	521.000	3301.000	521.000	3319.000
GR	523.000	3328.000	531.200	3341.000	540.100	3359.000	549.600	3371.000	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
NC	0.045	0.045	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1525.000	2730.000

FIS XS AF

X1	41.000	57.000	1904.000	2096.000	470.000	390.000	460.000	0.0	0.0	0.0
GR	510.000	1250.000	495.000	1295.000	493.000	1500.000	492.800	1654.000	492.400	1740.000
GR	489.500	1817.000	488.200	1856.000	485.800	1875.000	485.100	1904.000	483.700	1921.000
GR	480.900	1928.000	479.400	1932.000	478.800	1934.000	478.800	1998.000	478.800	2058.000
GR	479.400	2063.000	480.300	2071.000	490.000	2096.000	485.700	2114.000	487.000	2130.000
GR	487.500	2214.000	488.700	2298.000	488.100	2367.000	488.000	2423.000	485.800	2583.000
GR	488.000	2712.000	488.700	2835.000	488.500	2925.000	488.100	3009.000	487.600	3108.000
GR	487.000	3185.000	485.300	3220.000	486.400	3256.000	486.900	3343.000	486.600	3432.000
GR	486.300	3552.000	486.600	3637.000	486.600	3705.000	487.200	3801.000	487.200	3839.000
GR	487.500	3861.000	484.600	3876.000	482.000	3886.000	478.800	3897.000	478.000	3899.000
GR	478.000	3923.000	478.000	3942.000	478.800	3946.000	480.100	3953.000	490.200	3974.000
GR	502.100	3995.000	520.900	4011.000	520.900	4027.000	522.000	4036.000	527.300	4047.000
GR	537.600	4068.000	551.200	4087.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.042	0.500	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
X1	42.010	37.000	1955.000	2125.000	100.000	250.000	250.000	0.0	0.0	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
X1	42.020	37.000	1955.000	2106.000	25.000	25.000	25.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	492.500	491.900	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000
SB	0.0	1.500	2.500	0.0	151.000	0.0	1786.000	0.0	0.0	0.0
X1	42.100	0.0	0.0	0.0	25.000	25.000	25.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	493.000	492.000	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	492.600	492.000	0.0

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BT	34.000	1000.000	511.600	0.0	1027.000	511.800	0.0	1042.000	510.800	0.0
BT	1053.000	509.800	0.0	1073.000	505.400	0.0	1100.000	492.600	0.0	1113.000
BT	494.000	0.0	1125.000	494.000	0.0	1145.000	494.000	0.0	1218.000	494.000
BT	0.0	1308.000	494.000	0.0	1413.000	494.000	0.0	1543.000	494.000	0.0
BT	1582.000	494.700	0.0	1640.000	495.200	0.0	1695.000	495.400	0.0	1771.000
BT	495.700	0.0	1815.000	495.800	0.0	1955.000	496.000	482.200	1955.000	496.000
BT	493.000	2106.000	494.900	491.900	2106.000	494.900	479.200	2125.000	494.600	0.0
BT	2400.000	492.000	0.0	2905.000	490.000	0.0	3330.000	492.500	0.0	3570.000
BT	490.000	0.0	3580.000	485.000	0.0	3585.000	481.900	0.0	3640.000	481.900
BT	0.0	3690.000	484.000	0.0	3785.000	485.000	0.0	3860.000	490.000	0.0
BT	3980.000	500.000	0.0	4005.000	520.200	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1490.000	2760.000

X1	42.200	37.000	1955.000	2125.000	50.000	50.000	50.000	0.0	0.0	0.0
GR	511.600	1000.000	511.800	1027.000	510.800	1042.000	509.800	1053.000	505.400	1073.000
GR	492.600	1100.000	494.000	1113.000	494.000	1125.000	494.000	1145.000	494.000	1218.000
GR	494.000	1308.000	494.000	1413.000	494.000	1543.000	494.700	1582.000	495.200	1640.000
GR	495.400	1695.000	495.700	1771.000	495.800	1815.000	482.200	1955.000	482.200	1955.000
GR	484.200	1988.000	477.000	2073.000	479.200	2106.000	479.200	2106.000	494.600	2125.000
GR	492.000	2400.000	490.000	2905.000	492.500	3330.000	490.000	3570.000	485.000	3580.000
GR	481.900	3585.000	481.900	3640.000	484.000	3690.000	485.000	3785.000	490.000	3860.000
GR	500.000	3980.000	520.200	4005.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.045	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	24300.000	45700.000	58500.000	48800.000	102000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1520.000	2980.000

FIS XS AG

X1	43.000	59.000	2146.000	2442.000	230.000	230.000	230.000	0.0	0.0	0.0
GR	509.500	1000.000	509.500	1010.000	508.500	1023.000	504.600	1043.000	506.700	1064.000
GR	509.500	1073.000	509.500	1098.000	507.200	1108.000	500.400	1124.000	492.800	1159.000
GR	492.900	1183.000	493.300	1263.000	493.700	1324.000	493.900	1384.000	493.700	1463.000
GR	493.700	1535.000	493.100	1607.000	493.500	1677.000	493.900	1744.000	494.100	1829.000
GR	493.400	1902.000	492.900	1937.000	493.600	1965.000	493.100	2011.000	487.000	2023.000
GR	487.000	2059.000	486.500	2085.000	484.800	2112.000	486.900	2138.000	486.900	2146.000
GR	484.500	2159.000	482.800	2202.000	481.600	2217.000	481.000	2224.000	481.000	2279.000
GR	481.000	2333.000	481.700	2335.000	484.300	2342.000	485.200	2373.000	486.300	2419.000
GR	487.500	2442.000	487.400	2468.000	487.200	2475.000	490.000	3020.000	493.000	3040.000
GR	493.000	3065.000	490.000	3085.000	488.000	3150.000	486.500	3550.000	485.000	4030.000
GR	482.500	4085.000	482.500	4115.000	485.000	4135.000	490.000	4400.000	495.000	4450.000
GR	505.000	4475.000	507.000	4480.000	507.000	4495.000	510.000	4510.000	0.0	0.0
QT	6.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
NC	0.0	0.050	0.0	0.600	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1495.000	2540.000

FIS XS AH

X1	44.000	61.000	2114.000	2355.000	275.000	700.000	415.000	0.0	0.0	0.0
GR	507.800	1000.000	507.800	1013.000	506.700	1024.000	503.100	1050.000	506.200	1065.000
GR	507.800	1073.000	507.800	1098.000	507.000	1112.000	491.000	1149.000	492.000	1163.000
GR	495.200	1190.000	495.400	1277.000	495.700	1342.000	495.700	1407.000	495.800	1518.000
GR	496.200	1596.000	495.600	1649.000	493.900	1711.000	493.300	1807.000	493.600	1875.000
GR	494.600	1933.000	495.300	1974.000	495.300	2008.000	495.500	2064.000	494.700	2088.000
GR	494.900	2088.000	488.900	2114.000	485.600	2141.000	483.400	2160.000	482.000	2173.000
GR	480.600	2186.000	480.600	2231.000	480.600	2259.000	482.000	2288.000	482.700	2303.000
GR	482.000	2312.000	481.500	2319.000	481.500	2321.000	481.500	2330.000	482.000	2332.000
GR	483.700	2337.000	490.300	2355.000	490.900	2403.000	491.200	2491.000	491.700	2570.000
GR	492.700	2611.000	494.200	2623.000	495.300	2635.000	495.300	2661.000	495.700	2682.000
GR	498.300	2703.000	498.300	2731.000	501.300	2759.000	501.300	2803.000	506.500	2828.000
GR	509.100	2860.000	522.000	2881.000	511.300	2921.000	512.200	2970.000	513.500	3010.000
GR	525.200	3031.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.095	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1780.000	2674.000

X1	45.000	40.000	2431.000	2674.000	395.000	425.000	420.000	0.0	0.0	0.0
GR	535.200	1000.000	520.700	1031.000	509.200	1060.000	506.500	1065.000	506.500	1305.000
GR	506.500	1386.000	506.500	1411.000	505.600	1422.000	492.300	1461.000	493.300	1495.000
GR	495.400	1536.000	495.800	1608.000	495.900	1701.000	496.100	1790.000	495.800	1874.000
GR	495.500	1931.000	494.600	1985.000	495.200	2040.000	495.500	2113.000	495.700	2201.000
GR	496.100	2318.000	496.100	2379.000	495.800	2431.000	493.500	2444.000	487.800	2463.000

GR	485.200	2470.000	483.000	2478.000	481.500	2483.000	481.500	2545.000	481.500	2602.000
GR	483.000	2608.000	484.000	2612.000	486.300	2631.000	489.300	2652.000	499.400	2674.000
GR	505.400	2683.000	505.400	2704.000	516.200	2729.000	525.800	2773.000	531.500	2851.000
NC	0.040	0.100	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1645.000	2560.000
X1	46.000	35.000	2374.000	2560.000	530.000	570.000	565.000	0.0	0.0	0.0
GR	535.200	1000.000	504.600	1085.000	504.500	1342.000	500.900	1358.000	495.600	1405.000
GR	495.700	1470.000	496.100	1522.000	496.200	1626.000	496.400	1725.000	496.500	1805.000
GR	496.800	1866.000	496.300	1935.000	495.600	1993.000	494.700	2102.000	493.800	2187.000
GR	492.700	2255.000	491.700	2321.000	490.600	2374.000	488.700	2391.000	484.700	2399.000
GR	483.800	2411.000	482.200	2433.000	482.200	2467.000	482.200	2503.000	483.800	2530.000
GR	484.100	2535.000	488.100	2553.000	490.300	2560.000	497.800	2581.000	497.800	2592.000
GR	519.200	2611.000	519.200	2633.000	520.200	2638.000	529.900	2651.000	535.200	2660.000
NC	0.060	0.100	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1570.000	2350.000
X1	47.000	48.000	2160.000	2327.000	325.000	660.000	630.000	0.0	0.0	0.0
GR	535.200	1000.000	520.500	1031.000	510.000	1055.000	503.800	1072.000	503.800	1200.000
GR	503.800	1282.000	501.800	1298.000	497.200	1317.000	497.200	1364.000	497.100	1434.000
GR	497.000	1519.000	496.700	1600.000	496.800	1680.000	496.100	1749.000	495.600	1835.000
GR	495.000	1913.000	494.100	1940.000	491.300	1997.000	485.800	2010.000	485.200	2018.000
GR	484.900	2022.000	484.900	2024.000	484.900	2027.000	485.200	2031.000	486.900	2051.000
GR	488.600	2071.000	490.900	2095.000	489.200	2124.000	487.900	2160.000	485.500	2191.000
GR	485.300	2203.000	484.900	2212.000	484.000	2234.000	484.000	2250.000	484.000	2283.000
GR	484.900	2296.000	485.900	2310.000	492.300	2327.000	491.500	2344.000	488.000	2359.000
GR	484.600	2382.000	485.900	2400.000	492.400	2418.000	498.300	2440.000	498.300	2460.000
GR	521.300	2480.000	521.300	2509.000	535.500	2528.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1580.000	2175.000
X1	48.000	38.000	1994.000	2172.000	570.000	620.000	610.000	0.0	0.0	0.0
GR	535.400	1000.000	526.200	1021.000	512.500	1049.000	503.500	1067.000	503.500	1279.000
GR	501.400	1289.000	497.800	1313.000	499.000	1354.000	498.300	1397.000	498.100	1479.000
GR	498.600	1563.000	496.700	1625.000	494.100	1704.000	492.300	1767.000	492.500	1843.000
GR	491.900	1871.000	487.500	1893.000	488.000	1914.000	487.400	1928.000	489.400	1942.000
GR	491.600	1969.000	489.900	1994.000	487.900	2001.000	486.800	2009.000	486.000	2014.000
GR	486.000	2076.000	486.000	2133.000	486.800	2138.000	488.200	2148.000	489.100	2172.000
GR	496.600	2190.000	497.000	2211.000	499.500	2219.000	514.200	2234.000	530.900	2251.000
GR	530.900	2266.000	531.700	2276.000	534.700	2284.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	15.400	0.0	0.0	0.0	0.0	0.0
X1	49.000	40.000	1781.000	1998.000	549.000	555.000	555.000	0.0	0.0	0.0
GR	534.700	1000.000	520.300	1028.000	503.900	1069.000	503.900	1100.000	503.900	1200.000
GR	503.900	1294.000	503.900	1315.000	501.200	1333.000	497.600	1361.000	494.000	1378.000
GR	492.400	1401.000	492.000	1455.000	491.100	1482.000	491.300	1510.000	495.300	1522.000
GR	495.800	1532.000	495.200	1544.000	491.900	1557.000	489.800	1571.000	491.000	1593.000
GR	491.900	1635.000	492.900	1695.000	494.700	1739.000	493.000	1781.000	491.100	1810.000
GR	488.500	1835.000	487.000	1846.000	486.300	1850.000	486.300	1913.000	486.300	1974.000
GR	487.000	1978.000	488.100	1985.000	492.600	1998.000	499.200	2015.000	499.200	2034.000
GR	514.300	2061.000	514.500	2081.000	516.100	2099.000	524.800	2122.000	535.300	2179.000
NC	0.080	0.095	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	50.000	32.000	1987.000	[illegible]	420.000	468.000	465.000	0.0	0.0	0.0
GR	525.000	1222.000	505.500	1262.000	505.500	1300.000	505.500	1400.000	505.500	1500.000
GR	505.500	1675.000	505.000	1680.000	495.000	1703.000	494.000	1778.000	490.000	1813.000
GR	487.000	1828.000	487.000	1848.000	490.000	1869.000	492.600	1910.000	492.100	1948.000
GR	492.800	1968.000	490.200	1987.000	488.900	2020.000	488.400	2043.000	487.500	2059.000
GR	486.200	2081.000	486.200	2106.000	486.200	2150.000	487.500	2155.000	489.100	2163.000
GR	491.000	2190.000	500.800	2218.000	500.800	2233.000	522.100	2258.000	522.100	2276.000
GR	535.000	2292.000	550.900	2310.000	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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*   SEPT 1971 VERSION, UPDATED JUNE 1974        *    * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT     *
*   ERROR CORRECTIONS 01 THRU 09R2              *    * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS,      *
*   MODIFICATIONS 52 THRU 58                    *    * DEPARTMENT OF THE ARMY.                                   *
*   MBJ UPDATED  07/20/76  0830                 *    * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC.  *
*                                               *    * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES  *
*   TODAYS DATE IS 03/02/77    20.34            *    * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE   *
*                                               *    * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.        *
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   2.807 SECONDS
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FISHING CREEK
FLOODWAY
50.0 - 60.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

T1 SUSQUEHANNA RIVER BASIN COMMISSION
T2 BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3 FISHING CREEK - 100 YEAR FLOOD

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	503.831	0.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
NC	0.080	0.095	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	50.000	32.000	1987.000	2190.000	420.000	468.000	465.000	0.0	0.0	0.0
GR	525.000	1222.000	505.500	1262.000	505.500	1300.000	505.500	1400.000	505.500	1500.000
GR	505.500	1675.000	505.000	1680.000	495.000	1703.000	494.000	1778.000	490.000	1813.000
GR	487.000	1828.000	487.000	1848.000	490.000	1869.000	492.600	1910.000	492.100	1948.000
GR	492.800	1968.000	490.200	1987.000	488.900	2020.000	488.400	2043.000	487.500	2059.000
GR	486.200	2081.000	486.200	2106.000	486.200	2150.000	487.500	2155.000	489.100	2163.000
GR	491.000	2190.000	500.800	2218.000	500.800	2233.000	522.100	2258.000	522.100	2276.000
GR	535.000	2292.000	550.900	2310.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1657.000	0.055	1914.000	0.036	2052.000	0.095	2234.000	0.0
X1	51.000	34.000	1914.000	2052.000	205.000	230.000	225.000	0.0	0.0	0.0
GR	535.000	1000.000	521.200	1024.000	506.000	1039.000	506.000	1300.000	506.000	1633.000
GR	506.000	1657.000	504.100	1670.000	495.300	1691.000	493.100	1711.000	492.700	1744.000
GR	490.300	1759.000	488.400	1766.000	490.200	1779.000	491.500	1801.000	490.200	1823.000
GR	490.200	1848.000	490.300	1876.000	490.100	1914.000	488.500	1935.000	488.000	1963.000
GR	486.100	2003.000	488.000	2042.000	490.000	2052.000	492.500	2078.000	492.500	2098.000
GR	491.100	2112.000	500.700	2134.000	500.700	2146.000	516.000	2168.000	516.000	2185.000
GR	518.900	2190.000	527.400	2200.000	535.100	2212.000	550.000	2234.000	0.0	0.0
NC	0.060	0.060	0.060	0.100	0.500	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1925.000	0.060	2051.000	0.036	2297.000	0.085	2421.000	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	52.000	29.000	2051.000	2297.000	223.000	217.000	225.000	0.0	0.0	0.0
GR	535.400	1000.000	525.800	1042.000	510.000	1064.000	506.500	1073.000	506.500	1925.000
GR	505.800	1937.000	494.900	1963.000	493.300	1982.000	492.400	2017.000	491.200	2032.000
GR	492.800	2051.000	491.100	2068.000	490.100	2085.000	489.800	2091.000	489.300	2101.000
GR	489.300	2164.000	489.300	2232.000	489.800	2234.000	490.900	2238.000	492.300	2253.000
GR	492.900	2278.000	497.900	2297.000	501.900	2314.000	501.900	2328.000	512.100	2347.000
GR	512.100	2365.000	524.400	2379.000	535.400	2398.000	550.200	2421.000	0.0	0.0
NC	0.060	0.060	0.060	0.100	0.700	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	4.400	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1897.000	0.050	1952.000	0.036	2147.000	0.080	2265.000	0.0
X1	52.100	17.000	1952.000	2147.000	297.000	251.000	275.000	0.0	0.0	0.0
GR	525.000	1000.000	507.500	1022.000	507.500	1897.000	505.000	1911.000	500.000	1923.000

GR	495.000	1952.000	489.600	1971.000	489.600	2136.000	495.000	2147.000	500.000	2177.000
GR	505.000	2217.000	509.000	2227.000	509.000	2246.000	510.000	2247.000	515.000	2248.000
GR	520.000	2255.000	525.000	2265.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	2057.000	0.040	2107.000	0.036	2309.000	0.070	2466.000	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	53.000	27.000	2107.000	2309.000	298.000	252.000	275.000	0.0	0.0	0.0
GR	550.100	1000.000	524.900	1019.000	508.400	1030.000	508.400	1080.000	508.400	2000.000
GR	508.400	2035.000	508.400	2057.000	507.500	2068.000	504.400	2084.000	501.200	2107.000
GR	492.500	2125.000	491.000	2131.000	489.900	2135.000	489.900	2206.000	489.900	2270.000
GR	491.000	2276.000	492.200	2283.000	500.400	2309.000	501.600	2330.000	502.700	2351.000
GR	502.700	2358.000	506.300	2374.000	506.300	2393.000	509.100	2400.000	525.300	2419.000
GR	534.100	2437.000	549.900	2466.000	0.0	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.100	2088.000	0.050	2148.000	0.038	2343.000	0.080	2520.000	0.0
X1	54.000	26.000	2148.000	2343.000	813.000	797.000	805.000	0.0	0.0	0.0
GR	549.800	1000.000	526.300	1013.000	512.600	1028.000	512.300	1029.000	512.300	2088.000
GR	510.800	2097.000	507.700	2117.000	504.900	2148.000	495.600	2156.000	493.500	2163.000
GR	491.500	2169.000	491.500	2239.000	491.500	2312.000	493.500	2317.000	495.800	2323.000
GR	502.300	2343.000	505.000	2368.000	505.700	2383.000	505.700	2396.000	514.400	2409.000
GR	514.400	2426.000	524.300	2454.000	527.000	2467.000	535.200	2483.000	544.600	2507.000
GR	550.100	2520.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.055	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1802.000	0.040	1848.000	0.036	2043.000	0.070	2229.000	0.0
X1	55.000	29.000	1848.000	2043.000	659.000	662.000	655.000	0.0	0.0	0.0
GR	550.000	1000.000	525.800	1014.000	513.800	1028.000	513.800	1100.000	513.800	1500.000
GR	513.800	1771.000	513.800	1802.000	512.500	1812.000	507.300	1831.000	504.100	1848.000
GR	497.600	1863.000	497.000	1868.000	495.300	1875.000	491.800	1889.000	491.800	1947.000
GR	491.800	2013.000	495.300	2022.000	496.900	2026.000	502.700	2043.000	504.700	2068.000
GR	505.500	2094.000	505.500	2126.000	508.600	2135.000	508.600	2146.000	515.100	2157.000
GR	526.000	2180.000	526.000	2197.000	537.300	2209.000	549.900	2229.000	0.0	0.0
NC	0.055	0.095	0.030	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1645.000	0.050	1668.000	0.036	1865.000	0.070	2218.000	0.0
X1	56.000	32.000	1668.000	1865.000	374.000	368.000	380.000	0.0	0.0	0.0
GR	549.800	1000.000	525.100	1012.000	516.300	1019.000	516.300	1300.000	516.300	1617.000
GR	516.300	1645.000	515.800	1651.000	510.200	1668.000	499.700	1702.000	498.700	1706.000
GR	496.000	1712.000	491.700	1738.000	496.000	1763.000	496.400	1770.000	496.000	1776.000
GR	491.700	1806.000	496.000	1836.000	497.400	1852.000	502.400	1865.000	506.100	1890.000
GR	505.800	1932.000	505.400	1968.000	505.900	2010.000	506.400	2054.000	506.700	2102.000
GR	510.700	2115.000	510.700	2131.000	515.600	2147.000	515.600	2164.000	525.700	2172.000
GR	540.200	2196.000	550.500	2218.000	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
NH	4.000	0.085	1406.000	0.060	1529.000	0.036	1774.000	0.060	2339.000	0.0
X1	57.000	35.000	1529.000	1774.000	530.000	500.000	500.000	0.0	0.0	0.0
GR	550.000	1000.000	537.200	1013.000	524.900	1027.000	520.500	1032.000	520.500	1406.000
GR	519.500	1421.000	519.000	1432.000	519.200	1456.000	519.800	1466.000	519.800	1494.000
GR	518.600	1509.000	510.700	1529.000	506.100	1548.000	500.800	1576.000	499.800	1582.000
GR	498.600	1589.000	493.400	1636.000	498.600	1681.000	499.100	1701.000	501.000	1748.000
GR	506.000	1774.000	506.800	1822.000	507.600	1902.000	506.700	1970.000	506.600	2014.000
GR	507.200	2036.000	508.800	2079.000	511.000	2124.000	510.600	2147.000	508.800	2168.000
GR	504.100	2186.000	505.200	2194.000	515.400	2211.000	515.400	2306.000	550.400	2339.000
NC	0.090	0.055	0.036	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	58.000	53.000	2032.000	2216.000	685.000	645.000	705.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	575.000	1000.000	566.700	1023.000	549.900	1067.000	537.400	1086.000	535.400	1090.000
GR	533.800	1094.000	533.800	1300.000	533.800	1548.000	533.800	1572.000	532.400	1585.000
GR	525.700	1601.000	515.500	1616.000	506.100	1639.000	505.300	1653.000	501.300	1664.000
GR	500.000	1668.000	500.000	1670.000	500.000	1675.000	501.300	1678.000	504.100	1684.000
GR	506.000	1704.000	506.600	1753.000	508.400	1811.000	509.500	1882.000	509.300	1942.000
GR	507.400	1978.000	506.400	2015.000	506.100	2032.000	502.000	2045.000	500.800	2052.000
GR	496.500	2075.000	496.500	2113.000	496.500	2113.000	500.800	2170.000	501.300	2177.000
GR	501.900	2197.000	507.000	2216.000	508.300	2237.000	511.200	2266.000	510.600	2306.000

GR	510.900	2366.000	512.600	2417.000	512.600	2481.000	513.700	2552.000	515.400	2593.000
GR	511.600	2614.000	514.600	2625.000	520.700	2636.000	520.700	2800.000	525.100	2804.000
GR	550.600	2837.000	562.300	2857.000	575.600	2878.000	0.0	0.0	0.0	0.0
NC	0.100	0.055	0.036	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	40.400	0.0	0.0	0.0	0.0	0.0
X1	59.000	69.000	3263.000	3437.000	400.000	330.000	360.000	0.0	0.0	0.0
GR	575.400	1000.000	565.700	1042.000	552.500	1086.000	543.400	1119.000	543.400	1200.000
GR	543.400	1600.000	543.400	1800.000	543.400	2140.000	543.400	2171.000	542.500	2180.000
GR	539.400	2200.000	542.700	2219.000	543.200	2230.000	543.200	2258.000	540.500	2267.000
GR	535.300	2280.000	525.600	2297.000	514.300	2325.000	507.700	2337.000	505.500	2343.000
GR	502.000	2349.000	501.500	2350.000	501.500	2356.000	501.500	2361.000	502.000	2363.000
GR	503.900	2369.000	505.700	2386.000	505.100	2429.000	505.700	2492.000	506.000	2556.000
GR	505.700	2619.000	506.300	2687.000	506.500	2770.000	508.300	2845.000	508.500	2926.000
GR	508.500	3001.000	509.300	3081.000	508.200	3110.000	509.500	3131.000	508.900	3149.000
GR	508.500	3188.000	507.300	3204.000	505.500	3208.000	506.000	3222.000	507.800	3248.000
GR	508.000	3263.000	504.600	3278.000	501.500	3293.000	498.000	3310.000	498.000	3352.000
GR	498.000	3414.000	501.500	3418.000	504.300	3420.000	507.200	3437.000	508.400	3473.000
GR	510.800	3512.000	511.500	3574.000	511.500	3613.000	513.900	3644.000	514.700	3673.000
GR	515.700	3703.000	515.200	3730.000	513.200	3743.000	514.200	3749.000	523.800	3761.000
GR	523.800	3950.000	550.300	3982.000	562.100	4004.000	574.800	4031.000	0.0	0.0
NC	0.100	0.055	0.038	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	60.000	30.000	4190.000	4378.000	460.000	410.000	410.000	0.0	0.0	0.0
GR	574.800	1000.000	550.300	2496.000	515.400	3371.000	515.500	3393.000	514.900	3422.000
GR	512.700	3483.000	512.400	3539.000	512.000	3596.000	511.500	3654.000	510.900	3713.000
GR	509.000	3751.000	507.200	3774.000	505.800	3813.000	505.100	3838.000	509.800	3867.000
GR	511.100	3933.000	511.200	3992.000	511.700	4064.000	511.100	4120.000	509.600	4141.000
GR	506.500	4160.000	506.000	4190.000	504.700	4212.000	502.500	4225.000	495.900	4262.000
GR	495.900	4295.000	495.900	4338.000	502.500	4364.000	505.900	4378.000	528.000	4379.000
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GR	510.900	2366.000	512.600	2417.000	512.600	2481.000	513.700	2552.000	515.400	2593.000
GR	511.600	2614.000	514.600	2625.000	520.700	2636.000	520.700	2800.000	525.100	2804.000
GR	550.600	2837.000	562.300	2857.000	575.600	2878.000	0.0	0.0	0.0	0.0
NC	0.100	0.055	0.036	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	40.400	0.0	0.0	0.0	0.0	0.0
X1	59.000	69.000	3263.000	3437.000	400.000	330.000	360.000	0.0	0.0	0.0
GR	575.400	1000.000	565.700	1042.000	552.500	1086.000	543.400	1119.000	543.400	1200.000
GR	543.400	1600.000	543.400	1800.000	543.400	2140.000	543.400	2171.000	542.500	2180.000
GR	539.400	2200.000	542.700	2219.000	543.200	2230.000	543.200	2258.000	540.500	2267.000
GR	535.300	2280.000	525.600	2297.000	514.300	2325.000	507.700	2337.000	505.500	2343.000
GR	502.000	2349.000	501.500	2350.000	501.500	2356.000	501.500	2361.000	502.000	2363.000
GR	503.900	2369.000	505.700	2386.000	505.100	2429.000	505.700	2492.000	506.000	2556.000
GR	505.700	2619.000	506.300	2687.000	506.500	2770.000	508.300	2845.000	508.500	2926.000
GR	508.500	3001.000	509.300	3081.000	508.200	3110.000	509.500	3131.000	508.900	3149.000
GR	508.500	3188.000	507.300	3204.000	505.500	3208.000	506.000	3222.000	507.800	3248.000
GR	508.000	3263.000	504.600	3278.000	501.500	3293.000	498.000	3310.000	498.000	3352.000
GR	498.000	3414.000	501.500	3418.000	504.300	3420.000	507.200	3437.000	508.400	3473.000
GR	510.800	3512.000	511.500	3574.000	511.500	3613.000	513.900	3644.000	514.700	3673.000
GR	515.700	3703.000	515.200	3730.000	513.200	3743.000	514.200	3749.000	523.800	3761.000
GR	523.800	3950.000	550.300	3982.000	562.100	4004.000	574.800	4031.000	0.0	0.0
NC	0.100	0.055	0.038	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	60.000	30.000	4190.000	4378.000	460.000	410.000	410.000	0.0	0.0	0.0
GR	574.800	1000.000	550.300	2496.000	515.400	3371.000	515.500	3393.000	514.900	3422.000
GR	512.700	3483.000	512.400	3539.000	512.000	3596.000	511.500	3654.000	510.900	3713.000
GR	509.000	3751.000	507.200	3774.000	505.800	3813.000	505.100	3838.000	509.800	3867.000
GR	511.100	3933.000	511.200	3992.000	511.700	4064.000	511.100	4120.000	509.600	4141.000
GR	506.500	4160.000	506.000	4190.000	504.700	4212.000	502.500	4225.000	495.900	4262.000
GR	495.900	4295.000	495.900	4338.000	502.500	4364.000	505.900	4378.000	528.000	4379.000
NC	0.0	0.0	0.0	0.400	0.600	0.0	0.0	0.0	0.0	0.0
NH	3.000	0.100	4141.000	0.039	4378.000	0.060	4721.000	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	60.100	75.000	3944.000	4378.000	80.000	35.000	41.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	525.000	516.500	0.0
GR	574.800	1000.000	550.300	2496.000	550.300	2525.000	526.100	2534.000	520.600	2561.000
GR	520.400	2600.000	513.200	2669.000	517.500	2749.000	517.000	2835.000	517.500	2888.000
GR	519.600	2928.000	520.800	2949.000	520.300	2957.000	513.700	2977.000	506.900	2991.000
GR	504.900	2999.000	503.200	3006.000	503.200	3007.000	503.200	3009.000	504.900	3013.000
GR	509.000	3024.000	518.900	3058.000	517.500	3070.000	518.700	3096.000	519.700	3130.000
GR	517.900	3151.000	515.900	3169.000	513.000	3178.000	503.200	3209.000	503.200	3230.000
GR	513.000	3338.000	514.200	3351.000	515.400	3371.000	515.500	3393.000	514.900	3422.000
GR	512.700	3483.000	512.400	3539.000	512.000	3596.000	511.500	3654.000	510.900	3713.000
GR	509.000	3751.000	507.200	3774.000	505.800	3813.000	505.100	3838.000	509.800	3867.000
GR	511.100	3933.000	511.200	3944.000	511.200	3944.000	511.700	4064.000	511.100	4123.000
GR	511.100	4123.000	509.600	4141.000	506.500	4160.000	506.000	4190.000	504.700	4212.000
GR	502.500	4225.000	495.900	4262.000	495.900	4262.000	495.900	4295.000	495.900	4334.000
GR	495.900	4338.000	502.500	4364.000	505.900	4378.000	505.900	4378.000	507.400	4395.000
GR	508.900	4440.000	509.700	4518.000	510.400	4560.000	512.400	4601.000	512.400	4618.000
GR	514.200	4627.000	524.300	4633.000	550.000	4668.000	560.600	4694.000	575.300	4721.000
NH	3.000	0.100	4141.000	0.039	4378.000	0.060	4721.000	0.0	0.0	0.0
SB	1.200	1.500	2.900	0.0	467.000	74.000	6760.000	0.670	504.500	504.500
X1	60.200	0.0	0.0	0.0	12.000	12.000	12.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	524.500	517.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	530.000	517.500	0.0
BT	28.000	3012.000	537.900	0.0	3118.000	537.000	0.0	3197.000	536.500	0.0
BT	3259.000	535.900	0.0	3303.000	535.400	0.0	3357.000	534.900	0.0	3457.000
BT	533.800	0.0	3569.000	532.300	0.0	3668.000	531.700	0.0	3836.000	530.400
BT	0.0	3944.000	530.000	511.200	3944.000	530.000	524.500	4123.000	529.600	524.100
BT	4123.000	529.600	520.600	4262.000	529.200	520.200	4262.000	529.200	521.700	4378.000
BT	528.000	519.300	4378.000	528.000	505.900	4500.000	526.700	0.0	4653.000	525.300
BT	0.0	4817.000	523.300	0.0	4917.000	522.300	0.0	5056.000	520.600	0.0
BT	5105.000	519.700	0.0	5209.000	518.200	0.0	5276.000	517.500	0.0	5336.000

BT	517.500	0.0	5376.000	525.700	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.050	0.039	0.400	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	3538.000	4375.000
X1	62.000	44.000	3596.000	3809.000	306.000	495.000	417.000	0.0	0.0	0.0
GR	540.600	1000.000	529.700	3488.000	529.700	3488.000	529.700	3510.000	524.100	3518.000
GR	511.200	3538.000	509.300	3555.000	509.400	3583.000	509.700	3596.000	505.800	3604.000
GR	505.000	3611.000	504.500	3615.000	504.500	3681.000	504.500	3739.000	505.000	3746.000
GR	505.500	3752.000	508.000	3781.000	507.900	3788.000	505.600	3792.000	505.600	3801.000
GR	508.600	3809.000	509.300	3826.000	507.700	3845.000	505.500	3861.000	507.400	3872.000
GR	511.200	3887.000	511.400	3911.000	512.500	3949.000	512.200	4012.000	511.200	4089.000
GR	511.200	4172.000	511.300	4253.000	510.200	4285.000	506.300	4313.000	506.200	4332.000
GR	505.800	4344.000	506.200	4352.000	506.200	4396.000	511.600	4428.000	511.600	4442.000
GR	513.500	4448.000	525.300	4463.000	549.300	4482.000	575.100	4512.000	0.0	0.0
NC	0.100	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	13.400	0.0	0.0	0.0	0.0	0.0
X1	63.000	58.000	3392.000	3623.000	545.000	1180.000	544.000	0.0	0.0	0.0
GR	535.400	3142.000	525.900	3161.000	512.100	3187.000	511.100	3217.000	511.800	3258.000
GR	511.900	3317.000	513.800	3356.000	514.000	3392.000	508.200	3406.000	505.600	3411.000
GR	505.000	3412.000	505.000	3419.000	505.600	3423.000	507.000	3435.000	508.000	3447.000
GR	507.000	3479.000	505.800	3493.000	505.000	3502.000	505.000	3540.000	505.000	3583.000
GR	505.800	3586.000	509.000	3596.000	512.300	3623.000	512.500	3678.000	511.000	3701.000
GR	511.200	3739.000	511.000	3787.000	509.800	3803.000	508.000	3810.000	507.200	3813.000
GR	508.000	3827.000	509.000	3845.000	508.300	3867.000	508.300	3883.000	510.300	3898.000
GR	513.600	3944.000	514.000	3975.000	513.200	4106.000	512.400	4287.000	511.900	4508.000
GR	512.600	4646.000	512.400	4831.000	511.500	5003.000	511.300	5094.000	512.000	5162.000
GR	510.600	5208.000	507.300	5277.000	506.200	5295.000	507.900	5318.000	506.900	5352.000
GR	507.000	5363.000	509.200	5373.000	509.200	5395.000	509.900	5402.000	525.200	5421.000
GR	550.900	5444.000	567.500	5453.000	575.700	5465.000	0.0	0.0	0.0	0.0
NC	0.100	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	64.000	52.000	2562.000	2803.000	400.000	750.000	499.000	0.0	0.0	0.0
GR	539.000	2205.000	539.000	2218.000	518.600	2244.000	514.800	2290.000	513.400	2424.000
GR	511.700	2498.000	513.300	2520.000	512.000	2562.000	509.700	2588.000	508.100	2622.000
GR	507.000	2634.000	505.300	2652.000	505.300	2700.000	505.300	2741.000	507.000	2754.000
GR	508.800	2768.000	511.100	2803.000	510.300	2861.000	511.100	2902.000	512.400	2969.000
GR	511.000	3040.000	510.900	3110.000	510.200	3169.000	508.700	3209.000	506.700	3231.000
GR	511.100	3260.000	512.400	3310.000	515.100	3441.000	515.000	3563.000	515.400	3680.000
GR	510.400	3774.000	509.600	3800.000	508.900	3819.000	509.700	3847.000	511.200	3908.000
GR	511.100	3997.000	510.900	4095.000	510.100	4202.000	509.800	4271.000	509.600	4340.000
GR	509.400	4363.000	508.900	4376.000	509.600	4385.000	509.900	4408.000	513.500	4420.000
GR	513.500	4440.000	515.000	4448.000	527.300	4468.000	546.200	4515.000	546.200	4548.000
GR	554.900	4573.000	575.500	4627.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	65.000	83.000	2131.000	2313.000	392.000	325.000	380.000	0.0	0.0	0.0
GR	569.800	1000.000	567.200	1052.000	564.800	1116.000	558.100	1214.000	551.800	1307.000
GR	549.100	1381.000	545.900	1416.000	540.300	1435.000	543.200	1467.000	542.300	1508.000
GR	544.100	1532.000	544.100	1554.000	537.800	1576.000	532.800	1607.000	525.300	1656.000
GR	522.300	1675.000	523.900	1693.000	523.900	1711.000	520.200	1728.000	515.500	1766.000
GR	513.900	1770.000	511.900	1778.000	511.000	1782.000	511.000	1788.000	511.000	1796.000
GR	511.900	1797.000	515.700	1802.000	517.400	1814.000	517.900	1840.000	516.800	1868.000
GR	516.200	1947.000	515.700	2051.000	515.400	2105.000	510.600	2131.000	509.100	2135.000
GR	507.500	2142.000	500.200	2174.000	500.200	2187.000	500.200	2187.000	507.500	2241.000
GR	508.900	2253.000	509.700	2279.000	511.000	2313.000	511.000	2368.000	511.700	2441.000
GR	513.200	2508.000	512.400	2573.000	511.100	2634.000	512.500	2663.000	512.300	2782.000
GR	514.000	2869.000	514.800	2987.000	514.900	3075.000	510.900	3134.000	509.500	3154.000
GR	510.200	3215.000	509.800	3260.000	511.100	3292.000	511.400	3405.000	511.800	3503.000
GR	511.800	3595.000	510.400	3692.000	509.900	3754.000	509.000	3783.000	507.900	3795.000
GR	509.000	3810.000	509.500	3864.000	510.300	3900.000	514.300	3909.000	514.300	3931.000
GR	515.000	3937.000	526.000	3954.000	536.000	3981.000	527.300	4012.000	524.600	4022.000
GR	527.500	4031.000	534.400	4046.000	550.200	4080.000	551.400	4095.000	556.400	4115.000
GR	557.300	4132.000	569.400	4159.000	575.200	4178.000	0.0	0.0	0.0	0.0
NC	0.060	0.070	0.042	0.0	0.0	0.0	0.0	0.0	0.0	0.0

X1	66.000	82.000	1832.000	1995.000	350.000	337.000	350.000	0.0	0.0	0.0
GR	575.200	1000.000	572.000	1059.000	567.100	1123.000	563.700	1187.000	559.900	1262.000
GR	555.000	1327.000	549.700	1355.000	549.700	1381.000	547.400	1412.000	545.700	1454.000
GR	543.000	1482.000	535.100	1503.000	534.400	1540.000	530.000	1574.000	526.400	1585.000
GR	525.700	1605.000	523.900	1620.000	523.500	1626.000	520.800	1633.000	514.200	1645.000
GR	511.500	1650.000	510.500	1652.000	510.500	1659.000	510.500	1665.000	511.400	1666.000
GR	514.000	1671.000	519.400	1680.000	519.400	1707.000	518.100	1717.000	516.900	1751.000
GR	516.600	1802.000	516.300	1832.000	512.300	1842.000	509.300	1850.000	508.000	1855.000
GR	505.700	1863.000	505.700	1890.000	505.700	1890.000	508.000	1920.000	508.500	1929.000
GR	509.000	1962.000	510.500	1995.000	511.200	2039.000	512.000	2111.000	512.800	2158.000
GR	513.200	2182.000	512.500	2235.000	512.200	2277.000	510.700	2318.000	515.500	2358.000
GR	517.400	2390.000	516.900	2437.000	516.500	2499.000	515.400	2556.000	513.300	2636.000
GR	511.900	2661.000	512.500	2739.000	512.500	2821.000	512.500	2912.000	512.400	3043.000
GR	512.100	3119.000	512.000	3241.000	511.600	3354.000	510.800	3410.000	510.100	3477.000
GR	509.800	3519.000	509.800	3541.000	509.600	3564.000	508.700	3571.000	509.200	3578.000
GR	512.200	3593.000	515.900	3606.000	515.900	3623.000	518.800	3631.000	526.100	3645.000
GR	535.700	3669.000	544.000	3697.000	546.300	3736.000	549.700	3769.000	559.200	3809.000
GR	569.900	3859.000	574.100	3881.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.070	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	67.000	89.000	2461.000	2664.000	635.000	400.000	680.000	0.0	0.0	0.0
GR	610.200	1000.000	606.200	1100.000	601.600	1167.000	596.800	1234.000	590.600	1303.000
GR	584.700	1364.000	574.100	1407.000	573.300	1474.000	570.500	1499.000	568.600	1510.000
GR	566.900	1517.000	566.100	1526.000	565.300	1533.000	558.100	1544.000	554.500	1562.000
GR	554.600	1594.000	554.800	1608.000	549.100	1655.000	546.600	1684.000	541.700	1709.000
GR	537.500	1730.000	530.700	1738.000	530.700	1758.000	523.800	1773.000	524.000	1787.000
GR	515.800	1798.000	512.700	1805.000	512.000	1816.000	511.000	1822.000	512.000	1831.000
GR	513.000	1840.000	515.000	1864.000	516.600	1882.000	516.600	1905.000	518.600	1927.000
GR	521.000	1964.000	515.700	1985.000	512.800	2008.000	512.700	2053.000	513.700	2085.000
GR	514.400	2123.000	514.800	2184.000	515.500	2214.000	515.500	2229.000	514.700	2240.000
GR	514.200	2272.000	513.200	2314.000	510.300	2371.000	512.400	2390.000	511.600	2413.000
GR	512.600	2434.000	514.400	2461.000	512.900	2475.000	511.800	2496.000	510.100	2512.000
GR	506.000	2550.000	506.000	2574.000	506.000	2597.000	510.100	2638.000	511.300	2651.000
GR	513.900	2664.000	514.300	2691.000	513.900	2740.000	513.500	2777.000	512.900	2822.000
GR	512.200	2874.000	511.900	2968.000	512.000	3056.000	512.800	3153.000	513.000	3236.000
GR	513.700	3290.000	514.600	3373.000	514.700	3450.000	514.300	3542.000	514.700	3617.000
GR	514.800	3672.000	515.200	3712.000	514.800	3737.000	514.700	3795.000	514.800	3861.000
GR	515.300	3924.000	517.100	3948.000	517.100	3969.000	519.200	3978.000	525.800	3993.000
GR	540.500	4019.000	555.300	4045.000	567.300	4097.000	573.500	4121.000	0.0	0.0
NC	0.075	0.045	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	68.000	68.000	2127.000	2327.000	300.000	1150.000	725.000	0.0	0.0	0.0
GR	600.000	1000.000	597.500	1048.000	593.400	1085.000	585.700	1125.000	575.500	1169.000
GR	555.200	1205.000	555.200	1242.000	557.800	1262.000	555.400	1283.000	553.900	1299.000
GR	550.400	1312.000	538.000	1324.000	526.700	1340.000	521.600	1347.000	521.500	1363.000
GR	523.200	1375.000	520.600	1391.000	515.300	1414.000	513.400	1420.000	512.600	1428.000
GR	512.000	1433.000	512.600	1438.000	514.000	1448.000	513.300	1454.000	512.700	1460.000
GR	513.900	1469.000	515.400	1491.000	516.200	1534.000	516.000	1604.000	515.900	1659.000
GR	515.500	1700.000	515.600	1738.000	515.300	1785.000	515.300	1846.000	515.800	1888.000
GR	516.600	1956.000	516.200	2023.000	515.600	2071.000	514.800	2127.000	513.300	2162.000
GR	513.200	2199.000	513.000	2213.000	506.500	2250.000	513.000	2287.000	513.900	2295.000
GR	515.500	2327.000	515.900	2390.000	516.200	2459.000	516.200	2547.000	515.700	2627.000
GR	516.000	2677.000	516.200	2778.000	516.400	2856.000	516.600	2959.000	516.700	3056.000
GR	517.300	3080.000	518.000	3118.000	521.000	3150.000	523.900	3160.000	523.900	3171.000
GR	523.900	3179.000	524.800	3189.000	536.400	3209.000	549.100	3221.000	574.500	3266.000
GR	599.800	3307.000	616.400	3343.000	626.000	3386.000	0.0	0.0	0.0	0.0
NC	0.100	0.055	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	69.000	74.000	1851.000	2191.000	220.000	378.000	425.000	0.0	0.0	0.0
GR	599.700	1000.000	593.500	1047.000	585.100	1092.000	575.900	1121.000	565.400	1146.000
GR	560.800	1150.000	560.400	1175.000	556.600	1189.000	555.900	1202.000	551.700	1213.000
GR	546.500	1224.000	524.800	1253.000	520.900	1293.000	520.900	1322.000	520.900	1341.000
GR	517.000	1363.000	515.200	1382.000	514.300	1393.000	513.600	1398.000	513.000	1404.000

GR	513.600	1409.000	514.200	1415.000	515.300	1429.000	515.600	1453.000	515.300	1468.000
GR	513.900	1480.000	513.400	1489.000	514.500	1496.000	515.400	1500.000	515.400	1524.000
GR	518.500	1548.000	520.400	1570.000	520.700	1591.000	519.500	1621.000	519.200	1643.000
GR	517.900	1704.000	517.200	1751.000	516.400	1772.000	516.500	1802.000	517.100	1825.000
GR	516.900	1851.000	515.600	1862.000	514.500	1876.000	513.000	1896.000	513.000	2019.000
GR	513.000	2153.000	514.500	2164.000	514.900	2167.000	517.000	2191.000	518.000	2252.000
GR	519.000	2305.000	519.000	2366.000	518.700	2444.000	518.400	2516.000	517.900	2612.000
GR	518.300	2725.000	518.900	2767.000	519.400	2854.000	520.500	2941.000	522.500	2983.000
GR	525.500	3029.000	530.700	3050.000	531.000	3062.000	532.200	3076.000	539.100	3094.000
GR	551.100	3124.000	551.300	3183.000	560.200	3220.000	561.300	3261.000	572.100	3280.000
GR	574.400	3302.000	584.800	3338.000	597.000	3380.000	599.100	3406.000	0.0	0.0
NC	0.100	0.055	0.042	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	70.000	79.000	1960.000	2114.000	640.000	920.000	641.000	0.0	0.0	0.0
GR	600.200	1000.000	593.600	1020.000	584.800	1033.000	583.900	1056.000	557.800	1080.000
GR	557.800	1095.000	556.400	1103.000	550.400	1120.000	537.400	1150.000	522.400	1177.000
GR	520.500	1190.000	516.100	1195.000	515.100	1202.000	514.200	1209.000	515.100	1214.000
GR	516.200	1226.000	517.200	1259.000	518.100	1300.000	520.400	1331.000	520.900	1381.000
GR	520.700	1430.000	520.000	1464.000	519.300	1497.000	521.500	1519.000	521.500	1530.000
GR	515.300	1550.000	516.100	1573.000	517.000	1596.000	521.100	1638.000	522.100	1720.000
GR	521.900	1786.000	521.500	1850.000	519.500	1880.000	515.600	1897.000	517.100	1906.000
GR	520.000	1918.000	520.600	1932.000	521.100	1953.000	520.600	1960.000	516.800	1969.000
GR	515.400	1975.000	510.000	2000.000	510.000	2032.000	510.000	2066.000	515.400	2089.000
GR	517.400	2098.000	520.300	2114.000	516.200	2139.000	518.800	2171.000	516.800	2202.000
GR	516.700	2234.000	516.000	2241.000	514.700	2255.000	515.900	2264.000	517.200	2274.000
GR	520.000	2299.000	520.800	2335.000	521.500	2411.000	521.800	2503.000	522.000	2611.000
GR	522.100	2732.000	522.000	2859.000	522.200	2971.000	522.500	3063.000	523.000	3157.000
GR	522.700	3209.000	526.200	3239.000	526.200	3254.000	526.200	3262.000	529.700	3273.000
GR	540.900	3284.000	550.200	3303.000	557.200	3338.000	564.000	3371.000	575.500	3419.000
GR	577.000	3439.000	585.200	3464.000	591.600	3486.000	598.400	3503.000	0.0	0.0
NC	0.060	0.050	0.042	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1850.000	2900.000
X1	71.000	47.000	2253.000	2467.000	480.000	440.000	501.000	0.0	0.0	0.0
GR	599.100	1000.000	592.700	1041.000	584.600	1058.000	584.600	1079.000	576.000	1087.000
GR	560.900	1106.000	560.900	1115.000	556.200	1127.000	545.600	1149.000	535.500	1181.000
GR	525.500	1207.000	525.500	1300.000	525.500	1500.000	525.500	1800.000	525.500	2198.000
GR	525.500	2209.000	520.600	2218.000	516.500	2230.000	515.300	2233.000	516.500	2245.000
GR	517.300	2253.000	517.000	2263.000	516.500	2272.000	512.500	2341.000	512.500	2367.000
GR	512.500	2435.000	516.500	2457.000	518.300	2467.000	520.800	2497.000	521.900	2530.000
GR	522.400	2581.000	522.900	2641.000	523.000	2725.000	522.900	2799.000	523.100	2858.000
GR	523.100	2922.000	523.400	3063.000	523.700	3166.000	523.900	3273.000	526.400	3287.000
GR	526.400	3307.000	528.600	3315.000	548.500	3346.000	563.200	3374.000	578.200	3398.000
GR	590.500	3443.000	600.200	3477.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.050	0.044	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	72.000	64.000	2430.000	2718.000	410.000	734.000	790.000	0.0	0.0	0.0
GR	600.100	1000.000	588.400	1014.000	577.900	1032.000	578.800	1048.000	560.900	1064.000
GR	560.900	1074.000	555.300	1086.000	544.500	1106.000	527.100	1123.000	527.100	1200.000
GR	527.100	1400.000	527.100	1700.000	527.100	2000.000	527.100	2278.000	526.300	2289.000
GR	521.600	2312.000	521.300	2335.000	518.700	2352.000	516.000	2359.000	515.000	2362.000
GR	515.000	2392.000	516.000	2396.000	517.400	2403.000	520.800	2419.000	522.000	2430.000
GR	520.400	2438.000	519.400	2445.000	519.000	2450.000	512.300	2484.000	519.000	2524.000
GR	519.700	2531.000	519.700	2538.000	519.000	2546.000	518.400	2554.000	519.000	2577.000
GR	519.500	2596.000	519.500	2624.000	519.500	2649.000	519.000	2669.000	518.200	2703.000
GR	519.000	2710.000	519.900	2718.000	520.600	2748.000	520.600	2773.000	519.400	2801.000
GR	519.000	2820.000	518.400	2847.000	519.000	2856.000	519.900	2869.000	523.700	2905.000
GR	523.800	2952.000	523.900	3043.000	524.200	3143.000	524.600	3231.000	525.200	3307.000
GR	525.900	3350.000	528.100	3362.000	528.100	3379.000	529.700	3384.000	550.000	3402.000
GR	564.100	3420.000	580.500	3445.000	590.800	3476.000	599.400	3508.000	0.0	0.0
NC	0.050	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	73.000	56.000	2690.000	2855.000	950.000	490.000	575.000	0.0	0.0	0.0
GR	575.500	1000.000	569.500	1013.000	569.500	1023.000	564.400	1035.000	558.100	1047.000

GR	558.100	1056.000	549.100	1067.000	540.800	1088.000	536.600	1096.000	530.900	1106.000
GR	530.900	2446.000	525.300	2462.000	523.800	2474.000	519.700	2493.000	517.400	2500.000
GR	516.400	2503.000	516.400	2525.000	517.400	2537.000	518.300	2547.000	521.200	2575.000
GR	521.700	2614.000	521.000	2657.000	520.900	2690.000	520.200	2705.000	517.000	2773.000
GR	517.000	2773.000	517.000	2793.000	520.200	2834.000	521.800	2855.000	521.900	2906.000
GR	522.000	2966.000	523.100	3036.000	520.800	3080.000	521.500	3114.000	520.200	3154.000
GR	518.500	3206.000	520.200	3246.000	521.200	3285.000	521.300	3325.000	520.300	3371.000
GR	519.400	3388.000	524.700	3406.000	525.700	3457.000	526.000	3537.000	525.800	3624.000
GR	526.000	3747.000	526.200	3853.000	526.900	3951.000	527.400	3978.000	530.200	3999.000
GR	530.200	4015.000	530.700	4022.000	550.200	4034.000	575.100	4063.000	584.800	4081.000
GR	600.400	4098.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2291.000	3436.000
X1	74.000	58.000	2556.000	2796.000	970.000	230.000	640.000	0.0	0.0	0.0
GR	574.500	1000.000	566.200	1040.000	561.600	1052.000	560.100	1089.000	558.600	1161.000
GR	557.200	1209.000	556.500	1229.000	556.500	1291.000	556.500	1414.000	555.800	1491.000
GR	555.400	1595.000	552.300	1660.000	549.000	1716.000	526.200	1750.000	526.200	1933.000
GR	526.400	2014.000	526.900	2079.000	525.600	2096.000	525.900	2120.000	526.300	2154.000
GR	526.600	2205.000	525.900	2291.000	525.400	2402.000	524.900	2493.000	521.000	2510.000
GR	521.900	2536.000	523.200	2556.000	522.700	2562.000	521.000	2568.000	518.400	2576.000
GR	518.400	2656.000	518.400	2721.000	521.000	2738.000	523.100	2752.000	525.500	2796.000
GR	525.100	2839.000	520.700	2883.000	521.000	2909.000	524.700	2943.000	525.600	2969.000
GR	524.400	2999.000	520.900	3029.000	525.500	3063.000	525.700	3104.000	525.800	3173.000
GR	526.200	3262.000	526.500	3366.000	526.900	3465.000	527.300	3574.000	527.800	3698.000
GR	530.300	3789.000	531.000	3804.000	531.000	3821.000	531.900	3828.000	538.800	3835.000
GR	549.800	3849.000	574.400	3890.000	600.900	3917.000	0.0	0.0	0.0	0.0
NC	0.050	0.055	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	75.000	57.000	2589.000	2803.000	790.000	320.000	640.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.900	1000.000	590.300	1043.000	583.900	1061.000	579.100	1074.000	577.000	1094.000
GR	571.500	1134.000	562.800	1157.000	565.300	1180.000	562.300	1241.000	560.200	1260.000
GR	557.400	1326.000	555.300	1404.000	552.200	1501.000	551.000	1621.000	550.500	1711.000
GR	550.200	1769.000	550.300	1771.000	550.700	1805.000	550.500	1946.000	549.300	1986.000
GR	545.200	2023.000	534.300	2072.000	532.100	2085.000	532.100	2100.000	532.100	2150.000
GR	532.100	2174.000	530.600	2206.000	530.300	2282.000	528.500	2397.000	527.200	2504.000
GR	528.200	2569.000	529.400	2589.000	525.700	2601.000	524.000	2607.000	521.500	2612.000
GR	516.000	2623.000	516.000	2702.000	516.000	2759.000	521.500	2790.000	523.900	2803.000
GR	526.300	2834.000	526.600	2906.000	526.800	3009.000	527.100	3167.000	527.200	3316.000
GR	527.400	3460.000	528.000	3479.000	528.000	3500.000	529.400	3553.000	530.000	3605.000
GR	531.600	3630.000	531.700	3646.000	534.200	3672.000	535.000	3679.000	545.200	3699.000
GR	554.500	3715.000	571.000	3740.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.040	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	77.010	48.000	2343.000	2573.000	120.000	150.000	130.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	531.500	530.200	0.0
GR	625.300	1000.000	610.500	1049.000	598.400	1086.000	586.200	1125.000	580.300	1135.000
GR	580.300	1144.000	547.100	1199.000	550.300	1226.000	550.300	1247.000	548.800	1276.000
GR	553.200	1313.000	553.100	1391.000	551.700	1491.000	549.700	1548.000	549.700	1574.000
GR	549.800	1610.000	546.500	1647.000	545.900	1706.000	543.500	1746.000	535.500	1783.000
GR	531.000	1904.000	528.600	1970.000	528.200	2094.000	528.500	2262.000	533.800	2290.000
GR	533.800	2309.000	530.800	2343.000	523.700	2363.000	522.000	2367.000	517.500	2380.000
GR	517.500	2450.000	517.500	2503.000	522.000	2530.000	523.600	2540.000	524.600	2573.000
GR	525.400	2637.000	525.900	2754.000	526.100	2882.000	526.600	3099.000	526.900	3158.000
GR	527.200	3252.000	528.900	3276.000	542.200	3309.000	549.700	3332.000	562.900	3349.000
GR	574.700	3364.000	584.200	3378.000	600.100	3391.000	0.0	0.0	0.0	0.0
SB	0.900	1.500	3.000	0.0	160.000	6.000	3320.000	2.000	517.500	517.500
X1	77.020	0.0	0.0	0.0	50.000	50.000	50.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	535.100	530.700	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	532.000	530.700	0.0
BT	23.000	1614.000	545.500	0.0	1686.000	542.000	0.0	1746.000	539.700	0.0
BT	1796.000	537.400	0.0	1870.000	535.600	0.0	1950.000	534.600	0.0	2025.000

BT	532.800	0.0	2085.000	532.000	0.0	2225.000	534.700	0.0	2384.000	539.000
BT	0.0	2487.000	539.000	0.0	2607.000	539.000	0.0	2786.000	537.400	0.0
BT	2984.000	534.900	0.0	3144.000	533.600	0.0	3223.000	533.100	0.0	3285.000
BT	532.800	0.0	3354.000	531.100	0.0	3403.000	531.000	0.0	3506.000	530.700
BT	0.0	3516.000	530.700	0.0	3527.000	532.500	0.0	3553.000	549.000	0.0
NC	0.040	0.040	0.039	0.300	0.500	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	18.400	0.0	0.0	0.0	0.0	0.0
X1	77.000	48.000	2343.000	2573.000	80.000	40.000	60.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	625.300	1000.000	610.500	1049.000	598.400	1086.000	586.200	1125.000	580.300	1135.000
GR	580.300	1144.000	547.100	1199.000	550.300	1226.000	550.300	1247.000	548.800	1276.000
GR	553.200	1313.000	553.100	1391.000	551.700	1491.000	549.700	1548.000	549.700	1574.000
GR	549.800	1610.000	546.500	1647.000	545.900	1706.000	543.500	1746.000	535.500	1783.000
GR	531.000	1904.000	528.600	1970.000	528.200	2094.000	528.500	2262.000	533.800	2290.000
GR	533.800	2309.000	530.800	2343.000	523.700	2363.000	522.000	2367.000	517.500	2380.000
GR	517.500	2450.000	517.500	2503.000	522.000	2530.000	523.600	2540.000	524.600	2573.000
GR	525.400	2637.000	525.900	2754.000	526.100	2882.000	526.600	3099.000	526.900	3158.000
GR	527.200	3252.000	528.900	3276.000	542.200	3309.000	549.700	3332.000	562.900	3349.000
GR	574.700	3364.000	584.200	3378.000	600.100	3391.000	0.0	0.0	0.0	0.0
NC	0.040	0.040	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	15.400	0.0	0.0	0.0	0.0	0.0
X1	78.000	45.000	1739.000	1955.000	740.000	710.000	735.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1033.000	549.900	1071.000	537.500	1096.000	537.500	1100.000
GR	537.500	1150.000	537.500	1158.000	536.800	1166.000	534.900	1183.000	534.900	1216.000
GR	532.700	1220.000	528.300	1232.000	526.800	1262.000	527.300	1320.000	527.300	1368.000
GR	527.900	1412.000	527.000	1457.000	527.400	1509.000	529.200	1564.000	530.100	1658.000
GR	530.000	1721.000	527.900	1739.000	525.000	1754.000	521.600	1768.000	522.900	1780.000
GR	521.200	1787.000	519.300	1795.000	519.300	1872.000	519.300	1940.000	521.200	1945.000
GR	524.300	1955.000	526.200	1984.000	525.800	2056.000	526.000	2126.000	525.100	2214.000
GR	525.100	2269.000	526.600	2327.000	529.000	2396.000	529.000	2464.000	529.300	2507.000
GR	529.900	2548.000	530.000	2563.000	550.700	2593.000	575.100	2625.000	600.000	2655.000
ET	0.0	0.0	0.0	0.0	16.400	0.0	0.0	0.0	0.0	0.0
X1	79.000	40.000	1602.000	1823.000	755.000	620.000	710.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1070.000	550.600	1132.000	536.100	1168.000	536.100	1184.000
GR	536.100	1203.000	536.000	1227.000	533.400	1248.000	533.000	1271.000	530.100	1342.000
GR	529.200	1411.000	529.200	1464.000	531.000	1531.000	531.000	1597.000	530.000	1602.000
GR	525.000	1610.000	522.000	1626.000	520.200	1636.000	520.200	1684.000	520.200	1711.000
GR	522.000	1753.000	522.500	1764.000	523.500	1792.000	526.200	1823.000	523.700	1844.000
GR	523.900	1854.000	529.500	1885.000	530.700	1907.000	529.400	1950.000	529.500	2015.000
GR	530.000	2063.000	529.800	2109.000	529.100	2152.000	528.000	2197.000	528.700	2257.000
GR	529.600	2294.000	530.100	2308.000	550.300	2343.000	575.300	2380.000	600.100	2428.000
NC	0.040	0.040	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	80.000	32.000	1449.000	1767.000	460.000	412.000	430.000	0.0	0.0	0.0
GR	600.000	1000.000	575.000	1064.000	550.000	1125.000	539.000	1142.000	539.000	1152.000
GR	539.000	1178.000	535.000	1198.000	533.400	1261.000	532.000	1329.000	531.000	1366.000
GR	531.400	1420.000	531.400	1449.000	525.000	1463.000	522.700	1476.000	518.800	1499.000
GR	518.800	1527.000	518.800	1688.000	522.700	1718.000	523.900	1728.000	525.200	1737.000
GR	527.400	1767.000	529.400	1792.000	531.700	1802.000	531.900	1846.000	529.400	1898.000
GR	527.900	1918.000	527.100	1936.000	529.800	1953.000	530.500	1963.000	564.400	1997.000
GR	588.700	2025.000	600.000	2045.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.090	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1424.000	1815.000
X1	81.000	36.000	1424.000	1815.000	365.000	340.000	350.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.000	1000.000	575.100	1086.000	572.600	1108.000	554.400	1133.000	554.500	1155.000
GR	539.800	1180.000	539.800	1210.000	537.900	1222.000	535.900	1235.000	534.800	1273.000
GR	531.700	1304.000	530.500	1356.000	531.600	1405.000	534.400	1424.000	530.500	1431.000
GR	524.800	1451.000	523.500	1455.000	523.500	1466.000	524.800	1483.000	525.400	1491.000
GR	527.100	1511.000	528.800	1533.000	524.800	1549.000	523.500	1554.000	523.500	1625.000
GR	523.500	1690.000	524.800	1768.000	525.000	1780.000	527.600	1797.000	529.300	1815.000

GR	532.200	1845.000	534.000	1867.000	534.500	1880.000	550.000	1915.000	575.000	1951.000
GR	600.000	1997.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.040	0.090	0.043	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.075	1432.000	0.045	1507.000	0.090	1582.000	0.041	1738.000	0.100
NH	1842.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1265.000	1738.000
X1	82.000	33.000	1582.000	1738.000	690.000	660.000	685.000	0.0	0.0	0.0
GR	600.100	1000.000	586.800	1038.000	574.500	1068.000	558.000	1114.000	543.800	1141.000
GR	544.100	1168.000	535.800	1198.000	535.800	1220.000	535.800	1268.000	535.700	1310.000
GR	535.700	1355.000	529.700	1376.000	527.700	1411.000	529.100	1422.000	527.900	1432.000
GR	526.200	1446.000	523.100	1471.000	526.200	1497.000	527.300	1507.000	527.900	1520.000
GR	526.800	1548.000	529.700	1582.000	527.200	1607.000	526.200	1624.000	522.800	1673.000
GR	522.800	1673.000	522.800	1727.000	526.200	1733.000	528.500	1738.000	537.800	1764.000
GR	550.100	1780.000	575.400	1807.000	600.600	1842.000	0.0	0.0	0.0	0.0
NC	0.055	0.100	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.055	1124.000	0.045	1212.000	0.100	1865.000	0.039	1990.000	0.100
NH	2058.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1135.000	1990.000
X1	83.000	44.000	1865.000	1990.000	935.000	957.000	950.000	0.0	0.0	0.0
GR	600.300	1000.000	598.000	1015.000	569.700	1039.000	552.600	1070.000	552.600	1092.000
GR	537.600	1115.000	537.600	1124.000	528.000	1140.000	528.000	1149.000	528.000	1168.000
GR	528.000	1185.000	528.900	1188.000	534.500	1212.000	535.400	1250.000	535.300	1284.000
GR	535.400	1312.000	536.400	1327.000	534.600	1349.000	527.000	1362.000	524.500	1366.000
GR	527.000	1381.000	528.900	1392.000	532.300	1432.000	532.000	1465.000	527.800	1489.000
GR	527.800	1505.000	532.800	1529.000	531.800	1566.000	532.300	1592.000	532.700	1636.000
GR	533.200	1659.000	533.300	1713.000	532.900	1770.000	531.500	1833.000	532.800	1865.000
GR	527.000	1878.000	523.000	1888.000	523.000	1923.000	523.000	1954.000	527.000	1966.000
GR	528.900	1971.000	534.200	1990.000	550.400	2030.000	575.300	2058.000	0.0	0.0
NH	5.000	0.085	1260.000	0.045	1338.000	0.100	1992.000	0.041	2191.000	0.100
NH	2268.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1175.000	2191.000
X1	84.000	53.000	1992.000	2191.000	490.000	730.000	700.000	0.0	0.0	0.0
GR	600.800	1000.000	574.400	1040.000	550.100	1084.000	544.100	1099.000	544.100	1130.000
GR	538.100	1158.000	536.700	1170.000	534.600	1195.000	532.800	1232.000	533.100	1260.000
GR	530.000	1274.000	529.100	1290.000	528.400	1302.000	529.100	1309.000	530.500	1325.000
GR	531.700	1338.000	533.800	1361.000	532.100	1369.000	534.400	1387.000	533.600	1408.000
GR	535.500	1427.000	535.700	1458.000	535.400	1481.000	530.700	1488.000	531.700	1499.000
GR	534.400	1522.000	534.300	1564.000	533.200	1608.000	532.200	1620.000	534.000	1642.000
GR	534.000	1692.000	532.900	1729.000	530.500	1748.000	533.200	1771.000	533.900	1790.000
GR	533.300	1826.000	532.000	1842.000	534.500	1869.000	536.300	1891.000	536.400	1930.000
GR	535.800	1979.000	534.300	1992.000	529.700	2003.000	528.000	2010.000	525.000	2022.000
GR	525.000	2118.000	525.000	2173.000	528.000	2178.000	529.900	2181.000	532.800	2191.000
GR	550.100	2228.000	575.400	2246.000	599.600	2268.000	0.0	0.0	0.0	0.0
NC	0.090	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1260.000	2255.000
X1	85.000	58.000	2026.000	2255.000	210.000	250.000	245.000	0.0	0.0	0.0
GR	599.600	1000.000	574.400	1042.000	548.600	1096.000	548.200	1106.000	544.300	1141.000
GR	542.000	1147.000	542.000	1158.000	542.000	1191.000	535.200	1200.000	534.500	1219.000
GR	530.400	1230.000	538.700	1243.000	537.000	1268.000	534.300	1291.000	534.700	1343.000
GR	535.400	1425.000	534.900	1465.000	533.700	1496.000	535.100	1518.000	536.200	1529.000
GR	533.000	1544.000	532.000	1567.000	531.200	1576.000	530.400	1585.000	531.200	1593.000
GR	532.900	1611.000	534.000	1658.000	534.500	1719.000	531.900	1752.000	531.300	1781.000
GR	530.700	1806.000	531.300	1810.000	532.600	1818.000	534.700	1848.000	535.900	1888.000
GR	534.500	1914.000	533.500	1928.000	535.600	1948.000	536.100	1977.000	534.700	1997.000
GR	536.000	2020.000	534.800	2026.000	530.700	2035.000	529.100	2046.000	526.500	2063.000
GR	526.500	2099.000	526.500	2125.000	529.100	2148.000	530.100	2156.000	532.500	2174.000
GR	532.200	2189.000	530.000	2208.000	529.300	2224.000	530.100	2236.000	534.000	2255.000
GR	551.600	2294.000	574.200	2329.000	600.100	2366.000	0.0	0.0	0.0	0.0
NC	0.070	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	534.000	0.038	541.000	0.042	543.000	0.042	543.800	0.040
NV	543.900	0.040	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1265.000	1915.000

X1	86.000	31.000	1777.000	1915.000	1038.000	895.000	905.000	0.0	0.0	0.0
GR	600.100	1000.000	575.500	1046.000	568.100	1064.000	554.600	1082.000	554.600	1107.000
GR	536.100	1149.000	535.900	1161.000	535.100	1167.000	536.100	1174.000	536.000	1257.000
GR	536.200	1318.000	539.100	1333.000	536.000	1343.000	536.000	1437.000	535.500	1527.000
GR	534.700	1581.000	534.100	1612.000	535.700	1646.000	537.100	1711.000	537.100	1757.000
GR	533.500	1777.000	532.100	1812.000	531.000	1833.000	526.500	1871.000	531.000	1908.000
GR	533.200	1915.000	551.100	1955.000	562.900	1986.000	564.200	2001.000	575.300	2025.000
GR	600.500	2083.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	536.000	0.038	542.000	0.042	542.500	0.042	544.400	0.040
NV	544.500	0.040	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1276.000	1919.000
X1	87.000	27.000	1623.000	1919.000	250.000	260.000	270.000	0.0	0.0	0.0
GR	600.400	1000.000	574.400	1035.000	558.800	1065.000	558.800	1090.000	536.800	1132.000
GR	536.000	1144.000	535.600	1152.000	536.000	1160.000	535.500	1252.000	535.900	1328.000
GR	540.700	1350.000	540.700	1358.000	535.500	1371.000	535.900	1501.000	536.400	1574.000
GR	536.900	1623.000	532.700	1656.000	531.600	1678.000	530.800	1694.000	530.800	1785.000
GR	530.800	1904.000	531.600	1907.000	532.800	1910.000	537.000	1919.000	550.400	1946.000
GR	575.000	1973.000	600.100	2000.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.087	0.038	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	536.000	0.038	543.000	0.045	545.000	0.045	545.700	0.043
NV	545.800	0.043	560.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1178.000	1855.000
X1	88.000	34.000	1410.000	1604.000	925.000	860.000	920.000	0.0	0.0	0.0
GR	600.100	1000.000	574.700	1047.000	551.100	1087.000	551.100	1111.000	536.600	1140.000
GR	536.100	1147.000	536.700	1154.000	537.700	1234.000	539.000	1308.000	540.600	1353.000
GR	540.400	1384.000	538.400	1410.000	535.700	1424.000	534.000	1428.000	532.200	1434.000
GR	530.700	1438.000	530.700	1496.000	530.700	1552.000	532.200	1560.000	534.300	1570.000
GR	537.300	1604.000	537.700	1658.000	537.900	1711.000	535.800	1726.000	534.500	1737.000
GR	534.000	1742.000	534.000	1763.000	534.000	1779.000	534.500	1781.000	536.500	1791.000
GR	541.500	1841.000	550.200	1877.000	575.100	1914.000	599.900	1946.000	0.0	0.0
NC	0.060	0.080	0.038	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	538.000	0.038	544.000	0.045	546.500	0.045	547.400	0.043
NV	547.500	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1241.000	1845.000
X1	89.000	32.000	1487.000	1699.000	766.000	754.000	760.000	0.0	0.0	0.0
GR	603.500	1000.000	574.700	1065.000	555.800	1127.000	554.300	1146.000	554.300	1159.000
GR	554.300	1168.000	538.500	1201.000	538.000	1208.000	538.800	1215.000	539.500	1322.000
GR	539.100	1438.000	539.500	1487.000	536.800	1500.000	534.600	1542.000	534.000	1562.000
GR	532.600	1609.000	532.600	1615.000	532.600	1648.000	534.000	1667.000	534.900	1678.000
GR	538.500	1699.000	538.500	1751.000	534.900	1780.000	534.500	1790.000	534.300	1795.000
GR	534.300	1802.000	534.300	1808.000	534.500	1811.000	535.200	1820.000	550.100	1860.000
GR	575.600	1894.000	599.800	1932.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.060	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	538.000	0.038	544.500	0.045	547.000	0.045	547.700	0.043
NV	547.800	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1221.000	1795.000
X1	90.000	24.000	1471.000	1726.000	150.000	150.000	150.000	0.0	0.0	0.0
GR	601.600	1000.000	585.100	1057.000	554.700	1122.000	554.700	1140.000	539.900	1174.000
GR	539.200	1185.000	539.700	1194.000	539.500	1254.000	538.700	1365.000	539.700	1441.000
GR	539.700	1471.000	535.800	1504.000	534.500	1513.000	533.800	1518.000	533.800	1600.000
GR	533.800	1658.000	534.500	1678.000	534.900	1689.000	539.000	1726.000	537.100	1762.000
GR	536.500	1781.000	549.200	1819.000	575.500	1850.000	599.200	1912.000	0.0	0.0
NC	0.060	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	539.000	0.038	546.000	0.045	548.500	0.045	549.300	0.043
NV	549.400	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1273.000	1704.000
X1	91.000	22.000	1520.000	1704.000	910.000	908.000	905.000	0.0	0.0	0.0
GR	590.300	1000.000	575.500	1039.000	549.300	1091.000	549.300	1112.000	548.500	1130.000
GR	546.600	1176.000	544.800	1218.000	543.200	1333.000	542.700	1451.000	543.200	1501.000

GR	544.100	1520.000	538.000	1537.000	536.000	1544.000	532.700	1554.000	532.700	1617.000
GR	532.700	1680.000	537.000	1696.000	539.100	1704.000	542.000	1728.000	549.900	1757.000
GR	575.800	1808.000	600.200	1854.000	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	541.500	0.038	548.000	0.045	551.000	0.045	551.700	0.043
NV	551.800	0.043	565.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	92.000	30.000	1785.000	1975.000	935.000	900.000	905.000	0.0	0.0	0.0
GR	585.400	1000.000	577.700	1069.000	569.200	1140.000	560.400	1164.000	554.900	1199.000
GR	555.300	1227.000	555.300	1248.000	555.300	1263.000	549.600	1291.000	548.900	1353.000
GR	547.600	1438.000	545.100	1498.000	542.300	1567.000	543.100	1635.000	545.500	1696.000
GR	545.800	1737.000	544.900	1776.000	543.900	1785.000	540.000	1794.000	537.000	1804.000
GR	532.400	1818.000	532.400	1877.000	532.400	1936.000	537.000	1951.000	538.700	1956.000
GR	542.700	1975.000	545.700	1995.000	557.600	2020.000	575.600	2039.000	599.300	2087.000
NC	0.070	0.110	0.038	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.038	542.000	0.038	549.000	0.045	552.000	0.045	552.900	0.043
NV	553.000	0.043	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	3.400	0.0	0.0	0.0	0.0	0.0
X1	93.000	34.000	1722.000	1858.000	765.000	803.000	795.000	0.0	0.0	0.0
GR	585.200	1000.000	575.700	1044.000	574.000	1068.000	563.200	1108.000	560.900	1122.000
GR	560.600	1139.000	557.000	1151.000	554.600	1169.000	552.000	1177.000	552.000	1223.000
GR	551.800	1242.000	551.800	1314.000	552.000	1353.000	551.200	1370.000	548.000	1402.000
GR	544.800	1441.000	544.500	1520.000	545.600	1569.000	549.900	1590.000	542.300	1611.000
GR	541.100	1633.000	543.100	1649.000	547.600	1691.000	544.700	1722.000	539.800	1743.000
GR	538.000	1755.000	533.000	1790.000	533.000	1802.000	533.000	1841.000	538.000	1852.000
GR	540.900	1858.000	561.700	1876.000	575.000	1890.000	599.700	1923.000	0.0	0.0
NC	0.070	0.110	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.040	543.500	0.040	550.000	0.055	554.000	0.055	554.800	0.045
NV	554.900	0.045	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	94.000	30.000	1820.000	1930.000	435.000	448.000	445.000	0.0	0.0	0.0
GR	595.100	1000.000	585.800	1096.000	578.300	1196.000	569.500	1227.000	564.300	1240.000
GR	564.300	1254.000	559.300	1286.000	552.000	1304.000	553.500	1338.000	550.300	1368.000
GR	547.300	1430.000	547.900	1509.000	550.200	1540.000	550.500	1567.000	546.600	1598.000
GR	545.400	1667.000	544.000	1706.000	545.100	1767.000	545.100	1792.000	540.300	1820.000
GR	539.500	1828.000	538.500	1839.000	534.000	1884.000	534.000	1884.000	534.000	1910.000
GR	538.500	1924.000	540.500	1930.000	549.400	1942.000	574.500	1970.000	600.400	1993.000
NC	0.070	0.110	0.042	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.042	545.500	0.042	552.000	0.060	555.000	0.060	556.000	0.050
NV	556.100	0.050	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1489.000	2150.000
X1	95.000	41.000	1782.000	2147.000	115.000	520.000	380.000	0.0	0.0	0.0
GR	594.800	1000.000	585.800	1086.000	577.500	1166.000	574.400	1199.000	568.500	1208.000
GR	568.500	1223.000	559.600	1265.000	552.000	1286.000	553.400	1323.000	550.200	1348.000
GR	548.700	1425.000	548.600	1478.000	551.800	1503.000	550.200	1518.000	546.400	1548.000
GR	546.400	1622.000	546.500	1691.000	547.400	1747.000	545.000	1782.000	540.900	1803.000
GR	538.700	1820.000	536.700	1835.000	538.700	1848.000	540.400	1858.000	540.700	1866.000
GR	538.800	1877.000	531.700	1904.000	538.800	1928.000	540.200	1933.000	544.800	1958.000
GR	541.700	1985.000	539.700	2013.000	539.200	2032.000	534.000	2073.000	539.200	2129.000
GR	540.200	2137.000	542.900	2147.000	547.400	2164.000	563.600	2190.000	576.100	2208.000
GR	600.000	2242.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.042	545.500	0.042	552.000	0.060	555.500	0.060	556.300	0.050
NV	556.400	0.050	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1405.000	2290.000
X1	96.000	42.000	1562.000	1819.000	140.000	200.000	300.000	0.0	0.0	0.0
GR	595.000	1000.000	585.100	1076.000	579.900	1134.000	578.100	1156.000	574.600	1181.000
GR	563.100	1207.000	559.600	1226.000	552.100	1257.000	553.100	1289.000	550.700	1321.000
GR	548.900	1390.000	549.400	1405.000	551.900	1420.000	551.900	1430.000	547.900	1469.000
GR	546.900	1497.000	545.200	1562.000	540.600	1584.000	542.800	1630.000	541.400	1664.000
GR	540.100	1679.000	537.900	1705.000	537.900	1735.000	537.900	1782.000	540.100	1796.000
GR	541.500	1805.000	544.700	1819.000	545.900	1845.000	544.700	1910.000	544.300	1945.000
GR	544.900	2044.000	543.600	2131.000	544.500	2210.000	543.800	2243.000	540.300	2261.000

GR	539.700	2264.000	540.300	2275.000	540.800	2284.000	542.000	2303.000	550.200	2328.000
GR	575.000	2360.000	599.700	2401.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.100	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.039	546.000	0.039	552.500	0.055	556.000	0.055	556.700	0.047
NV	556.800	0.047	570.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1368.000	2360.000
X1	97.000	45.000	1368.000	1478.000	530.000	250.000	540.000	0.0	0.0	0.0
GR	624.900	1000.000	618.700	1079.000	617.400	1103.000	611.000	1143.000	599.600	1219.000
GR	592.100	1263.000	574.100	1299.000	553.600	1315.000	553.600	1344.000	551.300	1349.000
GR	550.400	1368.000	541.000	1384.000	538.200	1389.000	538.200	1423.000	538.200	1467.000
GR	541.000	1471.000	544.500	1478.000	546.800	1505.000	545.100	1543.000	545.400	1559.000
GR	547.400	1614.000	546.500	1660.000	546.500	1697.000	546.600	1710.000	545.200	1738.000
GR	544.400	1777.000	542.300	1834.000	541.800	1893.000	541.500	1929.000	541.800	1937.000
GR	543.000	1971.000	545.100	2008.000	550.400	2044.000	551.300	2109.000	549.800	2177.000
GR	547.400	2233.000	546.400	2307.000	544.800	2392.000	544.200	2403.000	545.000	2428.000
GR	545.500	2456.000	554.700	2484.000	575.500	2540.000	587.500	2593.000	595.700	2633.000
NV	6.000	0.039	546.000	0.039	553.000	0.055	556.000	0.055	557.000	0.045
NV	557.100	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1113.000	2360.000
X1	98.000	47.000	1113.000	1243.000	300.000	140.000	300.000	0.0	0.0	0.0
GR	624.600	1000.000	600.400	1031.000	574.900	1054.000	555.800	1071.000	555.800	1101.000
GR	551.900	1113.000	541.600	1122.000	538.000	1126.000	538.000	1161.000	538.000	1171.000
GR	541.600	1197.000	543.100	1208.000	546.100	1243.000	547.800	1289.000	549.000	1319.000
GR	547.600	1379.000	549.000	1437.000	549.000	1519.000	548.200	1628.000	547.800	1697.000
GR	545.800	1720.000	545.800	1756.000	546.200	1798.000	544.100	1815.000	543.900	1828.000
GR	543.700	1838.000	543.900	1841.000	544.700	1851.000	545.700	1906.000	549.400	1929.000
GR	549.700	1973.000	550.700	2009.000	550.700	2076.000	549.400	2159.000	548.000	2253.000
GR	546.500	2312.000	545.200	2361.000	546.100	2400.000	546.900	2426.000	546.500	2435.000
GR	545.500	2445.000	546.100	2452.000	551.300	2501.000	575.100	2569.000	588.500	2634.000
GR	593.800	2672.000	599.900	2707.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.039	547.000	0.039	553.500	0.055	556.500	0.055	557.300	0.045
NV	557.400	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	99.000	52.000	1489.000	1681.000	420.000	180.000	340.000	0.0	0.0	0.0
GR	625.100	1000.000	599.000	1026.000	575.600	1061.000	557.400	1073.000	557.400	1101.000
GR	555.600	1117.000	549.000	1148.000	547.400	1162.000	548.200	1170.000	548.500	1241.000
GR	550.100	1349.000	547.500	1389.000	547.200	1420.000	547.300	1489.000	545.000	1508.000
GR	542.100	1522.000	540.600	1529.000	540.600	1574.000	540.600	1616.000	542.100	1626.000
GR	544.200	1639.000	547.900	1681.000	547.100	1733.000	547.100	1799.000	546.500	1902.000
GR	548.000	1984.000	546.000	2022.000	545.600	2074.000	545.600	2149.000	545.800	2210.000
GR	547.000	2240.000	546.900	2270.000	545.200	2276.000	543.300	2282.000	545.200	2289.000
GR	546.500	2294.000	548.400	2310.000	549.000	2372.000	549.100	2465.000	547.800	2565.000
GR	546.300	2674.000	546.300	2793.000	547.800	2829.000	551.000	2871.000	554.900	2901.000
GR	554.200	2911.000	555.100	2917.000	561.000	2949.000	566.000	2976.000	575.900	3016.000
GR	587.400	3081.000	599.600	3154.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	547.000	0.037	554.000	0.055	557.000	0.055	557.700	0.045
NV	557.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	100.000	57.000	2217.000	2371.000	800.000	620.000	550.000	0.0	0.0	0.0
GR	599.900	1000.000	570.600	1051.000	550.400	1091.000	551.300	1149.000	551.300	[illegible]
GR	552.000	1350.000	552.000	1439.000	552.500	1524.000	553.300	1543.000	552.700	1567.000
GR	550.700	1591.000	549.400	1635.000	550.100	1692.000	550.600	1743.000	550.700	1813.000
GR	550.400	1940.000	551.100	2058.000	551.100	2124.000	551.600	2171.000	550.400	2201.000
GR	548.100	2217.000	545.100	2223.000	543.000	2230.000	541.500	2235.000	541.500	2282.000
GR	541.500	2319.000	543.000	2329.000	544.600	2339.000	548.000	2371.000	548.100	2440.000
GR	547.000	2481.000	547.000	2536.000	546.400	2610.000	550.700	2662.000	551.000	2740.000
GR	551.000	2823.000	550.300	2880.000	549.600	2982.000	548.800	2993.000	549.700	3000.000
GR	555.100	3046.000	557.000	3107.000	566.100	3141.000	566.100	3154.000	571.000	3173.000
GR	572.500	3201.000	575.400	3236.000	576.300	3325.000	576.400	3442.000	575.300	3636.000
GR	575.200	3785.000	575.400	3907.000	580.500	4013.000	590.200	4207.000	594.700	4337.000

GR	594.700	4361.000	595.100	4369.000	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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*  SEPT 1971 VERSION,  UPDATED JUNE 1974        *        * THIS PROGRAM IS OWNED BY THE UNITED STATES GOVERNMENT       *
*  ERROR CORRECTIONS 01 THRU 09R2               *        * AND IS USED BY PERMISSION OF THE CORPS OF ENGINEERS,        *
*  MODIFICATIONS 52 THRU 56                     *        * DEPARTMENT OF THE ARMY.                                     *
*  MBJ UPDATED  07/20/76   0830                 *        * THE PROGRAM HAS BEEN REVISED BY MICHAEL BAKER,JR., INC.     *
*                                               *        * ONLY AS REQUIRED FOR USE ON THEIR COMPUTER AND EXECUTES     *
*  TODAYS DATE IS 04/26/77    17.35             *        * CORRECTLY THE STANDARD TEST SERIES AS PUBLISHED BY THE      *
*                                               *        * CORPS OF ENGINEERS, HYDROLOGIC ENGINEERING CENTER.          *
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2.553 SECONDS

FISHING CREEK

FLOODWAY

100.0 - 145.0

T1 SUSQUEHANNA RIVER BASIN COMMISSION
T2 BLOOMSBURG-BERWICK-SHICKSHINNY REACH
T3 FISHING CREEK - 100 YEAR FLOOD

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	4.	0.	0.	0.0	0.0	0.0	0.	559.167	0.0

J2	NPROF	IPLOT	PREVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.0	-1.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Michael Baker, Jr., Inc.
2763 N. Fourth St.
Box 3225
Harrisburg, Pa. 17105

J3	1.000	34.000	3.000	4.000	27.000	28.000	9.000	0.0	0.0	0.0
NC	0.070	0.080	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	6.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
NV	6.000	0.037	547.000	0.037	554.000	0.055	557.000	0.055	557.700	0.045
NV	557.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	100.000	57.000	2217.000	2371.000	800.000	620.000	550.000	0.0	0.0	0.0
GR	599.900	1000.000	570.600	1051.000	550.400	1091.000	551.300	1149.000	551.300	1257.000
GR	552.000	1350.000	552.000	1439.000	552.500	1524.000	553.300	1543.000	552.700	1567.000
GR	550.700	1591.000	549.400	1635.000	550.100	1692.000	550.600	1743.000	550.700	1813.000
GR	550.400	1940.000	551.100	2058.000	551.100	2124.000	551.600	2171.000	550.400	2201.000
GR	548.100	2217.000	545.100	2223.000	543.000	2230.000	541.500	2235.000	541.500	2282.000
GR	541.500	2319.000	543.000	2329.000	544.600	2339.000	548.000	2371.000	548.100	2440.000
GR	547.000	2481.000	547.000	2536.000	546.400	2610.000	550.700	2662.000	551.000	2740.000
GR	551.000	2823.000	550.300	2880.000	549.600	2982.000	548.800	2993.000	549.700	3000.000
GR	555.100	3046.000	557.000	3107.000	566.100	3141.000	566.100	3154.000	571.000	3173.000
GR	572.500	3201.000	575.400	3236.000	576.300	3325.000	576.400	3442.000	575.300	3636.000
GR	575.200	3785.000	575.400	3907.000	580.500	4013.000	590.200	4207.000	594.700	4337.000
GR	594.700	4361.000	595.100	4369.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.070	0.037	0.100	0.400	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.040	547.500	0.040	554.000	0.055	557.000	0.055	557.900	0.045
NV	55[illegible].000	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1246.000	2703.000
X1	101.000	52.000	2153.000	2331.000	215.000	200.000	180.000	0.0	0.0	0.0
GR	599.800	1000.000	575.300	1028.000	550.500	1078.000	550.900	1121.000	552.100	1223.000
GR	552.300	1319.000	552.600	1431.000	552.000	1568.000	552.600	1637.000	555.300	1667.000
GR	555.500	1690.000	553.500	1727.000	553.500	1817.000	550.400	1955.000	552.300	2048.000
GR	550.600	2130.000	549.800	2153.000	544.700	2162.000	543.300	2168.000	542.800	2171.000
GR	542.800	2237.000	542.800	2300.000	543.300	2305.000	544.200	2313.000	548.900	2331.000
GR	551.600	2369.000	552.000	2431.000	552.600	2502.000	551.800	2637.000	550.400	2761.000
GR	549.400	2813.000	549.000	2828.000	549.800	2844.000	554.200	2895.000	558.100	2942.000
GR	570.700	2983.000	570.700	2990.000	578.300	3017.000	578.400	3051.000	577.300	3091.000
GR	577.600	3184.000	578.000	3266.000	575.800	3331.000	575.900	3421.000	576.300	3502.000
GR	579.500	3593.000	586.000	3790.000	589.300	3872.000	592.800	3995.000	594.700	4055.000
GR	594.700	4082.000	595.100	4094.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.070	0.040	0.100	0.300	0.0	0.0	0.0	0.0	0.0

NV	6.000	0.036	549.500	0.036	556.000	0.055	558.000	0.055	558.900	0.045
NV	559.000	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1334.000	2491.000
X1	102.000	53.000	2116.000	2391.000	695.000	665.000	740.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	551.000	555.000	0.0
GR	599.900	1000.000	575.500	1065.000	551.300	1122.000	552.500	1209.000	552.800	1304.000
GR	553.800	1405.000	553.700	1511.000	554.400	1603.000	552.900	1630.000	554.200	1654.000
GR	554.200	1672.000	551.700	1680.000	552.600	1720.000	553.300	1791.000	552.700	1850.000
GR	553.900	1909.000	554.700	1939.000	554.000	1992.000	554.900	2030.000	555.400	2083.000
GR	555.400	2116.000	550.200	2138.000	551.000	2151.000	549.800	2162.000	546.400	2169.000
GR	544.700	2175.000	542.300	2183.000	542.300	2238.000	542.300	2321.000	544.700	2332.000
GR	546.300	2339.000	550.500	2362.000	558.600	2391.000	556.800	2480.000	555.100	2573.000
GR	553.600	2633.000	552.800	2725.000	560.600	2753.000	575.200	2791.000	578.300	2810.000
GR	578.300	2825.000	578.400	2972.000	579.100	3065.000	579.400	3179.000	579.600	3273.000
GR	579.800	3355.000	581.400	3421.000	583.100	3434.000	583.100	3456.000	586.200	3491.000
GP	592.600	3521.000	594.300	3571.000	600.700	3646.000	0.0	0.0	0.0	0.0
NC	0.080	0.070	0.037	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.036	550.000	0.036	556.000	0.053	558.500	0.053	559.400	0.045
NV	559.500	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1351.000	2397.000
X1	103.000	49.000	2102.000	2357.000	280.000	290.000	285.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	553.000	555.000	0.0
GR	600.600	1000.000	585.700	1072.000	570.400	1127.000	554.600	1186.000	554.700	1253.000
GR	554.800	1350.000	555.200	1443.000	555.200	1534.000	555.100	1609.000	556.800	1637.000
GR	555.800	1660.000	555.600	1717.000	551.900	1727.000	551.400	1744.000	553.500	1755.000
GR	552.900	1829.000	551.900	1883.000	552.300	1923.000	553.400	1994.000	555.300	2052.000
GR	556.600	2065.000	556.600	2085.000	553.000	2102.000	548.800	2128.000	545.500	2138.000
GR	545.000	2140.000	545.000	2228.000	545.000	2318.000	545.500	2320.000	547.900	2332.000
GR	558.800	2357.000	557.300	2471.000	555.500	2597.000	554.100	2710.000	553.100	2772.000
GR	553.100	2793.000	559.500	2814.000	562.000	2870.000	562.000	3002.000	565.300	3025.000
GR	574.500	3109.000	576.700	3118.000	576.700	3138.000	579.700	3158.000	589.900	3251.000
GR	589.900	3268.000	594.600	3293.000	594.900	3350.000	600.200	3428.000	0.0	0.0
NC	0.080	0.100	0.037	0.100	0.700	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	550.500	0.037	557.000	0.053	559.000	0.053	560.200	0.045
NV	560.300	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	4.400	0.0	0.0	0.0	0.0	0.0
X1	104.000	41.000	2193.000	2405.000	330.000	450.000	380.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.200	1000.000	590.000	1139.000	583.600	1202.000	575.300	1264.000	567.700	1318.000
GR	560.500	1361.000	558.600	1418.000	557.900	1511.000	559.000	1656.000	557.700	1732.000
GR	558.400	1754.000	558.800	1769.000	559.200	1820.000	559.900	1873.000	559.900	1902.000
GR	558.000	1951.000	555.600	2004.000	553.900	2063.000	552.200	2122.000	554.600	2141.000
GR	557.500	2155.000	557.500	2175.000	555.700	2193.000	550.600	2216.000	548.800	2222.000
GR	546.500	2228.000	543.000	2236.000	543.000	2293.000	543.000	2352.000	546.500	2367.000
GR	549.500	2380.000	555.300	2405.000	556.000	2455.000	558.900	2484.000	564.700	2530.000
GR	568.400	2577.000	569.200	2632.000	577.900	2651.000	586.500	2697.000	596.500	2755.000
GR	600.500	2795.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.0	0.0	0.300	0.800	0.0	0.0	0.0	0.0	0.0
NV	6.000	0.037	550.500	0.037	557.000	0.052	560.000	0.052	560.700	0.045
NV	560.800	0.045	575.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
X1	106.010	24.000	1913.000	2059.000	150.000	137.000	145.000	0.0	-0.500	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	556.000	559.200	0.0
GR	600.800	1000.000	590.600	1136.000	585.000	1199.000	583.900	1262.000	579.600	1321.000
GR	562.800	1367.000	560.200	1437.000	560.600	1454.000	560.100	1551.000	558.900	1633.000
GR	556.100	1674.000	555.900	1731.000	555.900	1756.000	555.100	1800.000	555.000	1869.000
GR	550.300	1913.000	541.500	1963.000	541.500	2044.000	549.000	2059.000	570.300	2097.000
GR	570.800	2105.000	571.100	2121.000	574.400	2128.000	601.600	2167.000	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
SB	0.900	1.500	3.000	0.0	144.000	7.500	1815.000	0.0	544.500	544.500
X1	106.020	0.0	0.0	0.0	30.000	30.000	30.000	0.0	0.0	0.0

X2	0.0	0.0	1.000	557.900	557.100	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	557.100	562.000	0.0
BT	12.000	1325.000	579.400	0.0	1373.000	561.800	0.0	1444.000	560.200	0.0
BT	1504.000	560.500	0.0	1645.000	557.100	0.0	1668.000	557.100	0.0	1794.000
BT	557.500	0.0	1857.000	557.900	0.0	1925.000	562.000	0.0	2069.000	562.000
BT	0.0	2102.000	563.000	0.0	2125.000	563.200	0.0	2155.000	575.100	0.0
NC	0.045	0.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1655.000	2059.000
X1	106.000	0.0	0.0	0.0	125.000	90.000	100.000	0.0	0.500	0.0
NC	0.050	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	107.000	29.000	1837.000	2071.000	570.000	810.000	755.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.300	1000.000	589.700	1122.000	580.500	1282.000	574.600	1310.000	568.600	1321.000
GR	558.500	1358.000	557.000	1419.000	555.800	1471.000	557.600	1499.000	557.600	1538.000
GR	557.600	1634.000	557.700	1703.000	556.800	1738.000	554.300	1769.000	554.900	1797.000
GR	561.400	1837.000	555.500	1858.000	550.400	1891.000	549.600	1936.000	549.000	1946.000
GR	547.000	1978.000	547.000	2006.000	547.000	2043.000	549.000	2056.000	550.400	2066.000
GR	557.000	2071.000	575.700	2087.000	575.700	2109.000	599.900	2138.000	0.0	0.0
NC	0.060	0.060	0.041	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	108.000	24.000	1703.000	1919.000	200.000	415.000	350.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	599.300	1000.000	589.100	1084.000	580.400	1148.000	574.200	1181.000	560.500	1239.000
GR	558.100	1303.000	558.100	1388.000	557.400	1491.000	554.700	1556.000	553.500	1622.000
GR	553.100	1663.000	561.100	1703.000	550.800	1738.000	549.800	1767.000	549.500	1775.000
GR	546.500	1836.000	549.500	1891.000	550.600	1905.000	555.100	1919.000	560.700	2009.000
GR	562.100	2048.000	562.100	2070.000	575.700	2081.000	600.700	2117.000	0.0	0.0
NC	0.055	0.080	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.400	0.0	0.0	0.0	0.0	0.0
X1	109.000	27.000	1458.000	1709.000	250.000	410.000	365.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GR	600.[illegible]	1000.000	575.000	1121.000	560.200	1189.000	559.700	1229.000	558.600	1304.000
GR	559.000	1371.000	556.900	1387.000	553.900	1418.000	554.200	1435.000	562.500	1458.000
GR	550.400	1487.000	550.000	1492.000	550.000	1496.000	550.000	1582.000	550.000	1701.000
GR	550.500	1703.000	552.100	1709.000	552.400	1761.000	559.700	1783.000	560.300	1849.000
GR	560.900	1950.000	555.600	1969.000	565.600	2008.000	565.600	2019.000	565.600	2028.000
GR	574.500	2049.000	600.400	2101.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	110.000	33.000	1095.000	1378.000	500.000	570.000	580.000	0.0	0.0	0.0
GR	605.300	1000.000	604.000	1009.000	585.200	1038.000	575.200	1054.000	565.300	1073.000
GR	555.800	1095.000	553.700	1101.000	552.500	1108.000	549.800	1124.000	549.800	1147.000
GR	549.800	1175.000	552.500	1201.000	554.100	1217.000	552.800	1266.000	552.200	1303.000
GR	551.500	1328.000	551.000	1346.000	551.500	1357.000	552.000	1369.000	554.000	1378.000
GR	552.900	1391.000	555.500	1421.000	556.000	1464.000	556.000	1506.000	555.100	1529.000
GR	560.300	1589.000	560.400	1654.000	560.700	1734.000	555.600	1754.000	570.500	1789.000
GR	570.500	1809.000	575.000	1820.000	599.400	1854.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	12.400	0.0	0.0	0.0	0.0	0.0
X1	111.000	33.000	1327.000	1507.000	570.000	410.000	550.000	0.0	0.0	0.0
GR	625.000	1000.000	600.000	1033.000	575.000	1065.000	557.500	1099.000	554.900	1112.000
GR	554.600	1119.000	554.600	1119.000	554.600	1119.000	554.900	1145.000	555.400	1186.000
GR	558.000	1229.000	559.900	1245.000	555.100	1270.000	557.500	1284.000	555.200	1309.000
GR	554.900	1327.000	554.500	1342.000	551.700	1392.000	554.500	1456.000	555.100	1466.000
GR	556.700	1507.000	556.400	1570.000	557.600	1625.000	556.500	1709.000	557.200	1787.000
GR	560.700	1841.000	561.300	1856.000	560.200	1880.000	570.200	1921.000	570.200	1940.000
GR	574.600	1944.000	600.300	1975.000	625.200	2024.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.100	1433.000	0.041	1625.000	0.100	1666.000	0.050	1713.000	0.100

NH	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1169.000	1940.000
X1	112.000	31.000	1433.000	1625.000	330.000	375.000	405.000	0.0	0.0	0.0
GR	624.800	1000.000	600.200	1030.000	574.700	1055.000	556.800	1102.000	557.900	1170.000
GR	561.200	1241.000	560.100	1328.000	556.400	1340.000	557.700	1372.000	557.300	1433.000
GR	556.000	1457.000	553.100	1496.000	553.100	1496.000	553.100	1590.000	556.000	1610.000
GR	558.300	1625.000	560.600	1656.000	556.000	1666.000	553.100	1672.000	553.100	1685.000
GR	553.100	1685.000	556.000	1703.000	557.500	1713.000	560.400	1803.000	561.000	1879.000
GR	562.500	1978.000	570.500	1998.000	570.500	2018.000	574.300	2036.000	599.300	2077.000
GR	624.700	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.500	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1160.000	1830.000
NH	5.000	0.100	1400.000	0.041	1535.000	0.100	1719.000	0.050	1770.000	0.100
NH	1978.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	113.000	38.000	1400.000	1535.000	95.000	250.000	100.000	0.0	0.0	0.0
GR	624.700	1000.000	600.600	1029.000	574.800	1056.000	557.100	1099.000	560.000	1140.000
GR	561.100	1205.000	561.400	1257.000	560.300	1349.000	558.400	1400.000	557.200	1430.000
GR	556.400	1438.000	551.500	1477.000	551.500	1477.000	551.500	1496.000	556.400	1529.000
GR	557.200	1535.000	560.800	1560.000	560.600	1600.000	560.400	1640.000	558.100	1659.000
GR	556.500	1670.000	552.200	1699.000	556.300	1712.000	558.700	1719.000	558.300	1740.000
GR	556.700	1748.000	556.200	1750.000	556.200	1754.000	556.200	1761.000	556.700	1762.000
GR	560.000	1770.000	560.300	1800.000	560.900	1840.000	570.500	1852.000	570.500	1874.000
GR	575.000	1889.000	600.400	1936.000	624.800	1978.000	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1256.000	2000.000
NH	5.000	0.100	1278.000	0.041	1424.000	0.100	1920.000	0.050	1982.000	0.100
NH	2118.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	114.000	39.000	1278.000	1424.000	460.000	660.000	550.000	0.0	0.0	0.0
GR	625.300	1000.000	598.900	1046.000	575.500	1099.000	560.200	1172.000	560.600	1180.000
GR	560.500	1189.000	561.400	1225.000	560.300	1254.000	558.500	1278.000	558.000	1288.000
GR	557.600	1295.000	558.000	1302.000	558.400	1311.000	557.700	1315.000	551.700	1349.000
GR	551.700	1360.000	551.700	1390.000	557.700	1409.000	558.800	1413.000	560.000	1424.000
GR	565.000	1454.000	565.500	1486.000	565.000	1518.000	563.100	1604.000	565.300	1680.000
GR	566.300	1741.000	564.100	1810.000	562.400	1875.000	559.500	1920.000	558.400	1930.000
GR	556.000	1952.000	556.000	1952.000	556.000	1977.000	558.400	1982.000	570.500	2003.000
GR	577.700	2022.000	574.800	2040.000	[illegible]	2070.000	624.100	2118.000	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1189.000	2230.000
NH	5.000	0.100	1189.000	0.041	1342.000	0.100	2150.000	0.050	2220.000	0.100
NH	2386.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	115.000	35.000	1189.000	1342.000	480.000	255.000	510.000	0.0	0.0	0.0
GR	625.300	1000.000	615.300	1079.000	611.800	1110.000	599.500	1132.000	574.300	1175.000
GR	565.000	1189.000	560.100	1196.000	559.500	1208.000	555.500	1251.000	559.500	1300.000
GR	560.200	1312.000	565.300	1342.000	566.100	1382.000	566.400	1455.000	565.800	1520.000
GR	566.100	1590.000	566.500	1655.000	567.100	1734.000	566.300	1801.000	563.400	1850.000
GR	564.100	1875.000	563.700	1935.000	563.000	2020.000	561.500	2100.000	559.500	2150.000
GR	558.600	2157.000	555.000	2180.000	558.600	2209.000	560.000	2220.000	562.300	2232.000
GR	570.500	2259.000	570.500	2280.000	574.800	2296.000	600.100	2320.000	625.300	2386.000
NC	0.080	0.080	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
FT	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1283.000	2705.000
NH	5.000	0.080	1283.000	0.041	1375.000	0.100	2639.000	0.050	2691.000	0.100
NH	2942.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	116.000	56.000	1283.000	1375.000	250.000	280.000	265.000	0.0	0.0	0.0
GR	624.800	1000.000	624.200	1012.000	623.500	1021.000	620.000	1038.000	615.100	1087.000
GR	605.200	1150.000	604.400	1165.000	604.100	1172.000	600.000	1196.000	575.400	1238.000
GR	562.400	1283.000	561.500	1290.000	560.600	1294.000	553.000	1331.000	553.000	1331.000
GR	553.000	1346.000	560.600	1366.000	563.800	1375.000	567.000	1399.000	566.600	1423.000
GR	565.800	1459.000	567.700	1493.000	570.100	1541.000	570.500	1620.000	570.300	1674.000
GR	568.400	1747.000	567.800	1794.000	565.400	1850.000	564.000	1903.000	563.400	1950.000
GR	564.100	1988.000	564.400	2052.000	564.800	2112.000	565.200	2192.000	565.100	2308.000
GR	564.700	2351.000	564.400	2402.000	564.000	2444.000	563.100	2509.000	563.800	2542.000

GR	562.300	2569.000	560.800	2611.000	559.700	2639.000	559.000	2641.000	556.000	2647.000
GR	556.000	2662.000	556.000	2670.000	559.000	2684.000	560.300	2691.000	570.700	2730.000
GR	570.700	2750.000	571.800	2783.000	575.300	2804.000	599.600	2835.000	610.900	2880.000
GR	625.300	2942.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.080	2303.000	0.041	2473.000	0.080	3802.000	0.050	3870.000	0.080
NH	3992.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2303.000	3870.000
X1	117.000	67.000	2303.000	2473.000	650.000	175.000	525.000	0.0	0.0	0.0
GR	624.600	1000.000	620.100	1071.000	600.400	1120.000	600.400	1150.000	600.200	1166.000
GR	595.300	1207.000	592.400	1241.000	589.800	1281.000	589.800	1295.000	584.900	1402.000
GR	588.300	1416.000	588.400	1450.000	586.000	1481.000	585.300	1562.000	575.400	1595.000
GR	573.200	1644.000	572.600	1662.000	572.600	1820.000	571.500	1833.000	571.500	1922.000
GR	571.500	1963.000	571.500	2048.000	571.500	2070.000	571.500	2080.000	570.500	2103.000
GR	570.100	2164.000	568.300	2203.000	568.300	2266.000	567.500	2303.000	565.300	2351.000
GR	564.200	2356.000	562.000	2359.000	553.700	2370.000	553.700	2381.000	553.700	2381.000
GR	562.000	2402.000	564.300	2410.000	565.100	2420.000	570.000	2473.000	570.300	2522.000
GR	571.100	2580.000	570.300	2620.000	570.100	2700.000	569.400	2755.000	568.800	2830.000
GR	560.600	2894.000	566.400	2943.000	565.800	2990.000	566.000	3040.000	567.500	3100.000
GR	566.000	3150.000	567.500	3201.000	566.500	3400.000	566.500	3600.000	565.800	3788.000
GR	565.000	3802.000	560.500	3814.000	559.200	3822.000	557.000	3835.000	557.000	3842.000
GR	557.000	3856.000	559.200	3858.000	572.500	3870.000	572.500	3890.000	575.000	3904.000
GR	574.800	3931.000	625.300	3992.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.100	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
NH	5.000	0.080	2041.000	0.039	2242.000	0.080	3615.000	0.050	3723.000	0.090
NH	3835.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	2041.000	3723.000
X1	118.000	48.000	2041.000	2242.000	270.000	250.000	265.000	0.0	0.0	0.0
GR	625.200	1000.000	616.300	1041.000	604.300	1102.000	604.100	1108.000	604.100	1142.000
GR	601.300	1151.000	595.100	1205.000	592.800	1267.000	592.800	1277.000	591.100	1296.000
GR	586.200	1391.000	586.200	1422.000	584.300	1439.000	582.500	1501.000	581.800	1551.000
GR	574.800	1591.000	573.800	1600.000	574.900	1603.000	576.100	1621.000	574.200	1644.000
GR	570.100	1682.000	574.100	1722.000	574.100	1743.000	572.800	1762.000	570.500	1800.000
GR	572.300	1891.000	572.100	1903.000	570.900	1958.000	572.100	2000.000	571.900	2041.000
GR	570.100	2050.000	564.500	2068.000	562.500	2072.000	560.700	2077.000	560.700	2210.000
GR	570.000	2242.000	570.500	2455.000	570.000	2668.000	566.000	3348.000	568.000	3595.000
GR	568.000	3615.000	560.000	3644.000	558.000	3670.000	558.000	3705.000	568.000	3723.000
GR	575.000	3736.000	575.000	3760.000	625.000	3835.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	119.000	60.000	1892.000	2103.000	435.000	390.000	420.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	573.100	560.000	0.0
GR	625.300	1000.000	611.100	1104.000	605.400	1166.000	603.500	1179.000	603.500	1195.000
GR	600.300	1275.000	594.800	1325.000	592.500	1371.000	589.700	1412.000	586.200	1468.000
GR	580.300	1544.000	579.800	1551.000	579.800	1603.000	579.800	1607.000	579.800	1635.000
GR	577.200	1644.000	577.200	1681.000	577.000	1690.000	574.600	1712.000	572.500	1751.000
GR	572.500	1763.000	570.500	1810.000	571.100	1881.000	573.100	1892.000	565.400	1917.000
GR	563.400	1928.000	561.400	1940.000	561.400	1982.000	561.400	2022.000	563.400	2037.000
GR	564.200	2044.000	572.500	2103.000	571.300	2211.000	570.000	2350.000	567.900	2709.000
GR	566.700	2944.000	567.600	3022.000	568.100	3167.000	567.900	3182.000	562.300	3209.000
GR	560.700	3214.000	559.200	3219.000	559.200	3230.000	559.200	3238.000	560.700	3247.000
GR	561.900	3254.000	567.500	3282.000	567.000	3396.000	566.800	3437.000	566.400	3593.000
GR	564.700	3672.000	560.800	3727.000	559.700	3735.000	560.300	3743.000	574.500	3772.000
GR	574.500	3792.000	576.300	3802.000	582.600	3812.000	599.300	3828.000	626.100	3874.000
ET	0.0	0.0	0.0	0.0	16.400	0.0	0.0	0.0	0.0	0.0
X1	120.000	53.000	1379.000	1569.000	795.000	660.000	765.000	0.0	0.0	0.0
GR	625.600	1000.000	616.300	1029.000	614.100	1068.000	611.200	1087.000	611.000	1099.000
GR	597.500	1140.000	597.300	1163.000	595.700	1166.000	594.700	1201.000	593.100	1252.000
GR	576.500	1296.000	576.500	1308.000	576.500	1314.000	576.500	1340.000	575.200	1379.000
GR	568.900	1401.000	565.800	1418.000	563.000	1433.000	563.000	1468.000	563.000	1500.000
GR	565.800	1520.000	566.900	1528.000	573.500	1569.000	572.900	1720.000	572.000	1912.000
GR	569.800	2206.000	566.000	2380.000	567.300	2417.000	564.600	2440.000	563.400	2444.000
GR	560.800	2453.000	560.800	2460.000	560.800	2460.000	563.400	2473.000	564.200	2480.000

GR	568.200	2499.000	567.400	2609.000	568.100	2690.000	565.300	2804.000	564.400	[illegible]
GR	566.300	2851.000	568.300	3022.000	566.100	3198.000	565.600	3262.000	562.700	3314.000
GR	560.800	3319.000	561.500	3323.000	562.700	3388.000	573.100	3431.000	573.300	3451.000
GR	576.700	3459.000	599.400	3483.000	626.100	3535.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	121.000	45.000	1244.000	1379.000	850.000	780.000	840.000	0.0	0.0	0.0
GR	625.400	1000.000	612.100	1052.000	601.900	1105.000	599.700	1127.000	599.200	1157.000
GR	580.400	1187.000	580.400	1194.000	568.900	1244.000	564.500	1249.000	564.000	1250.000
GR	564.000	1311.000	564.000	1370.000	564.500	1371.000	570.000	1379.000	572.800	1404.000
GR	571.400	1563.000	570.500	1748.000	571.200	1897.000	572.800	1953.000	574.100	2109.000
GR	572.800	2212.000	570.800	2325.000	567.700	2364.000	564.800	2390.000	564.000	2399.000
GR	562.100	2418.000	564.000	2437.000	564.800	2445.000	567.200	2477.000	566.800	2550.000
GR	564.600	2616.000	566.900	2667.000	567.500	2802.000	568.000	2998.000	567.200	3145.000
GR	568.200	3398.000	570.600	3434.000	568.300	3442.000	566.800	3449.000	567.300	3455.000
GR	577.900	3472.000	577.900	3488.000	580.100	3500.000	601.300	3522.000	624.700	3561.000
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	48800.000	87000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	122.000	51.000	1261.000	1352.000	720.000	650.000	715.000	0.0	0.0	0.0
GR	624.300	1000.000	605.300	1067.000	602.800	1074.000	602.800	1094.000	582.700	1128.000
GR	582.600	1135.000	581.100	1150.000	572.800	1176.000	576.700	1231.000	574.800	1252.000
GR	573.400	1261.000	570.500	1267.000	565.000	1278.000	565.000	1303.000	565.000	1325.000
GR	570.500	1342.000	573.600	1352.000	575.200	1383.000	576.700	1432.000	573.800	1530.000
GR	575.500	1575.000	576.100	1789.000	575.600	1982.000	574.800	2066.000	574.100	2200.000
GR	573.800	2301.000	571.900	2450.000	568.900	2533.000	563.200	2567.000	570.800	2590.000
GR	567.100	2603.000	565.500	2609.000	563.000	2619.000	563.000	2628.000	563.000	2638.000
GR	565.500	2648.000	568.100	2658.000	572.300	2710.000	568.800	2750.000	569.200	2879.000
GR	567.200	3066.000	568.300	3188.000	570.100	3358.000	578.200	3412.000	581.300	3448.000
GR	580.200	3464.000	580.300	3483.000	598.100	3512.000	598.100	3530.000	599.800	3537.000
GR	624.700	3597.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	20000.000	38000.000	48800.000	42400.000	87000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	17.400	0.0	0.0	0.0	0.0	0.0
X1	123.000	43.000	1328.000	1502.000	550.000	600.000	545.000	0.0	0.0	0.0
GR	624.800	1000.000	610.300	1039.000	608.200	1073.000	603.100	1105.000	594.600	1199.000
GR	594.600	1222.000	594.800	1239.000	574.600	1278.000	573.900	1311.000	573.300	1328.000
GR	571.100	1335.000	567.000	1350.000	567.000	1408.000	567.000	1470.000	571.100	1478.000
GR	575.200	1487.000	578.300	1502.000	576.100	1575.000	574.100	1648.000	573.500	1950.000
GR	574.000	2200.000	573.500	2450.000	574.200	2738.000	573.500	2922.000	572.000	3100.000
GR	570.700	3132.000	567.000	3147.000	564.700	3156.000	564.700	3167.000	564.700	3178.000
GR	567.000	3188.000	568.800	3195.000	573.100	3218.000	571.400	[illegible]	571.500	3400.000
GR	573.100	3550.000	582.100	3580.000	582.100	3601.000	582.100	3629.000	583.500	3675.000
GR	584.100	3709.000	599.800	3738.000	624.800	3778.000	0.0	0.0	0.0	0.0
NC	0.080	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	17200.000	32900.000	42400.000	42400.000	77000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	11.400	0.0	0.0	0.0	0.0	0.0
X1	123.500	34.000	1328.000	1545.000	300.000	1500.000	300.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	573.300	579.000	0.0
GR	624.800	1000.000	610.300	1039.000	608.200	1073.000	603.100	1105.000	594.600	1199.000
GR	594.600	1222.000	594.800	1239.000	574.600	1278.000	573.900	1311.000	573.300	1328.000
GR	571.100	1335.000	567.000	1350.000	567.000	1408.000	567.000	1470.000	571.100	1478.000
GR	575.200	1487.000	581.000	1545.000	580.000	1580.000	575.000	1880.000	573.500	2580.000
GR	575.000	2700.000	573.500	2850.000	575.000	2930.000	572.000	3170.000	575.000	3500.000
GR	580.000	3700.000	578.000	4100.000	580.000	4270.000	580.000	4470.000	590.000	4680.000
GR	590.000	4710.000	595.000	5450.000	600.000	5580.000	625.000	5700.000	0.0	0.0
NC	0.080	0.080	0.039	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	124.000	39.000	1266.000	1556.000	320.000	350.000	320.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	592.800	579.500	0.0
GR	629.300	1000.000	611.800	1056.000	599.800	1075.000	583.000	1096.000	583.000	[illegible]

GR	575.300	1127.000	580.500	1160.000	577.100	1179.000	575.700	1187.000	580.300	1196.000
GR	592.800	1266.000	590.700	1310.000	589.300	1326.000	580.700	1350.000	575.700	1371.000
GR	571.800	1387.000	568.000	1403.000	568.000	1443.000	568.000	1502.000	571.800	1513.000
GR	574.100	1520.000	585.500	1556.000	587.000	1856.000	582.500	2101.000	581.000	2400.000
GR	575.000	2700.000	573.000	2830.000	575.000	2930.000	580.000	3300.000	580.000	3480.000
GR	577.500	3650.000	580.000	3730.000	581.000	4050.000	585.000	4480.000	590.000	4530.000
GR	590.000	4560.000	595.000	5200.000	600.000	5330.000	625.000	5520.000	0.0	0.0
X1	124.100	0.0	0.0	0.0	115.000	350.000	115.000	0.0	0.600	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	593.400	580.100	0.0
NC	0.080	0.080	0.041	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	126.010	39.000	1269.000	1425.000	115.000	350.000	115.000	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	591.000	581.500	0.0
GR	630.400	1000.000	630.200	1009.000	624.400	1029.000	600.500	1100.000	594.200	1108.000
GR	580.700	1138.000	581.700	1238.000	581.700	1251.000	575.900	1269.000	575.900	1269.000
GR	568.000	1334.000	568.000	1347.000	568.000	1393.000	576.600	1408.000	577.600	1425.000
GR	577.600	1425.000	580.000	1440.000	580.000	3590.000	592.000	3618.000	592.000	3638.000
GR	592.300	3655.000	593.900	3691.000	594.100	3814.000	594.500	3913.000	594.700	4001.000
GR	594.800	4071.000	594.900	4144.000	594.800	4231.000	594.500	4333.000	594.600	4430.000
GR	594.900	4481.000	597.600	4558.000	598.900	4653.000	598.900	4744.000	599.800	4782.000
GR	603.800	4843.000	609.600	4901.000	620.500	4960.000	630.200	5032.000	0.0	0.0
SB	0.900	1.500	3.000	0.0	106.000	6.000	2470.000	1.280	568.000	568.000
X1	126.020	0.0	0.0	0.0	80.000	80.000	80.000	0.0	0.0	0.0
X2	0.0	0.0	1.000	584.700	585.500	0.0	0.0	0.0	0.0	0.0
X3	10.000	0.0	0.0	0.0	0.0	0.0	0.0	593.100	585.500	0.0
BT	42.000	1157.000	595.300	0.0	1184.000	590.500	0.0	1216.000	594.200	0.0
BT	1239.000	594.200	0.0	1335.000	593.700	0.0	1508.000	592.500	0.0	1594.000
BT	592.100	0.0	1667.000	591.900	0.0	1716.000	591.700	0.0	1813.000	591.500
BT	0.0	1883.000	591.200	0.0	1932.000	590.700	0.0	2043.000	589.500	0.0
BT	2184.000	589.200	0.0	2312.000	588.500	0.0	2418.000	587.900	0.0	2567.000
BT	587.100	0.0	2727.000	586.700	0.0	2814.000	586.400	0.0	2912.000	586.100
BT	0.0	3051.000	585.900	0.0	3161.000	585.500	0.0	3374.000	585.500	0.0
BT	3497.000	585.500	0.0	3612.000	585 500	0.0	3745.000	585.500	0.0	3869.000
BT	586.100	0.0	3967.000	586.600	0.0	4057.000	588.000	0.0	4210.000	592.000
BT	0.0	4227.000	592.300	0.0	4263.000	593.900	0.0	4386.000	594.100	0.0
BT	4485.000	594.500	0.0	4573.000	594.700	0.0	4643.000	594.800	0.0	4716.000
BT	594.900	0.0	4803.000	594.800	0.0	4905.000	594.500	0.0	5002.000	594.600
BT	0.0	5053.000	594.900	0.0	5130.000	597.600	0.0	0.0	0.0	0.0
NC	0.100	0.060	0.039	0.300	0.800	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	127.000	42.000	1103.000	1254.000	900.000	100.000	835.000	0.0	0.0	0.0
GR	630.400	1000.000	607.500	1047.000	582.800	1087.000	582.800	1103.000	575.700	1117.000
GR	574.500	1127.000	570.500	1160.000	570.500	1176.000	570.500	1179.000	574.500	1228.000
GR	575.400	1239.000	578.900	1254.000	581.000	1295.000	580.900	1392.000	581.900	1524.000
GR	580.500	1632.000	581.300	1674.000	580.100	1730.000	579.600	1805.000	584.500	1895.000
GR	584.500	3065.000	592.000	3093.000	592.000	3113.000	592.300	3702.000	593.900	3738.000
GR	594.100	3861.000	594.500	3960.000	594.700	4048.000	594.800	4118.000	594.900	4191.000
GR	594.800	4278.000	594.500	4380.000	594.600	4477.000	594.900	4528.000	597.600	4605.000
GR	598.900	4700.000	598.900	4791.000	599.800	4829.000	603.800	4890.000	609.600	4948.000
GR	620.500	5007.000	630.200	5079.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.100	0.080	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	128.000	50.000	1111.000	1250.000	750.000	350.000	750.000	0.0	0.0	0.0
GR	650.300	1000.000	625.600	1027.000	600.200	1066.000	583.400	1092.000	583.400	1111.000
GR	576.200	1129.000	572.000	1139.000	572.000	1189.000	572.000	1226.000	576.200	1244.000
GR	577.600	1250.000	581.200	1278.000	582.300	1323.000	583.100	1394.000	583.300	1454.000
GR	583.500	1509.000	580.100	1522.000	580.100	1580.000	580.300	1642.000	580.600	1721.000
GR	582.200	1801.000	583.100	1877.000	583.800	1892.000	583.000	1905.000	580.100	1960.000
GR	580.700	2025.000	582.800	2066.000	585.500	2116.000	585.500	2551.000	592.000	2579.000
GR	592.000	2599.000	592.300	3188.000	593.900	3224.000	594.100	3347.000	594.500	3446.000
GR	594.700	3534.000	594.800	3604.000	594.900	3677.000	594.800	3764.000	594.500	3866.000

GR	594.600	3963.000	594.900	4014.000	597.600	4091.000	598.900	4186.000	598.900	4277.000
GR	599.800	4315.000	603.800	4376.000	609.600	4434.000	620.500	4493.000	630.200	4565.000
NC	0.100	0.090	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	129.000	44.000	1144.000	1265.000	390.000	475.000	415.000	0.0	0.0	0.0
GR	650.300	1000.000	625.600	1039.000	599.000	1083.000	585.300	1103.000	585.300	1122.000
GR	578.500	1144.000	576.600	1158.000	573.500	1180.000	573.500	1200.000	573.500	1220.000
GR	576.500	1251.000	577.900	1265.000	579.800	1298.000	581.600	1332.000	579.100	1357.000
GR	578.400	1377.000	581.000	1424.000	581.500	1476.000	582.400	1503.000	580.100	1532.000
GR	581.100	1578.000	582.700	1649.000	581.900	1707.000	582.300	1815.000	582.500	2002.000
GR	583.900	2092.000	584.300	2225.000	582.700	2302.000	592.200	2346.000	592.200	2368.000
GR	594.100	2383.000	594.400	2511.000	594.700	2689.000	594.800	2835.000	594.900	2933.000
GR	594.800	3081.000	594.900	3151.000	598.000	3242.000	598.100	3344.000	598.400	3415.000
GR	602.500	3479.000	609.900	3551.000	621.500	3632.000	630.600	3736.000	0.0	0.0
NC	0.100	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	130.000	57.000	1066.000	1180.000	620.000	880.000	632.000	0.0	0.0	0.0
GR	650.500	1000.000	625.600	1015.000	600.200	1024.000	589.400	1042.000	589.100	1057.000
GR	584.200	1066.000	578.000	1073.000	572.000	1104.000	578.000	1141.000	579.200	1154.000
GR	583.000	1180.000	578.700	1200.000	583.200	1237.000	584.700	1281.000	584.700	1355.000
GR	584.500	1416.000	584.900	1487.000	584.600	1564.000	584.900	1612.000	584.900	1669.000
GR	585.800	1719.000	585.400	1781.000	586.100	1827.000	587.500	1887.000	586.400	1946.000
GR	587.000	2001.000	587.400	2058.000	587.700	2118.000	584.800	2193.000	584.400	2270.000
GR	584.100	2372.000	585.300	2468.000	585.800	2561.000	586.100	2660.000	586.300	2765.000
GR	586.100	2803.000	595.300	2827.000	595.300	2850.000	595.300	2885.000	595.300	2975.000
GR	603.800	3000.000	605.200	3052.000	606.400	3133.000	604.900	3207.000	604.900	3255.000
GR	606.000	3276.000	607.800	3382.000	608.100	3450.000	609.700	3514.000	610.800	3589.000
GR	614.000	3633.000	614.800	3660.000	616.400	3686.000	622.[illegible]00	3747.000	627.700	3772.000
GR	636.400	3800.000	649.800	3853.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	131.000	69.000	1943.000	2075.000	500.000	550.000	800.000	0.0	0.0	0.0
GR	635.100	1000.000	624.900	1024.000	607.000	1073.000	589.400	1113.000	589.400	1122.000
GR	579.700	1137.000	577.000	1141.000	579.700	1150.000	582.900	1161.000	586.600	1191.000
GR	586.600	1296.000	586.900	1417.000	586.900	1546.000	588.000	1631.000	588.200	1755.000
GR	589.500	1841.000	589.000	1923.000	584.700	1943.000	581.600	1955.000	577.000	1974.000
GR	577.000	2002.000	577.000	2019.000	581.600	2063.000	582.800	2075.000	584.900	2103.000
GR	584.900	2161.000	584.900	2218.000	583.700	2244.000	584.600	2282.000	582.000	2304.000
GR	584.700	2325.000	586.700	2348.000	585.500	2377.000	585.100	2396.000	586.600	2416.000
GR	588.000	2435.000	585.600	2455.000	587.000	2487.000	587.000	2535.000	586.400	2581.000
GR	586.400	2640.000	587.400	2701.000	587.800	2774.000	588.600	2822.000	587.700	2937.000
GR	587.900	3006.000	587.900	3076.000	590.200	3138.000	589.800	3189.000	588.200	3227.000
GR	596.600	3251.000	596.600	3256.000	600.700	3273.000	600.200	3302.000	600.800	3330.000
GR	604.400	3350.000	605.600	3412.000	606.900	3526.000	608.000	3618.000	612.500	3751.000
GR	612.900	3824.000	613.500	3882.000	613.300	3897.000	613.800	3923.000	614.900	3967.000
GR	615.700	3988.000	625.200	4030.000	636.500	4072.000	650.600	4135.000	0.0	0.0
NC	0.050	0.090	0.041	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	132.000	69.000	2301.000	2492.000	340.000	250.000	550.000	0.0	0.0	0.0
GR	637.400	1000.000	614.800	1033.000	589.700	1090.000	589.700	1102.000	582.400	1117.000
GR	580.500	1121.000	582.400	1131.000	585.400	1148.000	586.800	1200.000	587.300	1269.000
GR	588.200	1344.000	588.100	1451.000	588.500	1585.000	589.700	1688.000	589.600	1768.000
GR	587.400	1847.000	586.900	1878.000	589.600	1930.000	588.400	2005.000	587.400	2086.000
GR	586.600	2132.000	587.400	2146.000	589.400	2198.000	589.800	2284.000	589.400	2301.000
GR	586.600	2315.000	584.500	2322.000	580.000	2339.000	584.500	2360.000	586.000	2371.000
GR	586.300	2372.000	584.500	2379.000	580.000	2395.000	580.000	2417.000	580.000	2430.000
GR	584.500	2470.000	586.000	2483.000	586.800	2492.000	587.400	2565.000	588.300	2597.000
GR	587.200	2684.000	585.600	2715.000	588.000	2755.000	587.500	2819.000	589.200	2872.000
GR	590.200	2941.000	590.800	3001.000	590.600	3089.000	590.400	3130.000	587.100	3173.000
GR	587.600	3194.000	606.000	3254.000	606.600	3332.000	607.600	3373.000	606.000	3386.000
GR	606.000	3413.000	605.600	3422.000	608.300	3455.000	608.700	3538.000	609.900	3595.000
GR	612.200	3670.000	614.800	3803.000	616.700	3905.000	617.200	4005.000	618.200	4036.000

GR	618.200	4056.000	625.900	4075.000	637.400	4112.000	649.800	4154.000	0.0	0.0
NC	0.060	0.100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
X1	133.000	92.000	3156.000	3387.000	345.000	210.000	560.000	0.0	0.0	0.0
GR	635.400	1000.000	613.800	1033.000	599.900	1059.000	588.000	1087.000	588.000	1102.000
GR	584.900	1118.000	584.500	1134.000	583.800	1148.000	583.100	1162.000	583.800	1168.000
GR	585.400	1183.000	587.500	1209.000	589.800	1292.000	589.500	1382.000	589.800	1453.000
GR	589.800	1571.000	589.800	1663.000	589.900	1767.000	589.300	1868.000	588.800	1968.000
GR	590.400	2045.000	591.100	2078.000	589.600	2124.000	589.200	2144.000	590.600	2170.000
GR	591.600	2216.000	590.100	2272.000	589.200	2337.000	589.100	2388.000	590.400	2454.000
GR	590.800	2534.000	591.000	2566.000	589.200	2590.000	587.000	2600.000	586.400	2603.000
GR	586.400	2642.000	587.000	2646.000	589.600	2666.000	591.300	2692.000	589.300	2733.000
GR	595.100	2775.000	593.100	2816.000	591.600	2887.000	590.800	2896.000	586.500	2910.000
GR	586.400	2911.000	586.400	2925.000	586.500	2926.000	587.200	2937.000	589.600	2950.000
GR	587.800	2976.000	589.400	2997.000	589.300	3048.000	589.300	3127.000	587.800	3156.000
GR	586.400	3165.000	587.700	3174.000	586.200	3190.000	580.800	3260.000	586.200	3316.000
GR	586.600	3323.000	587.100	3337.000	586.200	3356.000	585.500	3372.000	586.200	3375.000
GR	588.900	3387.000	590.700	3414.000	590.500	3503.000	590.500	3599.000	586.100	3664.000
GR	586.100	3680.000	595.800	3730.000	596.200	3775.000	596.800	3800.000	604.700	3837.000
GR	605.100	3882.000	604.700	3932.000	605.300	3972.000	610.700	3989.000	612.600	4021.000
GR	605.400	4048.000	609.700	4107.000	610.400	4160.000	614.200	4215.000	614.800	4292.000
GR	615.700	4397.000	616.500	4478.000	620.100	4494.000	620.100	4513.000	625.800	4533.000
GR	637.000	4572.000	650.500	4619.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.080	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
X1	134.000	61.000	3259.000	3372.000	200.000	920.000	865.000	0.0	0.0	0.0
GR	637.800	1000.000	625.200	1018.000	600.300	1057.000	589.400	1091.000	589.400	1105.000
GR	584.800	1122.000	584.200	1132.000	583.800	1139.000	584.200	1146.000	585.200	1160.000
GR	588.300	1184.000	587.500	1308.000	588.300	1371.000	589.700	1450.000	590.400	1531.000
GR	591.000	1648.000	590.800	1718.000	591.900	1833.000	592.800	1889.000	590.200	1934.000
GR	591.300	2018.000	591.900	2049.000	590.700	2075.000	590.700	2140.000	591.100	2159.000
GR	590.200	2175.000	591.000	2190.000	592.400	2241.000	591.500	2333.000	589.600	2378.000
GR	590.400	2406.000	589.400	2441.000	590.700	2490.000	591.200	2550.000	590.100	2600.000
GR	588.700	2616.000	587.400	2627.000	586.200	2638.000	587.400	2650.000	589.400	2670.000
GR	589.700	2705.000	588.200	2742.000	592.100	2790.000	595.700	2846.000	589.900	2946.000
GR	591.500	3072.000	591.400	3156.000	590.900	3239.000	589.600	3259.000	588.700	3272.000
GR	581.000	3318.000	588.800	3363.000	592.200	3372.000	610.300	3410.000	611.900	3432.000
GR	609.300	3458.000	610.800	3499.000	610.800	3518.000	625.000	3544.000	636.400	3582.000
GR	650.200	3623.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.070	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	135.000	60.000	3257.000	3387.000	600.000	645.000	625.000	0.0	0.0	0.0
GR	638.600	1000.000	625.800	1034.000	599.700	1095.000	590.800	1131.000	590.800	1146.000
GR	590.100	1169.000	590.800	1225.000	592.600	1304.000	591.900	1373.000	591.000	1407.000
GR	591.500	1457.000	592.300	1515.000	592.700	1612.000	592.900	1668.000	591.600	1717.000
GR	589.300	1727.000	588.600	1730.000	589.300	1752.000	590.000	1775.000	592.400	1831.000
GR	593.800	1862.000	593.000	1935.000	590.800	2026.000	593.100	2081.000	595.000	2150.000
GR	594.100	2254.000	592.000	2398.000	591.100	2514.000	589.700	2537.000	588.500	2559.000
GR	587.600	2575.000	588.500	2586.000	589.800	2602.000	592.000	2637.000	592.900	2660.000
GR	590.300	2678.000	588.900	2696.000	588.400	2702.000	588.900	2711.000	590.200	2734.000
GR	595.300	2778.000	595.600	2882.000	596.000	2979.000	595.500	3095.000	595.100	3107.000
GR	596.100	3138.000	595.700	3204.000	594.900	3257.000	593.300	3278.000	590.700	3288.000
GR	585.000	3312.000	585.000	3336.000	585.000	3359.000	590.700	3378.000	593.300	3387.000
GR	616.400	3425.000	618.900	3440.000	618.900	3458.000	625.300	3474.000	650.600	3512.000
NC	0.0	0.090	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	4.400	0.0	0.0	0.0	0.0	0.0
X1	136.000	60.000	2989.000	3168.000	380.000	635.000	575.000	0.0	0.0	0.0
GR	637.300	1000.000	624.800	1058.000	599.600	1106.000	593.200	1152.000	593.200	1166.000
GR	591.100	1196.000	593.900	1285.000	592.500	1408.000	593.200	1547.000	592.900	1630.000
GR	589.200	1719.000	590.000	1790.000	589.600	1809.000	588.600	1816.000	586.000	1834.000
GR	586.000	1841.000	588.600	1853.000	591.400	1866.000	594.800	1900.000	592.600	1948.000
GR	592.100	2031.000	594.000	2092.000	595.600	2185.000	595.200	2240.000	593.800	2324.000
GR	593.800	2410.000	593.000	2454.000	589.000	2475.000	592.900	2511.000	588.800	2569.000
GR	591.300	2599.000	593.200	2630.000	588.600	2650.000	592.200	2675.000	595.200	2722.000

GR	595.300	2837.000	595.200	2930.000	595.100	2970.000	593.800	2989.000	592.000	3002.000
GR	586.000	3045.000	586.000	3075.000	586.000	3076.000	592.000	3150.000	593.500	3168.000
GR	593.800	3215.000	605.000	3270.000	605.200	3290.000	608.000	3297.000	611.100	3346.000
GR	612.900	3447.000	614.600	3509.000	614.600	3547.000	615.500	3568.000	616.800	3621.000
GR	619.700	3665.000	619.700	3677.000	622.000	3700.000	637.000	3746.000	649.300	3795.000
NC	0.060	0.050	0.039	0.100	0.300	0.0	0.0	0.0	599.376	0.0
ET	0.0	0.0	0.0	0.0	8.400	0.0	0.0	0.0	0.0	0.0
X1	137.000	52.000	2476.000	2678.000	310.000	580.000	600.000	0.0	0.0	0.0
GR	637.700	1000.000	624.800	1058.000	600.300	1100.000	596.200	1117.000	596.200	1140.000
GR	594.100	1192.000	594.600	1307.000	594.700	1413.000	594.800	1519.000	594.400	1620.000
GR	594.800	1706.000	593.200	1725.000	592.700	1791.000	593.100	1828.000	590.200	1847.000
GR	590.200	1861.000	592.600	1878.000	593.700	1891.000	592.800	1922.000	594.300	1967.000
GR	594.300	2028.000	594.800	2090.000	595.500	2150.000	595.500	[illegible]	595.300	2296.000
GR	595.100	2367.000	595.200	2431.000	594.800	2476.000	593.600	2489.000	592.400	2503.000
GR	586.500	2572.000	592.400	2637.000	595.300	2678.000	595.900	2777.000	595.700	2867.000
GR	595.100	2898.000	594.100	2930.000	592.900	2949.000	594.400	2961.000	596.200	3004.000
GR	600.300	3069.000	601.300	3128.000	605.300	3192.000	605.300	3205.000	607.100	3246.000
GR	610.300	3304.000	612.200	3389.000	612.200	3415.000	614.400	3459.000	615.600	3515.000
GR	630.200	3588.000	649.700	3653.000	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.070	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1375.000	2535.000
X1	138.000	56.000	1999.000	2180.000	365.000	650.000	615.000	0.0	0.0	0.0
GR	639.000	1000.000	624.800	1062.000	598.500	1101.000	597.700	1128.000	592.200	1159.000
GR	594.100	1212.000	595.200	1289.000	594.900	1374.000	594.500	1449.000	594.500	1559.000
GR	593.900	1624.000	594.800	1689.000	594.100	1770.000	592.200	1788.000	591.000	1803.000
GR	590.200	1818.000	594.900	1844.000	595.500	1897.000	593.900	1912.000	595.100	1950.000
GR	594.800	1999.000	593.900	2012.000	592.900	2021.000	588.500	2075.000	592.900	2146.000
GR	593.300	2158.000	594.700	2180.000	594.800	2191.000	593.100	2199.000	588.800	2218.000
GR	593.100	2234.000	594.400	2239.000	595.100	2255.000	595.100	2292.000	595.500	2369.000
GR	595.000	2449.000	593.000	2464.000	594.700	2478.000	596.100	2530.000	600.300	2602.000
GR	595.600	2657.000	596.200	2709.000	600.800	2790.000	600.500	2882.000	600.300	2956.000
GR	600.100	3027.000	596.800	3088.000	596.800	3134.000	596.800	3167.000	598.300	3180.000
GR	594.200	3196.000	606.600	3220.000	606.600	3254.000	619.400	3287.000	630.100	3328.000
GR	650.200	3393.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.050	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1285.000	2370.000
X1	139.000	54.000	1518.000	1724.000	585.000	490.000	590.000	0.0	0.0	0.0
GR	642.700	1000.000	625.800	1057.000	600.800	1094.000	600.800	1111.000	595.600	1132.000
GR	598.300	1169.000	600.200	1232.000	599.800	1273.000	600.300	1328.000	598.900	1401.000
GR	600.500	1451.000	599.800	1489.000	599.400	1518.000	596.400	1542.000	594.200	1564.000
GR	593.400	1571.000	589.000	1611.000	589.000	1626.000	589.000	1665.000	593.400	1696.000
GR	594.800	1706.000	596.100	1724.000	595.600	1755.000	595.500	1784.000	593.600	1801.000
GR	591.600	1817.000	593.600	1825.000	595.800	1834.000	595.400	1866.000	595.100	1917.000
GR	594.000	1947.000	594.200	1962.000	595.300	1998.000	597.800	2070.000	600.300	2138.000
GR	600.500	2168.000	600.500	2189.000	600.900	2251.000	600.100	2336.000	597.000	2389.000
GR	597.300	2423.000	600.300	2477.000	600.800	2545.000	600.100	2659.000	597.500	2733.000
GR	595.900	2828.000	596.000	2887.000	598.400	2900.000	595.700	2907.000	606.200	2928.000
GR	606.200	2957.000	609.200	2962.000	625.600	2982.000	649.900	3025.000	0.0	0.0
NC	0.085	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1310.000	2355.000
X1	140.000	53.000	1396.000	1587.000	375.000	335.000	385.000	0.0	0.0	0.0
GR	649.900	[illegible]000.000	637.000	1049.000	625.100	1097.000	598.200	1157.000	598.500	1187.000
GR	597.700	1207.000	601.100	1229.000	601.100	1246.000	600.300	1268.000	601.100	1346.000
GR	600.900	1376.000	598.800	1396.000	594.500	1407.000	593.500	1416.000	589.500	1455.000
GR	589.500	1471.000	589.500	1508.000	593.500	1532.000	594.400	1537.000	593.500	1543.000
GR	591.600	1553.000	591.600	1553.000	591.600	1557.000	593.500	1568.000	594.600	1574.000
GR	597.500	1587.000	595.700	1610.000	595.900	1669.000	598.000	1726.000	596.400	1812.000
GR	595.500	1851.000	595.600	1925.000	600.200	2013.000	601.000	2068.000	600.300	2141.000
GR	599.400	2218.000	598.400	2269.000	596.500	2296.000	597.700	2342.000	601.300	2408.000
GR	601.600	2492.000	601.200	2558.000	600.100	2632.000	598.100	2733.000	596.400	2833.000
GR	597.200	2886.000	599.900	2897.000	597.000	2905.000	605.100	2923.000	605.100	2955.000
GR	607.300	2959.000	625.600	2995.000	650.500	3023.000	0.0	0.0	0.0	0.0

NC	0.080	0.060	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
QT	5.000	17200.000	32900.000	42400.000	42400.000	77000.000	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1128.000	2315.000
X1	141.000	46.000	1252.000	1408.000	940.000	620.000	890.000	0.0	0.0	0.0
GR	650.500	1000.000	634.300	1044.000	606.300	1104.000	606.300	1114.000	594.300	1127.000
GR	592.100	1129.000	594.300	1160.000	594.900	1169.000	596.400	1203.000	597.400	1221.000
GR	595.200	1252.000	594.100	1264.000	590.500	1303.000	590.500	1316.000	590.500	1356.000
GR	594.100	1379.000	595.400	1388.000	602.800	1408.000	601.700	1441.000	601.100	1497.000
GR	602.200	1571.000	601.100	1641.000	600.000	1731.000	597.500	1791.000	595.600	1839.000
GR	596.100	1880.000	600.400	1943.000	600.800	2051.000	601.500	2161.000	602.500	2263.000
GR	602.700	2351.000	603.000	2451.000	601.900	2563.000	600.500	2644.000	598.800	2769.000
GR	598.300	2845.000	599.900	2878.000	598.000	2885.000	604.100	2917.000	604.100	2939.000
GR	604.100	2946.000	604.100	2985.000	607.400	2994.000	607.400	3009.000	625.900	3043.000
GR	650.700	3093.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.095	0.050	0.039	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	9.100	0.0	0.0	0.0	1220.000	2335.000
X1	142.000	50.000	1277.000	1446.000	365.000	350.000	365.000	0.0	0.0	0.0
GR	650.600	1000.000	638.400	1061.000	629.100	1104.000	625.500	1136.000	601.100	1184.000
GR	601.100	1210.000	595.700	1227.000	597.100	1248.000	597.200	1277.000	595.200	1298.000
GR	594.800	1306.000	592.000	1353.000	592.000	1353.000	592.000	1387.000	594.800	1412.000
GR	595.700	1420.000	598.400	1446.000	598.400	1501.000	596.400	1512.000	599.100	1534.000
GR	598.500	1566.000	598.700	1597.000	598.700	1655.000	598.100	1718.000	598.200	1787.000
GR	598.700	1847.000	599.100	1928.000	600.100	1999.000	598.700	2065.000	600.200	2103.000
GR	600.700	2197.000	601.300	2298.000	601.700	2453.000	602.000	2563.000	601.900	2662.000
GR	601.700	2763.000	600.600	2869.000	599.600	2924.000	601.400	2949.000	603.000	2965.000
GR	599.800	2974.000	603.700	3000.000	604.700	3024.000	604.700	3039.000	604.700	3190.000
GR	614.800	3209.000	614.800	3222.000	625.400	3239.000	637.300	3277.000	649.900	3314.000
NC	0.0	0.0	0.0	0.100	0.600	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	7.400	0.0	0.0	0.0	0.0	0.0
X1	143.010	50.000	1222.000	1385.000	260.000	267.000	267.000	0.0	-0.700	0.0
GR	650.000	1000.000	637.800	1058.000	626.700	1115.000	625.700	1179.000	604.800	1204.000
GR	604.800	1214.000	598.500	1222.000	595.800	1228.000	592.000	1236.000	592.000	1272.000
GR	592.000	1272.000	595.800	1330.000	596.900	1351.000	600.000	1385.000	601.400	1444.000
GR	602.600	1460.000	601.800	1477.000	601.800	1509.000	602.200	1608.000	602.700	1650.000
GR	602.700	1755.000	602.200	1807.000	602.600	1835.000	601.600	1864.000	602.100	1921.000
GR	602.200	2003.000	602.600	2102.000	602.800	2223.000	602.400	2319.000	602.000	2433.000
GR	602.800	2523.000	603.700	2656.000	604.900	2739.000	604.900	2815.000	606.300	2882.000
GR	607.100	2911.000	610.300	2925.000	610.300	2935.000	610.300	2940.000	610.300	2959.000
GR	612.400	2980.000	612.400	3008.000	613.500	3066.000	613.700	3115.000	614.200	3156.000
GR	614.700	3238.000	615.200	3325.000	616.300	3367.000	627.300	3403.000	650.100	3463.000
NC	0.0	0.0	0.0	0.100	0.300	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	6.400	0.0	0.0	0.0	0.0	0.0
X1	143.000	0.0	0.0	0.0	260.000	268.000	268.000	0.0	0.700	0.0
NC	0.0	0.060	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ET	0.0	0.0	0.0	0.0	10.400	0.0	0.0	0.0	0.0	0.0
X1	144.000	66.000	1606.000	1796.000	570.000	330.000	600.000	0.0	0.0	0.0
GR	650.100	1000.000	636.400	1067.000	629.200	1126.000	625.800	1163.000	604.800	1195.000
GR	604.800	1208.000	599.400	1229.000	598.400	1245.000	597.900	1254.000	598.500	1260.000
GR	599.600	1271.000	602.200	1328.000	601.600	1379.000	599.300	1419.000	602.900	1453.000
GR	600.400	1482.000	598.900	1506.000	599.200	1526.000	602.300	1566.000	601.600	1606.000
GR	598.900	1638.000	598.000	1646.000	597.000	1656.000	597.000	1700.000	597.000	1754.000
GR	598.000	1759.000	599.600	1767.000	603.500	1796.000	603.500	1831.000	604.400	1888.000
GR	604.000	1939.000	604.600	2008.000	603.000	2068.000	602.100	2106.000	596.300	2143.000
GR	596.700	2169.000	604.900	2186.000	603.200	2246.000	602.100	2309.000	603.000	2397.000
GR	603.500	2480.000	603.400	2545.000	603.500	2625.000	605.600	2678.000	606.600	2756.000
GR	607.900	2840.000	609.000	2932.000	608.800	2982.000	611.000	3006.000	611.000	3014.000
GR	611.000	3034.000	614.400	3049.000	614.400	3070.000	616.000	3091.000	616.900	3149.000
GR	617.300	3229.000	617.100	3301.000	615.600	3313.000	616.300	3349.000	616.800	3422.000
GR	617.600	3489.000	618.300	3571.000	620.100	3621.000	622.900	3644.000	633.100	3683.000
GR	650.100	3732.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NC	0.0	0.050	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ET	0.0	0.0	0.0	0.0	5.400	0.0	0.0	0.0	0.0	0.0
X1	145.000	56.000	1669.000	1860.000	375.000	620.000	560.000	0.0	0.0	0.0
GR	650.100	1000.000	639.700	1050.000	637.100	1080.000	630.700	1135.000	622.400	1188.000
GR	608.200	1211.000	608.200	1226.000	599.300	1247.000	597.800	1251.000	597.800	1255.000
GR	599.300	1273.000	601.300	1298.000	604.500	1354.000	604.100	1414.000	604.800	1431.000
GR	600.400	1450.000	599.300	1476.000	604.500	1502.000	604.700	1572.000	604.400	1618.000
GR	604.100	1669.000	600.500	1690.000	599.000	1699.000	597.800	1707.000	597.800	1771.000
GR	597.800	1810.000	599.000	1821.000	600.200	1832.000	604.400	1860.000	604.400	1912.000
GR	609.400	2011.000	608.400	2061.000	608.400	2099.000	608.800	2128.000	607.700	2230.000
GR	607.300	2340.000	608.400	2419.000	611.400	2477.000	610.600	2552.000	611.000	2637.000
GR	613.000	2695.000	613.300	2730.000	613.500	2825.000	614.400	2923.000	616.100	3010.000
GR	616.700	3106.000	616.700	3146.000	614.900	3167.000	616.400	3181.000	617.900	3241.000
GR	618.700	3313.000	621.200	3401.000	624.600	3500.000	629.200	3557.000	634.500	3629.000
GR	649.900	3723.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EJ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK 100 YEAR F

Floodplain WSEL
Floodway WSEL

HEC-2 and FIS Table 7 Matching
NAVD29 + (datum shift) = NGVD88
468.69 + (- 0.71) = 467.98

Known WSEL

High Water Mark 100-yr

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
	1.01	0.0	0.0	0.0	448.20	58500.00	462.24	6680.32	467.10	371.86	0.0	0.0	460.70
	1.01	0.0	0.0	0.0	448.20	58500.00	462.14	6540.79	467.14	343.00	4900.00	5243.00	461.70
	1.02	450.00	0.0	0.0	448.20	58500.00	466.98	12966.91	468.98	750.83	0.0	0.0	0.0
	1.02	450.00	0.0	0.0	448.20	58500.00	467.02	12893.66	469.07	453.00	4830.00	5283.00	0.0
FIS XS A	1.00	680.00	0.0	0.0	448.20	58500.00	468.69	16061.32	470.14	1052.12	0.0	0.0	0.0
	1.00	680.00	0.0	0.0	448.20	58500.00	468.75	15979.25	470.24	629.00	4656.00	5285.00	0.0
B	1.10	700.00	0.0	0.0	449.40	58500.00	470.09	10181.03	471.51	2361.30	0.0	0.0	0.0
	1.10	700.00	0.0	0.0	449.40	58500.00	469.61	8051.32	472.22	673.66	4530.00	5509.00	0.0
C	2.00	230.00	0.0	0.0	446.00	58500.00	471.15	22346.64	471.92	3443.27	0.0	0.0	0.0
	2.00	230.00	0.0	0.0	446.00	58500.00	471.93	21525.43	472.79	1385.00	4160.00	5545.00	0.0
	3.01	125.00	0.0	0.0	449.50	58500.00	471.42	22891.14	472.03	4087.02	0.0	0.0	0.0
	3.01	125.00	0.0	0.0	449.50	58500.00	472.18	20743.62	472.91	1549.00	4140.00	5689.00	0.0
	3.02	10.00	467.60	476.10	449.50	58500.00	471.30	20190.35	472.16	4083.86	0.0	0.0	0.0
	3.02	10.00	467.60	476.10	449.50	58500.00	472.03	17948.14	473.08	1549.00	4140.00	5689.00	0.0
	3.10	21.00	467.60	476.10	449.50	58500.00	471.33	20288.28	472.18	4094.98	0.0	0.0	0.0
	3.10	21.00	467.60	476.10	449.50	58500.00	472.06	18017.59	473.11	1549.00	4140.00	5689.00	0.0
	3.20	10.00	0.0	0.0	449.50	58500.00	471.77	24756.82	472.29	4389.82	0.0	0.0	0.0
	3.20	10.00	0.0	0.0	449.50	58500.00	472.59	22081.39	473.24	1549.00	4140.00	5689.00	0.0
	4.01	30.00	0.0	0.0	448.30	58500.00	472.31	39567.16	472.47	5438.82	0.0	0.0	0.0
	4.01	30.00	0.0	0.0	448.30	58500.00	473.26	39308.01	473.45	2200.39	3850.00	6100.00	0.0
	4.02	15.00	0.0	0.0	448.30	58500.00	472.32	39610.01	472.47	5439.61	0.0	0.0	0.0
	4.02	15.00	0.0	0.0	448.30	58500.00	473.26	39341.90	473.46	2200.85	3850.00	6100.00	0.0
	4.10	17.00	474.10	476.00	448.30	58500.00	475.83	72525.81	475.87	5811.43	0.0	0.0	0.0
	4.10	17.00	474.10	476.00	448.30	58500.00	475.91	53725.77	476.02	2250.00	3850.00	6100.00	0.0
	4.20	66.00	0.0	0.0	448.30	58500.00	475.83	72631.94	475.87	5812.21	0.0	0.0	0.0
	4.20	66.00	0.0	0.0	448.30	58500.00	475.92	53792.48	476.03	2250.00	3850.00	6100.00	0.0
	5.01	5.00	482.20	484.30	442.80	58500.00	475.72	27192.71	475.98	4722.04	0.0	0.0	0.0
	5.01	5.00	482.20	484.30	442.80	58500.00	475.39	15756.96	476.57	1551.59	3540.00	5918.00	0.0
	5.10	18.00	482.20	484.30	442.80	58500.00	475.73	27222.12	475.99	4723.08	0.0	0.0	0.0
	5.10	18.00	482.20	484.30	442.80	58500.00	475.43	15841.16	476.60	1564.60	3540.00	5918.00	0.0
	6.01	5.00	0.0	0.0	451.50	58500.00	475.98	56191.27	476.05	5355.43	0.0	0.0	0.0
	6.01	5.00	0.0	0.0	451.50	58500.00	476.80	46700.09	476.91	2841.00	2980.00	5821.00	0.0
D	6.00	205.00	0.0	0.0	451.50	58500.00	476.00	56345.55	476.06	5357.25	0.0	0.0	0.0
	6.00	205.00	0.0	0.0	451.50	58500.00	476.82	46857.13	476.93	2841.00	2980.00	5821.00	0.0
E	7.00	680.00	0.0	0.0	454.30	58500.00	476.03	56346.86	476.09	5130.95	0.0	0.0	0.0
	7.00	680.00	0.0	0.0	454.30	58500.00	476.87	44941.11	476.98	2554.00	2840.00	5394.00	0.0

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
F	8.00	725.00	0.0	0.0	456.00	58500.00	476.08	57974.20	476.13	4821.38	0.0	0.0	0.0
	8.00	725.00	0.0	0.0	456.00	58500.00	476.95	48733.07	477.05	2562.00	2480.00	5042.00	0.0
G	9.00	30.00	0.0	0.0	456.00	58500.00	476.08	56406.45	476.14	4817.53	0.0	0.0	0.0
	9.00	30.00	0.0	0.0	456.00	58500.00	476.95	48126.94	477.06	2577.00	2465.00	5042.00	0.0
H	10.00	860.00	0.0	0.0	456.70	58500.00	476.18	51415.77	476.24	4658.92	0.0	0.0	0.0
	10.00	860.00	0.0	0.0	456.70	58500.00	477.11	49167.54	477.18	2931.00	1830.00	4761.00	0.0
I	11.00	675.00	0.0	0.0	459.40	58500.00	476.23	44880.45	476.30	4321.93	0.0	0.0	0.0
	11.00	675.00	0.0	0.0	459.40	58500.00	477.17	44238.63	477.24	3191.00	1720.00	4911.00	0.0
	11.10	75.00	0.0	0.0	459.40	58500.00	476.26	44730.84	476.33	4248.57	0.0	0.0	0.0
	11.10	75.00	0.0	0.0	459.40	58500.00	477.20	44346.98	477.27	3191.00	1720.00	4911.00	0.0
	12.01	5.00	480.00	476.90	452.90	58500.00	476.25	32609.55	476.34	4036.19	0.0	0.0	0.0
	12.01	5.00	480.00	476.90	452.90	58500.00	477.19	31119.73	477.28	3230.89	1670.00	5092.00	0.0
	12.10	110.00	480.00	476.90	452.90	58500.00	476.29	32774.10	476.37	4041.75	0.0	0.0	0.0
	12.10	110.00	480.00	476.90	452.90	58500.00	477.23	31271.95	477.32	3234.41	1670.00	5092.00	0.0
	13.10	5.00	0.0	0.0	460.00	58500.00	476.28	35740.82	476.38	4304.26	0.0	0.0	0.0
	13.10	5.00	0.0	0.0	460.00	58500.00	477.22	35420.55	477.33	3356.86	1650.00	5148.00	0.0
J	13.20	115.00	0.0	0.0	460.00	58500.00	476.31	35992.40	476.41	4307.58	0.0	0.0	0.0
	13.20	115.00	0.0	0.0	460.00	58500.00	477.25	35997.37	477.36	3377.36	1630.00	5148.00	0.0
K	14.00	635.00	0.0	0.0	456.00	58500.00	476.35	39976.17	476.45	4236.61	0.0	0.0	0.0
	14.00	635.00	0.0	0.0	456.00	58500.00	477.29	39507.46	477.42	3228.91	1620.00	4976.00	0.0
	16.01	684.00	0.0	0.0	458.00	58500.00	476.32	27905.69	476.58	3794.65	0.0	0.0	0.0
	16.01	684.00	0.0	0.0	458.00	58500.00	477.28	27467.27	477.54	2946.19	1545.00	4621.00	0.0
	16.02	10.00	485.70	494.60	458.00	58500.00	476.39	25448.70	476.59	3277.09	0.0	0.0	0.0
	16.02	10.00	485.70	494.60	458.00	58500.00	477.28	23544.60	477.55	2308.02	1645.00	4721.00	0.0
	16.03	76.00	485.70	494.60	458.00	58500.00	476.44	25623.45	476.63	3280.08	0.0	0.0	0.0
	16.03	76.00	485.70	494.60	458.00	58500.00	477.33	23701.59	477.59	2308.25	1645.00	4721.00	0.0
	16.04	10.00	0.0	0.0	458.00	58500.00	476.40	28320.40	476.65	3802.30	0.0	0.0	0.0
	16.04	10.00	0.0	0.0	458.00	58500.00	477.34	27732.50	477.60	2947.29	1545.00	4621.00	0.0
L	16.00	60.00	0.0	0.0	459.00	58500.00	476.54	33240.89	476.68	4282.23	0.0	0.0	0.0
	16.00	60.00	0.0	0.0	459.00	58500.00	477.44	30793.43	477.63	2949.29	1585.00	4661.00	0.0
	18.01	738.00	0.0	0.0	459.00	58500.00	476.75	24640.36	477.03	3696.41	0.0	0.0	0.0
	18.01	738.00	0.0	0.0	459.00	58500.00	477.70	23972.79	478.01	2627.31	1490.00	4154.00	0.0
	18.02	10.00	473.10	478.50	459.00	58500.00	476.91	20408.50	477.05	3711.95	0.0	0.0	0.0
	18.02	10.00	473.10	478.50	459.00	58500.00	477.86	19442.61	478.03	2630.07	1490.00	4154.00	0.0
	18.03	27.00	473.10	478.50	459.00	58500.00	476.93	20489.92	477.07	3713.83	0.0	0.0	0.0
	18.03	27.00	473.10	478.50	459.00	58500.00	477.89	19515.18	478.05	2630.41	1490.00	4154.00	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
18.04	10.00	0.0	0.0	459.00	58500.00	476.85	25144.52	477.11	3706.09	0.0	0.0	0.0
18.04	10.00	0.0	0.0	459.00	58500.00	477.80	24418.22	478.10	2629.06	1490.00	4154.00	0.0
M 18.00	55.00	0.0	0.0	459.00	58500.00	476.94	25137.30	477.15	3714.62	0.0	0.0	0.0
18.00	55.00	0.0	0.0	459.00	58500.00	477.89	24431.14	478.13	2630.55	1490.00	4154.00	0.0
N 19.00	1283.00	0.0	0.0	460.70	58500.00	477.89	18708.96	478.50	3342.07	0.0	0.0	0.0
19.00	1283.00	0.0	0.0	460.70	58500.00	478.84	18886.05	479.55	1821.26	2650.00	4535.00	0.0
19.10	805.00	0.0	0.0	461.90	58500.00	478.79	11320.66	480.41	2136.32	0.0	0.0	0.0
19.10	805.00	0.0	0.0	461.90	58500.00	479.69	11405.36	481.50	1150.62	2070.00	3291.00	0.0
O 20.00	805.00	0.0	0.0	461.40	58500.00	480.81	10256.30	483.48	2014.26	0.0	0.0	0.0
20.00	805.00	0.0	0.0	461.40	58500.00	481.64	10634.38	484.44	470.37	2811.63	3282.00	480.81
P 21.00	525.00	0.0	0.0	462.80	58500.00	483.31	15009.24	484.74	1281.43	0.0	0.0	0.0
21.00	525.00	0.0	0.0	462.80	58500.00	484.06	14914.68	485.66	367.00	2225.00	2592.00	483.31
23.01	445.00	0.0	0.0	458.30	58500.00	483.46	14422.87	486.00	669.83	0.0	0.0	0.0
23.01	445.00	0.0	0.0	458.30	58500.00	484.35	15248.57	486.72	276.00	1299.00	1575.00	0.0
23.02	30.00	482.50	485.00	458.30	58500.00	484.64	16099.46	486.81	832.15	0.0	0.0	0.0
23.02	30.00	482.50	485.00	458.30	58500.00	485.26	16299.26	487.42	276.00	1299.00	1575.00	0.0
Q 23.00	55.00	0.0	0.0	458.30	58500.00	485.42	17415.54	487.04	841.12	0.0	0.0	0.0
23.00	55.00	0.0	0.0	458.30	58500.00	485.94	17396.73	487.63	276.00	1299.00	1575.00	0.0
R 24.00	370.00	0.0	0.0	462.80	58500.00	485.37	13574.36	487.81	946.12	0.0	0.0	0.0
24.00	370.00	0.0	0.0	462.80	58500.00	485.76	12880.69	488.50	223.53	1239.00	1472.00	0.0
S 25.00	750.00	0.0	0.0	465.20	58500.00	488.70	21180.36	489.44	1384.59	0.0	0.0	0.0
25.00	750.00	0.0	0.0	465.20	58500.00	488.90	17386.29	490.25	525.00	1365.00	1890.00	0.0
T 26.00	450.00	0.0	0.0	465.50	58500.00	488.95	16448.24	490.31	942.09	0.0	0.0	0.0
26.00	450.00	0.0	0.0	465.50	58500.00	489.38	15801.37	491.01	495.00	1445.00	1940.00	0.0
U 27.00	540.00	0.0	0.0	467.80	58500.00	489.77	19453.89	490.88	733.77	0.0	0.0	0.0
27.00	540.00	0.0	0.0	467.80	58500.00	490.01	16263.53	491.72	340.00	1490.00	1830.00	0.0
V 28.00	940.00	0.0	0.0	468.50	58500.00	490.40	14875.47	492.17	592.05	0.0	0.0	0.0
28.00	940.00	0.0	0.0	468.50	58500.00	491.16	14957.45	493.11	320.00	1780.00	2100.00	0.0
W 29.00	790.00	0.0	0.0	470.10	58500.00	492.43	20790.27	493.10	1037.87	0.0	0.0	0.0
29.00	790.00	0.0	0.0	470.10	58500.00	493.41	19907.10	494.10	724.80	1568.20	2293.00	492.43
X 30.00	410.00	0.0	0.0	471.00	58500.00	492.87	24675.47	493.38	1018.34	0.0	0.0	0.0
30.00	410.00	0.0	0.0	471.00	58500.00	493.84	25335.13	494.38	799.16	1518.94	2321.00	492.87
Y 31.00	575.00	0.0	0.0	472.90	58500.00	493.18	22809.90	493.70	1251.78	0.0	0.0	0.0
31.00	575.00	0.0	0.0	472.90	58500.00	494.13	23507.11	494.68	1013.97	1418.94	2432.91	493.18
Z 32.00	630.00	0.0	0.0	470.80	58500.00	493.34	15834.91	494.53	913.49	0.0	0.0	0.0
32.00	630.00	0.0	0.0	470.80	58500.00	494.33	15662.37	495.45	780.03	1313.00	2093.04	493.34

	SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
AA	33.00	380.00	0.0	0.0	469.00	58500.00	494.17	22434.83	494.86	1160.05	0.0	0.0	0.0
	33.00	380.00	0.0	0.0	469.00	58500.00	495.06	23318.57	495.76	966.00	1280.00	2246.00	0.0
AB	34.00	480.00	0.0	0.0	475.40	58500.00	494.45	17182.77	495.30	1055.67	0.0	0.0	0.0
	34.00	480.00	0.0	0.0	475.40	58500.00	495.27	17417.21	496.20	831.18	1345.28	2176.47	494.45
AC	35.00	720.00	0.0	0.0	477.60	58500.00	495.37	16453.04	496.12	1548.90	0.0	0.0	0.0
	35.00	720.00	0.0	0.0	477.60	58500.00	496.17	16688.48	497.00	1113.39	1235.[illegible]3	2349.22	495.37
AD	36.00	740.00	0.0	0.0	474.20	58500.00	496.03	13175.85	497.87	385.17	0.0	0.0	0.0
	36.00	740.00	0.0	0.0	474.20	58500.00	496.88	14029.82	498.55	350.00	2870.00	3220.00	0.0
	36.10	60.00	0.0	0.0	475.00	58500.00	495.85	9094.88	498.39	374.12	0.0	0.0	0.0
	36.10	60.00	0.0	0.0	475.00	58500.00	496.73	9905.41	498.99	329.32	2629.00	3130.00	0.0
	36.20	10.00	513.00	532.00	475.00	58500.00	495.93	9168.10	498.44	374.75	0.0	0.0	0.0
	36.20	10.00	513.00	532.00	475.00	58500.00	496.79	9959.70	499.03	329.52	2629.00	3130.00	0.0
	36.30	130.00	513.00	532.00	475.00	58500.00	496.80	10007.84	499.01	381.85	0.0	0.0	0.0
	36.30	130.00	513.00	532.00	475.00	58500.00	497.45	10608.22	499.50	331.93	2629.00	3130.00	0.0
	36.40	10.00	0.0	0.0	475.00	58500.00	496.85	10044.53	499.05	382.16	0.0	0.0	0.0
	36.40	10.00	0.0	0.0	475.00	58500.00	497.50	10640.04	499.54	332.05	2629.00	3130.00	0.0
	38.00	100.00	0.0	0.0	476.50	58500.00	498.40	18317.72	499.54	391.05	0.0	0.0	0.0
	38.00	100.00	0.0	0.0	476.50	58500.00	498.90	18987.16	499.98	365.00	2265.00	2630.00	0.0
	39.00	315.00	0.0	0.0	477.60	58500.00	499.54	23146.87	499.97	852.26	0.0	0.0	0.0
	39.00	315.00	0.0	0.0	477.60	58500.00	499.85	20997.67	500.38	699.00	2151.00	2850.00	0.0
AE	40.00	410.00	0.0	0.0	478.60	58500.00	500.01	50628.57	500.10	1813.74	0.0	0.0	0.0
	40.00	410.00	0.0	0.0	478.60	48800.00	500.23	21896.92	500.64	685.00	1780.00	2465.00	0.0
AF	41.00	460.00	0.0	0.0	478.80	58500.00	500.10	63092.50	500.15	2711.76	0.0	0.0	0.0
	41.00	460.00	0.0	0.0	478.80	48800.00	500.64	31928.38	500.81	1205.00	1525.00	2730.00	0.0
	42.01	250.00	0.0	0.0	477.00	58500.00	500.11	41802.78	500.20	2896.01	0.0	0.0	0.0
	42.01	250.00	0.0	0.0	477.00	48800.00	500.67	20387.65	500.99	1270.00	1490.00	2760.00	0.0
	42.02	25.00	0.0	0.0	477.00	58500.00	500.12	41937.76	500.21	2896.02	0.0	0.0	0.0
	42.02	25.00	0.0	0.0	477.00	48800.00	500.68	20530.22	501.01	1270.00	1490.00	2760.00	0.0
	42.10	25.00	492.00	493.00	477.00	58500.00	500.12	34587.50	500.22	2896.00	0.0	0.0	0.0
	42.10	25.00	492.00	493.00	477.00	48800.00	500.68	20536.67	501.01	1270.00	1490.00	2760.00	0.0
	42.20	50.00	0.0	0.0	477.00	58500.00	500.14	41924.42	500.23	2896.07	0.0	0.0	0.0
	42.20	50.00	0.0	0.0	477.00	48800.00	500.73	20580.62	501.05	1270.00	1490.00	2760.00	0.0
AG	43.00	230.00	0.0	0.0	481.00	58500.00	500.22	67731.44	500.26	3338.24	0.0	0.0	0.0
	43.00	230.00	0.0	0.0	481.00	48800.00	501.01	32173.24	501.14	1460.00	1520.00	2980.00	0.0
AH	44.00	415.00	0.0	0.0	480.60	48800.00	500.23	18298.09	500.63	1621.36	0.0	0.0	0.0
	44.00	415.00	0.0	0.0	480.60	48800.00	501.11	17672.61	501.61	1045.00	1495.00	2540.00	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TO	EG	TOPWID	STENCL	STENCR	WSELK
45.00	420.00	0.0	0.0	481.50	48800.00	500.34	11911.60	501.19	1238.01	0.0	0.0	0.0
45.00	420.00	0.0	0.0	481.50	48800.00	501.24	12012.13	502.20	894.00	1780.00	2674.00	0.0
46.00	565.00	0.0	0.0	482.20	48800.00	501.38	15602.67	501.92	1239.34	0.0	0.0	0.0
46.00	565.00	0.0	0.0	482.20	48800.00	502.35	15867.06	502.91	915.00	1645.00	2560.00	0.0
47.00	630.00	0.0	0.0	484.00	48800.00	501.89	13850.42	502.46	1165.89	0.0	0.0	0.0
47.00	630.00	0.0	0.0	484.00	48800.00	502.78	13471.77	503.49	780.00	1570.00	2350.00	0.0
48.00	610.00	0.0	0.0	486.00	48800.00	502.57	12099.34	503.36	938.65	0.0	0.0	0.0
48.00	610.00	0.0	0.0	486.00	48800.00	503.51	12584.90	504.36	595.00	1580.00	2175.00	0.0
49.00	555.00	0.0	0.0	486.30	48800.00	503.48	13178.26	504.19	723.82	0.0	0.0	0.0
49.00	555.00	0.0	0.0	486.30	48800.00	504.30	11934.48	505.27	494.66	1503.34	1998.00	503.48
50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11412.67	505.05	553.87	0.0	0.0	0.0
50.00	465.00	0.0	0.0	486.20	48800.00	504.81	11025.67	506.22	378.91	1811.09	2190.00	503.83

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
1.010	58500.000	462.239	0.0	0.0	0.0	371.863	0.0	0.0
1.010	58500.000	462.136	-0.103	0.0	0.0	343.000	28.863	0.0
1.020	58500.000	466.984	0.0	4.745	0.0	750.832	0.0	450.000
1.020	58500.000	467.016	0.032	4.880	0.0	453.000	297.832	450.000
1.000	58500.000	468.694	0.0	1.711	0.0	1052.117	0.0	680.000
1.000	58500.000	468.755	0.060	1.739	0.0	629.000	423.117	680.000
1.100	58500.000	470.087	0.0	1.392	0.0	2361.301	0.0	700.000
1.100	58500.000	469.613	-0.474	0.858	0.0	673.660	1687.641	700.000
2.000	58500.000	471.152	0.0	1.066	0.0	3443.270	0.0	230.000
2.000	58500.000	471.927	0.775	2.314	0.0	1385.000	2058.270	230.000
3.010	58500.000	471.415	0.0	0.263	0.0	4087.016	0.0	125.000
3.010	58500.000	472.181	0.766	0.254	0.0	1549.000	2538.016	125.000
3.020	58500.000	471.299	0.0	-0.116	0.0	4083.863	0.0	10.000
3.020	58500.000	472.025	0.726	-0.156	0.0	1549.000	2534.863	10.000
3.100	58500.000	471.329	0.0	0.030	0.0	4094.977	0.0	21.000
3.100	58500.000	472.058	0.729	0.033	0.0	1549.000	2545.977	21.000
3.200	58500.000	471.773	0.0	0.444	0.0	4389.816	0.0	10.000
3.200	58500.000	472.595	0.822	0.537	0.0	1549.000	2840.816	10.000
4.010	58500.000	472.314	0.0	0.541	0.0	5438.816	0.0	30.000
4.010	58500.000	473.260	0.946	0.665	0.0	2200.387	3238.430	30.000
4.020	58500.000	472.318	0.0	0.004	0.0	5439.609	0.0	15.000
4.020	58500.000	473.263	0.945	0.003	0.0	2200.848	3238.762	15.000
4.100	58500.000	475.825	0.0	3.508	0.0	5811.430	0.0	17.000
4.100	58500.000	475.912	0.086	2.649	0.0	2249.996	3561.434	17.000
4.200	58500.000	475.820	0.0	0.004	0.0	5812.215	0.0	66.000
4.200	58500.000	475.920	0.090	0.008	0.0	2249.996	3562.219	66.000
5.010	58500.000	475.724	0.0	-0.105	0.0	4722.043	0.0	5.000
5.010	58500.000	475.386	-0.338	-0.534	0.0	1551.586	3170.457	5.000

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK 100 YEAR F

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TO	FG	TOPWID	STENCL	STENCR	WSELK
50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11411.62	505.05	553.87	0.0	0.0	503.83
50.00	465.00	0.0	0.0	486.20	48800.00	504.81	11023.32	506.22	378.88	1811.12	2190.00	503.83
51.00	225.00	0.0	0.0	486.10	48800.00	504.11	11155.47	505.51	481.02	0.0	0.0	0.0
51.00	225.00	0.0	0.0	486.10	48800.00	505.06	11116.04	506.72	339.96	1727.41	2067.38	504.11
52.00	225.00	0.0	0.0	489.30	48800.00	504.27	9428.89	506.37	391.76	0.0	0.0	0.0
52.00	225.00	0.0	0.0	489.30	48800.00	505.17	9434.87	507.63	273.81	2023.19	2297.00	504.27
52.10	275.00	0.0	0.0	489.60	48800.00	504.67	7462.70	508.51	302.55	0.0	0.0	0.0
52.10	275.00	0.0	0.0	489.60	48800.00	505.64	7983.86	509.42	206.88	1942.51	2149.40	504.67
53.00	275.00	0.0	0.0	489.90	48800.00	505.78	7289.76	509.92	294.84	0.0	0.0	0.0
53.00	275.00	0.0	0.0	489.90	48800.00	506.64	7824.16	510.58	202.00	2107.00	2309.00	505.78
54.00	805.00	0.0	0.0	491.50	48800.00	509.86	8835.27	512.97	299.20	0.0	0.0	0.0
54.00	805.00	0.0	0.0	491.50	48800.00	510.15	8831.23	513.42	195.00	2148.00	2343.00	509.86
55.00	655.00	0.0	0.0	491.80	48800.00	512.26	11203.93	514.60	339.30	0.0	0.0	0.0
55.00	655.00	0.0	0.0	491.80	48800.00	512.29	10505.92	515.13	195.00	1848.00	2043.00	512.26
56.00	380.00	0.0	0.0	491.70	48800.00	513.09	10193.99	515.40	479.61	0.0	0.0	0.0
56.00	380.00	0.0	0.0	491.70	48800.00	513.03	9163.20	516.14	267.72	1668.00	1935.72	513.09
57.00	500.00	0.0	0.0	493.40	48800.00	515.20	13059.20	516.39	693.07	0.0	0.0	0.0
57.00	500.00	0.0	0.0	493.40	48800.00	515.92	12931.52	517.29	481.26	1529.00	2010.27	515.20
58.00	705.00	0.0	0.0	496.50	48800.00	516.20	12022.93	517.46	1012.91	0.0	0.0	0.0
58.00	705.00	0.0	0.0	496.50	48800.00	516.93	11908.20	518.39	674.87	1690.30	2365.17	516.20
59.00	360.00	0.0	0.0	498.00	48800.00	517.44	16693.35	517.96	1435.84	0.0	0.0	0.0
59.00	360.00	0.0	0.0	498.00	48800.00	517.47	10697.77	519.14	645.50	2791.50	3437.00	517.44
60.00	410.00	0.0	0.0	495.90	48800.00	517.60	12437.23	518.92	1062.63	0.0	0.0	0.0
60.00	410.00	0.0	0.0	495.90	48800.00	518.53	12333.40	519.92	627.05	3750.94	4378.00	517.60

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
50.000	48800.000	503.831	0.0	0.0	0.0	553.869	0.0	465.000
50.000	48800.000	504.810	0.979	0.0	0.0	378.877	174.991	465.000
51.000	48800.000	504.115	0.0	0.284	0.0	481.018	0.0	225.000
51.000	48800.000	505.065	0.950	0.255	0.950	339.962	141.057	225.000
52.000	48800.000	504.267	0.0	0.152	0.0	391.756	0.0	225.000
52.000	48800.000	505.166	0.899	0.101	0.899	273.807	117.950	225.000
52.100	48800.000	504.667	0.0	0.401	0.0	302.549	0.0	275.000
52.100	48800.000	505.635	0.968	0.469	0.968	206.884	95.665	275.000
53.000	48800.000	505.782	0.0	1.114	0.0	294.840	0.0	275.000
53.000	48800.000	506.636	0.854	1.001	0.854	202.001	92.839	275.000
54.000	48800.000	509.860	0.0	4.079	0.0	299.196	0.0	805.000
54.000	48800.000	510.150	0.289	3.514	0.290	195.001	104.195	805.000

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK - 100 YEAR

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
50.00	465.00	0.0	0.0	486.20	48800.00	503.83	11411.62	505.05	553.87	0.0	0.0	503.83
50.00	465.00	0.0	0.0	486.20	48800.00	504.82	11037.90	506.23	378.88	1811.12	2190.00	503.83
51.00	225.00	0.0	0.0	486.10	48800.00	504.11	11155.47	505.51	481.02	0.0	0.0	0.0
51.00	225.00	0.0	0.0	486.10	48800.00	505.08	11129.67	506.73	339.96	1727.41	2067.38	504.11
52.00	225.00	0.0	0.0	489.30	48800.00	504.27	9428.89	506.37	391.76	0.0	0.0	0.0
52.00	225.00	0.0	0.0	489.30	48800.00	505.18	9446.60	507.64	273.81	2023.19	2297.00	504.27
52.10	275.00	0.0	0.0	489.60	48800.00	504.67	7462.70	508.51	302.55	0.0	0.0	0.0
52.10	275.00	0.0	0.0	489.60	48800.00	505.65	7992.05	509.43	206.88	1942.51	2149.40	504.67
53.00	275.00	0.0	0.0	489.90	48800.00	505.78	7289.76	509.92	294.84	0.0	0.0	0.0
53.00	275.00	0.0	0.0	489.90	48800.00	506.64	7830.68	510.59	202.00	2107.00	2309.00	505.78
54.00	805.00	0.0	0.0	491.50	48800.00	509.86	8835.27	512.97	299.20	0.0	0.0	0.0
54.00	805.00	0.0	0.0	491.50	48800.00	510.15	8832.00	513.42	195.00	2148.00	2343.00	509.86
55.00	655.00	0.0	0.0	491.80	48800.00	512.26	11203.93	514.60	339.30	0.0	0.0	0.0
55.00	655.00	0.0	0.0	491.80	48800.00	512.29	10506.44	515.13	195.00	1848.00	2043.00	512.26
56.00	380.00	0.0	0.0	491.70	48800.00	513.09	10193.99	515.40	479.61	0.0	0.0	0.0
56.00	380.00	0.0	0.0	491.70	48800.00	513.03	9163.98	516.14	267.72	1668.00	1935.72	513.09
57.00	500.00	0.0	0.0	493.40	48800.00	515.20	13059.20	516.39	693.07	0.0	0.0	0.0
57.00	500.00	0.0	0.0	493.40	48800.00	515.92	12948.86	517.29	481.26	1529.00	2010.27	515.20
58.00	705.00	0.0	0.0	496.50	48800.00	516.20	12022.93	517.46	1012.91	0.0	0.0	0.0
58.00	705.00	0.0	0.0	496.50	48800.00	516.92	11905.80	518.39	674.87	1690.30	2365.17	516.20
59.00	360.00	0.0	0.0	498.00	48800.00	517.44	16693.35	517.96	1435.84	0.0	0.0	0.0
59.00	360.00	0.0	0.0	498.00	48800.00	517.47	10696.40	519.14	645.50	2791.50	3437.00	517.44
60.00	410.00	0.0	0.0	495.90	48800.00	517.60	12437.23	518.92	1062.63	0.0	0.0	0.0
60.00	410.00	0.0	0.0	495.90	48800.00	518.53	12331.64	519.92	627.05	3750.94	4378.00	517.60
60.10	41.00	0.0	0.0	495.90	48800.00	518.50	14227.79	519.22	685.55	0.0	0.0	0.0
60.10	41.00	0.0	0.0	495.90	48800.00	519.45	14462.34	520.23	536.12	3944.00	4480.12	518.50
60.20	12.00	0.0	0.0	495.90	48800.00	519.46	15840.39	520.07	686.13	0.0	0.0	0.0
60.20	12.00	0.0	0.0	495.90	48800.00	520.41	16086.64	521.06	550.52	3944.00	4494.53	519.46
62.00	417.00	0.0	0.0	504.50	48800.00	520.09	16570.73	520.53	932.15	0.0	0.0	0.0
62.00	417.00	0.0	0.0	504.50	48800.00	521.06	17477.47	521.52	837.00	3538.00	4375.00	0.0
63.00	544.00	0.0	0.0	505.00	48800.00	520.93	26891.23	521.04	2245.33	0.0	0.0	0.0
63.00	544.00	0.0	0.0	505.00	48800.00	521.89	25373.39	522.03	1785.79	3392.00	5177.80	520.93
64.00	499.00	0.0	0.0	505.30	48800.00	521.15	26329.00	521.26	2217.24	0.0	0.0	0.0
64.00	499.00	0.0	0.0	505.30	48800.00	522.13	26059.95	522.27	1709.08	2562.00	4271.09	521.15
65.00	380.00	0.0	0.0	500.20	48800.00	521.26	25308.73	521.39	2223.61	0.0	0.0	0.0
65.00	380.00	0.0	0.0	500.20	48800.00	522.25	25282.70	522.40	1674.94	2121.45	3796.40	521.26

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
66.00	350.00	0.0	0.0	505.70	48800.00	521.41	18073.69	521.58	2004.54	0.0	0.0	0.0
66.00	350.00	0.0	0.0	505.70	48800.00	522.39	17905.72	522.59	1607.19	1832.00	3439.20	521.41
67.00	680.00	0.0	0.0	506.00	48800.00	521.77	18083.60	521.94	2193.85	0.0	0.0	0.0
67.00	680.00	0.0	0.0	506.00	48800.00	522.75	18014.34	522.96	1625.71	2067.31	3693.04	521.77
68.00	725.00	0.0	0.0	506.50	48800.00	522.48	12535.21	522.82	1799.83	0.0	0.0	0.0
68.00	725.00	0.0	0.0	506.50	48800.00	523.45	11990.98	523.92	1237.58	1666.49	2904.06	522.48
69.00	425.00	0.0	0.0	513.00	48800.00	522.95	8976.00	523.68	1717.83	0.0	0.0	0.0
69.00	425.00	0.0	0.0	513.00	48800.00	523.94	9154.21	524.86	1129.81	1535.76	2665.57	522.95
70.00	641.00	0.0	0.0	510.00	48800.00	525.11	8759.41	525.90	2057.61	0.0	0.0	0.0
70.00	641.00	0.0	0.0	510.00	48800.00	526.04	8461.13	527.15	1193.63	1509.84	2703.47	525.11
71.00	501.00	0.0	0.0	512.50	48800.00	526.48	7741.78	528.04	2102.83	0.0	0.0	0.0
71.00	501.00	0.0	0.0	512.50	48800.00	527.47	8414.61	529.02	1050.00	1850.00	2900.00	0.0
72.00	790.00	0.0	0.0	512.30	48800.00	529.41	12549.10	529.81	2262.33	0.0	0.0	0.0
72.00	790.00	0.0	0.0	512.30	48800.00	530.19	12099.65	530.75	1064.58	2005.77	3070.34	529.41
73.00	575.00	0.0	0.0	516.40	48800.00	530.30	13958.73	530.66	1568.74	0.0	0.0	0.0
73.00	575.00	0.0	0.0	516.40	48800.00	531.19	13707.32	531.63	1065.67	2532.96	3598.64	530.30
74.00	640.00	0.0	0.0	518.40	48800.00	531.01	12744.30	531.43	2078.28	0.0	0.0	0.0
74.00	640.00	0.0	0.0	518.40	48800.00	531.82	11655.42	532.46	1145.00	2291.00	3436.00	0.0
75.00	640.00	0.0	0.0	516.00	48800.00	531.47	9244.13	532.85	1440.67	0.0	0.0	0.0
75.00	640.00	0.0	0.0	516.00	48800.00	532.46	10116.89	533.79	892.17	2497.31	3389.48	531.47
77.01	130.00	0.0	0.0	517.50	48800.00	532.80	13651.52	533.35	1394.59	0.0	0.0	0.0
77.01	130.00	0.0	0.0	517.50	48800.00	533.48	12892.33	534.21	905.26	2173.10	3102.65	532.80
77.02	50.00	0.0	0.0	517.50	48800.00	535.35	22272.90	535.61	1505.11	0.0	0.0	0.0
77.02	50.00	0.0	0.0	517.50	48800.00	536.03	21237.18	536.35	1080.17	2065.98	3146.16	535.35
77.00	60.00	0.0	0.0	517.50	48800.00	535.38	22378.24	535.64	1505.92	0.0	0.0	0.0
77.00	60.00	0.0	0.0	517.50	48800.00	536.01	19050.27	536.43	917.56	2154.90	3072.46	535.38
78.00	735.00	0.0	0.0	519.30	48800.00	535.73	21869.45	536.00	1395.74	0.0	0.0	0.0
78.00	735.00	0.0	0.0	519.30	48800.00	536.51	19784.94	536.90	943.22	1393.51	2336.73	535.73
79.00	710.00	0.0	0.0	520.20	48800.00	535.99	13902.55	536.61	1091.13	0.0	0.0	0.0
79.00	710.00	0.0	0.0	520.20	48800.00	536.73	12204.63	537.71	681.73	1468.65	2150.38	535.99
80.00	430.00	0.0	0.0	518.80	48800.00	536.40	13372.29	537.22	777.91	0.0	0.0	0.0
80.00	430.00	0.0	0.0	518.80	48800.00	537.35	13098.30	538.36	473.05	1406.98	1880.02	536.40
81.00	350.00	0.0	0.0	523.50	48800.00	536.73	9134.52	538.02	655.43	0.0	0.0	0.0
81.00	350.00	0.0	0.0	523.50	48800.00	537.68	9090.87	539.18	391.00	1424.00	1815.00	0.0
82.00	685.00	0.0	0.0	522.80	48800.00	538.63	7825.70	540.46	577.30	0.0	0.0	0.0
82.00	685.00	0.0	0.0	522.80	48800.00	539.64	8764.66	541.27	473.00	1265.00	1738.00	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
83.00	950.00	0.0	0.0	523.00	48800.00	542.07	11415.58	542.97	901.29	0.0	0.0	0.0
83.00	950.00	0.0	0.0	523.00	48800.00	542.58	12012.79	543.43	855.00	1135.00	1990.00	0.0
84.00	700.00	0.0	0.0	525.00	48800.00	543.23	14902.75	543.82	1079.28	0.0	0.0	0.0
84.00	700.00	0.0	0.0	525.00	48800.00	543.64	15536.73	544.20	1016.00	1175.00	2191.00	0.0
85.00	245.00	0.0	0.0	526.50	48800.00	543.50	12620.32	544.12	1132.95	0.0	0.0	0.0
85.00	245.00	0.0	0.0	526.50	48800.00	543.88	12688.75	544.49	995.00	1260.00	2255.00	0.0
86.00	905.00	0.0	0.0	526.50	48800.00	545.05	9935.07	546.05	812.80	0.0	0.0	0.0
86.00	905.00	0.0	0.0	526.50	48800.00	545.41	9076.29	546.62	650.00	1265.00	1915.00	0.0
87.00	270.00	0.0	0.0	530.80	48800.00	545.92	14869.37	546.50	822.38	0.0	0.0	0.0
87.00	270.00	0.0	0.0	530.80	48800.00	546.40	13741.61	547.14	643.00	1276.00	1919.00	0.0
88.00	920.00	0.0	0.0	530.70	48800.00	547.02	10252.64	548.00	744.71	0.0	0.0	0.0
88.00	920.00	0.0	0.0	530.70	48800.00	547.69	10659.48	548.68	677.00	1178.00	1855.00	0.0
89.00	760.00	0.0	0.0	532.60	48800.00	548.75	10881.20	549.63	676.81	0.0	0.0	0.0
89.00	760.00	0.0	0.0	532.60	48800.00	549.30	11132.66	550.21	604.00	1241.00	1845.00	0.0
90.00	150.00	0.0	0.0	533.80	48800.00	549.03	11121.40	549.94	665.45	0.0	0.0	0.0
90.00	150.00	0.0	0.0	533.80	48800.00	549.55	11303.24	550.51	574.00	1221.00	1795.00	0.0
91.00	905.00	0.0	0.0	532.70	48800.00	550.60	9157.83	552.26	669.95	0.0	0.0	0.0
91.00	905.00	0.0	0.0	532.70	48800.00	551.06	8648.07	552.96	431.00	1273.00	1704.00	0.0
92.00	905.00	0.0	0.0	532.40	48800.00	553.16	12283.77	554.22	737.20	0.0	0.0	0.0
92.00	905.00	0.0	0.0	532.40	48800.00	553.93	12050.60	555.07	482.37	1492.63	1975.00	553.16
93.00	795.00	0.0	0.0	533.00	48800.00	554.29	8905.57	556.11	699.67	0.0	0.0	0.0
93.00	795.00	0.0	0.0	533.00	48800.00	555.24	9198.00	556.88	455.40	1402.60	1858.00	554.29
94.00	445.00	0.0	0.0	534.00	48800.00	555.92	9244.63	557.42	654.93	0.0	0.0	0.0
94.00	445.00	0.0	0.0	534.00	48800.00	556.48	8161.72	558.34	415.66	1514.34	1930.00	555.92
95.00	380.00	0.0	0.0	531.70	48800.00	557.52	18644.06	557.89	909.52	0.0	0.0	0.0
95.00	380.00	0.0	0.0	531.70	48800.00	558.47	18932.01	558.87	661.00	1489.00	2150.00	0.0
96.00	300.00	0.0	0.0	537.90	48800.00	557.76	16632.36	558.09	1104.17	0.0	0.0	0.0
96.00	300.00	0.0	0.0	537.90	48800.00	558.72	17068.89	559.07	885.00	1405.00	2290.00	0.0
97.00	540.00	0.0	0.0	538.20	48800.00	558.15	14174.32	558.49	1181.84	0.0	0.0	0.0
97.00	540.00	0.0	0.0	538.20	48800.00	559.10	14075.35	559.46	992.00	1368.00	2360.00	0.0
98.00	300.00	0.0	0.0	538.00	48800.00	558.38	14386.18	558.72	1452.58	0.0	0.0	0.0
98.00	300.00	0.0	0.0	538.00	48800.00	559.35	14649.20	559.68	1247.00	1113.00	2360.00	0.0
99.00	340.00	0.0	0.0	540.60	48800.00	558.77	19991.29	558.93	1864.74	0.0	0.0	0.0
99.00	340.00	0.0	0.0	540.60	48800.00	559.69	19548.06	559.90	1437.56	1294.69	2732.25	558.77
100.00	550.00	0.0	0.0	541.50	48800.00	559.17	18853.70	559.35	2041.46	0.0	0.0	0.0
100.00	550.00	0.0	0.0	541.50	48800.00	560.10	18655.71	560.32	1577.32	1283.17	2860.50	559.17

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
50.000	48800.000	503.831	0.0	0.0	0.0	553.869	0.0	465.000
50.000	48800.000	504.823	0.992	0.0	0.0	378.877	174.991	465.000
51.000	48800.000	504.115	0.0	0.284	0.0	481.018	0.0	225.000
51.000	48800.000	505.077	0.962	0.254	0.963	339.962	141.057	225.000

SUMMARY PRINTOUT FOR MULTIPLE PROFILES

FISHING CREEK 100 YEAR F

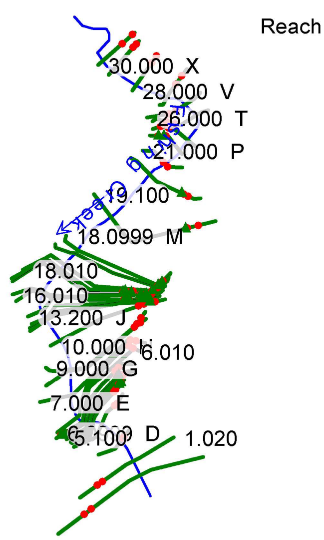
SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
100.00	550.00	0.0	0.0	541.50	48800.00	559.17	18851.92	559.35	2041.46	0.0	0.0	559.17
100.00	550.00	0.0	0.0	541.50	48800.00	560.10	18660.13	560.32	1577.18	1283.24	2860.43	559.17
101.00	180.00	0.0	0.0	542.80	48800.00	559.25	15580.47	559.56	1885.41	0.0	0.0	0.0
101.00	180.00	0.0	0.0	542.80	48800.00	560.17	15018.75	560.55	1457.00	1246.00	2703.00	0.0
102.00	740.00	0.0	0.0	542.30	48800.00	559.95	12496.16	560.48	1649.06	0.0	0.0	0.0
102.00	740.00	0.0	0.0	542.30	48800.00	560.88	12056.91	561.58	1157.00	1334.00	2491.00	0.0
103.00	285.00	0.0	0.0	545.00	48800.00	560.35	11293.14	561.00	1668.56	0.0	0.0	0.0
103.00	285.00	0.0	0.0	545.00	48800.00	561.29	11034.38	562.13	1046.00	1351.00	2397.00	0.0
104.00	380.00	0.0	0.0	543.00	48800.00	560.93	7695.59	562.94	1141.62	0.0	0.0	0.0
104.00	380.00	0.0	0.0	543.00	48800.00	561.92	8234.01	563.81	699.81	1705.19	2405.00	560.93
106.01	145.00	0.0	0.0	541.00	48800.00	561.36	7531.61	564.17	689.58	0.0	0.0	0.0
106.01	145.00	0.0	0.0	541.00	48800.00	562.34	7773.07	564.86	404.00	1655.00	2059.00	0.0
106.02	30.00	557.10	557.90	541.00	48800.00	562.76	8985.06	564.83	718.69	0.0	0.0	0.0
106.02	30.00	557.10	557.90	541.00	48800.00	562.87	8228.50	565.18	404.00	1655.00	2059.00	0.0
106.00	100.00	0.0	0.0	541.50	48800.00	564.22	12000.70	565.35	723.02	0.0	0.0	0.0
106.00	100.00	0.0	0.0	541.50	48800.00	564.28	10505.16	565.72	404.00	1655.00	2059.00	0.0
107.00	755.00	0.0	0.0	547.00	48800.00	565.64	13315.87	566.40	746.55	0.0	0.0	0.0
107.00	755.00	0.0	0.0	547.00	48800.00	566.10	12376.76	567.04	582.72	1488.28	2071.00	565.64
108.00	350.00	0.0	0.0	546.50	48800.00	566.11	13687.47	566.80	858.02	0.0	0.0	0.0
108.00	350.00	0.0	0.0	546.50	48800.00	566.61	12990.66	567.49	589.69	1348.07	1937.76	566.11
109.00	365.00	0.0	0.0	550.00	48800.00	566.49	13316.17	567.27	870.00	0.0	0.0	0.0
109.00	365.00	0.0	0.0	550.00	48800.00	567.04	12785.90	568.00	556.09	1280.06	1836.16	566.49
110.00	580.00	0.0	0.0	549.80	48800.00	567.19	12511.01	568.13	711.89	0.0	0.0	0.0
110.00	580.00	0.0	0.0	549.80	48800.00	567.86	12323.36	568.88	508.94	1095.00	1603.94	567.19
111.00	550.00	0.0	0.0	551.70	48800.00	568.20	10558.88	569.06	834.59	0.0	0.0	0.0
111.00	550.00	0.0	0.0	551.70	48800.00	568.76	9779.16	569.95	603.61	1164.16	1767.76	568.20
112.00	405.00	0.0	0.0	553.10	48800.00	569.03	11583.23	569.81	924.43	0.0	0.0	0.0
112.00	405.00	0.0	0.0	553.10	48800.00	569.93	12047.24	570.75	771.00	1169.00	1940.00	0.0
113.00	100.00	0.0	0.0	551.50	48800.00	569.12	8662.97	570.38	780.47	0.0	0.0	0.0
113.00	100.00	0.0	0.0	551.50	48800.00	570.01	9125.93	571.29	670.00	1160.00	1830.00	0.0
114.00	550.00	0.0	0.0	551.70	48800.00	570.75	9348.90	572.08	882.01	0.0	0.0	0.0
114.00	550.00	0.0	0.0	551.70	48800.00	571.50	9573.15	572.91	744.00	1256.00	2000.00	0.0
115.00	510.00	0.0	0.0	555.00	48800.00	572.33	9725.49	573.15	1108.86	0.0	0.0	0.0
115.00	510.00	0.0	0.0	555.00	48800.00	573.15	10872.74	573.86	1041.00	1189.00	2230.00	0.0
116.00	265.00	0.0	0.0	553.00	48800.00	573.19	10925.59	573.79	1545.66	0.0	0.0	0.0
116.00	265.00	0.0	0.0	553.00	48800.00	573.85	11881.51	574.38	1422.00	1283.00	2705.00	0.0

SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
117.00	525.00	0.0	0.0	553.70	48800.00	574.02	11774.34	574.36	2272.73	0.0	0.0	0.0
117.00	525.00	0.0	0.0	553.70	48800.00	574.49	11924.07	574.86	1566.99	2303.00	3870.00	0.0
118.00	265.00	0.0	0.0	558.00	48800.00	574.35	12622.48	574.80	2099.04	0.0	0.0	0.0
118.00	265.00	0.0	0.0	558.00	48800.00	574.83	13416.88	575.26	1681.99	2041.00	3723.00	0.0
119.00	420.00	0.0	0.0	559.20	48800.00	575.10	13608.56	575.37	2087.97	0.0	0.0	0.0
119.00	420.00	0.0	0.0	559.20	48800.00	575.45	11810.41	575.86	1615.96	1892.00	3507.96	575.10
120.00	765.00	0.0	0.0	560.80	48800.00	576.02	14201.91	576.23	2103.10	0.0	0.0	0.0
120.00	765.00	0.0	0.0	560.80	48800.00	576.69	11929.97	577.04	1656.19	1379.00	3035.19	576.02
121.00	840.00	0.0	0.0	562.10	48800.00	576.88	15358.18	577.10	2261.07	0.0	0.0	0.0
121.00	840.00	0.0	0.0	562.10	48800.00	577.85	14827.30	578.11	1844.72	1244.00	3088.72	576.88
122.00	715.00	0.0	0.0	563.00	48800.00	577.76	10122.26	578.11	2248.59	0.0	0.0	0.0
122.00	715.00	0.0	0.0	563.00	48800.00	578.77	10100.05	579.17	1852.05	1261.00	3113.05	577.76
123.00	545.00	0.0	0.0	564.70	48800.00	579.01	10671.24	579.42	2300.24	0.0	0.0	0.0
123.00	545.00	0.0	0.0	564.70	42400.00	579.99	9020.65	580.54	1630.28	1328.00	2958.29	579.01
123.50	300.00	0.0	0.0	567.00	42400.00	580.90	12851.13	581.11	3218.24	0.0	0.0	0.0
123.50	300.00	0.0	0.0	567.00	42400.00	581.90	12488.51	582.18	1833.30	1328.00	3161.30	580.90
124.00	320.00	0.0	0.0	568.00	42400.00	581.33	5994.19	582.78	1945.82	0.0	0.0	0.0
124.00	320.00	0.0	0.0	568.00	42400.00	582.33	6354.89	583.87	1055.84	1266.00	2989.62	581.33
124.10	115.00	0.0	0.0	568.60	42400.00	582.94	7730.90	583.80	2259.84	0.0	0.0	0.0
124.10	115.00	0.0	0.0	568.60	42400.00	583.89	8210.98	584.79	1286.95	1266.00	3138.20	582.94
126.01	115.00	0.0	0.0	568.00	42400.00	583.65	7182.86	584.68	2329.50	0.0	0.0	0.0
126.01	115.00	0.0	0.0	568.00	42400.00	584.47	6922.02	585.85	1401.06	1269.00	2670.06	583.65
126.02	80.00	0.0	0.0	568.00	42400.00	587.48	17223.13	587.67	2338.46	0.0	0.0	0.0
126.02	80.00	0.0	0.0	568.00	42400.00	588.31	16756.82	588.53	1830.84	1269.00	3099.85	587.48
127.00	835.00	0.0	0.0	570.50	42400.00	587.76	10617.04	588.35	1998.18	0.0	0.0	0.0
127.00	835.00	0.0	0.0	570.50	42400.00	588.61	10599.63	589.30	1139.76	1103.00	2242.76	587.75
128.00	750.00	0.0	0.0	572.00	42400.00	588.52	9239.14	589.44	1479.91	0.0	0.0	0.0
128.00	750.00	0.0	0.0	572.00	42400.00	589.40	9376.88	590.38	892.73	1111.00	2003.73	588.52
129.00	415.00	0.0	0.0	573.50	42400.00	589.57	9119.10	590.40	1237.10	0.0	0.0	0.0
129.00	415.00	0.0	0.0	573.50	42400.00	590.53	9364.70	591.31	941.66	1144.00	2085.66	589.57
130.00	632.00	0.0	0.0	572.00	42400.00	591.48	9079.75	592.11	1778.53	0.0	0.0	0.0
130.00	632.00	0.0	0.0	572.00	42400.00	592.30	8967.89	592.98	1335.98	1066.00	2401.98	591.48
131.00	800.00	0.0	0.0	577.00	42400.00	592.80	12110.71	593.14	2134.88	0.0	0.0	0.0
131.00	800.00	0.0	0.0	577.00	42400.00	593.65	11748.30	594.07	1478.78	1233.66	2712.44	592.80
132.00	550.00	0.0	0.0	580.00	42400.00	593.33	10720.20	593.67	2130.94	0.0	0.0	0.0
132.00	550.00	0.0	0.0	580.00	42400.00	594.25	11274.75	594.61	1554.16	1185.50	2739.66	593.33

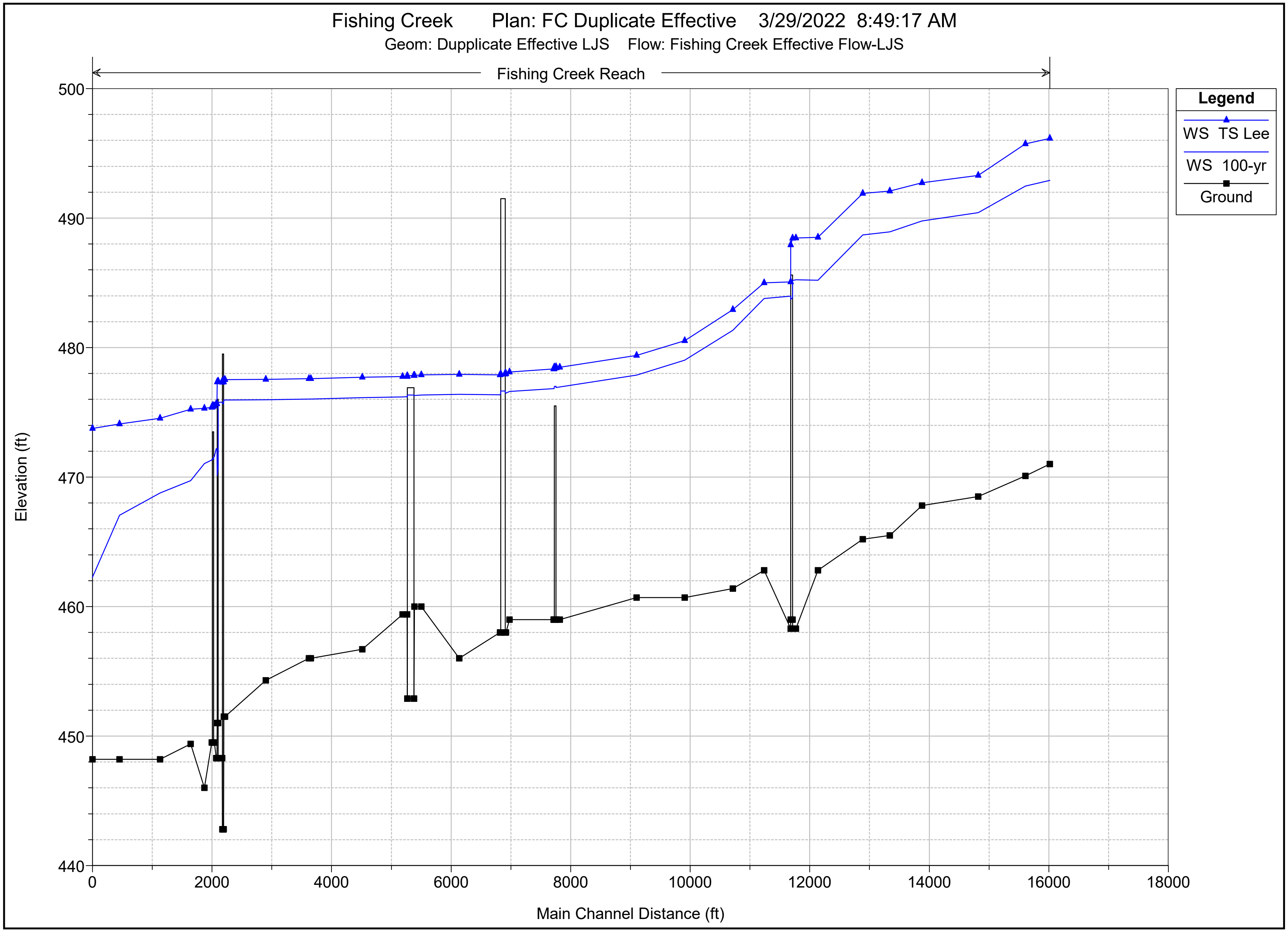
SECTION NUMBER	CHANNEL LENGTH	MIN EL OF ROADWAY	MAX EL OF LOW CHORD	MIN EL GROUND	DISCHARGE %CFS<	CWSEL	TQ	EG	TOPWID	STENCL	STENCR	WSELK
133.00	560.00	0.0	0.0	580.80	42400.00	594.03	10545.95	594.30	2618.27	0.0	0.0	0.0
133.00	560.00	0.0	0.0	580.80	42400.00	594.92	11000.30	595.22	2122.06	1259.86	3387.00	594.03
134.00	865.00	0.0	0.0	581.00	42400.00	594.82	6816.21	595.34	2274.60	0.0	0.0	0.0
134.00	865.00	0.0	0.0	581.00	42400.00	595.63	6982.48	596.19	2043.33	1326.24	3372.00	594.82
135.00	625.00	0.0	0.0	585.00	42400.00	597.13	6934.07	597.65	2287.90	0.0	0.0	0.0
135.00	625.00	0.0	0.0	585.00	42400.00	597.82	7265.91	598.35	1993.27	1393.73	3387.00	597.13
136.00	575.00	0.0	0.0	586.00	42400.00	598.49	9298.87	598.85	2124.04	0.0	0.0	0.0
136.00	575.00	0.0	0.0	586.00	42400.00	599.09	9679.76	599.46	1814.61	1353.39	3168.00	598.49
137.00	600.00	0.0	0.0	586.50	42400.00	599.38	8614.41	599.81	1950.40	0.0	0.0	0.0
137.00	600.00	0.0	0.0	586.50	42400.00	599.88	7992.56	600.49	1387.48	1377.98	2765.46	599.38
138.00	615.00	0.0	0.0	588.50	42400.00	600.55	9448.60	600.92	2029.66	0.0	0.0	0.0
138.00	615.00	0.0	0.0	588.50	42400.00	601.21	8781.35	601.77	1160.00	1375.00	2535.00	0.0
139.00	590.00	0.0	0.0	589.00	42400.00	601.65	6854.02	602.57	1826.18	0.0	0.0	0.0
139.00	590.00	0.0	0.0	589.00	42400.00	602.40	6569.57	603.68	1085.00	1285.00	2370.00	0.0
140.00	385.00	0.0	0.0	589.50	42400.00	602.99	9410.84	603.58	1771.99	0.0	0.0	0.0
140.00	385.00	0.0	0.0	589.50	42400.00	603.99	9517.05	604.74	1045.00	1310.00	2355.00	0.0
141.00	890.00	0.0	0.0	590.50	42400.00	604.59	8544.65	605.30	1870.47	0.0	0.0	0.0
141.00	890.00	0.0	0.0	590.50	42400.00	605.58	8811.52	606.41	1187.00	1128.00	2315.00	0.0
142.00	365.00	0.0	0.0	592.00	42400.00	605.61	12101.39	605.94	2016.60	0.0	0.0	0.0
142.00	365.00	0.0	0.0	592.00	42400.00	606.60	12023.70	607.04	1115.00	1220.00	2335.00	0.0
143.01	267.00	0.0	0.0	591.30	42400.00	605.86	8077.52	606.75	1689.75	0.0	0.0	0.0
143.01	267.00	0.0	0.0	591.30	42400.00	606.87	8502.29	607.77	1067.46	1222.00	2289.46	605.86
143.00	268.00	0.0	0.0	592.00	42400.00	606.62	8181.22	607.48	1691.41	0.0	0.0	0.0
143.00	268.00	0.0	0.0	592.00	42400.00	607.59	8762.01	608.43	1115.48	1222.00	2337.48	606.62
144.00	600.00	0.0	0.0	596.30	42400.00	608.16	8488.36	608.72	1671.90	0.0	0.0	0.0
144.00	600.00	0.0	0.0	596.30	42400.00	608.83	7941.61	609.64	1053.38	1406.73	2460.12	608.16
145.00	560.00	0.0	0.0	597.80	42400.00	609.10	5208.13	611.22	1203.16	0.0	0.0	0.0
145.00	560.00	0.0	0.0	597.80	42400.00	610.01	5712.21	612.11	685.16	1279.49	1964.66	609.10

SECTION NUMBER	DISCHARGE CFS	CWSEL	CWSEL DIFF EACH Q	CWSEL DIFF EACH SECTION	CWSEL-WSELK	TOPWID	T.W. DIFF	LENGTH
100.000	48800.000	559.167	0.0	0.0	0.0	2041.458	0.0	550.000
100.000	48800.000	560.103	0.936	0.0	0.0	1577.181	464.277	550.000
101.000	48800.000	559.254	0.0	0.088	0.0	1885.409	0.0	180.000
101.000	48800.000	560.169	0.914	0.066	0.0	1456.999	428.410	180.000
102.000	48800.000	559.952	0.0	0.698	0.0	1649.057	0.0	740.000
102.000	48800.000	560.878	0.926	0.709	0.0	1156.999	492.058	740.000
103.000	48800.000	560.351	0.0	0.399	0.0	1668.560	0.0	285.000
103.000	48800.000	561.294	0.943	0.417	0.0	1045.999	622.561	285.000
104.000	48800.000	560.926	0.0	0.575	0.0	1141.621	0.0	380.000
104.000	48800.000	561.921	0.995	0.626	0.995	699.813	441.808	380.000
106.010	48800.000	561.365	0.0	0.439	0.0	689.575	0.0	145.000

D.2 Effective Model in HEC-RAS Model Output



Reach
30.000 X
28.000 V
26.000 T
21.000 P
19.100
18.0999 M
18.010
16.010
13.200 J
10.000 I
6.010
9.000 G
7.000 E
D
5.100
1.020


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
Fishing Creek Reach
Legend
WS TS Lee
WS 100-yr
Ground
Elevation (ft)
500
490
480
470
460
450
440
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Main Channel Distance (ft)

HEC-RAS Plan: FC Duplicate Eff   River: Fishing Creek   Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	30.000 X	100-yr	58900.00	471.00	492.92		493.42	0.000564	6.53	13507.38	1018.62	0.28
Reach	30.000 X	TS Lee	78700.00	471.00	496.15		496.73	0.000530	7.06	16839.80	1047.34	0.28
Reach	29.000 W	100-yr	58900.00	470.10	492.47		493.15	0.000797	9.20	13798.48	1038.03	0.35
Reach	29.000 W	TS Lee	78700.00	470.10	495.73		496.47	0.000760	9.87	17201.74	1052.55	0.35
Reach	28.000 V	100-yr	58900.00	468.50	490.42		492.21	0.001563	11.72	6773.32	592.31	0.48
Reach	28.000 V	TS Lee	78700.00	468.50	493.29		495.50	0.001642	13.21	8536.08	637.04	0.50
Reach	27.000 U	100-yr	58900.00	467.80	489.78		490.91	0.000915	9.60	9470.83	733.90	0.37
Reach	27.000 U	TS Lee	78700.00	467.80	492.73		494.09	0.000961	10.75	11696.03	776.33	0.39
Reach	26.000 T	100-yr	58900.00	465.50	488.94		490.33	0.001284	11.27	9780.41	942.04	0.44
Reach	26.000 T	TS Lee	78700.00	465.50	492.09		493.54	0.001194	11.95	12864.01	1004.77	0.43
Reach	25.000 S	100-yr	58900.00	465.20	488.69		489.44	0.000775	8.46	13606.04	1384.56	0.34
Reach	25.000 S	TS Lee	78700.00	465.20	491.91		492.65	0.000681	8.79	18082.22	1404.59	0.33
Reach	24.000 R	100-yr	58900.00	462.80	485.19	478.93	487.74	0.001954	13.11	5625.45	935.28	0.53
Reach	24.000 R	TS Lee	78700.00	462.80	488.52		491.06	0.001804	13.64	8943.82	1017.58	0.52
Reach	23.0999 Q	100-yr	58900.00	458.30	485.24		486.93	0.001186	10.59	6730.50	839.00	0.42
Reach	23.0999 Q	TS Lee	78700.00	458.30	488.45		490.36	0.001152	11.53	9487.83	876.01	0.42
Reach	23.020	100-yr	58900.00	458.30	485.18	475.66	486.86	0.001202	10.60	6630.86	838.30	0.42
Reach	23.020	TS Lee	78700.00	458.30	488.45	478.92	490.23	0.001112	11.28	9404.02	875.98	0.41
Reach	23.015		Bridge									
Reach	23.010	100-yr	58900.00	458.30	483.98	475.67	486.20	0.001459	12.20	5661.51	740.58	0.47
Reach	23.010	TS Lee	78700.00	458.30	485.08	478.92	488.44	0.002108	15.17	6544.26	837.13	0.56
Reach	21.000 P	100-yr	58900.00	462.80	483.80		485.15	0.001287	9.96	8339.94	1331.05	0.43
Reach	21.000 P	TS Lee	78700.00	462.80	485.00		486.83	0.001659	11.84	9980.52	1394.43	0.49
Reach	20.000 O	100-yr	58900.00	461.40	481.34	481.34	484.09	0.002405	15.03	7545.80	2024.54	0.60
Reach	20.000 O	TS Lee	78700.00	461.40	482.93	482.93	485.66	0.002460	16.02	10789.25	2054.59	0.62
Reach	19.100	100-yr	58900.00	460.70	479.02	472.96	479.40	0.000551	6.43	20218.30	3664.80	0.28
Reach	19.100	TS Lee	78700.00	460.70	480.54	475.39	480.92	0.000556	6.85	25845.75	3757.01	0.28
Reach	19.000 N	100-yr	58900.00	460.70	477.87	472.95	478.48	0.000884	7.76	16229.94	3338.01	0.35
Reach	19.000 N	TS Lee	78700.00	460.70	479.40	476.39	479.98	0.000849	8.10	21593.80	3700.87	0.35
Reach	18.0999 M	100-yr	58900.00	459.00	476.96	474.81	477.21	0.000525	6.48	23499.09	3716.78	0.27
Reach	18.0999 M	TS Lee	78700.00	459.00	478.47	474.81	478.73	0.000524	6.84	29237.44	3868.15	0.28
Reach	18.040	100-yr	58900.00	459.00	476.93	474.71	477.18	0.000532	6.52	23373.94	3713.52	0.28
Reach	18.040	TS Lee	78700.00	459.00	478.44	474.71	478.70	0.000530	6.87	29109.95	3864.96	0.28
Reach	18.030	100-yr	58900.00	459.00	476.92	474.71	477.18	0.000534	6.52	23352.41	3712.94	0.28
Reach	18.030	TS Lee	78700.00	459.00	478.43	474.71	478.70	0.000531	6.88	29086.95	3864.36	0.28
Reach	18.025		Bridge									
Reach	18.020	100-yr	58900.00	459.00	476.83	474.61	477.10	0.000554	6.62	23023.97	3704.08	0.28
Reach	18.020	TS Lee	78700.00	459.00	478.35	474.61	478.62	0.000547	6.96	28768.52	3856.11	0.28
Reach	18.010	100-yr	58900.00	459.00	476.83	474.61	477.09	0.000555	6.63	23001.71	3703.48	0.28
Reach	18.010	TS Lee	78700.00	459.00	478.35	474.61	478.61	0.000548	6.97	28745.81	3855.52	0.28
Reach	16.0999 L	100-yr	58900.00	459.00	476.61	471.93	476.75	0.000305	4.68	29020.44	4292.82	0.21
Reach	16.0999 L	TS Lee	78700.00	459.00	478.12	474.20	478.27	0.000318	5.07	35654.21	4502.95	0.21
Reach	16.040	100-yr	58900.00	458.00	476.48	472.36	476.72	0.000421	6.09	23580.70	4273.25	0.25
Reach	16.040	TS Lee	78700.00	458.00	477.98	474.21	478.24	0.000440	6.56	29419.54	4487.15	0.26
Reach	16.030	100-yr	58900.00	458.00	476.51	472.51	476.70	0.000512	5.39	22671.96	3286.66	0.22
Reach	16.030	TS Lee	78700.00	458.00	478.01	474.01	478.22	0.000542	5.75	27705.68	3411.08	0.23
Reach	16.025		Bridge									
Reach	16.020	100-yr	58900.00	458.00	476.43	472.51	476.62	0.000528	5.46	22399.62	3279.91	0.22
Reach	16.020	TS Lee	78700.00	458.00	477.97	474.01	478.18	0.000550	5.79	27543.39	3407.10	0.23
Reach	16.010	100-yr	58900.00	458.00	476.36	472.36	476.61	0.000440	6.20	23124.49	4255.85	0.25
Reach	16.010	TS Lee	78700.00	458.00	477.90	474.01	478.16	0.000453	6.63	29089.08	4477.51	0.26
Reach	14.000 K	100-yr	58900.00	456.00	476.39	469.69	476.49	0.000234	3.91	28986.30	4240.59	0.17

HEC-RAS Plan: FC Duplicate Eff River: Fishing Creek Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	14.000 K	TS Lee	78700.00	456.00	477.93	471.06	478.04	0.000239	4.19	35659.46	4390.48	0.18
Reach	13.200 J	100-yr	58900.00	460.00	476.34	470.44	476.44	0.000295	4.12	27118.14	4245.36	0.19
Reach	13.200 J	TS Lee	78700.00	460.00	477.89	471.50	478.00	0.000288	4.35	33863.21	4427.62	0.19
Reach	13.100	100-yr	58900.00	460.00	476.30	470.44	476.41	0.000299	4.14	26982.44	4240.97	0.19
Reach	13.100	TS Lee	78700.00	460.00	477.86	471.50	477.97	0.000292	4.37	33725.85	4424.33	0.19
Reach	12.100	100-yr	58900.00	452.90	476.29	470.09	476.40	0.000274	4.34	26813.94	4043.40	0.18
Reach	12.100	TS Lee	78700.00	452.90	477.84	471.35	477.97	0.000279	4.58	33345.60	4362.96	0.18
Reach	12.015		Bridge									
Reach	12.010	100-yr	58900.00	452.90	476.19	470.10	476.31	0.000284	4.40	26416.23	4023.37	0.18
Reach	12.010	TS Lee	78700.00	452.90	477.77	471.34	477.90	0.000285	4.63	33043.36	4348.42	0.19
Reach	11.100	100-yr	58900.00	459.40	476.21	470.00	476.28	0.000176	3.56	33083.96	4319.33	0.16
Reach	11.100	TS Lee	78700.00	459.40	477.80	470.77	477.88	0.000181	3.85	39894.33	4504.08	0.16
Reach	11.000 I	100-yr	58900.00	459.40	476.18		476.25	0.000176	3.55	33286.38	4316.08	0.16
Reach	11.000 I	TS Lee	78700.00	459.40	477.76		477.84	0.000181	3.84	40245.63	4499.33	0.16
Reach	10.000 H	100-yr	58900.00	456.70	476.13		476.19	0.000133	3.09	37349.86	4653.96	0.14
Reach	10.000 H	TS Lee	78700.00	456.70	477.71		477.78	0.000141	3.38	44853.07	4843.49	0.14
Reach	9.000 G	100-yr	58900.00	456.00	476.03		476.09	0.000112	3.08	38750.25	4810.68	0.13
Reach	9.000 G	TS Lee	78700.00	456.00	477.60		477.67	0.000120	3.37	46468.77	4998.72	0.13
Reach	8.000 F	100-yr	58900.00	456.00	476.02		476.08	0.000106	3.02	39318.10	4813.99	0.12
Reach	8.000 F	TS Lee	78700.00	456.00	477.60		477.67	0.000115	3.32	47041.16	5002.69	0.13
Reach	7.000 E	100-yr	58900.00	454.30	475.98		476.04	0.000111	3.16	39957.93	5124.54	0.13
Reach	7.000 E	TS Lee	78700.00	454.30	477.55		477.62	0.000118	3.43	48169.94	5313.65	0.13
Reach	6.0999 D	100-yr	58900.00	451.50	475.95		476.01	0.000108	3.31	40609.99	5351.07	0.12
Reach	6.0999 D	TS Lee	78700.00	451.50	477.52		477.59	0.000113	3.55	49195.93	5540.00	0.13
Reach	6.010	100-yr	58900.00	451.50	475.95	466.80	476.01	0.000108	3.30	40603.63	5350.93	0.12
Reach	6.010	TS Lee	78700.00	451.50	477.52	469.59	477.59	0.000113	3.54	49188.97	5539.85	0.13
Reach	5.100	100-yr	58900.00	442.80	475.68	464.88	475.95	0.000480	5.68	22706.31	4707.49	0.21
Reach	5.100	TS Lee	78700.00	442.80	477.34	468.44	477.55	0.000419	5.45	30809.85	5056.57	0.19
Reach	5.015		Bridge									
Reach	5.010	100-yr	58900.00	442.80	475.67		475.94	0.000482	5.70	22653.04	4702.46	0.21
Reach	5.010	TS Lee	78700.00	442.80	477.33		477.54	0.000420	5.46	30762.48	5054.37	0.19
Reach	4.200	100-yr	58900.00	448.30	475.78	463.41	475.82	0.000067	2.85	46651.49	5807.50	0.10
Reach	4.200	TS Lee	78700.00	448.30	477.41	466.34	477.46	0.000074	3.12	56222.23	5944.09	0.11
Reach	4.100	100-yr	58900.00	448.30	475.77	463.42	475.82	0.000067	2.85	46625.07	5807.11	0.10
Reach	4.100	TS Lee	78700.00	448.30	477.40	466.35	477.45	0.000074	3.12	56192.31	5943.66	0.11
Reach	4.025		Bridge									
Reach	4.020	100-yr	58900.00	448.30	472.20	463.42	472.37	0.000231	4.83	26486.85	5423.42	0.18
Reach	4.020	TS Lee	78700.00	448.30	475.66	466.35	475.74	0.000124	3.87	45944.95	5797.28	0.14
Reach	4.010	100-yr	58900.00	448.30	472.20		472.37	0.000231	4.84	26465.50	5422.88	0.18
Reach	4.010	TS Lee	78700.00	448.30	475.65		475.74	0.000124	3.87	45933.63	5797.12	0.14
Reach	3.200	100-yr	58900.00	449.50	471.59	465.35	472.16	0.000616	8.29	17621.49	4218.00	0.31
Reach	3.200	TS Lee	78700.00	449.50	475.48	470.29	475.66	0.000232	5.67	35756.42	5090.56	0.20
Reach	3.100	100-yr	58900.00	449.50	471.61	463.88	472.13	0.000541	7.50	18299.93	4227.85	0.29
Reach	3.100	TS Lee	78700.00	449.50	475.48	469.88	475.66	0.000213	5.27	36615.28	5090.43	0.19
Reach	3.021		Bridge									
Reach	3.020	100-yr	58900.00	449.50	471.43		472.00	0.000626	8.32	17562.99	4152.52	0.31
Reach	3.020	TS Lee	78700.00	449.50	475.41		475.58	0.000229	5.62	36250.17	5074.23	0.19
Reach	3.010	100-yr	58900.00	449.50	471.32	465.35	471.97	0.000694	8.73	16506.47	4093.27	0.33
Reach	3.010	TS Lee	78700.00	449.50	475.39	470.29	475.58	0.000239	5.75	35313.59	5070.63	0.20
Reach	2.000 C	100-yr	58900.00	446.00	471.04		471.86	0.000726	8.85	14483.08	3378.55	0.33
Reach	2.000 C	TS Lee	78700.00	446.00	475.30		475.55	0.000258	5.93	32830.11	4924.11	0.20

HEC-RAS Plan: FC Duplicate Eff River: Fishing Creek Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	1.100 B	100-yr	58900.00	449.40	469.72	464.20	471.40	0.003829	11.46	7339.74	1772.15	0.48
Reach	1.100 B	TS Lee	78700.00	449.40	475.24		475.41	0.000567	4.89	28415.49	4882.81	0.18
Reach	1.0999 A	100-yr	58900.00	448.20	468.76		470.21	0.001322	10.30	7424.44	1065.56	0.44
Reach	1.0999 A	TS Lee	78700.00	448.20	474.54		475.08	0.000463	7.38	22802.96	4798.27	0.27
Reach	1.020	100-yr	58900.00	448.20	467.06	462.31	469.06	0.002027	11.89	5869.60	766.05	0.53
Reach	1.020	TS Lee	78700.00	448.20	474.10		474.73	0.000538	7.85	20696.31	4751.21	0.29
Reach	1.010	100-yr	58900.00	448.20	462.26	462.26	467.17	0.007714	18.17	3463.22	372.22	0.97
Reach	1.010	TS Lee	78700.00	448.20	473.75	464.72	474.47	0.000604	8.24	19118.47	4288.01	0.31

Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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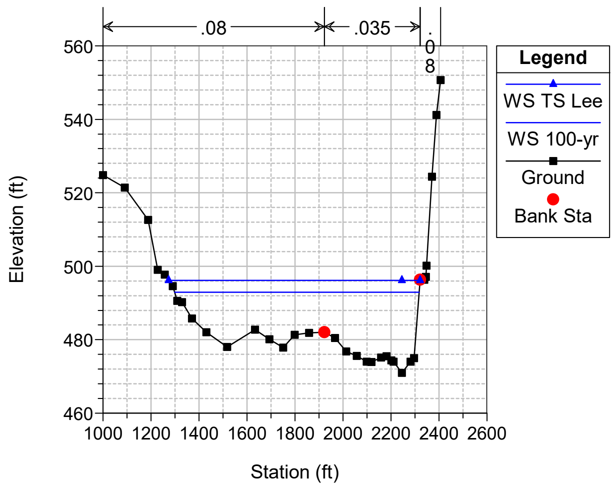

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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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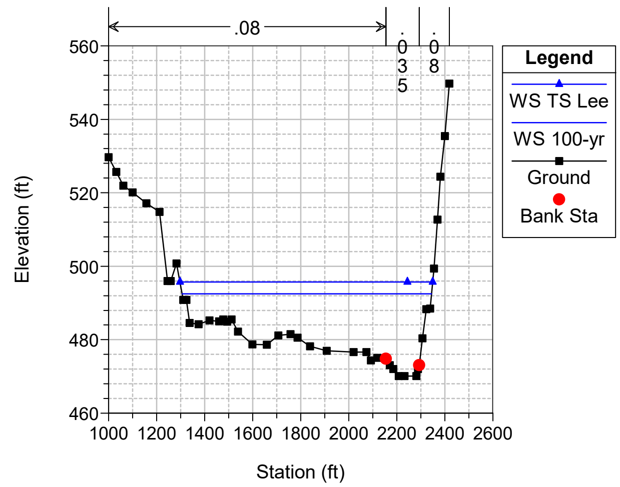

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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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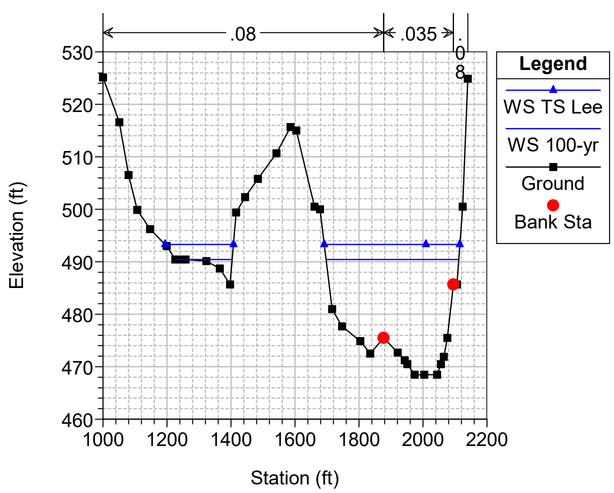

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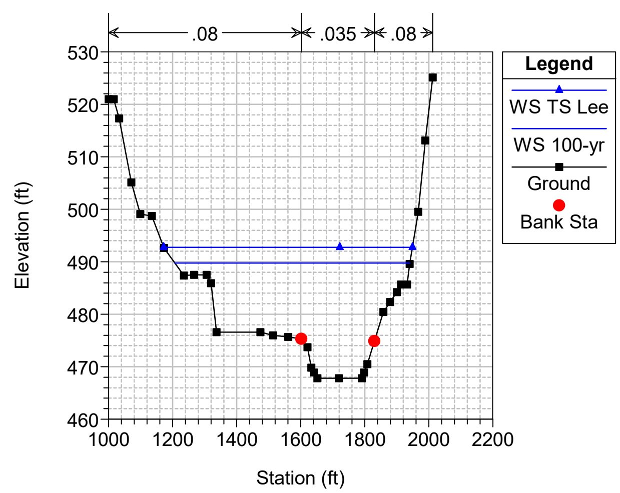

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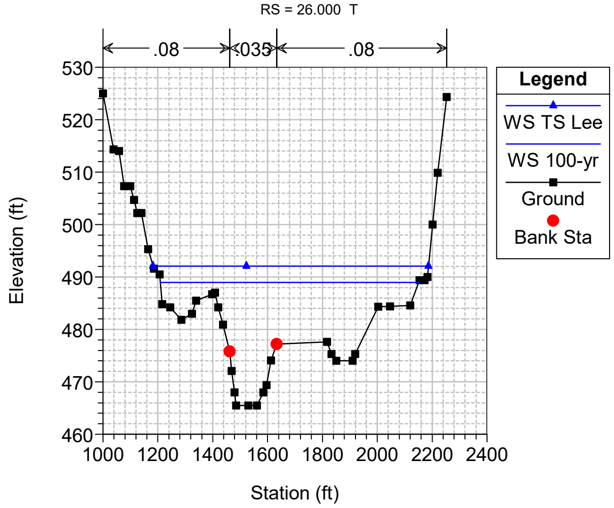

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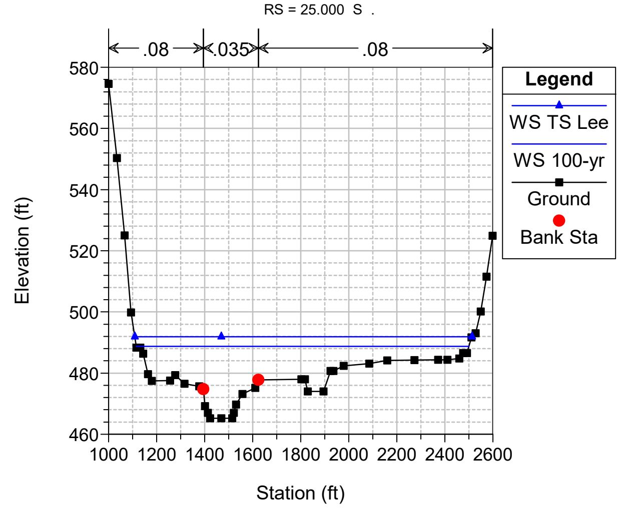

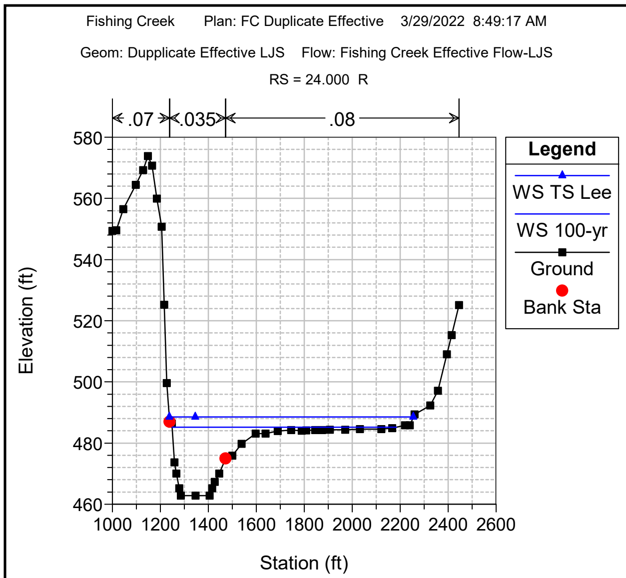
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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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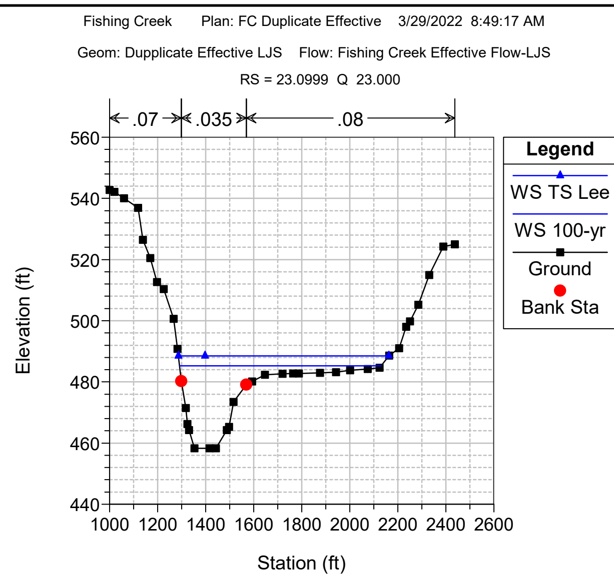
.07
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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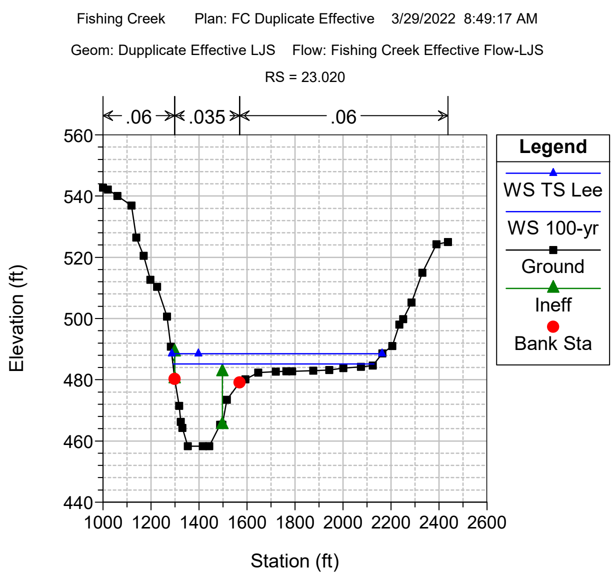
.07
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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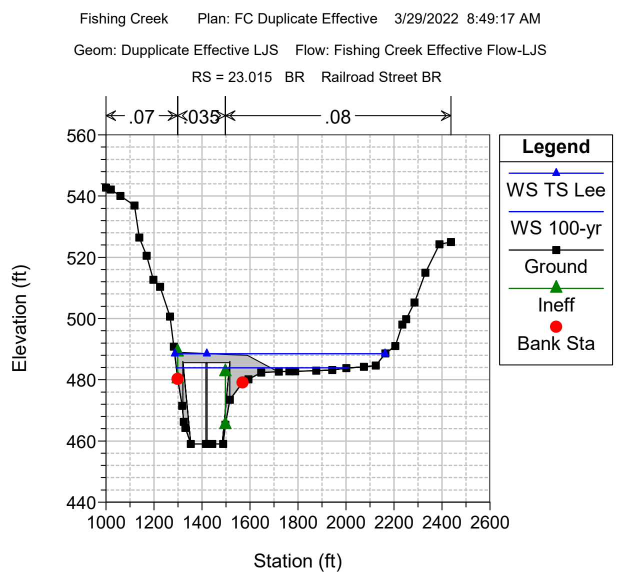
.06
.035
.06
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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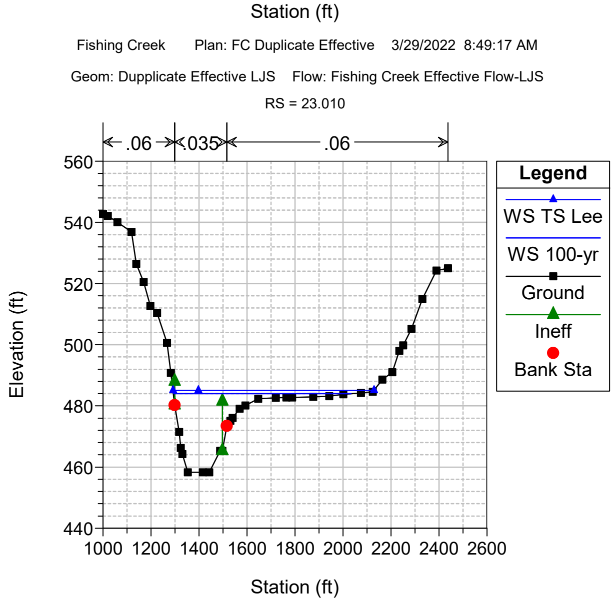
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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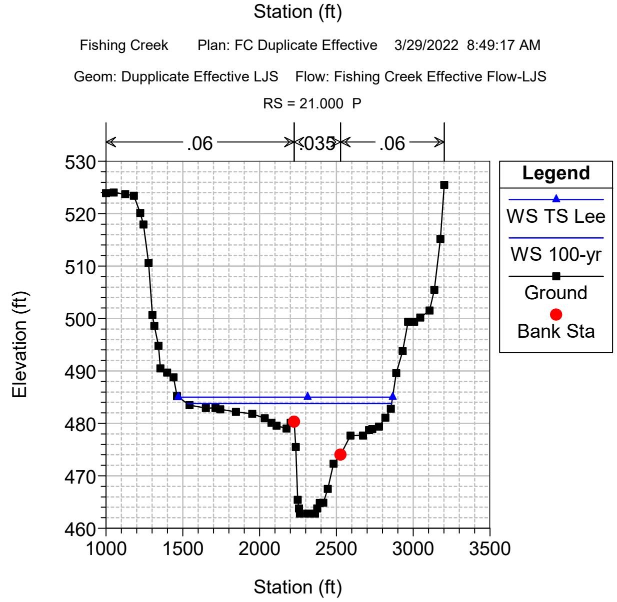
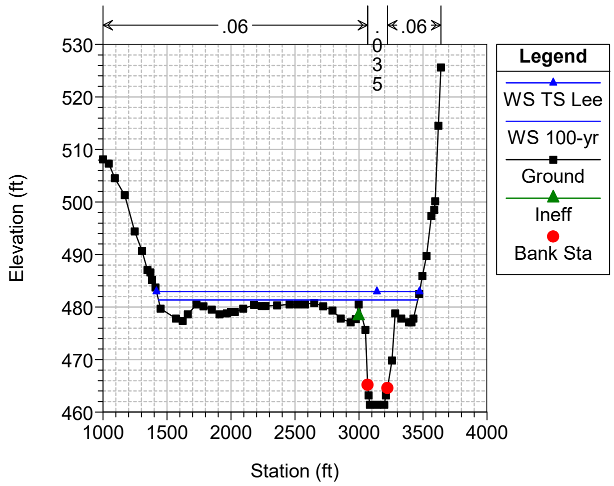
.06
.035
.06
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 21.000 P
.06
.035
.06
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 20.000 O



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
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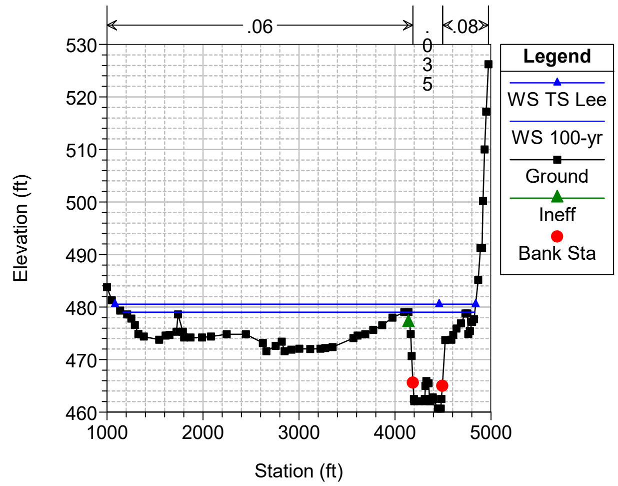

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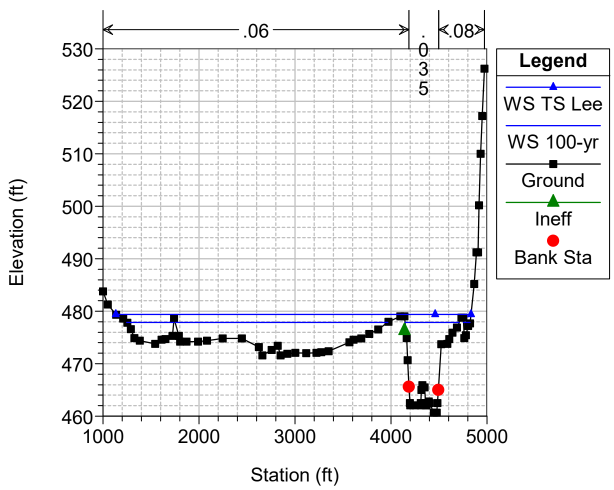
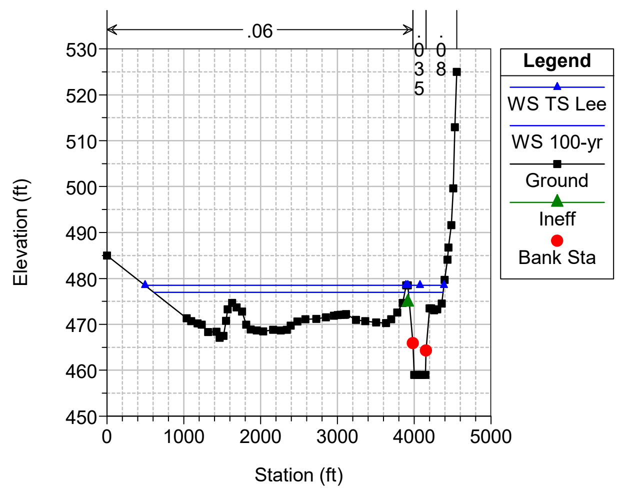
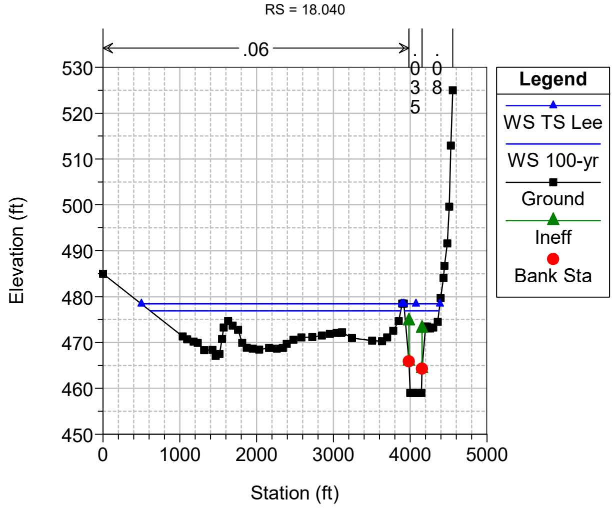
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 19.000 N



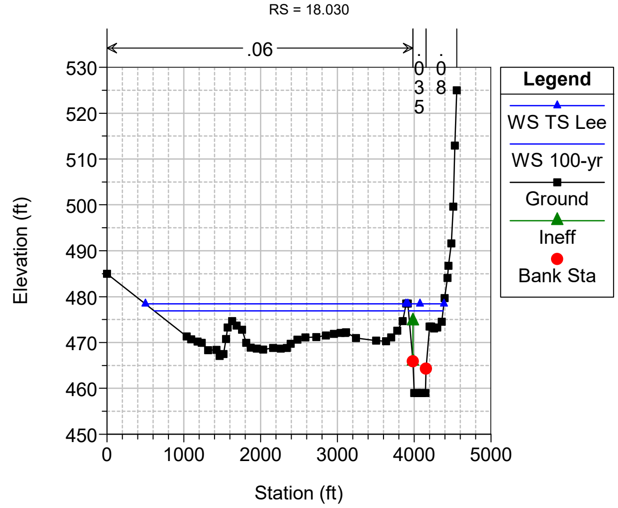
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.0999 M 18.000



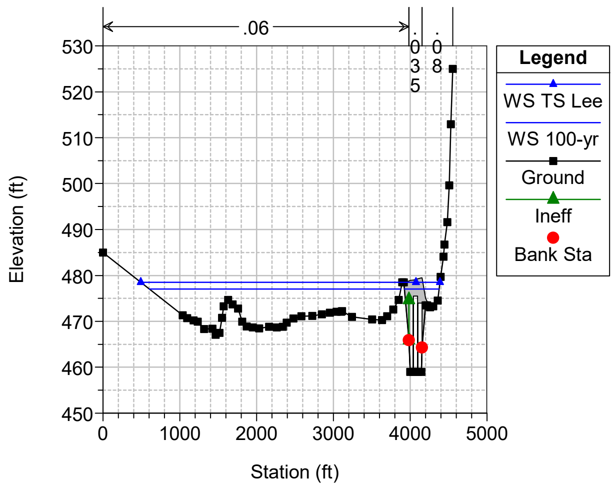
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.040



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.030



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.025 BR Red Mill Road (SR4003)



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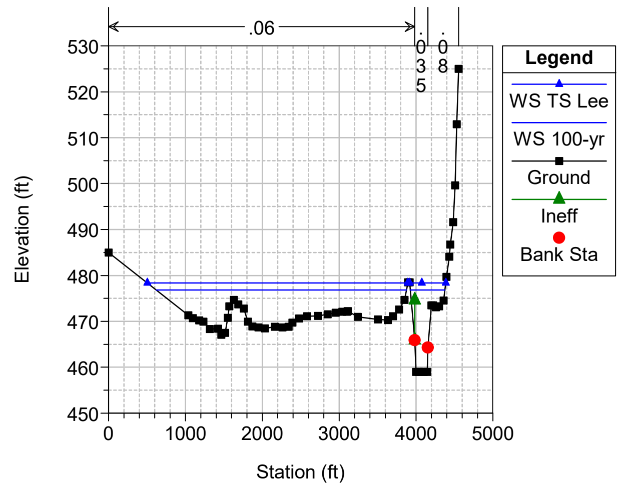
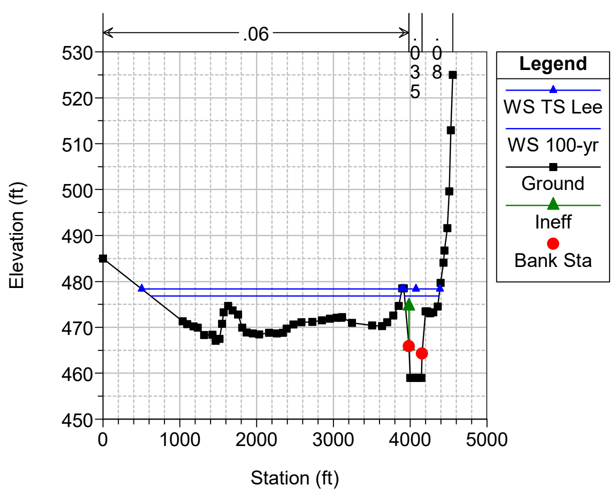
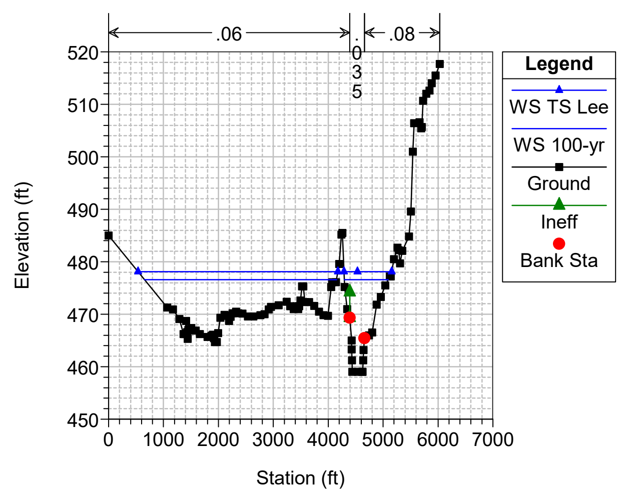
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.020



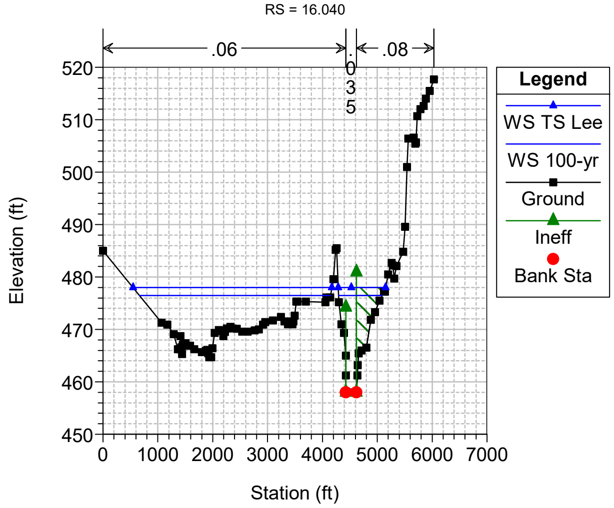
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 18.010



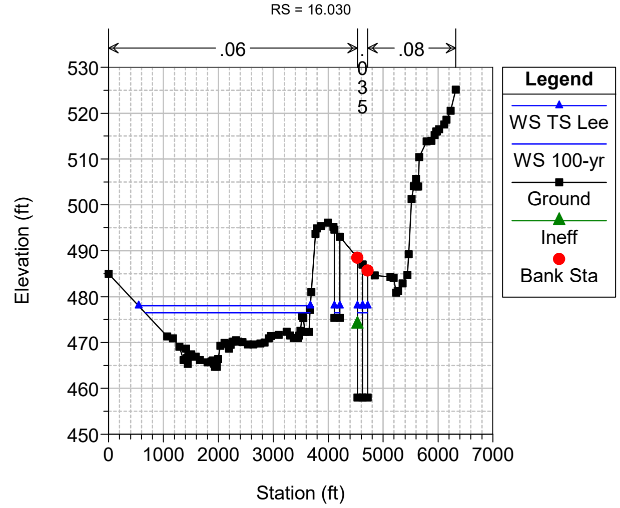
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.0999 L 16.000



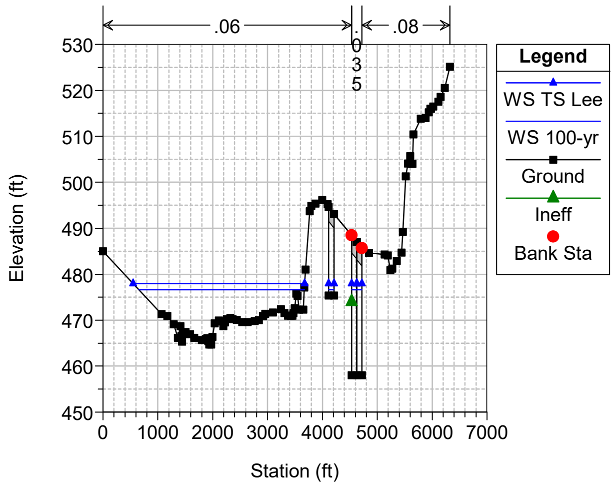
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.040



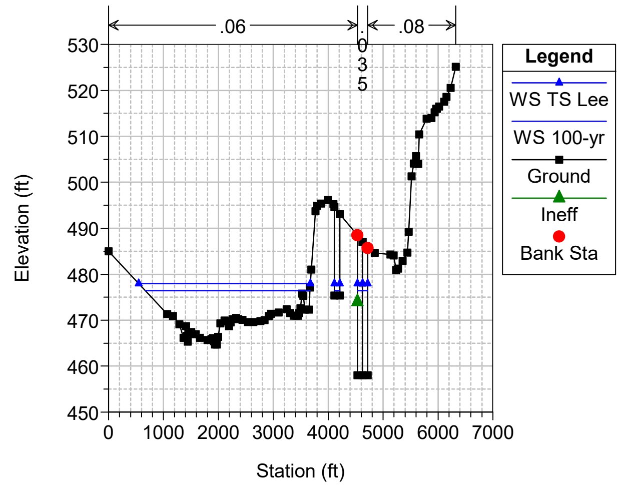
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.030



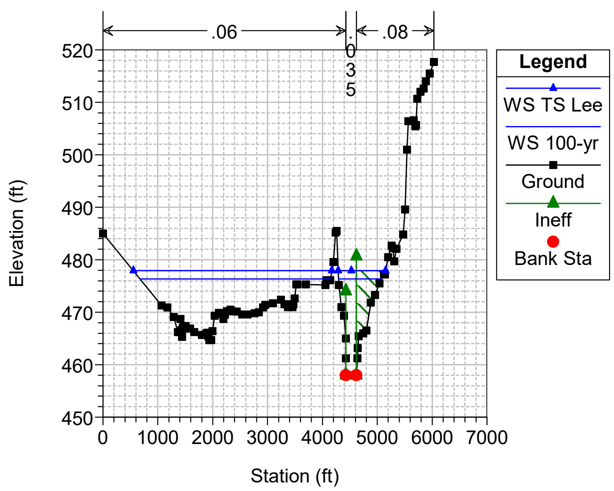
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.025 BR SR42 Mall Blvd over Fishing Creek and SR 11



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.020



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 16.010



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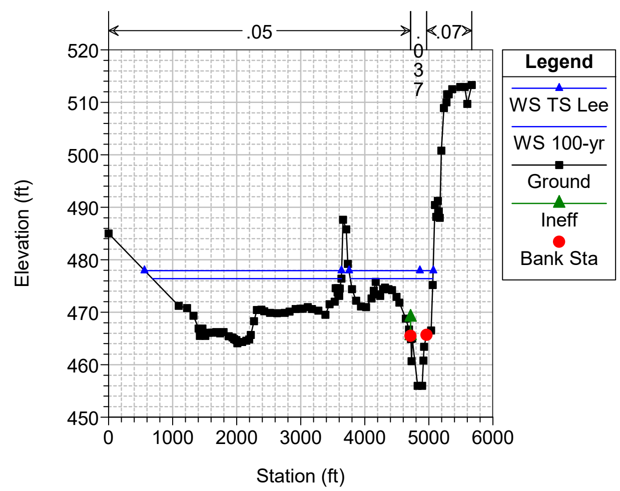
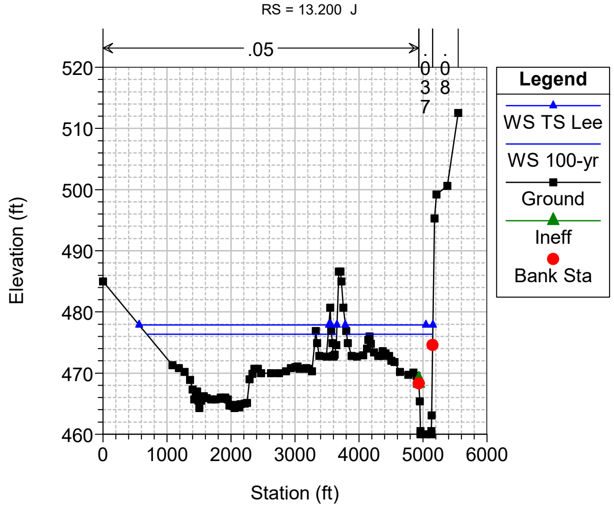
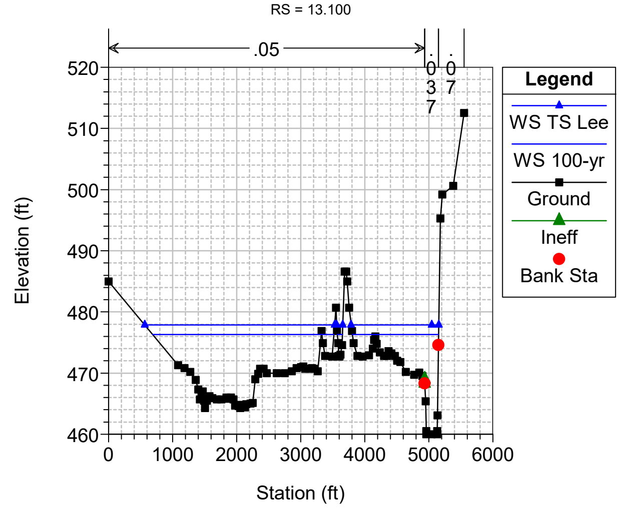
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 14.000 K



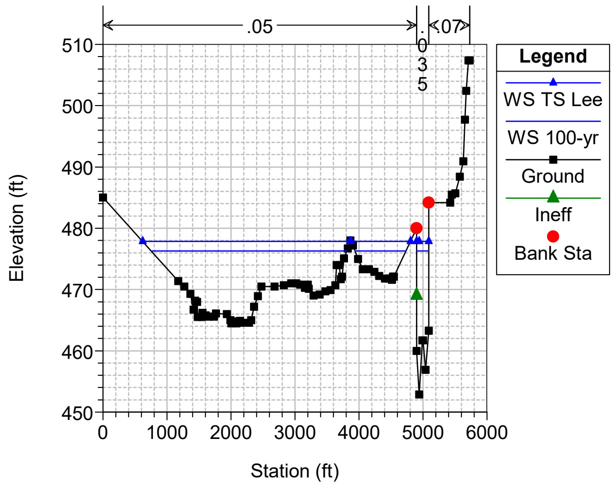
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 13.200 J



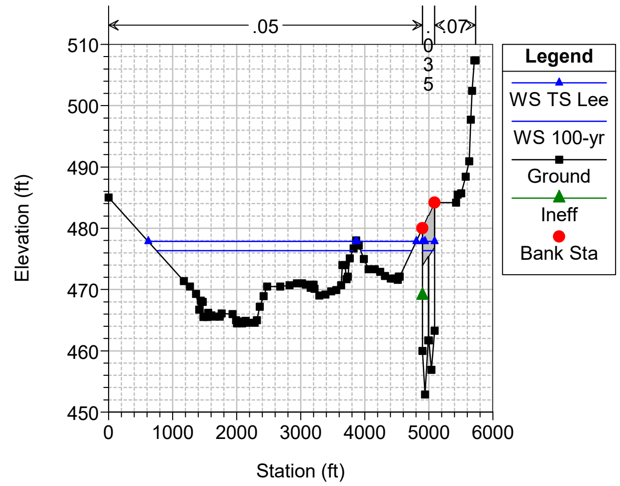
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 13.100



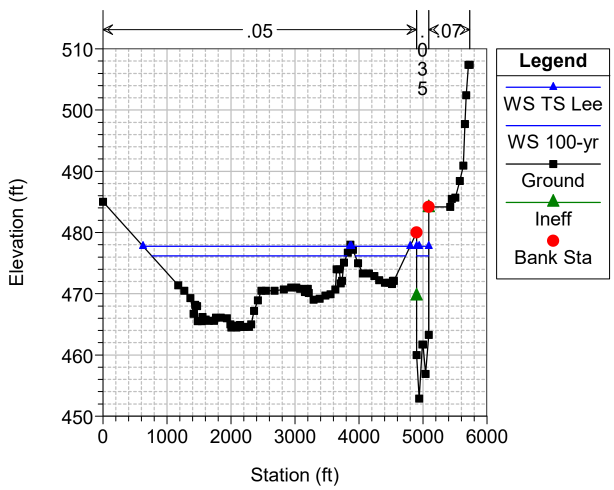
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 12.100



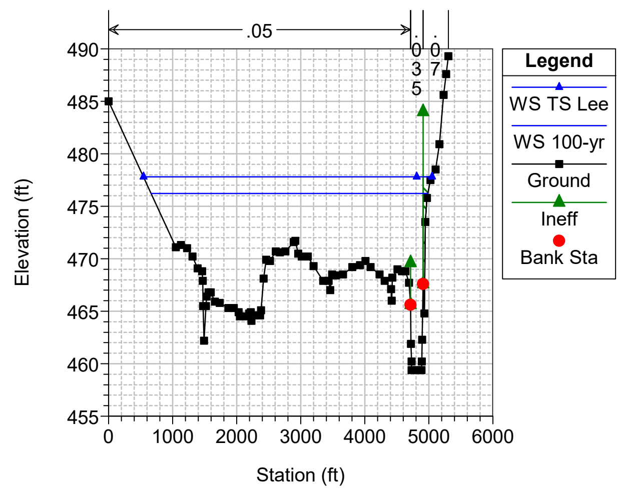
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 12.015 BR US Route 11 BR



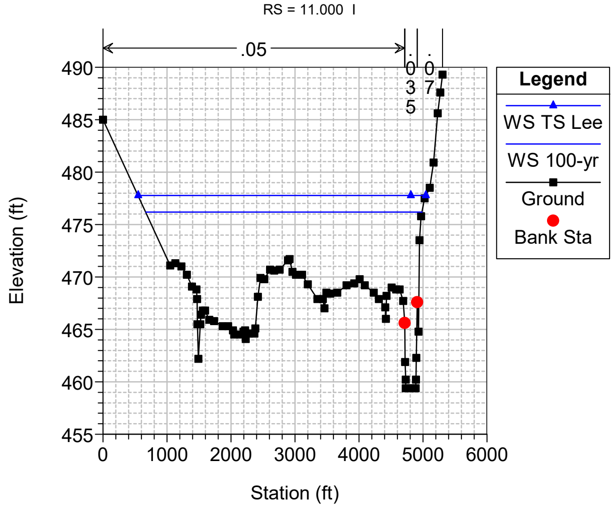
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 12.010



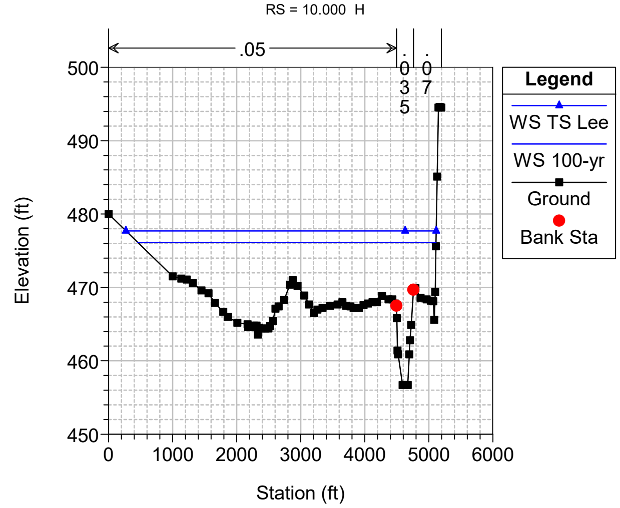
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 11.100

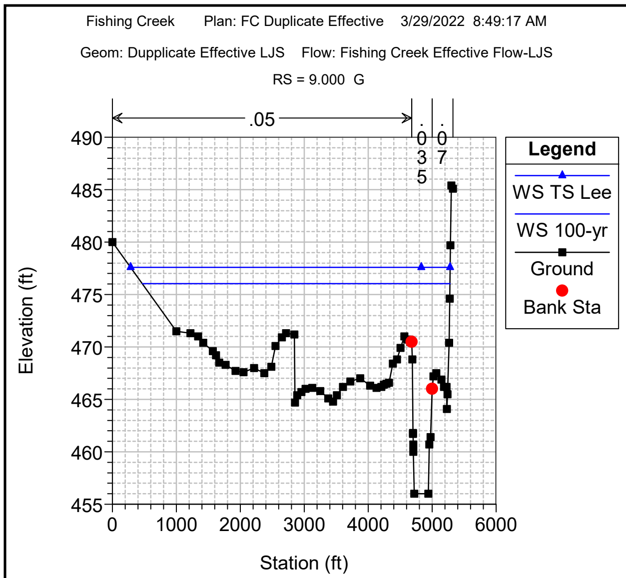


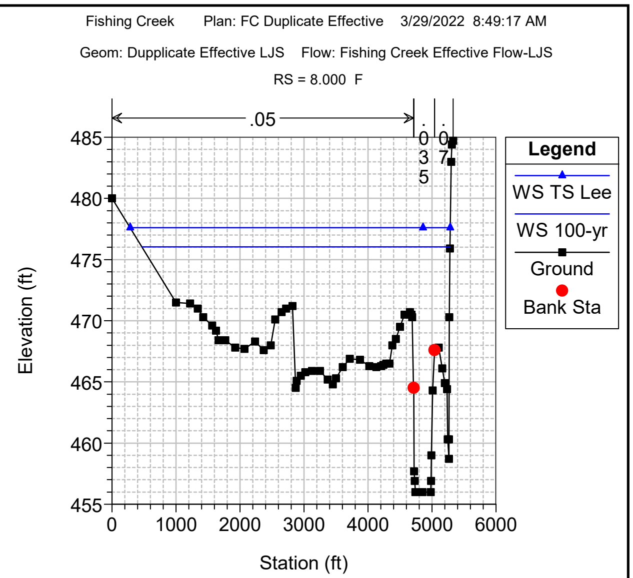
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 11.000 I

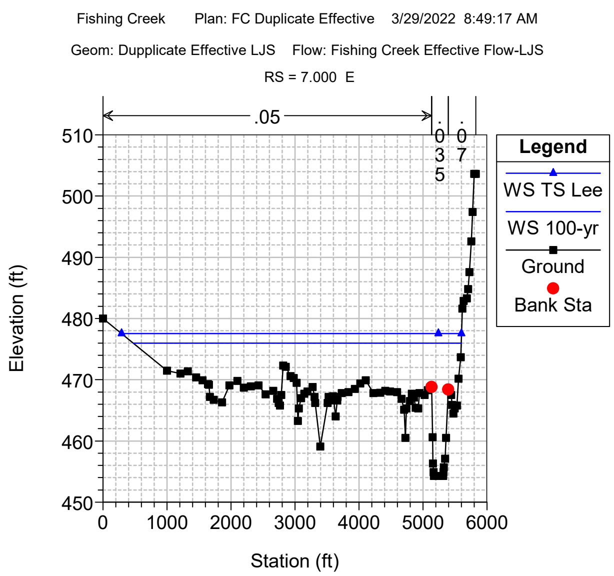


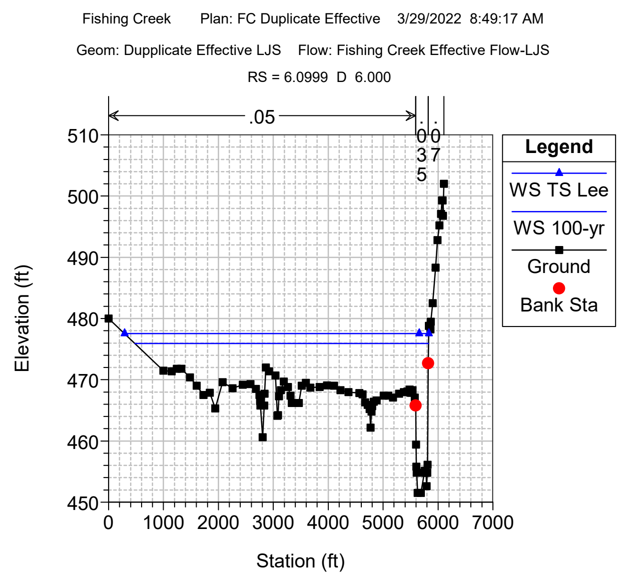
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 10.000 H

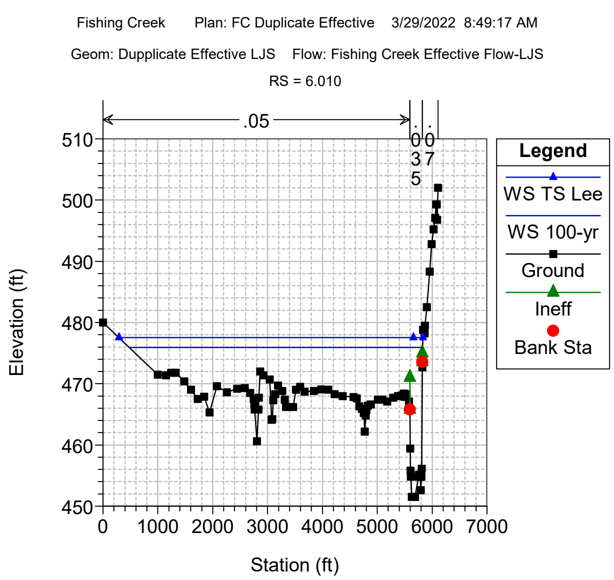


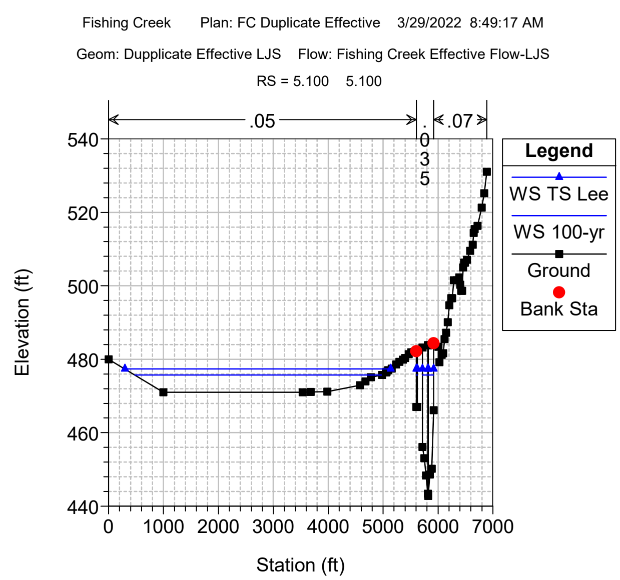

Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 9.000 G
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 8.000 F
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

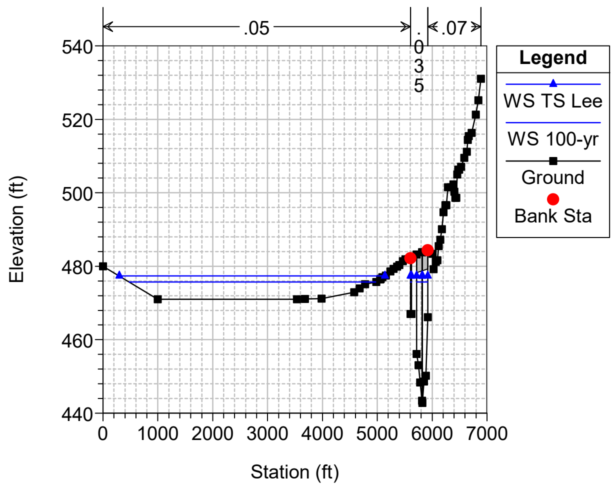

Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 7.000 E
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 6.0999 D 6.000
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

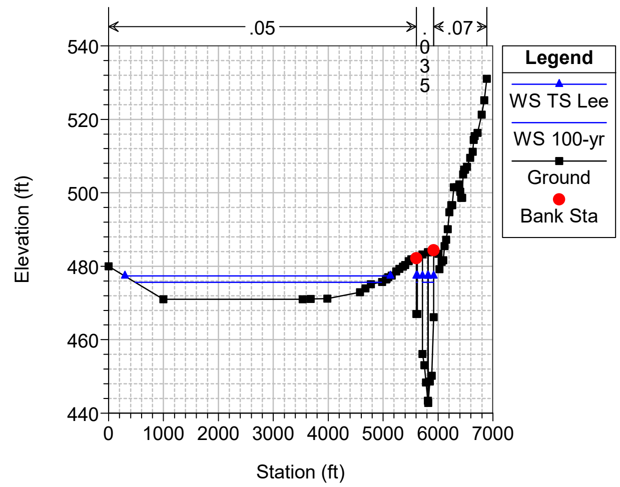

Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 6.010
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 5.100 5.100
.05
.035
.07
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

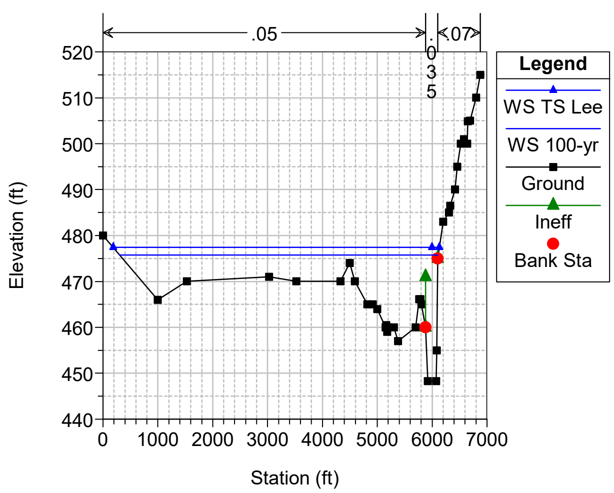
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 5.015 BR Railroad BR (abandoned);



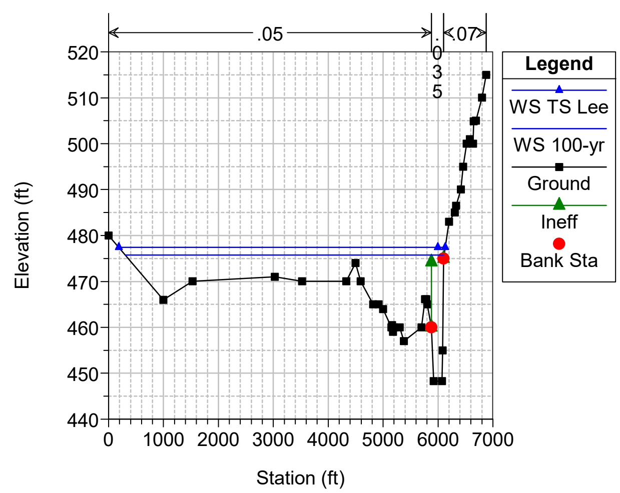
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 5.010



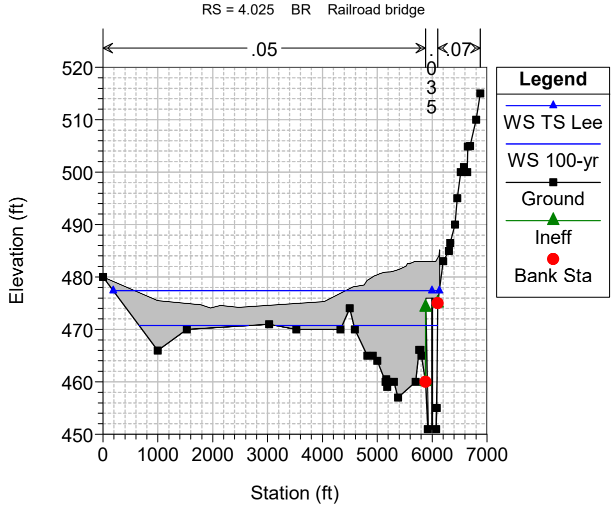
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 4.200



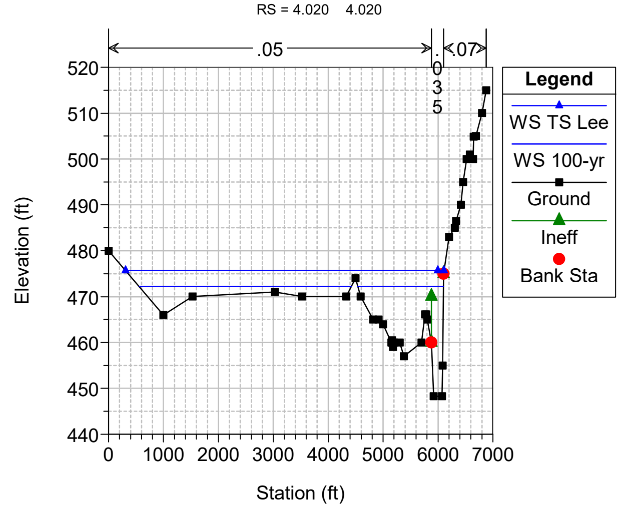
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 4.100



Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 4.025 BR Railroad bridge



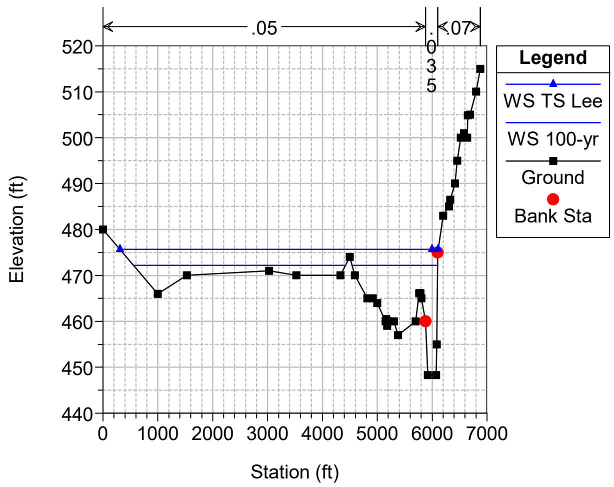
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 4.020 4.020



Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

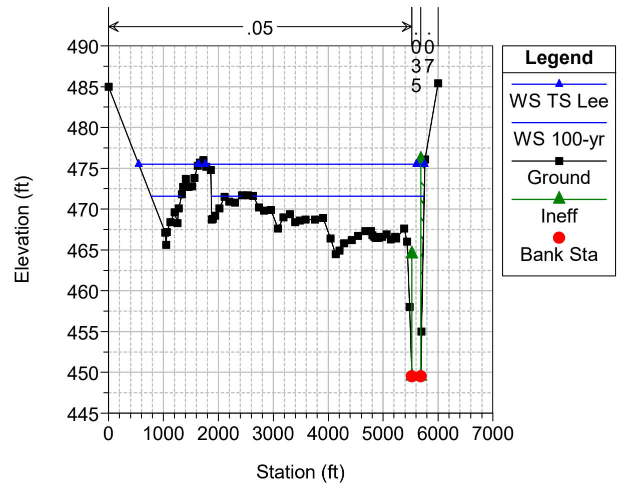
RS = 4.010



Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

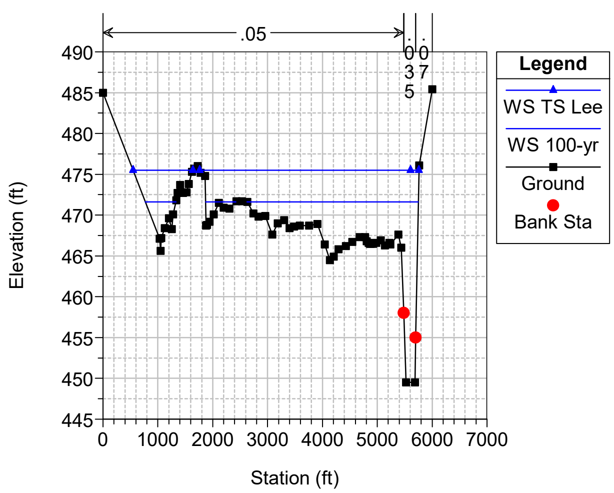
RS = 3.200



Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

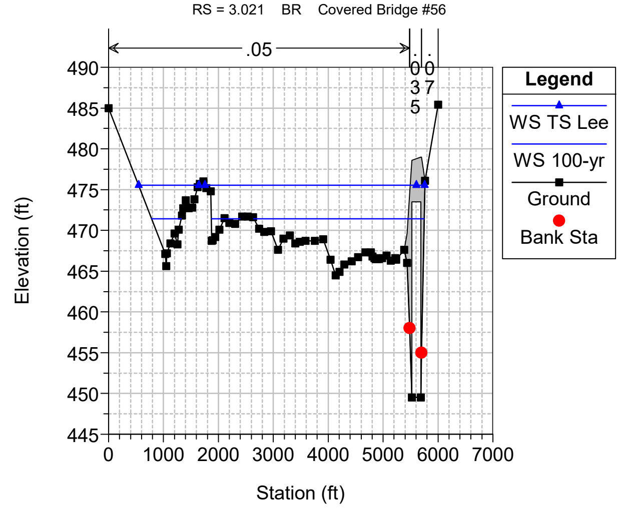
RS = 3.100



Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

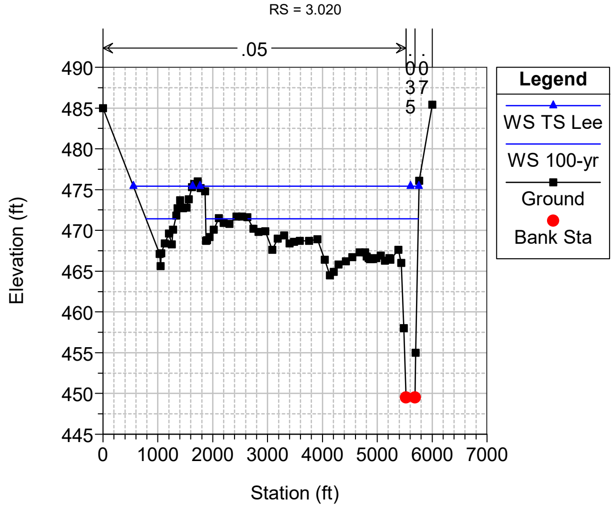
RS = 3.021   BR   Covered Bridge #56



Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

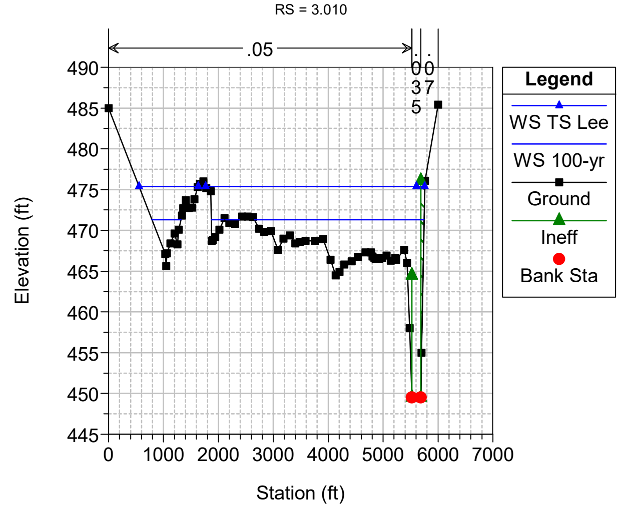
RS = 3.020



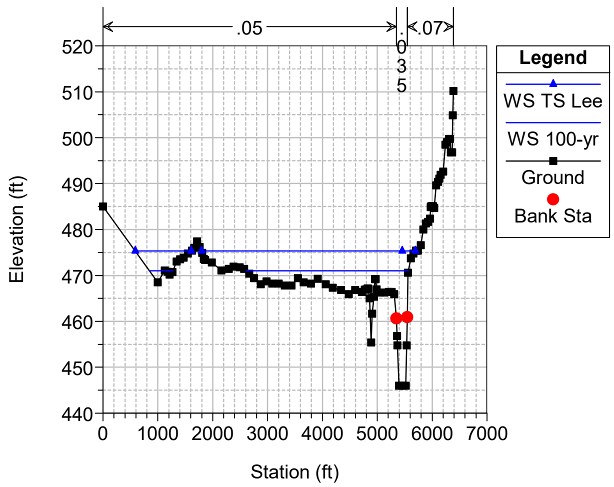
Fishing Creek   Plan: FC Duplicate Effective   3/29/2022 8:49:17 AM

Geom: Dupplicate Effective LJS   Flow: Fishing Creek Effective Flow-LJS

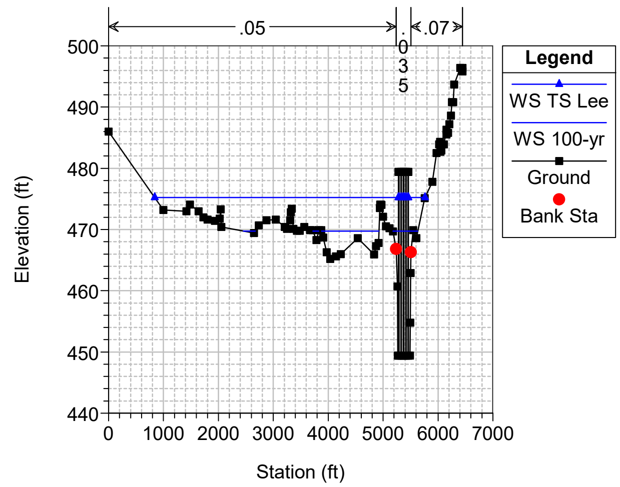
RS = 3.010



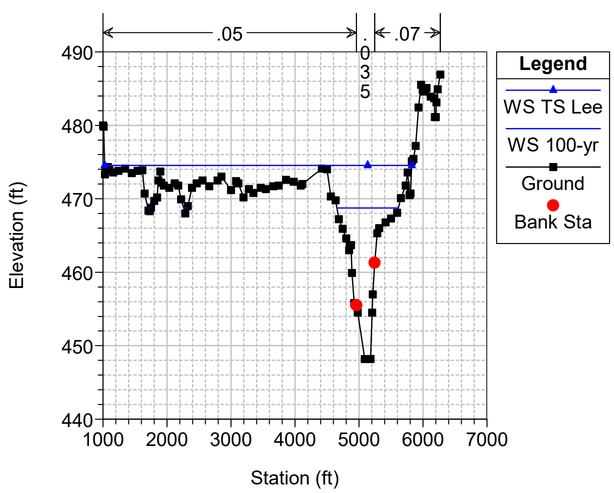
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 2.000 C



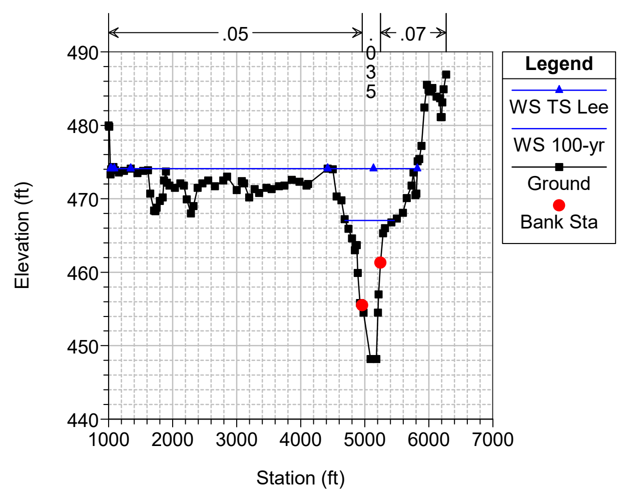
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 1.100 B



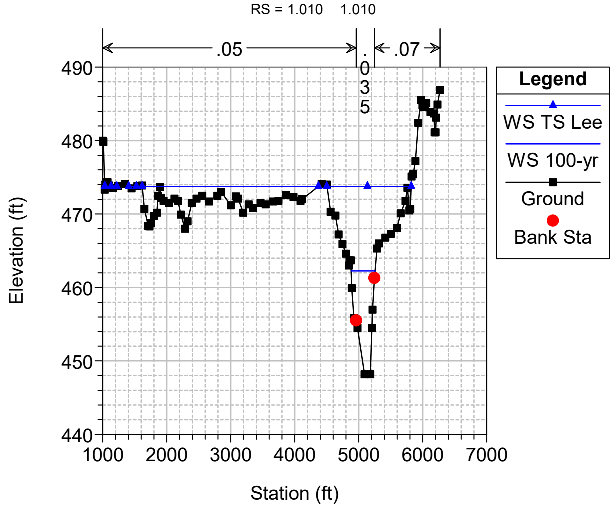
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 1.0999 A 1.000



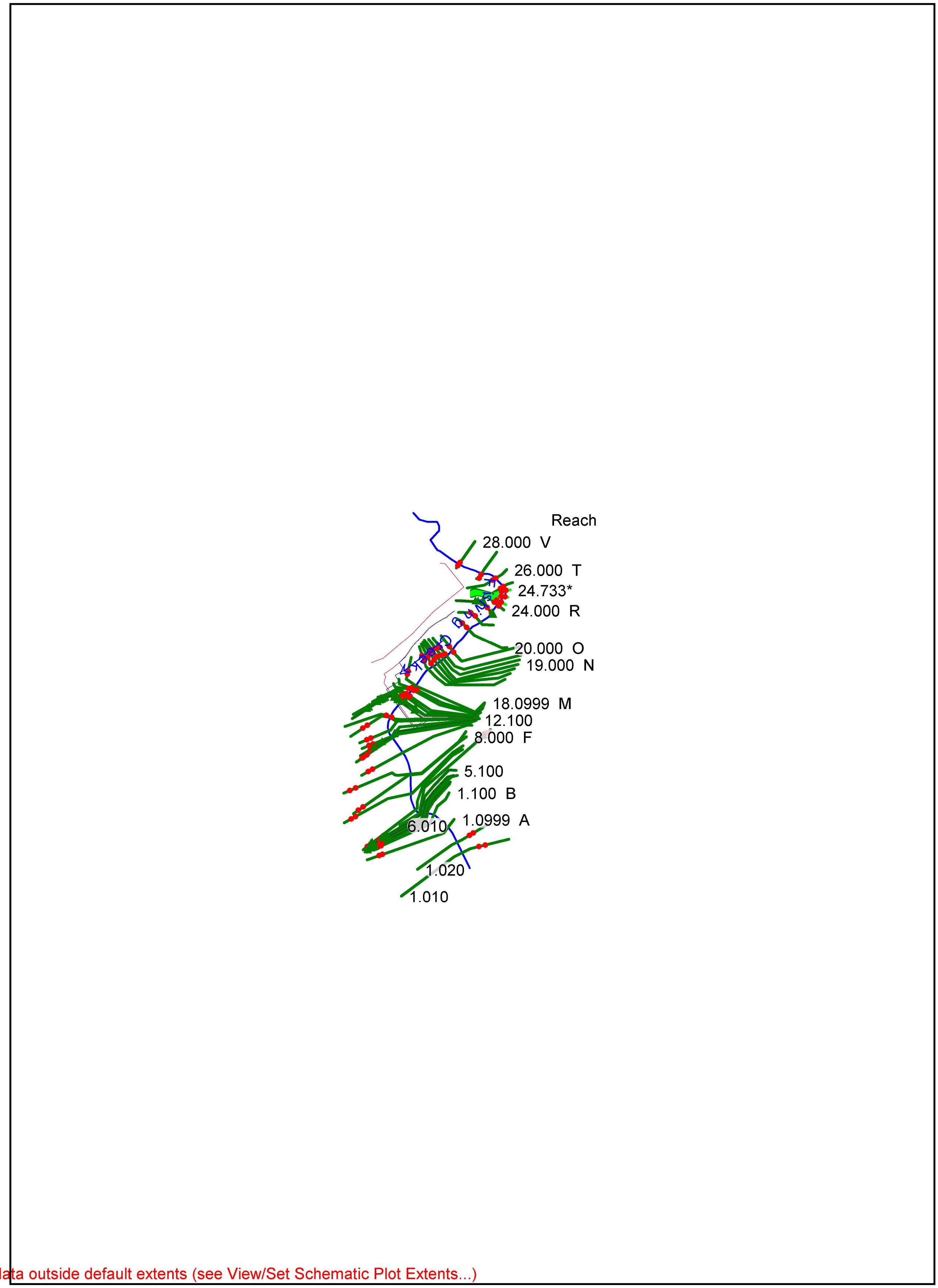
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 1.020 1.020



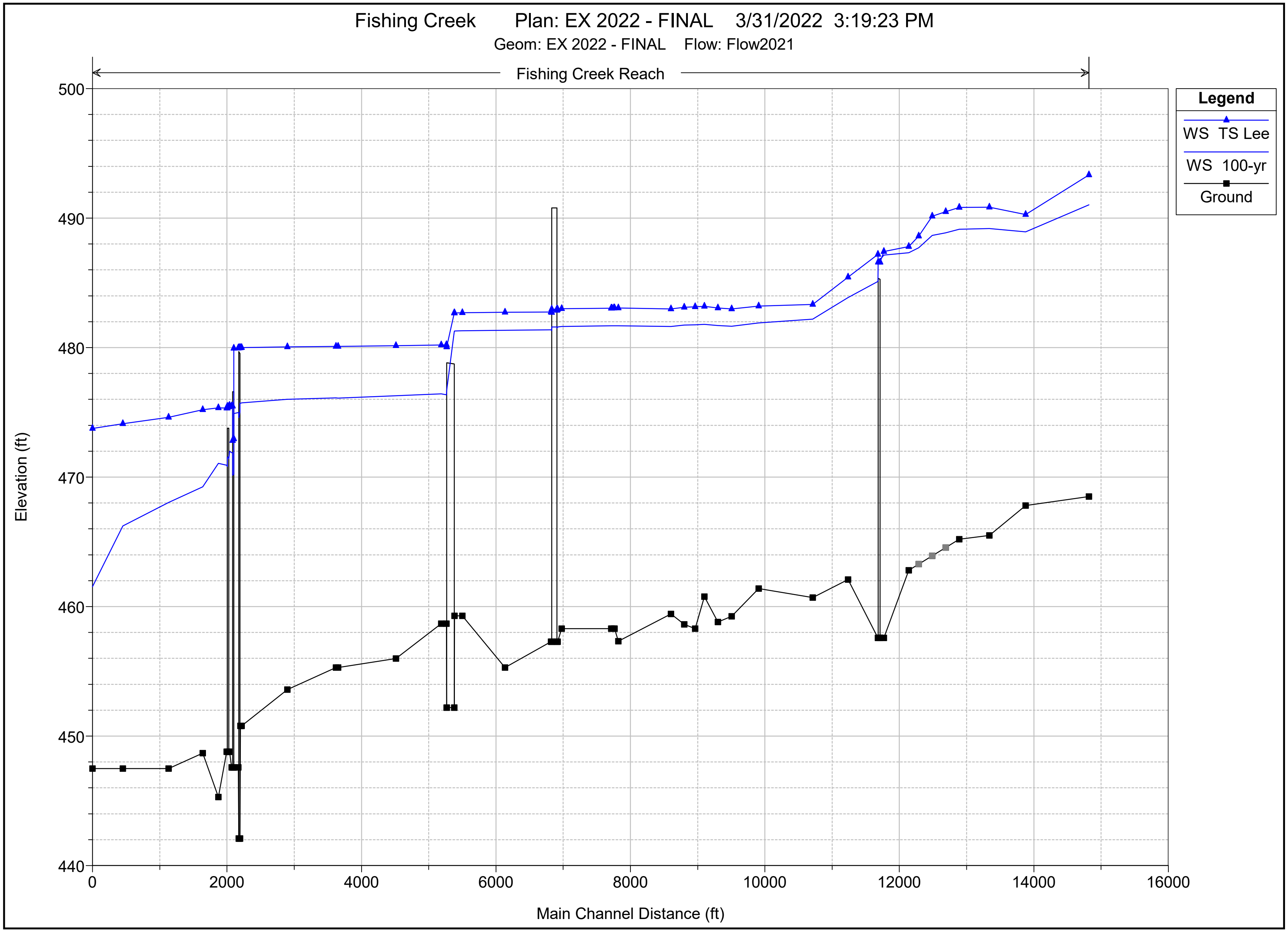
Fishing Creek Plan: FC Duplicate Effective 3/29/2022 8:49:17 AM
Geom: Dupplicate Effective LJS Flow: Fishing Creek Effective Flow-LJS
RS = 1.010 1.010



D.3 Existing Condition Model Output



Some schematic data outside default extents (see View/Set Schematic Plot Extents...)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
Fishing Creek Reach
Legend
WS TS Lee
WS 100-yr
Ground
Elevation (ft)
Main Channel Distance (ft)
500
490
480
470
460
450
440
0
2000
4000
6000
8000
10000
12000
14000
16000

HEC-RAS Plan: FINAL River: Fishing Creek Reach: Reach

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	28.000 V	100-yr	58900.00	468.50	491.03		492.82	0.001465	12.50	6887.95	423.35	0.47
Reach	28.000 V	TS Lee	78700.00	468.50	493.34		495.76	0.001774	14.69	7906.03	468.05	0.52
Reach	27.000 U	100-yr	58900.00	467.80	488.93		491.17	0.002024	13.76	6093.94	418.83	0.54
Reach	27.000 U	TS Lee	78700.00	467.80	490.27		493.62	0.002807	16.90	6657.74	421.68	0.64
Reach	26.000 T	100-yr	58900.00	465.50	489.20		490.08	0.000961	10.03	11107.83	973.07	0.38
Reach	26.000 T	TS Lee	78700.00	465.50	490.84		492.07	0.001255	12.02	12806.97	1063.84	0.44
Reach	25.000 S	100-yr	58900.00	465.20	489.14		489.64	0.000574	7.86	14355.65	1347.23	0.29
Reach	25.000 S	TS Lee	78700.00	465.20	490.82		491.48	0.000724	9.25	16625.94	1372.45	0.33
Reach	24.733*	100-yr	58900.00	464.56	488.87		489.54	0.000649	8.53	13696.06	1243.88	0.32
Reach	24.733*	TS Lee	78700.00	464.56	490.49		491.36	0.000801	9.93	15778.71	1299.09	0.36
Reach	24.467*	100-yr	58900.00	463.92	488.67		489.43	0.000753	9.01	11774.03	1101.22	0.33
Reach	24.467*	TS Lee	78700.00	463.92	490.15		491.21	0.001000	10.84	13409.80	1109.31	0.39
Reach	24.200*	100-yr	58900.00	463.28	487.71		489.21	0.001141	10.98	8792.51	997.98	0.41
Reach	24.200*	TS Lee	78700.00	463.28	488.62		490.90	0.001682	13.69	9701.49	1002.70	0.50
Reach	24.000 R	100-yr	58900.00	462.80	487.32		489.03	0.001221	11.07	7729.46	1009.78	0.42
Reach	24.000 R	TS Lee	78700.00	462.80	487.80		490.60	0.001971	14.27	8206.79	1012.85	0.54
Reach	23.0999 Q	100-yr	58900.00	457.59	487.14		488.62	0.000771	10.22	8746.05	855.59	0.35
Reach	23.0999 Q	TS Lee	78700.00	457.59	487.41		489.95	0.001316	13.44	8975.08	858.99	0.46
Reach	23.020	100-yr	58900.00	457.59	486.80	474.68	488.55	0.000870	10.88	7348.97	859.99	0.37
Reach	23.020	TS Lee	78700.00	457.59	486.59	477.70	489.80	0.001608	14.71	7174.31	857.40	0.51
Reach	23.015		Bridge									
Reach	23.010	100-yr	58900.00	457.59	485.12		486.87	0.001127	10.95	7202.54	849.60	0.41
Reach	23.010	TS Lee	78700.00	457.59	487.19		489.50	0.001386	12.80	8990.66	871.55	0.46
Reach	21.000 P	100-yr	58900.00	462.09	483.87		486.06	0.002216	12.27	7008.84	949.80	0.49
Reach	21.000 P	TS Lee	78700.00	462.09	485.43		488.43	0.002842	14.63	8552.48	1018.21	0.56
Reach	20.000 O	100-yr	58900.00	460.69	482.21	476.68	484.72	0.002809	13.41	8269.48	1764.75	0.54
Reach	20.000 O	TS Lee	78700.00	460.69	483.34	482.58	486.74	0.003707	16.01	10287.99	1791.87	0.63
Reach	19.100	100-yr	58900.00	461.39	481.91		482.86	0.001461	8.97	15946.64	2623.65	0.36
Reach	19.100	TS Lee	78700.00	461.39	483.20		484.40	0.001810	10.41	19374.93	2666.57	0.40
Reach	19.050	100-yr	58900.00	459.25	481.65		482.37	0.001143	7.84	15317.15	2710.17	0.32
Reach	19.050	TS Lee	78700.00	459.25	482.99		483.82	0.001327	8.84	18978.97	2757.94	0.34
Reach	19.025	100-yr	58900.00	458.81	481.70		482.13	0.000902	6.60	19521.89	3067.67	0.28
Reach	19.025	TS Lee	78700.00	458.81	483.06		483.56	0.001036	7.44	23747.79	3153.56	0.30
Reach	19.000 N	100-yr	58900.00	460.77	481.80		481.98	0.000461	4.81	28681.30	3760.48	0.20
Reach	19.000 N	TS Lee	78700.00	460.77	483.18		483.39	0.000522	5.38	33907.78	3797.56	0.21
Reach	18.902	100-yr	58900.00	458.29	481.77		481.95	0.000406	4.79	29013.84	3656.56	0.19
Reach	18.902	TS Lee	78700.00	458.29	483.14		483.36	0.000473	5.41	34076.38	3707.20	0.21
Reach	18.788	100-yr	58900.00	458.62	481.75		481.91	0.000417	4.72	29620.60	3718.29	0.19
Reach	18.788	TS Lee	78700.00	458.62	483.12		483.32	0.000481	5.31	34772.49	3771.21	0.21
Reach	18.649	100-yr	58900.00	459.43	481.63		481.87	0.000334	5.68	30292.85	3791.67	0.22
Reach	18.649	TS Lee	78700.00	459.43	482.98		483.27	0.000398	6.46	35474.79	3858.71	0.24
Reach	18.0999 M	100-yr	58900.00	457.32	481.69		481.76	0.000117	3.69	36120.95	4199.00	0.14
Reach	18.0999 M	TS Lee	78700.00	457.32	483.06		483.15	0.000135	4.12	41966.16	4315.08	0.15
Reach	18.040	100-yr	58900.00	458.29	481.69		481.75	0.000092	3.20	38679.98	3834.80	0.12
Reach	18.040	TS Lee	78700.00	458.29	483.06		483.14	0.000112	3.66	43941.62	3843.64	0.13
Reach	18.03	100-yr	58900.00	458.29	481.68		481.75	0.000099	3.32	37355.25	3829.95	0.12
Reach	18.03	TS Lee	78700.00	458.29	483.05		483.14	0.000119	3.78	42625.32	3860.10	0.14
Reach	18.02	100-yr	58900.00	458.29	481.68		481.74	0.000102	3.39	38116.11	4038.51	0.13
Reach	18.02	TS Lee	78700.00	458.29	483.05		483.13	0.000120	3.83	43674.54	4076.20	0.14
Reach	18.010	100-yr	58900.00	458.29	481.68		481.74	0.000101	3.37	38367.80	3993.20	0.13
Reach	18.010	TS Lee	78700.00	458.29	483.05		483.12	0.000120	3.83	43874.64	4068.43	0.14
Reach	16.0999 L	100-yr	58900.00	458.29	481.62	473.96	481.71	0.000115	3.57	32524.32	3807.68	0.13
Reach	16.0999 L	TS Lee	78700.00	458.29	483.00	475.68	483.10	0.000123	3.85	40234.56	3969.37	0.14

HEC-RAS Plan: FINAL River: Fishing Creek Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	16.040	100-yr	58900.00	457.29	481.59	473.91	481.70	0.000146	4.01	28322.24	3125.82	0.14
Reach	16.040	TS Lee	78700.00	457.29	482.95	475.85	483.08	0.000175	4.55	32796.02	3292.47	0.16
Reach	16.030	100-yr	58900.00	457.29	481.49	472.85	481.69	0.000287	5.18	25320.21	4498.27	0.19
Reach	16.030	TS Lee	78700.00	457.29	482.88	477.79	483.08	0.000302	5.47	31191.83	4766.38	0.19
Reach	16.025		Bridge									
Reach	16.020	100-yr	58900.00	457.29	481.32	473.02	481.53	0.000304	5.30	25078.89	4579.28	0.19
Reach	16.020	TS Lee	78700.00	457.29	482.71	477.63	482.92	0.000309	5.51	31088.23	4754.72	0.19
Reach	16.010	100-yr	58900.00	457.29	481.38		481.47	0.000117	3.59	32538.28	3396.50	0.13
Reach	16.010	TS Lee	78700.00	457.29	482.76		482.87	0.000140	4.08	37230.80	3416.21	0.15
Reach	14.000 K	100-yr	58900.00	455.29	481.34		481.43	0.000128	3.73	37587.54	5533.45	0.14
Reach	14.000 K	TS Lee	78700.00	455.29	482.73		482.83	0.000137	4.01	45316.93	5589.24	0.15
Reach	13.200 J	100-yr	58900.00	459.29	481.30		481.39	0.000157	3.94	36921.40	5539.58	0.15
Reach	13.200 J	TS Lee	78700.00	459.29	482.69		482.78	0.000161	4.16	44655.30	5570.03	0.16
Reach	13.100	100-yr	58900.00	459.29	481.29		481.37	0.000148	3.82	37957.67	5565.14	0.15
Reach	13.100	TS Lee	78700.00	459.29	482.68		482.77	0.000152	4.05	45722.82	5593.75	0.15
Reach	12.100	100-yr	58900.00	452.19	481.24	475.28	481.36	0.000194	4.38	32599.27	5554.43	0.16
Reach	12.100	TS Lee	78700.00	452.19	482.68	477.09	482.77	0.000151	4.01	45787.92	5582.37	0.14
Reach	12.015		Bridge									
Reach	12.010	100-yr	58900.00	452.19	476.65	476.65	478.37	0.001797	12.10	9809.68	4025.27	0.49
Reach	12.010	TS Lee	78700.00	452.19	480.05	477.68	480.56	0.000671	8.17	23009.01	5450.77	0.30
Reach	11.100	100-yr	58900.00	458.69	476.36		477.08	0.001152	8.80	13992.41	4073.46	0.39
Reach	11.100	TS Lee	78700.00	458.69	480.21		480.40	0.000324	5.41	33390.37	5717.74	0.22
Reach	11.000 I	100-yr	58900.00	458.69	476.43		476.70	0.000576	6.19	22131.63	5367.77	0.28
Reach	11.000 I	TS Lee	78700.00	458.69	480.21		480.29	0.000165	3.84	43558.57	5822.40	0.15
Reach	10.000 H	100-yr	58900.00	455.99	476.28		476.41	0.000255	4.42	32046.32	5825.34	0.19
Reach	10.000 H	TS Lee	78700.00	455.99	480.15		480.21	0.000095	3.10	54956.46	5979.34	0.12
Reach	9.000 G	100-yr	58900.00	455.29	476.11		476.26	0.000221	4.45	32822.70	5690.08	0.18
Reach	9.000 G	TS Lee	78700.00	455.29	480.08		480.15	0.000097	3.34	56624.66	6295.39	0.12
Reach	8.000 F	100-yr	58900.00	455.29	476.11		476.24	0.000180	4.18	33187.24	5709.34	0.16
Reach	8.000 F	TS Lee	78700.00	455.29	480.09		480.15	0.000081	3.16	57082.69	6302.69	0.11
Reach	7.000 E	100-yr	58900.00	453.59	476.00		476.14	0.000211	4.47	33520.75	6517.94	0.18
Reach	7.000 E	TS Lee	78700.00	453.59	480.05		480.10	0.000083	3.16	60278.77	6649.18	0.11
Reach	6.0999 D	100-yr	58900.00	450.79	475.72	466.04	476.03	0.000352	6.07	32184.62	6578.88	0.23
Reach	6.0999 D	TS Lee	78700.00	450.79	479.99	471.82	480.08	0.000119	3.96	60391.23	6777.32	0.14
Reach	6.010	100-yr	58900.00	450.79	475.70	466.01	476.02	0.000368	6.17	32832.28	6562.17	0.23
Reach	6.010	TS Lee	78700.00	450.79	479.98	471.86	480.08	0.000130	4.12	61086.23	6768.17	0.14
Reach	5.100	100-yr	58900.00	442.09	475.72	463.73	475.98	0.000259	5.69	34013.65	6456.41	0.20
Reach	5.100	TS Lee	78700.00	442.09	479.99	469.67	480.06	0.000095	3.76	61942.21	6718.27	0.12
Reach	5.015		Bridge									
Reach	5.010	100-yr	58900.00	442.09	474.97	465.39	475.32	0.000332	6.34	27406.27	5804.84	0.22
Reach	5.010	TS Lee	78700.00	442.09	479.97	467.28	480.05	0.000095	3.77	58023.35	6645.34	0.12
Reach	4.200	100-yr	58900.00	447.59	474.98	464.42	475.31	0.000306	6.08	27869.11	5546.07	0.22
Reach	4.200	TS Lee	78700.00	447.59	479.96	466.97	480.04	0.000093	3.78	58639.24	6690.45	0.12
Reach	4.100	100-yr	58900.00	447.59	474.91	464.37	475.28	0.000333	6.33	25815.02	4863.60	0.22
Reach	4.100	TS Lee	78700.00	447.59	479.94	467.29	480.03	0.000106	4.04	56010.30	6665.88	0.13
Reach	4.025		Bridge									
Reach	4.020	100-yr	58900.00	447.59	471.89	465.82	472.36	0.000494	7.14	19894.55	4734.58	0.27
Reach	4.020	TS Lee	78700.00	447.59	475.48	468.49	475.65	0.000209	5.10	38972.68	5766.76	0.18
Reach	4.010	100-yr	58900.00	447.59	471.88	462.91	472.36	0.000490	7.11	20399.35	4820.61	0.27
Reach	4.010	TS Lee	78700.00	447.59	475.49	468.74	475.65	0.000204	5.03	39623.91	5776.51	0.18
Reach	3.200	100-yr	58900.00	448.79	472.00	468.15	472.22	0.000653	5.47	23240.59	5630.46	0.22

HEC-RAS Plan: FINAL River: Fishing Creek Reach: Reach (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach	3.200	TS Lee	78700.00	448.79	475.53	469.29	475.60	0.000223	3.38	43496.16	6029.13	0.13
Reach	3.100	100-yr	58900.00	448.79	471.41	470.16	472.07	0.000725	9.15	19243.74	4940.42	0.34
Reach	3.100	TS Lee	78700.00	448.79	475.42	470.94	475.57	0.000216	5.57	41362.22	6014.20	0.19
Reach	3.021		Bridge									
Reach	3.020	100-yr	58900.00	448.79	470.83	469.83	471.74	0.000951	10.29	17115.16	4734.41	0.39
Reach	3.020	TS Lee	78700.00	448.79	475.33	470.90	475.49	0.000223	5.64	40487.60	5813.12	0.19
Reach	3.010	100-yr	58900.00	448.79	470.92	469.28	471.62	0.000714	8.94	18370.34	4664.49	0.34
Reach	3.010	TS Lee	78700.00	448.79	475.33	470.50	475.48	0.000197	5.30	41209.54	5799.19	0.18
Reach	2.000 C	100-yr	58900.00	445.29	471.06		471.34	0.000850	5.76	20021.66	4599.06	0.23
Reach	2.000 C	TS Lee	78700.00	445.29	475.35		475.43	0.000209	3.27	42302.69	5502.65	0.12
Reach	1.100 B	100-yr	58900.00	448.69	469.25		470.84	0.003623	11.21	7716.15	1518.79	0.47
Reach	1.100 B	TS Lee	78700.00	448.69	475.21		475.35	0.000457	4.44	32483.15	5377.91	0.16
Reach	1.0999 A	100-yr	58900.00	447.49	468.04		469.67	0.001444	10.75	7225.60	1129.17	0.46
Reach	1.0999 A	TS Lee	78700.00	447.49	474.61		475.06	0.000382	6.85	27447.36	5941.43	0.25
Reach	1.020	100-yr	58900.00	447.49	466.22	461.63	468.40	0.002194	12.31	5775.62	739.21	0.55
Reach	1.020	TS Lee	78700.00	447.49	474.12		474.73	0.000497	7.71	24184.15	4800.46	0.28
Reach	1.010	100-yr	58900.00	447.49	461.53	461.53	466.44	0.007740	18.18	3455.75	371.92	0.98
Reach	1.010	TS Lee	78700.00	447.49	473.75	463.97	474.48	0.000576	8.22	22421.56	4797.66	0.30

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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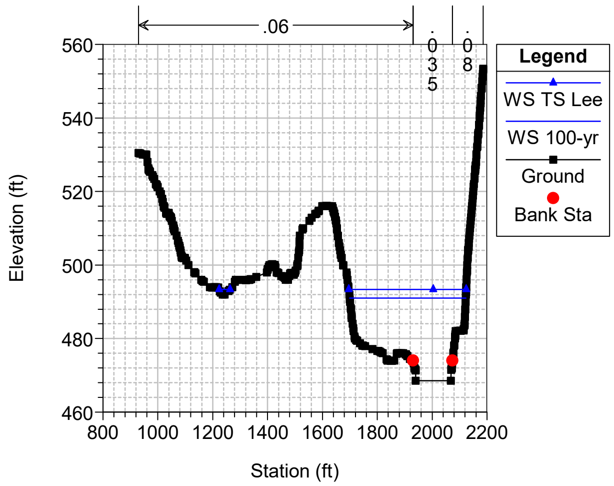

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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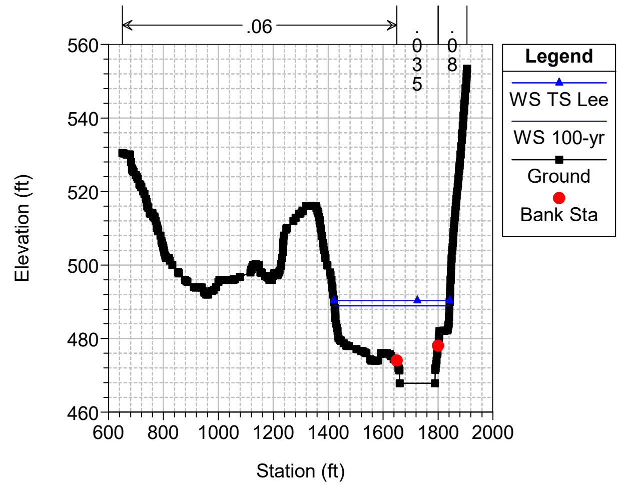

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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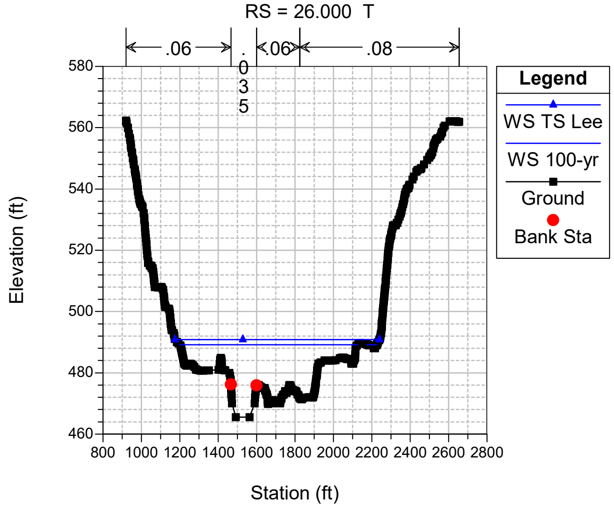

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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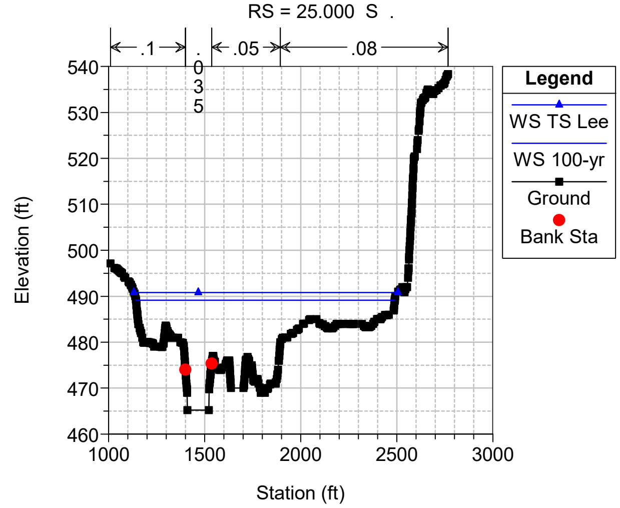

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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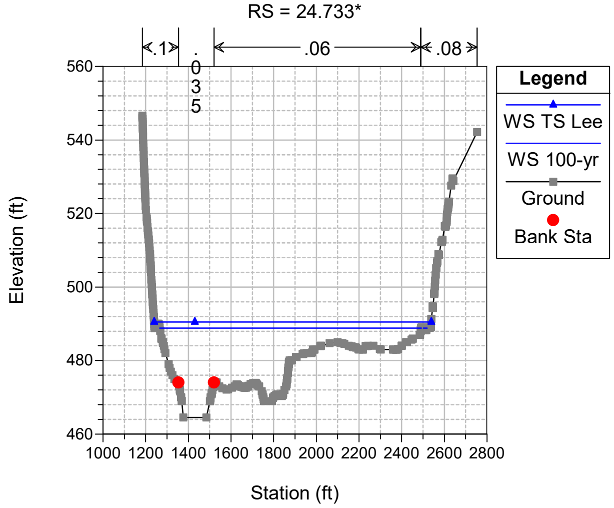
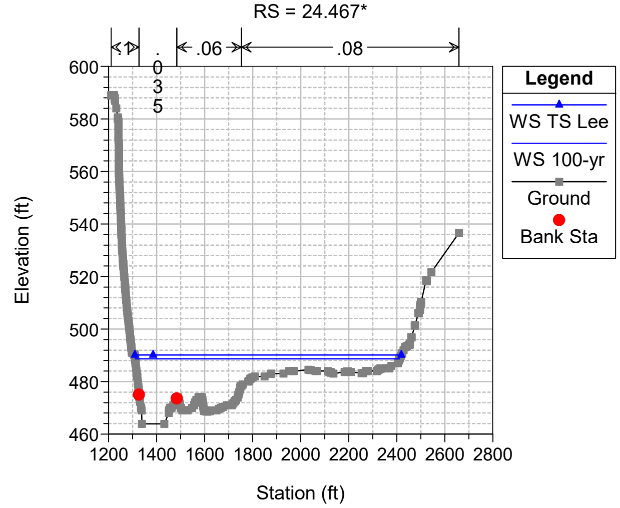


Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

RS = 24.467*



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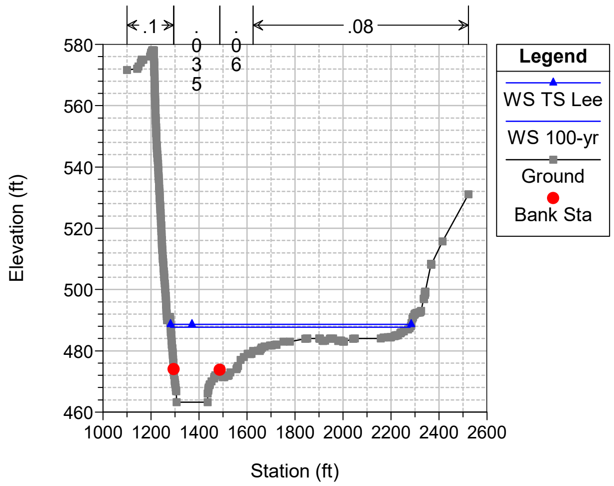
Geom: EX 2022 - FINAL   Flow: Flow2021

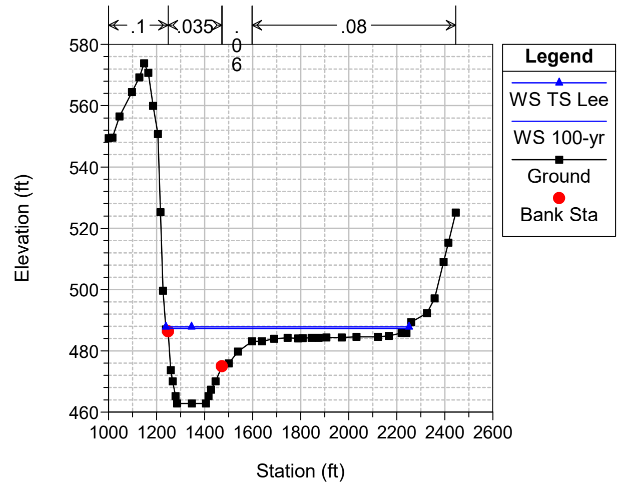
RS = 24.200*



Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

RS = 24.000 R



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Geom: EX 2022 - FINAL   Flow: Flow2021

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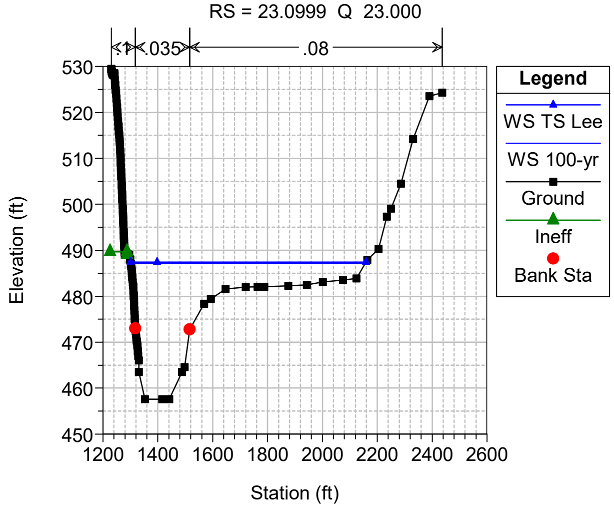

Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

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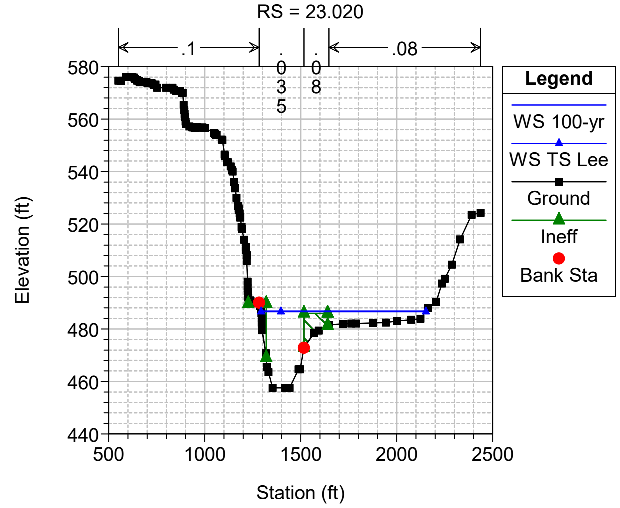
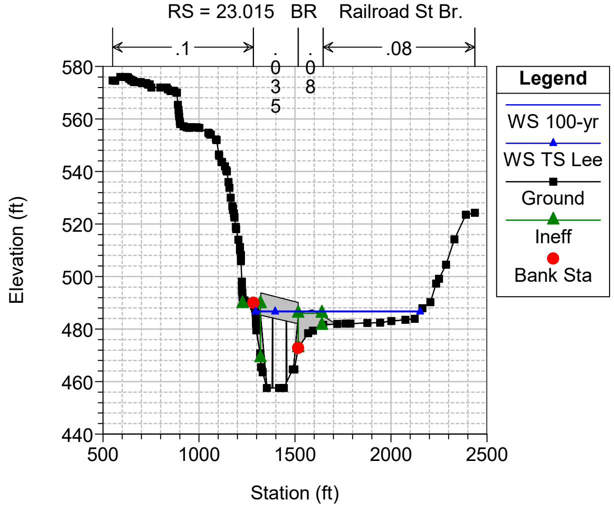


Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL   Flow: Flow2021

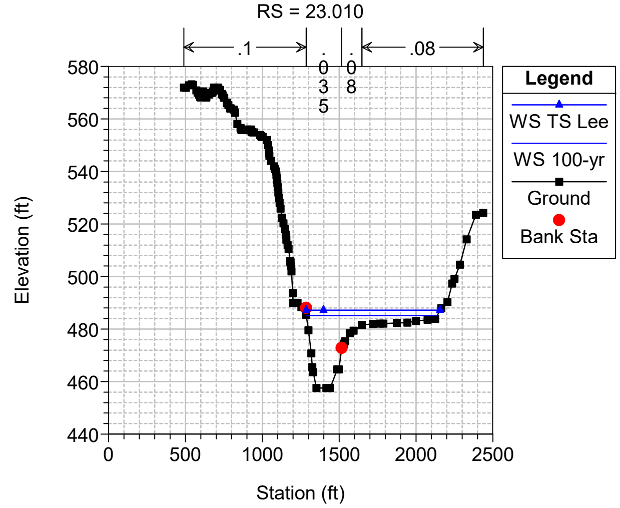
RS = 23.015   BR   Railroad St Br.

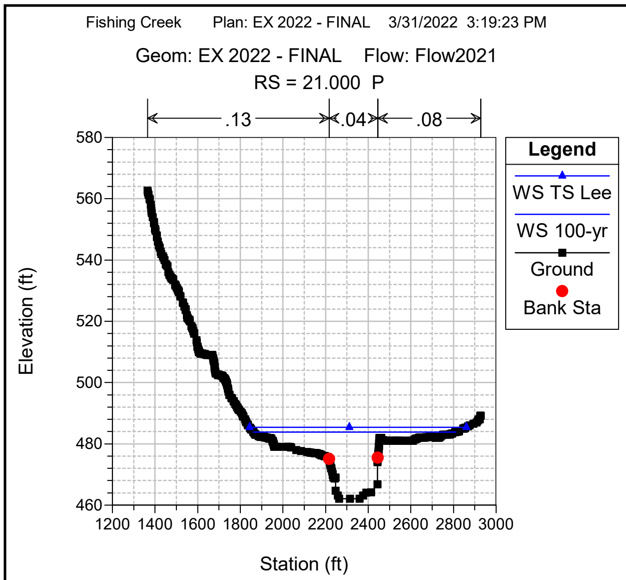


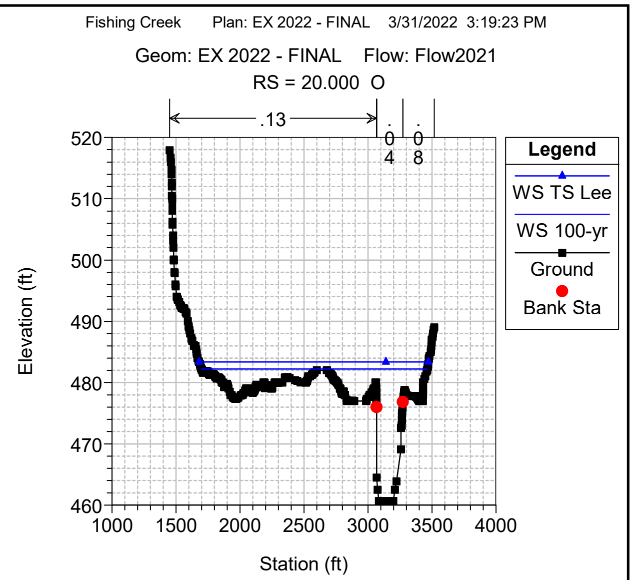
Fishing Creek   Plan: EX 2022 - FINAL   3/31/2022 3:19:23 PM

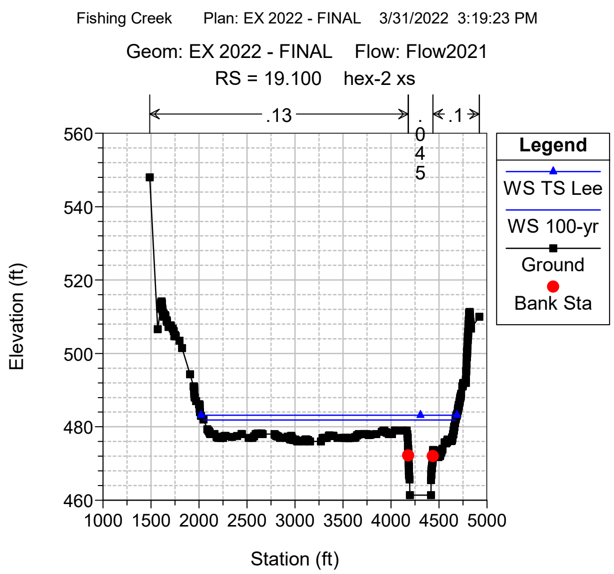
Geom: EX 2022 - FINAL   Flow: Flow2021

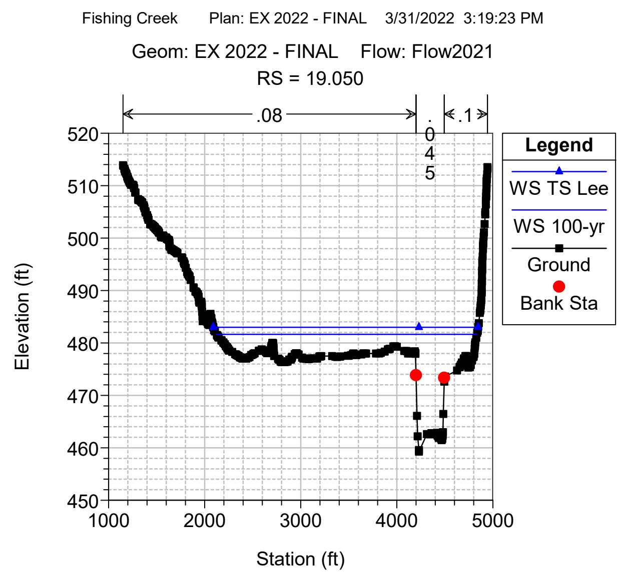
RS = 23.010

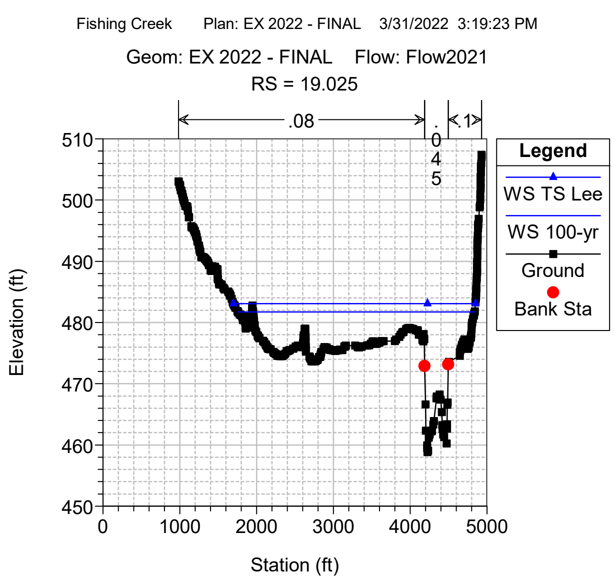


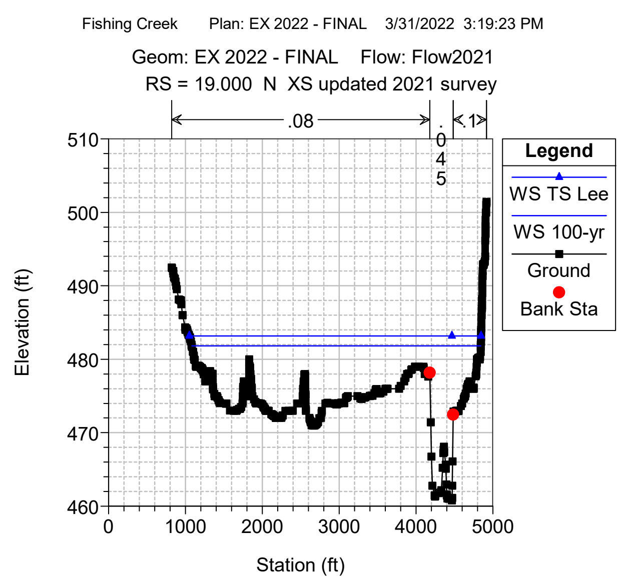

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 21.000 P
.13
.04
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 20.000 O
.13
.04
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

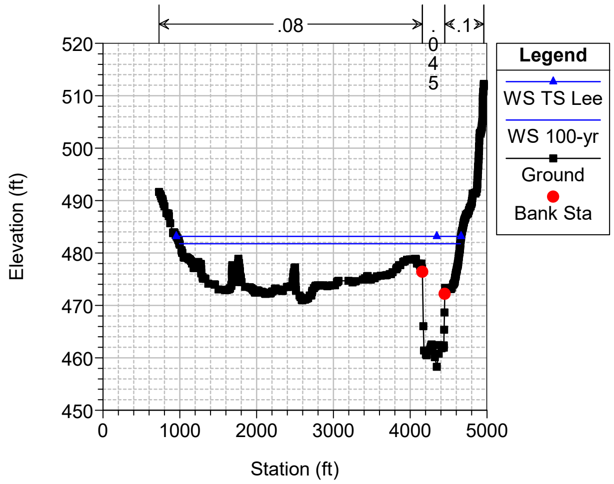

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 19.100 hex-2 xs
.13
.045
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 19.050
.08
.045
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

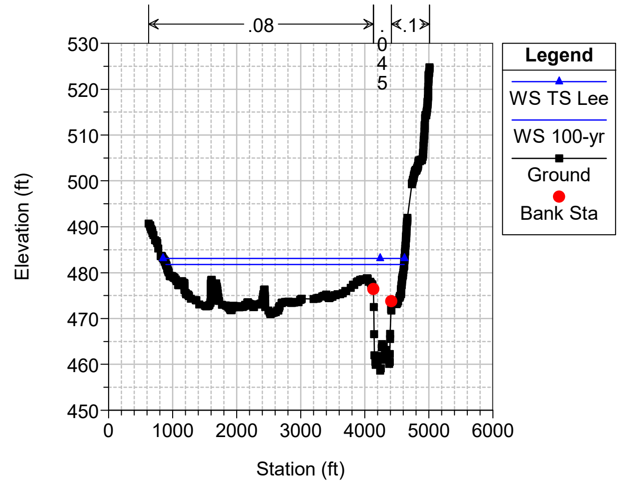

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 19.025
.08
.045
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 19.000 N XS updated 2021 survey
.08
.045
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

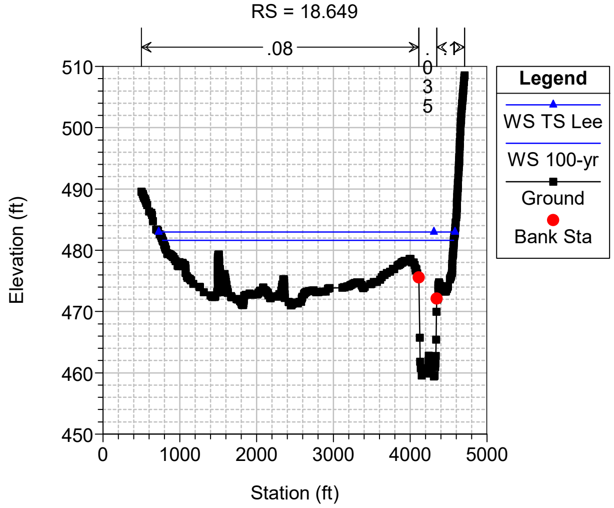
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.902



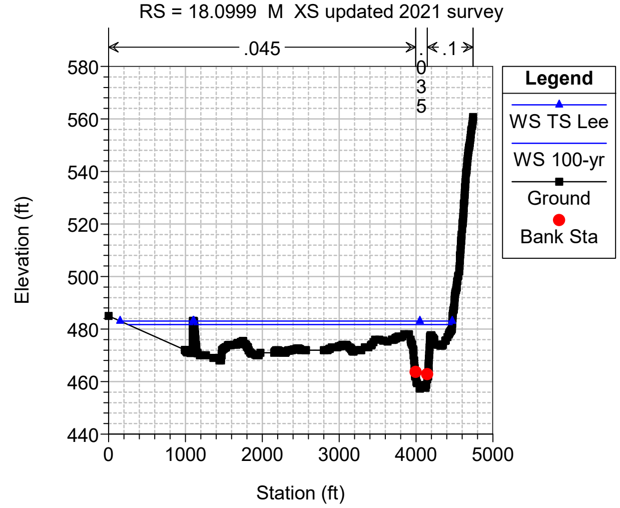
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.788



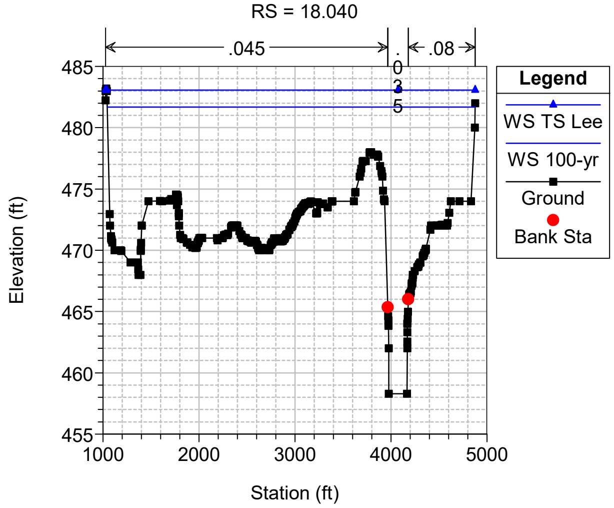
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.649



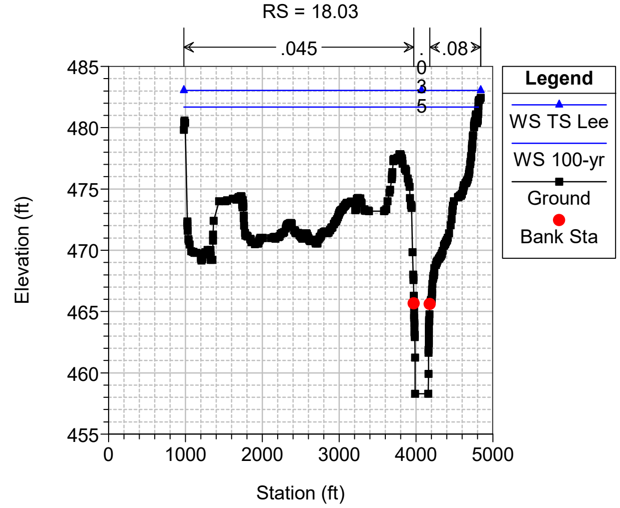
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.0999 M XS updated 2021 survey

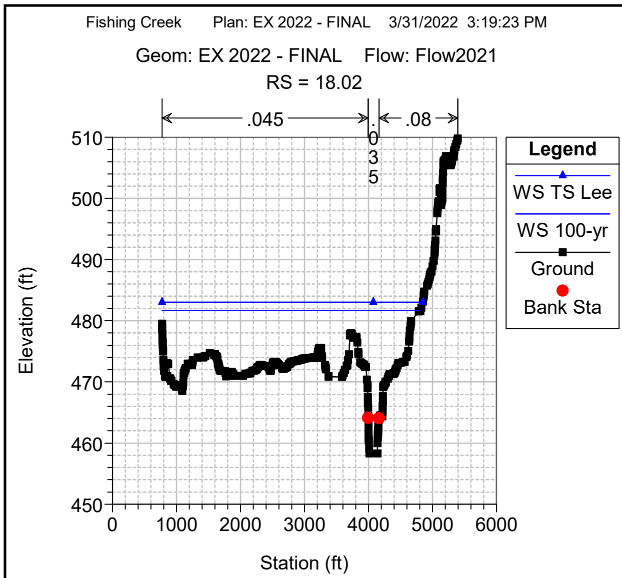


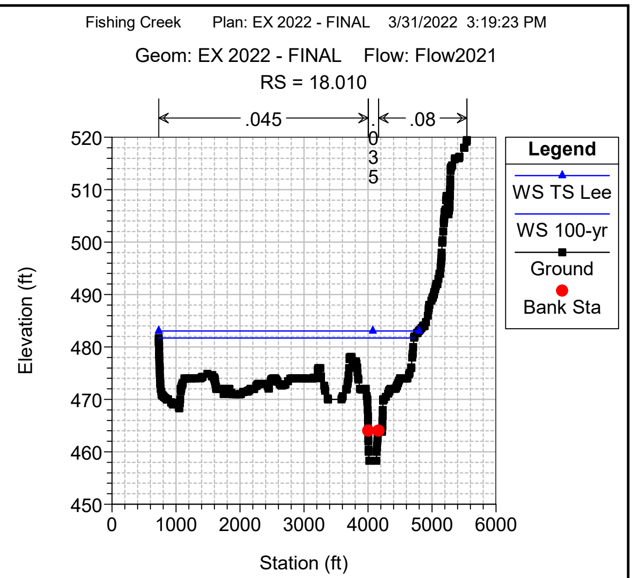
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.040

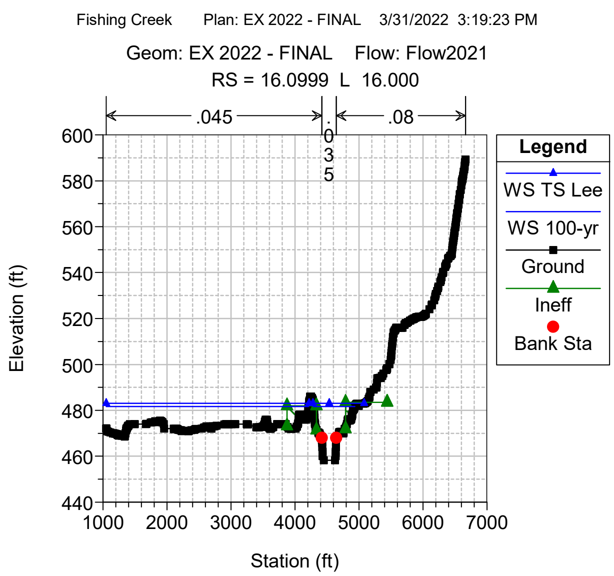


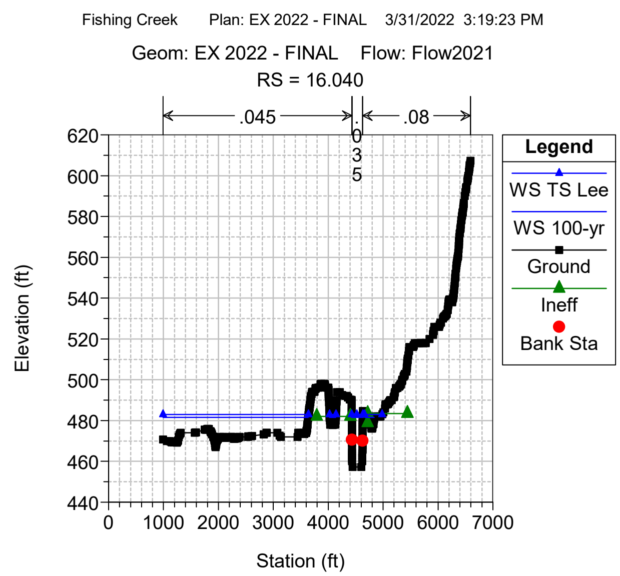
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.03

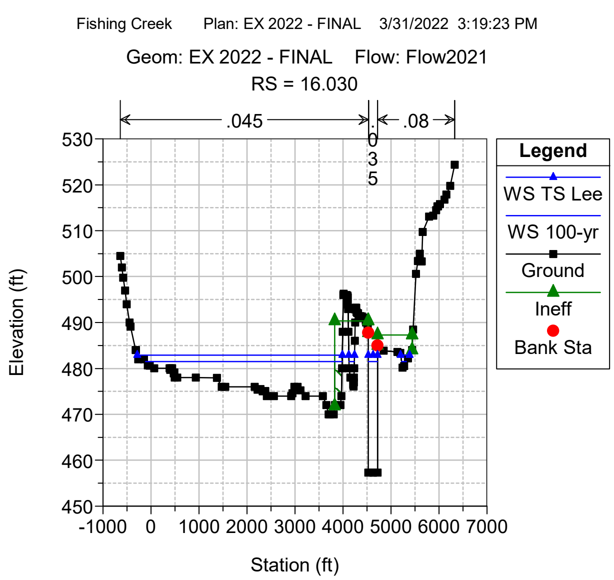


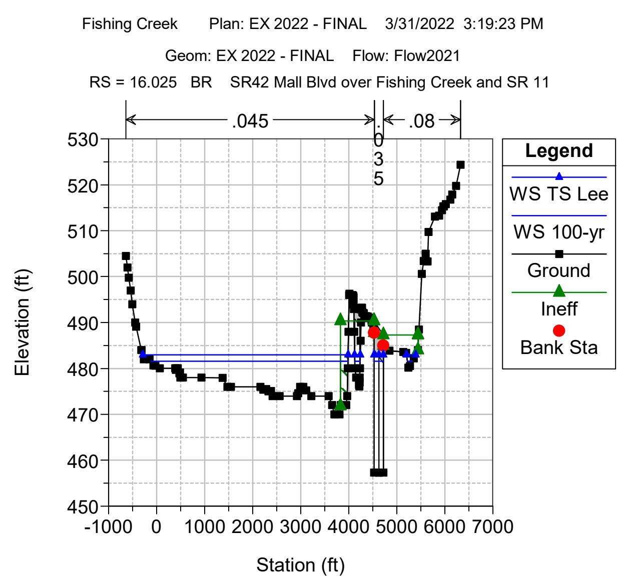

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.02
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

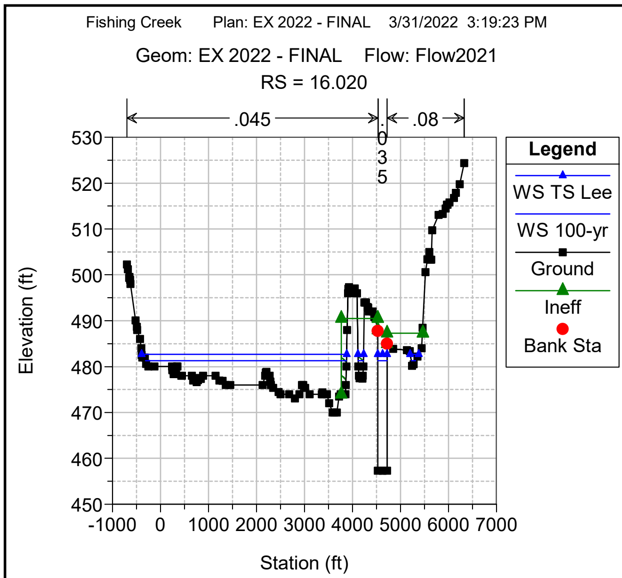

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 18.010
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

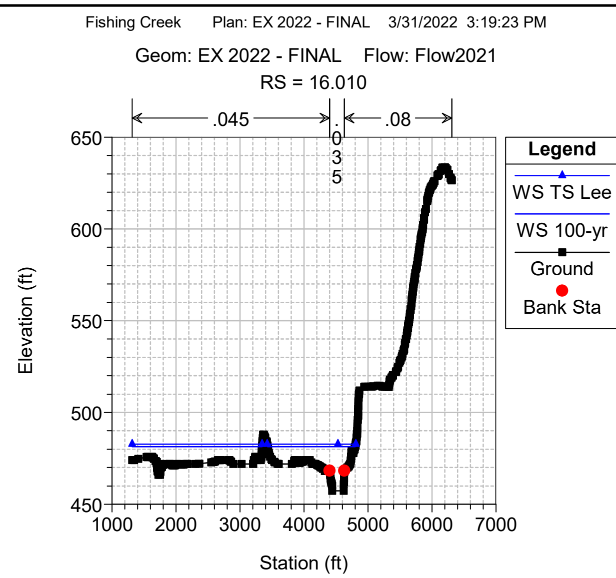

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.0999 L 16.000
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

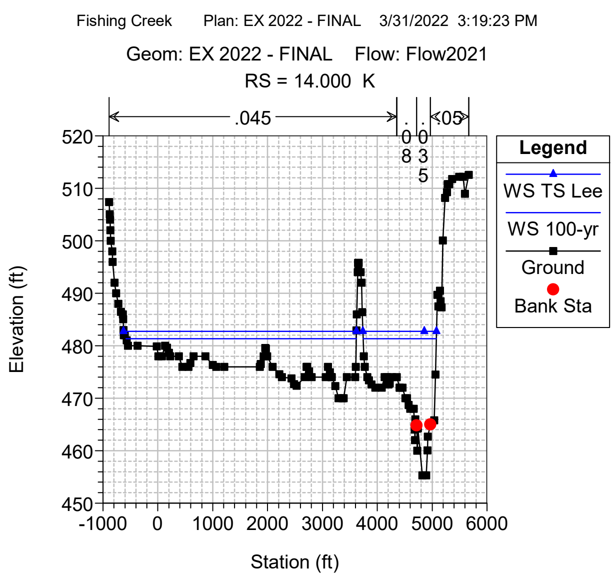

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.040
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

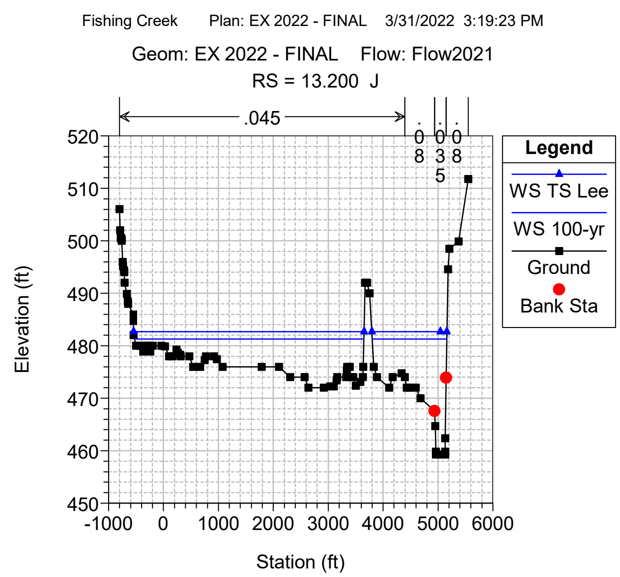

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.030
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

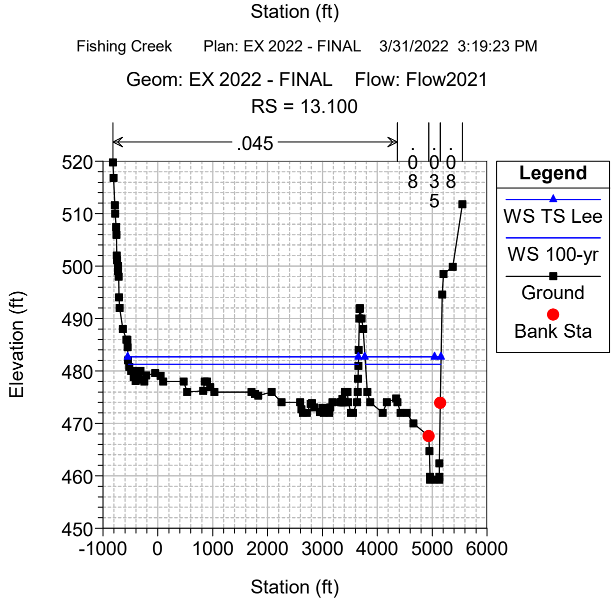

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.025 BR SR42 Mall Blvd over Fishing Creek and SR 11
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

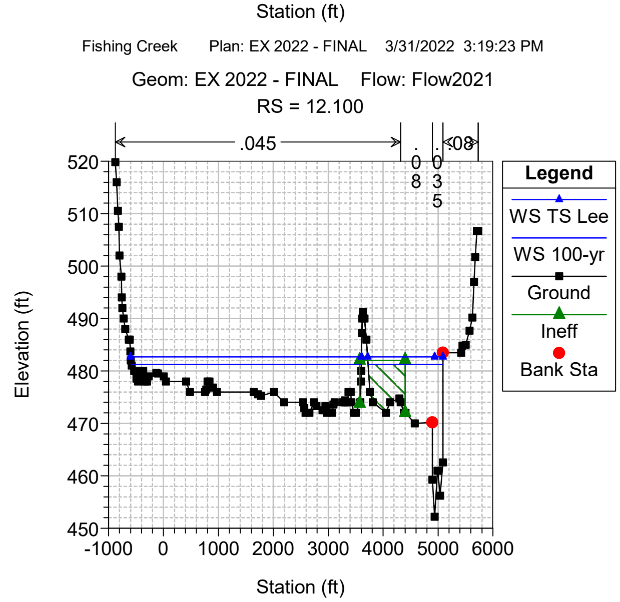

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.020
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

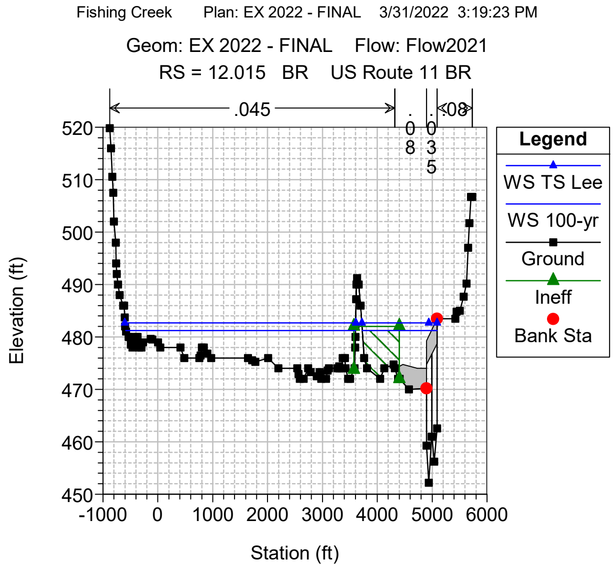

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 16.010
.045
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

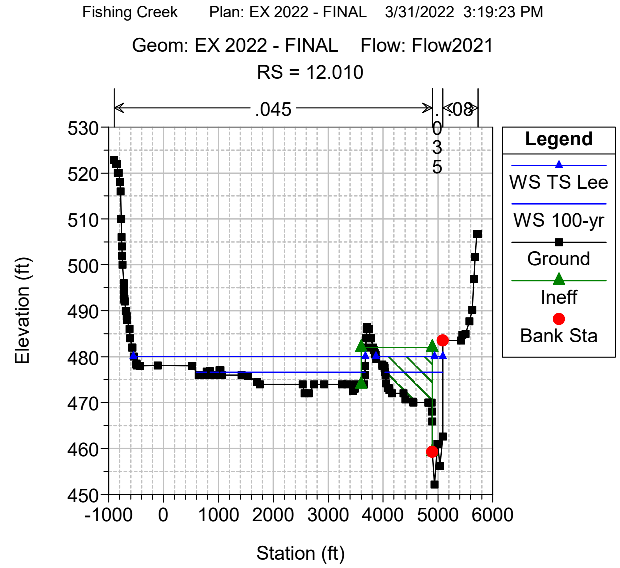

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 14.000 K
.045
.08
.035
.05
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

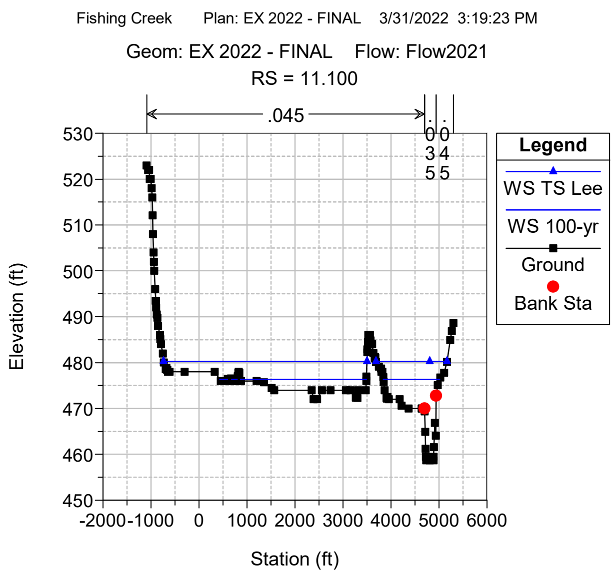

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 13.200 J
.045
.08
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

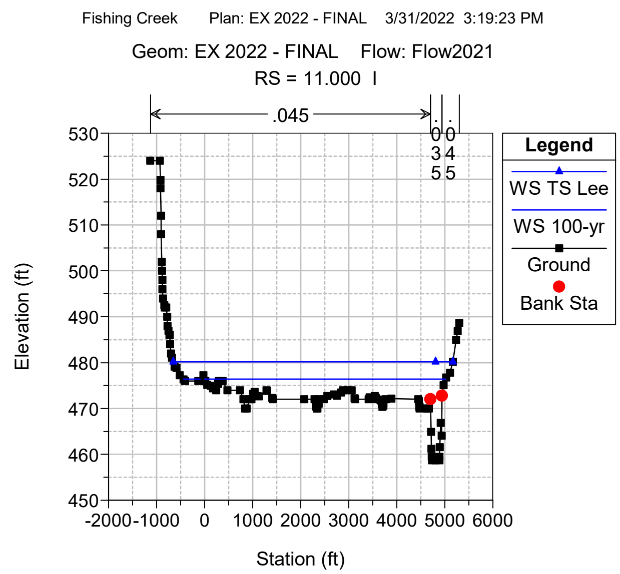

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 13.100
.045
.08
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta

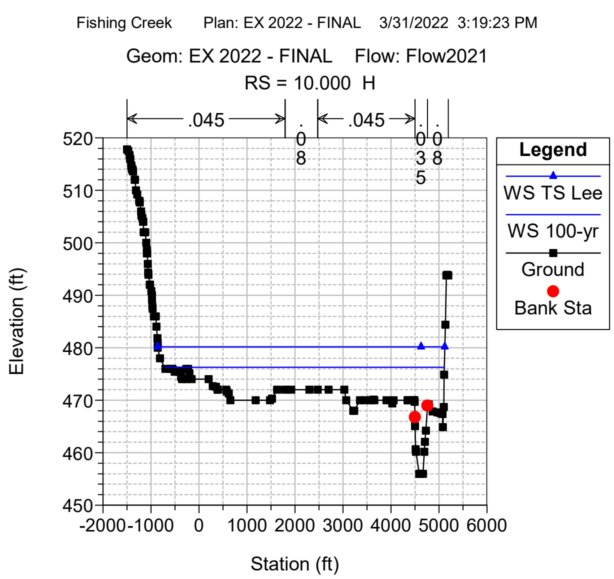

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 12.100
.045
.08
.035
.08
Elevation (ft)
Station (ft)
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta

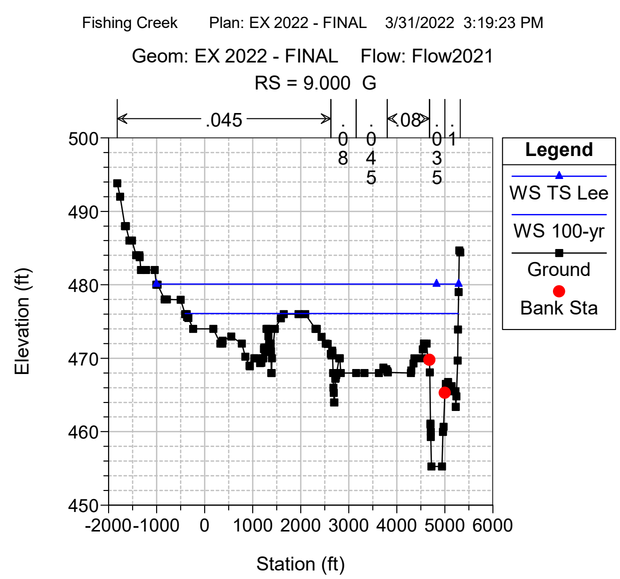

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 12.015 BR US Route 11 BR
.045
.08
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 12.010
.045
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 11.100
.045
.035
.045
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 11.000 I
.045
.035
.045
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

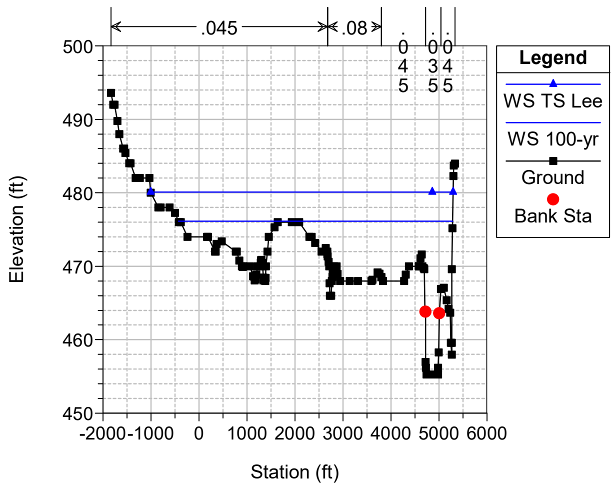

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 10.000 H
.045
.08
.045
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 9.000 G
.045
.08
.045
.08
.035
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021

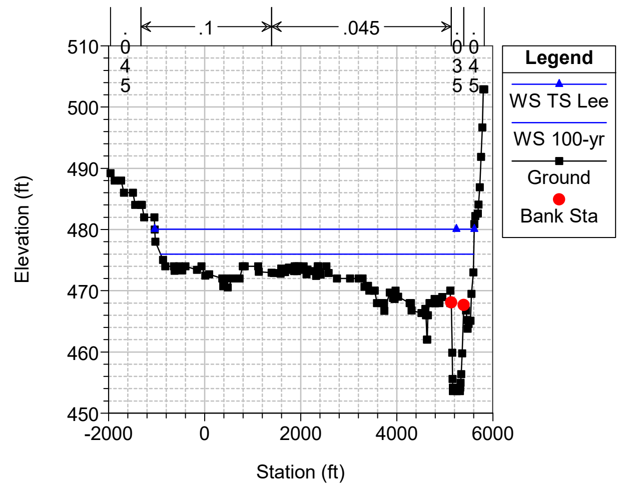
RS = 8.000 F



Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021

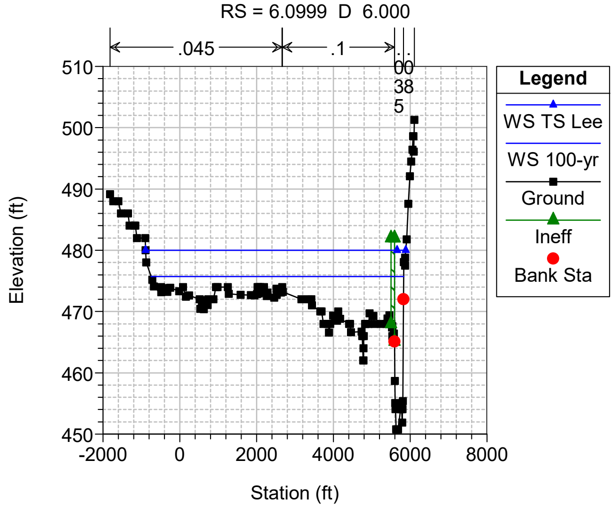
RS = 7.000 E



Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021

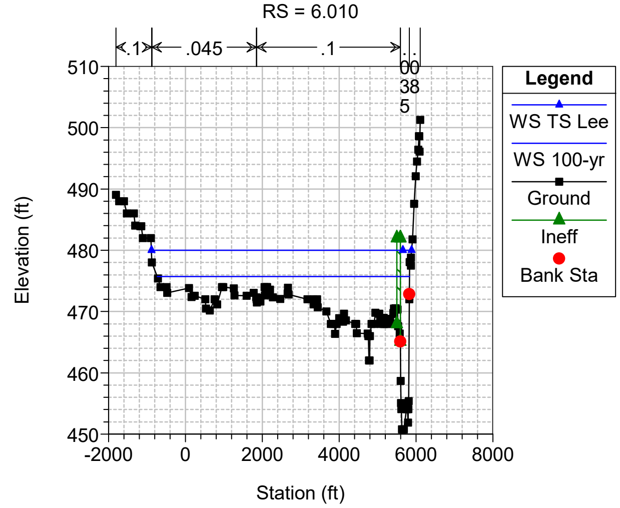
RS = 6.0999 D 6.000



Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021

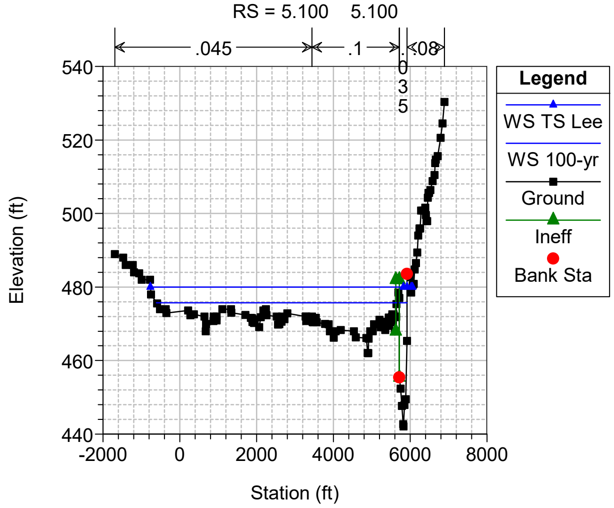
RS = 6.010



Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021

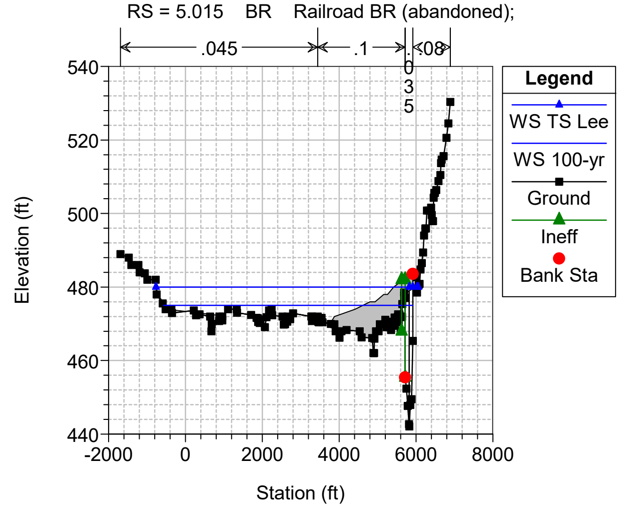
RS = 5.100 5.100



Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

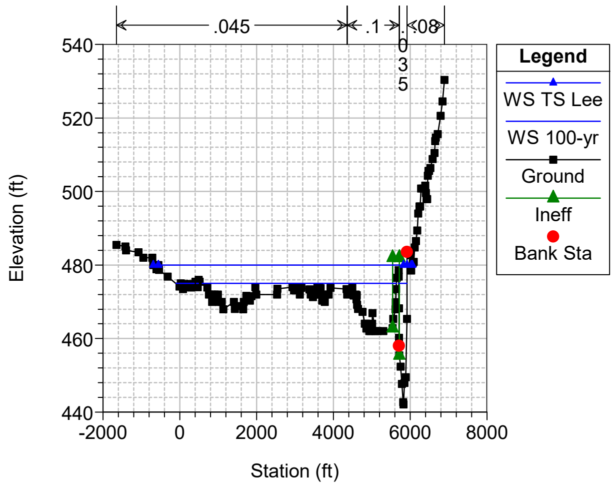
Geom: EX 2022 - FINAL Flow: Flow2021

RS = 5.015 BR Railroad BR (abandoned);



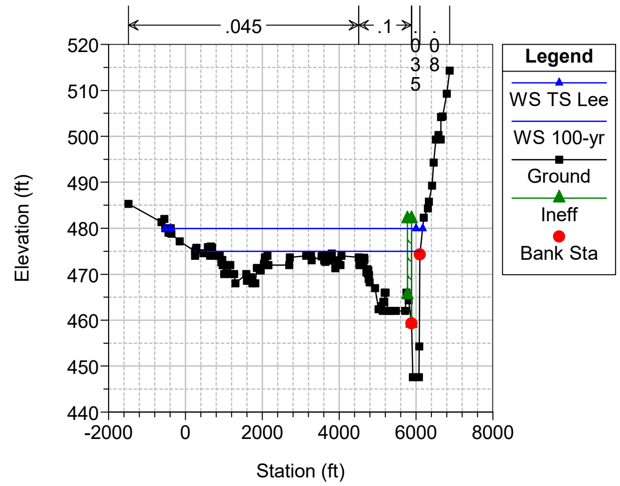
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 5.010



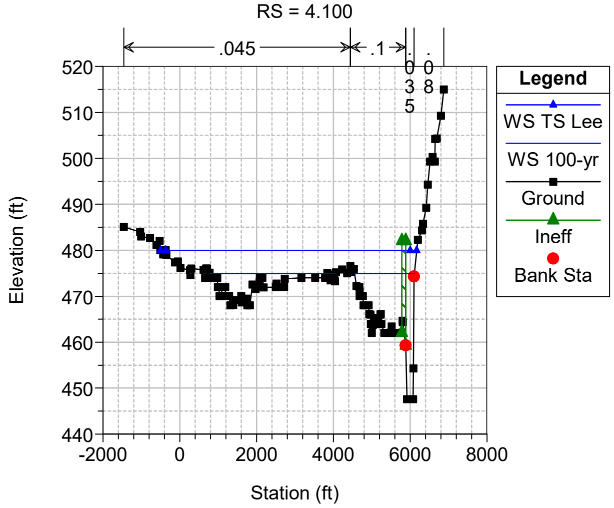
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 4.200



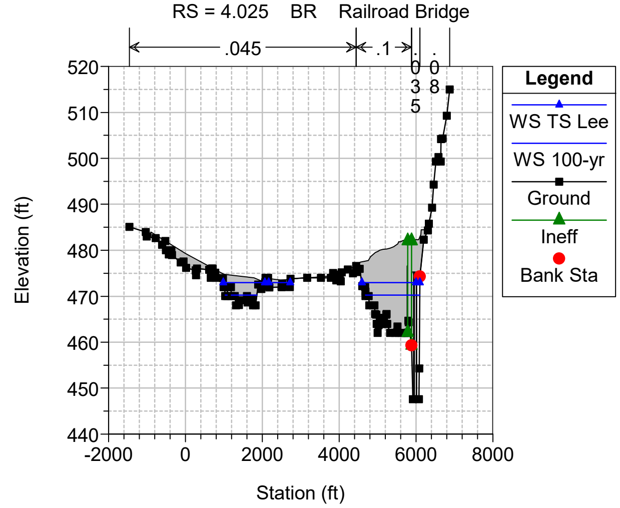
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 4.100



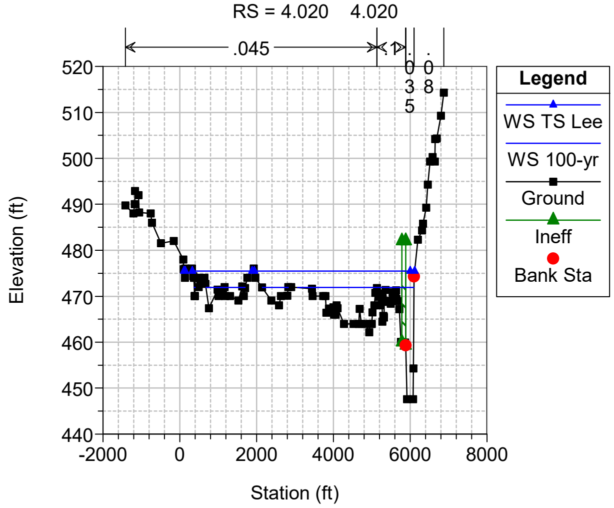
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 4.025 BR Railroad Bridge



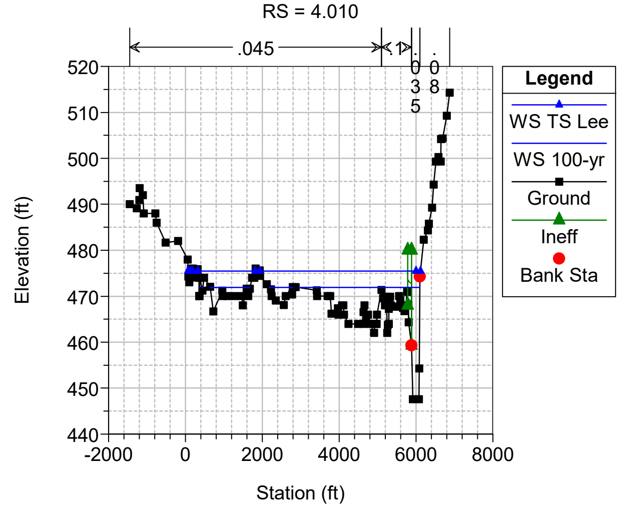
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 4.020 4.020



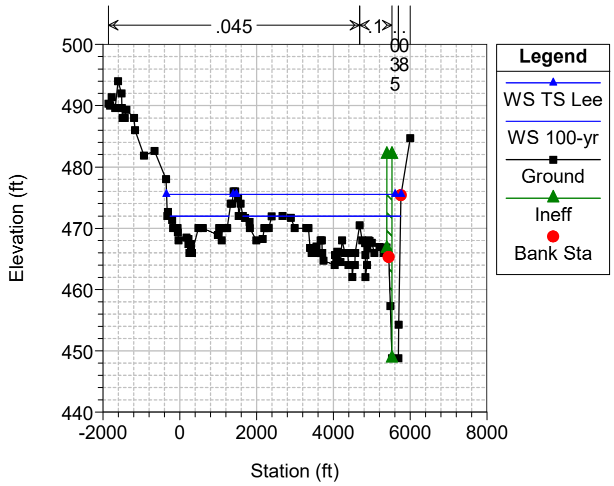
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 4.010



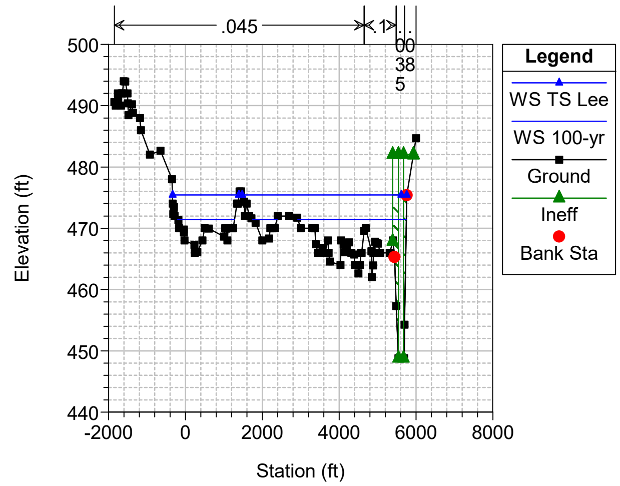
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 3.200



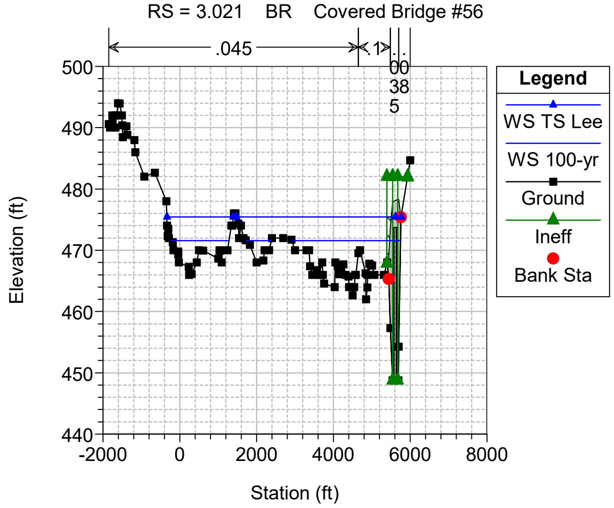
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 3.100



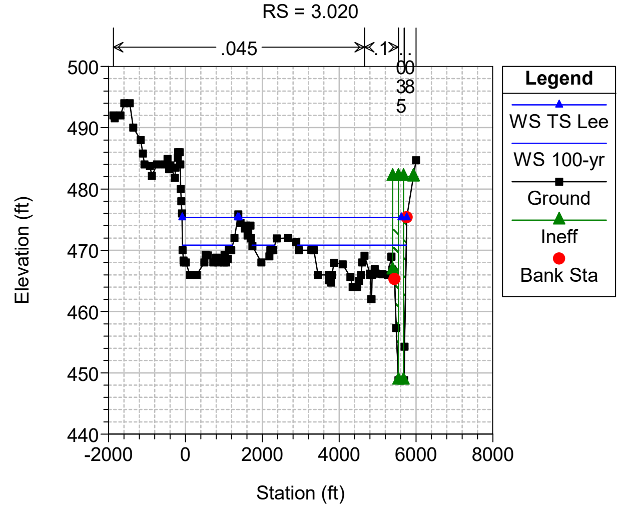
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 3.021 BR Covered Bridge #56



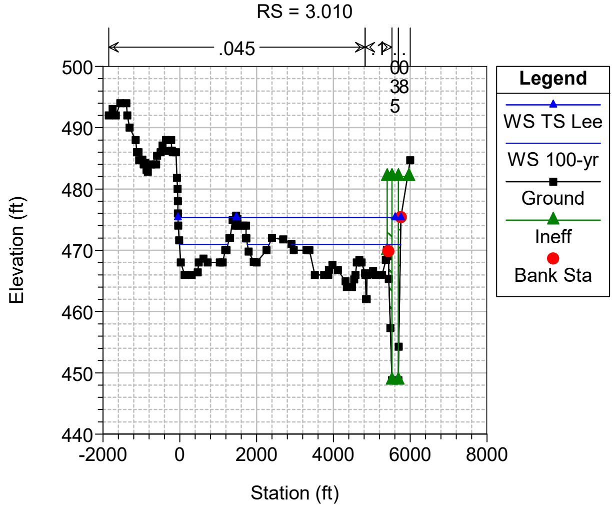
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

Geom: EX 2022 - FINAL Flow: Flow2021
RS = 3.020



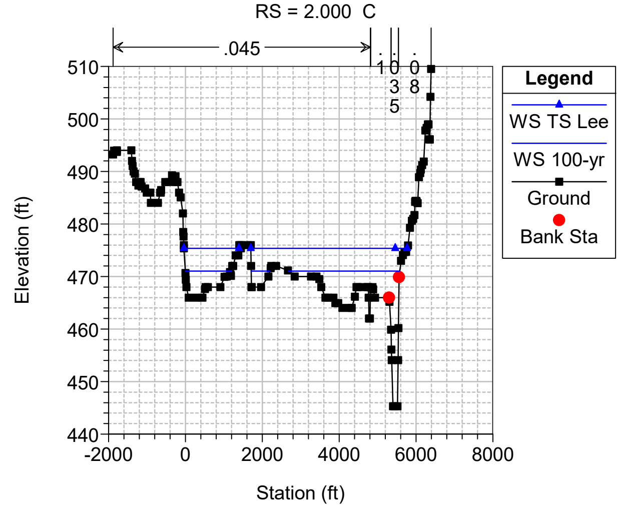
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

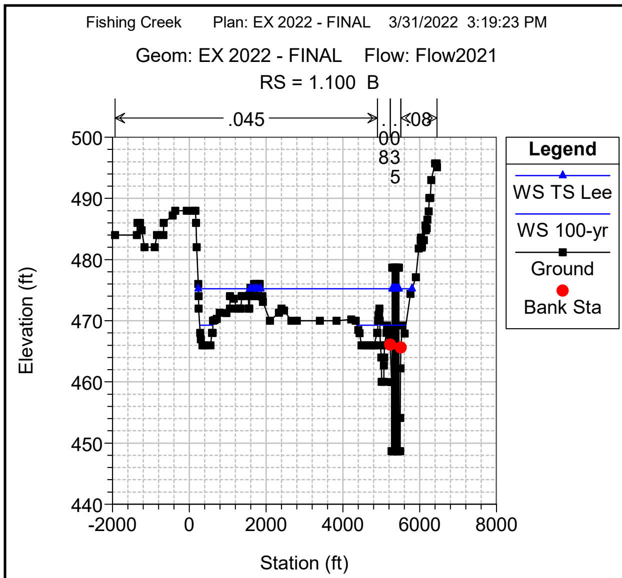
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 3.010

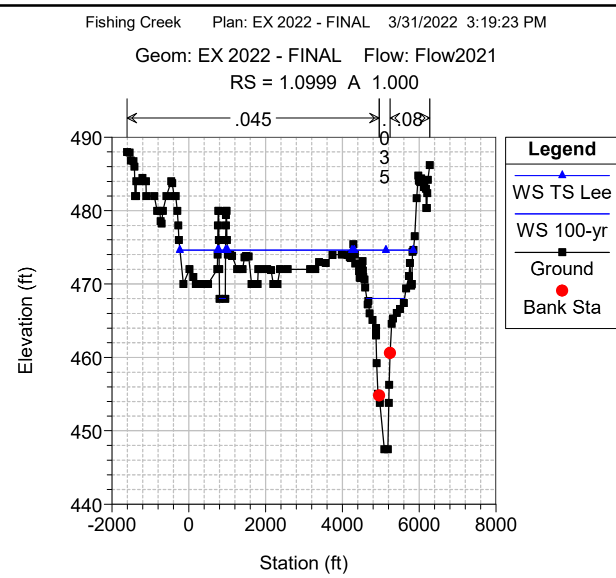


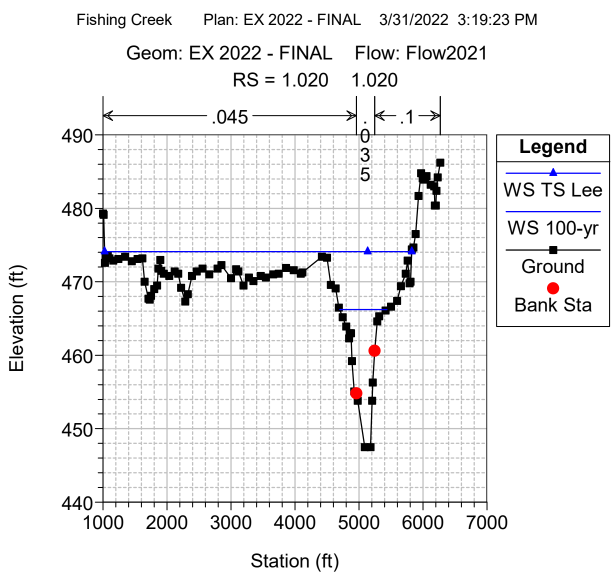
Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM

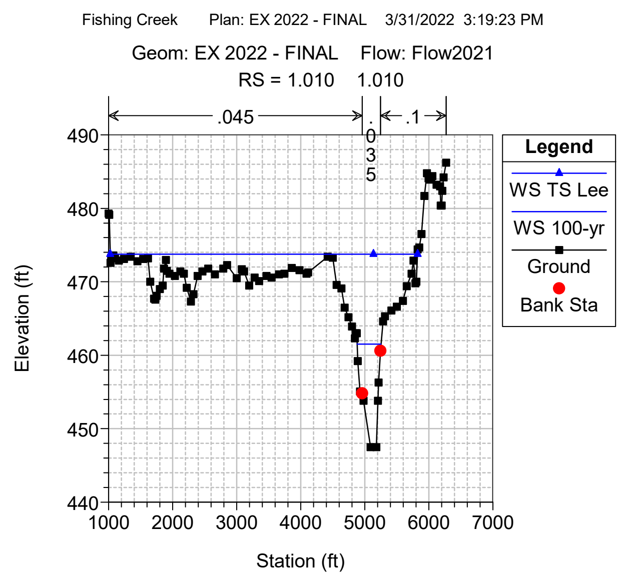
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 2.000 C




Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 1.100 B
.045
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 1.0999 A 1.000
.045
.035
.08
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

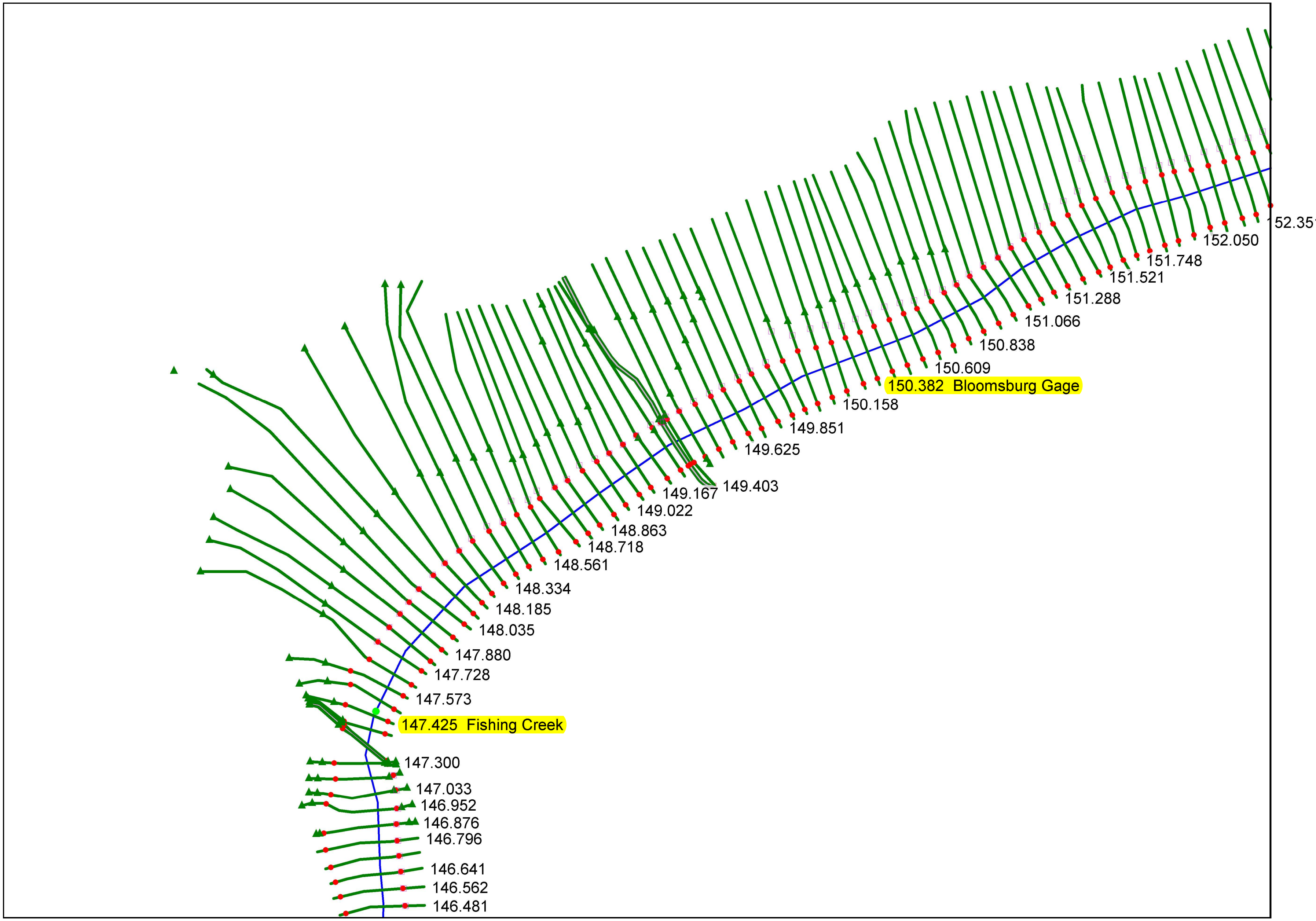

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 1.020 1.020
.045
.035
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

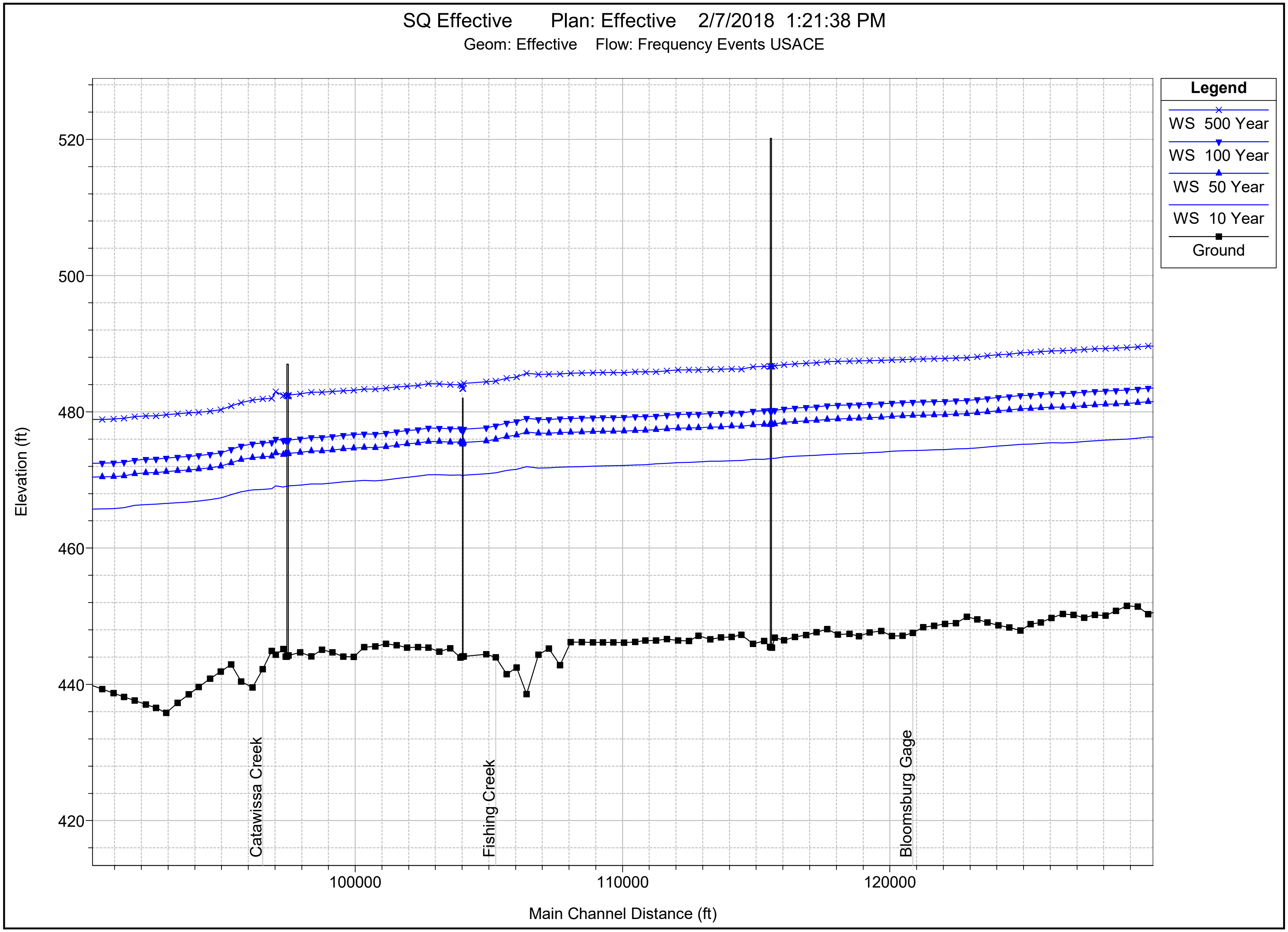

Fishing Creek Plan: EX 2022 - FINAL 3/31/2022 3:19:23 PM
Geom: EX 2022 - FINAL Flow: Flow2021
RS = 1.010 1.010
.045
.035
.1
Legend
WS TS Lee
WS 100-yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

E. Susquehanna River Hydraulic Analysis

E.1 Effective Model Output

Print out is limited to reach of Susquehanna River in the neighboring of the project area.




SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Elevation (ft)
520
500
480
460
440
420
Catawissa Creek
Fishing Creek
Bloomsburg Gage
100000
110000
120000
Main Channel Distance (ft)

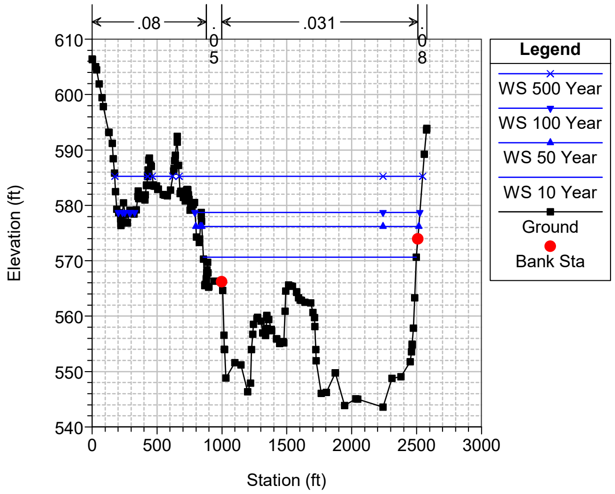
HEC-RAS Plan: Effective Locations: User Defined

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Susquehanna	Middle Reach	150.001	10 Year	176300.00	447.07	473.92	458.65	474.51	0.000186	6.17	28738.02	1605.64	0.23
Susquehanna	Middle Reach	150.001	50 Year	246300.00	447.07	479.04	461.04	479.77	0.000194	6.90	38064.75	2068.36	0.23
Susquehanna	Middle Reach	150.001	100 Year	277800.00	447.07	481.03	462.04	481.79	0.000189	7.12	46181.47	3248.02	0.23
Susquehanna	Middle Reach	150.001	500 Year	378000.00	447.07	487.46	464.93	488.25	0.000163	7.46	69464.70	3860.88	0.22
Susquehanna	Middle Reach	149.932	10 Year	176300.00	447.41	473.87	458.61	474.43	0.000184	6.02	29355.82	1401.05	0.23
Susquehanna	Middle Reach	149.932	50 Year	246300.00	447.41	479.01	460.95	479.69	0.000185	6.68	41857.58	3423.15	0.23
Susquehanna	Middle Reach	149.932	100 Year	277800.00	447.41	481.00	461.90	481.71	0.000180	6.89	48709.79	3451.94	0.23
Susquehanna	Middle Reach	149.932	500 Year	378000.00	447.41	487.45	464.79	488.18	0.000152	7.20	71832.33	3901.93	0.21
Susquehanna	Middle Reach	149.851	10 Year	176300.00	447.32	473.81	458.29	474.35	0.000172	5.90	29916.21	1375.98	0.22
Susquehanna	Middle Reach	149.851	50 Year	246300.00	447.32	478.96	460.63	479.60	0.000172	6.53	44180.27	3439.67	0.22
Susquehanna	Middle Reach	149.851	100 Year	277800.00	447.32	480.95	461.59	481.62	0.000167	6.72	51073.75	3456.26	0.22
Susquehanna	Middle Reach	149.851	500 Year	378000.00	447.32	487.42	464.28	488.10	0.000140	7.01	73805.20	3641.16	0.21
Susquehanna	Middle Reach	149.775	10 Year	176300.00	448.12	473.73	458.31	474.28	0.000170	5.97	29600.27	1348.61	0.22
Susquehanna	Middle Reach	149.775	50 Year	246300.00	448.12	478.89	460.51	479.53	0.000167	6.52	45359.56	3363.73	0.22
Susquehanna	Middle Reach	149.775	100 Year	277800.00	448.12	480.90	461.43	481.56	0.000162	6.71	52212.56	3447.58	0.22
Susquehanna	Middle Reach	149.775	500 Year	378000.00	448.12	487.38	464.14	488.04	0.000135	6.97	75160.83	3756.72	0.20
Susquehanna	Middle Reach	149.699	10 Year	176300.00	447.67	473.62	458.50	474.20	0.000183	6.15	28725.03	1314.61	0.23
Susquehanna	Middle Reach	149.699	50 Year	246300.00	447.67	478.74	460.75	479.45	0.000185	6.85	40814.86	2746.95	0.23
Susquehanna	Middle Reach	149.699	100 Year	277800.00	447.67	480.73	461.69	481.48	0.000181	7.09	46191.46	2890.98	0.23
Susquehanna	Middle Reach	149.699	500 Year	378000.00	447.67	487.19	464.44	487.97	0.000154	7.44	66348.77	3562.10	0.22
Susquehanna	Middle Reach	149.625	10 Year	176300.00	447.23	473.55	458.26	474.13	0.000179	6.11	28887.95	1305.22	0.22
Susquehanna	Middle Reach	149.625	50 Year	246300.00	447.23	478.66	460.51	479.38	0.000186	6.86	40003.36	3253.52	0.23
Susquehanna	Middle Reach	149.625	100 Year	277800.00	447.23	480.64	461.44	481.40	0.000182	7.12	45534.72	3454.43	0.23
Susquehanna	Middle Reach	149.625	500 Year	378000.00	447.23	487.13	464.21	487.91	0.000153	7.44	70878.15	3546.54	0.22
Susquehanna	Middle Reach	149.546	10 Year	176300.00	446.97	473.48	458.15	474.06	0.000177	6.10	28962.00	1299.52	0.22
Susquehanna	Middle Reach	149.546	50 Year	246300.00	446.97	478.56	460.41	479.30	0.000188	6.91	38248.08	3198.43	0.23
Susquehanna	Middle Reach	149.546	100 Year	277800.00	446.97	480.54	461.34	481.33	0.000186	7.20	42764.33	3470.90	0.23
Susquehanna	Middle Reach	149.546	500 Year	378000.00	446.97	487.03	464.11	487.84	0.000157	7.53	69236.80	3633.00	0.22
Susquehanna	Middle Reach	149.469	10 Year	176300.00	446.46	473.40	458.04	473.98	0.000184	6.14	28712.81	1269.04	0.23
Susquehanna	Middle Reach	149.469	50 Year	246300.00	446.46	478.46	460.31	479.22	0.000197	6.99	36250.65	2967.34	0.24
Susquehanna	Middle Reach	149.469	100 Year	277800.00	446.46	480.41	461.26	481.24	0.000199	7.33	39733.77	3372.58	0.24
Susquehanna	Middle Reach	149.469	500 Year	378000.00	446.46	486.94	464.04	487.77	0.000166	7.61	68299.38	3591.58	0.22
Susquehanna	Middle Reach	149.403	10 Year	176300.00	446.86	473.18	459.28	473.90	0.000239	6.79	25958.16	1208.07	0.26
Susquehanna	Middle Reach	149.403	50 Year	246300.00	446.86	478.21	461.76	479.12	0.000254	7.67	32305.38	2868.73	0.27
Susquehanna	Middle Reach	149.403	100 Year	277800.00	446.86	480.22	462.78	481.16	0.000242	7.85	42590.50	3341.17	0.26
Susquehanna	Middle Reach	149.403	500 Year	378000.00	446.86	486.76	465.84	487.70	0.000198	8.12	65606.53	3608.13	0.25
Susquehanna	Middle Reach	149.382	10 Year	176300.00	445.38	473.18	458.37	473.86	0.000216	6.61	26657.67	1192.30	0.25
Susquehanna	Middle Reach	149.382	50 Year	246300.00	445.38	478.21	460.81	479.09	0.000232	7.53	32688.71	2539.33	0.26
Susquehanna	Middle Reach	149.382	100 Year	277800.00	445.38	480.22	461.86	481.12	0.000193	7.70	44141.20	3126.58	0.25
Susquehanna	Middle Reach	149.382	500 Year	378000.00	445.38	486.71	464.87	487.68	0.000168	8.16	67252.34	3734.83	0.24
Susquehanna	Middle Reach	149.376		Bridge									
Susquehanna	Middle Reach	149.370	10 Year	176300.00	445.49	473.15	458.22	473.81	0.000214	6.56	26866.94	1211.12	0.25
Susquehanna	Middle Reach	149.370	50 Year	246300.00	445.49	478.17	460.65	479.03	0.000233	7.46	33033.45	2802.55	0.25
Susquehanna	Middle Reach	149.370	100 Year	277800.00	445.49	480.19	461.68	481.08	0.000225	7.66	43983.20	3212.09	0.25
Susquehanna	Middle Reach	149.370	500 Year	378000.00	445.49	486.68	464.71	487.64	0.000194	8.09	67445.95	3741.71	0.24
Susquehanna	Middle Reach	149.327	10 Year	176300.00	446.38	473.05	458.69	473.76	0.000226	6.79	25979.68	1247.04	0.25
Susquehanna	Middle Reach	149.327	50 Year	246300.00	446.38	478.16	461.09	478.96	0.000227	7.31	40395.69	2677.80	0.25
Susquehanna	Middle Reach	149.327	100 Year	277800.00	446.38	480.16	462.07	481.02	0.000223	7.59	46088.41	3086.83	0.25
Susquehanna	Middle Reach	149.327	500 Year	378000.00	446.38	486.68	465.00	487.57	0.000187	7.93	69424.03	3706.21	0.24
Susquehanna	Middle Reach	149.249	10 Year	176300.00	445.94	473.02	457.90	473.65	0.000194	6.39	27603.64	1266.06	0.23
Susquehanna	Middle Reach	149.249	50 Year	246300.00	445.94	478.07	460.24	478.87	0.000215	7.16	34387.10	1295.02	0.24
Susquehanna	Middle Reach	149.249	100 Year	277800.00	445.94	480.10	461.22	480.92	0.000205	7.34	44636.60	3025.93	0.24
Susquehanna	Middle Reach	149.249	500 Year	378000.00	445.94	486.62	464.12	487.49	0.000176	7.74	68048.04	3803.01	0.23
Susquehanna	Middle Reach	149.167	10 Year	176300.00	447.27	472.86	458.79	473.55	0.000230	6.66	26460.78	1227.81	0.25
Susquehanna	Middle Reach	149.167	50 Year	246300.00	447.27	477.88	461.17	478.76	0.000243	7.54	32786.05	1407.10	0.26
Susquehanna	Middle Reach	149.167	100 Year	277800.00	447.27	479.84	462.14	480.80	0.000245	7.90	36040.64	1937.68	0.26
Susquehanna	Middle Reach	149.167	500 Year	378000.00	447.27	486.27	465.19	487.38	0.000220	8.55	54863.59	3603.38	0.26
Susquehanna	Middle Reach	149.098	10 Year	176300.00	446.96	472.83	457.77	473.46	0.000198	6.36	27716.46	1232.17	0.24
Susquehanna	Middle Reach	149.098	50 Year	246300.00	446.96	477.89	460.12	478.64	0.000202	7.04	40715.45	1975.84	0.24
Susquehanna	Middle Reach	149.098	100 Year	277800.00	446.96	479.86	461.09	480.68	0.000202	7.36	44639.52	2010.08	0.24
Susquehanna	Middle Reach	149.098	500 Year	378000.00	446.96	486.29	463.97	487.27	0.000190	8.10	58723.41	3537.23	0.24
Susquehanna	Middle Reach	149.022	10 Year	176300.00	446.89	472.76	457.82	473.37	0.000195	6.27	28097.51	1260.73	0.23
Susquehanna	Middle Reach	149.022	50 Year	246300.00	446.89	477.76	460.12	478.56	0.000208	7.15	34701.88	1347.23	0.24
Susquehanna	Middle Reach	149.022	100 Year	277800.00	446.89	479.79	461.09	480.59	0.000198	7.29	44458.79	2074.77	0.24
Susquehanna	Middle Reach	149.022	500 Year	378000.00	446.89	486.24	463.95	487.18	0.000183	7.96	58701.80	3443.79	0.24
Susquehanna	Middle Reach	148.947	10 Year	176300.00	446.62	472.74	457.14	473.28	0.000164	5.88	29996.11	1358.13	0.22
Susquehanna	Middle Reach	148.947	50 Year	246300.00	446.62	477.76	459.30	478.45	0.000175	6.67	40045.30	2237.21	0.22
Susquehanna	Middle Reach	148.947	100 Year	277800.00	446.62	479.76	460.26	480.50	0.000176	6.98	44172.77	2577.14	0.23
Susquehanna	Middle Reach	148.947	500 Year	378000.00	446.62	486.22	462.97	487.09	0.000165	7.65	58803.37	3422.90	0.23
Susquehanna	Middle Reach	148.863	10 Year	176300.00	447.12	472.64	458.08	473.20	0.000184	6.04	30141.74	1846.18	0.23
Susquehanna	Middle Reach	148.863	50 Year	246300.00	447.12	477.66	460.26	478.36	0.000190	6.78	39949.64	2088.28	0.23
Susquehanna	Middle Reach	148.863	100 Year	277800.00	447.12	479.66	461.18	480.42	0.000189	7.07	44161.36	2174.03	0.23

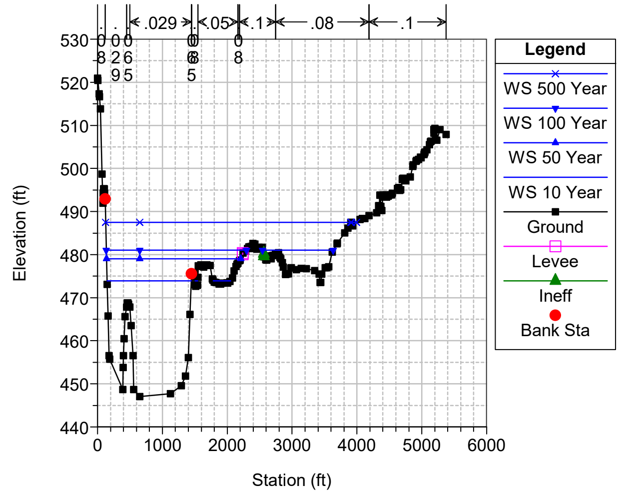
HEC-RAS Plan: Effective Locations: User Defined (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Susquehanna	Middle Reach	148.863	500 Year	378000.00	447.12	486.15	463.91	487.02	0.000171	7.66	63681.09	3766.93	0.23
Susquehanna	Middle Reach	148.795	10 Year	176300.00	446.36	472.59	457.80	473.13	0.000178	5.88	30212.50	1826.88	0.22
Susquehanna	Middle Reach	148.795	50 Year	246300.00	446.36	477.63	460.03	478.28	0.000179	6.54	41446.43	2362.45	0.22
Susquehanna	Middle Reach	148.795	100 Year	277800.00	446.36	479.64	460.96	480.34	0.000175	6.79	46117.23	2433.29	0.22
Susquehanna	Middle Reach	148.795	500 Year	378000.00	446.36	486.15	463.64	486.93	0.000155	7.29	61492.92	3414.50	0.22
Susquehanna	Middle Reach	148.718	10 Year	176300.00	446.43	472.54	456.75	473.05	0.000162	5.73	30900.11	1560.17	0.21
Susquehanna	Middle Reach	148.718	50 Year	246300.00	446.43	477.59	458.96	478.20	0.000162	6.35	43445.37	2647.04	0.21
Susquehanna	Middle Reach	148.718	100 Year	277800.00	446.43	479.61	459.90	480.25	0.000159	6.58	48228.43	2903.38	0.21
Susquehanna	Middle Reach	148.718	500 Year	378000.00	446.43	486.15	462.70	486.85	0.000138	6.98	70892.61	3765.84	0.21
Susquehanna	Middle Reach	148.639	10 Year	176300.00	446.64	472.45	456.80	472.98	0.000160	5.85	31061.93	2103.49	0.21
Susquehanna	Middle Reach	148.639	50 Year	246300.00	446.64	477.48	459.00	478.13	0.000166	6.54	42659.32	2741.94	0.22
Susquehanna	Middle Reach	148.639	100 Year	277800.00	446.64	479.49	459.92	480.18	0.000164	6.80	47398.78	2977.15	0.22
Susquehanna	Middle Reach	148.639	500 Year	378000.00	446.64	486.01	462.67	486.78	0.000147	7.30	63777.74	3790.02	0.21
Susquehanna	Middle Reach	148.561	10 Year	176300.00	446.44	472.36	456.58	472.91	0.000166	5.95	30477.81	1706.92	0.22
Susquehanna	Middle Reach	148.561	50 Year	246300.00	446.44	477.37	458.84	478.05	0.000175	6.72	39757.69	1998.13	0.22
Susquehanna	Middle Reach	148.561	100 Year	277800.00	446.44	479.37	459.78	480.11	0.000175	7.02	43868.36	2121.23	0.23
Susquehanna	Middle Reach	148.561	500 Year	378000.00	446.44	485.86	462.58	486.71	0.000160	7.61	60457.54	4750.54	0.22
Susquehanna	Middle Reach	148.486	10 Year	176300.00	446.44	472.24	456.91	472.84	0.000180	6.21	30035.60	3229.37	0.23
Susquehanna	Middle Reach	148.486	50 Year	246300.00	446.44	477.29	459.22	477.98	0.000181	6.83	43044.27	3724.58	0.23
Susquehanna	Middle Reach	148.486	100 Year	277800.00	446.44	479.31	460.19	480.03	0.000177	7.06	48479.53	5474.86	0.23
Susquehanna	Middle Reach	148.486	500 Year	378000.00	446.44	485.86	462.99	486.62	0.000152	7.43	67842.97	7224.92	0.22
Susquehanna	Middle Reach	148.413	10 Year	176300.00	446.24	472.18	456.74	472.77	0.000182	6.16	30955.36	3387.10	0.23
Susquehanna	Middle Reach	148.413	50 Year	246300.00	446.24	477.26	459.06	477.90	0.000174	6.64	46712.82	6054.33	0.22
Susquehanna	Middle Reach	148.413	100 Year	277800.00	446.24	479.29	460.02	479.95	0.000167	6.79	53253.55	6560.95	0.22
Susquehanna	Middle Reach	148.413	500 Year	378000.00	446.24	485.88	462.87	486.53	0.000137	6.99	74717.71	7922.09	0.21
Susquehanna	Middle Reach	148.334	10 Year	176300.00	446.14	472.13	456.30	472.68	0.000169	5.96	30835.19	3240.20	0.22
Susquehanna	Middle Reach	148.334	50 Year	246300.00	446.14	477.18	458.57	477.83	0.000171	6.58	44844.64	6104.20	0.22
Susquehanna	Middle Reach	148.334	100 Year	277800.00	446.14	479.20	459.52	479.87	0.000167	6.80	50813.49	7027.16	0.22
Susquehanna	Middle Reach	148.334	500 Year	378000.00	446.14	485.75	462.33	486.47	0.000143	7.16	70952.63	7922.18	0.21
Susquehanna	Middle Reach	148.259	10 Year	176300.00	446.15	472.10	456.01	472.61	0.000156	5.75	32054.11	4131.06	0.21
Susquehanna	Middle Reach	148.259	50 Year	246300.00	446.15	477.15	458.26	477.75	0.000157	6.34	48189.53	6838.98	0.21
Susquehanna	Middle Reach	148.259	100 Year	277800.00	446.15	479.17	459.17	479.79	0.000152	6.51	55210.36	7312.04	0.21
Susquehanna	Middle Reach	148.259	500 Year	378000.00	446.15	485.76	461.92	486.39	0.000127	6.77	78135.33	7449.68	0.20
Susquehanna	Middle Reach	148.185	10 Year	176300.00	446.16	472.05	455.82	472.54	0.000147	5.64	31252.55	1339.13	0.21
Susquehanna	Middle Reach	148.185	50 Year	246300.00	446.16	477.13	458.01	477.67	0.000142	6.09	50189.50	7184.18	0.20
Susquehanna	Middle Reach	148.185	100 Year	277800.00	446.16	479.16	458.94	479.71	0.000136	6.23	57313.82	7344.40	0.20
Susquehanna	Middle Reach	148.185	500 Year	378000.00	446.16	485.77	461.62	486.31	0.000111	6.39	80519.62	7420.10	0.19

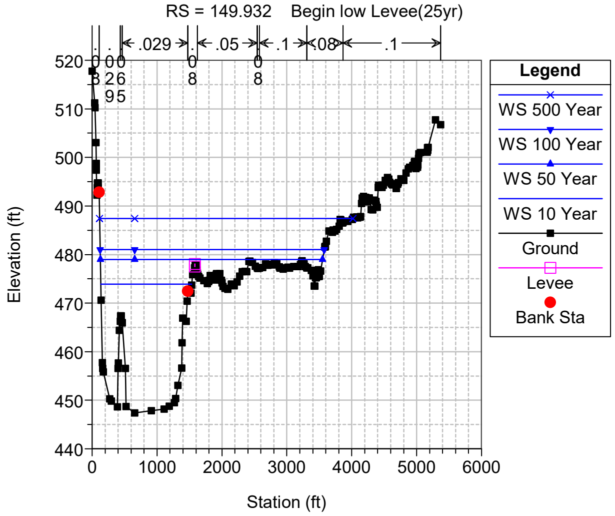
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 205.877



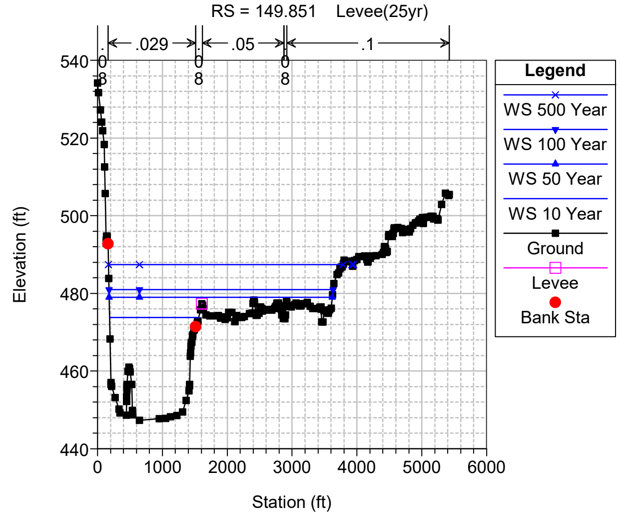
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 150.001 End low ground around right overbank, Levee(50yr)



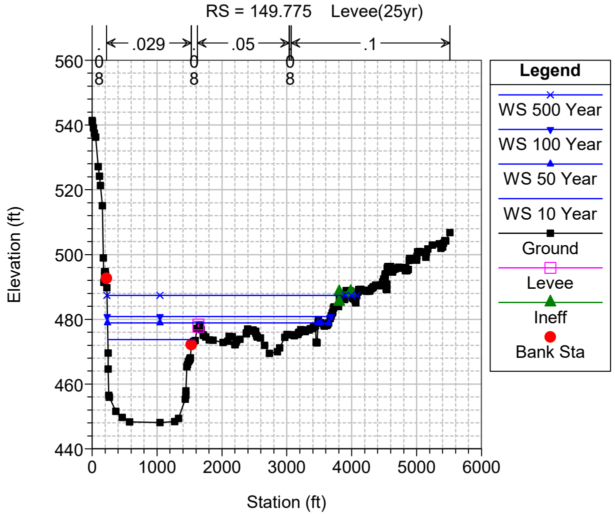
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.932 Begin low Levee(25yr)



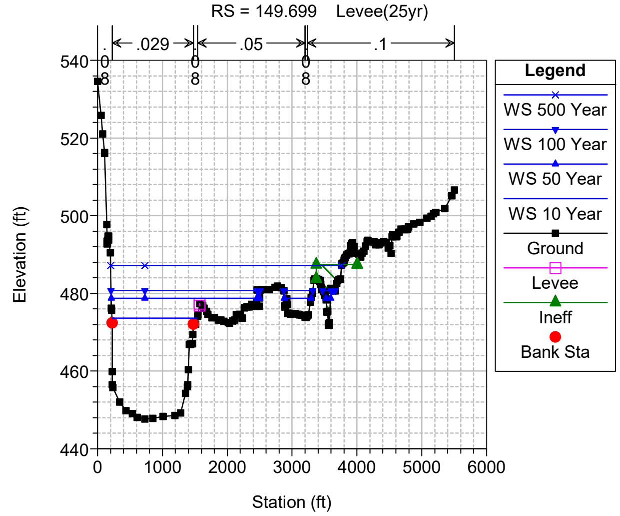
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.851 Levee(25yr)

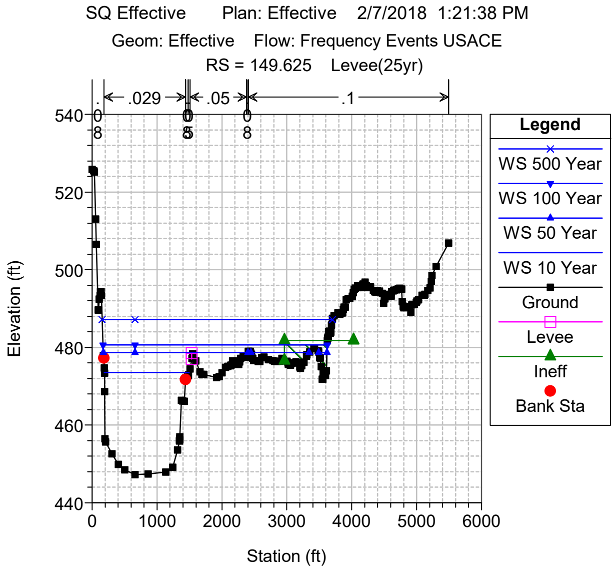


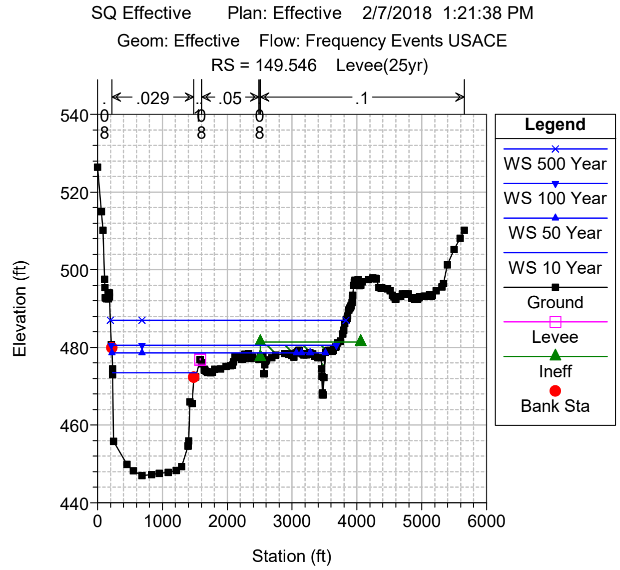
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.775 Levee(25yr)

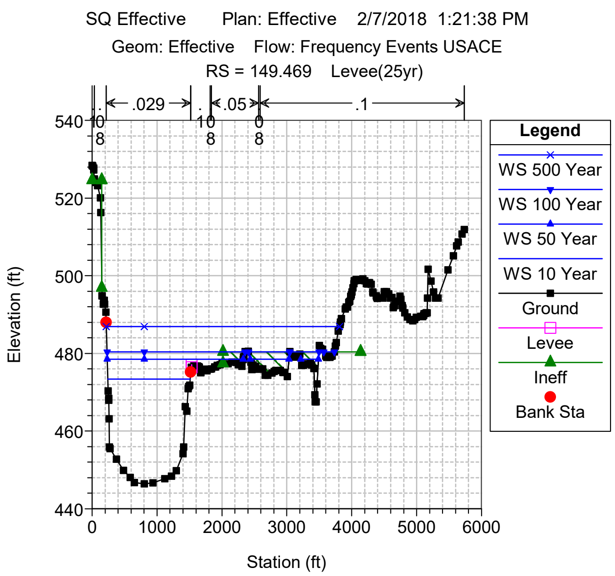


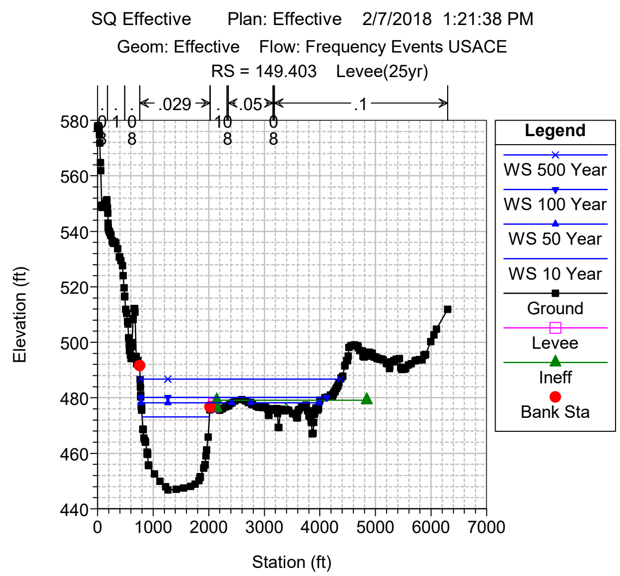
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.699 Levee(25yr)

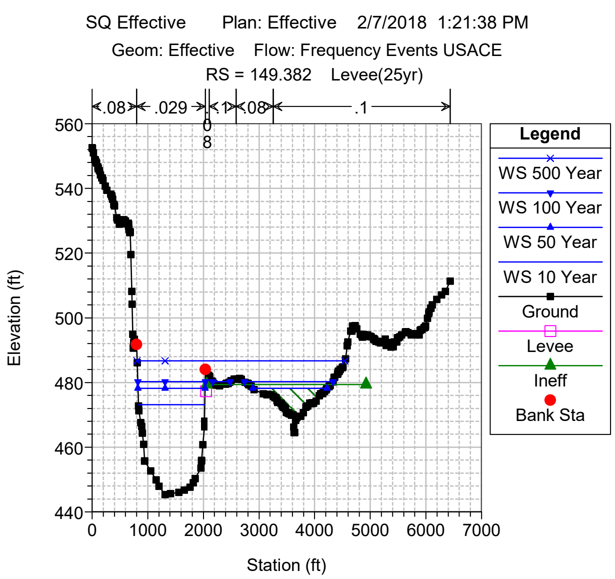


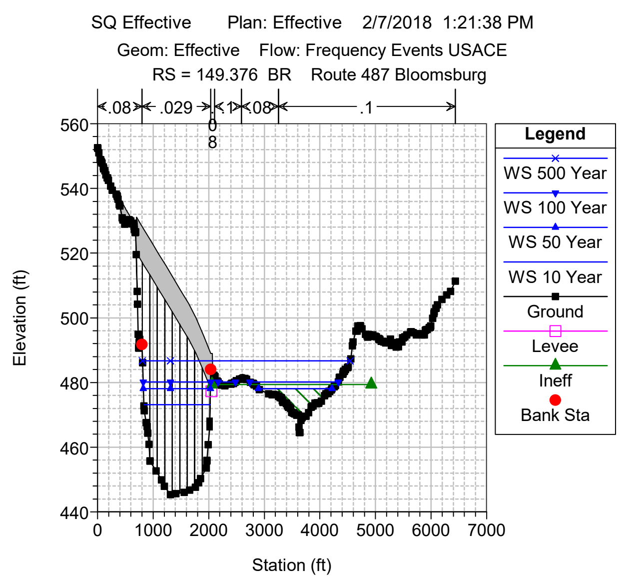

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.625 Levee(25yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.546 Levee(25yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

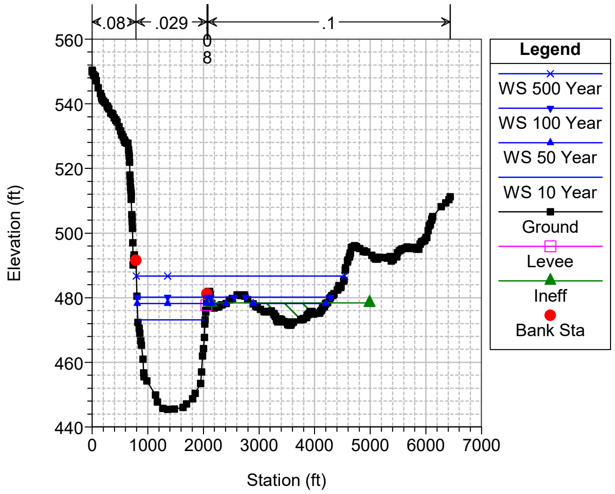

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.469 Levee(25yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.403 Levee(25yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

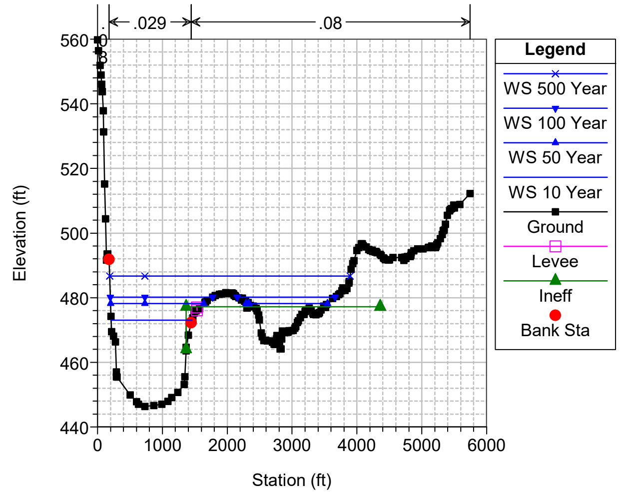

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.382 Levee(25yr)
.08
.029
.08
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.376 BR Route 487 Bloomsburg
.08
.029
.08
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

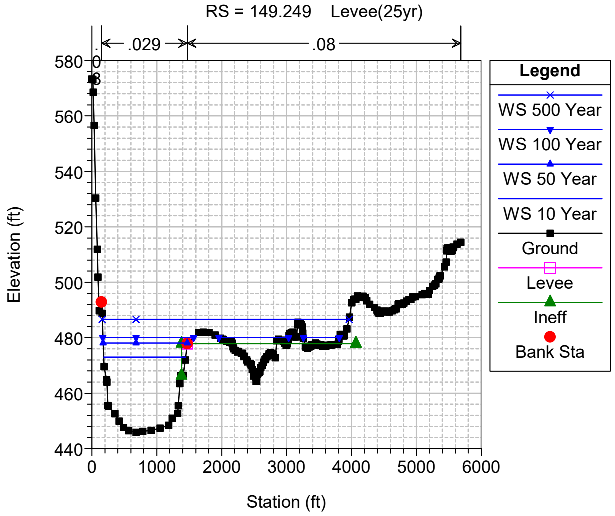
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.370 Levee(25yr)



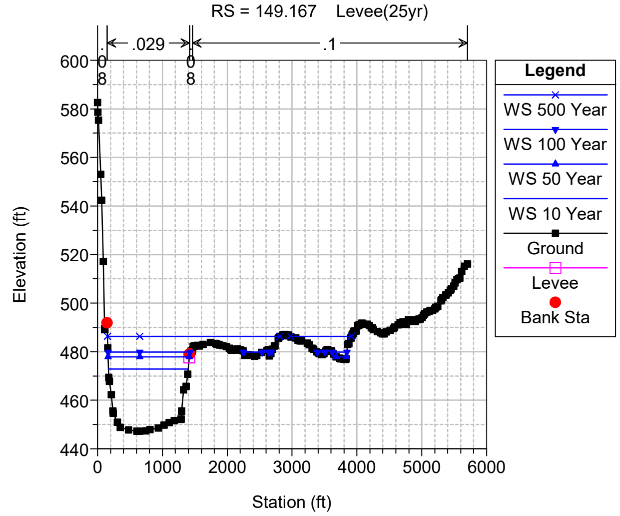
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.327 Levee(25yr)



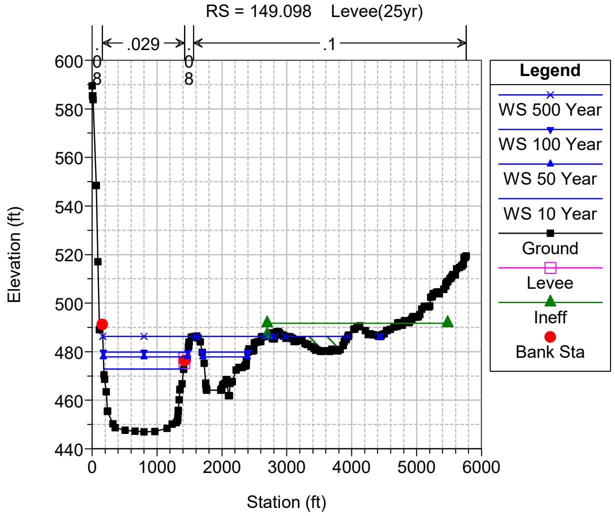
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.249 Levee(25yr)



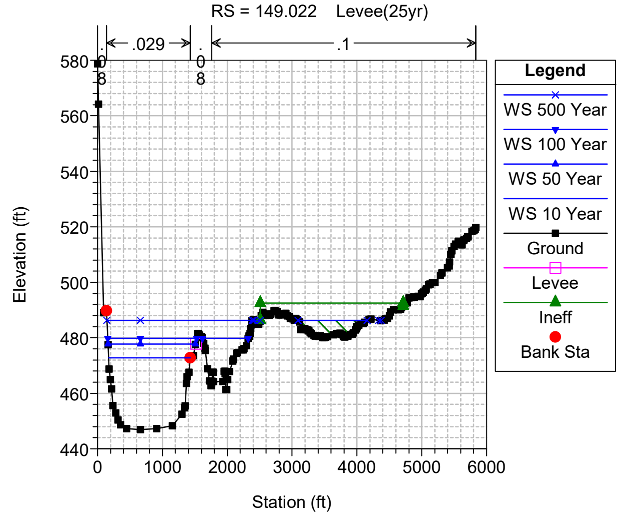
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.167 Levee(25yr)

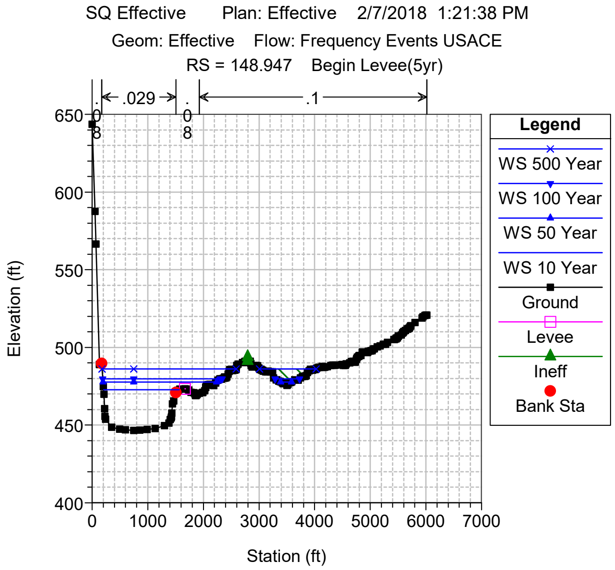


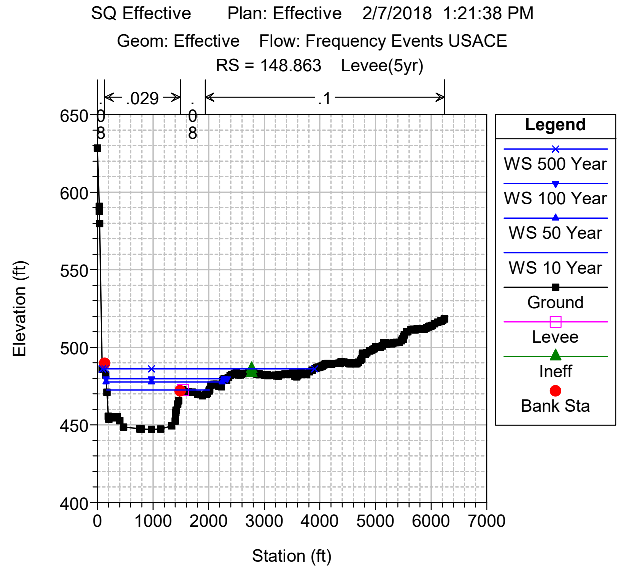
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.098 Levee(25yr)

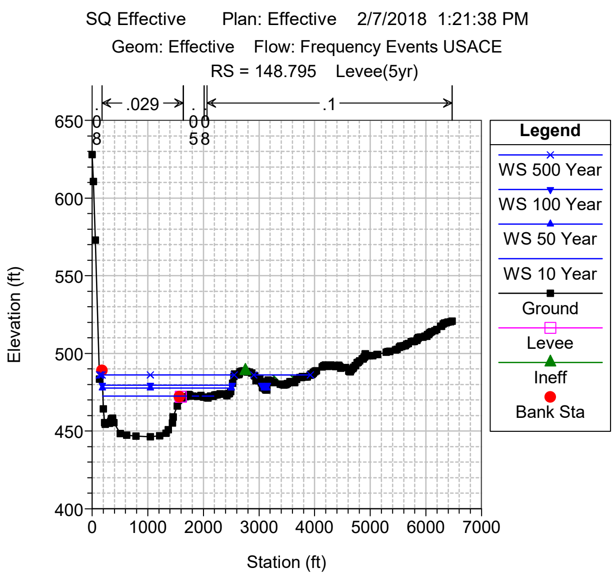


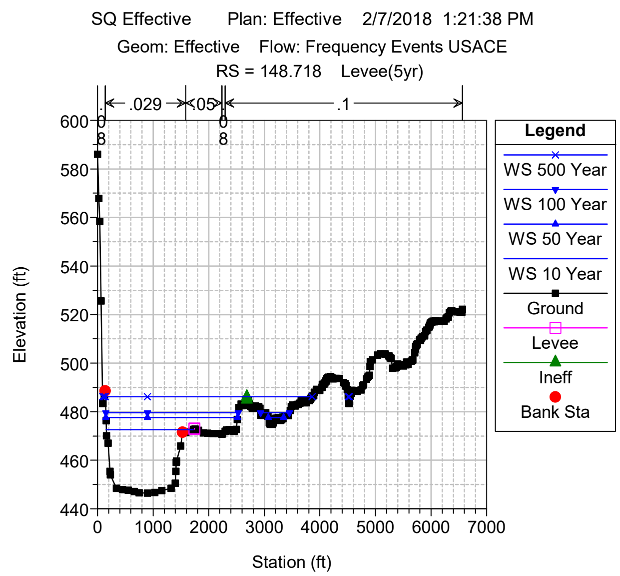
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 149.022 Levee(25yr)

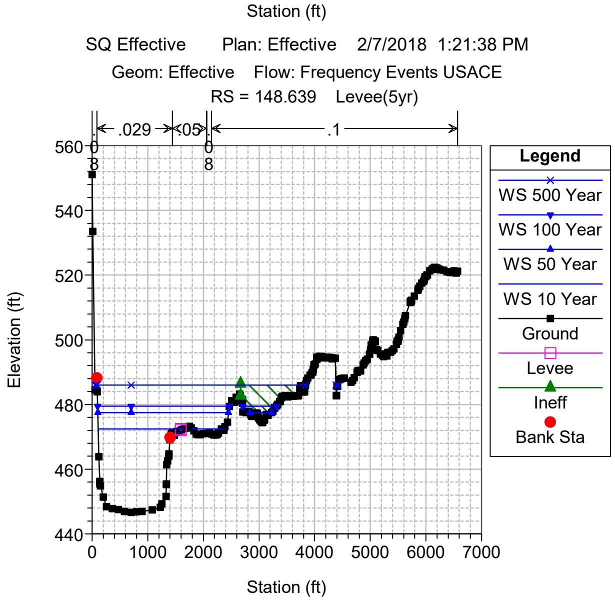


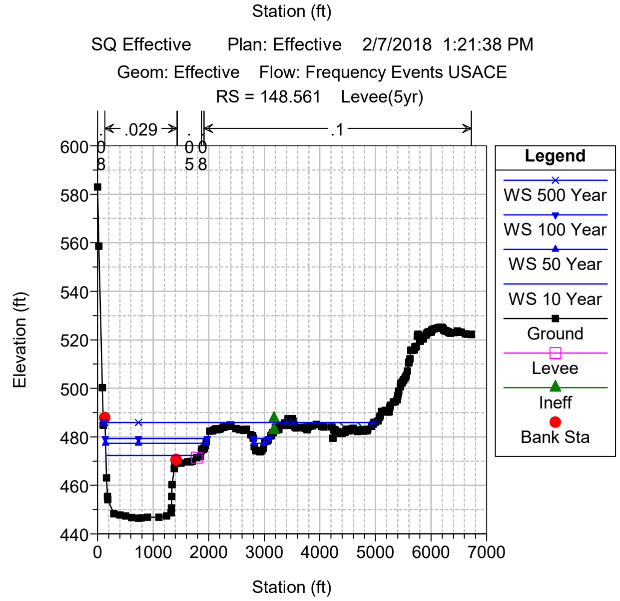

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.947 Begin Levee(5yr)
.029
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.863 Levee(5yr)
.029
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

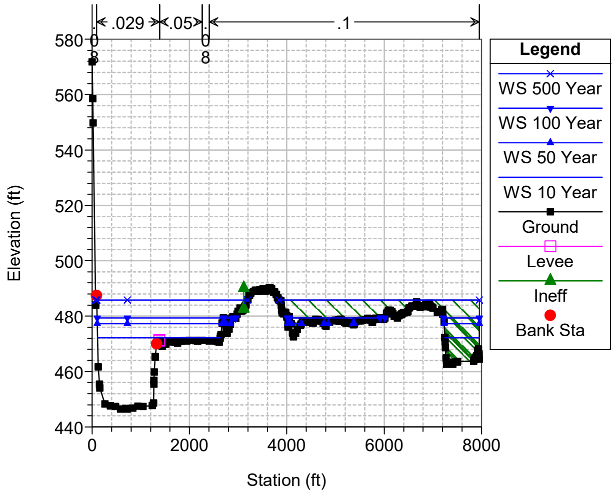

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.795 Levee(5yr)
.029
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.718 Levee(5yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

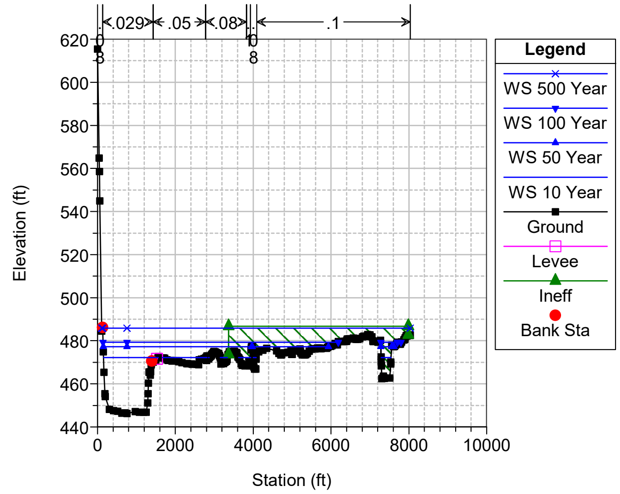

SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.639 Levee(5yr)
.029
.05
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta


SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.561 Levee(5yr)
.029
.1
Elevation (ft)
Station (ft)
Legend
WS 500 Year
WS 100 Year
WS 50 Year
WS 10 Year
Ground
Levee
Ineff
Bank Sta

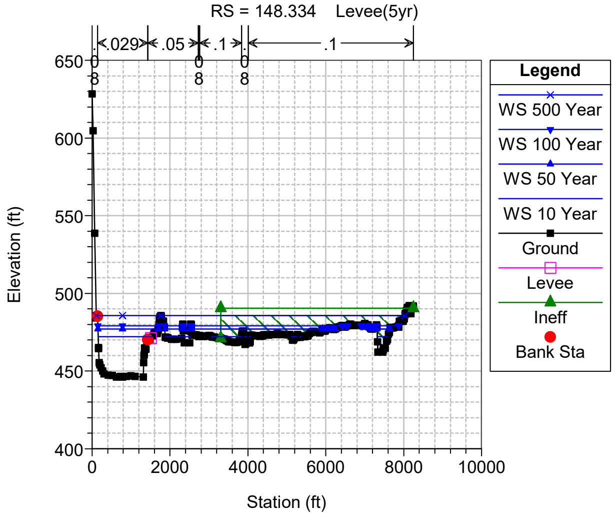
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.486 Levee(5yr)



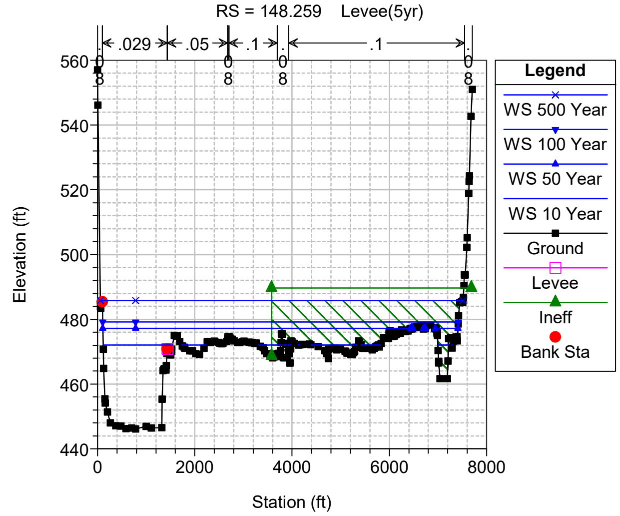
SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.413 Levee(5yr)



SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.334 Levee(5yr)



SQ Effective Plan: Effective 2/7/2018 1:21:38 PM
Geom: Effective Flow: Frequency Events USACE
RS = 148.259 Levee(5yr)



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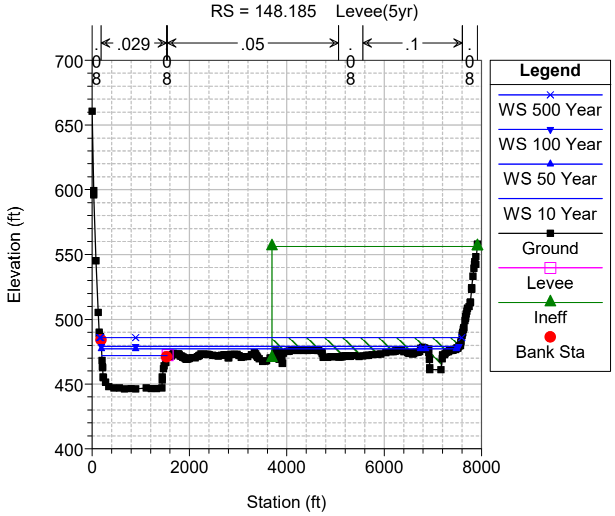
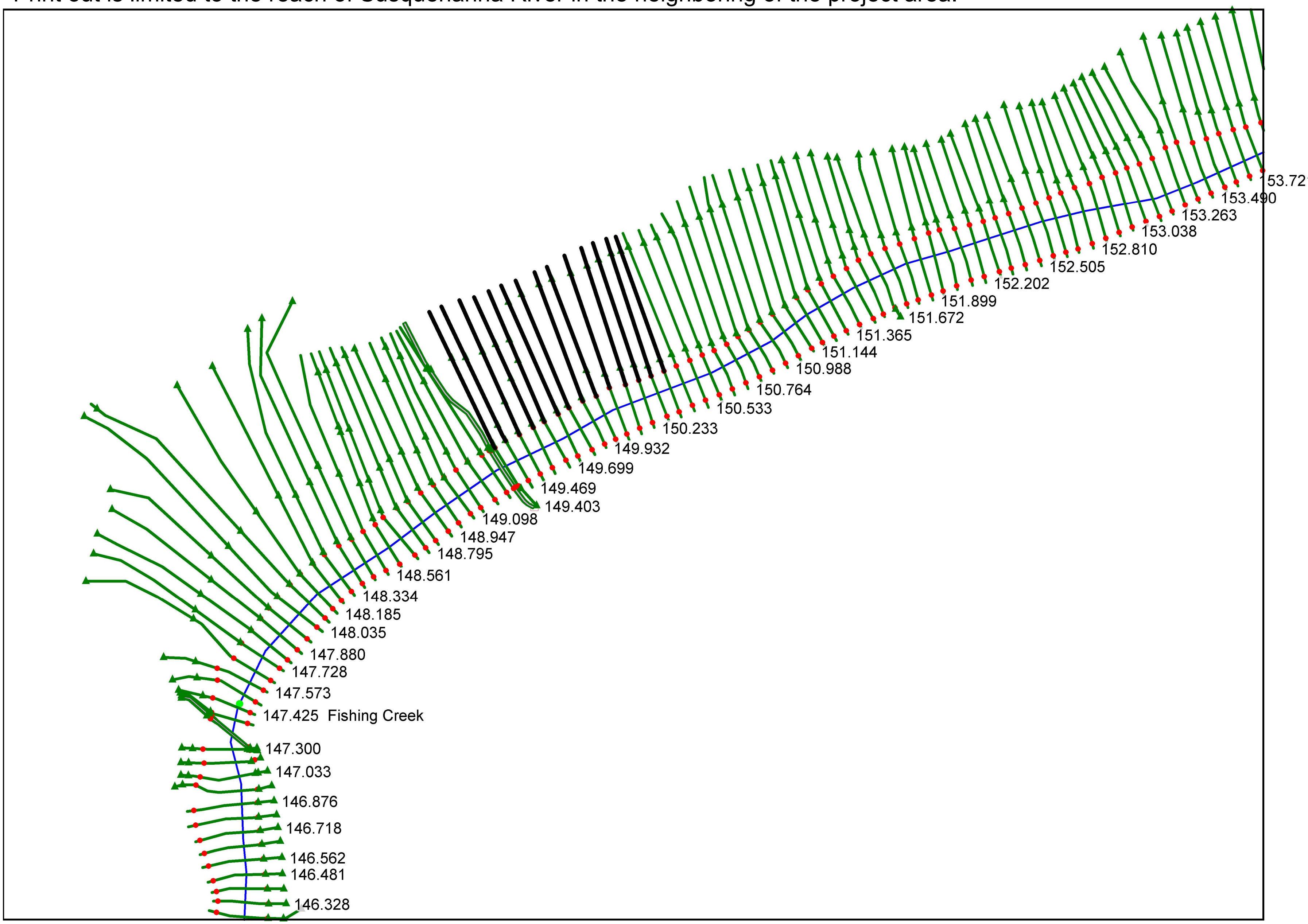
Geom: Effective Flow: Frequency Events USACE
RS = 148.185 Levee(5yr)

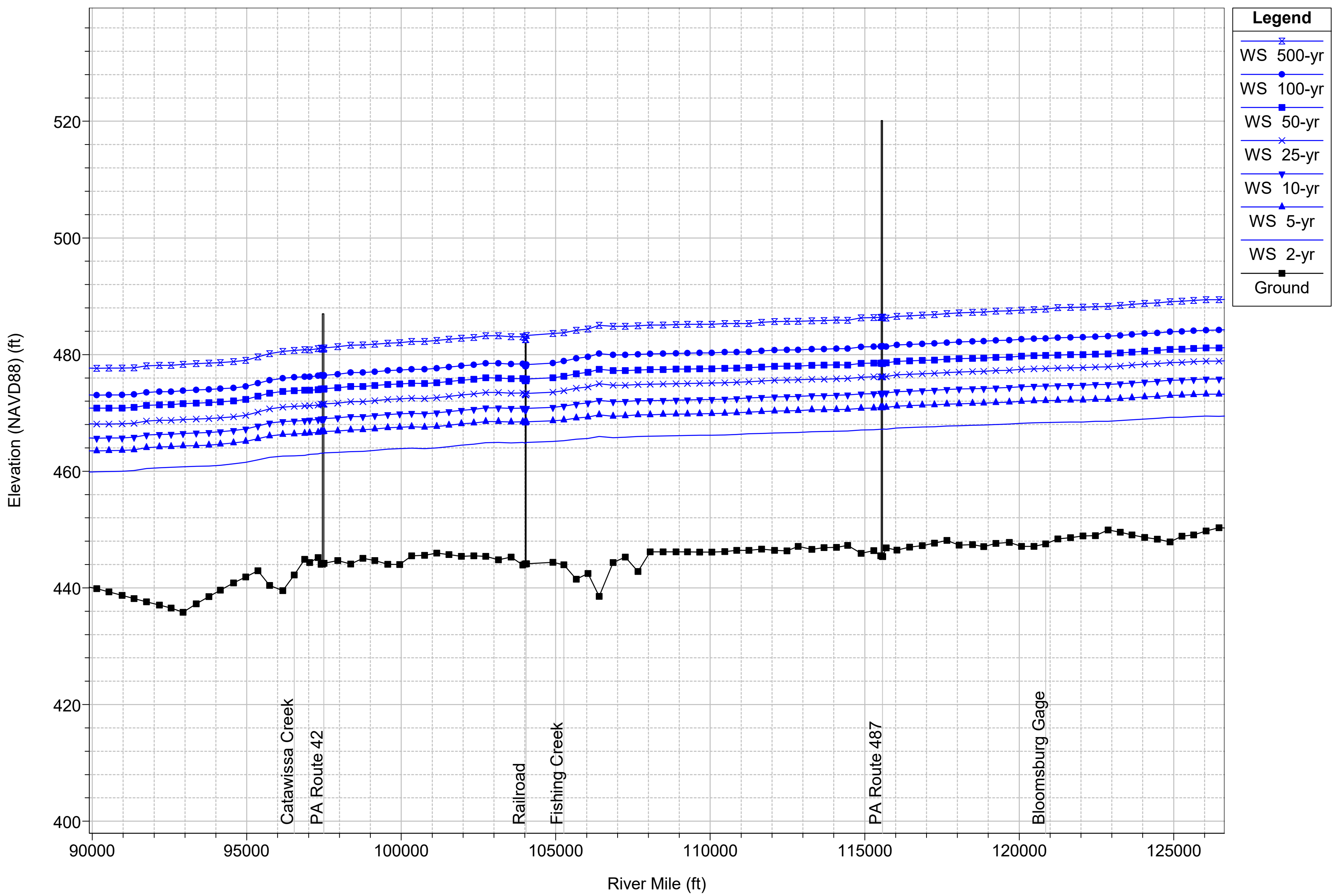


E.2 Preliminary Revised Effective Model Output

Print out is limited to the reach of Susquehanna River in the neighboring of the project area.



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013



HEC-RAS Plan: Frequency 2013 Locations: User Defined

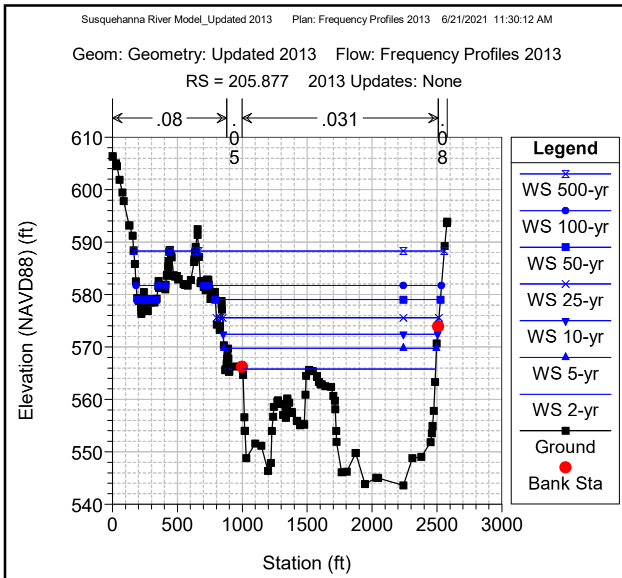
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Susquehanna	Middle Reach	150.001	2-yr	117600.00	447.07	467.92	456.37	468.41	0.000183	5.63	20879.82	1225.73	0.24
Susquehanna	Middle Reach	150.001	5-yr	162000.00	447.07	471.67	458.13	472.29	0.000183	6.31	25659.90	1288.13	0.25
Susquehanna	Middle Reach	150.001	10-yr	193500.00	447.07	474.19	459.27	474.89	0.000192	6.69	28919.91	1293.56	0.25
Susquehanna	Middle Reach	150.001	25-yr	239600.00	447.07	477.13	460.82	477.96	0.000208	7.32	32721.18	1298.18	0.26
Susquehanna	Middle Reach	150.001	50-yr	268800.00	447.07	479.41	461.77	480.29	0.000199	7.53	35687.06	1301.77	0.25
Susquehanna	Middle Reach	150.001	100-yr	303400.00	447.07	482.29	462.81	483.21	0.000222	7.69	39448.32	1306.31	0.25
Susquehanna	Middle Reach	150.001	500-yr	390900.00	447.07	487.28	465.30	488.40	0.000243	8.50	45983.41	1314.17	0.25
Susquehanna	Middle Reach	149.932	2-yr	117600.00	447.41	467.86	456.35	468.34	0.000186	5.52	21295.73	1311.30	0.24
Susquehanna	Middle Reach	149.932	5-yr	162000.00	447.41	471.62	458.07	472.21	0.000182	6.17	26260.72	1326.77	0.24
Susquehanna	Middle Reach	149.932	10-yr	193500.00	447.41	474.15	459.20	474.81	0.000189	6.53	29614.44	1330.26	0.24
Susquehanna	Middle Reach	149.932	25-yr	239600.00	447.41	477.08	460.75	477.87	0.000203	7.15	33521.54	1334.32	0.25
Susquehanna	Middle Reach	149.932	50-yr	268800.00	447.41	479.37	461.64	480.20	0.000193	7.35	36576.96	1337.48	0.25
Susquehanna	Middle Reach	149.932	100-yr	303400.00	447.41	482.24	462.69	483.12	0.000215	7.50	40431.16	1341.46	0.24
Susquehanna	Middle Reach	149.932	500-yr	390900.00	447.41	487.23	465.13	488.30	0.000233	8.29	47139.66	1348.36	0.25
Susquehanna	Middle Reach	149.851	2-yr	117600.00	447.32	467.81	456.08	468.25	0.000164	5.34	22038.78	1265.69	0.23
Susquehanna	Middle Reach	149.851	5-yr	162000.00	447.32	471.56	457.79	472.13	0.000169	6.03	26874.34	1316.90	0.24
Susquehanna	Middle Reach	149.851	10-yr	193500.00	447.32	474.08	458.87	474.72	0.000177	6.41	30196.65	1319.87	0.24
Susquehanna	Middle Reach	149.851	25-yr	239600.00	447.32	477.01	460.40	477.78	0.000192	7.03	34063.79	1323.32	0.24
Susquehanna	Middle Reach	149.851	50-yr	268800.00	447.32	479.30	461.34	480.12	0.000183	7.25	37097.41	1326.02	0.24
Susquehanna	Middle Reach	149.851	100-yr	303400.00	447.32	482.17	462.31	483.02	0.000204	7.42	40902.58	1329.40	0.24
Susquehanna	Middle Reach	149.851	500-yr	390900.00	447.32	487.15	464.60	488.20	0.000223	8.22	47535.55	1335.37	0.24
Susquehanna	Middle Reach	149.775	2-yr	117600.00	448.12	467.74	456.19	468.19	0.000166	5.37	21896.05	1260.47	0.23
Susquehanna	Middle Reach	149.775	5-yr	162000.00	448.12	471.49	457.81	472.06	0.000166	6.08	26666.59	1275.77	0.23
Susquehanna	Middle Reach	149.775	10-yr	193500.00	448.12	474.00	458.88	474.65	0.000175	6.48	29873.10	1278.34	0.24
Susquehanna	Middle Reach	149.775	25-yr	239600.00	448.12	476.91	460.31	477.70	0.000192	7.13	33599.73	1281.33	0.25
Susquehanna	Middle Reach	149.775	50-yr	268800.00	448.12	479.20	461.17	480.04	0.000184	7.36	36535.79	1283.67	0.24
Susquehanna	Middle Reach	149.775	100-yr	303400.00	448.12	482.05	462.17	482.94	0.000207	7.55	40200.88	1286.60	0.24
Susquehanna	Middle Reach	149.775	500-yr	390900.00	448.12	487.01	464.48	488.10	0.000228	8.39	46589.09	1291.68	0.25
Susquehanna	Middle Reach	149.699	2-yr	117600.00	447.67	467.64	456.38	468.11	0.000181	5.55	21185.33	1238.48	0.24
Susquehanna	Middle Reach	149.699	5-yr	162000.00	447.67	471.38	458.00	471.99	0.000180	6.27	25836.99	1244.11	0.24
Susquehanna	Middle Reach	149.699	10-yr	193500.00	447.67	473.88	459.08	474.57	0.000189	6.68	28953.16	1248.57	0.24
Susquehanna	Middle Reach	149.699	25-yr	239600.00	447.67	476.78	460.55	477.62	0.000206	7.36	32578.95	1255.38	0.25
Susquehanna	Middle Reach	149.699	50-yr	268800.00	447.67	479.07	461.43	479.96	0.000196	7.59	35456.70	1258.26	0.25
Susquehanna	Middle Reach	149.699	100-yr	303400.00	447.67	481.90	462.42	482.85	0.000220	7.79	39033.69	1261.84	0.25
Susquehanna	Middle Reach	149.699	500-yr	390900.00	447.67	486.83	464.80	488.00	0.000242	8.67	45269.67	1268.04	0.25
Susquehanna	Middle Reach	149.625	2-yr	117600.00	447.23	467.57	456.10	468.04	0.000175	5.50	21390.14	1234.48	0.23
Susquehanna	Middle Reach	149.625	5-yr	162000.00	447.23	471.32	457.76	471.92	0.000174	6.22	26027.08	1239.93	0.24
Susquehanna	Middle Reach	149.625	10-yr	193500.00	447.23	473.81	458.82	474.50	0.000184	6.64	29125.06	1241.46	0.24
Susquehanna	Middle Reach	149.625	25-yr	239600.00	447.23	476.70	460.30	477.53	0.000203	7.32	32718.99	1247.63	0.25
Susquehanna	Middle Reach	149.625	50-yr	268800.00	447.23	478.99	461.18	479.88	0.000194	7.55	35596.45	1259.67	0.25
Susquehanna	Middle Reach	149.625	100-yr	303400.00	447.23	481.82	462.18	482.76	0.000218	7.76	39168.12	1265.45	0.24
Susquehanna	Middle Reach	149.625	500-yr	390900.00	447.23	486.75	464.54	487.90	0.000240	8.63	45421.35	1275.50	0.25
Susquehanna	Middle Reach	149.546	2-yr	117600.00	446.97	467.50	456.04	467.97	0.000171	5.47	21490.63	1229.63	0.23
Susquehanna	Middle Reach	149.546	5-yr	162000.00	446.97	471.25	457.67	471.84	0.000172	6.20	26120.97	1240.81	0.24
Susquehanna	Middle Reach	149.546	10-yr	193500.00	446.97	473.74	458.74	474.42	0.000182	6.62	29217.26	1242.86	0.24
Susquehanna	Middle Reach	149.546	25-yr	239600.00	446.97	476.62	460.21	477.45	0.000201	7.30	32802.18	1247.18	0.25
Susquehanna	Middle Reach	149.546	50-yr	268800.00	446.97	478.92	461.08	479.80	0.000192	7.54	35671.96	1251.14	0.25
Susquehanna	Middle Reach	149.546	100-yr	303400.00	446.97	481.74	462.09	482.67	0.000217	7.74	39215.20	1263.41	0.24
Susquehanna	Middle Reach	149.546	500-yr	390900.00	446.97	486.65	464.45	487.80	0.000239	8.62	45449.68	1274.52	0.25
Susquehanna	Middle Reach	149.469	2-yr	117600.00	446.46	467.43	455.89	467.90	0.000171	5.51	21329.31	1208.74	0.23
Susquehanna	Middle Reach	149.469	5-yr	162000.00	446.46	471.16	457.55	471.77	0.000176	6.25	25899.55	1238.97	0.24
Susquehanna	Middle Reach	149.469	10-yr	193500.00	446.46	473.65	458.62	474.34	0.000190	6.66	29036.50	1265.46	0.25
Susquehanna	Middle Reach	149.469	25-yr	239600.00	446.46	476.53	460.11	477.37	0.000208	7.33	32681.53	1270.05	0.25
Susquehanna	Middle Reach	149.469	50-yr	268800.00	446.46	478.83	460.99	479.72	0.000198	7.55	35612.78	1273.74	0.25
Susquehanna	Middle Reach	149.469	100-yr	303400.00	446.46	481.65	462.00	482.58	0.000222	7.74	39200.24	1278.24	0.25
Susquehanna	Middle Reach	149.469	500-yr	390900.00	446.46	486.55	464.39	487.70	0.000245	8.59	45494.09	1286.09	0.25
Susquehanna	Middle Reach	149.403	2-yr	117600.00	446.86	467.21	456.93	467.81	0.000245	6.24	18855.04	1168.91	0.27
Susquehanna	Middle Reach	149.403	5-yr	162000.00	446.86	470.93	458.73	471.69	0.000238	6.97	23258.47	1194.52	0.28
Susquehanna	Middle Reach	149.403	10-yr	193500.00	446.86	473.41	459.91	474.25	0.000248	7.38	26234.03	1208.71	0.28
Susquehanna	Middle Reach	149.403	25-yr	239600.00	446.86	476.25	461.53	477.27	0.000268	8.07	29685.96	1219.44	0.29
Susquehanna	Middle Reach	149.403	50-yr	268800.00	446.86	478.56	462.49	479.62	0.000253	8.27	32516.18	1229.28	0.28
Susquehanna	Middle Reach	149.403	100-yr	303400.00	446.86	481.37	463.60	482.47	0.000281	8.43	35975.07	1237.74	0.28
Susquehanna	Middle Reach	149.403	500-yr	390900.00	446.86	486.24	466.20	487.59	0.000303	9.30	42028.74	1246.31	0.28
Susquehanna	Middle Reach	149.382	2-yr	117600.00	445.38	467.22	456.04	467.78	0.000207	5.98	19664.23	1172.16	0.25
Susquehanna	Middle Reach	149.382	5-yr	162000.00	445.38	470.94	457.84	471.65	0.000212	6.75	23993.54	1496.90	0.26
Susquehanna	Middle Reach	149.382	10-yr	193500.00	445.38	473.41	459.01	474.22	0.000224	7.18	26933.55	1692.66	0.27
Susquehanna	Middle Reach	149.382	25-yr	239600.00	445.38	476.26	460.60	477.22	0.000245	7.90	30336.38	2166.33	0.28
Susquehanna	Middle Reach	149.382	50-yr	268800.00	445.38	478.56	461.56	479.59	0.000232	8.12	33117.50	2584.33	0.27
Susquehanna	Middle Reach	149.382	100-yr	303400.00	445.38	481.44	462.67	482.40	0.000242	8.02	48122.84	3440.25	0.26
Susquehanna	Middle Reach	149.382	500-yr	390900.00	445.38	486.42	465.24	487.47	0.000244	8.53	66143.31	3728.89	0.26
Susquehanna	Middle Reach	149.376 PA Route 487		Bridge									
Susquehanna	Middle Reach	149.370	2-yr	117600.00	445.49	467.19	455.89	467.73	0.000201	5.93	19847.11	1145.94	0.25
Susquehanna	Middle Reach	149.370	5-yr	162000.00	445.49	470.90	457.68	471.60	0.000207	6.70	24176.80	1184.99	0.26
Susquehanna	Middle Reach	149.370	10-yr	193500.00	445.49	473.37	458.84	474.16	0.000223	7.13	27142.09	1686.33	0.27
Susquehanna	Middle Reach	149.370	25-yr	239600.00	445.49	476.21	460.44	477.16	0.000245	7.83	30608.27	2309.94	0.28
Susquehanna	Middle Reach	149.370	50-yr	268800.00	445.49	478.56	461.41	479.52	0.000226	7.92	39006.63	2904.45	0.27
Susquehanna	Middle Reach	149.370	100-yr	303400.00	445.49	481.39	462.50	482.36	0.000246	7.98	48056.44	3506.46	0.26
Susquehanna	Middle Reach	149.370	500-yr	390900.00	445.49	486.37	465.08	487.42	0.000244	8.47	66270.86	3738.68	0.26
Susquehanna	Middle Reach	149.327	2-yr	117600.00	446.38	467.10	456.43	467.68	0.000220	6.12	19217.98	1378.91	0.26
Susquehanna	Middle Reach	149.327	5-yr	162000.00	446.38	470.82	458.18	471.55	0.000233	6.87	23588.10	1751.04	0.27
Susquehanna	Middle Reach	149.327	10-yr	193500.00	446.38	473.29	459.31	474.11	0.000244	7.27	26626.48	1865.33	0.28
Susquehanna	Middle Reach	149.327	25-yr	239600.00	446.38	476.18	460.88	477.09	0.000246	7.74	35480.69	2282.09	0.28
Susquehanna	Middle Reach	149.327	50-yr	268800.00	446.38	478.53	461.80	479.46	0.000226	7.86	41400.75	2732.69	0.27
Susquehanna	Middle Reach	149.327	100-yr	303400.00	446.38	481.37	462.87	482.29	0.000241	7.89	50002.89	3468.20	0.26
Susquehanna	Middle Reach	149.327	500-yr	390900.00	446.38	486.36	465.42	487.34	0.000235	8.31	68228.77	3703.24	0.25

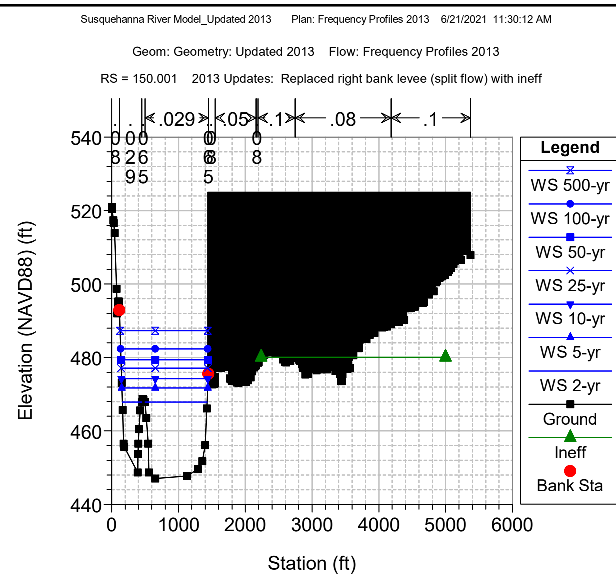
HEC-RAS Plan: Frequency 2013 Locations: User Defined (Continued)

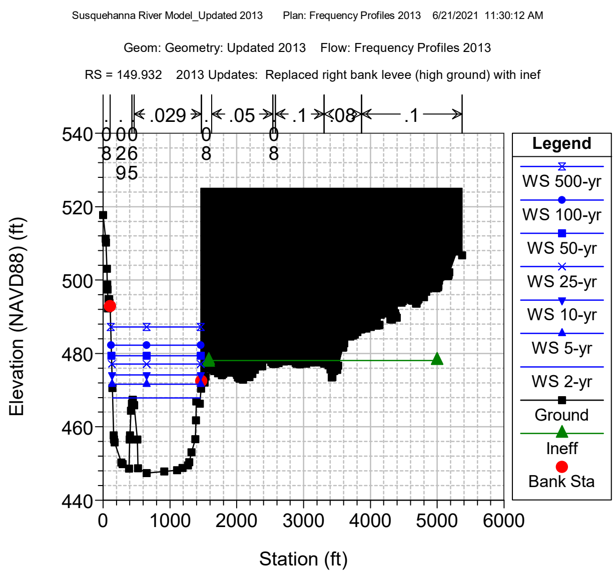
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Susquehanna	Middle Reach	149.249	2-yr	117600.00	445.94	467.07	455.67	467.58	0.000192	5.73	20526.36	1276.39	0.24
Susquehanna	Middle Reach	149.249	5-yr	162000.00	445.94	470.79	457.37	471.43	0.000197	6.45	25102.71	1456.48	0.25
Susquehanna	Middle Reach	149.249	10-yr	193500.00	445.94	473.26	458.49	473.99	0.000208	6.86	28211.63	1636.40	0.26
Susquehanna	Middle Reach	149.249	25-yr	239600.00	445.94	476.11	460.00	476.99	0.000227	7.52	31849.70	1940.15	0.27
Susquehanna	Middle Reach	149.249	50-yr	268800.00	445.94	478.48	460.95	479.35	0.000206	7.56	40017.76	2615.23	0.26
Susquehanna	Middle Reach	149.249	100-yr	303400.00	445.94	481.30	461.99	482.18	0.000223	7.64	48425.35	3320.09	0.25
Susquehanna	Middle Reach	149.249	500-yr	390900.00	445.94	486.28	464.46	487.24	0.000221	8.11	66751.58	3799.42	0.24
Susquehanna	Middle Reach	149.167	2-yr	117600.00	447.27	466.90	456.51	467.48	0.000233	6.11	19242.32	1183.54	0.27
Susquehanna	Middle Reach	149.167	5-yr	162000.00	447.27	470.61	458.26	471.34	0.000230	6.83	23705.05	1217.45	0.27
Susquehanna	Middle Reach	149.167	10-yr	193500.00	447.27	473.07	459.41	473.88	0.000239	7.24	26710.56	1228.73	0.27
Susquehanna	Middle Reach	149.167	25-yr	239600.00	447.27	475.89	460.96	476.87	0.000259	7.93	30202.63	1241.47	0.28
Susquehanna	Middle Reach	149.167	50-yr	268800.00	447.27	478.22	461.87	479.24	0.000244	8.12	33262.41	1444.46	0.28
Susquehanna	Middle Reach	149.167	100-yr	303400.00	447.27	481.00	462.93	482.06	0.000269	8.27	38563.93	2449.49	0.27
Susquehanna	Middle Reach	149.167	500-yr	390900.00	447.27	485.88	465.59	487.11	0.000278	8.97	53467.63	3539.34	0.27
Susquehanna	Middle Reach	149.098	2-yr	117600.00	446.96	466.87	455.54	467.38	0.000190	5.74	20494.65	1521.96	0.24
Susquehanna	Middle Reach	149.098	5-yr	162000.00	446.96	470.58	457.24	471.24	0.000194	6.49	24962.76	1680.05	0.25
Susquehanna	Middle Reach	149.098	10-yr	193500.00	446.96	473.04	458.38	473.78	0.000206	6.92	27972.50	1746.60	0.26
Susquehanna	Middle Reach	149.098	25-yr	239600.00	446.96	475.86	459.91	476.76	0.000227	7.61	31474.50	1905.54	0.27
Susquehanna	Middle Reach	149.098	50-yr	268800.00	446.96	478.25	460.82	479.11	0.000201	7.57	41414.48	1981.96	0.25
Susquehanna	Middle Reach	149.098	100-yr	303400.00	446.96	481.03	461.86	481.92	0.000222	7.71	47037.44	2504.23	0.25
Susquehanna	Middle Reach	149.098	500-yr	390900.00	446.96	485.90	464.35	486.96	0.000237	8.47	57777.21	3294.18	0.25
Susquehanna	Middle Reach	149.022	2-yr	117600.00	446.89	466.80	455.61	467.30	0.000187	5.68	20702.58	1485.92	0.24
Susquehanna	Middle Reach	149.022	5-yr	162000.00	446.89	470.52	457.31	471.15	0.000191	6.41	25283.60	1629.36	0.25
Susquehanna	Middle Reach	149.022	10-yr	193500.00	446.89	472.97	458.41	473.69	0.000203	6.82	28358.69	1704.27	0.25
Susquehanna	Middle Reach	149.022	25-yr	239600.00	446.89	475.79	459.91	476.66	0.000221	7.50	32058.67	1921.43	0.26
Susquehanna	Middle Reach	149.022	50-yr	268800.00	446.89	478.18	460.81	479.03	0.000197	7.51	41149.89	2023.19	0.25
Susquehanna	Middle Reach	149.022	100-yr	303400.00	446.89	480.94	461.85	481.83	0.000218	7.64	46891.29	2546.31	0.25
Susquehanna	Middle Reach	149.022	500-yr	390900.00	446.89	485.83	464.28	486.86	0.000230	8.34	57736.74	3334.75	0.25
Susquehanna	Middle Reach	148.947	2-yr	117600.00	446.62	466.78	455.05	467.21	0.000156	5.27	22299.75	1261.53	0.22
Susquehanna	Middle Reach	148.947	5-yr	162000.00	446.62	470.50	456.66	471.06	0.000161	5.99	27053.47	1373.91	0.23
Susquehanna	Middle Reach	148.947	10-yr	193500.00	446.62	472.96	457.71	473.59	0.000171	6.40	30286.12	1680.67	0.23
Susquehanna	Middle Reach	148.947	25-yr	239600.00	446.62	475.79	459.15	476.55	0.000186	7.02	36089.05	1885.29	0.24
Susquehanna	Middle Reach	148.947	50-yr	268800.00	446.62	478.15	460.01	478.94	0.000174	7.18	40831.55	2276.35	0.24
Susquehanna	Middle Reach	148.947	100-yr	303400.00	446.62	480.91	460.97	481.72	0.000194	7.32	46684.89	2732.65	0.23
Susquehanna	Middle Reach	148.947	500-yr	390900.00	446.62	485.79	463.30	486.75	0.000208	8.01	57774.51	3326.12	0.24
Susquehanna	Middle Reach	148.863	2-yr	117600.00	447.12	466.66	456.00	467.13	0.000186	5.52	21316.58	1288.24	0.24
Susquehanna	Middle Reach	148.863	5-yr	162000.00	447.12	470.39	457.59	470.98	0.000183	6.19	26155.35	1520.30	0.24
Susquehanna	Middle Reach	148.863	10-yr	193500.00	447.12	472.84	458.63	473.51	0.000191	6.57	30520.21	1849.23	0.25
Susquehanna	Middle Reach	148.863	25-yr	239600.00	447.12	475.67	460.07	476.46	0.000204	7.16	35851.86	1953.47	0.25
Susquehanna	Middle Reach	148.863	50-yr	268800.00	447.12	478.04	460.93	478.86	0.000188	7.29	40748.94	2090.92	0.25
Susquehanna	Middle Reach	148.863	100-yr	303400.00	447.12	480.80	461.92	481.63	0.000208	7.41	46667.40	2209.59	0.24
Susquehanna	Middle Reach	148.863	500-yr	390900.00	447.12	485.68	464.23	486.66	0.000218	8.07	58701.57	3735.74	0.24
Susquehanna	Middle Reach	148.795	2-yr	117600.00	446.36	466.61	455.60	467.06	0.000179	5.38	21844.02	1333.29	0.23
Susquehanna	Middle Reach	148.795	5-yr	162000.00	446.36	470.34	457.29	470.91	0.000176	6.03	26872.55	1363.05	0.24
Susquehanna	Middle Reach	148.795	10-yr	193500.00	446.36	472.80	458.41	473.43	0.000185	6.39	30594.79	1891.39	0.24
Susquehanna	Middle Reach	148.795	25-yr	239600.00	446.36	475.63	459.84	476.37	0.000195	6.95	36827.47	2300.76	0.25
Susquehanna	Middle Reach	148.795	50-yr	268800.00	446.36	478.02	460.69	478.77	0.000177	7.02	42351.32	2399.01	0.24
Susquehanna	Middle Reach	148.795	100-yr	303400.00	446.36	480.79	461.68	481.54	0.000192	7.09	48793.39	2658.82	0.23
Susquehanna	Middle Reach	148.795	500-yr	390900.00	446.36	485.69	463.99	486.55	0.000197	7.65	60381.77	3378.06	0.23
Susquehanna	Middle Reach	148.718	2-yr	117600.00	446.43	466.57	454.62	466.98	0.000154	5.18	22691.39	1308.73	0.22
Susquehanna	Middle Reach	148.718	5-yr	162000.00	446.43	470.30	456.26	470.83	0.000159	5.85	27673.33	1363.17	0.23
Susquehanna	Middle Reach	148.718	10-yr	193500.00	446.43	472.75	457.32	473.35	0.000168	6.23	31222.67	2303.24	0.23
Susquehanna	Middle Reach	148.718	25-yr	239600.00	446.43	475.59	458.76	476.28	0.000177	6.74	38712.57	2425.55	0.24
Susquehanna	Middle Reach	148.718	50-yr	268800.00	446.43	477.99	459.64	478.69	0.000161	6.81	44384.89	2663.93	0.23
Susquehanna	Middle Reach	148.718	100-yr	303400.00	446.43	480.75	460.65	481.45	0.000174	6.87	50952.57	2936.51	0.22
Susquehanna	Middle Reach	148.718	500-yr	390900.00	446.43	485.67	463.03	486.45	0.000176	7.34	69070.72	3741.20	0.22
Susquehanna	Middle Reach	148.639	2-yr	117600.00	446.64	466.49	454.67	466.92	0.000154	5.24	22426.79	1270.53	0.22
Susquehanna	Middle Reach	148.639	5-yr	162000.00	446.64	470.21	456.32	470.76	0.000157	5.96	27186.01	1295.99	0.23
Susquehanna	Middle Reach	148.639	10-yr	193500.00	446.64	472.65	457.37	473.28	0.000167	6.36	31484.54	2136.71	0.23
Susquehanna	Middle Reach	148.639	25-yr	239600.00	446.64	475.47	458.77	476.21	0.000180	6.94	37945.15	2430.14	0.24
Susquehanna	Middle Reach	148.639	50-yr	268800.00	446.64	477.87	459.67	478.62	0.000165	7.02	43576.18	2885.34	0.23
Susquehanna	Middle Reach	148.639	100-yr	303400.00	446.64	480.62	460.64	481.37	0.000181	7.11	50089.52	3059.57	0.22
Susquehanna	Middle Reach	148.639	500-yr	390900.00	446.64	485.55	463.03	486.37	0.000183	7.58	69428.42	3743.85	0.22
Susquehanna	Middle Reach	148.561	2-yr	117600.00	446.44	466.41	454.44	466.85	0.000155	5.32	22085.66	1223.77	0.22
Susquehanna	Middle Reach	148.561	5-yr	162000.00	446.44	470.12	456.09	470.69	0.000162	6.07	26819.10	1530.79	0.23
Susquehanna	Middle Reach	148.561	10-yr	193500.00	446.44	472.56	457.17	473.21	0.000173	6.48	30806.19	1708.57	0.24
Susquehanna	Middle Reach	148.561	25-yr	239600.00	446.44	475.35	458.64	476.13	0.000188	7.10	35792.30	1927.25	0.24
Susquehanna	Middle Reach	148.561	50-yr	268800.00	446.44	477.75	459.51	478.54	0.000174	7.22	40521.33	2008.42	0.24
Susquehanna	Middle Reach	148.561	100-yr	303400.00	446.44	480.48	460.51	481.29	0.000194	7.35	46256.35	2188.92	0.23
Susquehanna	Middle Reach	148.561	500-yr	390900.00	446.44	485.33	462.90	486.28	0.000205	8.01	58847.77	4679.01	0.24
Susquehanna	Middle Reach	148.486	2-yr	117600.00	446.44	466.31	454.69	466.79	0.000171	5.57	21119.16	1947.19	0.23
Susquehanna	Middle Reach	148.486	5-yr	162000.00	446.44	470.00	456.41	470.62	0.000178	6.35	25523.39	2351.27	0.24
Susquehanna	Middle Reach	148.486	10-yr	193500.00	446.44	472.42	457.51	473.13	0.000188	6.76	30489.93	3875.74	0.25
Susquehanna	Middle Reach	148.486	25-yr	239600.00	446.44	475.24	459.02	476.05	0.000200	7.30	37649.77	4041.82	0.25
Susquehanna	Middle Reach	148.486	50-yr	268800.00	446.44	477.68	459.92	478.47	0.000179	7.33	44072.35	4670.67	0.24
Susquehanna	Middle Reach	148.486	100-yr	303400.00	446.44	480.42	460.93	481.20	0.000194	7.36	51638.53	6541.69	0.23
Susquehanna	Middle Reach	148.486	500-yr	390900.00	446.44	485.32	463.37	486.17	0.000196	7.84	66291.58	7970.82	0.23
Susquehanna	Middle Reach	148.413	2-yr	117600.00	446.24	466.24	454.53	466.72	0.000175	5.57	21103.54	1421.39	0.23
Susquehanna	Middle Reach	148.413	5-yr	162000.00	446.24	469.93	456.23	470.55	0.000181	6.33	25573.73	2298.54	0.24
Susquehanna	Middle Reach	148.413	10-yr	193500.00	446.24	472.36	457.35	473.05	0.000190	6.70	31453.10	3466.70	0.25
Susquehanna	Middle Reach	148.413	25-yr	239600.00	446.24	475.19	458.86	475.96	0.000196	7.17	40057.91	4872.50	0.25
Susquehanna	Middle Reach	148.413	50-yr	268800.00	446.24	477.65	459.72	478.39	0.000172	7.11	47984.29	6223.76	0.24
Susquehanna	Middle Reach	148.413	100-yr	303400.00	446.24	480.41	460.79	481.10	0.000181	7.05	56855.33	7072.77	0.22
Susquehanna	Middle Reach	148.413	500-yr	390900.00	446.24	485.33	463.24	486.06	0.000177	7.38	72766.41	8191.24	0.22

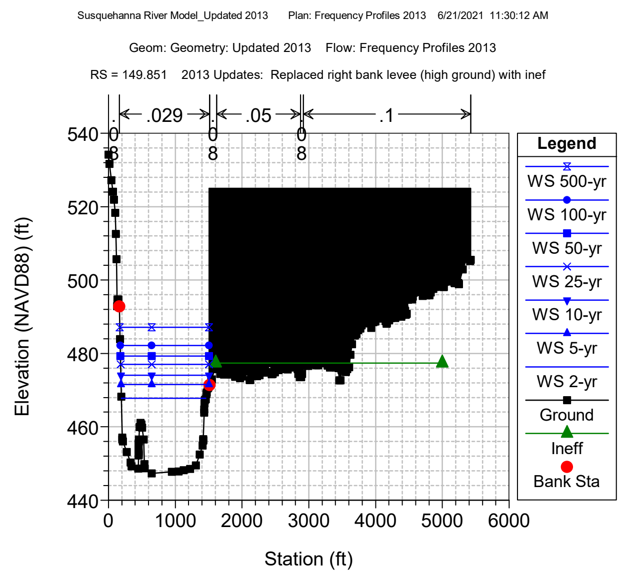
HEC-RAS Plan: Frequency 2013 Locations: User Defined (Continued)

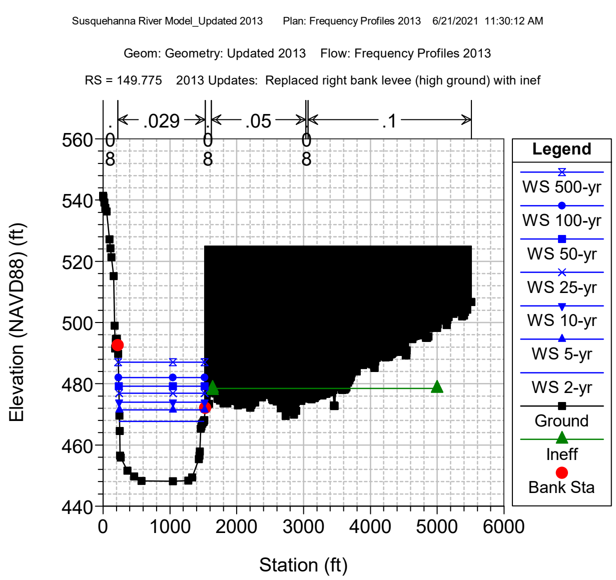
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Susquehanna	Middle Reach	148.334	2-yr	117600.00	446.14	466.19	454.12	466.64	0.000159	5.35	21964.93	1436.99	0.22
Susquehanna	Middle Reach	148.334	5-yr	162000.00	446.14	469.89	455.79	470.47	0.000166	6.10	26555.00	2087.89	0.23
Susquehanna	Middle Reach	148.334	10-yr	193500.00	446.14	472.31	456.88	472.96	0.000177	6.48	31237.13	3413.69	0.24
Susquehanna	Middle Reach	148.334	25-yr	239600.00	446.14	475.12	458.36	475.87	0.000188	7.04	38828.77	5591.51	0.24
Susquehanna	Middle Reach	148.334	50-yr	268800.00	446.14	477.57	459.24	478.31	0.000169	7.06	45996.72	6275.68	0.23
Susquehanna	Middle Reach	148.334	100-yr	303400.00	446.14	480.29	460.25	481.02	0.000183	7.10	54104.03	7588.98	0.22
Susquehanna	Middle Reach	148.334	500-yr	390900.00	446.14	485.18	462.68	485.98	0.000184	7.55	69130.52	7876.50	0.22
Susquehanna	Middle Reach	148.259	2-yr	117600.00	446.15	466.15	453.89	466.57	0.000150	5.16	22774.39	1474.32	0.22
Susquehanna	Middle Reach	148.259	5-yr	162000.00	446.15	469.85	455.54	470.39	0.000153	5.87	27575.92	2341.10	0.23
Susquehanna	Middle Reach	148.259	10-yr	193500.00	446.15	472.28	456.60	472.88	0.000163	6.26	32453.59	4354.76	0.23
Susquehanna	Middle Reach	148.259	25-yr	239600.00	446.15	475.08	458.06	475.79	0.000175	6.80	41022.80	6339.75	0.23
Susquehanna	Middle Reach	148.259	50-yr	268800.00	446.15	477.55	458.93	478.23	0.000155	6.79	49571.74	6994.65	0.22
Susquehanna	Middle Reach	148.259	100-yr	303400.00	446.15	480.27	459.92	480.93	0.000165	6.78	59022.78	7317.40	0.21
Susquehanna	Middle Reach	148.259	500-yr	390900.00	446.15	485.18	462.25	485.88	0.000164	7.16	76087.17	7401.43	0.21
Susquehanna	Middle Reach	148.185	2-yr	117600.00	446.16	466.11	453.70	466.51	0.000138	5.02	23428.94	1558.07	0.21
Susquehanna	Middle Reach	148.185	5-yr	162000.00	446.16	469.81	455.33	470.32	0.000143	5.73	28285.25	1922.10	0.22
Susquehanna	Middle Reach	148.185	10-yr	193500.00	446.16	472.24	456.39	472.81	0.000152	6.09	33680.32	4032.35	0.22
Susquehanna	Middle Reach	148.185	25-yr	239600.00	446.16	475.05	457.82	475.70	0.000160	6.58	42920.78	6001.03	0.23
Susquehanna	Middle Reach	148.185	50-yr	268800.00	446.16	477.53	458.66	478.15	0.000140	6.52	51613.42	7208.79	0.21
Susquehanna	Middle Reach	148.185	100-yr	303400.00	446.16	480.26	459.65	480.85	0.000148	6.47	61167.34	7381.12	0.20
Susquehanna	Middle Reach	148.185	500-yr	390900.00	446.16	485.18	461.95	485.79	0.000144	6.76	78435.28	7408.89	0.20

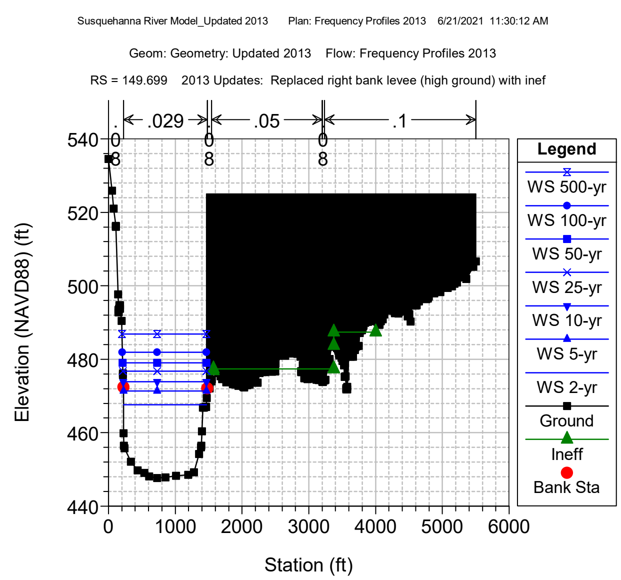

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 205.877 2013 Updates: None
.08
.031
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 150.001 2013 Updates: Replaced right bank levee (split flow) with ineff
.029
.05
.1
.08
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.932 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.05
.1
.08
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.851 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.05
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta

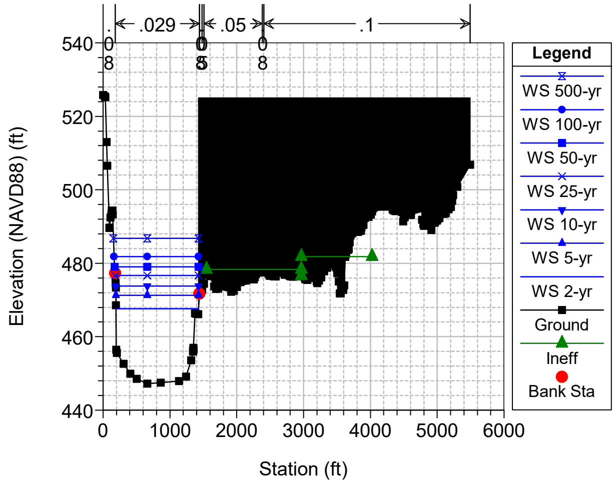

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.775 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.05
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.699 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.05
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

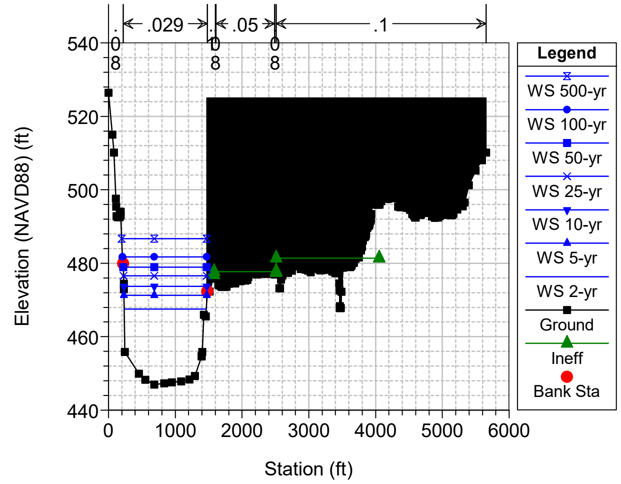
RS = 149.625 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

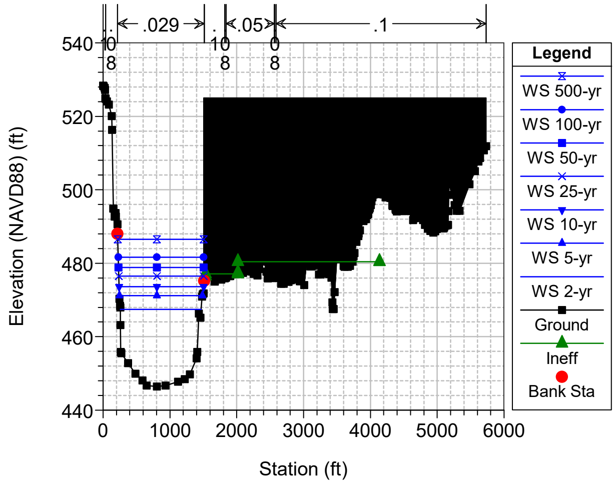
RS = 149.546 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

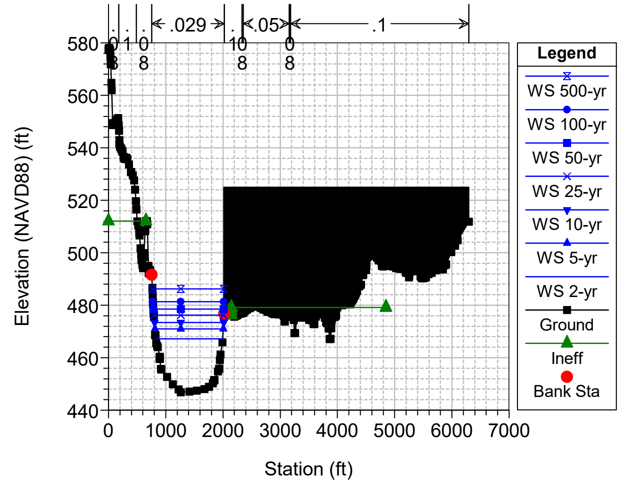
RS = 149.469 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

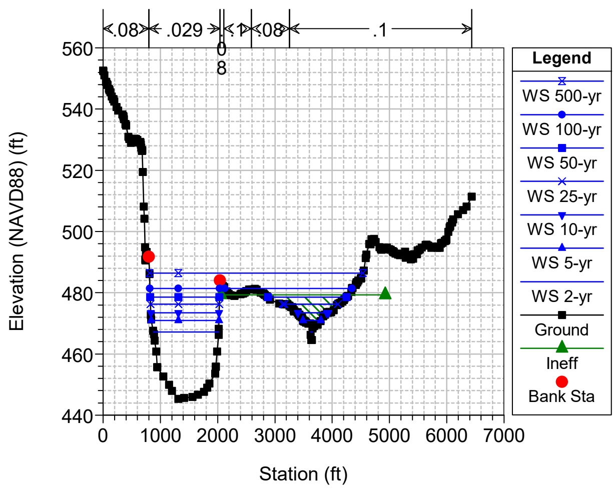
RS = 149.403 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

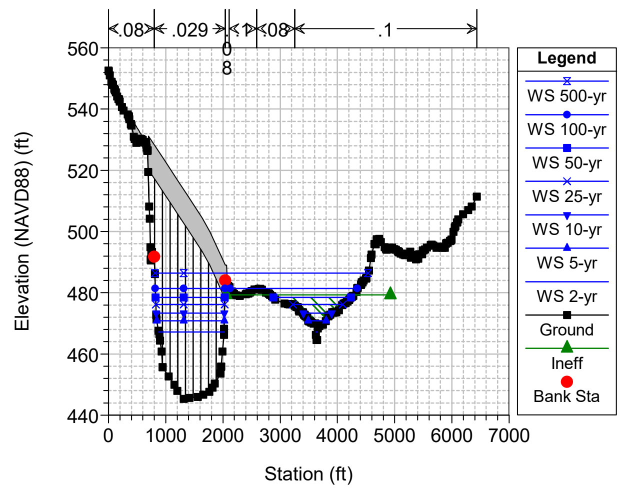
RS = 149.382 2013 Updates: Removed right bank levee (high ground).

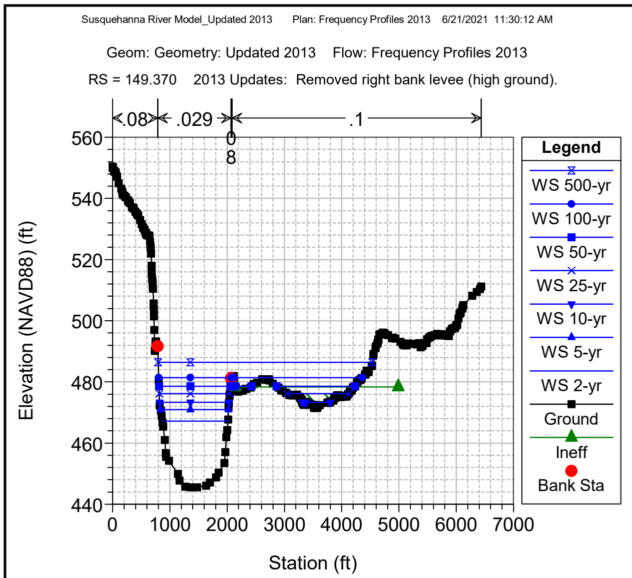


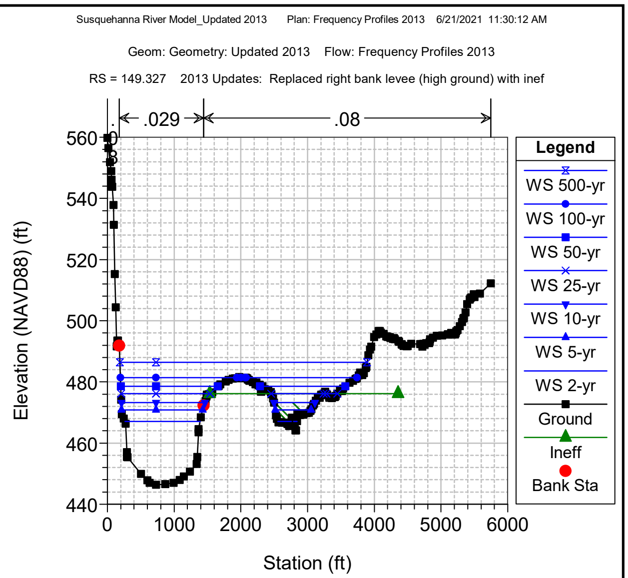
Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

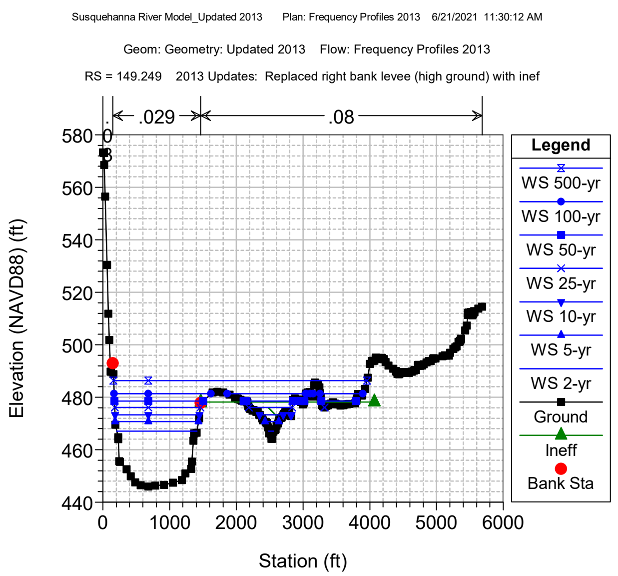
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

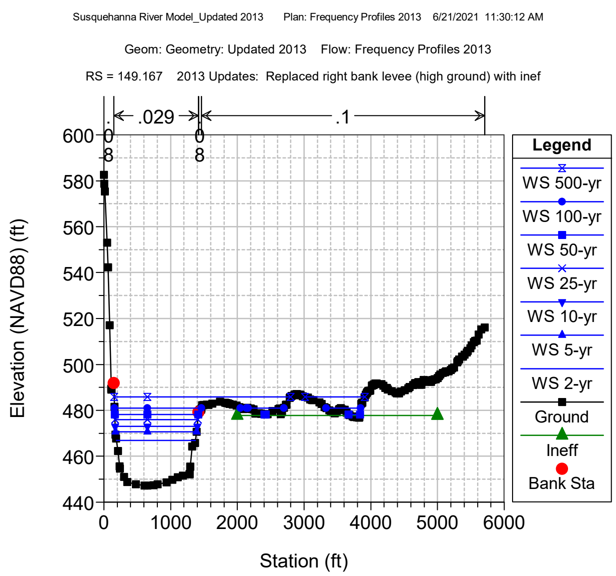
RS = 149.376 BR PA Route 487 PA ROUTE 487. 2013 Update: Replaced levee (high ground) on right

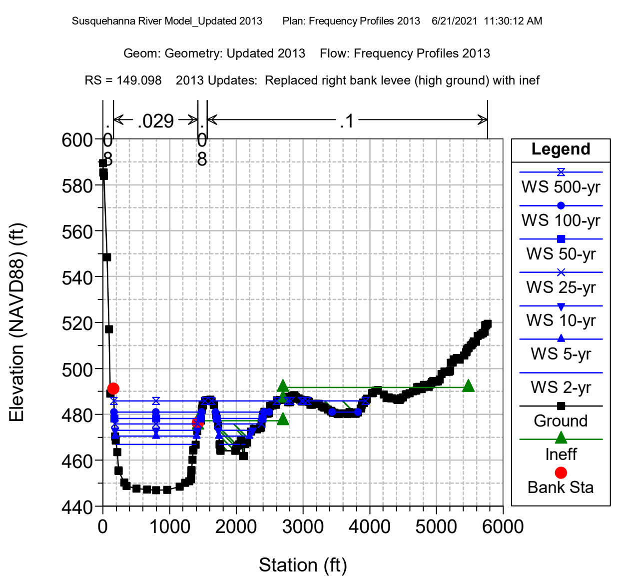


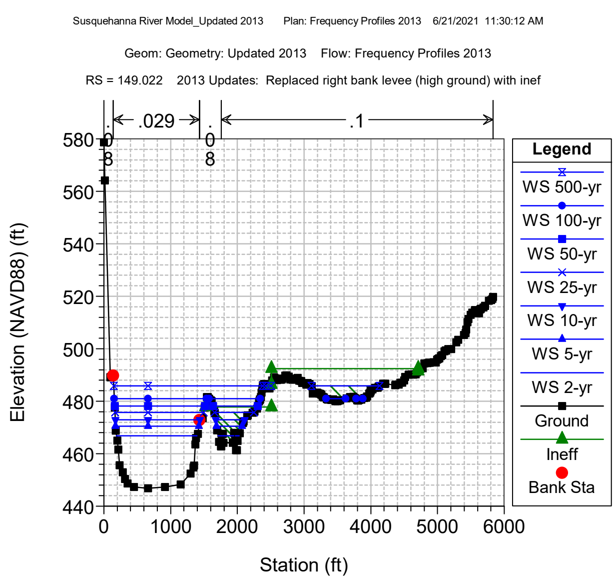

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.370 2013 Updates: Removed right bank levee (high ground).
.08
.029
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.327 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.08
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.249 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.08
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.167 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta

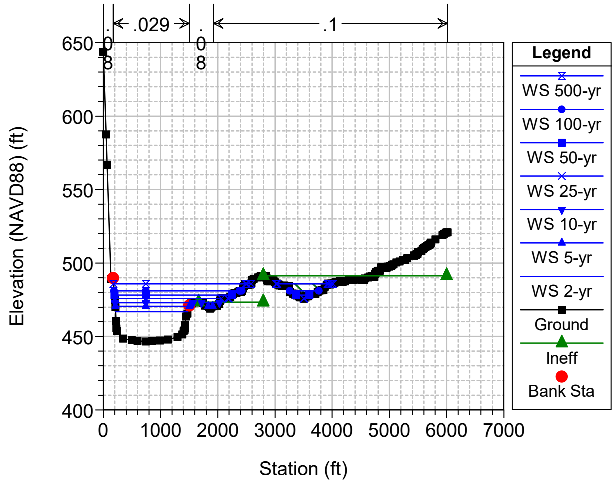

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.098 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 149.022 2013 Updates: Replaced right bank levee (high ground) with inef
.029
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta

Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

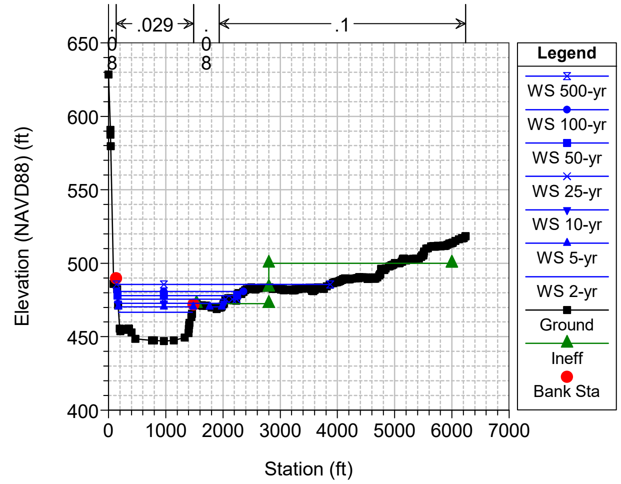
RS = 148.947 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

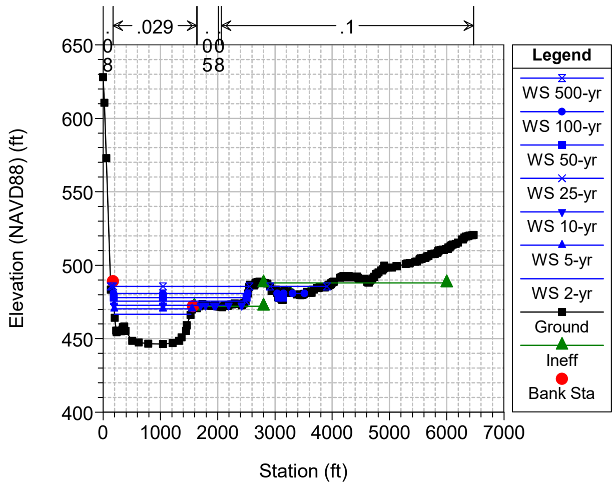
RS = 148.863 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

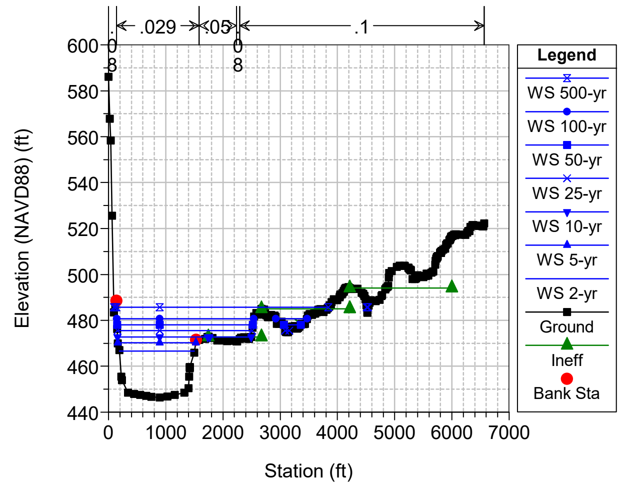
RS = 148.795 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

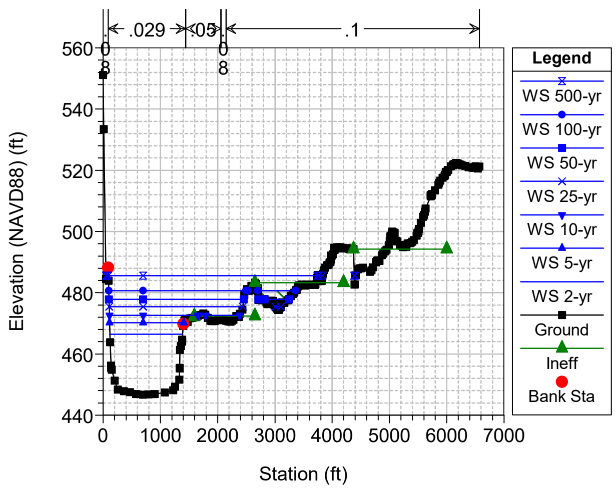
RS = 148.718 2013 Updates: Replaced right bank levee (high ground) with inef



Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

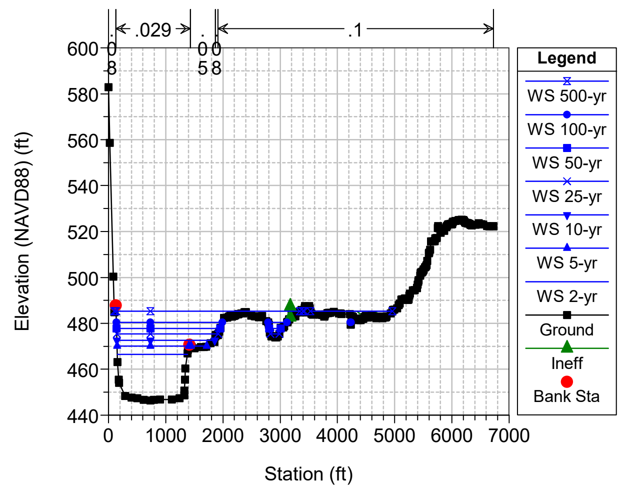
RS = 148.639 2013 Updates: Replaced right bank levee (high ground) with inef

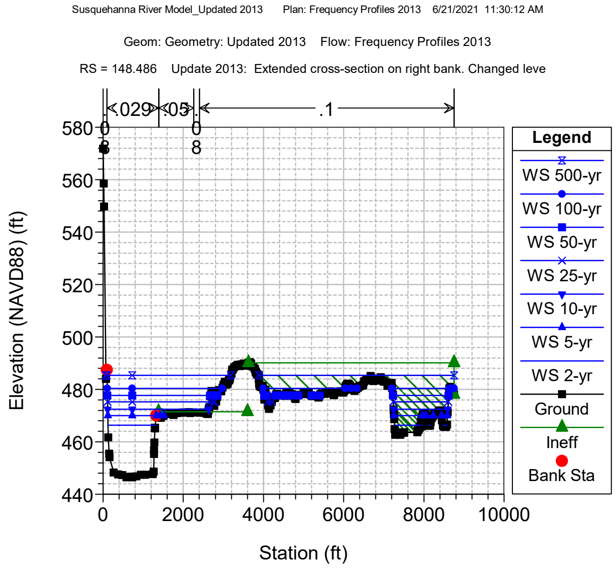


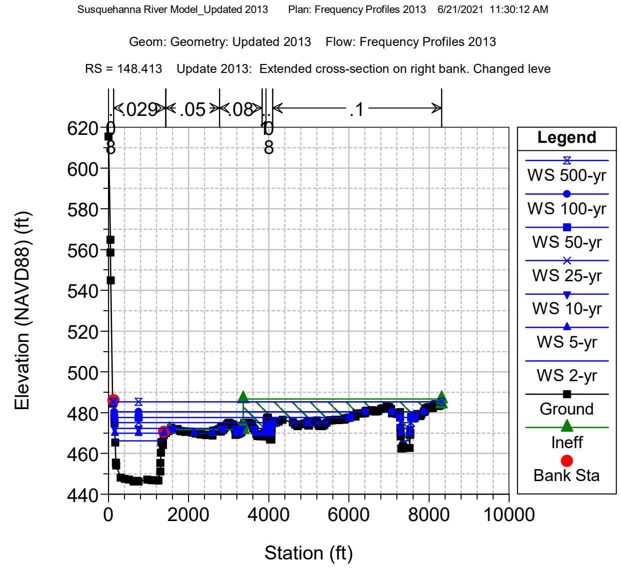
Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM

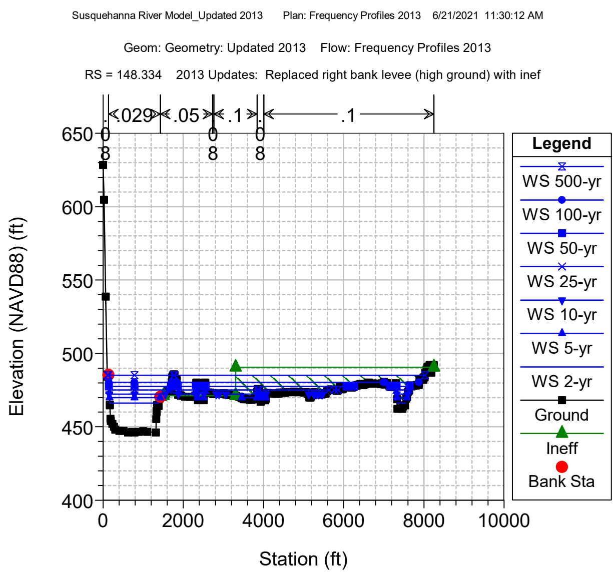
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013

RS = 148.561 2013 Updates: Removed levee in right bank (no levee on ground).




Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 148.486 Update 2013: Extended cross-section on right bank. Changed leve
.029
.05
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta


Susquehanna River Model_Updated 2013 Plan: Frequency Profiles 2013 6/21/2021 11:30:12 AM
Geom: Geometry: Updated 2013 Flow: Frequency Profiles 2013
RS = 148.413 Update 2013: Extended cross-section on right bank. Changed leve
.029
.05
.08
.1
Elevation (NAVD88) (ft)
Station (ft)
Legend
WS 500-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta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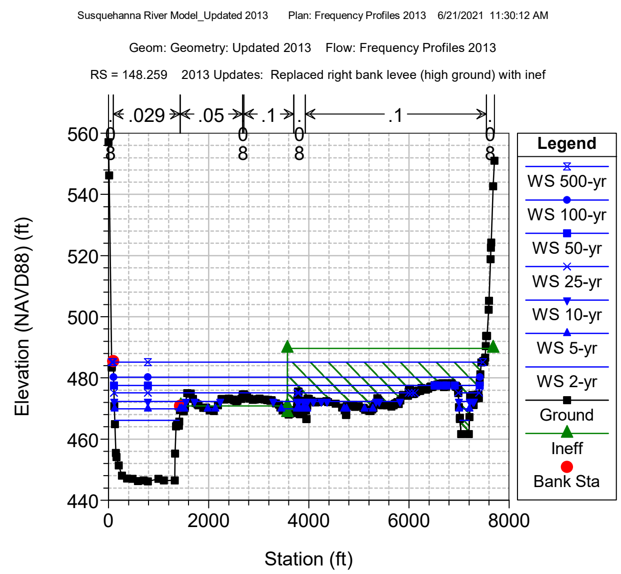
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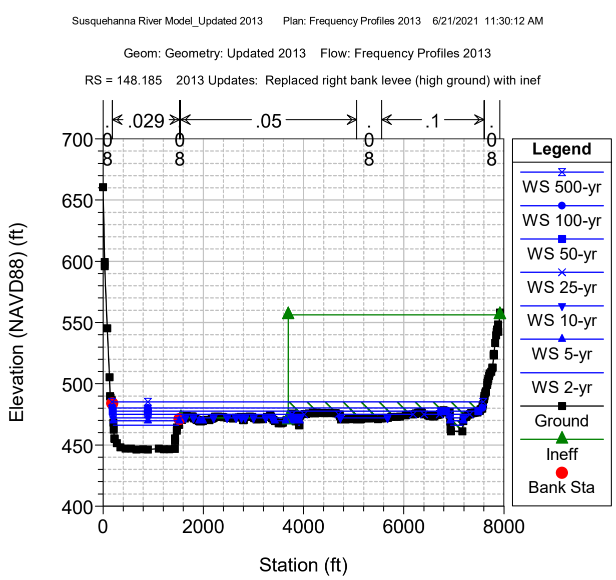
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WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix B - Geotechnical Engineering

WEST END FLOOD MITIGATION STUDY

,COLUMBIA COUNTY, PENNSYLVANIA

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WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix B - Geotechnical Engineering

1. **Proposed Levee/Floodwall System:** The project area is located in the Town of Bloomsburg in Columbia County, Pennsylvania, at the confluence of Fishing Creek with the Susquehanna River.

The recommended project will consist of a system of earthen levees, mechanically stabilized earth (MSE) levee, concrete floodwalls, sheet pile floodwalls, road closure structures, and a storm water pumping station. Earthen and MSE levees are proposed for the majority of the flood protection alignment. Riprap will be utilized to protect the waterside slopes of the system along Fishing Creek.

The system begins immediately to the East of Railroad Street where the earthen levee ties into high ground. Elevation 491.00 is the top of the system. The alignment proceeds westward across Railroad Street which is at Elev. 490.0 +/- where the roadway would be raised approximately one foot.

On the west side of Railroad Street, an earthen levee with a landside toe drain extends downstream to Station 11+50. Through this reach, the levee crest is 10' wide with a land side slope of 2.5 Horizontal to 1 Vertical (2.5H:1V) and a riverside side slope of 2H:1V. This reach of the system is through a residential area. The riverside toe will extend into the bed of the creek due to severe erosion since the 2011 Lee Flood has caused loss of the bank along this reach of the creek. The riverside levee slope will be protected by 18 to 24" riprap.

An MSE levee then extends westward adjacent to Fishing Creek from Sta. 11+50 to14+50. The MSE levee has a 12' wide crest with vertical wall faces, fall protection railings and a landside toe drain. The MSE levee will have a riverside slope of 2H:1V. This reach of the system is also through a residential area. The riverside toe will extend into the bed of the creek

The top of protection descends from Elev. 491.00 at the high ground tie-out at Railroad Street Elev. 490.94 at Sta. 20+00. .

A sheet pile wall is proposed 4 feet from the top of bank from Sta. 14+50 to Sta. 22+50. If required, a concrete cap will be added to the sheet piling for additional strength and aesthetics.

This reach of the line of protection is on an alignment with minimal lateral clearance through the residential area. The riverside levee slope will be protected by 18 to 24" riprap.

Beginning at Sta. 22+50, (TOS=Elev.485.00±), an earth levee will extend to the Route 11 road closure structure abutment at Sta. 25+70+_. The stop log closure across route 11 is approximately 6 feet in height if the roadway is pot raised. Being a state highway and also being in the floodplain, it was determined that the road elvation should remain at its' present elevation. On the south side of the closure, an earth levee extends from Sta. 26+50 to the Fairgrounds access road closure structures 2 and 2A. The top of levee is at Elevatioon 485.00, about 6 to 7 feet in height. Riprap is required on the creek side of the levee. Flow velocities from the creek out of bank flows during higher level flood events requires 24" riprap on the levee slope.

Closures 2 and 2A are proposed to be automatic Floodbreak type of closures since the creek flows in this area are fast rising compared to the river backwater which is also a source of flooding in the west end of Bloomsburg. To minimize the activation frequency, the ground level would be raised to elevation 478.00 as indicated on the concept plans.

An MSE levee of varying heights is proposed from the abutment of closure 2A at Sta. 31+30 to the tie-in to a concrete floodwall at Sta. 59+95. The tie-in location is near Closure 5 of the Columbia County levee System #1. This location is also the lowest existing ground elevation, approximately Elev. 470.5. With a top of system elevation of 485.00, the MSE levee would be about 14 feet in height. Extensive investigation of the embankment stability and underseepage potential will be required to determine the final width of the crest of the levee and the riverside earth slope which is assumed to be 3:1. Underseepage may require a deeper base trench (See MSE levee cross section in concept plans). Other options would be a slurry cutoff trench or sheeting.

The above stretch of MSE levee has three access road closure structures located at Sta, 40+35, Sta. 46+10, and sta. 47+25. The closures are proposed stop log systems 10 feet in height.
To minimize the erection time for each flood event, it is assumed most of the approximately 10 foot segments of stop logs between the steel column supports can remain in place until a major Fairgrounds event which would require removal to fully open the access points.

A stormwater pumping station is proposed at approximately Sta. 51+25 to collect and discharge interior stormwater draining towards the levee from the Fairgrounds and the residential and commercial areas of the west end behind the levee system. Detailed drainage calculations will be required to develop a conveyance system which will collect the drainage which now exits to Fishing Creek via several storm sewers along the creek. These sewers extend along town streets from the edge of the fairgrounds to Fishing Creek. Connections to the beginning of the systems would convey the excess flows during high rainfall periods to the combined overland and subsurface system directing the flows to the pumping station at Sta. 51=25. The pumping station is estimated to be a 20,000 gallons per minute (GPM) capacity assuming the very low area of the main promenade of the fairgrounds is utilized for storage to a 2 foot depth.

Other features of the levee system consist of stormwater control structures at each storm sewer penetration of the system along Fishing Creek and at the Route 11 closure strucuture. The fairgrounds

2. **Regional Geology.** The study area is in the Appalachian Mountain Section of the Ridge and Valley physiographic province. The long, parallel ridges and valleys in this physiographic region were produced by differential erosion of folded strata. Bloomsburg is located beyond the southern terminus of the late Wisconsinan glacier. That glacial episode produced most of the prominent glacial landforms found in northeast Pennsylvania. Meltwater from the Wisconsinan glacier carried significant quantities of materials through the Fishing Creek and Susquehanna River valleys.

   Much of Bloomsburg consists .of a low terrace, where glacial meltwaters and more recent floodwaters deposited material up to boulder-size. Published geologic reports indicate that this material is stratified and moderately to poorly graded. The thickness of these deposits is 3 to 50 feet near Bloomsburg.

   The soil unit mapped by the U.S. Department of Agriculture in the study area is the Chenango silt loam. It formed in sand & gravel outwash and is well-drained. The surface layer of this soil consists of silt loam and gravelly sand loam. Below that is gravelly sandy loam to a depth of 20 to 50 inches, followed by stratified gravel and sand. Bedrock is reportedly at a depth greater than 30 feet; however, borings drilled for this project encountered bedrock at shallower depths.

   Bedrock underlying most of the study area is part of the Wills Creek Formation. Part of the study area, near the northeast end, is underlain by Bloomsburg Formation rocks. The strike of bedrock bedding at the Railroad Street Bridge is north 65° east; dip is 28° to the south. That bedding dip is within the range measured in test boring cores. Bedrock strike at the test boring locations should be similar to that measured at the outcrop. A bedrock geologic map of the area is included as Figure 1.

   The Wills Creek Formation is mostly calcareous claystone or shale, but also consists of calcareous limestone and dolostone. Laminated to thin bedding predominates in Wills Creek rocks. Wills Creek rocks are usually highly weathered to a moderate depth, due to lithology, bedding characteristics, joints, and calcareous content.

   The Bloomsburg Formation is mostly claystone and shale, with abundant siltstone and sandstone interbeds. The claystones and shales are medium to thick-bedded. Sandstones and siltstones are thin to medium-bedded. Bloomsburg Formation rocks are also highly susceptible to weathering, but not to the extent that Wills Creek rocks are.

3. **Exploration Program -** The subsurface conditions were investigated by the Corps of Engineers in November of 2000 along the alignment. Drilling was performed by contractors to Pennsylvania Department of Environmental Protection (DEP). DEP provided the drilling services as in-kind services to the study at that time. No investigations were performed in Fernville. A total of 9 borings were performed to investigate the foundation conditions in the area of the flood protection alignment along Fishing Creek. An overall boring location plan is attached as Figure 2. See the study concept drawings in Appendix C for more detailed boring location information. Field boring logs are included as Attachment 1 to this Appendix. Additional borings should be drilled in the preliminary design phase, which will include additional testing.

The borings were advanced by means of the Standard Penetration Test (SPT) method with continuous sampling. The SPT consists of driving a 1 3/8-inch ID by 2-ft 8-inch long split spoon sampler a total of 18 inches with a 140-pound hammer falling 30 inches. The SPT provides a disturbed sample for defining soil consistency and relative density. Rock coring was performed with NWD4 (2 1/8 inch diameter) bit and double tube barrel.

a. **Laboratory Testing.** All jar samples were visually inspected and assigned a Unified Soil Classification System (USCS) classification by an experienced laboratory technician. Additionally grain size distributions and Atterberg Limits tests were performed on selected samples. Results of all laboratory tests are included as Attachment 2 to this Appendix.

b. **Description of Subsurface Conditions -** The average soil thickness for the area is approximately 20 feet. Bedrock depths are highly variable over the entire project area. Bedrock was encountered between 12-25 feet in several borings, while it was not encountered at depths greater than 30 feet in several borings towards 6th Street.

Along Fishing Creek from approximately Station 1+00 to 25+80, foundation soils are moderately pervious to very pervious with little to no impervious blanket above. A layer of dense gravel was encountered in most borings at a depth of approximately 10 feet. The soils had varying amounts of fines (material passing No. 200 sieve), but most of the soils were classified as sands and gravels. Also along Fishing Creek, bedrock was encountered between depths of 12 feet to 25 feet along the project alignment.

Borings along the Bloomsburg Fairgrounds portion of the alignment (approximately Station 31+00 to Station 60+00) show a silt/clay blanket (average thickness of 4 feet) overlying a sand/gravel layer. Beneath this sand/gravel layer, highly weathered bedrock was encountered at depths of 10 feet to 20 feet.

4. Seepage and Slope Stability Analysis. Seepage and slope stability analyses were performed during the 2005 study. This consisted of analyzing the earth levee, MSE wall, and floodwall sections of varying heights with varying foundation conditions. The foundation conditions were based upon the foundation drilling described earlier.

With the pervious soils located in the foundation for the levee, an underseepage analysis to estimate seepage quantities and the effect on the stability of the levee and MSE wall sections will be required in the design stage. Due to the proximity of the levee on the bank of Fishing Creek, it is assumed that the foundation zones are directly connected hydraulically to the Creek. In the other project reaches, the levee is located much farther from the Creek and the Susquehanna River. In that case, the conservative assumption of direct hydraulic connection can also be made; however, additional investigations in the project design will be required to confirm this assumption.

Underseepage raises pore pressures in the blanket material, decreases the effective weight of the material, decreases effective stress, and reduces stability on the landside portion of the levee. The increased pore pressures can also lead to piping of the foundation material and undermining of the levee foundation. Many of the foundation soils are silty sands and silty gravels which could be susceptible to piping. Appropriate underseepage control measures should be implemented if the stability of the levee or foundation material is not adequate during high water events. Typical underseepage control measures are seepage cutoffs (slurry trenches, sheetpile, overexcavation and replacement with impervious material), seepage collection measures (toe drains, relief wells) or weighted landside filters (seepage blankets).

The seepage analysis by the Corps in 2005 utilized the finite element program *SEEP2D,* along with the pre- and post-processor *GMS 4.0. SEEP2D* was developed by the United States Army Engineer Waterways Experiment Station to model a variety of problems involving seepage. *GMS* was developed by the Brigham Young University Environmental Modeling Research Laboratory in cooperation with the Waterways Experiment Station (now Engineering Research and Development Center). The slope stability analysis was performed using the computer program *UTEXAS4,* which was developed for the US Army Corps of Engineers by Dr. Stephen Wright. Pore pressures computed in the seepage analysis were used in the slope stability analysis.

Permeabilities were estimated based on the Unified Classification System for soils (Powers, 1981, pg 45), pump test results, and material gradations. The following table contains the various soil types encountered and the respective horizontal permeabilities used in the analysis. Vertical permeabilities were assumed to be 1/10 of the horizontal permeabilities, due to the layering effect in alluvial soil deposits.

Horizontal Permeability (ft/min)									
Levee (CL)	**CL**	**CL-ML**	**ML**	**MSE Fill**	**SC**	**SM**	**SC-SM**	**SP**	**GP-GM**
2.0 x 10-6	2.0 x 10-6	2.0 x 10-5	2.0 x 10-5	5.0 x 10-5	2.0 x 10-4	2.0 x 10-3	2.0 x 10-3	1.0 x 10-2	1.0 x 10-l
		GP	**GP-GC**	**GW-GM**	**GC-GM**	**Toe Drain**	**Sand Drain**		
		2.0 x 10-3	5.0 x 10-2	2.0 x 10-2	4.0 x 10-3	1.0 x 10-l	5.0 x 10-2		

Shear strengths used in the stability analysis were determined by using correlations for the Standard Penetration Test, based on soil type. The chart found in NAVFAC Manual 7.1, page 149, was used to determine the effective shear strength parameters. Since pore pressures were included in the stability analysis, effective shear strength parameters were the only parameters necessary for use.

A seepage analysis for the case with water to the top of the levee/MSE wall/floodwall was performed by the Corps in 2005. Stability analyses were performed using the information from the seepage analysis. The levee foundation may quickly experience saturation and seepage due to higher permeabilities. Thus, a steady seepage conditions should be investigated. Sections were analyzed at each boring location from the drilling using the foundation profile encountered. The sudden drawdown case was not analyzed. Sudden drawdown analysis is highly dependent upon the material used for the levee section. With a typical 2.5H:1V slope, most levee sections are stable against sudden drawdown. In the next design phase, once a levee material is specified, a sudden drawdown analysis should be performed. From previous experience, the material type most susceptible to sudden drawdown failure is highly plastic clay (CH). Most other material types are typically stable against sudden drawdown when compacted in a controlled manner.

From the analysis for the case with steady seepage conditions developed and water to the top of the levee, underseepage could be a major concern. With no foundation improvements, the levee section may be unstable due to the excess pore water pressures in the landside portion of the foundation. Reasonable variations in permeability and material strength do not affect the factors of safety tremendously. From the seepage and slope stability analyses, in addition to engineering judgment and experience, underseepage must be reduced and/or controlled in order to provide a stable levee section during high water events.

As mentioned previously, typical options for reducing or controlling underseepage are aquifer cutoffs, toe drains, seepage berms, and relief wells. The aquifer cutoffs can consist of slurry trenches backfilled with impervious material, sheetpile, concrete cutoffs, or standard excavate and replace procedures. Cutoffs reduce seepage amounts and seepage pressures, with the magnitude of reduction depending upon the materials used.

Toe drains or relief wells reduce seepage pressures at the landside toe of the levee by providing an efficient outlet for the underseepage water. The toe drains or relief wells are designed to allow water to enter, but to not allow piping of the foundation soils into the drains or wells. Stability and protection against foundation piping is then provided by allowing the pore pressures to dissipate safely and quickly.

The seepage and slope stability analyses modeled cutoffs of the upper aquifer layer, a toe drain, and combinations of the two where appropriate. The normal groundwater level is well below the bottom of the cutoff. Thus, the cutoff should not interfere greatly with groundwater discharge/recharge with Fishing Creek and groundwater should not impact construction of the cutoff. The toe drain sections analyzed all penetrated into a pervious layer, allowing seepage pressures to be relieved safely.

A toe drain is the preferred method of handling the underseepage. This is due to the fact stated above that a cutoff can alter groundwater movement by blocking the groundwater from the river. Therefore, where cutoffs are used, it is considered best not to use long stretches of cutoffs. A toe drain is proposed for the extent of the levee/floodwall alignment along Fishing Creek. In this reach, a slurry trench cutoff was proposed in the Corps report but that was without the addition of a creek side slope embankment down to the creek bed. Additional geotechnical investigations with a modified crrekside slope will be required to verify the need for a seepage cutoff system versus a seepage control sytem. Any seepage control or sutoff system will be constructed in addition to the toe drain. The toe drain will control underseepage not cut-off as well as any seepage through the levee.

A toe drain is also proposed for the portion of levee that crosses the Fairgrounds. The sand and gravel aquifers in this portion have the potential to destabilize the landside toe of the levee, thus a toe drain will safe!y relieve the high seepage pressures.

The toe drain will most likely consist of open-graded gravel wrapped in a geotextile. The geotextile will prevent the finer foundation materials from moving into and clogging the gravel drain. The geotextile must also be permeable enough to allow ·water to freely enter the gravel drain without clogging.

The typical levee section will consist of a random material zone (for drawdown protection) on the riverside 1/3, adjacent to a select fill zone, which will in effect be an impervious material. In sections without toe drains, a landside blanket drain will be used. In areas where riprap is determined to be necessary, a layer of riprap on 6 inches of bedding soil will be provided. Exterior levee slopes will be 2.5H or 3: 1V for areas receiving topsoil. Areas requiring riprap can be steepened to 2H:1V. A rock toe keyed into the streambed is recommended for slope stability.

Overexcavation will be required to an approximate depth of 6 feet along all MSE levees. The overexcavation would extend under the entire reinforced earth zone.

Included as Sub-Attachments 3 and 4 to the Geotechnical Attachment to the Engineering Appenidix in the Corps report are selected seepage and slope stability trials. These are not included here but referenced for future use. They are intended to give an illustration of the conditions in the various reaches. Details and typical proposed levee sections are shown in the study drawings.

5. Settlement Analysis. No extensive areas of soft, fine-grained materials were encountered. Due to the granular foundation materials encountered in much of the project area, a long-term settlement analysis was not performed. The settlement caused by the levee/floodwall construction will occur during construction, thus an overbuild due to long-term settlement concerns is not deemed necessary at this time.

6. MSE Wall Design. MSE walls are planned as part of the project. Detailed design calculations are required for these levee systems. MSE walls consist of three main components: 1) Facing, 2) Reinforcement, and 3) engineered backfill. The reinforcement for this project, and most projects near water bodies, should be geogrid. Geogrid is a polymeric material generally consisting of polypropylene, polyethylene, or polyester. Metallic reinforcement (the other predominant type of reinforcement for MSE walls) is very prone to deterioration when exposed to water. Since these walls will be used along a creek as flood walls, they will be subjected to water relatively often.

In MSE wall construction, a leveling pad of lean concrete or compacted aggregate is placed along the wall face alignment. The concrete panels or concrete modular blocks are then placed on the leveling pad one row at a time. Once a row of block is placed, soil is placed and compacted in the reinforced soil zone behind the block or panels. Reinforcement is then placed at specified elevations. Additional soil is placed and compacted above the reinforcement layer. By placing the tensile reinforcements in the soil, the strength of the soil is improved significantly. With the geogrid (or metallic) reinforcement, the reinforced soil mass is essentially self-supporting. The facing for the MSE walls is provided mainly to keep the soil from eroding and for aesthetic reasons. The entire wall is built in lifts in this fashion.

Both an internal and external stability analysis are required for MSE wall design. The MSE wall is considered to act as a mass to resist external forces, much like a concrete gravity wall. External design consists of determining what external loads will be acting on the wall, and what size of wall is required to resist those forces. Internally, the reinforcing must be designed to have the required length and strength to hold the reinforced soil together. Vertical spacing of geogrid is generally kept at a maximum of 2 feet. At spacings larger than 2.5-3 feet, the reinforced soil begins not to act as a reinforced mass.

The MSE walls proposed for this project are currently designed as single-sided walls. This means that the wall facing is on the landside of the levee. Most MSE walls are built with one face, retaining soil behind the reinforced soil zone.

Subsurface Information: Soil parameters utilized by the Corps in the analysis were based on those observed in DH-3 through DH-7 of the November 2000 exploration. The limited exploration performed to date will be supplemented with a more detailed exploration prior to the preliminary and final design. The analyses included in the Corps report of 2005 is therefore preliminary and must be re-visited after completion of a full subsurface investigation program. Additionally, as no borings were performed on the Femville side of the river, any channel work on that side of the creek will require additional borings..

It should be noted that DH-101 performed in April 2002 also falls within the general area of the planned wall and was reviewed as part of the study. The conditions observed in DH-101 were significantly less dense (i.e. lower SPT blow counts) than those observed in the other nearby borings. It is currently assumed that the conditions observed in DH-101 are isolated and possibly associated with previous fills in the area (indications of previous filling activities also seen in other borings). The extent of such "soft" soil areas should be further investigated during the future exploration. Specific wall heights, etc in those areas can then be more closely reviewed and the design adjusted as necessary. The final design may determine that specific "foundation improvement" measures are required in such areas in order to meet the design assumptions or the wall design may require revision. Refer to the "Insitu Soil Parameters for MSE Wall" paragraph included with the design for further discussion.

It should be noted that the current design criteria for MSE levees requires the ground surface at the base of the MSE wall to extend a minimum distance of 10' from the wall before sloping downwards. It also requires that any slopes beyond this minimum distance be no steeper than 2H:1V.

Insitu Soil Parameters for MSE Wall Design:

Insitu soils are primarily silty sands and silty gravels. Standard Penetration Test blow counts in the upper 10 feet of soils at the site are generally in the range of N=7 to 20 and govern the design. Typical SPT blows in the dense sands and gravels below this depth are N>50. When corrected for overburden pressure, the lowest N values increase to approximately N = 10.

Based on conservative correlations, a friction angle of <!>= 30° and a unit weight of y = 115 pcf will be used for the insitu soils below the planned MSE wall for the sliding analysis. For the bearing capacity analysis, values of<!>= 32° and a unit weight of y = 120 pcf will be used. This is appropriate as the shear failure is affected by soils to a significant depth as compared to the sliding.

7. Material Source. Suitable levee material sources for previous projects must be verified for the project. For cost estimating purposes, borrow material for levee construction was assumed to be available from a commercial source located within ten miles of the project area. Material source investigations will be undertaken in the next phase of design.

8. Closure Structures.

a. **Route 11 Stop Log Closure.** This structure crosses Route 11 at Station 26+10.. The stop log structure will be about 50 feet wide, 6 feet high and consist of 4 bays of closure panels. On both ends of the closure, a concrete abutment will be constructed to support the end spans of the stop log panels and to retain the earth levee embankment. A foundation key parallel to the wall below the foundation will be built to increase the abutment factor of safety against sliding failure.

The subsurface condition at this closure is currently represented by drill hole DH-5. The upper 3 feet of overburden consist of silty sand materials. The second strata consists mainly of sand and gravel **(GP, SP,** and combinations thereof) to a depth of 6 feet with some silty and clayey zones and to top of rock at a 23 foot depth.

b. Other closures are of similar abutment construction with concrete sills and footings. Additional test borings will be required at each structure to further refine geotechnical parameters for analysis and design recommendations for the structural engineers.

c. **Geotechnical Design Parameters.** The following geotechnical design parameters were provided to the Structural Engineer on the 2005 Corps study to analyze the closure structures for stability (i.e. determine forces, moments, and FS against sliding and overturning).

Angle of Internal Friction = 30°
Moist Unit Weight of Soil= 125 pounds/ft ^{3}
Active Lateral Earth Pressure Coefficient= Ka= .33
Passive Lateral Earth Pressure Coefficient= Kp = 3.0

9. Next Phase of Design. The next phase of design will be the preliminary engineering phase. Final design for the levee, MSE walls, floodwall, and closure structures will be performed based on the additional subsurface explorations and the information recovered to date. Plans and specifications will be prepared based upon the final designs.

10. Future Investigations - During the preliminary engineering design phase, additional subsurface investigations should be undertaken to refine the design features and to identify any unknown foundation conditions. Seepage along the MSE levee has to be confirmed.

Previously identified pervious subsurface soil strata along to bank of Fishing Creek will require testing and geotechnical recommendations. Also, subsurface conditions along the reach of the proposed sheet pile wall require additional investigation and analysis for acceptable driving conditions for PZ piling to the depths required for stability and seepage control.

The future investigations will consist of additional soil borings, rock coring, test pits, and permeability tests. Samples recovered will be tested as required. Design of the recommended plan will be refined during design, based on the additional information from the investigations and data that will be recovered or developed at that time.

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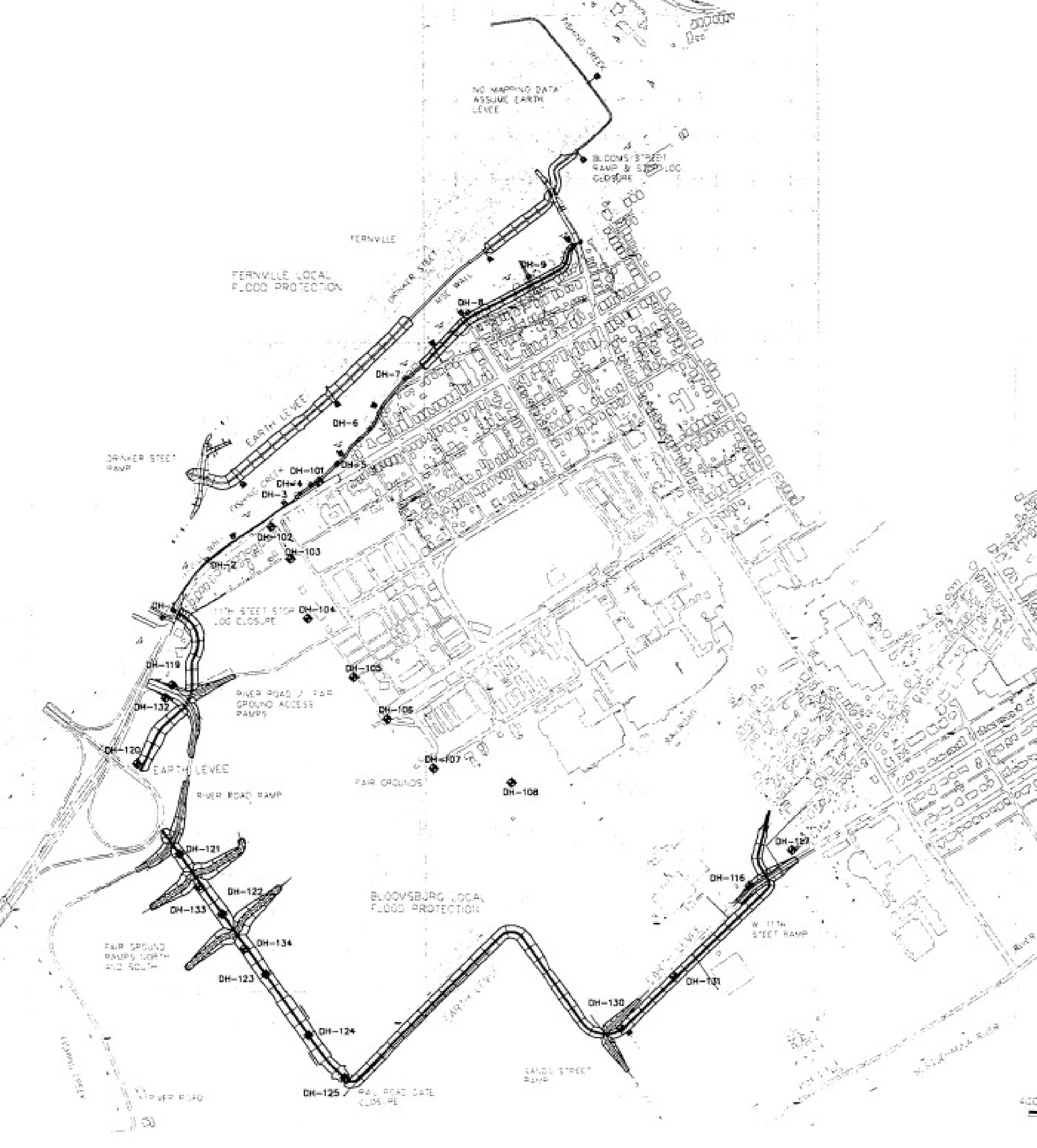
ATTACHMENTS 1 THRU 3

1 Drilling Location Plan
2 Field Boring Logs Phase I
2A Field Boring Logs Phase II
3 Phase I Geologic Profile

Attachment 1 Drilling Location Plan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DH-133
W. 11TH
STEET RAMP
DH-134
FAIR GROUND
RAMPS NORTH
AND SOUTH
DH-123
DH-131
DH-130
DH-124
SANDS STREET
RAMP
DH-125
RAIL ROAD GATE
CLOSURE
RIVER ROAD

Attachment 2 Field Boring Logs Phase I

Test Boring Log for *DH-1*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-30-00/9:30 AM* Completed *10-30-00/2:15 PM*	Notes *Depth to firm rock estimated from other borings to be within 5 ft of bottom of hole.*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.26*
Boring Methods/Diameter *SS/2"*
Casing Size *4 inch* Casing Depth *26.0 ft*
Total Depth *27.0 ft* Top of Rock *Not encountered*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes
10-30/2:20	*5.5* ▼	*471.76*	

Elevation | Depth | Soft Zones | Perm. Zones | Water Level | Lithologic Log and Description

Depth (ft)	Lithologic Log and Description
0 – 1.5	SILTY SAND: red-brown, moist, loose to med. compact, Artificial Fill (SM)
1.5 – 3.0	SANDY GRAVEL: red-brown, moist, med. compact, Artificial Fill (GW-GP
3.0 – 4.5	SILTY SAND: trace gravel, brown, moist, med. compact, Artificial Fill (SM)
4.5 – 6.0	SAND: red-brown, moist, loose to med. compact (SW-SP)
6.0 – 7.5	SILTY SAND: red-brown, moist, med. compact (SM)
7.5 – 9.0	NO RECOVERY
9.0 – 12.0	SAND WITH SILT: trace gravel, red-brown, wet, med. compact (SM)
12.0 – 13.5	SAND: brown, wet, loose (SW-SP)
13.5 –	SANDY, SILTY CLAY: red-brown, moist, med. stiff (CL-

Elevation scale: 476 (-1.26), 474, 472, 470, 468, 466, 464; Depth scale: 0, -2, -4, -6, -8, -10, -12, -14

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
-1				18	
-1.5	s-1	6-4-6	60		
-2				20	
-3	s-2	10-5-4	27	13	
-4				9	
-4.5	s-3	4-6-7	40		
-5				10	
-6	s-4	7-4-18	53	9	
-7				15	
-7.5	s-5	9-10-5	33		
-8				4	
-9	s-6	5-3-5	0	9	
-10				9	
-10.5	s-7	9-6-6	13		
-11				9	
-12	s-8	3-5-2	40	6	
-13				6	
-13.5	s-9	3-4-4	53		
-14				7	

Test Boring Log for *DH-1*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-30-00/9:30 AM* Completed *10-30-00/2:15 PM*	Notes *Depth to firm rock estimated from other borings to be within 5 ft of bottom of hole.*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.26*
Boring Methods/Diameter *SS/2"*
Casing Size *4 inch* Casing Depth *26.0 ft*
Total Depth *27.0 ft* Top of Rock *Not encountered*

Ground Water Level (▽ Encountered during drilling; ▼ Measured after completion)

Date/Time	Depth	Elevation	Notes
10-30/2:20	*5.5* ▼	*471.76*	

Elevation	Depth	Lithologic Log and Description
462		ML)
	-16	SAND WITH SILT: gray-brown, wet, loose? (see note) (SM)
460	-18	
458		SAND: trace silt, gray-brown, wet, compact, shale frags. in spoon tip (SM)
	-20	
456	-22	Decomposed SHALE: lt. olive, very highly weathered, moist, friable, clay seams, bedding dip 20 deg.
454	-24	
452	-26	

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
	s-10	2-3-3	100	8	
-16				4	16.0-17.5' blow counts for 2nd and 3rd 6" intervals may be result of pushing rock fragment
				12	
	s-11	2-28-26	67		
-18				19	
				12	
-20	s-12	10-20-21	53	28	
				17	
-22				43	
	s-13	18-30-30	53		
				28	
-24				66	lab grain size analysis for 23.5-27.0' indicates highly weathered rock is gravelly silt with sand
	s-14	39-46-78	87	100	
-26				100	
	s-15	22-100	100		

Test Boring Log for *DH-2*

Project Name	*Bloomsburg Phase I*	Date Started	*10-31-00/7:30 AM*
No.	*C 19:3*	Completed	*10-31-00/11:20AM*
Inspector	*S. Cox*	Drilling Contractor	*Pocono Test Borings*
		Driller	*Frank Sipple*

Notes

Location　　Offset　　Ground Elevation *476.06*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch*　Casing Depth *13.0 ft*
Total Depth *21.0 ft*　Top of Rock *16.0 ft*

Ground Water Level　(▽ Encountered during drilling; ▼ Measured after completion)

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm Zones	Water Level	Lithologic Log and Description
476	0				LEAN CLAY: drk brown, moist, v. stiff, (topsoil) (CL)
474	-2				SAND & GRAVEL: trace silt, drk gray-brown, med. compact, Artificial Fill (GM-SM
472	-4				
470	-6				SANDY CLAY: brown, damp, v. stiff (CL)
					CLAYEY SAND: brown, damp, med. compact (SC)
468	-8				SAND: trace silt, brown, moist, compact (SM)
466	-10				GRAVEL: brown, wet, v. compact (GW-GP)
					SAND & GRAVEL: trace clay, brown, moist, v. compact (GC-SC)
464	-12				Decomposed SHALE: clay seams, lt. olive, very highly weathered, moist, 45 deg. dip
462	-14				

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				26	
	s-1	4-15-4	53		
				38	
-2					
	s-2	4-7-7	20	23	
				7	
-4					
	s-3	13-16-18	20		
				17	
-6	s-4	9-8-8	13	7	
				14	
	s-5	7-11-19	53		
-8					
	s-6	50-94-100	20	15	
				19	
-10	s-7	29-52-100/0.3	23		
				35	
-12	s-8	25-37-43	53	65	lab grain size analysis for 12.0-13.0' indicates highly weathered rock is clayey sand with gravel
	s-9	50-105	60	125	
-14	s-10	39-50/0.1	83		

Test Boring Log for *DH-2*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-31-00/7:30 AM* Completed *10-31-00/11:20AM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *476.06*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *13.0 ft*
Total Depth *21.0 ft* Top of Rock *16.0 ft*

Ground Water Level — ▽ Encountered during drilling ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft zones	Perm. zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
460	-16					-16		50/0			
458	-18				SHALE: olive, med. hard, weathered, 45 deg dip, breaks easily along bedding	-18					
456	-20					-20	R-1	0%	92		

Test Boring Log for *DH-3*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-31-00/1:20 PM* Completed *11-1-00/1:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.76*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *26.0 ft*
Total Depth *39.0 ft* Top of Rock *29.0*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Lithologic Log and Description

Elevation	Depth	Description
	0	SANDY SILT: drk. brown, moist, stiff (ML)
476	-2	SAND WITH SILT: drk. brown, moist, med. compact (SM)
		SILT WITH SAND: dk gray-brown, moist, med stiff (ML)
474	-4	SILTY SAND: red-brown, moist, loose to med compact (SM)
472	-6	SANDY CLAY: red-brown, moist, med. stiff (CL)
		SILTY SAND: red-brown, moist, med. compact (SM)
470	-8	SANDY SILT: red-brown, wet, stiff to v. stiff (ML)
468	-10	GRAVEL WITH CLAY & SAND: red-brown, moist, very compact (GP-GC)
466	-12	
464	-14	

(Columns: Soft Zones, Perm. Zones, Water Level)

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				17	
	s-1	5-12-7	53		
-2				14	
	s-2	3-3-10	60	14	
-4				6	
	s-3	4-6-12	60		
				13	
-6	s-4	8-6-9	67	13	
				13	
	s-5	6-8-28	20		
-8				28	
	s-6	32-30-31	47	29	
-10				34	
	s-7	32-37-43	40		
				62	
-12	s-8	18-28-50	53	65	
				42	
	s-9	13-43-33	40		
-14				48	

Test Boring Log for *DH-3*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-31-00/1:20 PM* Completed *11-1-00/1:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.76*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *26.0 ft*
Total Depth *39.0 ft* Top of Rock *29.0*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Lithologic Log and Description	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
			s-10	32-24-30	53	38	
462	-16					40	
						65	
			s-11	12-28-31	27		
460	-18					77	
						81	
458	-20		s-12	27-40-65	67	58	lab grain size analysis of 21.0 to 29.0' indicates highly weathered shale is sandy silt, trace gravel
		Decomposed SHALE: lt. olive, very highly weathered, moist, clay seams, friable				75	
456	-22					50	
			s-13	18-27-40	40		
						65	
454	-24	CLAY: gray, moist, hard				58	23.5-25.0' clay is completely weathered shale
			s-14	12-38-72	80	65	
452	-26	Decomposed SHALE: lt. olive, very highly weathered, moist, clay seams, friable				78	
			s-15	75-50/0.1	83		
450	-28						
		SHALE: olive, highly	s-16	100	100		

Test Boring Log for *DH-3*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *10-31-00/1:20 PM* Completed *11-1-00/1:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.76*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *26.0 ft*
Total Depth *39.0 ft* Top of Rock *29.0*

Ground Water Level

▽ Encountered during drilling
▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description
448	-30				weathered, soft to med. hard, 25 deg. dip
446	-32				
444	-34				
442	-36				SHALE: olive, moderately weathered, hard
					SILTSTONE: gray, slightly weathered, hard to v. hard, no visible bedding
440	-38				SHALE: olive, mod. to highly weathered, soft to hard

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
-30					
-32					
-34	R-1	0%	66		
-36					all discontinuities in shale are along bedding except for one sub-vertical fracture
-38					
	R-2	10%	100		

Test Boring Log for DH-4

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-2-00/7:30 AM* Completed *11-2-00/2:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *25.0 ft*
Total Depth *32.6 ft* Top of Rock *27.6*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth
478	0
476	-2
474	-4
472	-6
470	-8
468	-10
466	-12
464	-14

Soft Zones | Perm. Zones | Water Level

Lithologic Log and Description

- SILT: red-brown, dry, v. stiff, (topsoil) (ML)
- SAND & GRAVEL: brown, dry, compact, Artificial Fill (GP-SP)
- SILTY SAND: trace gravel, moist, compact, Artificial Fill (SM)
- SANDY GRAVEL WITH SILT: brown, moist, compact, Artificial Fill (GM)
- SILTY SAND: brown, dry, v. compact (SM)
- SANDY GRAVEL WITH SILT: brown, moist, v. compact (GM)
- GRAVEL WITH SAND: trace silt/clay, red-brown, wet, v. compact (GM-GC)
- SANDY GRAVEL WITH SILT: brown, moist to 10.6 ft, wet to

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				27	
	s-1	9-12-16	27		
-2				56	
	s-2	17-24-18	20	46	
-4				35	
	s-3	22-20-17	33		
				20	
-6	s-4	15-25-19	40	38	
				35	
	s-5	25-35-35	27		
				70	
-8	s-6	200-100/0.4	20		
				45	
-10				25	
	s-7	25-47-75	67		
	s-8	50/0.1	100	47	
-12				80	
				36	
	s-9	27-48-68	20		
-14	s-10	100/0.4	50	48	

Test Boring Log for *DH-4*

Project Name *Bloomsburg Phase I*
No. *C 19:3*

Date Started *11-2-00/7:30 AM*
Completed *11-2-00/2:45 PM*

Notes

Inspector *S. Cox*

Drilling Contractor *Pocono Test Borings*
Driller *Frank Sipple*

Location Offset Ground Elevation *478.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *25.0 ft*
Total Depth *32.6 ft* Top of Rock *27.6*

Ground Water Level
▽ Encountered during drilling
▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description	Depth	Type/Run NO	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
					22.5 ft (GM)					62	
462	-16					-16				34	
							s-11	16-18-18	20	48	
460	-18					-18				52	
							s-12	28-47-58	20	37	
458	-20					-20				80	
							s-13	47-68-100/0.2	67	38	
456	-22					-22				48	
					Decomposed SHALE: lt olive, clay seams, friable, moist to 24 ft, wet to 27.6 ft					68	lab grain size analysis indicates decomposed shale is clayey sand with gravel
454	-24					-24	s-14	20-40-45	67	70	
										115	
452	-26					-26	s-15	70-39-100/02	50		
							s-16	50/0.1	0		
450	-28				SHALE: mod to highly weathered, olive, med hard, 20 deg dip	-28					

Test Boring Log for *DH-4*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-2-00/7:30 AM* Completed *11-2-00/2:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *25.0 ft*
Total Depth *32.6 ft* Top of Rock *27.6*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
448	-30				SILTSTONE: mod weathered, olive-gray, hard, shale laminae	-30					
					SHALE: mod to highly weathered, olive med hard, 20 deg dip						
446	-32					-32	R-1	0%	66		

Test Boring Log for *DH-5*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-3-00/8:00 AM* Completed *11-6-00/1:00 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.56*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *24.0 ft*
Total Depth *31.1 ft* Top of Rock *26.1 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation | Depth | Soft Zones | Perm Zones | Water Level | Lithologic Log and Description

Elevation	Depth
478	0
476	-2
474	-4
472	-6
470	-8
468	-10
466	-12
464	-14

Lithologic Log and Description:

- SILT WITH SAND: brown & red-brown, dry, stiff to v. stiff (ML)
- SAND & GRAVEL: gray, dry, med compact, Artificial Fill (GP-SP)
- SILTY SAND: red-brown, moist, med compact (SM)
- SANDY CLAY: red-brown, moist stiff to v. stiff (CL)
- SILTY SAND: red-brown, moist, med compact (SM)
- SILTY GRAVEL WITH SAND: yellow-brown & red-brown mottled, moist, v. compact (GM)

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				16	
	s-1	3-6-7	60		
				56	
-2					
	s-2	15-30-31	33	20	
				10	
-4					
	s-3	8-8-8	0		
				11	
-6	s-4	6-8-15	0	14	
				11	
	s-5	7-6-7	80		
-8				14	
	s-6	13-12-12	20	19	
-10				27	
	s-7	2-5-15	67		
				30	
-12	s-8	62-65-75	33	56	
				32	
	s-9	35-46-43	40		
-14				33	

Test Boring Log for *DH-5*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-3-00/8:00 AM* Completed *11-6-00/1:00 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.56*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *24.0 ft*
Total Depth *31.1 ft* Top of Rock *26.1 ft*

Ground Water Level ▽ Encountered during drilling ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
							s-10	32-28-23	27	65	
	-16					-16				40	
462										55	
							s-11	23-37-40	40		
	-18					-18				60	
460										55	
	-20					-20	s-12	23-36-42	33	51	
458										67	
	-22					-22				48	
456							s-13	18-47-70	33	69	
					Decomposed SHALE: olive, very highly weathered, friable					77	lab grain size analysis indicates decomposed shale is silty sand with gravel
	-24					-24	s-14	47-100/0.4	67		
454											
	-26					-26	s-15	50/0.1	100		only discontinuities in rock are along bedding
452					SHALE: mod to highly weathered, olive, med hard, 25 deg dip						
	-28				SILTSTONE	-28					siltstone broken into 2 inch or less pieces
450											

Test Boring Log for *DH-5*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-3-00/8:00 AM* Completed *11-6-00/1:00 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.56*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *24.0 ft*
Total Depth *31.1 ft* Top of Rock *26.1 ft*

Ground Water Level — Encountered during drilling / Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft zones	Perm. zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
	-30					-30					
448					SHALE: mod to highly weathered, olive, med. hard		R-1	0%	56		

Test Boring Log for *DH-6*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-13-00/7:45 AM* Completed *11-13-00/2:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.36*

Boring Methods/Diameter *SS/2" & NWD (2.125") Core*

Casing Size *4 inch* Casing Depth *24.0 ft*

Total Depth *38.7 ft* Top of Rock *28.7 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation | Depth | Soft Zones | Perm Zones | Water Level | Lithologic Log and Description

Depth	Lithologic Log and Description
0	SANDY CLAY: dk. gray-brown, moist, med. stiff to stiff (CL)
	SILTY, CLAYEY SAND: red-brown, damp, loose to med compact (SM-SC)
-6	SANDY CLAY: red-brown, moist, med stiff (CL)
	SILTY, CLAYEY SAND: red-brown, moist, loose to med compact (SM-SC)
	GRAVEL WITH SAND: trace silt, red & yellow-brown, mottled, moist, v. compact (GM)
	SANDY GRAVEL WITH SILT: red-brown, wet, v. compact (GM)
	GRAVELLY SAND WITH CLAY: red-brown, wet, v.

Elevation scale: 478, 476, 474, 472, 470, 468, 466, 464; Depth scale: 0, -2, -4, -6, -8, -10, -12, -14

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				9	
	s-1	2-5-5	27		
-2				14	
	s-2	4-5-4	27	9	
-4				9	
	s-3	3-2-5	100		
				10	
-6	s-4	5-6-5	80	3	
				6	
	s-5	3-3-4	87		
-8				8	
	s-6	7-12-19	100	9	
-10				0	
	s-7	14-30-47	20		
				38	
-12	s-8	40-34-75	20	45	
				35	
	s-9	35-33-40	47		
-14				52	

Test Boring Log for *DH-6*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-13-00/7:45 AM* Completed *11-13-00/2:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.36*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *24.0 ft*
Total Depth *38.7 ft* Top of Rock *28.7 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
					compact (SC)		s-10	49-50-45	67	75	
					SANDY GRAVEL WITH SILT: red-brown, wet, v. compact (GM)						
	-16					-16				88	
462											
					GRAVELL SAND WITH CLAY: red-brown, wet, v. compact (SC)					15	
							s-11	22-30-58	53		
	-18					-18				44	
460					SANDY GRAVEL WITH SILT: red-brown, wet, v. compact (GM)						
										58	
	-20				GRAVELLY SAND WITH CLAY,: red-brown, wet, v. compact (SC)	-20	s-12	33-40-35	47	25	
458											
										68	
					SANDY GRAVEL WITH CLAY: red-brown & yellow-brown mottle, moist, v. compact (GC)						
	-22					-22				27	
456							s-13	22-35-28	53		
										47	
					Decomposed SHALE: lt. olive, very highly weathered, friable, wet						lab grain size analysis indicates decomposed shale is silty sand, trace grave
	-24					-24	s-14	68--50/0.1	83	100	
454											
	-26					-26					
452											
							s-15	24-60-91	67		
	-28					-28					
450							s-16	50/0.2	100		
					SHALE: red, mod to highly weathered, soft						

Test Boring Log for *DH-6*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-13-00/7:45 AM* Completed *11-13-00/2:45 PM*	Notes
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.36*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *24.0 ft*
Total Depth *38.7 ft* Top of Rock *28.7 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description	Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
	-30				to med hard, 35 deg dip, a few sub-vertical fractures	-30					
448											
	-32					-32					
446											
							R-1	0%	74		
	-34					-34					
444											
	-36					-36					
442											
	-38					-38					
440							R-2	15%	72		

Test Boring Log for DH-7

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-8-00/2:40 PM* Completed *11-9-00/2:30 PM*	Notes *See report text for discussion of apparentl very 'soft' materials from 3' to 7', and 29' to 31.5'. No SPT for these intervals*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location　　Offset　　Ground Elevation *477.16*

Boring Methods/Diameter *SS/2" & NWD (2.125") Core*

Casing Size *4 inch*　Casing Depth *31.0 ft*

Total Depth *37.0 ft*　Top of Rock *32.0 ft*

Ground Water Level　　▽ Encountered during drilling　▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation / Depth / Soft Zones / Perm Zones / Water Level / Lithologic Log and Description

Depth (ft)	Elevation	Lithologic Log and Description
0 – 1.5		SILTY SAND: gray-brown, damp, med compact (SM)
1.5 – 3		NO RECOVERY
3 – 7		NO SAMPLE: Apparently loose, coarse Artificial Fill, see note
7 –		SILTY GRAVEL WITH SAND: red-brown & yellow-brown mottled, moist, v. compact (GM)

Elevation scale: 476, 474, 472, 470, 468, 466, 464; Depth scale: 0, -2, -4, -6, -8, -10, -12, -14

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				7	
	s-1	5-10-9	20		
-2				12	
	s-2	7-4-3	0	8	While cleaning casing to 3' casing rotated and moved vertically, due to loose and probably coarse fill. Cleaning casing to 6' caused casing to drop to 7'.
-4				14	
				6	
-6				2	
				0	
-8				20	
	s-3	8-35-38	40		
				30	
-10	s-4	40-33-61	40	44	
				38	
	s-5	10-26-35	33		
-12				58	
	s-6	38-40-68	100	60	
-14				36	
	s-7	37-33-38	20		

Test Boring Log for *DH-7*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-8-00/2:40 PM* Completed *11-9-00/2:30 PM*	Notes *See report text for discussion of apparentl very 'soft' materials from 3' to 7', and 29' to 31.5'. No SPT for these intervals*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *31.0 ft*
Total Depth *37.0 ft* Top of Rock *32.0 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Columns: Elevation, Depth, Soft Zones, Perm. Zones, Water Level, Lithologic Log and Description, Depth, Type/Run No, Blow Counts or RQD, Recovery (%), Casing Blows (per foot), Notes

Elevation scale: 462, 460, 458, 456, 454, 452, 450, 448
Depth scale: -16, -18, -20, -22, -24, -26, -28

Lithologic Log and Description

- (continued from previous page, to about -17.0)
- GRAVELLY SAND WITH SILT: red-brown, moist, v. compact (SM) (about -17.0 to -19.5)
- Decomposed SHALE: red to 26.5', lt. olive 26.5-29.0', moist to 21.0', wet 21.0-29.0', friable, clayey (about -19.5 to -29.0)
- SILTY SAND: orange, saturated, v. loose, see note (SM) (from about -29.0)

Samples

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Notes
-16	s-8	23-33-30	47	
-18.5	s-9	21-30-48	0	
-21	s-10	13-25-37	67	
-23.5	s-11	23-24-25	27	
-26	s-12	40-42-37	40	
-28.5	s-13	18-20-13	67	28.5 to 31.5' silty sand is almost

Casing Blows (per foot), top to bottom:

Casing Blows (per foot)
47
50
48
38
55
20
45
45
58
100
18
11
8
20
10

Test Boring Log for *DH-7*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-8-00/2:40 PM* Completed *11-9-00/2:30 PM*	Notes *See report text for discussion of apparentl very 'soft' materials from 3' to 7', and 29' to 31.5'. No SPT for these intervals*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *477.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *31.0 ft*
Total Depth *37.0 ft* Top of Rock *32.0 ft*

Ground Water Level
▽ Encountered during drilling
▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm Zones	Water Level	Lithologic Log and Description
	-30				
446					
					Decomposed SHALE: lt. olive, wet
	-32				
					SHALE: olive, mod. to highly weathered, soft to hard, 35 deg. dip
444					
	-34				
442					
	-36				

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
-30				9	completely decomposed shale. After cleaning hole to 29.5' casing dropped to 31.0'.
				8	
	s-14	1-50/0.2	100		
-32					
-34					
-36					
	R-1	14%	84		

Test Boring Log for *DH-8*

Project Name *Bloomsburg Phase I*
No. *C 19:3*
Inspector *S. Cox*

Date Started *11-8-00/8:15 AM*
Completed *11-8-00/1:30 PM*
Drilling Contractor *Pocono Test Borings*
Driller *Frank Sipple*

Notes
Poor recovery from 6.0-9.0'; gravel at bottom of samples suggests that unrecovered intervals are gravel/ sand soils

Location Offset Ground Elevation *478.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *18.5 ft*
Total Depth *23.6 ft* Top of Rock *18.6 ft*

Ground Water Level — ▽ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm Zones	Water Level	Lithologic Log and Description
478	0				ASPHALT
476	-2				SANDY GRAVEL: trace silt, brown, damp, med compact to compact, Artificial Fill (GP-GM)
474	-4				NO RECOVERY: probably a noncohesive soil similar to 0.9 to 3.0'
472	-6				SILTY SAND WITH GRAVEL: red-brown, moist, med compact (SM)
470	-8				
468	-10				SANDY GRAVEL WITH SILT: red-brown, moist to 10.5', wet 10.5 to 14.7', med compact to compact (GM)
466	-12				
464	-14				

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				30	
	s-1	9-24-16	20		
-2				25	
	s-2	10-9-10	20	31	
-4				6	
	s-3	8-7-6	0		
				10	
-6	s-4	10-9-14	20	11	
				7	
	s-5	6-11-10	33		
-8				9	
				10	
	s-6	1-20-31	40		
-10				14	
	s-7	12-18-25	47		
				20	
-12	s-8	24-22-13	13	24	
				20	
	s-9	4-10-14	13		
-14				23	

Test Boring Log for *DH-8*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-8-00/8:15 AM* Completed *11-8-00/1:30 PM*	Notes *Poor recovery from 6.0-9.0'; gravel at bottom of samples suggests that unrecovered intervals are gravel/ sand soils*
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*	

Location Offset Ground Elevation *478.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *18.5 ft*
Total Depth *23.6 ft* Top of Rock *18.6 ft*

Ground Water Level — ☐ Encountered during drilling; ▼ Measured after completion

Date/Time	Depth	Elevation	Notes

Elevation	Depth	Soft Zones	Perm. Zones	Water Level	Lithologic Log and Description
					CLAYEY SAND: dk. gray, wet, compact (SC)
462	-16				SANDY GRAVEL WITH SILT: red & yellow-bown mottled, moist, v. compact (GM)
460	-18				SHALE: red, mod weathered & med hard 18.6-20.6, highly weathered & soft 20.6-23.6, 35 deg dip, only discontinuities are along bedding
458	-20				
456	-22				

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
	s-10	17-19-22	60	46	
-16				195	
				51	
	s-11	36-46-68	27		
-18				70	
	s-12	50/0.1	100		
-20					
-22					
	R-1	0%	76		

Test Boring Log for *DH-9*

Project Name *Bloomsburg Phase I*
No. *C 19:3*

Date Started *11-7-00/8:30 AM*
Completed *11-7-00/2:00 PM*

Notes

Inspector *S. Cox*

Drilling Contractor *Pocono Test Borings*
Driller *Frank Sipple*

Location
Offset
Ground Elevation *481.16*
Boring Methods/Diameter *SS/2" & NWD (2.125") Core*
Casing Size *4 inch* Casing Depth *22.0 ft*
Total Depth *28.5 ft* Top of Rock *23.5 ft*

Ground Water Level

▽ Encountered during drilling
▼ Measured after completion

Date/Time	Depth	Elevation	Notes
11-8/7:30 AM			*caved at 5.0 ft*

Elevation · Depth · Soft Zones · Perm. Zones · Water Level · Lithologic Log and Description

Depth (ft)	Lithologic Log and Description
0 to approx. -9.0	SANDY GRAVEL: dk gray & blue-gray, moist, loose to compact, Artificial Fill (GP)
approx. -9.0 to -10.5	NO RECOVERY
approx. -10.5 to -12.0	SANDY GRAVEL WITH SILT: red-brown, moist, compact, Artificial Fill (GM)
approx. -12.0 to -13.5	NO RECOVERY
approx. -13.5 onward	SANDY, SILTY CLAY: red-brown, wet, soft to med stiff

Elevation scale: 480, 478, 476, 474, 472, 470, 468. Depth scale: 0, -2, -4, -6, -8, -10, -12, -14.

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
0					
				18	
	s-1	5-21-20	27		
-2				37	
	s-2	14-21-12	20	20	
-4				8	
	s-3	10-8-4	27		
				14	
-6	s-4	5-4-4	20		5.8 to 6.0' sandy gravel with silt, red-brown, moist. loose, Artificial Fill
				6	
	s-5	5-3-1	0		
-8				7	
	s-6	3-4-11	13	7	8.8 to 9.0' sandy gravel with silt, red-brown, moist, loose, Artificial F
-10				0	
	s-7	7-3-2	0		
				6	
-12	s-8	19-20-17	20	7	
				13	
	s-9	6-12-7	0		
-14				20	

Test Boring Log for *DH-9*

Project Name *Bloomsburg Phase I* No. *C 19:3*	Date Started *11-7-00/8:30 AM* Completed *11-7-00/2:00 PM*	Notes	
Inspector *S. Cox*	Drilling Contractor *Pocono Test Borings* Driller *Frank Sipple*		

Location | Offset | Ground Elevation *481.16*

Boring Methods/Diameter *SS/2" & NWD (2.125") Core*

Casing Size *4 inch* | Casing Depth *22.0 ft*

Total Depth *28.5 ft* | Top of Rock *23.5 ft*

Ground Water Level (Encountered during drilling / Measured after completion)

Date/Time	Depth	Elevation	Notes
11-8/7:30 AM			*caved at 5.0 ft*

Elevation / Depth / Soft Zones / Perm. Zones / Water Level / Lithologic Log and Description

Elevation	Depth	Lithologic Log and Description
466		(CL-ML)
	-16	GRAVEL WITH CLAY & SAND: red-brown, wet, compact to v. compact (GP-GC)
464		
	-18	CLAYEY GRAVEL WITH SAND: red-brown, wet, compact to v. compact (GC)
462		
	-20	
460		
	-22	
458		
	-24	SANDSTONE: fine-grained, red, slightly weathered, hard, 30 deg. dip, several high-angle fractures; other discontinuities are along bedding
456		
	-26	
454		
	-28	

Depth	Type/Run No	Blow Counts or RQD	Recovery (%)	Casing Blows (per foot)	Notes
	s-10	3-2-2	67	7	
-16				9	
				32	
	s-11	22-25-28	27		
-18				84	
				28	
-20	s-12	29-28-39	33	58	
				60	21.0 to 22.1' red shale fragments
-22	s-13	24-58-50/0.1	55	140	22.1 to 23.5' advanced with rotary bit, probably highly weathered shale or sandstone, (clayey gravel with sand?)
		50/0.0			
-24					
-26					
-28	R-1	0%	96		

Attachment 2A Field Boring Logs Phase II

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-101

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >/= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/25-26/02
DRILLING TIME: 10:19-2:00 (4/25) - 07:15-10:38 (4/26)

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Main St., by Magee Center
WEATHER: Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0 to -1.5		ML	2,2,4	0.5	S-1	SILT: Brown, medium stiff silt. Moist. clayey sand	
-1.5 to -3		ML	1,1,1	1.0	S-2	SILT AND CLAY: Brown silt and trace clay. Organics (roots). Moist. silty sand	Silty Sand (SM)
-3 to -4.5		SM	1/12,1	1.3	S-3	SILTY SAND: Brown silt and fine grain sand. Soft. Loose. Moist. Silty Sand	
-4.5 to -6		SM-SC	1,1,1	1.3	S-4	SILT AND CLAY: Brown fine grain sand and fines (silt and clay). Moist. Soft. Silty Sand	
-6 to -7.5		ML	1,2,3	1.3	S-5	SILT AND SAND: Brown silt with fine grain sand. Moist. Soft. clayey sand	
-7.5 to -9		SM	3,1,2	1.2	S-6	SAND AND SILT: Brown fine to medium grain sand and silt. Trace rounded pebbles. Moist Soft. Clayey sand	Permeability test conducted at 7.5 feet. Clayey Sand, tr gravel (SC)
-9 to -10.5		SM	2,3,3	-	S-7	SAND AND SILT: Brown fine grain sand and silt. Trace gravel, rounded. Moist. Soft. Clayey Sand	
-10.5 to -12		GM-GC	8.16,16	-	S-8	GRAVEL AND SAND: Mixed gravel, weathered shale, sand and fines. Gray to brown with red. Medium dense. Clayey Sand w. gravel	Permeability test conducted at 12 feet.
-12 to -13			8,8,10	0.0	S-9	BLANK: No recovery - no description	
-13						BLANK: Augering only. No sample.	

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-101

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >/= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/25-26/02
DRILLING TIME: 10:19-2:00 (4/25) - 07:15-10:38 (4/26)

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Main St., by Magee Center
WEATHER: Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15.5		SM	22,22,16	1.0	S-10	SILT AND SAND: Brown, red and yellow mottled silt and sand with trace gravel. Gravel medium grain in size and rounded. Moist to dry. Dense. clayey sand w. gravel	
-15.5 to -16.5						BLANK: Augering only. No sample.	
-16.5 to -18		GP	16,21,28	1.3	S-11	GRAVEL AND SAND: Sand and gravel. Brown, moist. Rounded grains, poorly sorted, poorly graded. Dense clayey sand w. gravel	
-18 to -19						BLANK: Augering only. No sample.	
-19 to -20.5		GM-GC	8,13,13	1.3	S-12	GRAVEL AND SAND: Sand and gravel with fines. Poorly sorted, poorly graded. Rounded to sub-rounded grains. Wet. Medium dense. silty sand w. gravel	Water level at 19.0 feet.
-20.5 to -21.5						BLANK: Augering only. No sample.	
-21.5 to -23		GM-GC	9,20,26	0.7	S-13	GRAVEL AND SAND: Sand and gravel. Sub-rounded, poorly sorted with fines. Wet. Dense. clayey sand w. gravel	
-23 to -24						BLANK: Augering only. No sample.	
-24 to -25.5		GM-GC	19,13,31	0.2	S-14	GRAVEL AND SAND: Gravel and sand with fines. Some weathered shale. Brown to gray. Poorly sorted, poorly graded. Wet. clayey sand w. gravel	
-25.5 to -26.5						BLANK: Augering only. No sample.	
-26.5						GRAVEL AND SAND: Gravel and sand with shale fragments. Poorly sorted	

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-101

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >/= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/25-26/02
DRILLING TIME: 10:19-2:00 (4/25) - 07:15-10:38 (4/26)

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Main St., by Magee Center
WEATHER: Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27		GP	6,8,41	0.7	S-15	sub-rounded to rounded grains. Brown. Dense. silty sand w. gravel	
-28						BLANK: Augering only. No sample.	
-29 / -30			24,31,34	1.3	S-16	SHALE: Green and tan weathered shale. Fissile, becoming clay. Dry. Hard. clayey sand w. gravel	Bedrock not encountered- no refusal

weathered shale

Sand, gravel

Decomposed shale

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH -102

PROJECT NAME/ NUMBER:	PA DEP Bloomsburg / 601-0100	**DRILLING CO.:**	Geo-Environmental
THICKNESS OF OVERBURDEN:	31.7 feet	**RIG TYPE/ METHOD:**	Hollow Stem Auger
SITE LOCATION:	Bloomsburg, PA	**SAMPLING METHOD:**	Continuous Split Spoon
LOGGED BY:	E. Pacinda	**TOTAL DEPTH:**	37.2 feet
DRILLING DATE:	04/24/02 - 04/25/02	**LOCATION:**	By Gate 2 of Fairgrounds
DRILLING TIME:	14:12-16:30 (4/24) - 07:08-9:30 (4/25)	**WEATHER:**	Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0, -1		GM-GC	4,3,3	1.1	S-1	GRAVEL AND FINES: Rounded gravel and pebbles with fines. Red-brown dry. Medium grained. Very loose. silty SAND w. gravel (SM)	Augered through 6" asphalt
-2		GM-GC	6,12,9	1.0	S-2	GRAVEL AND FINES: Brown to tan gravel with fines. Rounded gravel and pebbles. Loose. Dry. " "	
-3, -4		ML	5,2,2	1.0	S-3	SILT: Red-brown silt and trace clay Dry. Very loose. fine sandy lean CLAY	Sandy silty Clay (CL-ML)
-5		ML	2,3,9	1.0	S-4	SILT: Red-brown silt with clay. Dry. Very loose. " "	
-6, -7		GM	6,7,13	1.0	S-5	GRAVEL AND FINES: Red-brown gravel and fines. Dry. Rounded gravel and rock. Loose. clayey SAND w/ gravel	DTW = 6.26 feet. Water level taken after coring completed.
-8		GM-GC	19,20,21	0.5	S-6	GRAVEL AND FINES: Brown to tan gravel and fines. Medium grain. Dry. Loose. " "	Poorly-graded GRAVEL w. silt, clay & sand
-9, -10		GM-GC	9,11,15	0.9	S-7	GRAVEL AND SAND: Brown to gray gravel with sand and fines. Rounded gravel, fine sand. Dry. Loose. " "	
-11						Blank: Augering only. No sample.	
-12		GM-GC	11,13,16	0.8	S-8	GRAVEL AND SAND: Brown-red and tan gravel with sand and fines. Rounded stones, fine grained sand. Dry. Loose. silty SAND w. gravel	
-13						BLANK: Augering only. No sample.	

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH -102

PROJECT NAME/ NUMBER:	PA DEP Bloomsburg / 601-0100	**DRILLING CO.:**	Geo-Environmental
THICKNESS OF OVERBURDEN:	31.7 feet	**RIG TYPE/ METHOD:**	Hollow Stem Auger
SITE LOCATION:	Bloomsburg, PA	**SAMPLING METHOD:**	Continuous Split Spoon
LOGGED BY:	E. Pacinda	**TOTAL DEPTH:**	37.2 feet
DRILLING DATE:	04/24/02 - 04/25/02	**LOCATION:**	By Gate 2 of Fairgrounds
DRILLING TIME:	14:12-16:30 (4/24) - 07:08-9:30 (4/25)	**WEATHER:**	Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15.5		GM-GC	29,30, 50/5	1.0	S-9	GRAVEL AND SAND: Brown to gray gravel with sand and fines. Rounded stones. Moist. Silty ~~SAND~~ GRAVEL ~~gravel~~ w. sand	well-graded gravel with silt & sand (GW-GM)
-15.5 to -16						BLANK: Augering only. No sample.	
-16.5 to -18		GM-GC	12,20,20	0.95	S-10	GRAVEL AND SAND: Brown gravel with sand and fines. Rounded gravel and fine grained sand. Moist. Clayey GRAVEL w. sand	
-18 to -19						BLANK: Augering only. No sample.	clayey GRAVEL w. Sand (GC)
-19 to -20.5		GM-GC	9,20,16	1.1	S-11	GRAVEL AND SAND: Brown to red gravel with sand and fines and some weathered shale. Dense, medium grained. Wet.	
-20.5 to -21						BLANK: Augering only. No sample.	
-21.5 to -23			11,14,16	1.3	S-12	SHALE: Green and yellow weathered shale. Fissile. Medium dense. Moist to dry. silty SAND w. gravel	
-23 to -24						BLANK: Augering only. No sample.	
-24 to -25.5			16,23,32 Decomposed shale	2.0	S-13	SHALE: Green and yellow weathered shale. Fissile. Medium dense. Moist to dry. clayey SAND	
-25.5 to -26.5						BLANK: Augering only. No sample.	
-26.5						SHALE: Green, yellow and tan, mottled, weathered shale becoming	

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH -102

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 31.7 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/24/02 - 04/25/02
DRILLING TIME: 14:12-16:30 (4/24) - 07:08-9:30 (4/25)

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 37.2 feet
LOCATION: By Gate 2 of Fairgrounds
WEATHER: Cold and wet.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27 to -28			11,26,24	1.5	S-14	clay. Fissile. Moist. Clayey SAND	
-28 to -29						BLANK: Augering only. No sample.	
-29 to -30.5			45,50/1	0.9	S-15	SHALE: Green and tan to brown weathered shale. Dense, very hard. Moist to dry.	
-30.5 to -31.7						BLANK: Augering only. No sample.	
-31.7 to -37.2				4.15		BEDROCK: Gray green to dark gray calcified shale with thin to medium size white calcite veins. Calcite veins react to HCL. Very hard. Slightly fissile.	Refusal at 31.7 feet. Cored 5.5 feet into bedrock. Bedrock core recovery 83%. RQD = 7%

Shale Fragments
Decomposed Shale

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 103

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 27.0 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/18/02
DRILLING TIME: 15:30 - 18:45

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 32.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, warm. 70's

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0 to -1.5		CL	4,7,8	0.7	S-1	CLAY: Clay- stiff, medium brown. Top few inches gravel fill. Dry. Clayey Sand	
-1.5 to -3		CL	6,3,4	1.0	S-2	CLAY: Clay- medium stiff, medium brown. Dry. Sandy lean CLAY	Sandy lean CLAY (CL)
-3 to -4.5		CL	6,5,6	0.8	S-3	CLAY: Clay- medium stiff, medium brown. Dry. Sandy lean CLAY	
-4.5 to -6		CL	3,3,3	0.4	S-4	CLAY AND SAND: Medium brown clay. Medium stiff. Dry. Sandy Lean CLAY	
-6 to -7.5		CL-SW	2,4,5	1.3	S-5	CLAY AND SAND: Medium brown, medium stiff clay changing to sand- fine, medium brown then to fine gravel. Dry. clayey fine SAND	clayey SAND w. gravel (SC)
-7.5 to -9		CL-SM	16,25,28	1.1	S-6	CLAY AND SAND: 0.5 feet- medium stiff, medium brown clay. 0.6 feet- fine to coarse grained sand. Some silt and fines. Dry. clayey SAND w. gravel	
-9 to -10.5		GM-GC	18,50/4	1.0	S-7	SAND: Sand- medium dense, medium brown, fine to coarse. Some fine to coarse gravel. Trace silt and clay. Last two inches moist.	
-10.5 to -11.5						Blank: Augering only. No sample.	DTW= 10.90 feet. Water level taken before coring.
-11.5 to -13		SM-SC	16,21,28	1.6	S-8	SAND: Sand- dense to medium brown, fine to coarse. Some fine to coarse gravel. Some silt and clay. Moist	
-13						BLANK: Augering only. No sample.	

Field Borehole Log

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Borehole ID: DH - 103

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 27.0 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/18/02
DRILLING TIME: 15:30 - 18:45

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 32.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, warm. 70's

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
						Clayey SAND w. Gravel	
-14 -15		GM-GC	11,18,18	1.1	S-9	SAND: 0.4 feet- medium to coarse sand and fine and coarse gravel. Trace silt and clay. 0.6 feet- weathered shale with light brown clay. Wet. Clayey SAND w gravel	
-16						BLANK: Augering only. No sample.	
-17		GM-GC	13,12,9	1.4	S-10	SHALE: Top 3" same as S-9. Shale- weathered, green with clay, light brown. Wet.	
-18						BLANK: Augering only. No sample.	
-19 -20	Decomposed Shale	CL	2,2,3	1.4	S-11	CLAY AND SHALE: 0.3 feet- clay, soft, light brown. 1.1 feet- shale, weathered, green, with some light brown clay. Wet.	
-21						BLANK: Augering only. No sample.	
-22			2,2,1	1.4	S-12	SHALE: Weathered, green, with yellow clay and staining between layers. Wet.	
-23						BLANK: Augering only. No sample.	
-24 -25			2,50/5	1.0	S-13	SHALE: Weathered, green, with yellow clay.	
-26						BLANK: Augering only. No sample.	

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 103

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 27.0 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/18/02
DRILLING TIME: 15:30 - 18:45

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 32.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, warm. 70's

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27				4.0		BEDROCK: Calcareous, green-brown shale interbedded with limestone, light brown, with interbedded clay traces.	Refusal at 27.0 feet. Cored 5.0 feet into bedrock
-28							
-29							Bedrock core recovery 80%
-30							
-31							RQD = 0%
-32							

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH- 104

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 27.0 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/22/02
DRILLING TIME: 13:00 - 17:20

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 32.0 feet
LOCATION: Fairgrounds
WEATHER: Cloudy, cold, wet

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0 to -1.5		ML-CL	4,4,4	0.8	S-1	CLAY: Silty clay, dry, medium stiffness. Brown to medium brown with trace organics. lean CLAY tr. Sand	
-1.5 to -3		ML-CL	2,3,54	0.8	S-2	CLAY: Brown to medium brown, silty clay with trace organics. Dry. Stiff. lean CLAY	
-3 to -4.5		SP	4,4,5	1.3	S-3	CLAY AND SAND: Silty clay, dry, medium stiffness. Brown to medium brown with trace organics. Grades to red-brown, fine grain sand. Homogeneous. Stiff. Dry. Clayey f. SAND	clayey sand w. gravel
-4.5 to -6		GM-GC	12,12,14	1.1	S-4	SAND: Red-brown, fine grain sand. Homogeneous. Stiff. Dry. Grades to fine grained sand with gravel and fines. Poorly sorted. Dry. Very stiff. Clayey SAND w. gravel	DTW = 5.3 feet. Water level taken after coring.
-6 to -7.5		SP	15,23,24	1.1	S-5	SAND AND GRAVEL: Fine grained sand with gravel. Poorly sorted, rounded to well-rounded, Very stiff. Dry. Some silt. Silty SAND w. Gravel	
-7.5 to -9		SM	8,19,16	1.1	S-6	SAND AND GRAVEL: Fine grained sand with gravel. Poorly sorted, rounded to well-rounded, Very stiff. Dry. Little silt.	
-9 to -10.5		SM	15,23,24	-	S-7	SAND AND GRAVEL: Fine grained sand with gravel. Poorly sorted, rounded to well-rounded. Dense. Dry. Little silt.	Recovery not measured.
-10.5 to -11.5						Blank: Augering only. No sample.	
-11.5 to -13		SM	17,21,22	0.9	S-8	SAND AND GRAVEL: Fine grained sand with gravel. Poorly sorted, rounded to well-rounded, Hard. Dry. Little silt. Last 5 inches wet. clayey SAND w. gravel	clayey gravel w. sand
-13						BLANK: Augering only. No sample.	

Field Borehole Log

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Borehole ID: DH- 104

PROJECT NAME/ NUMBER:	PA DEP Bloomsburg / 601-0100	**DRILLING CO.:**	Geo-Environmental
THICKNESS OF OVERBURDEN:	27.0 feet	**RIG TYPE/ METHOD:**	Hollow Stem Auger
SITE LOCATION:	Bloomsburg, PA	**SAMPLING METHOD:**	Continuous Split Spoon
LOGGED BY:	E. Pacinda	**TOTAL DEPTH:**	32.0 feet
DRILLING DATE:	04/22/02	**LOCATION:**	Fairgrounds
DRILLING TIME:	13:00 - 17:20	**WEATHER:**	Cloudy, cold, wet

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15		SM	17,14,18	1.0	S-9	GRAVEL AND SAND: Fine grained sand with gravel. Poorly sorted, rounded to well-rounded. Dense. Wet. Clayey SAND w. gravel	Clayey gravel w. Sand
-15 to -16						BLANK: Augering only. No sample.	
-16 to -18	Decomposed Shale		22,27,29	1.2	S-10	SHALE: Brown to red weathered shale with clay. Hard. Moist. Clayey GRAVEL w. Sand	
-18 to -19						BLANK: Augering only. No sample.	
-19 to -20			6,5,5	1.0	S-11	SHALE: Yellow weathered silt becoming clay. Stiff. Moist. Clayey SAND w. gravel	
-20 to -21						BLANK: Augering only. No sample.	
-21 to -23			1,5,17	1.0	S-12	SHALE: Yellow weathered silt becoming clay. Stiff. Moist. Last 2" gray in color with less clay. Very stiff. Wet. " "	DTW = 22.5 feet. Water level taken before coring.
-23 to -24						BLANK: Augering only. No sample.	
-24 to -25			50/5	0.3	S-13	SHALE: Gray weathered shale. Very stiff. Wet. lean CLAY & weathered shale	
-25 to -26						BLANK: Augering only. No sample.	
-26 to -27			50/3	0.0	S-14	SHALE: Gray, weathered shale. Very stiff. Wet. Weathered Shale	

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH- 104

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 27.0 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/22/02
DRILLING TIME: 13:00 - 17:20

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 32.0 feet
LOCATION: Fairgrounds
WEATHER: Cloudy, cold, wet

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27 to -32						BEDROCK: Dark gray to gray calcareous either shaley limestone or limestone with shale. Interbedded with trace thin, white layers which react with HCl. At 1.9 feet, (approximately 28.9 feet) void in rock. Tiny calcite crystals growing on rock faces/break.	Refusal at 27.0 feet. Cored 5.0 feet into bedrock. Coring recovery recorded on core box. RQD = 70%

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 105

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 7:00-10:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Fairgrounds
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0, -1		ML	5,10,10	0.6	S-1	SILT AND GRAVEL: Red-brown clay-like silt with angular gravel. First 1-2 inches with organics (soil). Dry. lean CLAY w. sand & gravel	lean CLAY w. Sand & ~~gravel~~
-2			12,5,5	0.0		BLANK: No recovery. No sample.	No recovery due to broken basket.
-3, -4		ML-CL	2,2,10	0.9	S-2	SILT AND CLAY: Red-brown silt and clay. Very fine and homogeneous. Dry. Stiff. Low plasticity. lean CLAY tr. Sand	lean CLAY W. sand
-5		ML-CL	2,3,5	1.1	S-3	SILT AND CLAY: Red-brown silt and clay. Homogeneous. Medium stiffness. Dry. Low plasticity. lean CLAY tr. gravel	lean CLAY ~~& gravel~~ w. Sand
-6, -7		ML-CL	3,4,8	1.0	S-4	SILT AND CLAY: Brown and gray mottled silt and clay - high silt. Dry. Stiff. Low plasticity. lean CLAY tr sand	" "
-8		ML-CL, GP	11,15,17	1.4	S-5	SAND AND SILT: First 4" mottled clay and silt. Remaining is fine grained sand and rounded gravel. Poorly sorted. Brown to gray in color. Dry to moist. Clayey SAND w. gravel	
-9, -10		GP	6,18,25	1.2	S-6	GRAVEL AND SAND: Poorly sorted, brown to gray sand and gravel. Dry to moist. Clayey gravel w Sand	
-11						Blank: Augering only. No sample.	DTW= 10.4 feet. Water level taken after coring.
-12, -13		ML-CL, SP-GP,	11,17,23	1.3	S-7	GRAVEL AND SAND: 4" of silt and clay. 4" of fine-grained sand and gravel. Rest is fine-grained, homogeneous sand. Brown to gray. Wet to saturated. silty gravel w. Sand	see next page
						BLANK: Augering only. No sample.	

Field Borehole Log

Borehole ID: DH - 105

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 7:00-10:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Fairgrounds
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15.5		GM-GC	18,17	0.7	S-8	GRAVEL AND SAND: Red-brown gravel, sand, and fines. Poorly sorted, rounded with fine sand. Wet. silty sand w gravel	Poorly graded gravel w. silt & sand
-15.5 to -16.5						BLANK: Augering only. No sample.	
-16.5 to -18		SM	10,30,32	1.1	S-9	SAND: 2" of brown, fine-grained homogeneous sand. Remaining is brown sand with gravel and fines. Poorly sorted, rounded. Wet. " "	" "
-18 to -19						BLANK: Augering only. No sample.	
-19 to -20.5		GM-GC	17,36,45	1.1	S-10	SAND: 3" of fine-grained sand. Remaining is gravel, sand, and fines. Shale interbedded. Poorly sorted, rounded stones. Brown in color. Wet. NO JAR	
-20.5 to -21.5						BLANK: Augering only. No sample.	
-21.5 to -23		GM-GC	16,20,27	1.0	S-11	GRAVEL AND SAND: Poorly sorted gravel, sand, and fines. Rounded. Brown in color. Wet. Shale interbedded. Silty GRAVEL w. Sand	
-23 to -24						BLANK: Augering only. No sample.	
-24 to -25.5		SP	5,3,3	0.3	S-12	SAND: Fine-grained, homogeneous brown and gray sand. Wet. Clayey SAND	
-25.5 to -26.5						BLANK: Augering only. No sample.	
-26.5 to						SHALE: 3" of fine-grained homogeneous sand. Brown. Remaining	

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 105

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 7:00-10:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: Fairgrounds
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27		ML-CL	2,3,4	1.4	S-13	is yellow, weathered shale becoming clay. Low placticity and moderate stiffness. Clayey SAND w. gravel	
-28						BLANK: Augering only. No sample.	
-29							
-30		SP	2,2,2	1.4	S-14	SHALE: 4" of homogeneous, fine-grained sand. B rown in color. Wet. Remaining is yellow, weathered shale becoming clay. Moist and soft. Clayey SAND w. gravel	Bedrock not encountered. No refusal.

Decomposed Shale

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-106

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 23 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/19/02
DRILLING TIME: 07:25 - 11:15

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 28.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, hot

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0 to -1.5		CL	11,5,3	0.9	S-1	FILL AND CLAY: 0.6 feet- Fill beneath roadway.0.3 feet- Clay- medium stiff, light brown. Dry. lean CLAY w. sand & rock fragments	
-1.5 to -3		CL	3,3,3	1.1	S-2	CLAY: Medium stiffness. Light brown to red in color. Dry. lean CLAY w. sand	
-3 to -4.5		CL	5,5,7	1.1	S-3	CLAY: Stiff, light brown to red in color. Trace sand grading to fine sand. Some silt and clay. Dry. clayey SAND ~~+~~ w gravel	clayey SAND w. gravel
-4.5 to -6		SC	9,13,14	1.3	S-4	SAND: Dense, medium brown, fine to coarse-grained sand and gravel. Some clay. Dry. Last 2 inches wet. clayey SAND w. gravel	" "
-6 to -7.5		GC	10,15,18	0.8	S-5	SAND: Medium dense, light brown, medium to coarse grained. With fine to coarse-grained gravel. Some clay. Wet. clayey SAND w gravel	
-7.5 to -9		GC	9,15,22	1.0	S-6	SAND: Medium dense, medium brown, fine to coarse-grained sand and fine to coarse-grained gravel. Some clay. Wet. Silty GRAVEL w. sand	well-graded GRAVEL w. silt & sand
-9 to -10.5		GC	9,16,18	0.7	S-7	SAND: Medium dense, medium brown, fine to coarse-grained sand and fine to coarse-grained gravel. Some clay. Wet. "	"
-10.5 to -11.5						Blank: Augering only. No sample. "	
-11.5 to -13		SC	16,18,28	1.0	S-8	SAND: Dense, medium brown, fine to coarse-grained with some clay. 0.3 foot lense-no clay, some fine t coarse grained gravel. Wet. "	DTW= 11.29 feet. Water level taken before coring. "
-13						BLANK: Augering only. No sample. "	

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-106

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 23 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/19/02
DRILLING TIME: 07:25 - 11:15

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 28.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, hot

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15.5		SC	16,28,32	0.7	S-9	SHALE: Weathered, green with fine to coarse-grained sand. Trace gravel. Wet.	
-15.5 to -16.5						BLANK: Augering only. No sample.	
-16.5 to -18		GC	19,22,16	1.1	S-10	SAND: Coarse, medium brown with fine gravel. Some coarse gravel. Some weathered shale. Trace clay. Wet.	
-18 to -19						BLANK: Augering only. No sample.	
-19 to -20.5		SC	19,21,36	0.7	S-11	SAND: Medium brown, fine to coarse grained with some gravel, some shale, and limestone fragments. Some clay. Wet. clayey SAND w. gravel	
-20.5 to -21.5						BLANK: Augering only. No sample.	
-21.5 to -23			Decomposed shale 5,6,50/5	0.9	S-12	SHALE: Green-brown, very weathered with yellow clay. Some limestone fragments. Wet. lean CLAY tr. sand	
-23 to -24.5						BEDROCK: Black, shaley, hard limestone with interbedded yellow clay	Refusal at 23.0 feet. Cored 5.0 feet into bedrock.
-24.5 to -26				1.2	RW-1	BEDROCK: Gray, shaley, hard limestone with rocks and interbedded clay traces.	Bedrock core recovery = 61%

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH-106

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 23 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: J. O'Connor
DRILLING DATE: 04/19/02
DRILLING TIME: 07:25 - 11:15

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 28.0 feet
LOCATION: Fairgrounds
WEATHER: Sunny, hot

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27							
-28				1.9	RW-2		

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 107

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 09:36 - 11:35

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairgrounds.
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0, -1			4,8,10	1.2	S-1	SHALE: Top 3" soil and gravel with organics. Remaining weathered shale, mottled in color. Stiff. Dry.	Clayey SAND w. gravel
-2			7,13,10	1.1	S-2	SHALE: 1" of soil with organics. Remaining is weathered shale, mottled. Dry.	" "
-3, -4		ML	2,2,2	0.3	S-3	SHALE: Weathered, mottled shale. Dry.	lean CLAY w. Sand
-5		ML-CL	1,2,1	0.8	S-4	SILT AND CLAY: Mottled silt and clay. Grades to dark gray. Soft and sticky with low plasticity. Moist. lean CLAY tr. Sand	~~CLAY~~ SILT tr SAND
-6, -7		ML-CL	2,3,3	1.3	S-5	SILT AND CLAY: Mottled silt and clay wiith trace organincs. Black in color. Moderate stiffness with low plasticity. Dry. lean CLAY tr. organics	~~lean CLAY~~
-8		ML-CL	2,3,4	1.4	S-6	CLAY: Mottled gray and brown soft clay with organics. Low plasticity. Dry.	"
-9, -10		CL	1,2,1	0.9	S-7	CLAY: Dark gray and brown clay with some organics. Low plasticity. Dry. Soft.	"
-11						Blank: Augering only. No sample.	
-12, -13		ML-CL	1,1,1	1.3	S-8	CLAY AND SILT: Dark gray, very soft, silt and clay. Trace organics. Low plasticity. Moist.	"
						BLANK: Augering only. No sample.	

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 107

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 09:36 - 11:35

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairgrounds.
WEATHER: Cloudy, cool.

Depth scale (Feet): -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-15		GM-GC	17,21,25	1.3	S-9	GRAVEL AND SAND: Wet sand, gravel, and fines. Gray-brown. Last 3" dry, mottled (orange, yellow, brown) silt and clay with interbedded shale. Low plasticity. Clayey GRAVEL w. Sand	
						BLANK: Augering only. No sample.	
-17		GM-GC	50/5	0.5	S-10	SAND: 1" brown gravel, sand, and fines. Wet. Remaining white quartz sand. Well rounded, poorly sorted, with small to medium grain. Wet. Silty SAND w. gravel	DTW = 17.25
						BLANK: Augering only. No sample.	
-20		SW	8,11,11	1.0	S-11	CLAY AND SAND: 4" fine to medium-grained, gray to brown sand. Rounded. Wet. Remaining is mottled (yellow, green, rusty red) weathered shale becoming clay with medium-size rounded pebbles. Clayey SAND w. gravel	
-21						BLANK: Augering only. No sample.	
-22			27,50/5	0.4	S-12	CLAY AND SAND: 1.5" fine-grained, subrounded sand. Brown to gray in color. Remaining is mottled, weathered shale becoming clay. Silty GRAVEL w. Sand	
						BLANK: Augering only. No sample.	
-25			7,11,15	0.9	S-13	SHALE: 3" of fine-grained, gray sand. Wet. Remaining is yellow and orange mottled, weathered shale with rounded, medium-sized pebbles. Wet. Clayey SAND w. gravel	
						BLANK: Augering only. No sample.	
-27						SAND: Rusty, red to brown graded sand. Rounded to subrounded.	

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 107

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 09:36 - 11:35

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairgrounds.
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
			7,1,21	1.1	S-14	Medium to large size grains. Wet. silty SAND	
-28						BLANK: Augering only. No sample.	
-29 / -30			5,7,10	1.8	S-15	SAND AND SILT: 10" of rounded to subrounded, fine-grained sand with silt. Brown to gray. Wet. Remaining is mottled, sticky, weathered shale becoming clay. Low plasticity. Stiff. Silty SAND	Bedrock not encountered. No refusal.

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SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 108

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 13:14 - 15:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairground
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0, -1			5,6,6	1.3	S-1	SILT: 4" of soil with organics and fill material (glass and coal ash) Remaining is dry, fine silt. Brown and moderately stiff. lean CLAY w/ glass cinders	Silt w sand, tr gravel
-2		ML-CL	3,4,4	1.1	S-2	CLAY AND SILT: Dry, brown silt and clay with trace organics. Becoming mottled. Low plasticity and medium stiffness. lean CLAY tr. gravel	
-3, -4		CL-ML	3,4,5	1.2	S-3	CLAY AND SILT: Mottled clay with silt and trace organics. Brown and gray in color. Low plasticity stiff. Dry. lean CLAY	Silt w/ Sand
-5		ML-CL	4,5,5	6.9	S-4	CLAY AND SILT: Dry, mottled brown and gray clay and silt. Last 3" are very fine-grained, homogeneous sand and silt. Brown. Moist. Clayey SAND	
-6, -7		GM	8,13,16	1.1	S-5	GRAVEL AND SAND: 2" of brown, silt and fine-grained sand. Remaining is gravel with sand and silt. Angular to rounded and brown in color. Moist. Silty SAND w/ gravel	
-8		GM	10,12,7	0.7	S-6	SHALE: Weathered gray shale. Wet. Last 2" are poorly sorted, rounded gravel. Small to medium in size with sand and silt. Silty GRAVEL w Sand	
-9, -10		ML, SP-SM	13,26,20	1.0	S-7	SILT: Brown to gray, weathered silt Fine-grained sand with rounded pebbles and silt. Wet.	
-11						Blank: Augering only. No sample.	
-12, -13		GM-GC, SP	10,26,11	1.1	S-8	GRAVEL AND SAND: 2" of fine to medium grain, brown sand. 6" of mixed gravel, sand, and fines. Brown, well-rounded to rounded with some weathered shale. Remaining is very-fine sand. silty SAND w gravel	Silty SAND w/ gravel

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 108

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 13:14 - 15:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairground
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
						BLANK: Augering only. No sample.	
-14 to -15.5		GM-GC	28,42, 50/2	0.9	S-9	SAND AND SILT: 3" of brown, fine grain sand with silt. Remaining is mix of weathered shale, rounded gravel, sand, and fines. Wet. Silty SAND w gravel	"
						BLANK: Augering only. No sample.	
-16.5 to -18		SM-SC	9,10,10	0.5	S-10	SAND: Fine to medium-grained sand with fines. Homogeneous. Wet. Silt	
						BLANK: Augering only. No sample.	
-19 to -20.5		SM	2,3,3	1.4	S-11	SAND AND SILT: Gray to dark gray in color. Moist. Silt	
						BLANK: Augering only. No sample.	
-21.5 to -23		ML-CL	5,8,8	1.7	S-12	CLAY AND SILT: Dark gray. Homogeneous. Moist. fine sandy SILT	
						BLANK: Augering only. No sample.	
-24 to -25.5		ML-CL	6,6,6	0.9	S-13	CLAY AND SILT: Dark gray. Homogeneous. Moist. " "	
						BLANK: Augering only. No sample.	
-26.5						CLAY AND SILT: Dark gray. Homogeneous.Trace sand grains.	DTW = 26.5 feet

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 108

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: >= 30.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: E. Pacinda
DRILLING DATE: 04/23/02
DRILLING TIME: 13:14 - 15:30

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 30.5 feet
LOCATION: By Landfill, Behind Fairground
WEATHER: Cloudy, cool.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-27		ML-CL	5,5,6	0.9	S-14	Moist. lean CLAY tr. gravel	
-28						BLANK: Augering only. No sample.	
-29 / -30		ML-CL	8,20,22	1.3	S-15	CLAY AND SILT: Dark gray with some organics. Limestone fragment found at bottom of boring. lean CLAY w. gravel tr. sand	Bedrock not encountered. No Refusal.

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

Field Borehole Log

Borehole ID: DH - 116

PROJECT NAME/ NUMBER: PA DEP Bloomsburg / 601-0100
THICKNESS OF OVERBURDEN: 20.5 feet
SITE LOCATION: Bloomsburg, PA
LOGGED BY: B. Hallam
DRILLING DATE: 04/29/02
DRILLING TIME: 12:30 - 15:11

DRILLING CO.: Geo-Environmental
RIG TYPE/ METHOD: Hollow Stem Auger
SAMPLING METHOD: Continuous Split Spoon
TOTAL DEPTH: 25.5 feet
LOCATION: By Landfill, Behind Fairgrounds.
WEATHER: Cloudy, cold.

DEPTH (Feet)	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
0 to -1.5	ML	2,7,8	1.0	S-1	SILT AND GRAVEL: Brown silt and gravel with organics. Soft to medium. Coal and red shale fragments. Dry. silty SAND w gravel	
-1.5 to -3	ML	3,3,4	0.5	S-2	SILT: Brown silt and medium, rounded to well- rounded gravel. Poorly sorted. Dry. silty GRAVEL w sand	DTW = 1.51 feet. Water level taken after coring.
-3 to -4.5	ML	4,3,3	0.8	S-3	SILT: Light brown to tan, mottled silt. Dry. SILT tr. sand & gravel	
-4.5 to -6	ML	3,4,3	0.7	S-4	SILT: Dark gray silt with medium stiffness. Dry. SILT	
-6 to -7.5	ML	2,5,9	1.1 7.5	S-5	SILT: Light gray silt with organics Medium stiff to stiff. Dry. SILT lean CLAY	
-7.5 to -9	ML	5,9,11	1.3	S-6	SILT: Light gray silt with organics Stiff. Dry. SILT	silty CLAY tr. sand
-9 to -10.5	ML	3,6,6	1.3	S-7	SILT: Light gray silt with organics Mottled, with medium stiffness. Dry. "	
-10.5 to -11.5					Blank: Augering only. No sample.	
-11.5 to -13	CL-ML	2,1,2	1.4	S-8	CLAY AND SILT: Gray silt and clay with low placticity. Moist and soft. SILT (clay lense)	lean CLAY tr sand
-13					BLANK: Augering only. No sample.	

Field Borehole Log

Borehole ID: DH - 116

ENVIRONMENTAL ASSOCIATES, INC.
4326 Northern Pike, Monroeville, PA 15146

PROJECT NAME/ NUMBER:	PA DEP Bloomsburg / 601-0100	**DRILLING CO.:**	Geo-Environmental
THICKNESS OF OVERBURDEN:	20.5 feet	**RIG TYPE/ METHOD:**	Hollow Stem Auger
SITE LOCATION:	Bloomsburg, PA	**SAMPLING METHOD:**	Continuous Split Spoon
LOGGED BY:	B. Hallam	**TOTAL DEPTH:**	25.5 feet
DRILLING DATE:	04/29/02	**LOCATION:**	By Landfill, Behind Fairgrounds.
DRILLING TIME:	12:30 - 15:11	**WEATHER:**	Cloudy, cold.

DEPTH (Feet)	SOIL SYMBOLS	USCS	BLOW COUNT	RECOVERY (Feet)	SAMPLE NUMBER	LITHOLOGIC DESCRIPTION	REMARKS
-14 to -15.5		CL-ML	1,2,4	1.4	S-9	CLAY AND SILT: Light gray to gray silt and clay with little sand and trace organics (coal). Soft and moist. lean CLAY SILT w sand	lean CLAY tr sand
-15.5 to -16.5						BLANK: Augering only. No sample.	
-16.5 to -18		ML	12,14, 50/3	1.0	S-10	SILT: Dark gray silt with weathered shale and trace calcite veins. Very stiff. silty SAND w/ gravel	
-18 to -19						BLANK: Augering only. No sample.	
-19 to -20.5			50/4	0.7	S-11	SHALE: Dark gray weathered shale with fines. Hard. Highly weathered Sh	
-20.5 to -25.5						BEDROCK: Hard, black shale with trace very thin, white veins. No reaction to HCl. Slightly fissile to fissile.	Refusal at 20.5 feet. Cored 5.0 feet into bedrock. Bedrock core recovery- 100%. Bedding dip: 30-40 degrees. RQD = 0%

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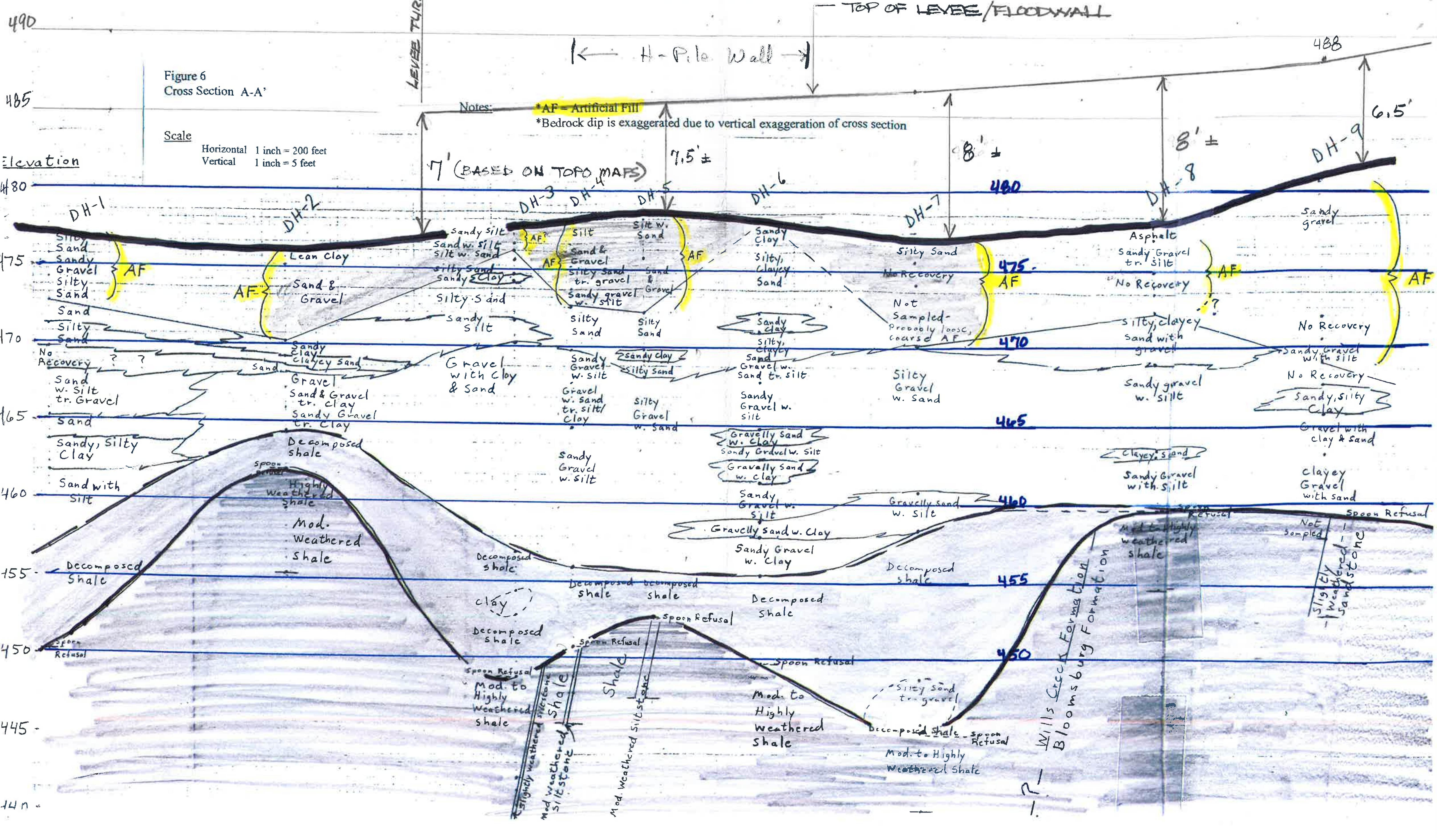
16-0.5
Decomposed Sh
3 ?

Attachment 3 Phase I Geologic Profile

PROFILE ALONG LEFT BANK FISHING CREEK FROM CORPS 2005 REPORT
EDITED WITH LEVEE INFO FROM 2022 WEST END STUDY



WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix C

Environmental and Regulatory Compliance

WEST END FLOOD MITIGATION STUDY

Appendix C

Environmental and Regulatory Compliance

TABLE OF CONTENTS:

LIST OF ATTACHMENTS

1. THE BLOOMSBURG, PENNSYLVANI, FLOOD DAMAGE REDUCTION FEASIBILITY STUDY (2005 CORPS REPORT)

2. PNDI RECEIPT – PROJECT SEARCH ID: PNDI-742254

3. PHMC SUMMARY LETTER – ER PROJECT #2021PR06578

WEST END
FLOOD MITIGATION STUDY

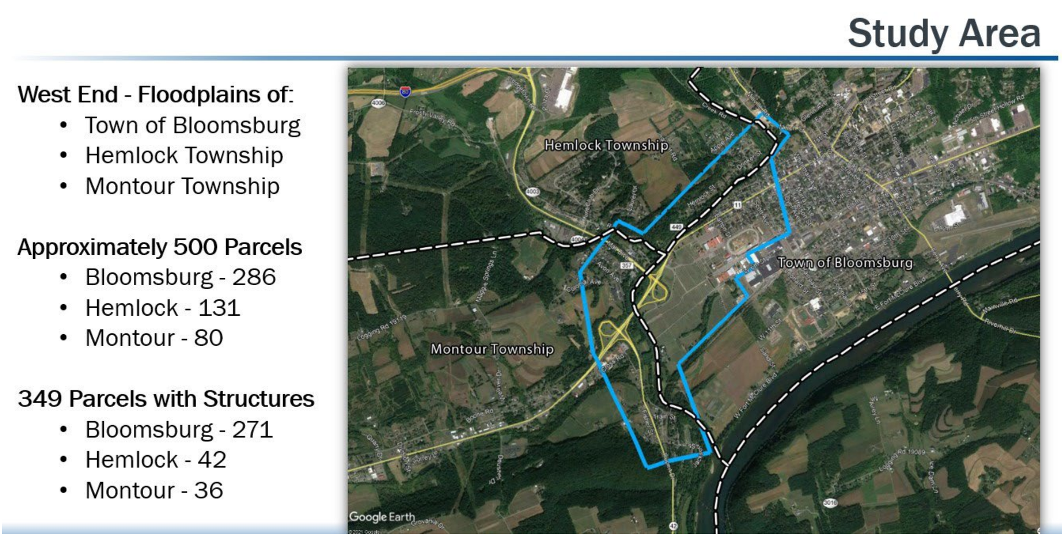
Attachment C

Environmental and Regulatory Compliance

1. LOCATION / DESCRIPTION OF THE STUDY AREA

Bloomsburg is located in the north central portion of the Commonwealth of Pennsylvania approximately 40 miles west of Scranton and 90 miles northwest of Harrisburg, Pennsylvania. The study area is in the Upper Susquehanna Basin along the North Branch of the Susquehanna River, approximately 8 miles above its confluence with the West Branch at Sunbury.

The primary focus of the study was the communities located along both banks of Fishing Creek from the Railroad Street Bridge to Fishing Creek's confluence with the Susquehanna River. The Townships of Hemlock and Montour are situated along the north bank of Fishing Creek whereas the West End of the Town of Bloomsburg and the Fairgrounds are located on the south bank of the creek. The remainder of the study area south of the creek is primarily comprised of open fields which serve as parking for Fairground events as shown below.



Fishing Creek flows into the Susquehanna River and is generally aligned north to south downstream (south) of SR 0011 (Main Street). Upstream (north) of SR 0011 Fishing Creek bends to the east, flowing parallel to SR 0011, north of the roadway. Upstream of the Railroad Street Bridge, Fishing Creek turns back to the north. Given the proximity of the site to the Susquehanna River and Fishing Creek, the west end is subject to extensive flooding from the river and the creek.

2. BASELINE CONDITIONS / AFFECTED ENVIRONMENT

In April 2005, "The Bloomsburg, Pennsylvania, Flood Damage Reduction Feasibility Study" (Corps Report) was issued by the U.S. Army Corps of Engineers. The study area for that study included generally the same area as this West End study. Data presented in the 2005 Corps study was utilized for this study, updated when necessary. The areal extent of lands that experienced flooding in 2011 is considered the study area. This section describes existing conditions and possible constraints on mitigation proposals.

The 2005 Corps Report is referenced and will not be re-written in this section if environmental conditions have not changed or if particular studies were not suitable at this phase of the project. However, nearly two decades have elapsed since that study was conducted and some environmental findings have changed since that time and will be discussed in this section. The description provides a baseline for measuring expected changes in the physical, environmental, cultural, social, and economic settings that would result from implementation of a flood damage reduction project in the study area.

3. PHYSICAL SETTING (*See 2005 Corps Report for Physiography, Geomorphology, and Soils*)

4. CLIMATE AND WEATHER

Climate and weather patterns have changed over the last 20 years and so have some of the statistics for Bloomsburg since the 2005 Corps Report. In Bloomsburg. The summers remain warm and wet, while winters are cold and snowy, and it is partly cloudy year-round. Variations in temperatures and precipitation trends have changed over this period. Over the course of the year, the temperature typically varies from 21°F to 84°F and is rarely below 6°F or above 92°F. The warm season lasts for 3.7 months, from May 25 to September 15, with an average daily high temperature above 74°F. The hottest month of the year in Bloomsburg is July, with an average high of 83°F and low of 63°F. The cold season lasts for 3.2 months, from December 1 to March 6, with an average daily high temperature below 44°F. The coldest month of the year in Bloomsburg is January, with an average low of 22°F and high of 35°F.

A *wet day* in Bloomsburg is one with at least *0.04 inches* of liquid or liquid-equivalent precipitation. The chance of wet days in Bloomsburg varies throughout the year. The *wetter season* lasts *4.8 months*, from *April 2* to *August 29*, with a greater than *30%* chance of a given day being a wet day. The month with the most wet days in Bloomsburg is *June*, with an average of *11.5 days* with at least *0.04 inches* of precipitation. The *drier season* lasts *7.1 months*, from *August 29* to *April 2*. The month with the fewest wet days in Bloomsburg is *January*, with an average of *6.5 days* with at least *0.04 inches* of precipitation. The month with the most days of rain alone in Bloomsburg is June, with an average of 11.5 days.

Bloomsburg experiences *significant* seasonal variation in monthly rainfall. Rain falls throughout the year in Bloomsburg. The month with the most rain in Bloomsburg is *September*, with an average rainfall of *3.7 inches*. The month with the least rain in Bloomsburg is *February*, with an average rainfall of *1.6 inches*. Bloomsburg experiences significant seasonal variation in monthly snowfall as well. The snowy period of the year lasts for 5 months, from November to April, with a sliding 31-day snowfall of at least 1.0 inches. The month with the most snow in Bloomsburg is February, with an average snowfall of 7.1 inches. The snowless period of the year lasts for the other 7 months (weatherspark.com).

5. WATER RESOURCES

Below is a description of the existing water resources in the study area. State and federal surface water listings have changed some since the 2005 Corps Report and are discussed below. However, hydrogeology and groundwater studies were not part of this updated assessment and can be referenced in the 2005 Army Corps Report.

5A. Surface Waters

Bloomsburg is within the Middle Susquehanna River subbasin. In the upper part of the subbasin, the Susquehanna River flows southeast through high, flat-topped plateaus separated by steep-sided valleys. Midway down the basin, the Lackawanna River joins the Susquehanna River before turning and flowing southwest towards Bloomsburg.

The Susquehanna River forms Bloomsburg's southern boundary and is the most prominent drainage feature, draining an area of approximately 10,576 square miles. Fishing Creek forms the northern and western boundary of the Town of Bloomsburg and drains an area of approximately 385 square miles at its confluence with the Susquehanna River. Fishing Creek and its tributaries - Huntington, Greene, Little Fishing, Spruce, and Hemlock Creeks - drain the northern nine townships of Columbia County southward to the bend of the Susquehanna River between Bloomsburg and Catawissa.

The middle Susquehanna River sub-basin is a mixture of urban and rural lands that include forest, agriculture, abandoned mines, and urban development. A section of this subbasin was heavily mined and remnants of mining activities (e.g., coal slag piles, abandoned mines, and acid mine drainage) still impact the water quality of many miles of streams and rivers throughout the Wyoming Valley (SRBC, 2002).

According to PA DEP's eMAP website, Susquehanna River in this stretch of Bloomsburg also has an attaining use of "impaired" with the source cause being unknown with polychlorinated biphenyls (PCBs) and also having an unknown source of Mercury.

Impairment status of Fishing Creek has changed for the better since the 2005 Corps Report. In the previous study, various reaches of Fishing Creek were listed on the PA-DEP 303(d) Impaired Streams and Rivers List (PADEP, 2002). Several reaches were listed for violations of Aquatic Life Use based on siltation from agriculture, road runoff, and removal of vegetation. Additionally, one reach of Fishing Creek (#20020111-1226-FIT) was listed for violations of Human Health Uses due to mercury. Little Fishing Creek, which flows into Fishing Creek at Bloomsburg, was also listed for violations related to Recreational Use due to pathogens. According to PA DEP's eMAP website, Fishing Creek in the stretch of Bloomsburg has an attained use of supporting aquatic life, potable water use, and fish consumption; and it is not listed as impaired.

6. BIOLOGICAL RESOURCES

6A. Vegetation (*previously addressed in the 2005 Corps Report*)

6b. Wetlands (*previously addressed in the 2005 Corps Report*)

Wetlands were noted in the 2005 Corps Report in the study area. An updated wetland delineation will need to be completed for any projects identified for advancement to preliminary design. Permitting involving anticipated wetland and stream impacts by any proposed structural components of a levee within Fishing Creek and its floodway, as well as any channel modifications to Fishing Creek. Early coordination with agencies such as the Army Corps of Engineers, PA Department of Environmental Protection and PA Fish and Boat Commission will be key to the success of this project in order to ensure all regulatory compliance requirements are met.

Field investigations were conducted along the project area in June 2003 by others to assess and determine the presence/absence of wetlands. The specific area investigated included the footprints and vicinities of two levee alignment corridors under consideration. The wetlands investigation was conducted in accordance with the "Corps of Engineers Wetland Delineation Manual," Technical Report Y-87-1, and specific regulatory guidance modifications subsequently issued.

Within the expected areas of disturbance, wetlands were identified only along the southeastern side of the Bloomsburg Fairgrounds property and delineated using a global positioning system unit. The 11 mapped wetlands (labeled A through K) are shown in Figure 2-3 of the 2005 Corps Report. The wetlands were further characterized as palustrine emergent wetland (PEM), palustrine shrub-scrub wetland (PSS), and palustrine forested wetland (PFO) characterized according to their cover type (Cowardin, 1979). The hydrologic source for these wetlands appears to be from local surface runoff (from parking lots and landfills) and a surface and groundwater connection to Snyder's Run.

In November 2004, a forested wetland system was identified along Fishing Creek's floodplain across the creek from the water treatment plant. This is a typical forested floodplain wetland (PFO) several acres in size with hydrology from both groundwater and overbank flooding from the Creek.

6C. Wildlife (*previously addressed in the 2005 Corps Report*)

6D. Fish

The previous 2005 Corps Report discussed the fish collected during a survey of Fishing Creek in 1998. The species list indicated that a cool/coldwater fishery existed at that time, and that the coldwater fish, (e.g., trout) were stocked (unknown if natural reproduction was occurring). According to the current PADEP eMapPA, Fishing Creek is listed as a Warm Water Fishery with no special trout listings in the project area by the PA Fish and Boat Commission. However, Fishing Creek is known for its great flyfishing and many public access areas north of Interstate 80 along Fishing Creek, where the stream inhabits both wild trout and stocked trout.

The proposed earthen/MSE/sheet pile levee would have a slight negative effect on Fishing Creek within the building footprint as it would eliminate the riparian corridor on the left bank of the stream, in turn affecting fish and other wildlife inhabiting this stretch. Mitigation assessment protocols regulated by the governing agencies will allow for compensation in the watershed to make up for this alteration.

6E. Threatened and Endangered Species

Except for the occasional transient species, no Federally listed endangered, threatened, or candidate species under U.S. Fish and Wildlife Service (USFWS) jurisdiction are known to exist in the project area (USFWS, 2000). Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required with the USFWS.

However, the Pennsylvania Natural Diversity Inventory (PNDI) indicated that there are potential impacts to state regulated species of special concern within the project area (PNDI, 2022). According to the Pennsylvania Department of Conservation and Natural Resources (PA DCNR), further review of the project is necessary to resolve the potential impact to a "sensitive species" resource with a current status of Special Concern Resource and to the Fassett Jeweled Shooting Star (*Primula fassettii*), a flowering plant with a current status of Threatened.

It is anticipated that a botanical survey will be required for this species, which is time sensitive and would need to occur during its flowering period in late April to May. Further inquiry into the unidentified species is required to determine if a habitat survey will be required.

Pennsylvania Fish and Boat Commission (PFBC) requires further review of the project to resolve the potential impact to the Triangle Floater (Alasmidonta undulata). If in-stream work is to occur as a result of this project, a mussel study may be required. The study period is not time of year sensitive, however, safety concerns for the malacologist would deter the study from being performed in the winter months.

7. AIR QUALITY (*See 2005 Corps Report for Air Quality*)

8. CULTURAL RESOURCES

BL submitted a project review to the PA Historical and Museum Commission for the Columbia County - West End Flood Mitigation Study (ER Project # 2021PR06578.001) and received a summary letter on November 8, 2021requesting more information for their environmental review due the high probability for archaeological resources.

It was PHMC's opinion that "a Phase IA archaeological study should be undertaken to assess this property's potential for National Register significant archaeological resources. This study should consist of a thorough review of all available historic through recent maps and other documentary sources which may provide information on past land use within the project area. A geomorphological assessment of the project area is recommended at this stage as it will provide useful information on the total depth and overall integrity of potential archaeological deposits. If this research suggests that potentially significant archaeological resources may be present, it will be our opinion that a Phase I archaeological testing plan should be developed to identify such resources."

The 2005 Corps Report has well documented findings from previous studies that will be utilized in the next phase of the project, as to not duplicate moneys and efforts. Historical and archaeological data does not expire and can be used for overlapping project areas. Additional studies outside of the initial APE are anticipated and will need to be addressed with similar studies. The next two sections below were taken from the 2005 Corps Report, addressing the actions that have been taken to date.

8A. Archeological Investigations

Phase IA archaeological investigations were conducted by KAR in 1999 along the project area. The investigated portion runs from the Route 11 / Route 42 interchange, southeast across the Bloomsburg Fairgrounds parking area, and then generally northeast to the area adjacent to the now vacated Windsor Plant. KAR concluded that there was a high potential for significant archaeological resources in the tested area. The findings were reported to the PA-DEP and the State Historic Preservation Officer (SHPO) in a letter report, dated 16 July 1999 (KAR, 1999). The report recommended Phase IB testing of all undisturbed portions of the tested area.

The Phase IB investigation of the undisturbed portion of the Phase IA-tested area included a series of excavation units dug along two parallel transects within the project area in the vicinity of the Fairgrounds. Tests along each transect were spaced at 60-meter intervals and were staggered so that there was a test every 30 meters along the corridor. Additional test units were dug whenever suspected archaeological materials were identified.

Forty (40) units of the systematic sample were completed, plus five additional units to examine suspected archaeological materials. None of the latter has been found to meet minimum criteria for an archaeological site, as defined by the Bureau for Historic Preservation. The recovered materials include two chert flakes and one apparently worked piece of chert, found in the plow zones of three separate units in the systematic sample. None of the supplemental tests recovered any additional cultural material.

Further Phase I investigations of the remaining portions of the project area were proposed for spring 2005. The remaining portions to be tested include an area northeast of Windsor, and an area adjacent to the left descending bank of Fishing Creek.

8B. Architectural Investigations

During the initial planning stages for this study, the Corps, PADEP and the Pennsylvania State Historic Preservation Office agreed that due to the uncertainty of the Area of Potential Effect (APE) for the project, it would be necessary to document, at least through a Phase I Level survey, all of the potentially affected historic properties up to a level of flooding equal to the 500-year event.

The following resources were identified within the original APE for this project:

The identification and documentation of National Register districts for the West Main Street portion of Bloomsburg, the Village of Femville, and thirty individual structures located throughout the APE. Additionally, other new potential historic districts were identified, which consisted of the North Branch Canal workers housing district, a potential district of post-World War I housing, a potential district encompassing the village of Rupert, and individual forms to document the bridges, rail, and canal resources, Bloomsburg Airport, the Irondale water treatment plant, and Bloomsburg Fairgrounds.

While most of the identified buildings and sites are not located within the project area, the Irondale water treatment plant (currently owned and operated by Suez Water Pennsylvania) is located immediately upstream of the project area.

8C. Other Known Historic Sites

In addition to Bloomsburg's rich background in Native American history, as well as the industrial boom that lasted three-quarters of a century in the 1800's, all of which is discussed in the 2005 Army Corps Report, other very notable historic structures lie within or close to the project area.

Rupert's Covered Bridge, a historically significant bridge spanning Fishing Creek and located downstream of the project area on TR409, was added to the National Register of Historic Places in 1979 and is the oldest existing bridge in Columbia County. Leonard Rupert settled on Fishing Creek in 1788 and established a village and a ferry where the covered bridge was later built. At just over 185 feet in length, it is Columbia County's longest covered bridge. The bridge has Burr arches with multiple king-post trusses and vertical board siding. After 150 years of continuous use, the bridge was reinforced with steel I-beams and two concrete piers and is open to traffic with no restrictions.

One of the non-structural mitigation options involves Fishing Creek channel modifications. A recent development is the proposed removal of Boone’s Dam along Fishing Creek by its’ current owner, Suez Water. Boone’s Dam is not listed on PHMC’s website as a landmark of historic significance. The dam was built in the 1850’s to generate power to the mill that Samuel Boone constructed along Fishing Creek. The dam has been associated with the tranquil setting of the property and Boone’s Dam Barn, which has been home to many families over the years, the most famous being artist David Armstrong. The current owners of The Barn at Boone’s Dam own and operate a wedding venue. The removal of the dam would not impact the flood flows on Fishing Creek.

The study area is near the Delaware, Lackawanna & Western Railroad (also known as the DL&W or Lackawanna Railroad). This was a U.S. Class 1 railroad that connected Buffalo, New York, and Hoboken, New Jersey (and by ferry with New York City), a distance of about 400 miles (640 km). Incorporated in Pennsylvania in 1853 primarily for the purpose of providing a connection between the anthracite coal fields of Pennsylvania's Coal Region and the large markets for coal in New York City, the railroad gradually expanded both East and West, eventually linking Buffalo with New York City.

The Great Warrior Path is also a known historic resource within the project area, with its eligibility noted as undetermined. The Great Warrior Path travels from present day Athens (then known as Tioga) to Sunbury (then known as Shamokin). This path was used in both times of war and in times of peace. It was often frequented by Iroquois ambassadors who were traveling south.

17. HAZARDOUS, TOXIC AND RADIOACTIVE WASTE *(see 2005 Corps Report for Hazardous Sites)*

In previous studies within the project area, sites of potential concern were identified. In the URS 2003 report, sampling results revealed elevated concentrations of heavy metals in excess of applicable cleanup levels throughout the project area and volatile organics contamination within an area that passes through an inactive landfill (URS, 2003). Since the heavy metals that were detected are likely a local background condition and since much of the contaminated soil along the project area is considered historic fill, it is likely suitable for reuse during the construction of the flood protection elements from a regulatory perspective (URS, 2003).

Contaminated soil in the landfill area is unlike the material found elsewhere within the project area due to the presence of large amounts of debris and is unsuitable for reuse during construction.

The potential impact of underground storage tanks adjacent to the project area along Fishing Creek must be further defined to determine whether relocation or removal is necessary. There is little concern about potential human exposure to contaminants from drinking groundwater because nearly all residences near the proposed alignment are believed to utilize drinking water delivered by Suez Water Pennsylvania (USACE, 2003).

A Phase II Environmental Site Assessment (ESA) is recommended in the next phase of the project within the project limits in order to complete proper site characterization. The Phase II ESA would consist of a subsurface investigation to identify potential contamination sources that may affect the

environmental integrity of the project. The results of the Phase II ESA may be used to ascertain the need for and extent of potential site remediation activities (i.e., Phase III ESA).

10. SOCIOECONOMICS

The Town of Bloomsburg is a rural and moderate density community characterized by attractive single-family residential neighborhoods, tree-lined streets and limited agricultural and industrial land use on the outskirts of town. Bloomsburg is the Columbia County seat and is the only incorporated town in Pennsylvania. The Town has a land area of 4.4 square miles and approximately 4,400 housing units. The Town of Bloomsburg had a population of 14,197 as of July 1, 2021. Bloomsburg ranks in the upper quartile for Population Density and Diversity Index when compared to the other cities, towns and Census Designated Places (CDPs) in Pennsylvania (HomeTownLocator.com).

The age distribution of Bloomsburg has a high proportion of persons in the 18- to 24-year-old category, which would be expected in a town with a moderately sized university. The median household income for Bloomsburg is $32,217. The economy of Bloomsburg employs about 5,300 people. The largest industries in Bloomsburg are Health Care & Social Assistance, Accommodation & Food Services, and Educational Services, and the highest paying industries are Transportation & Warehousing, & Utilities, Public Administration, and Manufacturing.

11. ENVIRONMENTAL JUSTICE

As stated in the 2005 Corps Report, "Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations* (Executive Order, 1994), directs Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low- income populations." According to PADEP eMapPA, the project area is located within an Environmental Justice Area, Census Block Group 2015, Tract 512, Block Group 5 (eMapPA, 2022).

12. NOISE (*see 2005 Corps Report for Noise*)

13. TRAFFIC (*see 2005 Corps Report for Traffic*)

14. AESTHETICS (*see 2005 Corps Report for Aesthetics*)

The proposed West End Flood Mitigation structures of earth levee, MSE levee with retaining wall, sheet pile levee, pump station, and gate closures, all can fit into the surrounding landscape of the Town of Bloomsburg with the proper design.

15. LAND USE (*see 2005 Corps Report for Land Use*)

16. PARKS AND RECREATION

Several state, local, and private park facilities are located near the study area and have been discussed in the 2005 Corps Report. But the most immediate park that the project will affect in a positive way is the Bloomsburg Fairgrounds. The fairgrounds is a 248-acre facility located within Bloomsburg's town limits and includes a grandstand with an 8,000-person seating capacity, 78,000 square feet of exhibition buildings, an indoor arena, a covered band shell, a half-mile racetrack, and other large outdoor event amenities. The Bloomsburg Fair begins the third Saturday after Labor Day and draws over 650,000 people (2003 estimate) from all along the Eastern Seaboard. The Fairgrounds also attracts many trade shows and conventions throughout the year. This project would mitigate the flood risk to the fairgrounds each year in September.

1. PROJECT INFORMATION

Project Name: **West End Columbia County Flood Mitigation Alternative**
Date of Review: **3/3/2022 12:39:37 PM**
Project Category: **In-stream / Riverine Activities and Projects, Levees and similar flood control structures (construction, modification, maintenance)**
Project Area: **124.23 acres**
County(s): **Columbia**
Township/Municipality(s): **BLOOMSBURG**
ZIP Code:
Quadrangle Name(s): **BLOOMSBURG; CATAWISSA**
Watersheds HUC 8: **Upper Susquehanna-Lackawanna**
Watersheds HUC 12: **Fishing Creek-Susquehanna River**
Decimal Degrees: **40.991320, -76.470171**
Degrees Minutes Seconds: **40° 59' 28.7519" N, 76° 28' 12.6157" W**

This is a draft receipt for information only. It has not been submitted to jurisdictional agencies for review.

2. SEARCH RESULTS

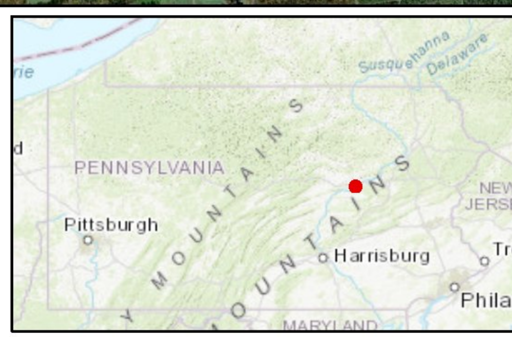
Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

West End Columbia County Flood Mitigation Alternative

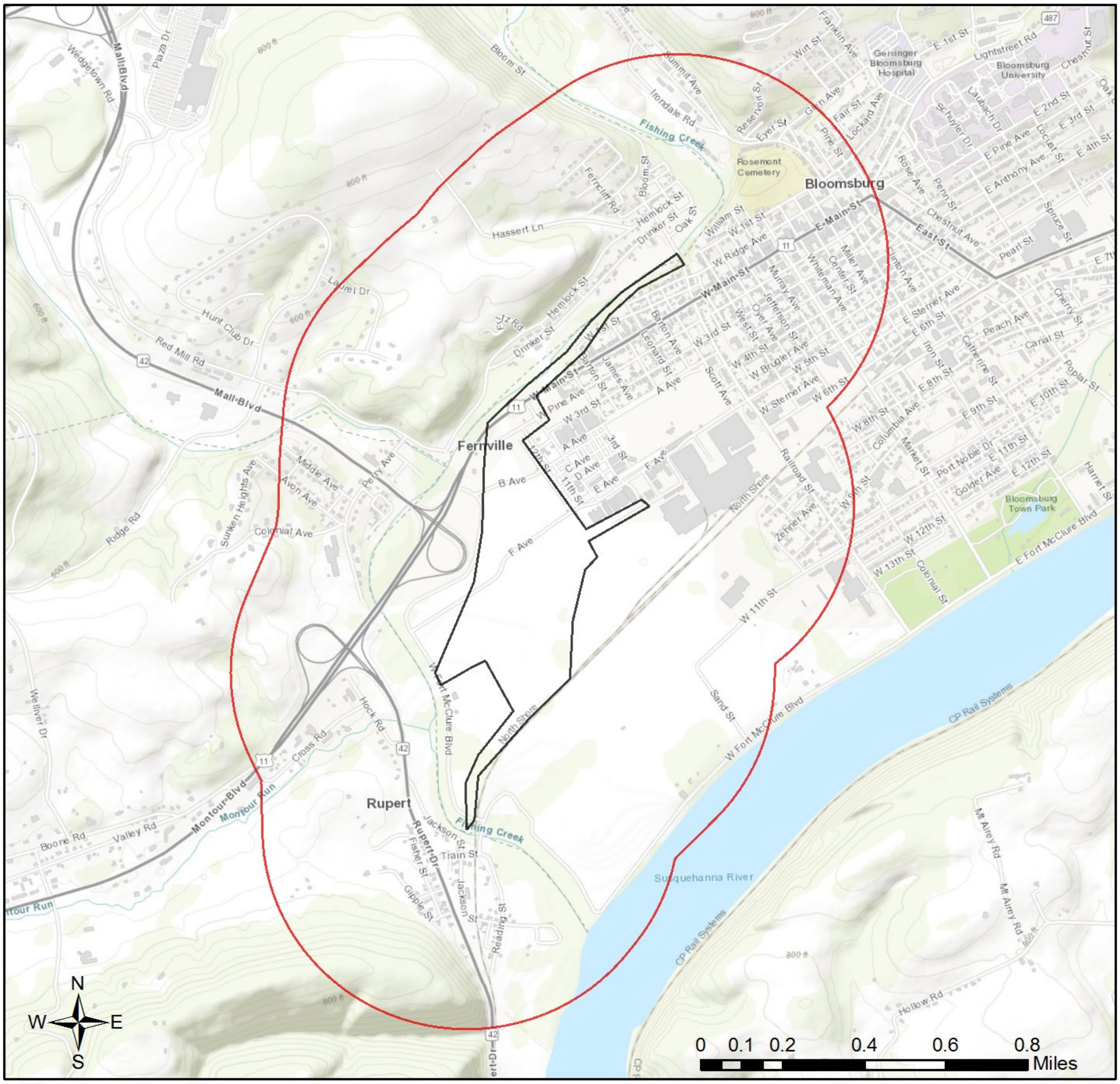
Project Boundary

Buffered Project Boundary



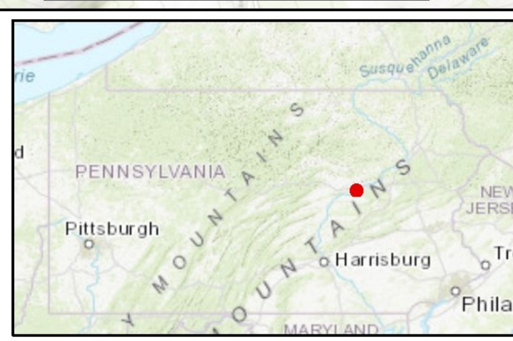
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

West End Columbia County Flood Mitigation Alternative



Project Boundary

Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

RESPONSE TO QUESTION(S) ASKED

Q1: Will the project require permanent alteration or removal of natural vegetation, soils, water (streams, ponds, vernal pools, etc.)?
Your answer is: Yes

Q2: Will any and all on-land (non-aquatic) disturbance occur in or on an existing building, parking lot, driveway, road, road shoulder, street, runway, paved area, railroad bed, maintained (periodically mown) lawn, crop agriculture field or maintained orchard?
Your answer is: No

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:

No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: https://conservationexplorer.dcnr.pa.gov/content/survey-protocols)

Scientific Name	Common Name	Current Status	Proposed Status	Survey Window
Sensitive Species**		Special Concern Resource*	Special Concern Resource*	
Primula fassettii	Fassett Jeweled Shooting-Star	Threatened	Threatened	Flowers in late April – May

PA Fish and Boat Commission
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PFBC Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

Scientific Name	Common Name	Current Status
Alasmidonta undulata	Triangle Floater	Special Concern Species*

U.S. Fish and Wildlife Service
RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email the following information to the agency(s) (see AGENCY CONTACT INFORMATION). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies (but not USFWS).
*If information was requested by USFWS, applicants must email, or mail, project information to IR1_ESPenn@fws.gov to initiate a review. USFWS will not accept uploaded project materials.

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

November 8, 2021

Lisa Clementoni
Borton Lawson
613 Baltimore Drive, Ste. 300
Wilkes-Barre PA 187020000

RE: ER Project # 2021PR06578.002, Columbia County - West End Flood Mitigation Study, Army Corps of Engineers, Hemlock Township, Columbia County

Dear Lisa Clementoni:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project’s potential effects on both historic and archaeological resources.

Archaeological Resources
More Information Requested - Environmental Review - More Info Archaeological - High Prob

As this project area is located wholly or partially within an urban area, it is our opinion that a Phase IA archaeological study should be undertaken to assess this property s potential for National Register significant archaeological resources. This study should consist of a thorough review of all available historic through recent maps and other documentary sources which may provide information on past land use within the project area. A geomorphological assessment of the project area is recommended at this stage as it will provide useful information on the total depth and overall integrity of potential archaeological deposits. If this research suggests that potentially significant archaeological resources may be present, it will be our opinion that a Phase I archaeological testing plan should be developed to identify such resources. Guidelines and instructions for conducting all phases of archaeological survey in Pennsylvania are available on our website http://www.phmc.pa.gov/Preservation/About/Documents/SHPO-Guidelines-Archaeological-Investigation.pdf

More Information Requested - New Survey

Please use this Request for More Information to enter survey and resource details and upload the survey report. Please submit the requested materials to the PA SHPO through PA-SHARE using the link under SHPO Requests More Information on the Response screen.

For questions concerning archaeological resources, please contact Casey Hanson at chanson@pa.gov.

Sincerely,

Andrea MacDonald

Andrea MacDonald
Director, State Historic Preservation Office

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix D

Public and Stakeholder Outreach

WEST END FLOOD MITIGATION STUDY

Appendix D

Public and Stakeholder Outreach

TABLE OF CONTENTS:

WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY

PUBLIC MEETING
JULY 29, 2021

BORTON LAWSON

Welcome

COLUMBIA COUNTY BOARD OF COMMISSIONERS

CHRIS YOUNG – CHAIRMAN

RICHARD RIDGWAY

DAVID KOVACH

SEDA-COUNCIL OF GOVERNMENTS

TERI PROVOST

DIRECTOR

HOUSING REHABILITATION & FLOOD RESILIENCY

Study Team

Columbia County – Study Sponsor
SEDA-COG – Study Administrator

Brozena Consulting Services, LLC

Columbia County
Flood Damage Reduction/Mitigation Efforts
2011 - 2021

- Updated County Hazard Mitigation Plan
- Community Rating System (CRS) - Bloomsburg Improved Classification to Class 7
- Inventory of Flood Plain Properties - Homeowner Surveys
- Identified Repetitive Loss (RL) and Severe Repetitive Loss (SRL) Properties
  - Active - 166   Mitigated - 25
- FEMA Buyouts - 11
- CDBG-DR Funded Structure Elevations - 2 Completed
- FMA Funded Elevations - 2 Underway
- Completed 2 Structural Mitigation Projects (Levee/ flood wall projects)

Phase I Flood Mitigation Project - Completed 2016

Non-Federal Project

Timeline:

- Design/Bidding 18 months
- Construction 18 months
- Total Timeline: 3 years

Construction Cost: $25,000,000

Phase II Flood Mitigation Project – Completed 2020

Non-Federal Project

Timeline:

- Design/Bidding 18 months
- Construction 20 months
- Total Timeline: 3 + years

Construction Cost: $14,800,000

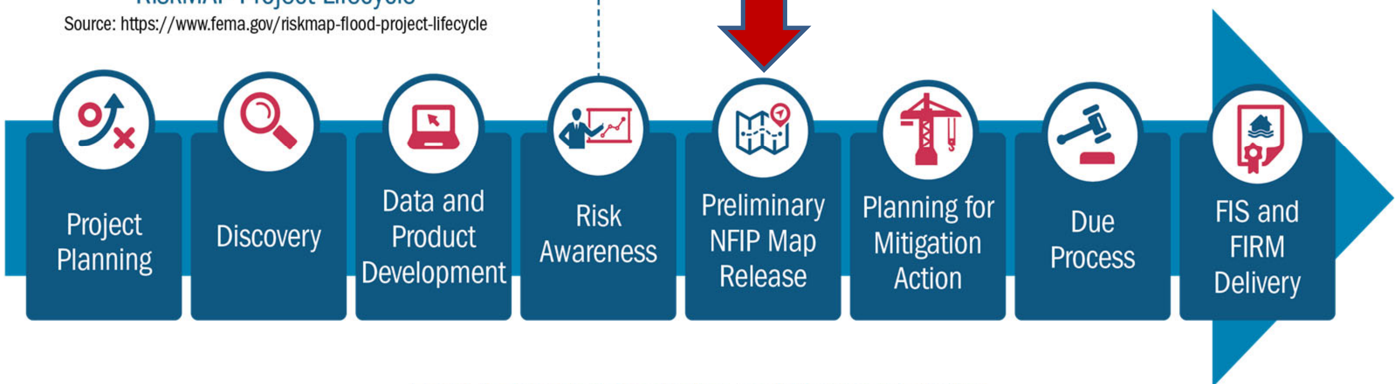
Flood Insurance Rate Map Update

RiskMAP Project Lifecycle

Source: https://www.fema.gov/riskmap-flood-project-lifecycle

Year 2021 – LOMR's Approved for Both Floodwall Projects

Fall/Winter 2021



Flood Risk Project Production and Mapping Activities

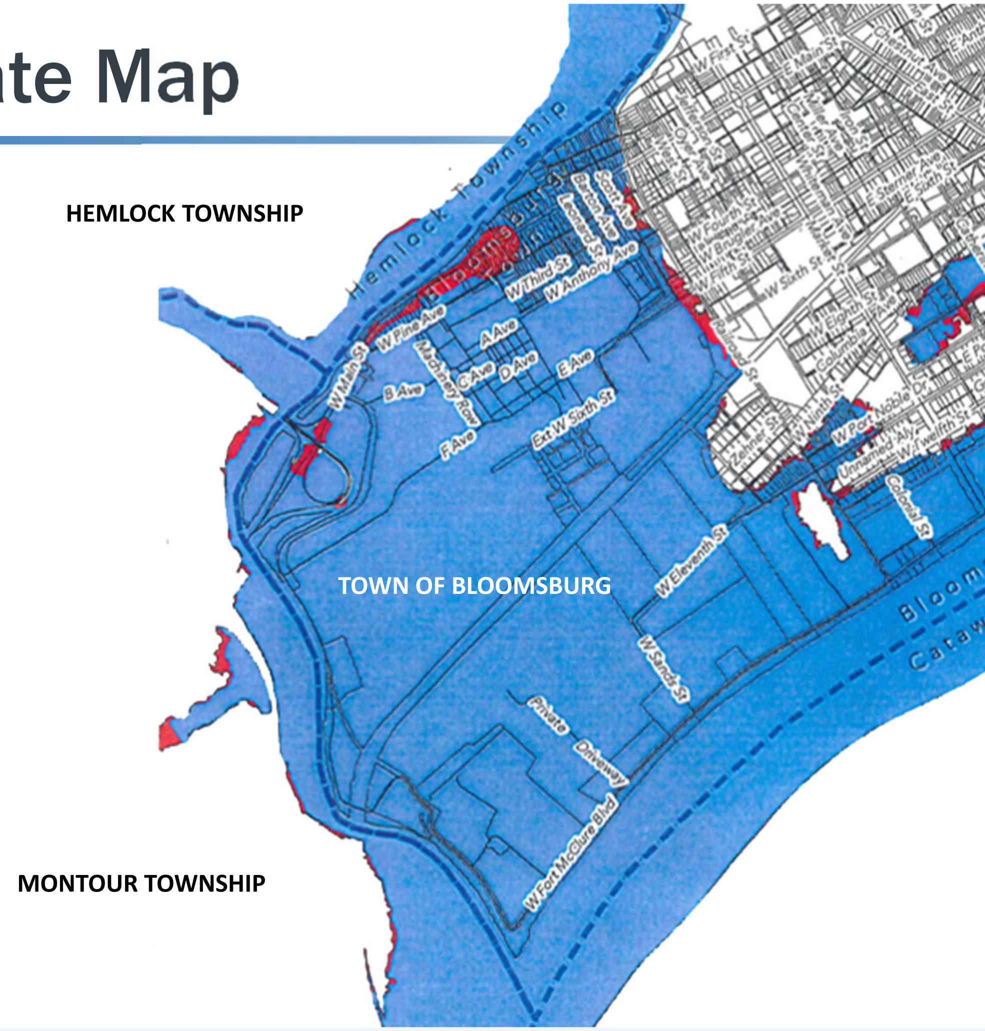
Souce: Fema Guidance for Stakeholder Engagement, Project Planning Phase (Nov 2015)

Preliminary Flood Insurance Rate Map

Changes & Impacts

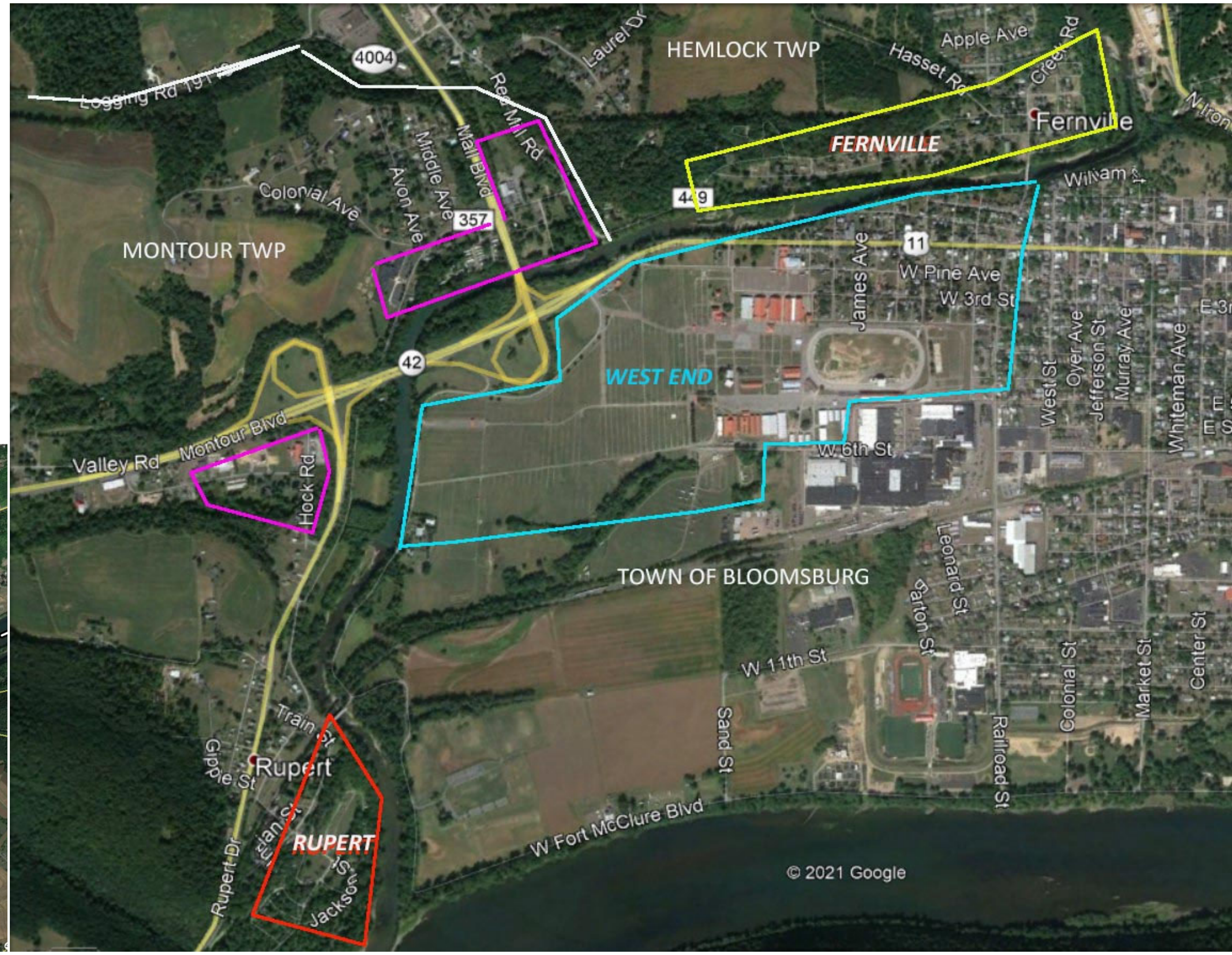
Updated Base Flood (100 Year)
= Existing Base Flood + 1.3 Feet

Red is increase in floodplain.
Some areas will see a decrease
in the floodplain area.

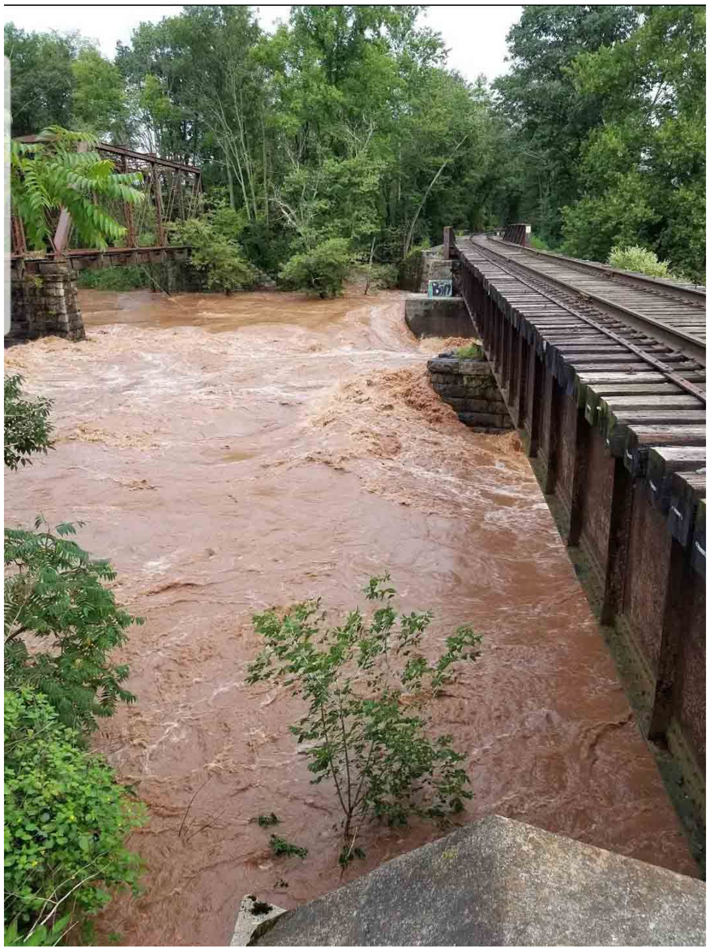


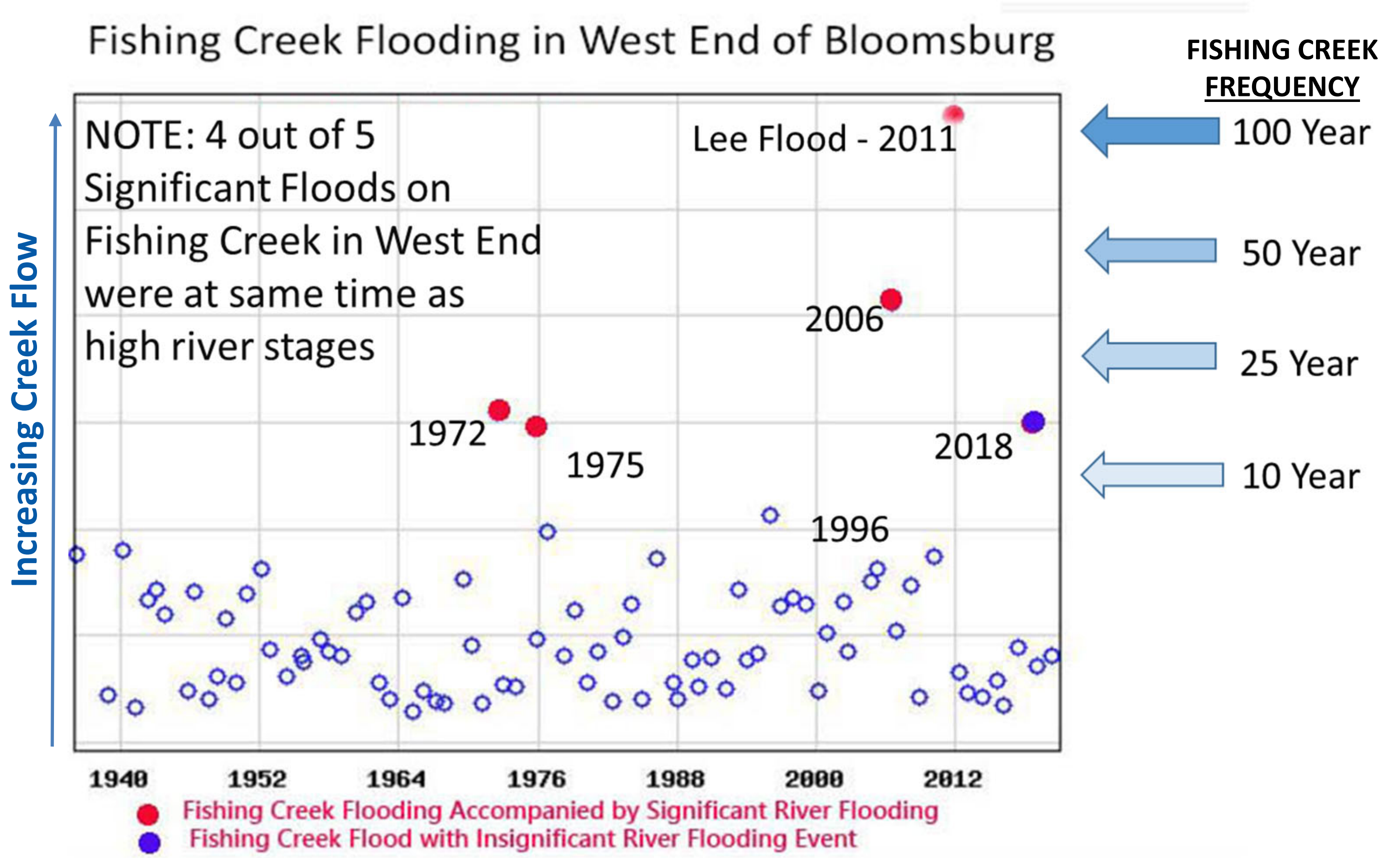
Study Area

- West End - Town of Bloomsburg, Hemlock Twp and Montour Twp in area of Floodplain
- Approx. 600 parcels



History of Fishing Creek Flooding





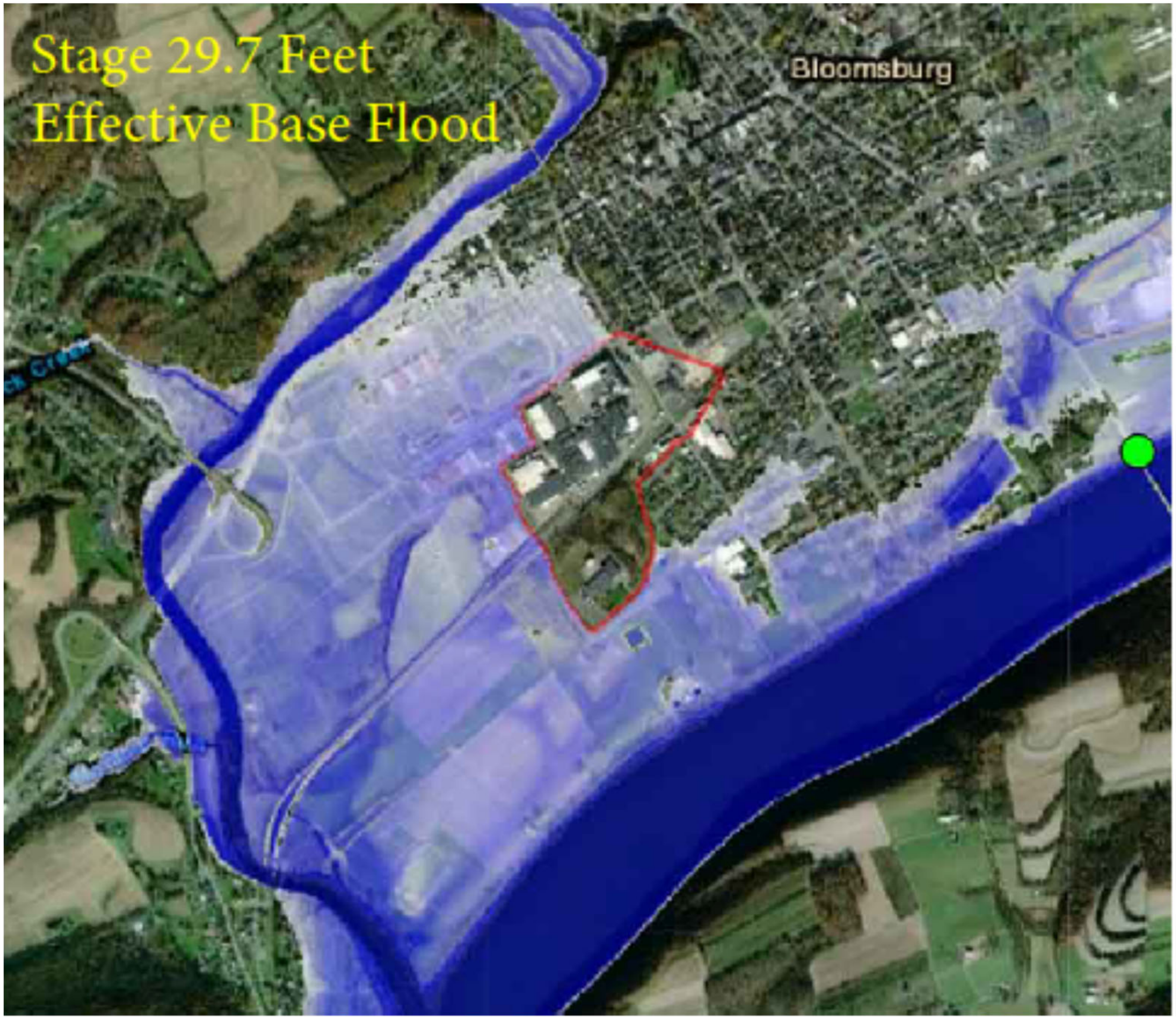

Tropical Storm Lee
SEPTEMBER 2011
FLOOD IMPACTS
Structures XX
Damages $$

West End 2011 Flooding

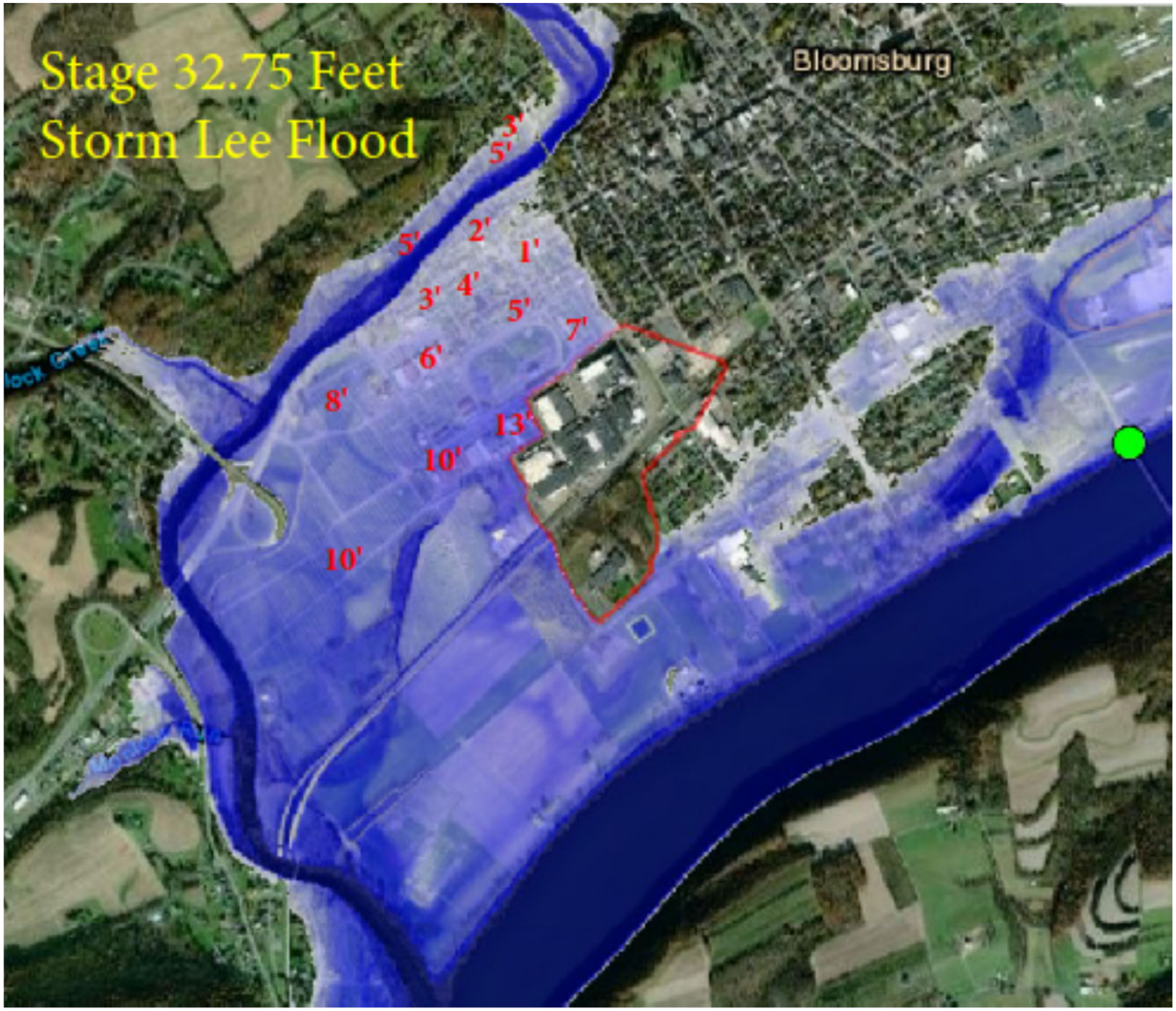
Fairgrounds 2018 Flooding


Stage 22 Feet
10 year
Bloomsburg
Creek


Stage 27 feet
50 year Flood
Bloomsburg
Creek


Stage 29.7 Feet
Effective Base Flood
Bloomsburg


Stage 30.70 Feet
Updated Base
Flood (100 Yr.)
Bloomsburg



Stage 32.75 Feet
Storm Lee Flood
Bloomsburg
3'
5'
5'
2'
1'
3'
4'
5'
7'
6'
8'
13'
10'
10'


Stage 35.7'
500 year Flood
Bloomsburg

Purpose & Goals of Study

Identify and determine best structural and non-structural project(s) to:

- Provide long-term flood resiliency (reduce long-term risk to loss of life and property damage)
- Reduce flood insurance premiums
- Minimize flood mitigation impacts on community fabric
- Identify possible funding sources

Scope of Study

- Inventory existing conditions
- Perform building elevation surveys
- Gather community input on possible solutions
- Assess flood reduction opportunities from upstream mitigation options identified in the Fishing Creek Watershed Study
- Formulate alternatives for flood mitigation

Scope of Study (continued)

- Perform Benefit/Cost Analysis (BCA) for all Alternatives
- Public Outreach

  Public Meetings
  Study Website
  Email Questions
- Recommend plan
- Study Timeframe – May 2021 through March 2022

Levees/Flood Walls

- Similar to completed projects – Walls and earth levees
- Height = Lee Flood + 1.5 feet, generally 10 feet
- Property aquisition
- Channel improvements
- Cost and community impacts will be major factor in feasibility

Non Structural Mitigation Actions

<u>Physical Measures</u>

- Acquisition
- Elevation
- Flood Proofing
- Abandon Basement
- Utility Floodproofing
- Mitigation Relocation

<u>Non-Physical Measures</u>

- Evacuation Plans
- Flood Warning
- Land Use / Zoning
- Flood Insurance

Outreach Overview – Educate & Inform

- Offer multiple avenues and opportunities for participation at various stages in the study
- Develop outreach goals for public education and information
- Engagement and outreach materials throughout the study
- Conduct a survey to
  - ✓ Gather local knowledge
  - ✓ Understand issues
  - ✓ Identify best solutions

Outreach and Engagement Strategy

Target Groups

- General Public
- Stakeholders

Outreach Goals

- Provide multiple opportunities for engagement
- Educate public and stakeholders on the study
- Garner interest and input
- Gather information

Inform

- Web Page
- Educational Briefings
- Press Releases
- Social Media
- Surveys
- Meetings – Stakeholder & Public

Study Participants

Public

- Approximately 600 parcels in Study Area

Stakeholders

- Federal, State & Local Officials
- PADEP, USACE, FEMA, PEMA, Conservation District
- Local Businesses, Schools, Healthcare Systems, Utilities, affected by flooding

Public Survey – We Want Your Feedback!

We would like to hear your feedback on:

- Risk of flooding
- Frequency/ history of flooding
- Type and amount of damage
- Personal preventative measures
- Need for flood mitigation efforts
- Communication preferences

By completing a survey and providing input, you have the opportunity to:

- Provide study team valuable information
- Support development of best mitigation alternatives and recommendations

Public Survey – Opportunities for Feedback

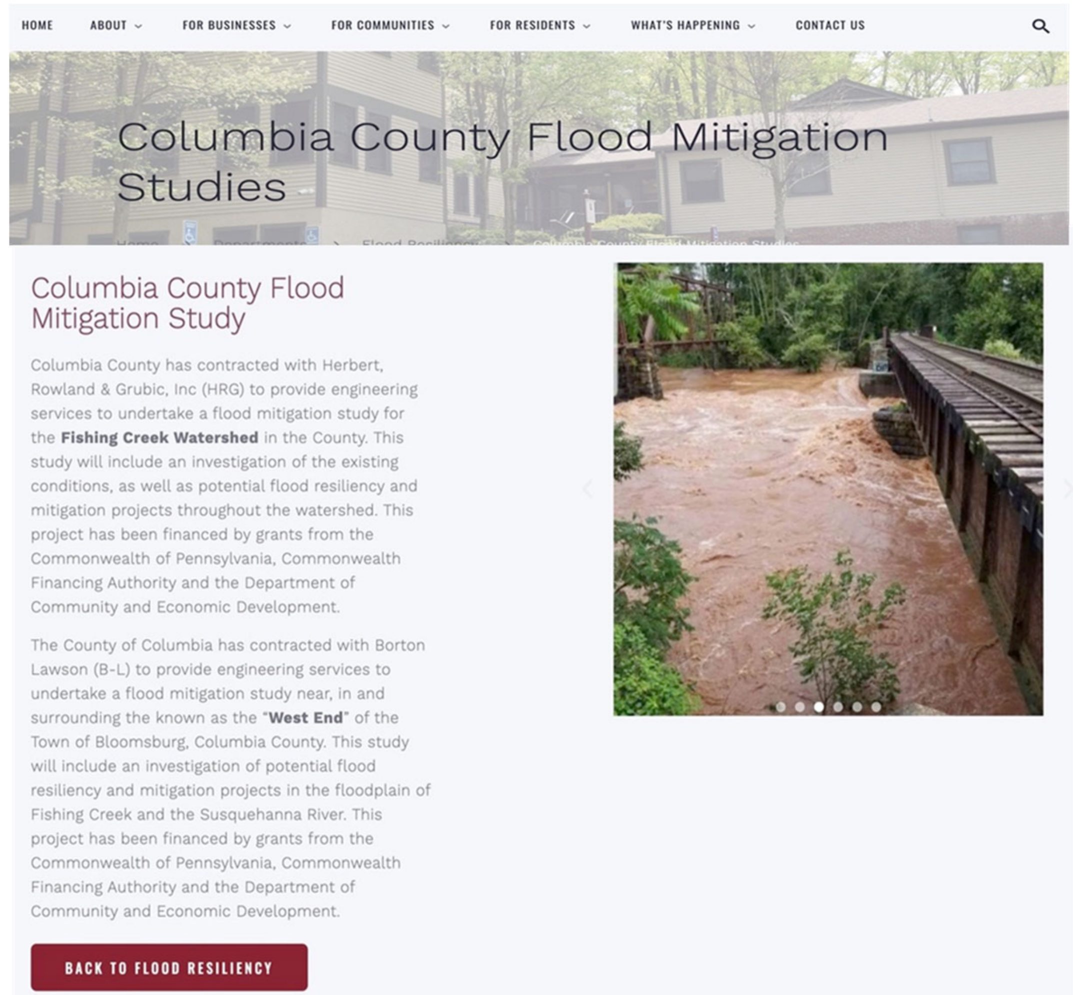
- Email/ Mailing Lists
- Mailed surveys
- Study Webpage/ SEDA-COG website
- Survey Forms at Municipal Offices
- Survey Forms at upcoming public meetings

Public Information - Project Updates & Meetings

SEDA-COG's Columbia County Flood Mitigation Study webpage: https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigation-studies/

Provides information on

- Upcoming Meetings
- Study Schedule
- Study Deliverables/ Report
- Presentations
- Surveys



Study Participant Meetings

Public & Stakeholder Meetings

- Three (3) separate meetings to be held with each group
  - Kickoff
  - Project midpoint, survey results, preliminary data, project direction
  - Study Findings/Final Report

Stakeholders
Columbia County
SEDA-COG
Town of Bloomsburg
Hemlock Township
Montour Township
Columbia County Housing and Redevelopment Authority
Bloomsburg Municipal Authority
Bloomsburg Area School District
County Conservation District
Geisinger Health System
Federal & State Representatives
Local Business/Industry Officials
Residential Leaders

Other Ways to Stay Informed and Engaged

Press Releases

- Distributed via traditional newspaper outlets (Press Enterprise)
- Developed at key milestones throughout the project
- Provide information on
  - Public Meetings
  - Opportunity for Involvement
  - How to review published study report, mapping

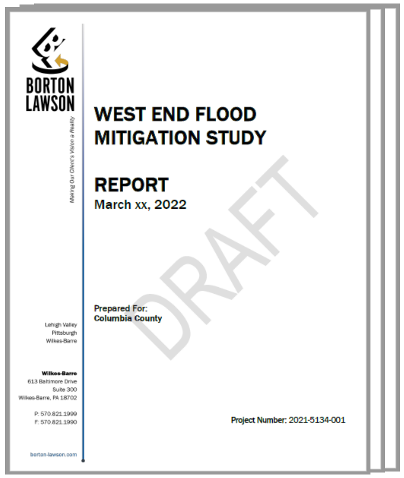
Website/ Social Media

- Provide information on
  - Upcoming meetings/events
  - Surveys/Questionnaires open to the public
  - Major milestone accomplishment
  - Flood risk mitigation analyses findings
  - Presentations
- Share with us your
  - Personal experiences with flooding
  - Photos of local flood events / damaged infrastructure
  - Personal mitigation projects undertaken
  - Ideas for flood mitigation or resiliency projects

Deliverables

Study Report

- Mitigation Alternatives- Identify & Analyze
- Recommended Plan
  - Project Features / Renderings
  - Induced Flooding If Any / Mitigation
  - Permitting Requirements
  - Benefit/Cost Analysis – All alternatives
  - Community Benefits / Impacts / Environmental Justice
- Planning Opportunities for Complimentary Projects
- Funding Options
- Schedule for Implementation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Making Our Client's Vision a Reality

WEST END FLOOD MITIGATION STUDY

REPORT

March xx, 2022

DRAFT

Prepared For:
Columbia County

Lehigh Valley
Pittsburgh
Wilkes-Barre

Wilkes-Barre
613 Baltimore Drive
Suite 300
Wilkes-Barre, PA 18702

P: 570.821.1999
F: 570.821.1990

borton-lawson.com

Project Number: 2021-5134-001

Next Study Update
Public Meeting - Fall 2021

FOR MORE PROJECT INFO…

Study Webpage

https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigation-studies

Study YouTube Channel

https://www.youtube.com/channel/UCgayzkKnERaUJpeVQfKmKkg

Email Questions/ Comments

Geralee Zeigler, SEDA-COG: gslotterback@seda-cog.org

THANK YOU!

Questions?

WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY

PUBLIC MEETING
DECEMBER 1, 2021

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Welcome

COLUMBIA COUNTY BOARD OF COMMISSIONERS

CHRIS YOUNG – CHAIRMAN

RICHARD RIDGWAY

DAVID KOVACH

SEDA-COUNCIL OF GOVERNMENTS

TERI PROVOST

DIRECTOR

HOUSING REHABILITATION & FLOOD RESILIENCY

Study Team

Columbia County – Study Sponsor
SEDA-COG – Study Administrator

BORTON LAWSON

McCORMICK TAYLOR

Brozena Consulting Services, LLC

GPI Greenman-Pedersen, Inc.

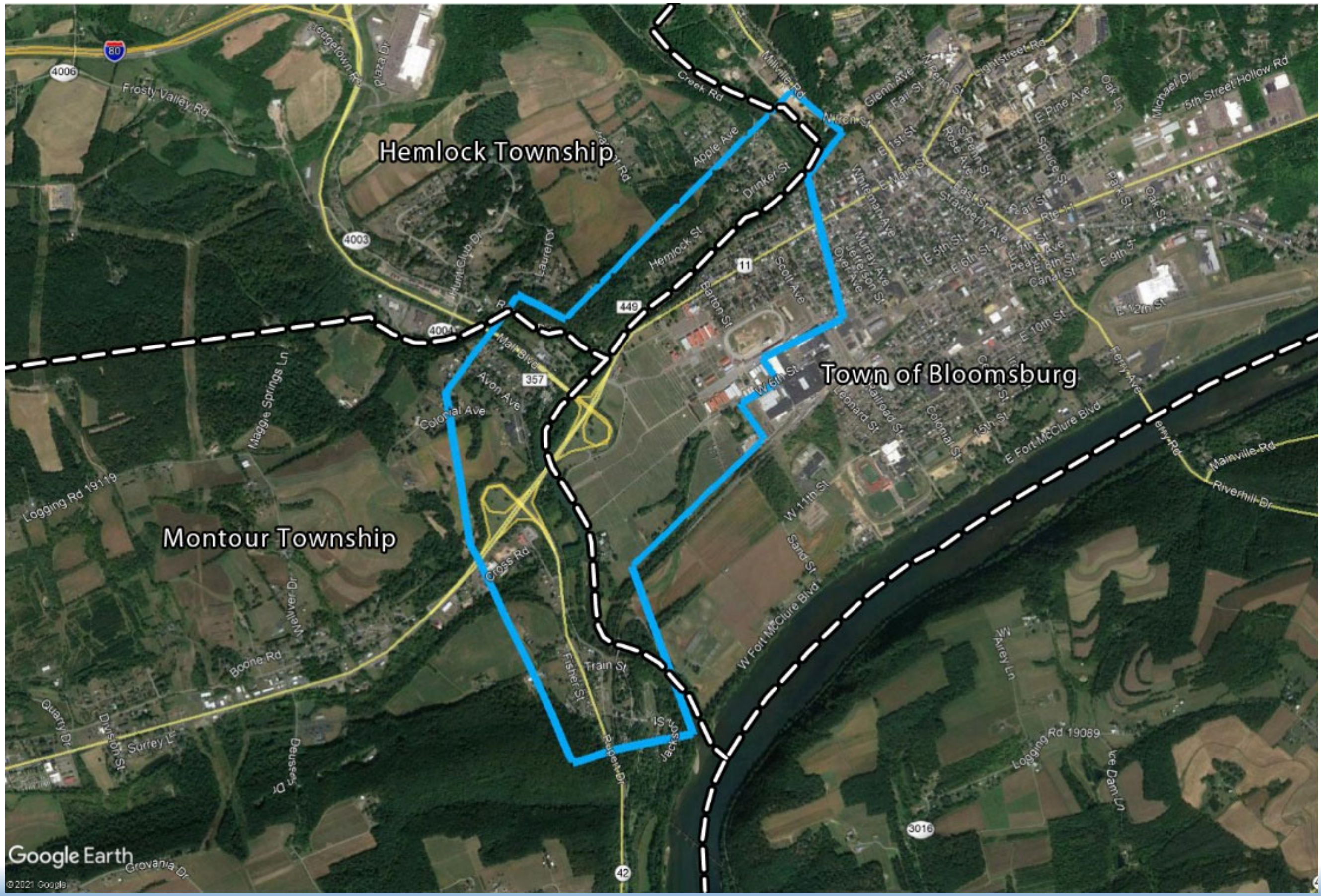
VPC VISION PLANNING AND CONSULTING

Study Area

West End - Floodplains of:
- Town of Bloomsburg
- Hemlock Township
- Montour Township

~500 Parcels
- Bloomsburg - 286
- Hemlock - 131
- Montour - 80

~350 Parcels Surveyed
- Bloomsburg - 271
- Hemlock - 42
- Montour - 36



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Purpose & Goals of Study

Identify and determine best structural and non-structural project(s) to:

- Provide flood resiliency (reduce long-term risk to loss of life and property damage)
- Reduce impacts of increasing insurance premiums
- Minimize flooding impacts on community
- Identify possible funding sources for flood mitigation projects

What’s Been Accomplished To Date

- Property Owner Surveys/ Questionnaires
- Field Structure Surveys
- Mapping Floodway, Floodplain & Zone X Properties
- Stakeholder Outreach
- Assessment of Non-Structural Mitigation Alternatives
- Detailed Hydrologic & Hydraulic Analysis – River and Fishing Creek
- Assessment of Structural Mitigation Alternatives

Property Surveys / Questionnaires:

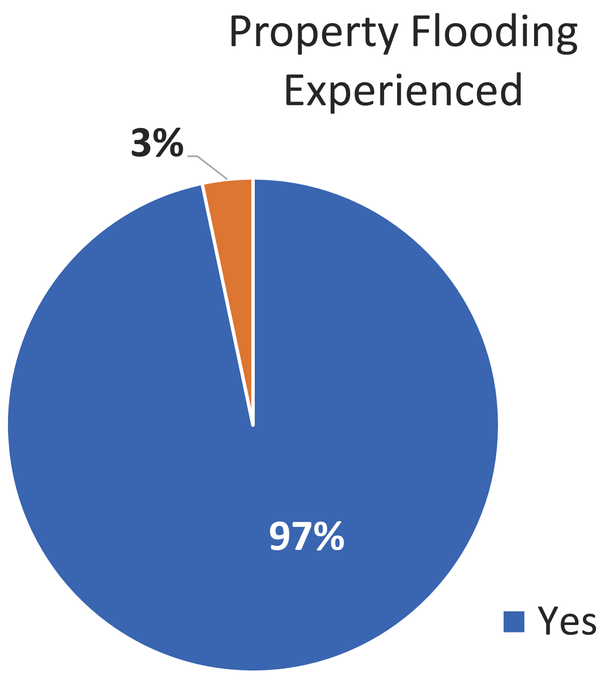
Survey Distribution

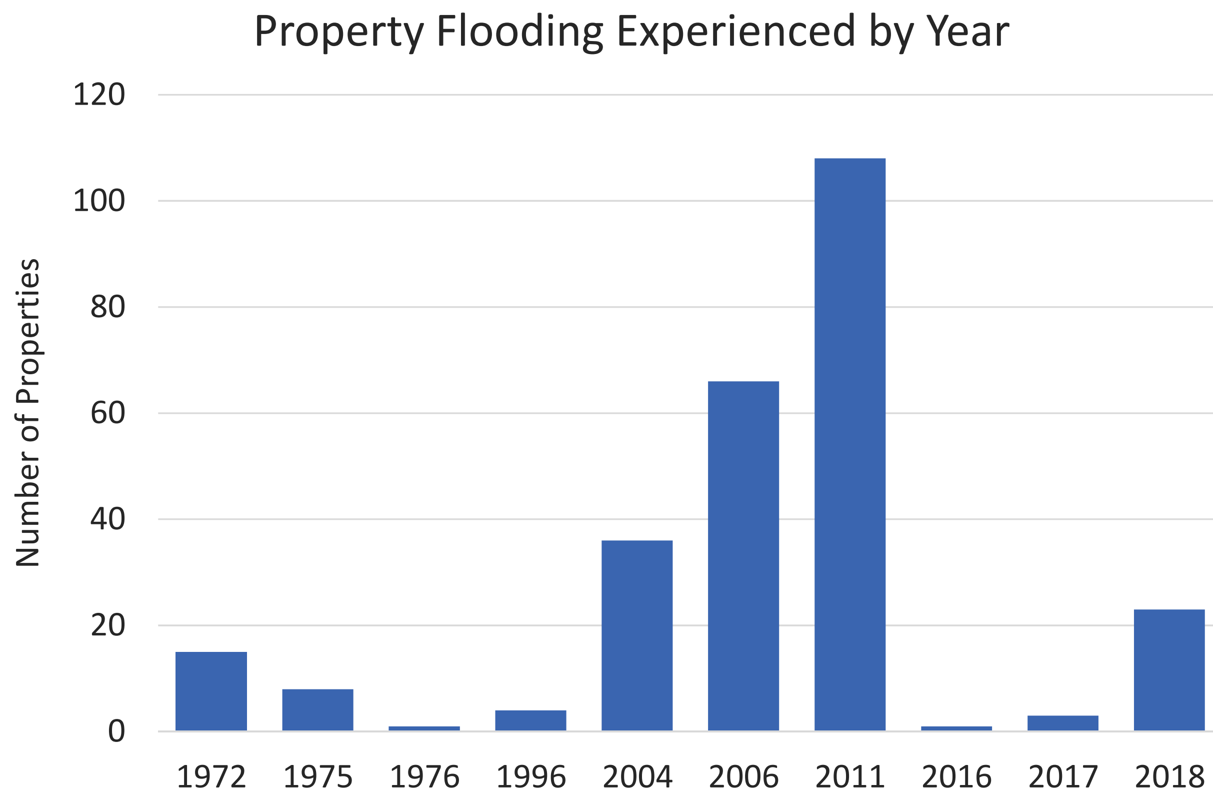
- Surveys were mailed on September 21, 2021, to the property owners of all 350 parcels in the Study Area. A letter outlining the purpose of the survey and directions for its completion accompanied the survey.
- Respondents could return their completed survey via mail or complete the survey online using the provided link and QR code.

Survey Response Rate

- 123 survey responses - Response Rate: ~35%

Property Flooding – Past Experiences





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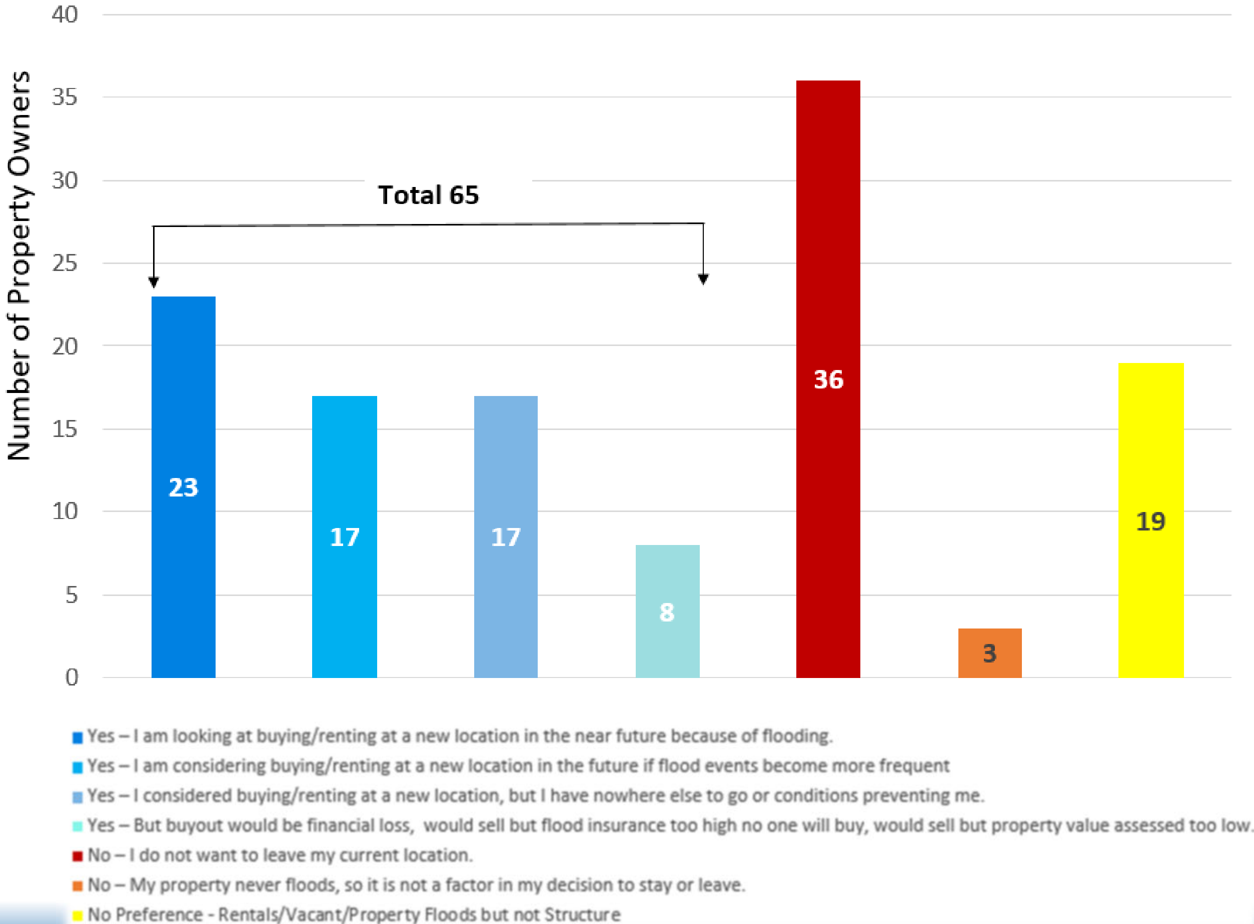
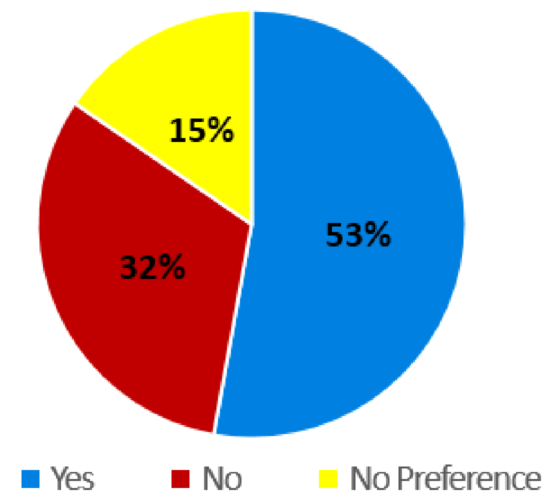
Relocation Preferences





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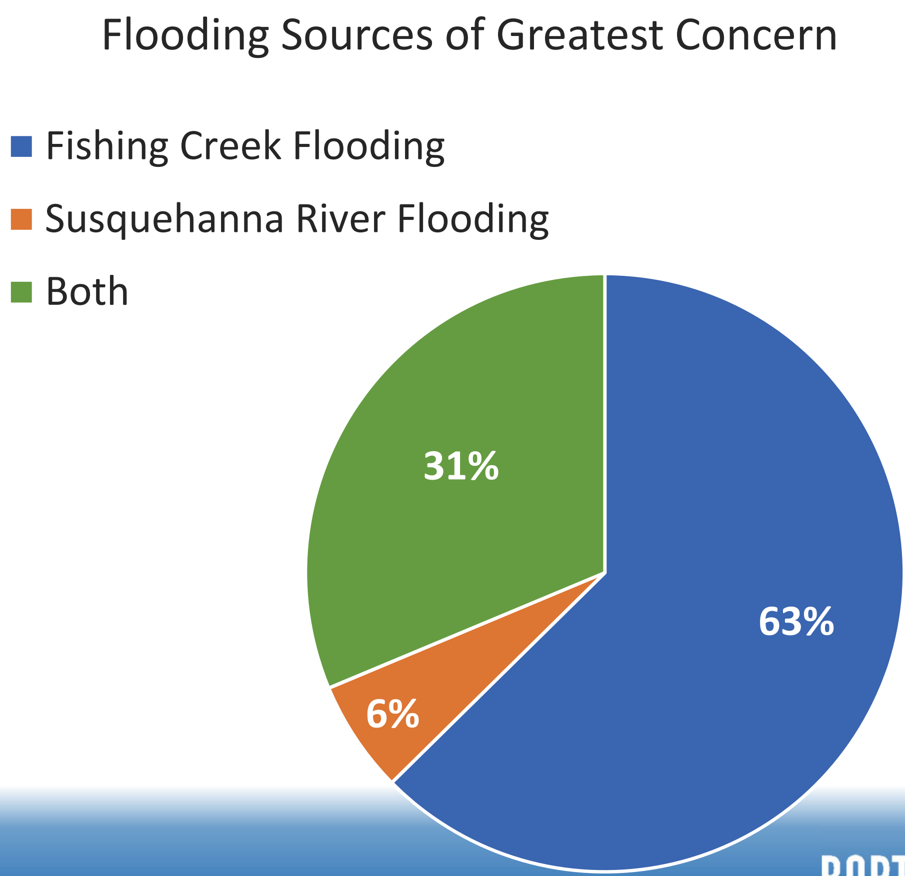
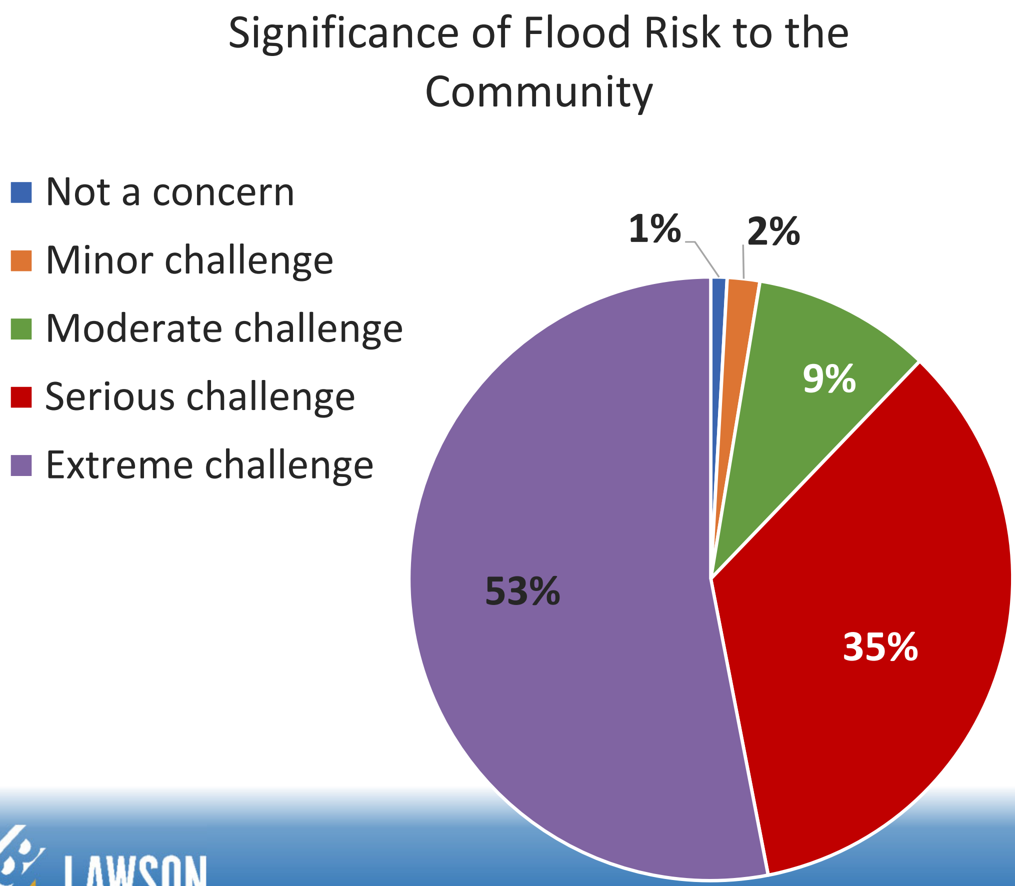
Perception of Flooding Risks





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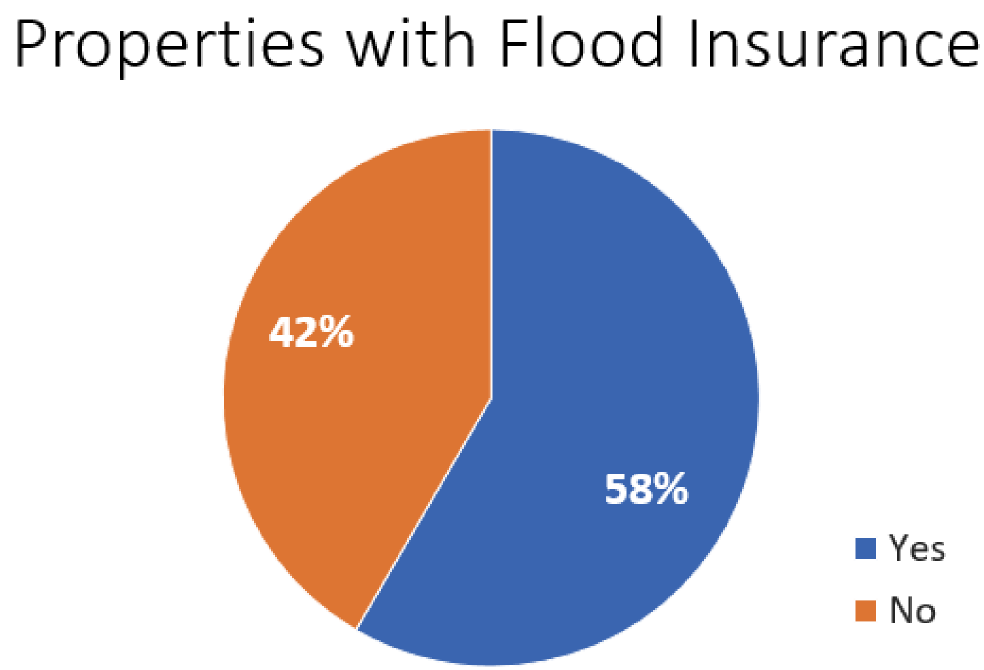
Properties with Flood Insurance:

Property Owner Survey Responses:

~350 Properties with Structures in Floodway & Floodplain



Field Structure Surveys

~350 Parcels Surveyed in Study Area

- First Floor Elevations
  (accuracy to within +/- 2 inches)

- Location and elevation in front of structure
  (accuracy to within +/- 3/8 of an inch)

- General Structure Information
  - ✓ Structure type
  - ✓ Basement
  - ✓ Number of stories
  - ✓ Detached Structures
  - ✓ Inhabited
  - ✓ Photos

Flood study responses needed

Official: Bloomsburg-area surveys to help determine mitigation options

Press Enterprise/Jimmy May

WADE WEBER, surveying crew chief, left, and **Catrian Coppola**, surveying assistant, document the property at the intersection of West Third and Leonard streets this week. They were working in the west end of Bloomsburg. Resident surveys need to be returned by Oct. 30.

By PETER KENDRON
Press Enterprise Editor

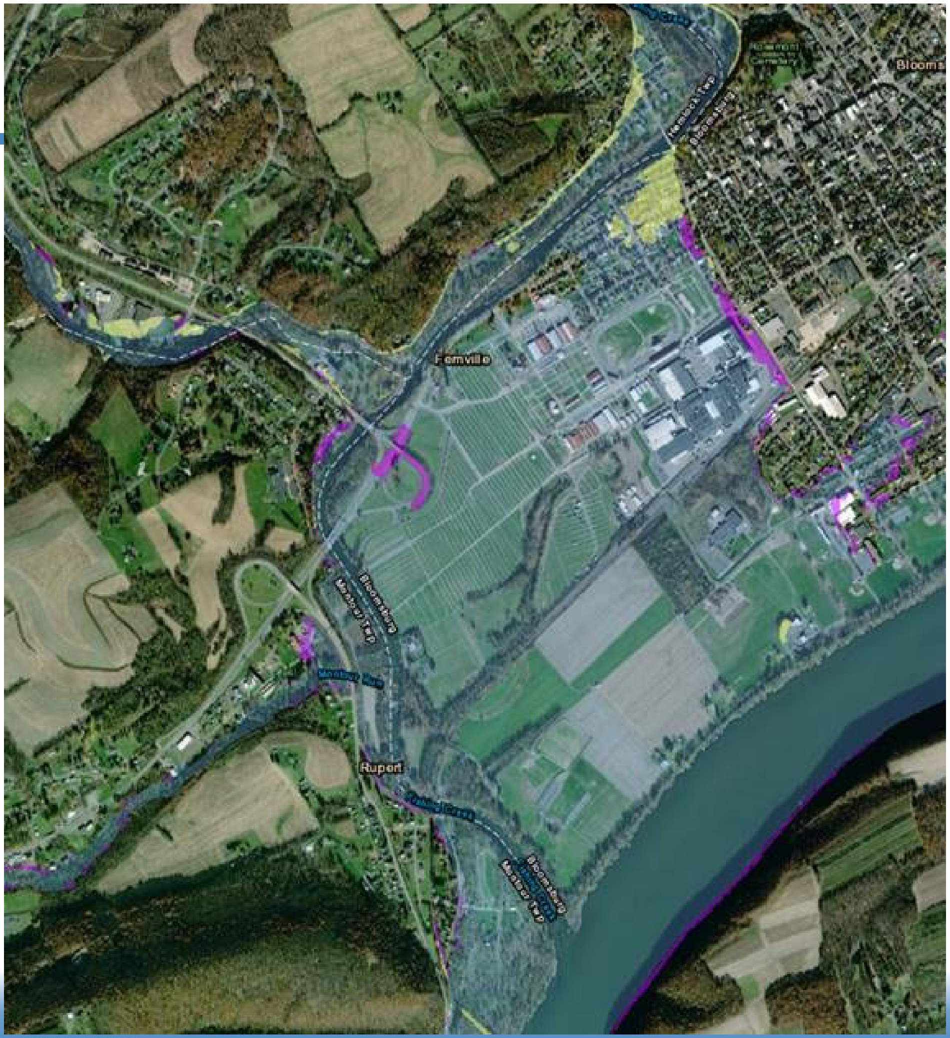
BLOOMSBURG — Survey crews are on the streets of west Bloomsburg and the flood-prone areas of Hemlock and Montour townships. They're taking measurements for a flood mitigation study, officials say.

Meanwhile, the company doing the study, Borton Lawson, sent about 350 surveys to area residents weeks ago. They're asking for measurements on their homes, the flood history of their property and their feelings on flood protection.

But so far, only about 25% — fewer than 100 — have come back. Those in charge of the study hope to boost that number by the end of the survey period Oct. 30.

Those responses are important, said Jim Brozena. He's a consultant assisting Borton-Lawson on flood miti-

Changes Coming with Preliminary Flood Insurance Rate Map

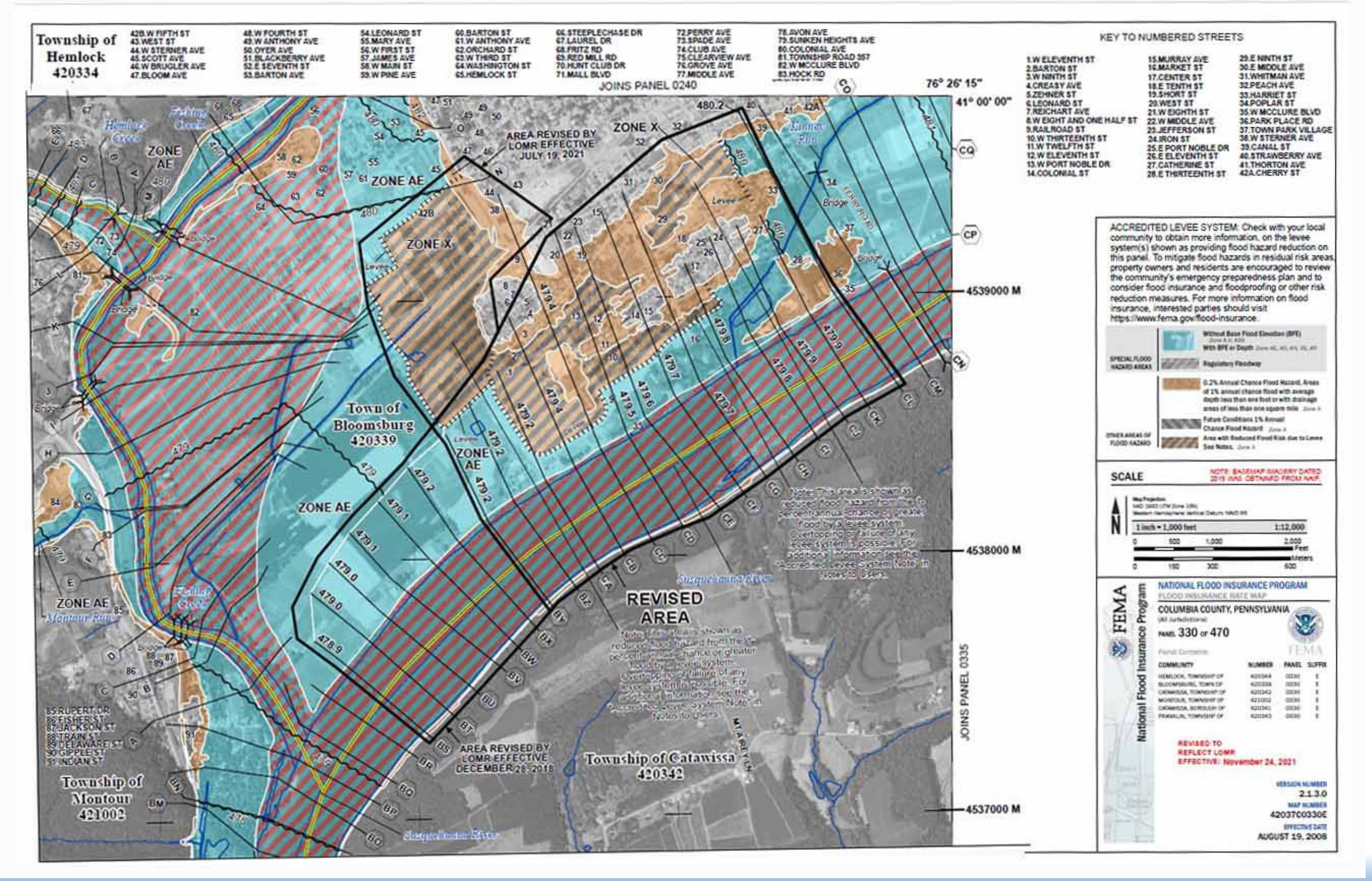


<u>Changes & Impacts</u>

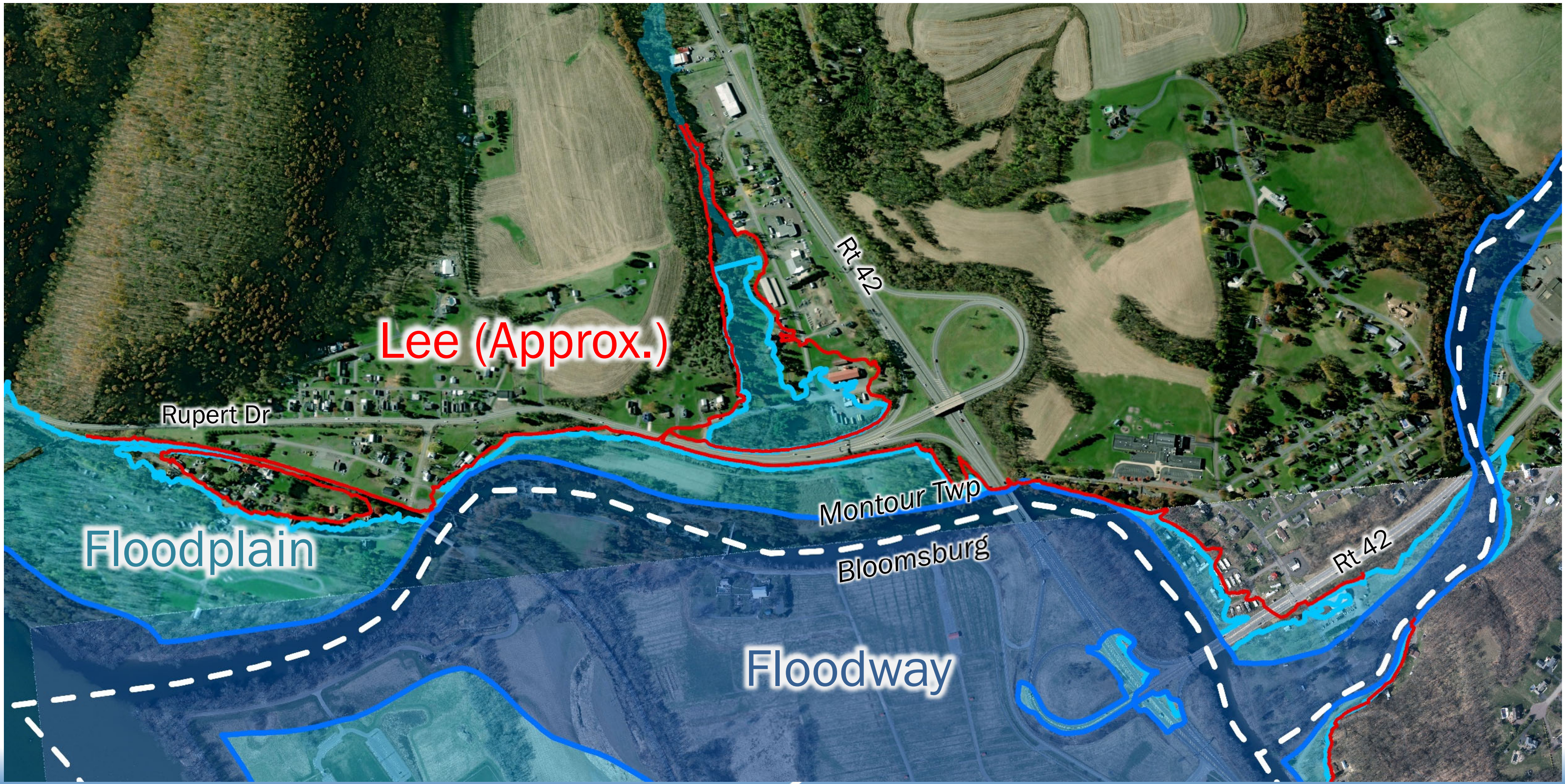
Updated Base Flood (100 Year)
(Existing Base Flood + 1.2 Feet)

PURPLE is <u>in</u>crease in floodplain area.
TAN is <u>de</u>crease in floodplain area.

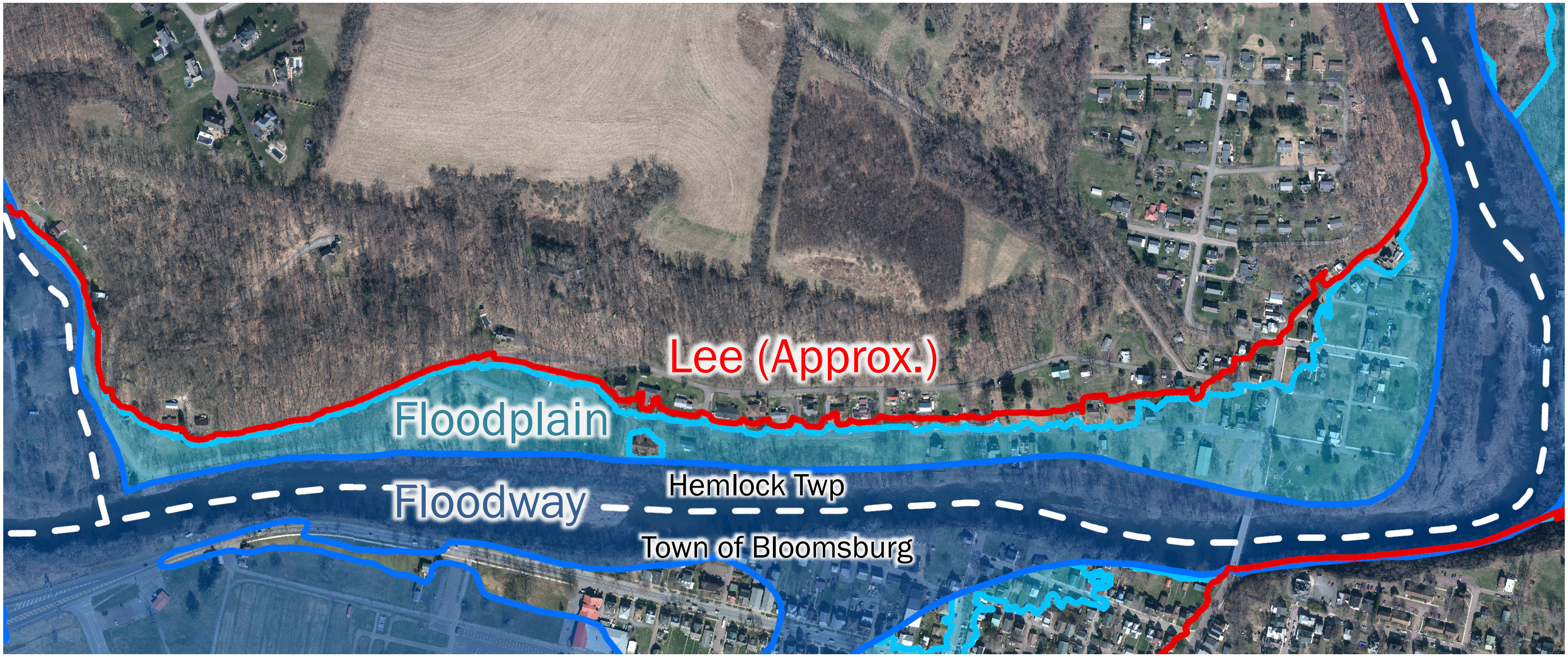
Preliminary Flood Insurance Rate Map



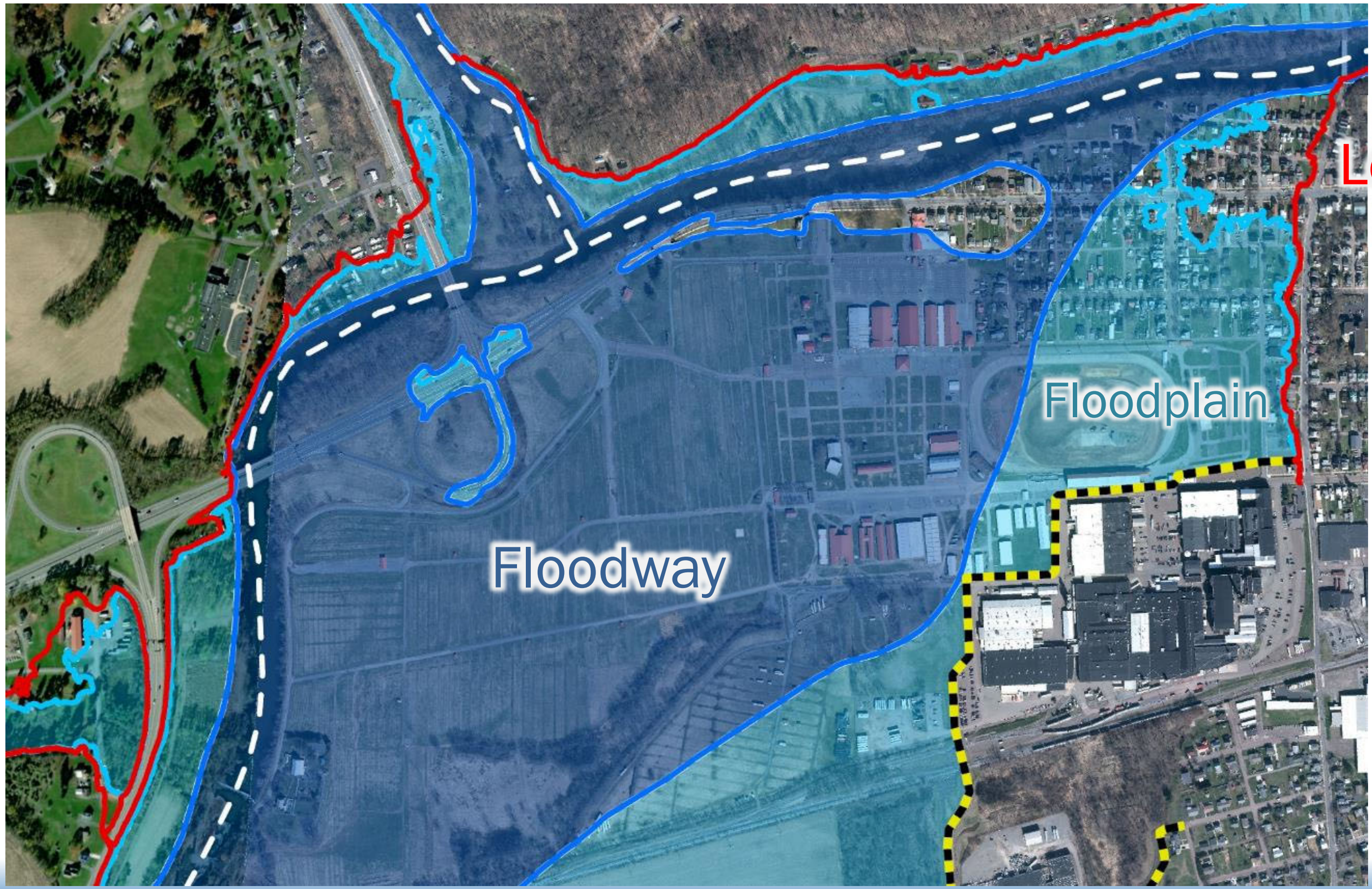
Montour Twp: Floodway, Floodplain, Lee Flood Limit



Hemlock Twp: Floodway, Floodplain, Lee Flood Limit



Bloomsburg: Floodway, Floodplain, Lee Flood Limit



Stakeholder Outreach

Columbia County
SEDA-COG
Town of Bloomsburg
Hemlock Township
Montour Township
Columbia County Housing & Redevelopment Authority
Bloomsburg Municipal Authority
Bloomsburg Area School District
Bloomsburg University
Geisinger Health System
Bloomsburg Fairgrounds

Stakeholder Outreach

Common Concerns:

- Access
  - Route 11 to Geisinger/Danville
  - Staff
  - Supplies
- Loss of Utilities
  - Electric
  - Drinking Water
- BASD & University - Impact to students
- Municipalities, BASD – Loss of tax base
- Fairgrounds - Loss of revenue, loss of services to community

Mitigation Actions Since 2011

- Drinking Water Treatment Plant Re-built
- PPL Substation/Distribution System Upgraded
- 2 Levee Systems constructed

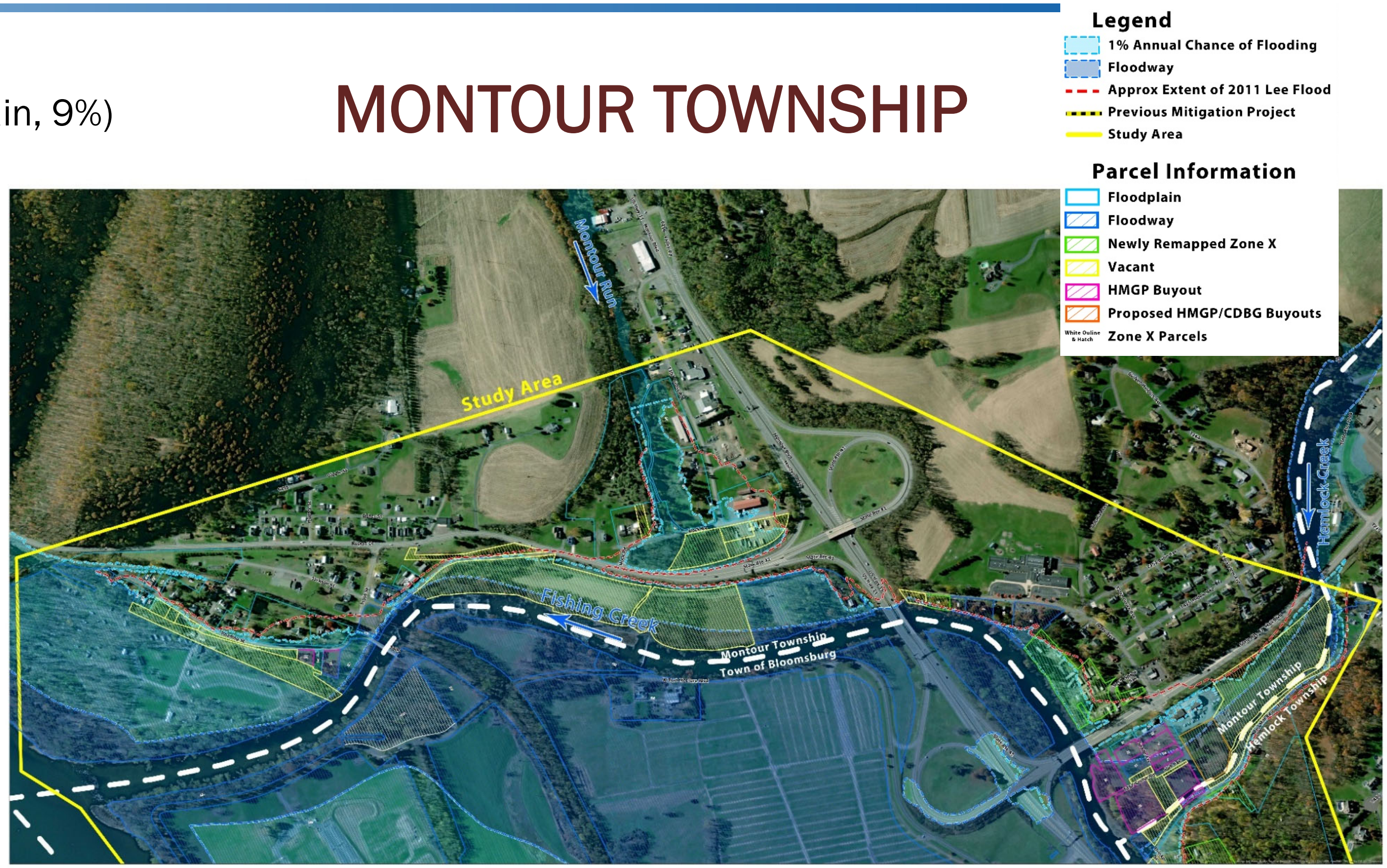
Flood Mitigation - Non Structural Mitigation Actions

Township Makeup
- 915 Structures (80 in Floodplain, 9%)
- 7% of Population in Floodplain
- 15 Flood Insurance Policies

Study Area – 80 Parcels
- Floodway: 16 (9 vacant)
- Floodplain: 34 (11 vacant)
- Zone X: 17
- Buyouts: 10 (vacant)

Proposed Actions
- HMGP Buyouts
- Evaluate County Bldg for Floodproofing
- RV Park – EAP required
- Sanitary Pump Stations
- Ordinance Revisions

MONTOUR TOWNSHIP



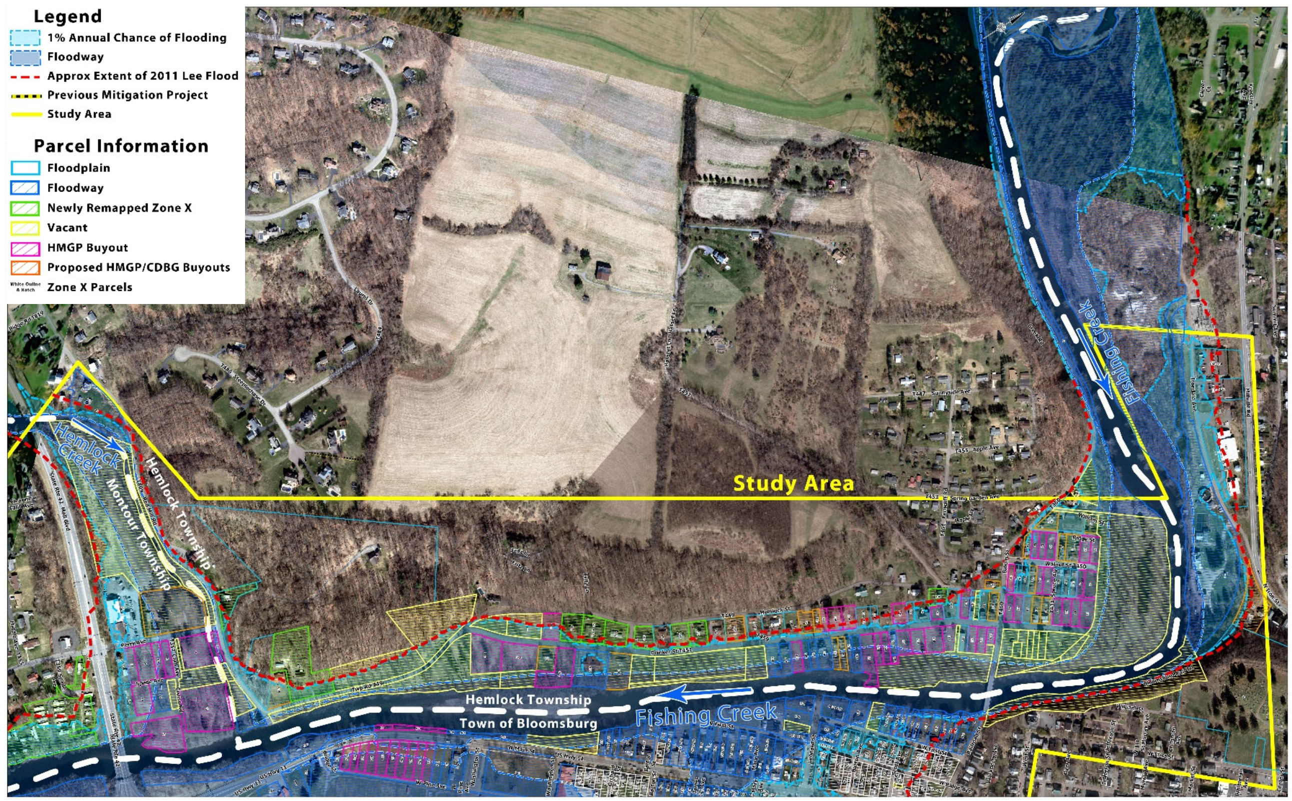
Flood Mitigation - Non Structural Mitigation Actions

Township Makeup
- 1,910 Structures (135 in Floodplain, 7%)
- 10% of Population in Floodplain
- 37 Flood Insurance Policies

Study Area – 131 Parcels
- Floodway: 25 (16 vacant)
- Floodplain: 45 (17 vacant)
- Zone X: 13
- Buyouts: 37 (vacant)
- Future Buyouts: 11

Proposed Actions
- HMGP Buyouts
- Emergency Road Access
- Ordinance Revisions
- Creek Road Elevation

HEMLOCK TOWNSHIP

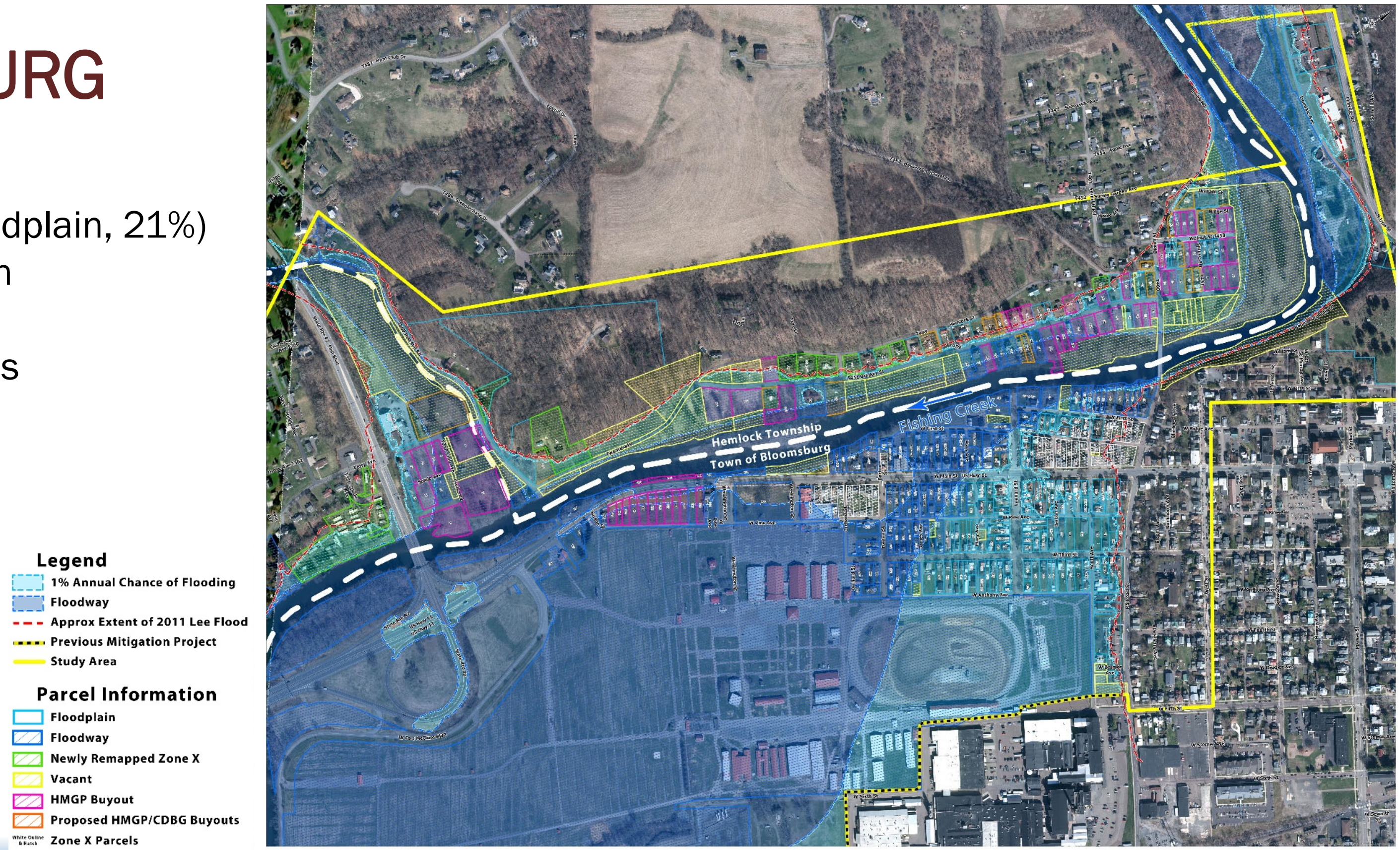


Flood Mitigation –
Non Structural Mitigation Actions

TOWN OF BLOOMSBURG

Town Makeup
- 3,160 Structures (560 in Floodplain, 21%)
- 8% of Population in Floodplain
- 291 Flood Insurance Policies
- 168 Repetitive Loss Properties

Study Area – 286 Parcels
- Floodway: 107 (15 vacant)
- Floodplain: 128 (16 vacant)
- Zone X: 40
- Buyouts: 11 (vacant)



Flood Risk Mitigation - Non Structural Mitigation Actions

TOWN OF BLOOMSBURG

Past Actions

- Buyouts
- Elevations
- CRS Community Class 8

Proposed Actions

- Buyouts
- Elevations
- Utility Relocations
- Floodproofing (commercial)
- Mitigation Reconstruction
- Ordinance Review
- Evacuation Plan
- Fishing Creek Gauge (early notification)

FAIRGROUNDS

Past Actions

- Utility Relocations

Proposed Actions

- Floodproofing
- Emergency Action Plan

Flood Risk Mitigation - Non Structural Mitigation Actions

Other Non-Physical Measures

- Evacuation Plans
- Flood Warning
- Land Use / Zoning
- Flood Insurance

River and Fishing Creek Flooding

- History of Flooding
- Analysis of Flooding
- Impacts of Flooding
- Structural Mitigation Alternatives

History of Flooding

Major Floods Ranked

Fishing Creek @ West End of Town

Return Period	COE Modelling Updated with Lee Event 2011	Rank	Date
500 yr	*89,600*		
350	78,700	1	**2011**
250 yr	*75,300*		
100 yr	*58,900*		
95	57,900	2	**2006**
50 yr	*48,200*		
45	43,400	3	**1972**
35	42,000	4	**2018**
30	41,300	5	**1975**
25 yr	*38,800*		
14	29,900	6	**1996**
10 yr	*28,000*		
		7	1976

Susquehanna River

Recurrence Interval	Rank (Floods after 1920)	Date
500 yr		
250 yr		
	1	**2011**
	2	**1972**
100 yr		
	3	**2006**
50 yr		
	4	**1936**
	5	**1975**
	6	**2004**
	7	**1996**
	8	**1940**
25 yr		

Stream flow data covers past 85 years

Three of top 5 major floods on Fishing Creek have occurred over last 15 years (2006, 2011, 2018)
Others were 1972 and 1975

River flooding generally same timeframe as creek flooding except 2018

Creek flooding can precede river flooding (2011)

History of Flooding

<u>Bloomsburg Fairgrounds</u>

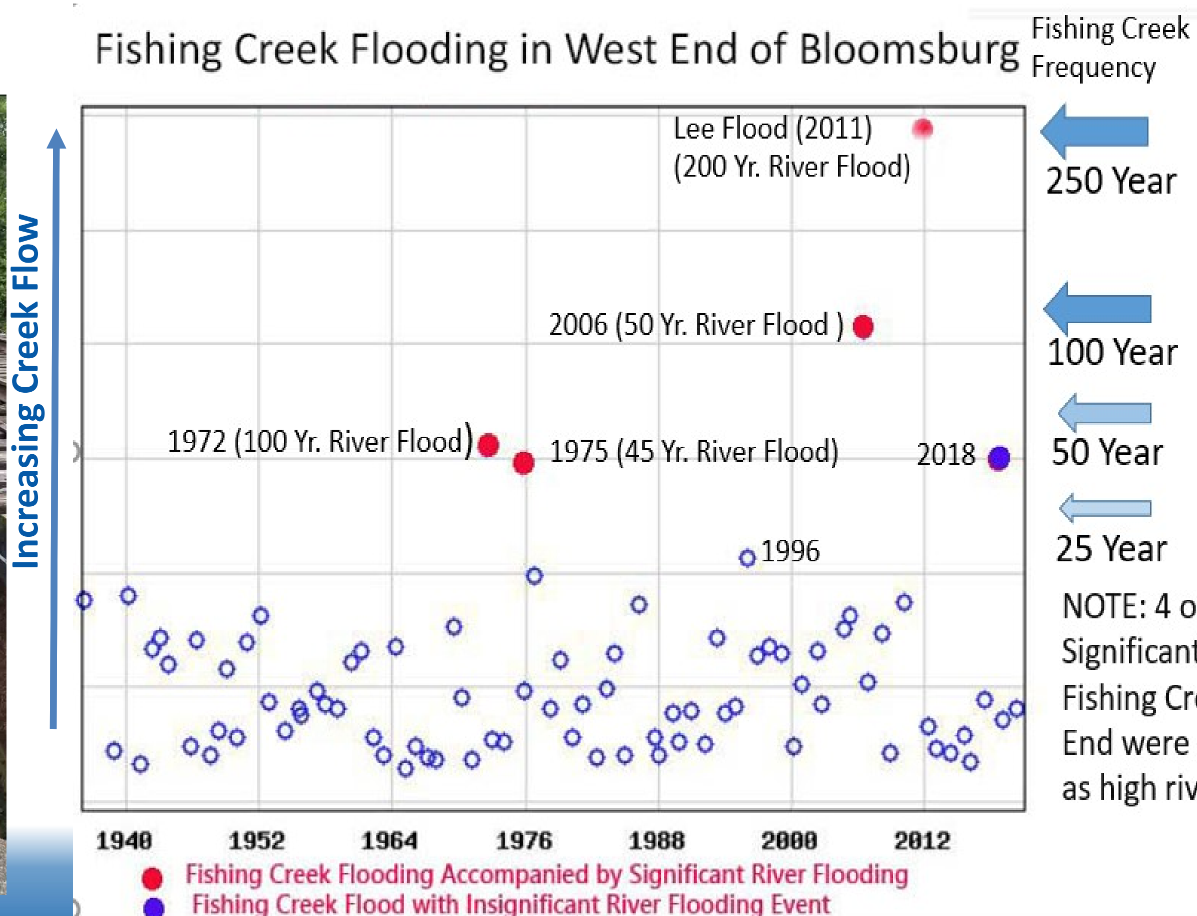
High water marks on barn behind grandstand

35 floods impacted Fairgrounds over last 120 years

1972 (Agnes Flood) 6” higher than Base Flood.

History of Fishing Creek Flooding

2/3 of survey respondents said creek is bigger concern than river, although river flooding is 80% of higher flood events.



NOTE: 4 out of 5 Significant Floods on Fishing Creek in West End were at same time as high river stages

History of Fishing Creek Flooding

Fishing Creek Flooding of 2011 was devastating to lower West End. Creek Flooding preceded river flooding. Essentially two flooding events.

The 2018 Creek Flooding in West End reinforced residents' fears of creek flooding as their biggest concern. Water moves with a destructive velocity.

History of Fishing Creek Flooding

1950

2021

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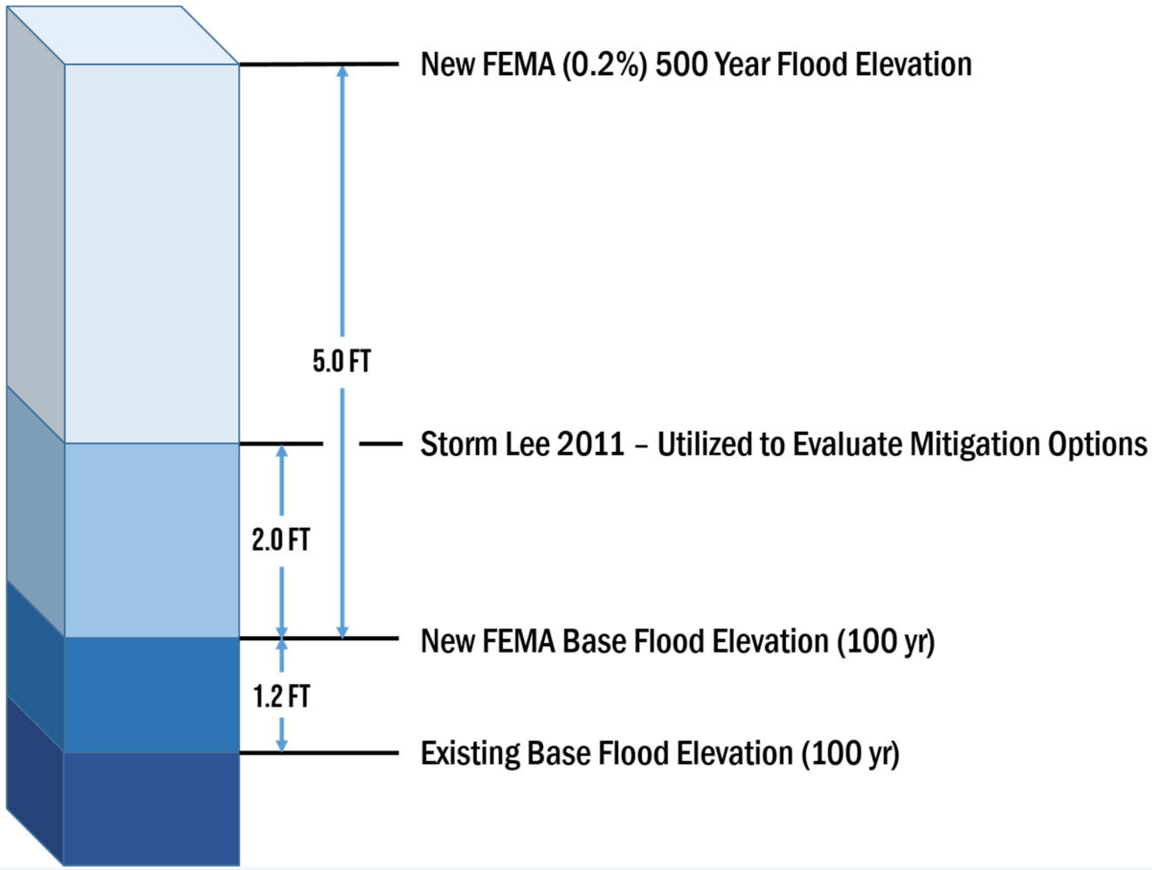
Analysis of Flooding

Analyzed Fishing Creek and Susquehanna River flooding to address all flooding scenarios.

- ✓ All singular or combination of events.
- ✓ Study team updated FEMA flood model for Fishing Creek to include all flood events including 2018.
  Last update by FEMA was in 1979.
- ✓ Utilized Susquehanna River FEMA model updated in 2013 – Includes 2011 Lee Flooding

Analysis of Flooding – Flood Levels



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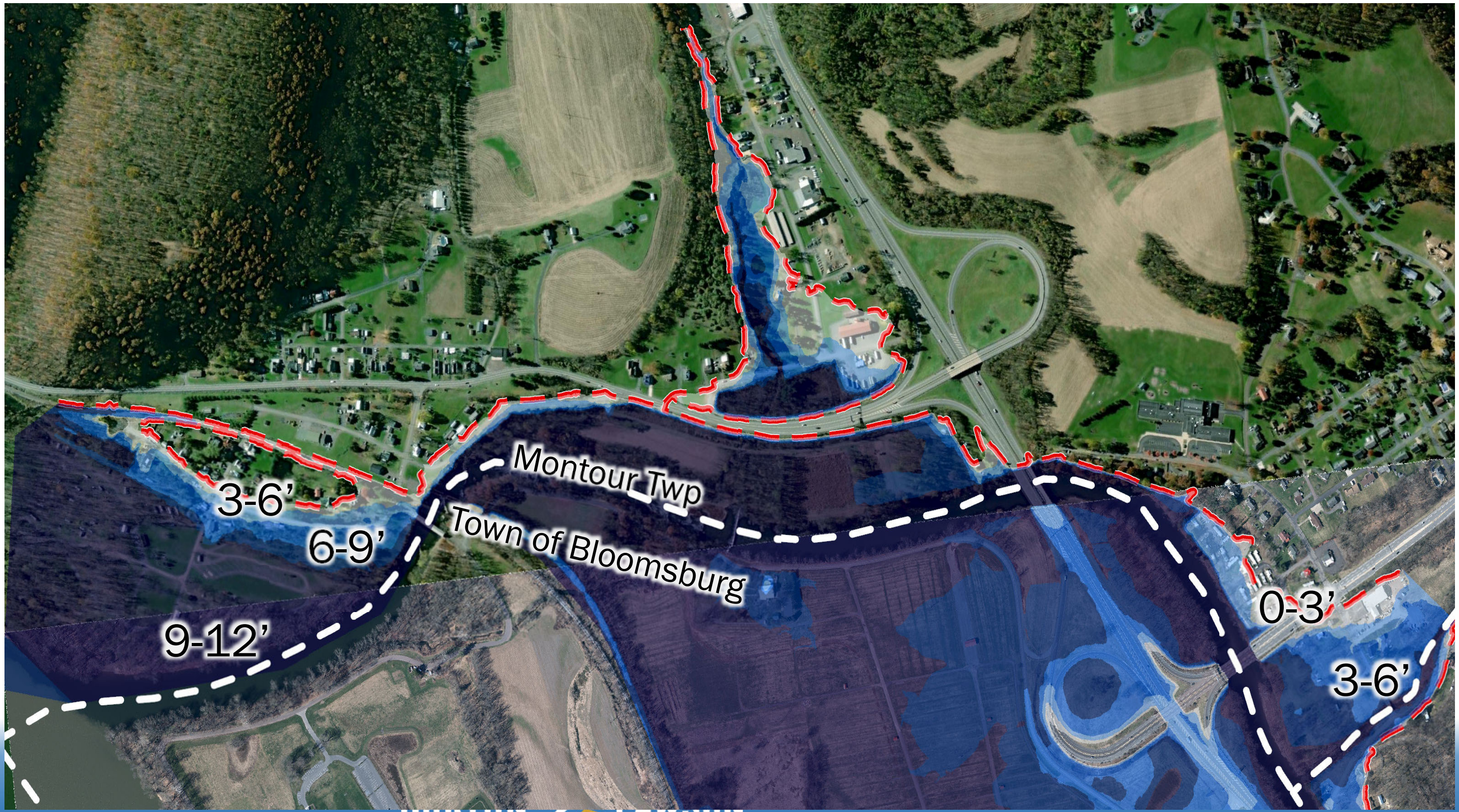
FISHING CREEK
2D FLOOD SIMULATION
BASE FLOOD (100 YR)
Selected: 'WSE'
07SEP2011 00:00:00
500.0
491.7
483.3
475.0
466.7
458.3
450.0
2000 ft

Montour Twp: Depth of Flooding (Lee Flood - 2011)

Base Flood = Lee Flood – 2 Feet

Township Efforts focused on Buyouts.

Lack of density of impacted homes along creek and river does not justify levee system from a funding standpoint.



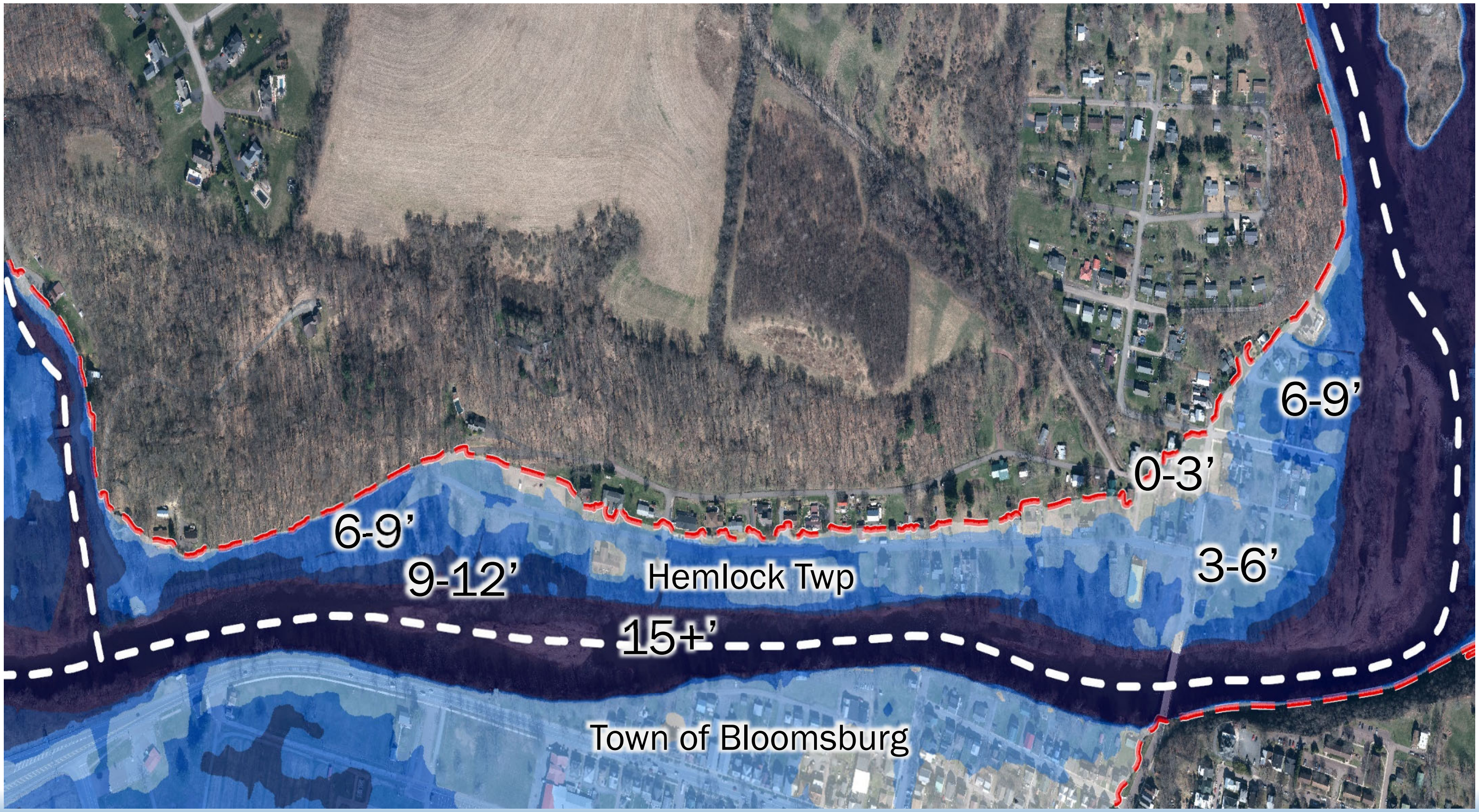
Hemlock Twp: Depth of Flooding (Lee Flood - 2011)

Base Flood = Lee Flood – 2 Feet

Buyouts completed
Additional planned

Levees or Floodwalls not cost effective

Town planning for growth outside floodplain.



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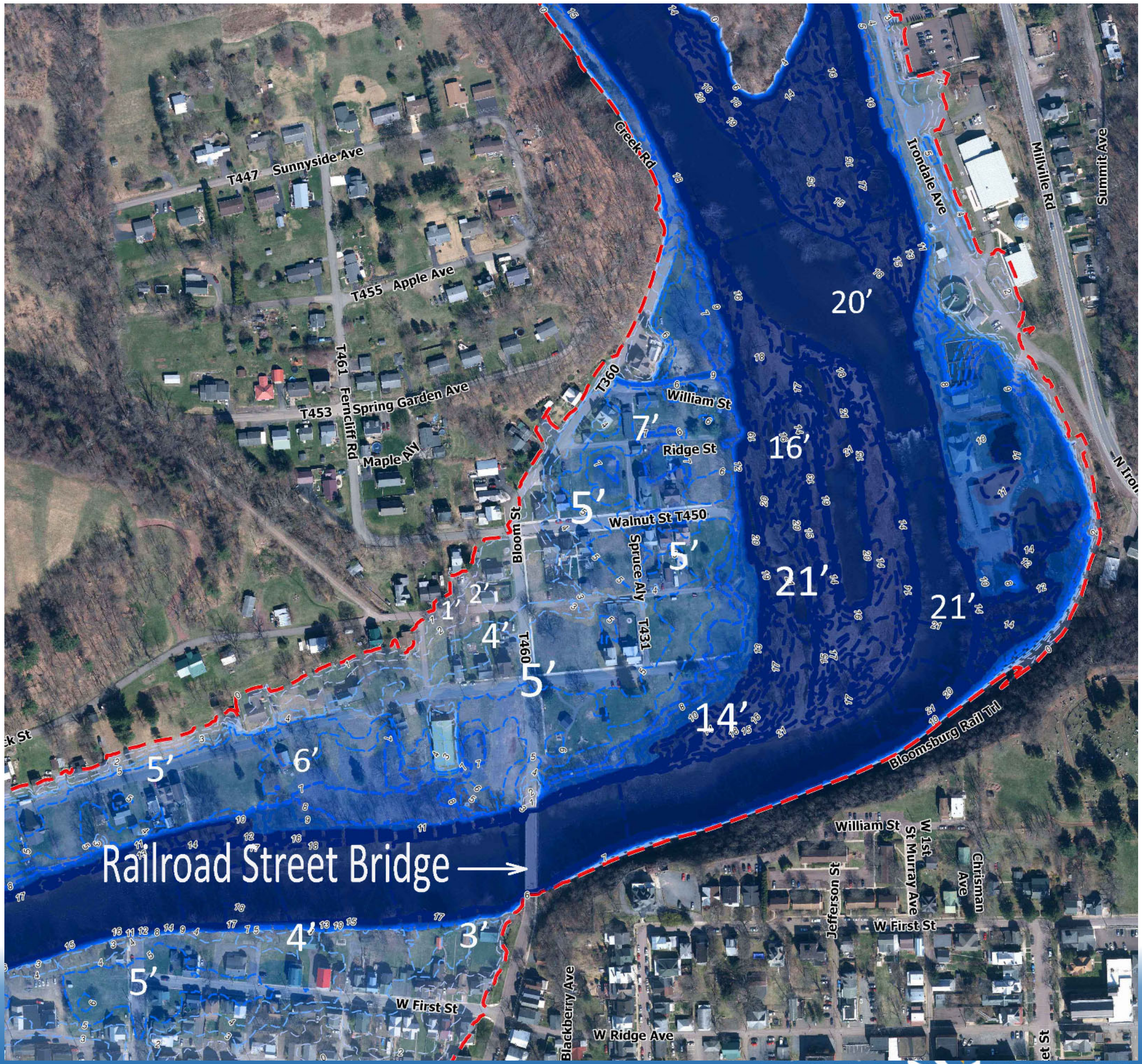


Hemlock Twp:

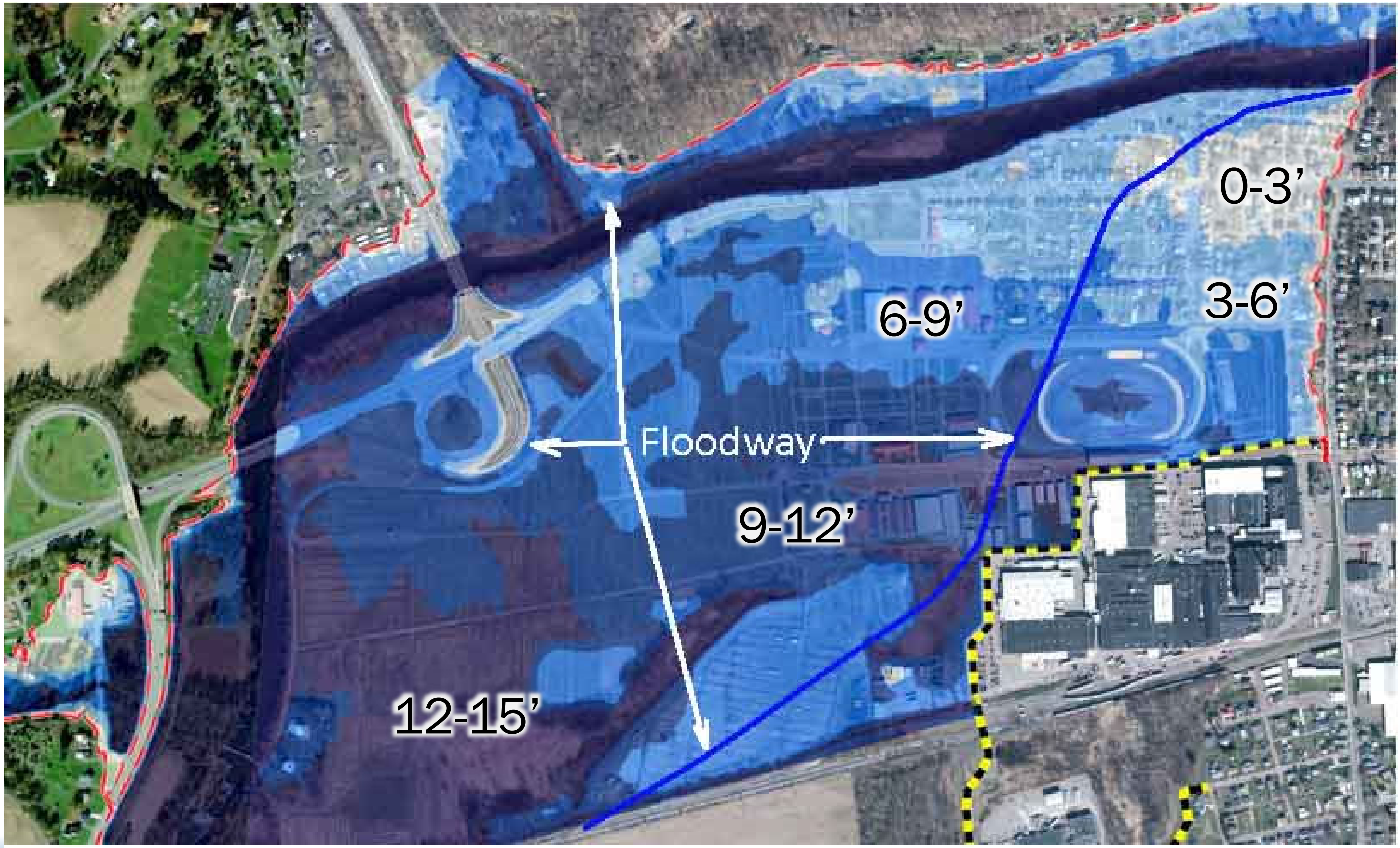
Depth of Flooding (2011)

Fishing Creek at bend upstream of Railroad Street bridge.

Flow channel wide and deep but loss of energy due to turbulence.

Raising Railroad Street Bridge being considered to reduce flood levels upstream – especially for flooding similar to 2011 (Storm Lee Flood)

Bloomsburg: Depth of River Flooding (2011)



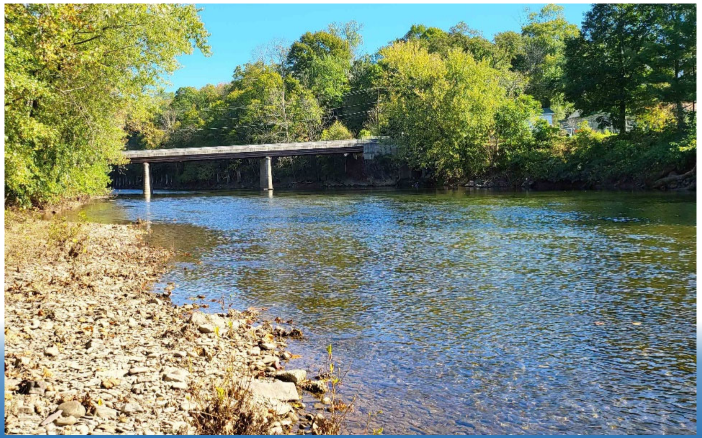
Fairgrounds impacted by deep water flooding.

Town residential area experiences significant first floor flooding.

Majority of deeper flooding in Fishing Creek floodway

Structural Mitigation Alternatives

- Bridge Removal / Raising
  - Covered bridge, railroad bridge, and old truss bridge Reduction of Fishing Creek Flooding of 3 feet - tapers to zero at upstream Route 11
  - Railroad Street Bridge – Raising could decrease 2011 flooding levels about 2 feet upstream of the bridge.



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Structural Mitigation Alternatives

- Channel Improvements – Widening, island removal – Ongoing Review
- Upstream Stormwater Management Facilities (Fishing Creek Watershed Study)
- Levees / Floodwalls

Conceptual Floodwall/Levee System - Bloomsburg

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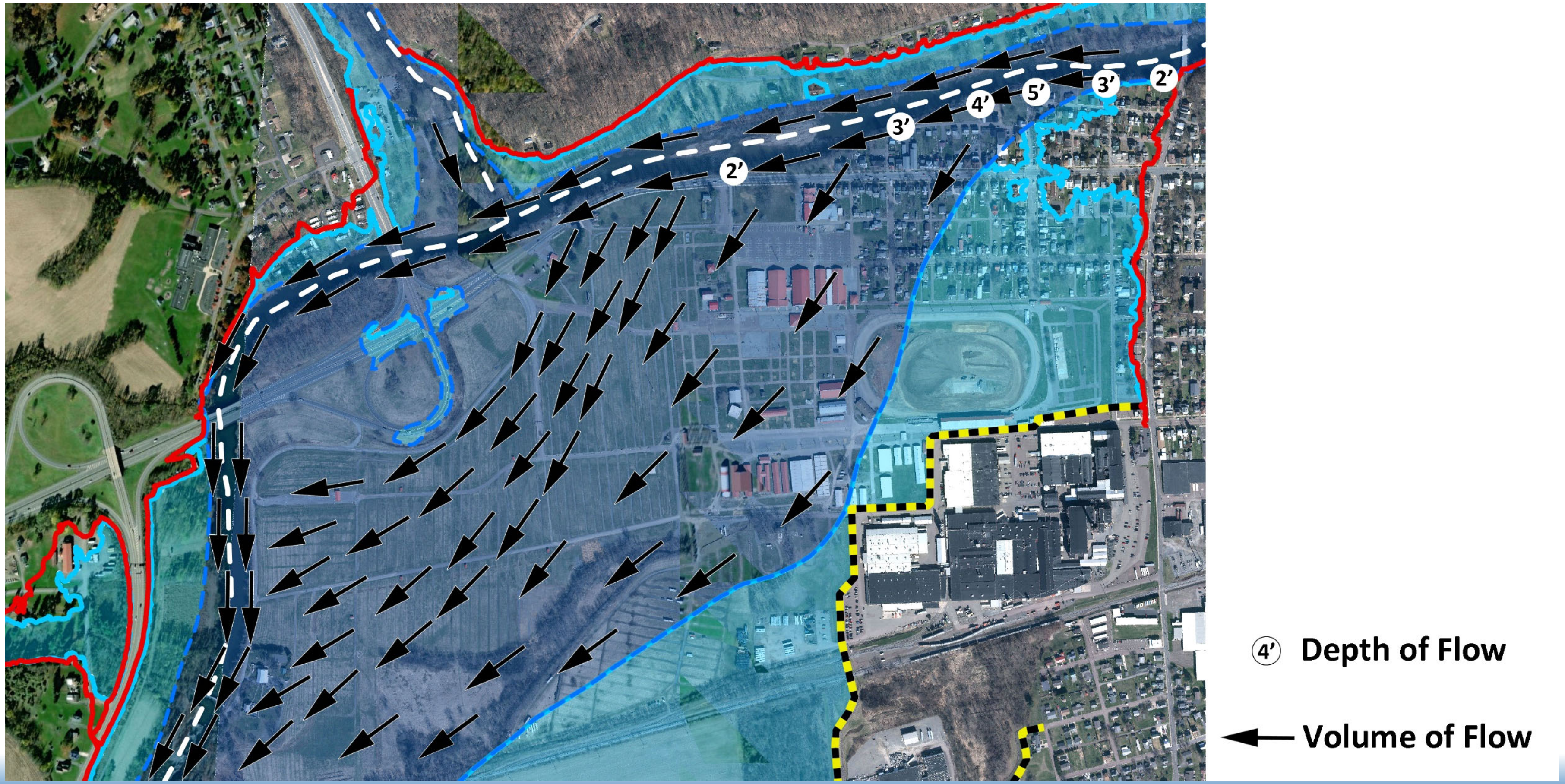
Conceptual Floodwall/Levee System - Bloomsburg

- River backwater and creek flooding eliminated behind system
- Length of Floodwall System – 6,200 Feet (1.2 Miles)
- Stormwater Pumping Stations – 2
- Roadway Closure Structures - 4
- System Height
  - Railroad Street to Route 11 crossing – 6 to 8 feet
  - Route 11 across Fairgrounds – 10 to 13 feet
- Property Aquisitions – Approximately 5 Full / 9 Partial
- Induced flooding (base flood levels):
  - Upstream of Railroad Street – Negligible
  - Downstream of Railroad Street along levee length – 12 to 15 inches
  - Mitigation of induced flooding to be investigated by altering system length along creek and minimizing levee encroachment in stream.

Fishing Creek Floodway (Base Flood)



Proposed Creek Floodway Revision System - Bloomsburg

Floodway Revision Levee
Purpose: Redirect Creek overbank flows downstream to minimize severe damage risk to homes/businesses.

Levee could be Phase I of eventual full levee / floodwall system.

Floodway designation can be removed. Reconstruction with elevated homes would be possible.

River and creek flooding still possible but with negligible velocity.

<u>Induced flooding</u>: Less than 2”

Public Information - Project Updates & Meetings

SEDA-COG's Columbia County Flood Mitigation Study webpage: https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigation-studies/

Provides information on

- Public Meetings
- Study Schedule
- Study Deliverables/ Report
- Surveys
- Contacts for Questions/Comments

Ways to Stay Informed and Engaged

Press Releases

- Distributed via traditional newspaper outlets (Press Enterprise)

Public Meetings

- Final Public Meeting – February/March 2022

Email

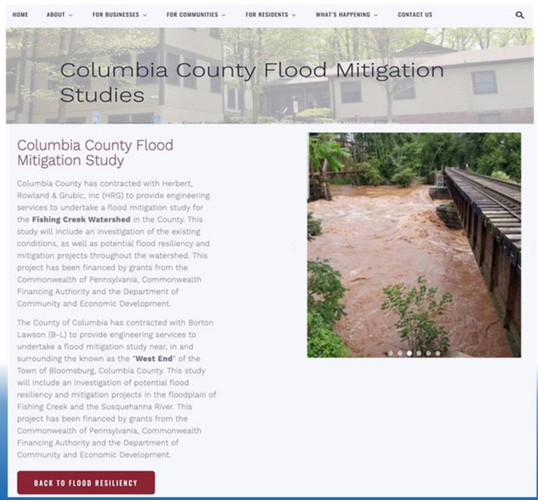
- Share with us your
  - Personal experiences with flooding
  - Photos of local flood events / damaged infrastructure
  - Personal mitigation projects undertaken
  - Ideas for flood mitigation or resiliency projects

Website/ Social Media

- SEDA-COG's Columbia County Flood Mitigation Study webpage

Provides information on

- Public Meetings
- Study Deliverables/ Report
- Property Owner Survey
- Contacts for Questions/Comments



Final Public Meeting

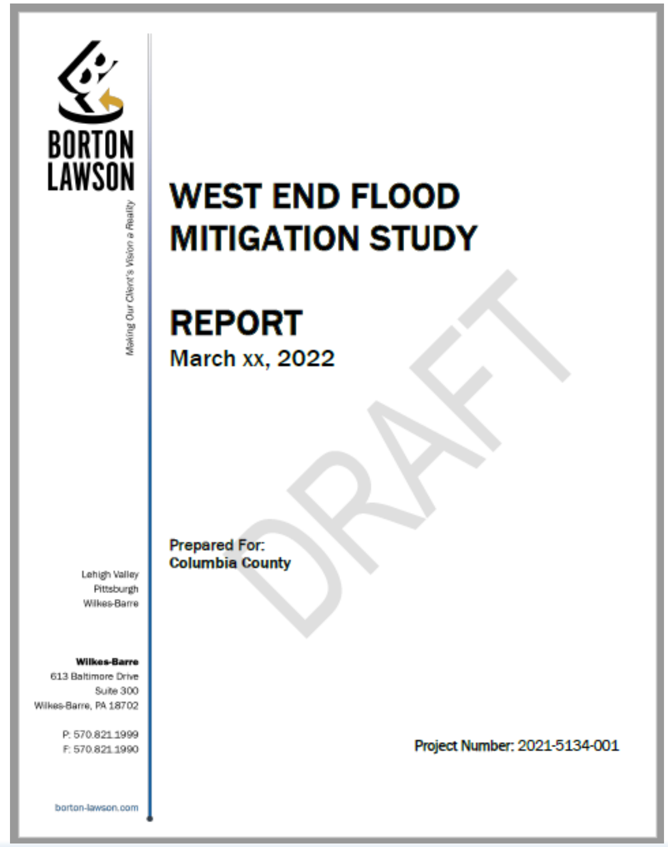
✓Flood Mitigation Alternatives – Identify, Summarize Evaluation

✓Recommendations

- Concept Level Drawings for Alternatives
- Induced Flooding /Mitigation
- Environmental Impacts/ Permitting Requirements
- Benefit/Cost Analysis – All alternatives
- Community Benefits / Impacts / Environmental Justice

✓Funding Options

✓Schedule for Implementation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Making Our Client's Vision a Reality

WEST END FLOOD MITIGATION STUDY

REPORT

March xx, 2022

DRAFT

Prepared For:
Columbia County

Lehigh Valley
Pittsburgh
Wilkes-Barre

Wilkes-Barre
613 Baltimore Drive
Suite 300
Wilkes-Barre, PA 18702

P: 570.821.1999
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borton-lawson.com

Project Number: 2021-5134-001

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Next Study Update….
Final Public Meeting – February/ March 2022

FOR MORE PROJECT INFO…

Study Webpage

https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigation-studies

Send Questions/ Comments

floodstudy@borton-lawson.com

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THANK YOU!

Questions?

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WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY

FINAL PUBLIC MEETING
MARCH 10, 2022

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This study has been financed by grants from the Commonwealth of Pennsylvania, Commonwealth Financing Authority and the Department of Community and Economic Development.

Welcome

COLUMBIA COUNTY BOARD OF COMMISSIONERS

Chris Young, Chairman

Richard Ridgway

David Kovach

COLUMBIA COUNTY RESILIENCY OFFICE

Eric Stahley

Columbia County Resiliency Officer

SEDA-COUNCIL OF GOVERNMENTS

Teri Provost

Director, Housing Rehabilitation and Flood Resiliency

Geralee Zeigler

Program Analyst, Flood Resiliency

Study Team

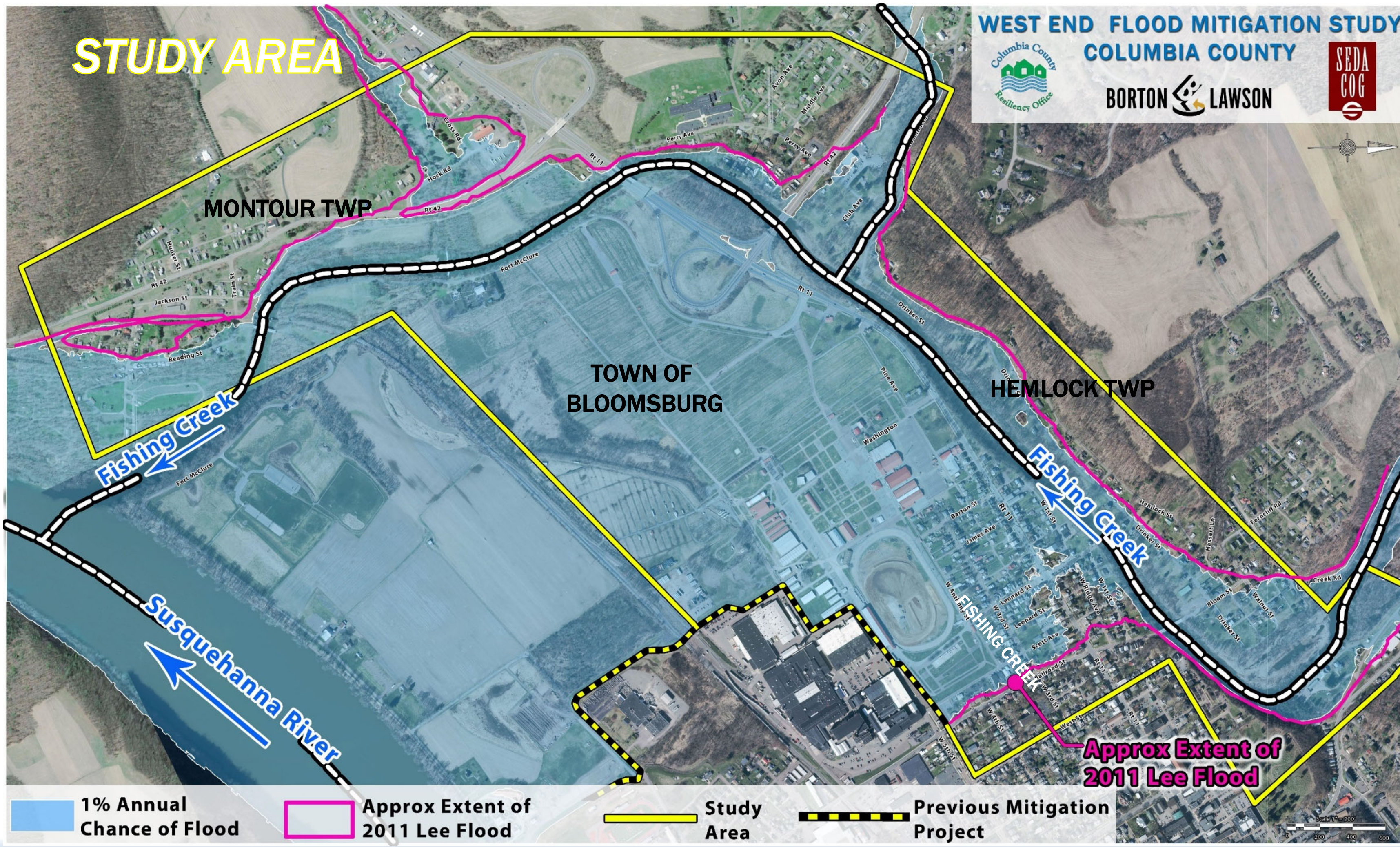
Columbia County – Study Sponsor
SEDA-COG – Study Administrator

Brozena Consulting Services, LLC

West End Flood Study Area

Floodplains of Fishing Creek in Town of Bloomsburg, Hemlock Twp & Montour Twp

~500 parcels
~350 structures



Purpose & Goals of Study

Identify and Determine Best Structural and Non-Structural Flood Mitigation Alternatives:

- Provide flood resiliency - reduce long-term risk to loss of life and property damage
- Minimize future flooding impacts on Community
- Identify possible funding sources
- Reduce impacts of increasing flood insurance premiums

Overview of Study - Major Tasks

- Inventory of Parcels & Structures - Mailed Surveys, Field Survey, First Floor Elevations, Parcel Data
- Stakeholder Meetings to Obtain Input
- Hydrologic & Hydraulic Modeling of Fishing Creek
- Identified Flood Mitigation Alternatives
- Evaluated Flood Mitigation Alternatives – Impact, Cost-Benefit Analysis, Funding

Flood Mitigation Projects Considered

Non-Structural Mitigation Projects

- Residential Structures in Floodway – Acquisition/Demolition
- Residential Structures in Floodplain – Acquisition/ Demolition, Elevations or Mitigation Reconstruction
- Commercial Buildings – Wet Floodproofing
- Other – Emergency Access Roads, Floodproofing Wastewater/Utility Systems, Emergency Action Plans, Additional Stream Gauges, Ordinances

Structural Mitigation Projects

- Levee/ Floodwall Systems
- Channel/ Floodplain Modifications

Typical Non-Structural Mitigation – Elevations

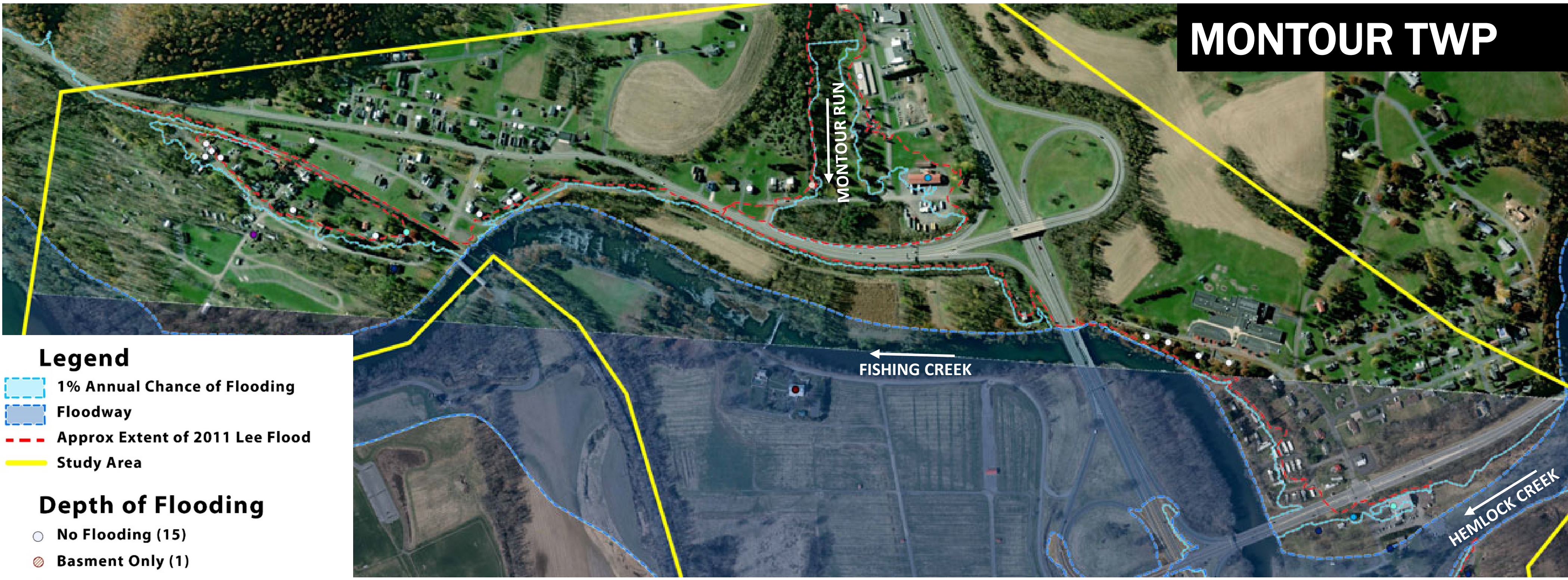
Non Structural Mitigation – Mitigation Reconstruction

Example Rebuild with An Elevated Home at Same Location

Structure Flooding Analysis – Flood Lee

- Historical Accounts – High Water Marks
- H&H Modeling, First Floor Elevations, GIS Mapping
- Structure Flood Depths - utilized for evaluation of Mitigation Alternatives, Benefit-Cost Analysis, and FEMA Criteria for Funding projects

Analysis of Lee Flooding Depths–above 1st Floor Elevation



Legend

- 1% Annual Chance of Flooding
- Floodway
- Approx Extent of 2011 Lee Flood
- Study Area

Depth of Flooding

- No Flooding (15)
- Basment Only (1)
- 0′ - 2′ Above First Floor (2)
- 2′ - 4′ Above First Floor (2)
- 4′ - 6′ Above First Floor (3)
- 6′ - 8′ Above First Floor (1)
- 8′ - 10′ Above First Floor (0)
- 10′ - 14′ Above First Floor (0)

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Analysis of Lee Flooding Depths–above 1st Floor Elevation

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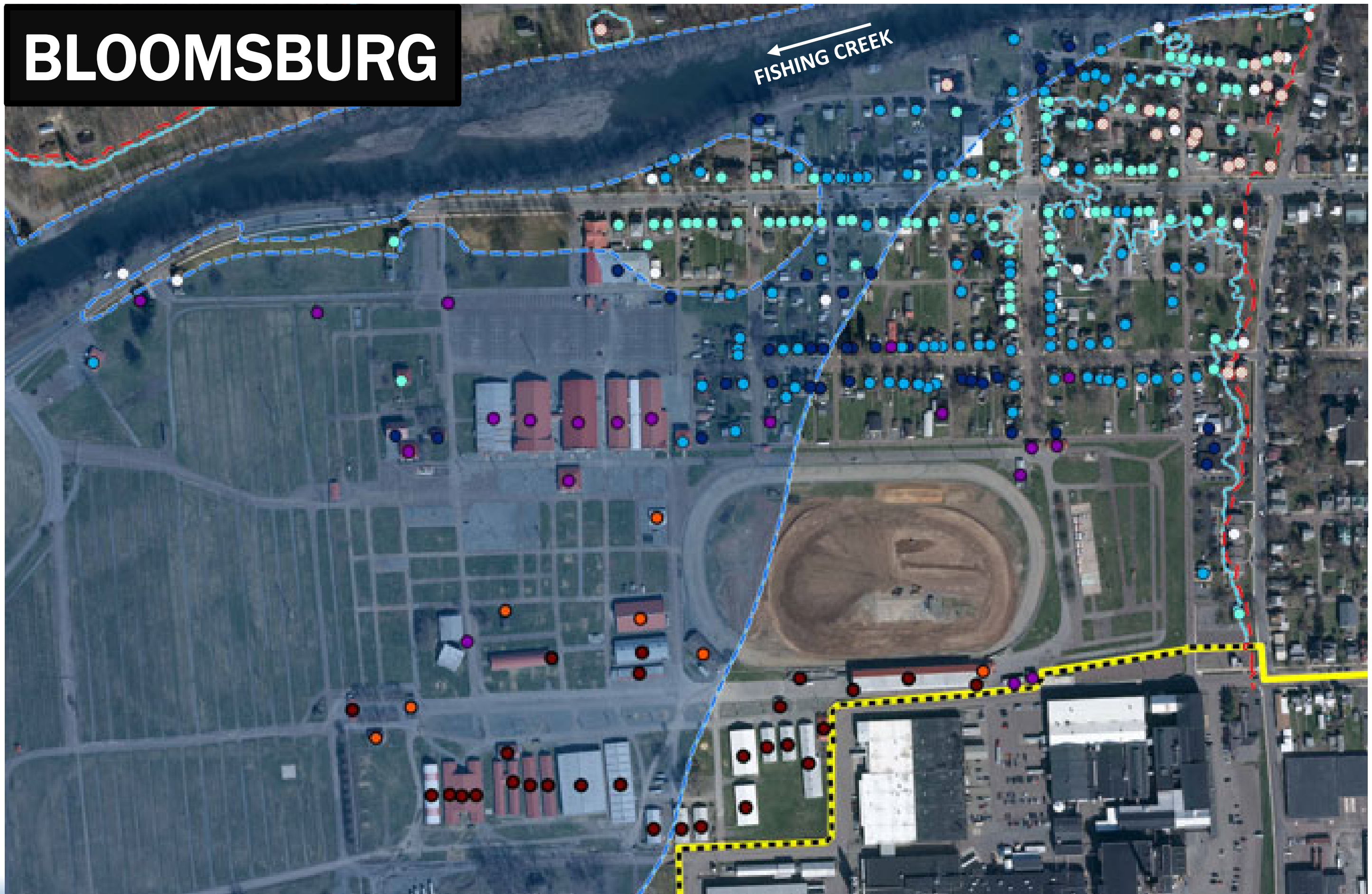
Analysis of Lee Flooding Depths–from 1st Floor Elevation



Legend

- 1% Annual Chance of Flooding
- Floodway
- Approx Extent of 2011 Lee Flood
- Study Area

Depth of Flooding

- No Flooding (17)
- Basment Only (16)
- 0' - 2' Above First Floor (83)
- 2' - 4' Above First Floor (91)
- 4' - 6' Above First Floor (34)
- 6' - 8' Above First Floor (20)
- 8' - 10' Above First Floor (7)
- 10' - 14' Above First Floor (29)

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Analysis of Lee Flooding Impacts from 1st Floor

TOTALS

	Bloom	Hemlock	Montour	Project Wide
Basement Only:	16	3	1	20
0' - 2'	83	12	2	97
2' - 4'	91	5	2	98
4' - 6'	34	2	3	39
6' - 8'	20	0	1	21
8' - 10'	7	0	0	7
10' - 14'	29	0	0	29
Total:	280	22	9	311
No Flooding:	17	13	15	45
Total Evaluated:	297	35	24	356

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FEMA Funding Criteria Non-Structural Mitigation

FEMA Pre-Calculated Benefit Acquisitions: $323,000 per structure Voluntary Program

- Project deemed eligible when project cost is less than $323,000
- If project costs is greater than $323,000, need to show Benefit-Cost Ratio (BCR) > 1

~90% Residential Properties in Floodplain will qualify under FEMA Pre-Calculated Benefits

- **25% Local Share required with FEMA FMA and BRIC programs; HMGP no local share**

FEMA Funding Criteria Non-Structural Mitigation

FEMA Pre-Calculated Benefit Elevations & Mitigation Reconstruction: $205,000 per structure

Voluntary Program

- Project deemed eligible when project cost is less than $205,000
- If project costs is greater than $205,000 need to show BCR > 1

<u>Other funding required when:</u>

- The homeowner desires a higher elevated home resulting in a greater costs than covered by FEMA (BFE + 2' or Flood of Record Elev.)
- If BCR is less than 1 (using FEMA Benefit-Cost Analysis) not eligible
- 25% Local Share required with FEMA FMA and BRIC programs; HMGP no local share

Benefit–Cost Analysis (BCA)

BCA used to determine Cost Effectiveness

- FEMA Methodology
- Calculated Benefit-Cost Ratio (BCR) for each property and for total Aggregate
- Inputs included Building Replacement Value, Square Footage, Modeled Depth of First Floor Flooding
- Considered Site Conditions (structure type, basement, USACE Generic Depth Damage Curves determined expected damages and costs based on range and frequency of flood events)
- Mitigation Costs (Levee, Acquisitions, Elevation or Mitigation Reconstruction)
- Incorporated Environmental and Social Benefits

Non-Structural Flood Mitigation Alternatives Evaluated For Each Municipality

Montour Township

Hemlock Township

Town of Bloomsburg

Flood Mitigation - Non Structural Mitigation Actions

Montour Township

- FEMA Buyouts – Voluntary
- FEMA Elevations - Voluntary
- RV Park – Emergency Action Plan
- 3 Sanitary Pump Stations – Dry Floodproof
- Construct Emergency Access Route from Reading St to Jackson St across RR Montour Twp
- Ordinance Revisions – Floodplain Management
- Evaluate County Building for Floodproofing

Flood Mitigation - Non Structural Mitigation Actions

MONTOUR TOWNSHIP EMERGENCY EVACUATION ROUTE VIA JACKSON STREET

ESTIMATED COST = $125,000

Flood Mitigation - Non Structural Mitigation Actions

Hemlock Township

- FEMA Buyouts - Voluntary
- FEMA Elevations - Voluntary
- Emergency Access Road – Hassert to Laurel Street
- Ordinance Revisions

Flood Mitigation - Non Structural Mitigation Actions

HEMLOCK TOWNSHIP - EMERGENCY EVACUATION ROAD

CONNECTS HASSERT LANE TO LAUREL DRIVE

REQUIRES LAND OWNER COOPERATION

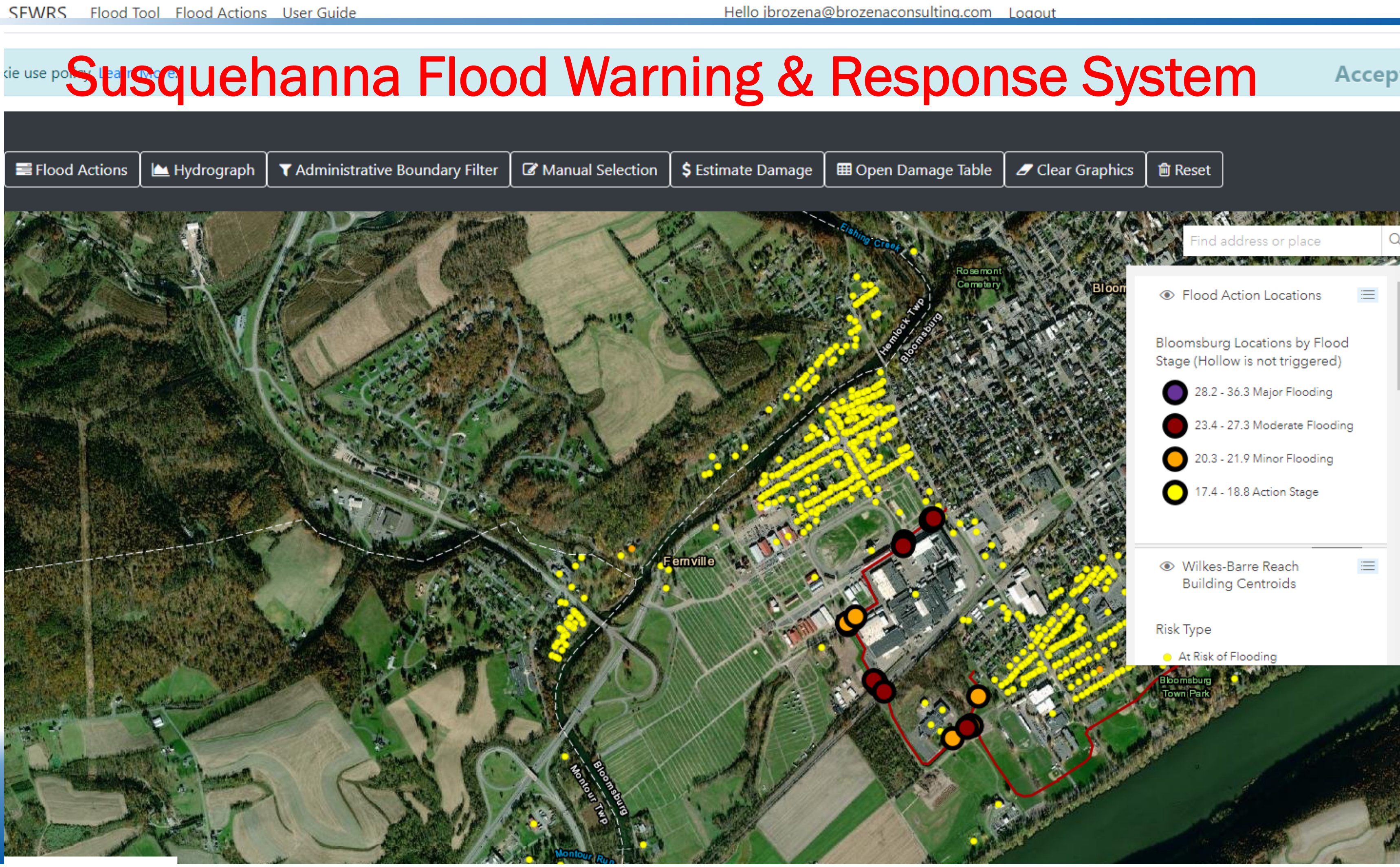
ESTIMATED COST = $600,000

Flood Mitigation - Non Structural Mitigation Actions

Town of Bloomsburg

- FEMA Buyouts - Voluntary
- FEMA Elevations - Voluntary
- Wet Floodproofing Commercial Buildings
- Emergency Evacuation Notification Siren (by W. First Street)
- Fishing Creek Radar Gauge at Railroad Street
- Fairgrounds – Additional Floodproofing
- Ordinance Review – Floodplain Management

Flood Mitigation - Non Structural Mitigation Project



Flood Mitigation - Non Structural Mitigation Project

Is There a Better Way?

- RetroFIT – Charlotte-Mecklenburg, North Carolina (2016)
  - Full range of flood mitigation options
  - Funded by County Stormwater Services Flood Mitigation Capital Budget
  - Property owner provides financial contribution, sliding scale
- Valmeyer Acquisition – Monroe County, Illinois (1993)
  - Acquired 242 Properties and relocated to high ground
  - Completed in 2 years
  - FEMA HMGP, State, EDA Funding
- Isle De Jean Charles Resettlement, Louisiana (2016)
  - Acquired 515 acres for 120 residential properties, commercial, retail, public spaces on higher ground
  - State CDBG Funding

NFIP Risk Rating 2.0

Changes

- Changes from Zone to Individual Rating
- Zone changes smaller difference in costs
- Replacement cost is part of premium calculation
- No elevation certificates needed
- Premiums reflect unique flood risk

Staying the Same

- Statutory rate caps on annual premium increases
- Availability of premium discounts
- Transfer of policy discounts to new owners
- FIRM's used for mandatory purchase and Floodplain Management
- FEMA Community Rating System discounts

National Flood Insurance Program

Existing Rating Methodology

FEMA-sourced data

Rating Variables
- Flood Insurance Rate Map Zone
- Base Flood Elevation
- Foundation Type
- Structural Elevation (Special Flood Hazard Area Only)

1% Annual Chance of Flooding (Frequency)

Fees and Surcharges

Risk Rating 2.0: Equity in Action Methodology*

FEMA-sourced data

Additional data sources: Federal government-sourced data, commercially available third-party

Cost to Rebuild

Rating Variables
- Distance to Coast/Ocean/River
- River Class
- Flood type — Fluvial/Pluvial
- Ground Elevation
- First Floor Height
- Construction Type/Foundation Type

Broader Range of Flood Frequencies

Fees and Surcharges

*Additional variables are not shown here

H&H Evaluation of Fishing Creek – Channel Modifications to Reduce Flooding

- Lee Flood is considered 300-Year Flood on Creek and 200-Year Flood on River.
- Evaluated existing creek channel to reduce Base Flood and Storm Lee Flood Elevations. Doesn't mitigate flooding to degree necessary for Bloomsburg or Hemlock Twp.
- Railroad Street Bridge and Stream Floodplain modifications provide significant reduction for Fernville flooding in vicinity of Railroad St Bridge and can mitigate some induced flooding from levee on Bloomsburg side.
- Dredging not feasible. Rock in stream bed prevents adequate excavation.

2011 FERNVILLE FLOODING
AT RAILROAD STREET BRIDGE

Fishing Creek 2011 Record Flood

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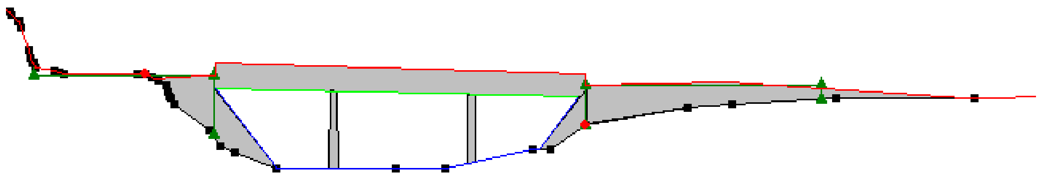
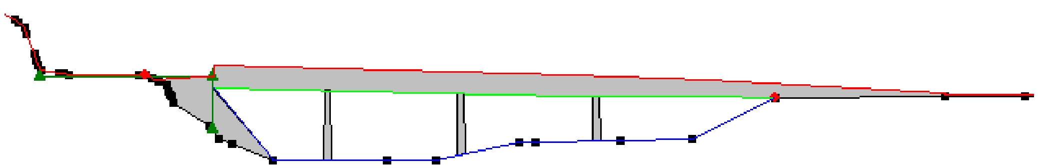
H&H Evaluation of Fishing Creek



EXISTING RAILROAD STREET BRIDGE – FACING DOWNSTREAM



LENGTHENED RAILROAD STREET BRIDGE WITH BENCHED FLOODPLAIN – FACING DOWNSTREAM

H&H Evaluation of Fishing Creek

BENCHED FLOODPLAIN BENEFITS:

- Compensates for lost conveyance in Bloomsburg Floodplain with levee option
- Allows more flow through RR St Bridge rather than through Fernville
- Environmental benefits of creek to Floodplain during lower flood flows.

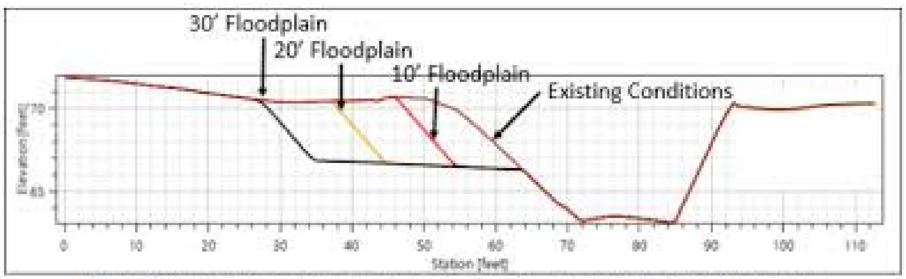


Figure 24. Typical cross section showing the three different floodplain bench alternatives.

FISHING CREEK HYDRAULICS

100-YR EVENT

REDUCTION OF **EXISTING** FLOOD LEVELS

Modification Alternatives	Near Hock Road	@ Route 42 Bridge	@ Barton Street	Above RR ST Bridge
Remove Covered Bridge & Railroad Bridges	2.1 FT	0.0 FT	0.0 FT	0.0 FT
Remove Route 11 & 42 Interchange Ramp Fill	0.0 FT	0.3 FT	0.2 FT	0.0 FT
Remove Existing Island	0.0 FT	0.0 FT	0.0 FT	0.1 FT
Excavate Benched Floodplain and Modify RR St Bridge	0.0 FT	0.0 FT	0.2 FT	**3.0 FT**
Remove Railroad Street Bridge	0.0 FT	0.0 FT	0.0 FT	**2.6 FT**

Full Floodwall/ Levee System Bloomsburg 6,200 LF

Total Estimated Cost $29 million

Structural Flood Mitigation (Levees)

Full Levee System - West End of Bloomsburg

- Length of Floodwall System – 6,200 Feet (1.2 Miles)
- Induced flooding
  - ➢ Upstream of Railroad Street – Negligible
  - ➢ Downstream of Railroad Street along levee length – 1.8 Feet

<u>Must be Mitigated to Zero</u>

H&H Evaluation – Mitigate Fishing Creek Impacts

MITIGATION OF INDUCED FLOODING

100-YR EVENT

REDUCTION OF **INDUCED** FLOOD LEVELS FROM LEVEE

Location	Induced Flooding	Mitigation Alternatives	
		Excavate Flood Bench & Modify RR Street Bridge	Replace all Bridges
Barton St	2.5 FT	-1.1 FT	-0.6 FT
Leonard St	2.4 FT	-1.5 FT	-1.0 FT
Scott Ave	1.9 FT	-2.0 FT	-1.7 FT
Hemlock St	0.0 FT	-1.0 FT	-1.0 FT

Flood Mitigation – Structural Mitigation (Levee)

Benefits:

- Protect 294 Structures (including Fairgrounds Bldgs) in Floodway, Floodplain, Zone x
- Total Property value = $42.9 Million
- Total Taxes Generated = $657,000

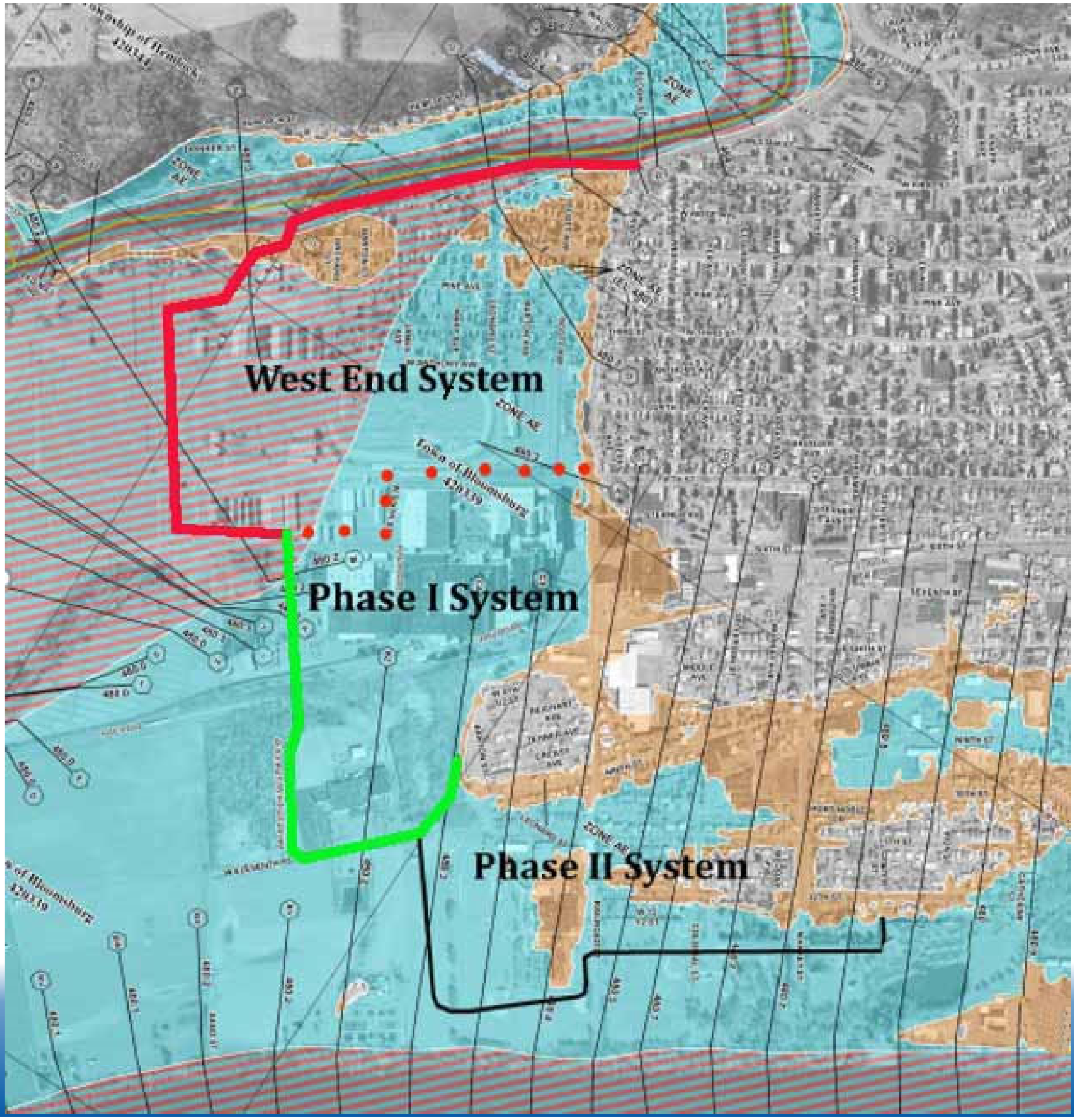
Challenges:

- Permitting Levee in Floodway / Eliminate Induced Flooding
- Property Acquisitions

Schedule:

- Engineering, Permitting, Property Acquisition – 18 to 20 months
- Construction – 20 months

OVERALL LEVEE/ FLOODWALL SYSTEM CONFIGURATION



FEMA BENEFIT-COST ANALYSIS
FLOOD MITIGATION ALTERNATIVES

Municipality	Flood Mitigation Alternative	Estimated Cost (w/ Maintenance Costs) Over Life of System**	Benefit-Cost Ratio (BCR) *BCR > 1 indicates "Cost Effective"*
Bloomsburg	Levee System	$30 Million	3.65
	Residential Acquisition – Floodway & Floodplain*	$45 Million	2.07
	Residential Floodplain Elevation & Floodway Buyout*	$42.6 Million	1.84
	Residential Floodplain Mitigation Reconstruction & Floodway Buyout*	$52.9 Million	1.47
Hemlock	Residential Acquisition*	$6.3 Million	2.39
	Residential Elevation*	$4.3 Million	2.08
Montour	Residential Acquisition*	$4.3 Million	2.65
	Residential Elevation*	$3.3 Million	0.63

**Calculated with 100% participation.*

***Life of System for BCR calculations - Levee = 50 yrs, Acquisition = 100 yrs*

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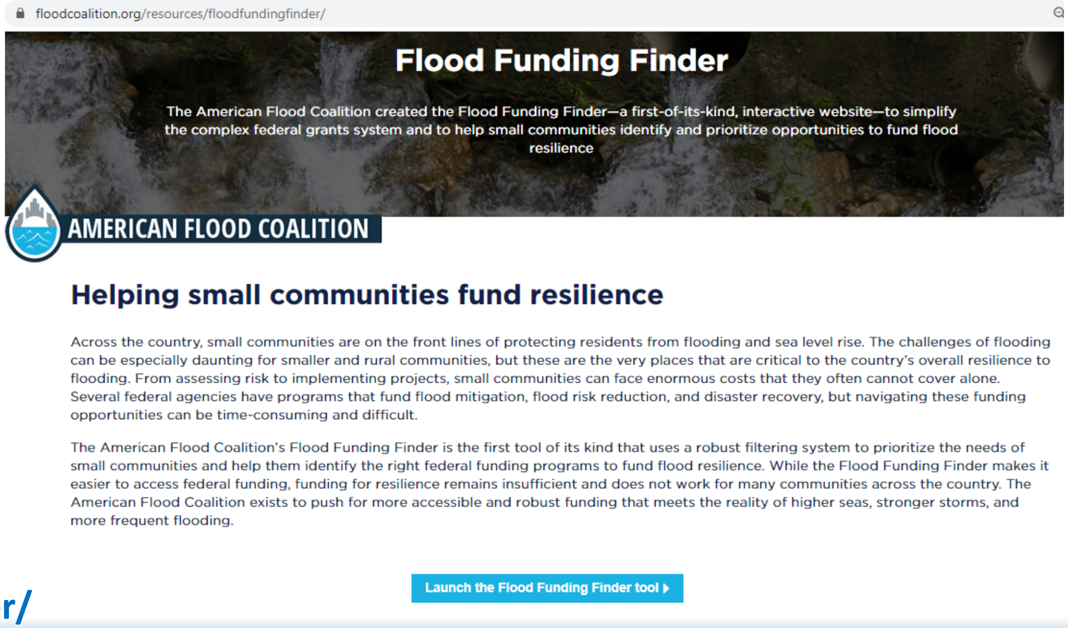
Funding - Non Structural Mitigation

- FEMA Grant Programs
  - Hazard Mitigation Grant Program – HMGP
  - Flood Mitigation Assistance – FMA
  - Building Resilient Infrastructure and Communities – BRIC

- US Department of Housing and Urban Development
  - HUD CDBG-DR

- American Flood Coalition
  - Flood Funding Finder, resource for flood mitigation funding information

https://floodcoalition.org/resources/floodfundingfinder/



Funding – Structural Mitigation Systems (Levee)

- FEMA Building Resilient Infrastructure and Communities – **BRIC**
- FEMA Flood Mitigation Assistance - **FMA**
- The Federal Infrastructure Bill contains billions for flood mitigation and coastal restoration from storms. The Senate version of the bill contains $3.5 billion for FEMA's Flood Mitigation Assistance program, and $1 billion for FEMA BRIC
- **State**

Study Summary

- Flood Insurance – April 2022, All existing policies renewing under Risk Rating 2.0, Contact ***Your*** Insurance Carrier
- Flood Mitigation Alternatives – Non Structural & Structural (Levee) Alternatives are Cost Effective (Benefit-Cost Ratios > 1), some Non Structural require individual analysis
- County and Municipalities Determine Mitigation Alternatives to Implement
- Challenges
    - ❑ Acquisitions/ Elevations/ Mitigation Reconstruction – Voluntary Program
    - ❑ Commercial Properties – Funding Options
    - ❑ Levee – Further Analysis of Impacts/ Mitigation of Induced Flooding
    - ❑ Levee – Permitting in Floodway

Next Steps - Final Study Report to be Published

WILL BE AVAILABLE FOR PUBLIC

Study Webpage

https://seda-cog.org/departments/flood-resiliency/columbia-county-flood-mitigation-studies

Send Questions/ Comments

floodstudy@borton-lawson.com

THANK YOU!

Questions?

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Making Our Client's Vision a Reality

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MEETING MINUTES

RE:	Flood Study Team Meeting with Town of Bloomsburg Columbia County West End Flood Mitigation Study
DATE & TIME OF MEETING:	September 30, 2021 10:00AM – 11:30AM
LOCATION:	Town Hall – Council Chambers
MEETING ORGANIZER:	Borton-Lawson

ITEMS FOR DISCUSSION:

I. **Introduction/Overview of Meeting**

The meeting was lead by Borton-Lawson (BL) and BL's sub-consultant Jim Brozena of Brozena Consulting. Teri Provost from SEDA-COG was also present at the meeting, as well as numerous representatives from the Town of Bloomsburg including the mayor, Town Manager, Director of Public Works, Director of Governmental Services and lead for management of Floodplain Ordinance, and Police Sergeant responsible for emergency services.

The purpose of the meeting was to introduce Bloomsburg representatives to the West End Flood Mitigation Study as well as obtain feedback from the Town as related to parcels located within the floodway and floodplains in the study area located in Bloomsburg, obtain feedback on properties that have been or are in the process of acquisition, and obtain feedback on preferences for flood mitigation alternatives.

II. **Attendees**

Town of Bloomsburg
Justin Hummel - Mayor
Lisa Dooley – Town Manager
Charles Fritz - Director of Governmental Services
John Fritz – Director of Public Works
Emergency Services/ Police Sergeant

SEDA- Council of Government
Teri Provost – Director of Flood Resiliency and Housing

Borton Lawson Engineering
Samantha Albert – Project Manager, Water Services Leader
Tom Lawson –,Technical Lead, Senior Engineer
Jim Brozena – Brozena Consulting, Inc. –Nonstructural Mitigation Lead

III. **Study Objectives and Timeline**

The primary purpose of the West End Flood Mitigation Study is to identify potential flood mitigation alternatives for the West End section of the Town of Bloomsburg. Mitigation alternatives are classified into either structural (earthen levee/flood wall) or non-structural (home acquisitions, elevation raisings, flood proofing, etc). The

Study will evaluate induced flooding as a result of structural alternatives and also financial impacts to the Town and community as a result of non-structural alternatives.

The first public meeting was held on July 29th. A second Public meeting is tentatively scheduled for late November 2021. The final public meeting will take place at the conclusion of the study in March 2022.

IV. Data/Map Review

An overview of various maps prepared by BL was completed. This included a map showing the study area, a color-coded parcel map showing modeled depths of flooding from 2011 Lee Flood in structures, and a map showing structures in the Floodway and Floodplains. The maps also identified the approximate extents of Tropical Storm Lee flooding. The color coded parcel map identified vacant parcels, buyout parcels, and parcels located within the FEMA designated floodway and floodplain. Town officials were asked to provide feedback on the accuracy of the maps and noted that the Tropical Storm Lee flood extents appears reasonably correct.

V. Public Survey

BL briefly discussed the property owner survey that was mailed out to owners of all properties within the floodway/floodplain. The mailed survey is the same survey that is also available online in electronic format. Field topographic survey and property surveys are scheduled to take place in October by BL's surveyors and engineers. Discussion with the Town on notifying property owners of this field work in the newspaper and in the survey letters. The purpose of the field survey is to obtain structure information and first floor elevations.

VI. Discussion Points

1. An abbreviated PowerPoint presentation was provided by BL to the attendees reviewing the goals and purpose of the study and what types of flood mitigation alternatives are to be evaluated as part of the study.

2. Group discussion on the make-up of the study area within Bloomsburg West End - number of renters versus owners, number of residential versus commercial properties. BL requested the current list of renters from the Town if that was available. BL also requested current list of RL and SRL properties.

3. BL/ Jim Brozena requested updated list of properties within the Town that will participate in any buyout programs.

4. BL indicated that the Fairgrounds property is listed as a commercial property on the County GIS tax database.

5. The Town handles acquisitions/buyouts themselves and does not go through SEDA-COG. They are a direct entitlement community for CDBG.

6. Discussion on impacts to tax base with acquisition of structures within the floodway and floodplain. The Town expressed concern with loss of property taxes with this option. Town does not prefer the option of acquisition/demolition of all the properties in the floodway and floodplain. The Town indicated that they receive about $200,000 per year in amusement tax from the Fair.

7. Town expressed concerned with low property values within the floodway and floodplain areas. Concerned with fair buy out values to property owners so they are not hurt financially. The Mayor specifically expressed concern for disabled veterans who may own property in the floodway/floodplain areas, whose properties are tax exempt, and being compensated fairly for buy outs.

8. Discussion on benefits to the Town of not having structures in the floodway and floodplains.

9. Town suggested study area may include low to moderate income area. BL to verify as part of study.

10. Discussion on the ability to bring in fill in the floodplain to raise grade of properties. This would not be allowed in the floodway, and if it were done on a large scale in the floodplain modeling would need to be completed to evaluate impact. Also need to consider if this is in conflict with Town's Floodplain Management Ordinance.

11. Discussion on the use of eminent domain to require homeowners to rebuild in Zone X or outside of Floodway and Floodplain. All generally agreed it would be difficult process to implement, would not be received well by residents, overall not preferred.

12. Discussion on the concept of Mitigation Reconstruction for homes in the floodplain– demolish home and potentially subdivide parcel if footprint allows, and rebuild new home at higher/floodproof elevation - the Mayor liked this option.

13. The Town indicated that it was extremely difficult to get the current Floodplain Ordinance adopted, and did not think it would be possible by the Town to amend this ordinance to regulate structures within Zone X. BL requested a copy of the Town's current floodplain ordinance.

14. Town discussed their desire to have a stream gage added to Fishing Creek to monitor stream levels, possibly at Railroad Street.

15. BL reviewed proposed levee alignment concepts and associated preliminary cost estimates. Also review a low height levee concept along Fishing Creek that could effectively change a portion of the floodway to a floodplain, which allows more funding for elevations and mitigation reconstruction projects.

16. BL reviewed the concept to rebuild homes on higher ground within the Town limits. Three parcels of vacant land on high ground, brought to BL's attention by the County, were discussed with the Town as an option for rebuilding homes.

17. Teri Provost suggested looking at the American Rescue Plan Act and use for under QCTs (Qualified Census Tracts).

18. The Town will provide BL the list of parcels they own.

19. BL discussed that the Bloomsburg Municipal Authority reached out to them to inquire as to why they were not included in this study, and then requested BL provide a proposal to complete a flood mitigation study for their WWTP facility.

20. The Town indicated that they currently have a Code Red system but they may not be keeping it.

21. Discussion on the Town's Evacuation Plan. There is good communication in place, biggest concern is Fishing Creek flash flooding. The Town has an Emergency Action Plan from the County and they use the same plan.

22. BL will inform the Town when the BL surveyors and engineers will be in the Town performing topographic and physical structure surveys. The Town mentioned that posters regarding the mailed homeowner surveys and the upcoming field survey could be posted on Leonard & West Main St for public viewing.

MEETING MINUTES

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RE:	Flood Study Team Meeting with Montour Township Columbia County West End Flood Mitigation Study
DATE & TIME OF MEETING:	September 16, 2021 1:00PM - 2:30PM
LOCATION:	Montour Township Municipal Building 195 Rupert Drive
MEETING ORGANIZER:	Borton-Lawson

ITEMS FOR DISCUSSION:

I. **Introduction/Overview of Meeting**
The meeting was lead by Borton-Lawson (BL) and BL's sub-consultant Jim Brozena of Brozena Consulting. The purpose of the meeting was to introduce Montour Township (Township) representatives to the West End Flood Mitigation Study as well as obtain feedback from the Township related to parcels located within the floodway and floodplains in Montour Township section of the study area.

II. **Attendees**
A sign-in sheet was provided at the meeting and is attached to these minutes.

III. **Study Objectives and Timeline**
The primary purpose of the West End Flood Mitigation Study is to identify potential flood mitigation alternatives for the West End section of the Town of Bloomsburg. Mitigation alternatives are classified into either structural (earthen levee/flood wall) or non-structural (home acquisitions, elevation raisings, flood proofing, etc). The Study will evaluate induced flooding as a result of structural alternatives and also financial impacts to the township and community as a result of non-structural alternatives.
The first public meeting was conducted on July 29th.
A second Public meeting is tentatively scheduled for late November.
The final public meeting will take place at the conclusion of the study in March.

IV. **Data/Map Review**
Jim Brozena of Brozena Consulting Services provided township officials an overview of a color-coded parcel map prepared by Borton-Lawson. The map identified approximate extents of Tropical Storm Lee flooding as well as vacant parcels, buyout parcels, and parcels located within the FEMA designated floodway and floodplain. Township officials were asked to provide feedback on the accuracy of the maps and noted that the Tropical Storm Lee flood extents appears reasonably correct.

V. **Public Survey**
Samantha Albert briefly discussed the property owner survey that was mailed out to owners of all properties within the floodway/floodplain. The mailed survey is the same survey that is also available online in electronic format. Physical property

surveys will take place at a later date to collect structure information and determine first floor elevations.

VI. Discussion Points

1. 9 Perry Avenue was identified for acquisition. Residents moved in without permission and Township lawyers are currently involved.

2. The county building located on Perry Avenue has experience frequent flooding damage and is currently not used except for the rear of the building which is still utilized by the maintenance department.

3. Most of the trailers located within the trailer park on Perry Avenue were flooded as a result of Tropical Storm Lee. The preliminary FEMA mapping shows the special flood hazard area increasing on this property.

4. The Montour Township ordinance regulates the 500-year floodplain by requiring permits for any development within this zone.

5. An evacuation plan is required from the RV park by the township ordinance. Regulations are not followed and an evacuation plan has not been provided as of this time.

6. The township is interested in buying out a property along Hemlock Creek where inoperable vehicles are stored on the property and near the creek.

7. An error was noted on the parcel map at 238 Jackson Street. The property where the police station and maintenance buildings are located is identified as vacant.

8. There are three (3) sanitary pump stations located within the study area that are impacted by flooding.

    a. Pump Station on Hock Road becomes inundated and needs to be raised.

    b. Pump Station on Perry Avenue has had electrical components raised.

    c. Design has been completed to raise the electrical components of the pump station located near the campground.

9. The Township expressed frustration with previous experience participating in property buyout programs. Montour Township was forced to take out a loan for several hundred thousand dollars to complete the acquisitions and was not made whole for several years.

10. A discussion on Legion Road, although outside of the project study limits, revealed that Legion Road was not flooded in Tropical Storm Lee; however, the bend of the creek flooded as was Thunder Chicken Auto Sales. One home has been acquired in this area and the Township continues to pursue action using code enforcement and buyouts.

11. Borton-Lawson will inform Montour Township when the survey mailings have been sent and when crews will be in the township performing physical structure surveys.

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SIGN IN SHEET

RE:	Meeting - Flood Study Team with Montour Township Columbia County West End Flood Mitigation Study
DATE & TIME OF MEETING:	September 16, 2021 1;00PM -2:30PM
LOCATION:	Montour Township Municipal Building 195 Rupert Drive
MEETING ORGANIZER:	Borton-Lawson

NAME	ORGANIZATION	EMAIL
Samantha Albert	Borton Lawson	salbert@borton-lawson.com
Clint Sorber	Borton-Lawson	csorber@borton-lawson.com
Lori Ebright	Montour Twp	lorie@montourtownship.org
Max Stoner	Glace Associates	max@glaceeng.com
Ashley Ebright	Montour Twp	aebright@montourtownship.org
Terry Eckart	Montour Twp	teckart@ptd.net
Mike Hinkle	Montour Twp	mikehinkle251@gmail.c[illegible]
Jim Brozena	Brozena Consulting Sve	jbrozena@brozenaconsulting.com
Linda Woodward	Montour Twp	lynwoodappraisals@yahoo

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MEETING MINUTES

RE:	Flood Study Team Meeting with Hemlock Township Columbia County West End Flood Mitigation Study
DATE & TIME OF MEETING:	September 23, 2021 9:00AM - 10:30AM
LOCATION:	Hemlock Township Municipal Building 26 Firehall Road
MEETING ORGANIZER:	Borton-Lawson

ITEMS FOR DISCUSSION:

I. **Introduction/Overview of Meeting**
The meeting was conducted by Borton-Lawson Engineering and Brozena Consulting Services. The purpose of the meeting was to introduce Hemlock Township representatives to the West End Flood Mitigation Study which includes the Town of Bloomsburg, Montour Township, and Hemlock Township as key stakeholders.

II. **Attendees**
A sign-in sheet was provided at the meeting and is attached to these minutes.

III. **Study Objectives and Timeline**
The primary purpose of the West End Flood Mitigation Study is to identify potential flood mitigation alternatives for the West End section of the Town of Bloomsburg. Mitigation alternatives are classified into either structural (earthen levee/flood wall) or non-structural (home acquisitions, elevation raisings, flood proofing, etc). The Study will evaluate induced flooding as a result of structural alternatives and also financial impacts to the township and community as a result of non-structural alternatives.
-The first public meeting was conducted on July 29th.
-A second Public meeting is tentatively scheduled for late November.
-The final public meeting will take place at the conclusion of the study in March.

IV. **Data/Map Review**
Jim Brozena of Brozena Consulting Services provided township officials an overview of a color-coded parcel map prepared by Borton-Lawson. The map identified approximate extents of Tropical Storm Lee flooding as well as vacant parcels, buyout parcels, and parcels located within the FEMA designated floodway and floodplain. Township officials were asked to provide feedback on the accuracy of the maps and noted that the Tropical Storm Lee flood extents appear reasonably correct.

There are approximately 126 parcels within the study area in Hemlock Township. Approximately 37 parcels are impacted by either the floodway or floodplain.

V. **Public Survey**
Samantha Albert briefly discussed the property owner survey that was mailed to owners of all properties within the floodway/floodplain. The mailed survey is the

same survey that is also available online in electronic format. Physical property surveys will take place at a later date to collect structure information and determine first floor elevations.

VI. Discussion Points

1. Borton-Lawson informed Hemlock Township that residents should soon be receiving surveys that were sent via US mail. Borton-Lawson will also inform the township when crews will be performing physical structure surveys.

2. A large number of buyouts occurred as part of an HMGP Project (~2013) after Tropical Storm Lee in 2011. Properties that withdrew or were administratively withdrawn include:
    a. 24 William Street
    b. 270 William Street

3. Eric Stahley asked if the properties within the study area are renters or owners. Michele Bella replied that properties are primarily owner occupied.

4. It is noted that many of the homes located along the upper side of Drinker Street, though situated on higher ground, still experience significant basement flooding. 399 Drinker Street was highlighted as experiencing basement flooding to the floor joists during Tropical Storm Lee.

5. Evacuation Routes and Planning are a priority for the Township as many properties become isolated when Fishing Creek flooding occurs.
    - Red Mill Road floods blocking evacuation to the west.
    - Bloom Street/Creek Road floods blocking evacuation to the east.
    - Jim Brozena mention the potential of constructing a gated stone road connecting Hassert Lane to Laurel Drive to serve as an emergency evacuation route. Hemlock Township officials replied that there is an existing field road from Red Mill Road that has been used by emergency services to reach otherwise inaccessible areas.
    - A deep gully between Hassert Lane and the Ferncliff Road community would prevent these residents from utilizing this potential evacuation route if Bloom Street is flooded unless a bridge or culvert was constructed across the gully.
    - A solution providing an alternative exit route does not solve the issue of flooding along Creek Road. Township officials are interested in a plan to raise the profile of Creek Road above the floodplain.

6. The implementation of a structural flood mitigation solution in the West End of Bloomsburg would result in induced flooding on the opposite bank in the community of Fernville. Induced flooding could impacts homes which are not currently impacted or homes which have already been elevated. A structural option such as a floodwall or earthen levee would include a mitigation component for impacted communities upstream and downstream of the project.

7. Hemlock Township has a sewer co-op. A sanitary pump station located at Red Mill Road and Drinker Street has been elevated.

8. Hemlock Township is located in the Bloomsburg School District.

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SIGN IN SHEET

RE: Flood Study Team Meeting with Hemlock Township
Columbia County West End Flood Mitigation Study

DATE & TIME OF MEETING: September 23, 2021
9:00AM - 10:30AM

LOCATION: Hemlock Township Municipal Building 195 Rupert Drive

MEETING ORGANIZER: Borton-Lawson

NAME	ORGANIZATION	EMAIL
Samantha Albert	Borton-Lawson	salbert@borton-lawson.com
Clint Sorber	Borton-Lawson	csorber@borton-lawson.com
Jim Brozena	Brozena Consulting	jbrozena@brozenaconsulting.com
Eric Stahley	Columbia County	estahley@columbiapa.org
Michelle Bella	Hemlock Township	bella@hemlocktownship.org
Jeff Sutton	Hemlock Township	sutton@hemlocktownship.org
Dan Carr	Hemlock Township	dancarr1@verizon.net
Scott Traugh	Hemlock Township	traugh@hemlocktownship.org
Andy Keister	MKA	akeister@mctish.com

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WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix E

Mitigation Alternatives and Concept Plans

WEST END FLOOD MITIGATION STUDY

,COLUMBIA COUNTY, PENNSYLVANIA

Appendix E – Mitigation Alternatives and Concept Plans

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WEST END FLOOD MITIGATION STUDY

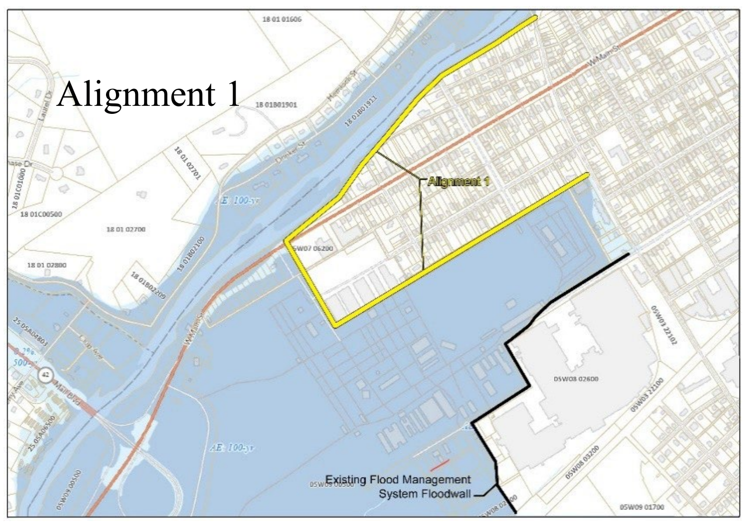
COLUMBIA COUNTY, PENNSYLVANIA

Appendix E

Mitigation Alternatives and Concept Plans

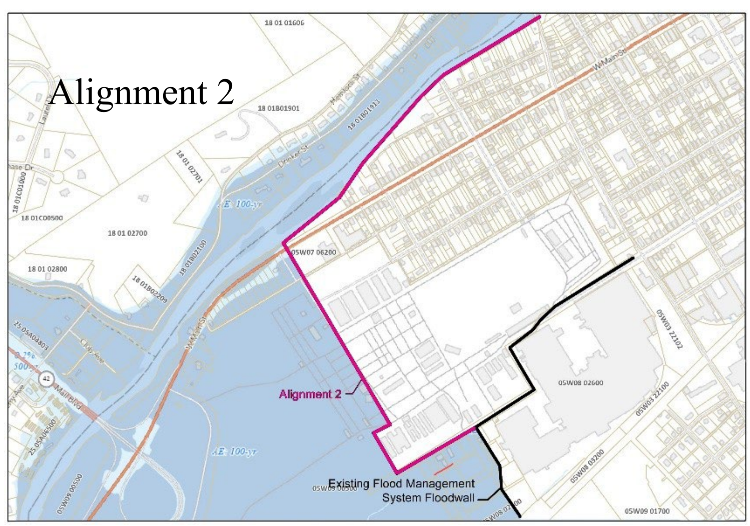
E.1 Mitigation Alternatives

The floodwall or levee system alternative for the west end of Bloomsburg considered impacts to the Town tax base and the community fabric, present and future. Two alignments were considered as shown and outlined below:



Alignment 1 would be a levee or floodwall system extending along the left bank of the creek from the Railroad Street Bridge westward, then south to a point where it would turn east resulting in a U-shaped system tying out to high ground near Scott Avenue and W. Anthony Street. This alignment would avoid the Fairgrounds to minimize disruption to access points and the general operation of the facility. It was also thought to be more economical.

Right-of Way constraints limited the type of system options to an H-pile or sheetpile floodwall.



Alignment 2 (*pictured right)* would extend through the Fairgrounds to tie into the first floodwall system in the vicinity of 6th Street. The Fairgrounds expressed interest in participating in this alignment due to the repeated flooding on their large parcel with 54 structures.

This alignment was not as limited as Alignment 1 with regard to right-of-way thus permitting the use of more economical earth and MSE levees.

E.2 Prioritization Process

Prioritizing structural system alignments usually depends on the number and type of structures behind the system, available real estate, community support, permitting issues, and the total project cost.
Alignment #1 is actually higher in cost as #2 with 54 fewer buildings behind the system.

The fairgrounds also overwhelmingly supports alignment 2 even though it will require a sizeable area for the system footprint and access easements.

Alignment #2 was carried forward for final consideration as a structural system.

E.3 Proposed System Rendering

The proposed alignment is shown below as a schematic level concept without the benefit of detailed design documentation and analysis. The Fishing Creek floodway will be encroached upon in a significant way. The flow depths through the floodway area are shallow however, an H&H analysis performed to verify the induced flooding impacts resulted in about two (2) feet of increase in the base flood levels. This

must be decreased through mitigation efforts to zero feet.

The alignment minimizes property takes, however, several properties will need to be acquired and as many as nine other properties will require partial takes for removal of garages and sheds along the levee alignment. Arriving at the proposed alignment considered the construction cost and the impact of reducing the tax base with property takes.

The system features represent the proper mix of context sensitive floodwall and levees on the most cost effective alignment for flood mitigation. A cost estimate for the proposed alignment was developed for the economic analysis. A summary of the estimate is included at the end of this section.

Hydraulic analysis of the system was performed to determine induced flooding impacts up and down stream and the impact on obtaining FEMA approval for a structural system in the creek floodway.

E.4 Levee/ Floodwall System Description

The recommended project (Alternate 2) will consist of a system of earthen levees, mechanically stabilized earth (MSE) floodwalls, concrete floodwalls, sheet pile floodwalls, road closure structures, and a storm water pumping station. Earthen and MSE levees are proposed for the majority of the flood protection alignment. Riprap will be utilized to protect the waterside slopes of the system along Fishing Creek.

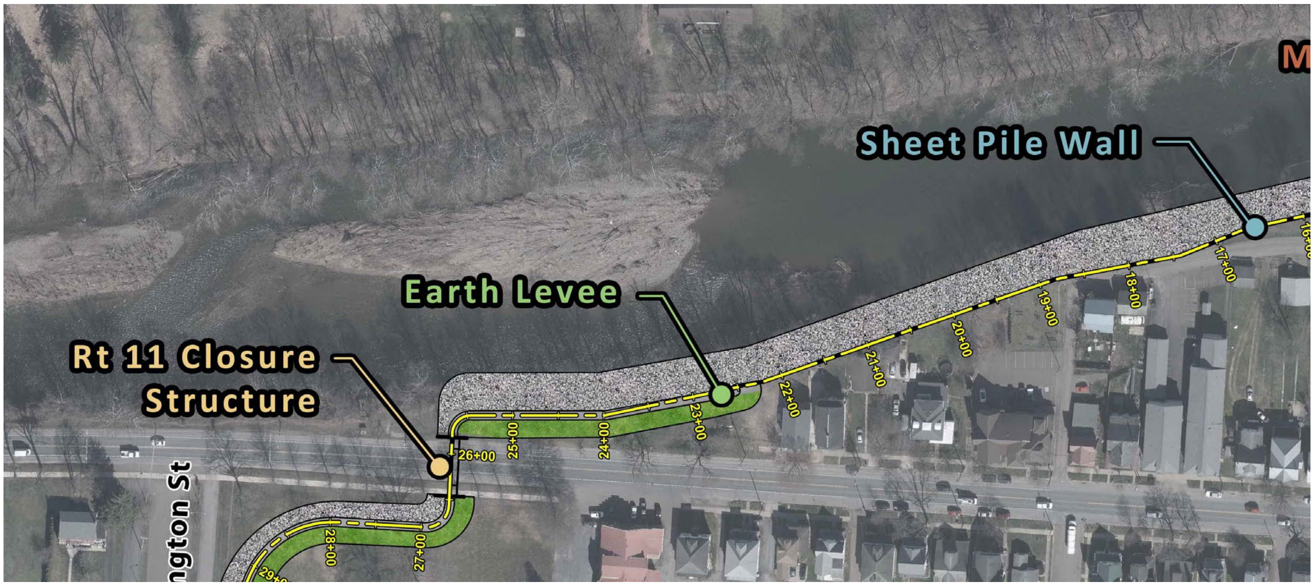
The system begins immediately to the East of Railroad Street where the earthen levee ties into high ground. The top of the system at this location is Elevation 491.00. The alignment proceeds westward across Railroad Street which is at Elev. 490.0 +/- . The roadway would be raised approximately one foot. The top of protection elevation descends from Elev. 491.00 at Railroad Street to Elev. 485.00 at the Route 11 closure structure.

On the west side of Railroad Street, an earthen levee with a landside toe drain extends downstream to Station 11+50. Through this reach the levee crest is 10' wide with a land side slope of 2.5 Horizontal to 1 Vertical (2.5H:1V) and a riverside side slope of 2H:1V. This reach of the system is through a residential area. The riverside toe will extend into the bed of the creek since severe erosion since the 2011 Lee Flood has caused loss of the bank along this reach of the creek. The riverside levee slope will be protected by 18 to 24" riprap.

A MSE levee then extends westward adjacent to Fishing Creek from Sta. 11+50 to14+50. The MSE levee has a 12' wide crest with vertical wall faces, fall protection railings and a landside toe drain. The MSE levee will have a riverside slope of 2H:1V. This reach of the system is also through a residential area. The riverside toe will extend into the bed of the creek

Starting at Sta. 14+50 a sheet pile wall is proposed 4 feet from the top of bank to Sta. 22+50.
A concrete cap can be added to the sheet piling for additional strength and aesthetics.

This reach of the line of protection is on an alignment with minimal lateral clearance through the residential area. The riverside levee slope will be protected by 18 to 24" riprap.



Beginning at Sta. 22+50, an earth levee will extend to the Route 11 road closure structure abutment at Sta. 25+70+_. The stop log closure across route 11 is approximately 6 feet in height if the roadway is not raised. Being a state highway and also being in the floodplain, it was determined that the road should not be raised to lower the activation frequency.

On the south side of the closure, an earth levee begins at Sta. 26+50 extending to the Fairgrounds road closure structures 2 and 2A. The top of levee is at Elevation 485.00, about 6 to 7 feet in height. Flow velocities from the creek overbank flows during higher level flood events requires 24” riprap on the levee slope.

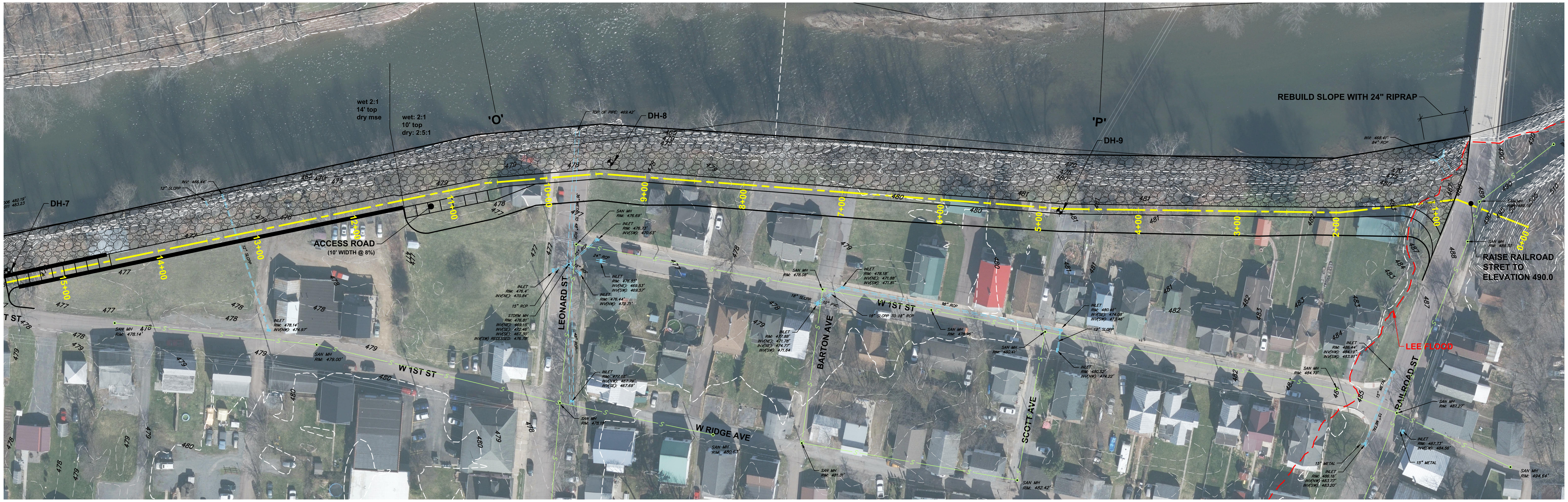
Closures 2 and 2A are proposed to be automatic Floodbreak type of closures since the creek flows in this area are fast rising compared to the river backwater which is also a source of flooding in the west end of Bloomsburg. To minimize the activation frequency, the ground level would be raised to elevation 478.00 as indicated on the concept plans.

An MSE levee of varying heights is proposed from the abutment of closure 2A at Sta. 31+30 to the tie-in to a concrete floodwall at Sta. 59+95. The tie-in location is near Closure 5 of the Columbia County levee System #1. This location is also the lowest existing elevation, approximately Elev. 470.5. With a top of system elevation of 485.00, the MSE levee would be about 14 feet in height. Extensive investigation of the embankment stability and underseepage potential will be required to determine the final width of the crest of the levee and the riverside earth slope which is assumed to be 3:1. Underseepage may require a deeper base trench (See MSE levee cross section in concept plans). Other options would be a slurry cutoff trench or sheeting.

The above stretch of MSE levee has three access road closure structures located at Sta, 40+35, Sta. 46+10, and sta. 47+25. They are proposed stop log closures 10 feet in height.
To minimize the erection time for each flood event, it is assumed most of the approximately 10 foot segments of stop logs between the steel column supports can remain in place until a major Fairgrounds event which would require removal to fully open the access points.

42+00
43+00
44+00
45+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
55+00
56+00
57+00
58+00
59+00
60+00
Gates 4 & 5 Closure Structure
Pump Station
MSE Levee
Retaining Wall Tie-in
St

E.5 Concept Plans and Typical Sections and Details



PLAN

SCALE: 1 INCH = 50 FEET
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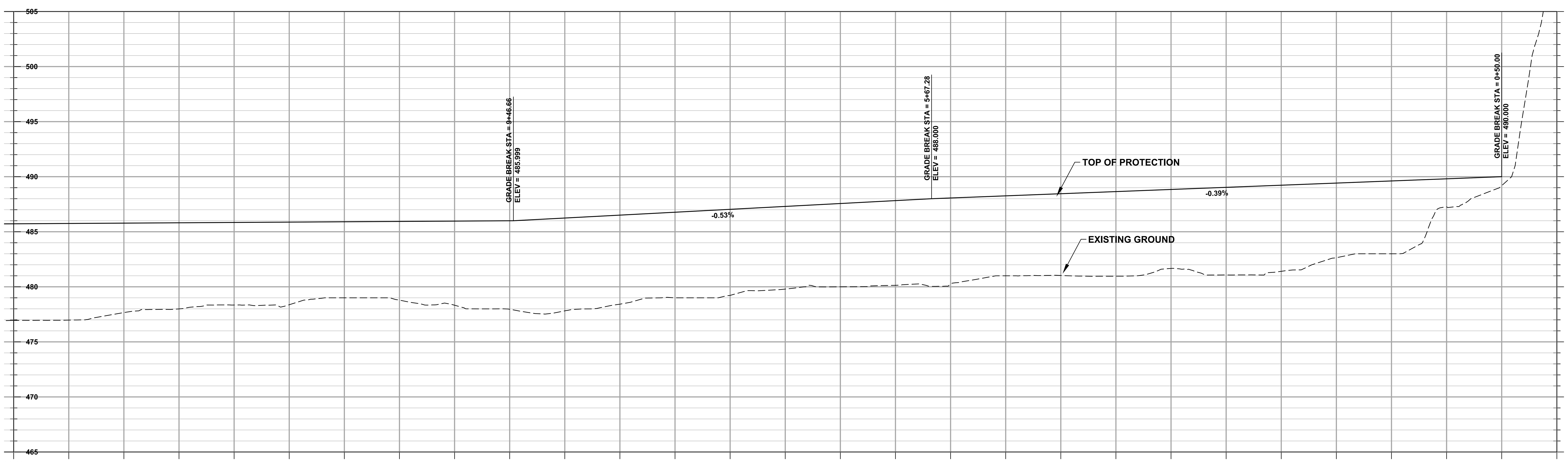

VERTICAL SCALE: 1 INCH = 5 FEET
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PROFILE

HORIZONTAL SCALE: 1 INCH = 50 FEET
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SEALS

CONCEPTUAL DESIGN

REVISIONS

NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

PLAN AND PROFILE STATION 0+00 TO 14+00

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	C101

PLAN

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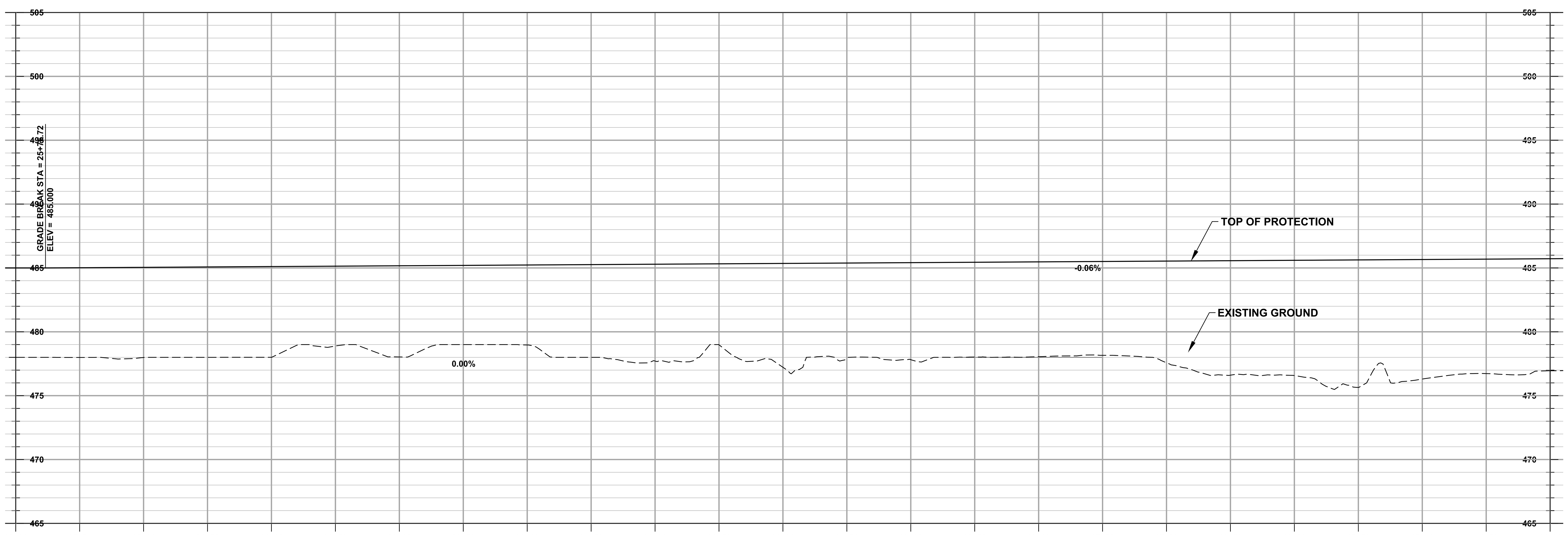

VERTICAL SCALE: 1 INCH = 5 FEET

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HORIZONTAL SCALE: 1 INCH = 50 FEET

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CONCEPTUAL DESIGN

REVISIONS

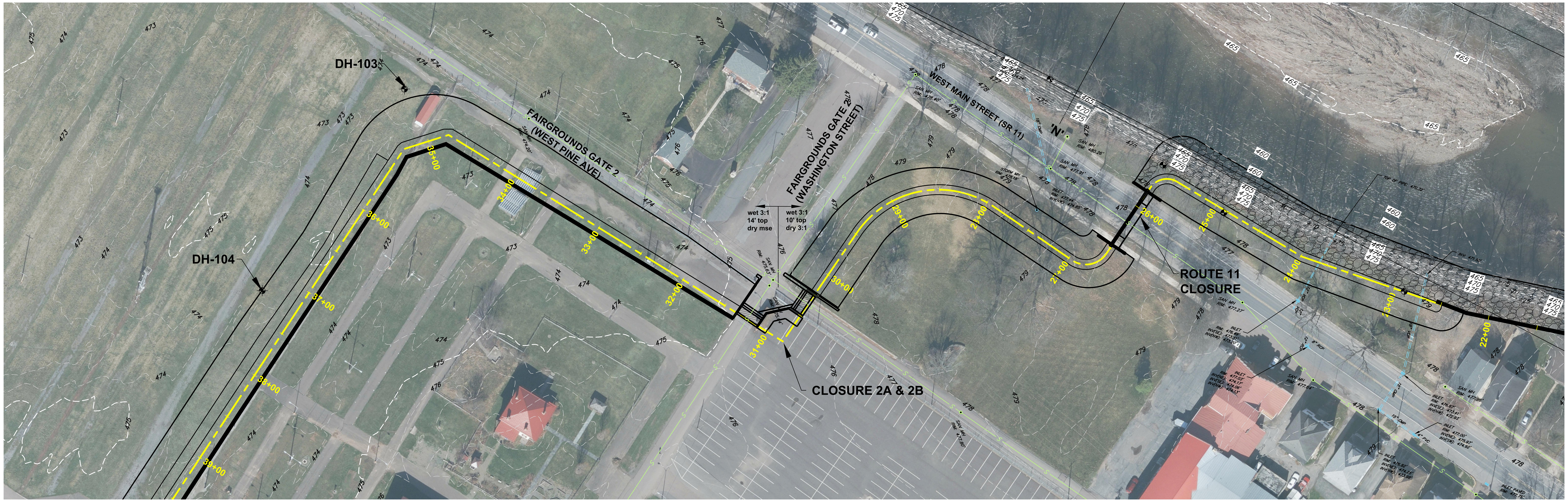
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

PLAN AND PROFILE STATION 14+00 TO 26+00

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	C102



PLAN

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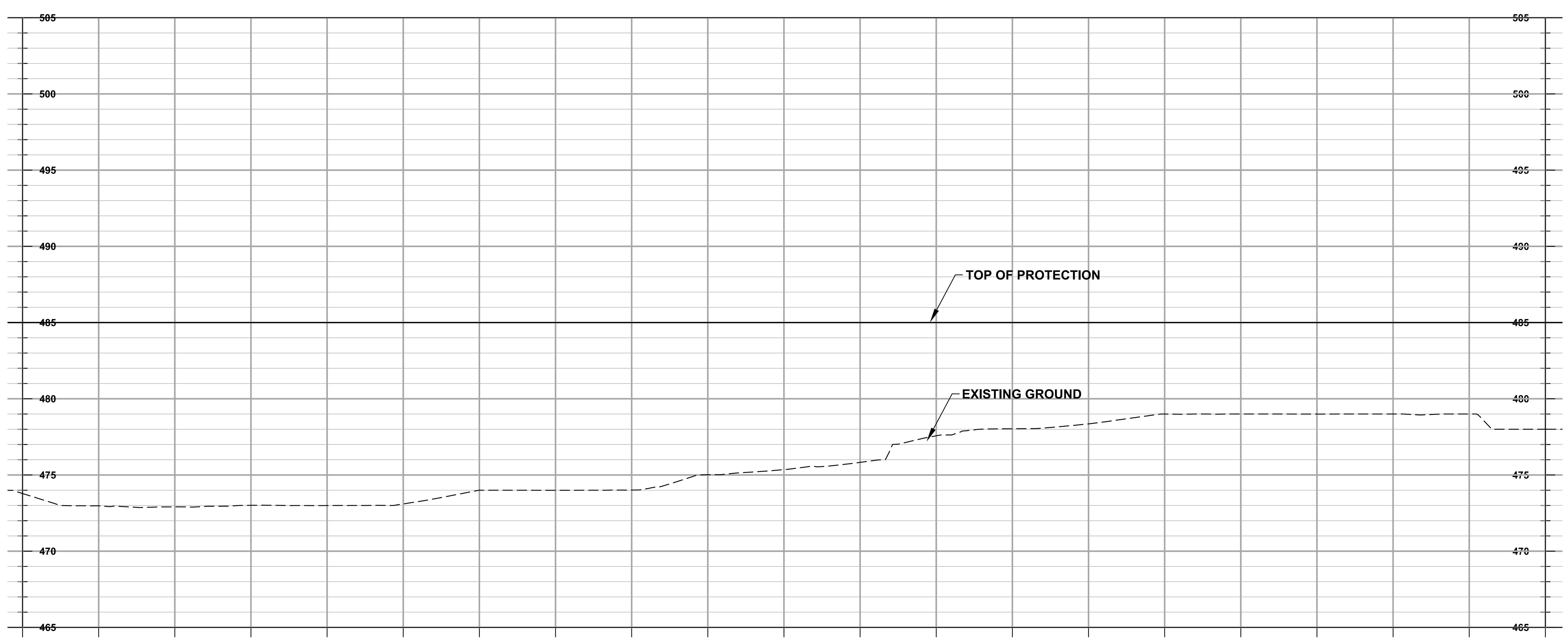

VERTICAL SCALE: 1 INCH = 5 FEET

0' 5' 10' 15'

PROFILE

HORIZONTAL SCALE: 1 INCH = 50 FEET

0' 50' 100' 150'

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REVISIONS

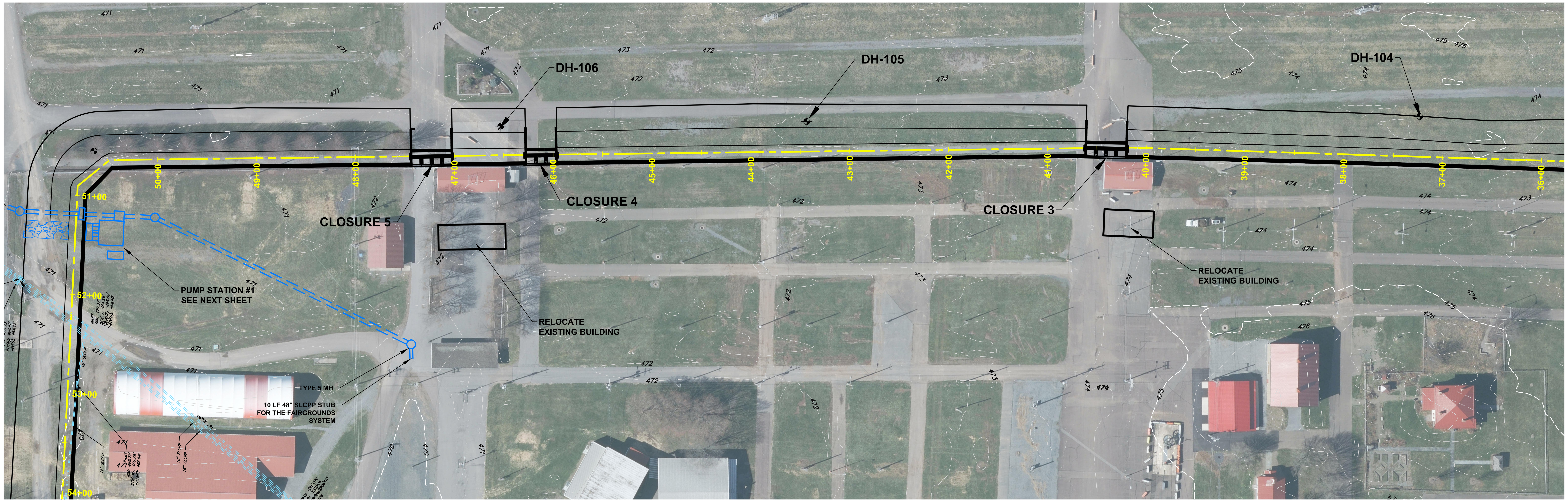
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

PLAN AND PROFILE STATION 26+00 TO 36+00

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	C103



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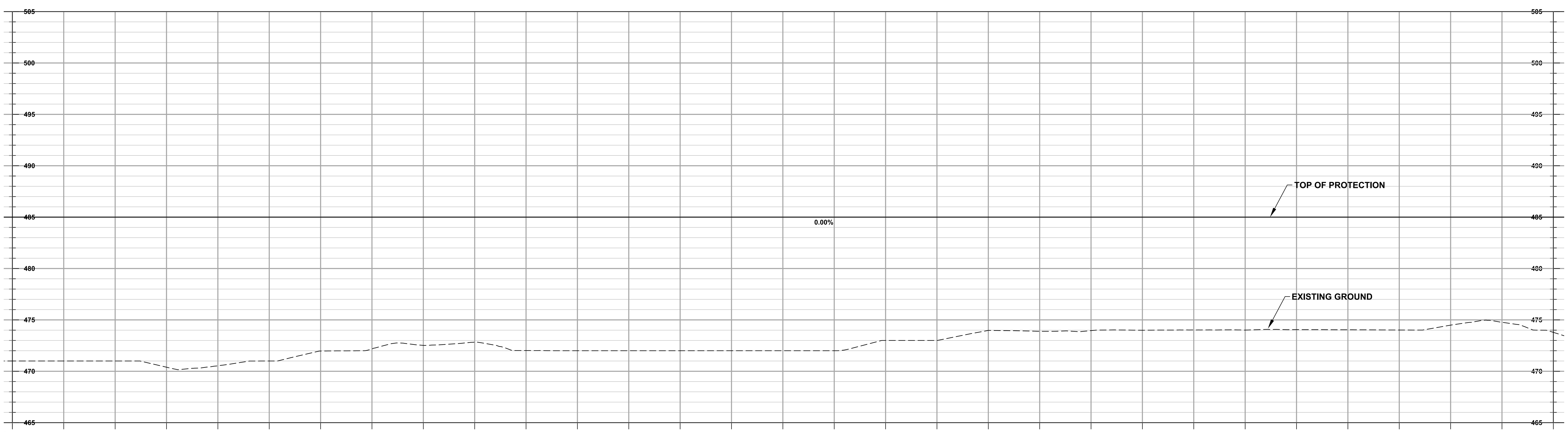

VERTICAL SCALE: 1 INCH = 5 FEET

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PROFILE

HORIZONTAL SCALE: 1 INCH = 50 FEET

0' 50' 100' 150'

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SEALS

CONCEPTUAL DESIGN

REVISIONS

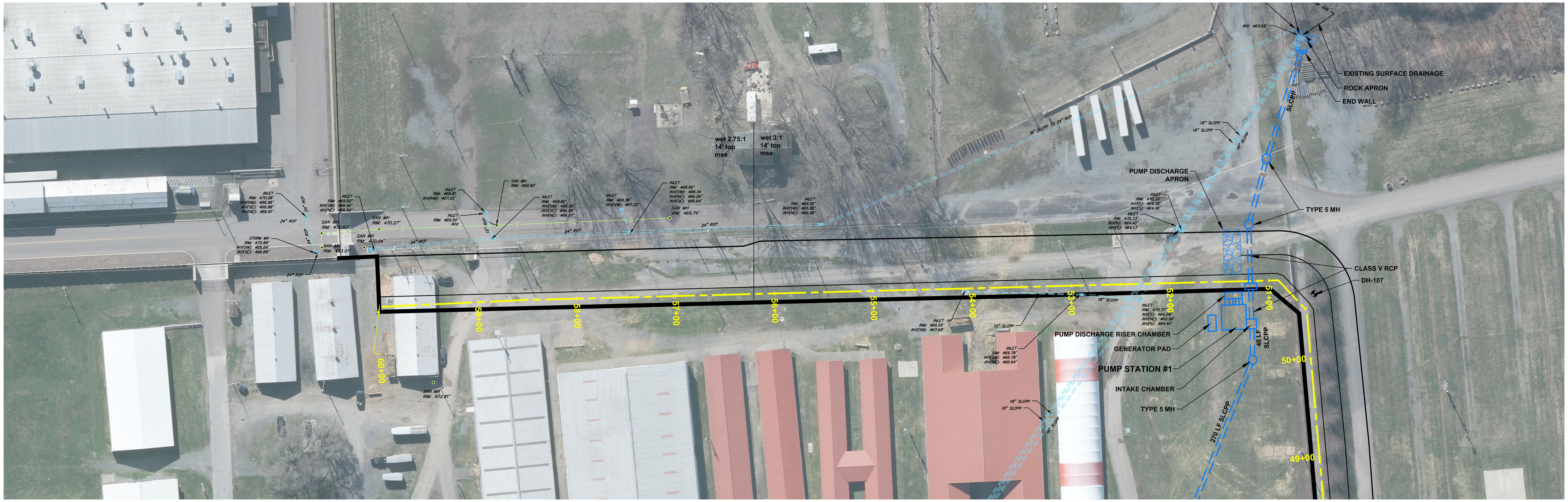
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

PLAN AND PROFILE STATION 36+00 TO 51+00

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	C104



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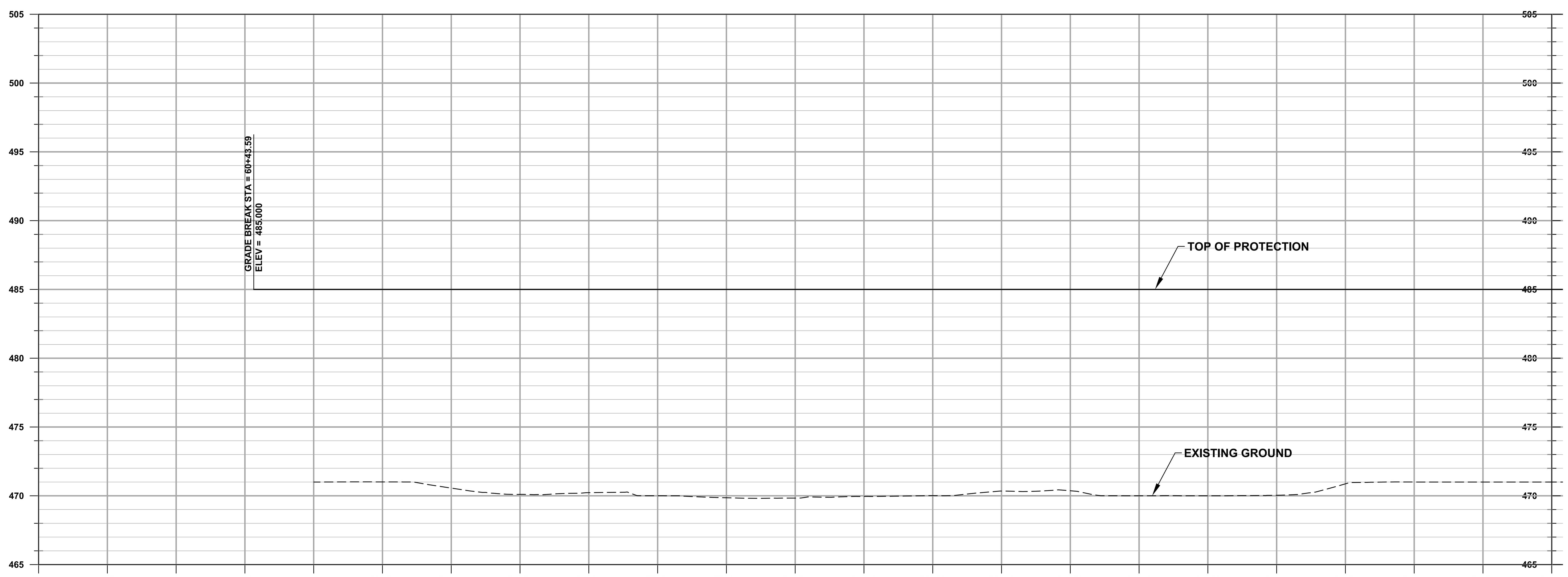

VERTICAL SCALE: 1 INCH = 5 FEET

0' 5' 10' 15'

PROFILE

HORIZONTAL SCALE: 1 INCH = 50 FEET

0' 50' 100' 150'

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SEALS

CONCEPTUAL DESIGN

REVISIONS

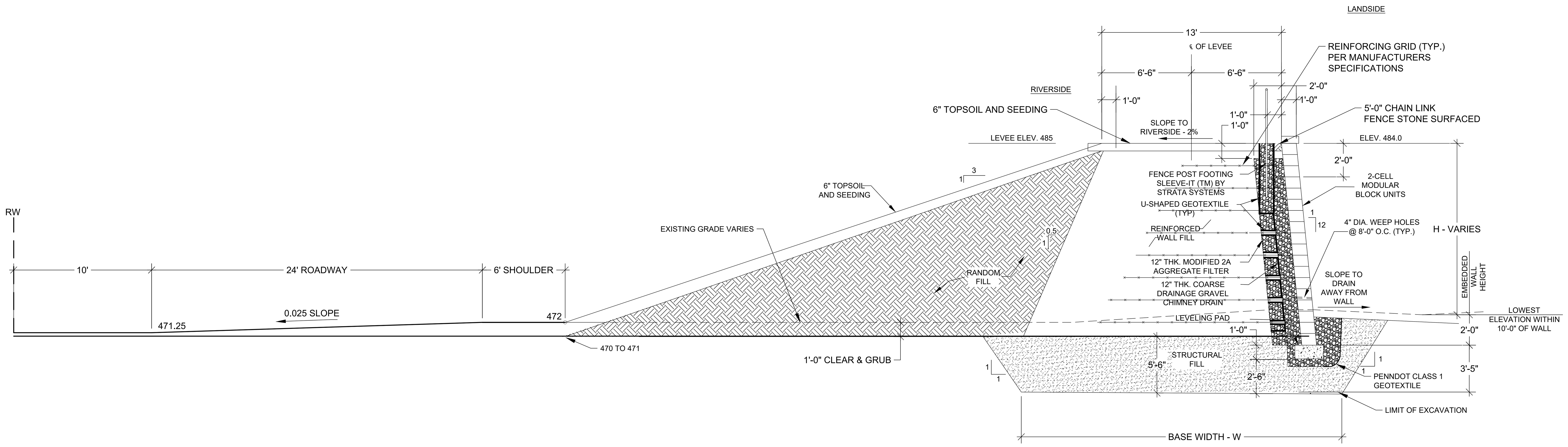
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

PLAN AND PROFILE STATION 51+00 TO 62+00

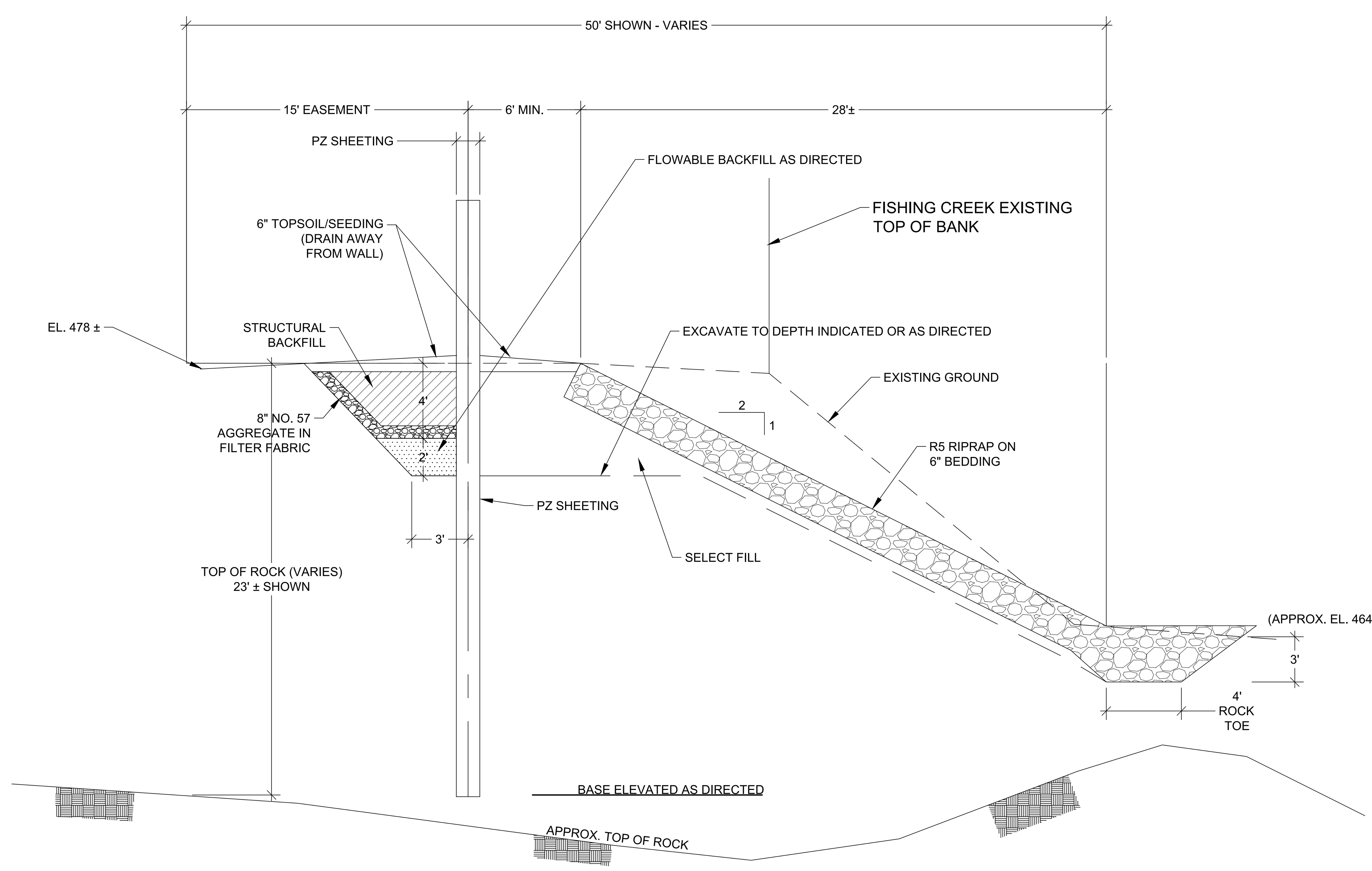
COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	C105



6TH STREET MSE LEVEE SECTION

SCALE: NTS



SECTION AT SHEETPILE WALL - STATION 23+00 SHOWN

SCALE: 1"=5'-0"

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SEALS

CONCEPTUAL DESIGN

REVISIONS

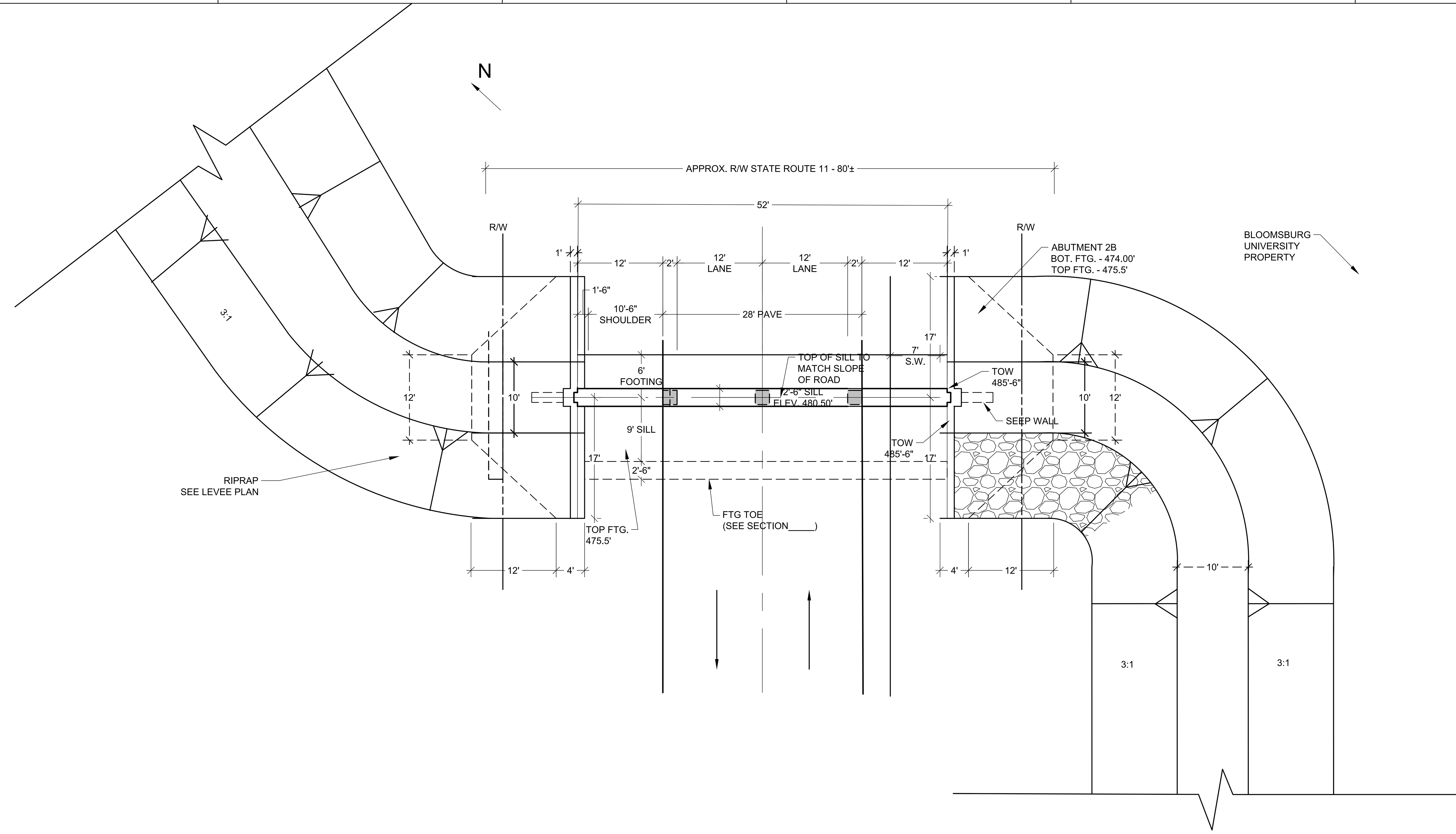
NO.	DATE	DESCRIPTION

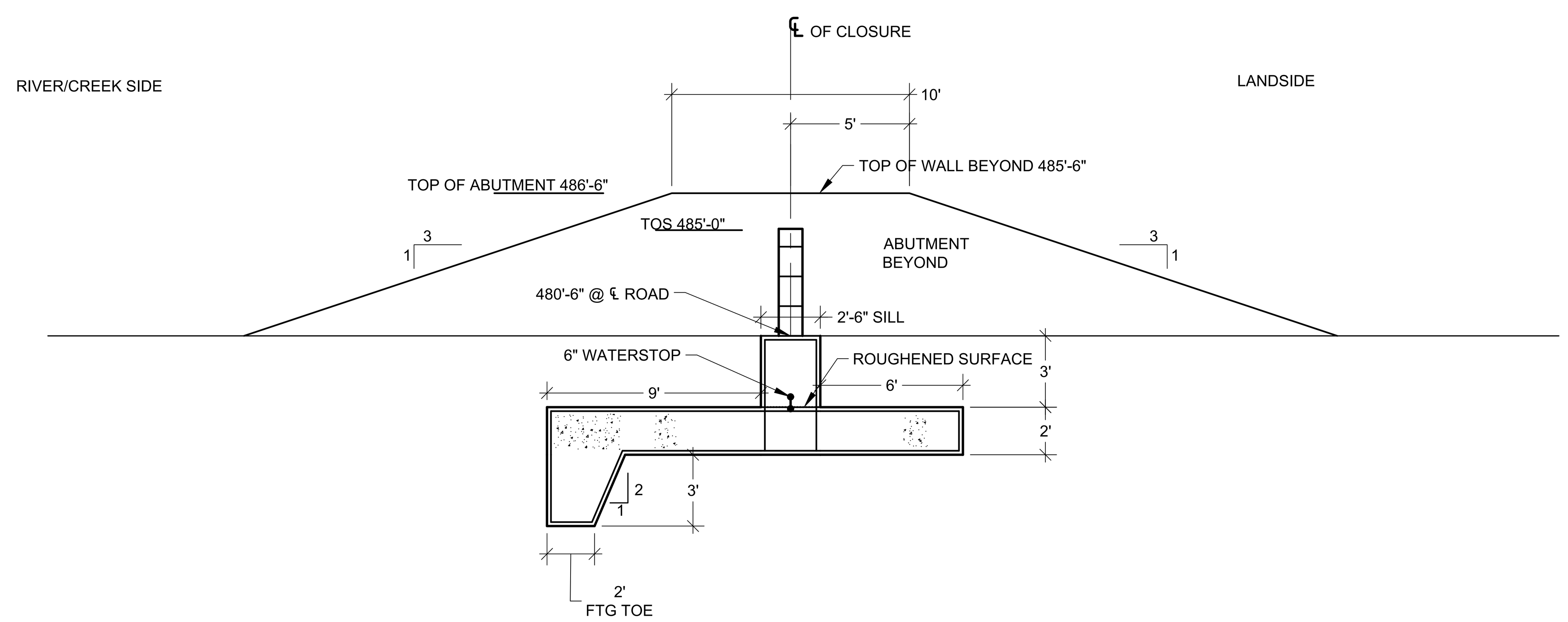
DRAWING TITLE & PROJECT NAME

TYPICAL SECTIONS

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-901





SECTION - ROUTE 11

SCALE: NTS

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REVISIONS

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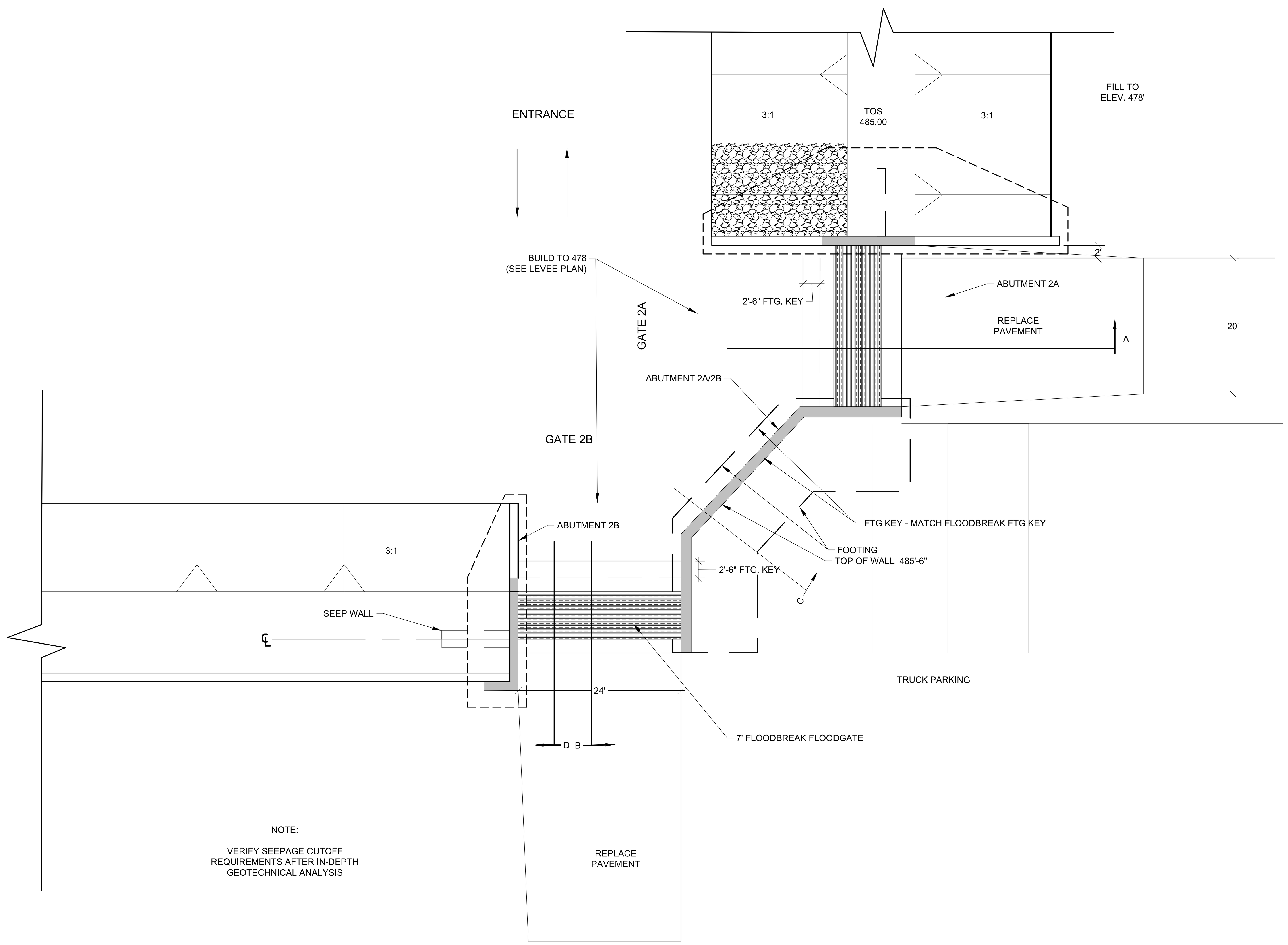
US ROUTE 11 CLOSURE

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-902



GATE 2 PLAN VIEW

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SEALS

CONCEPTUAL DESIGN

REVISIONS

NO.	DATE	DESCRIPTION

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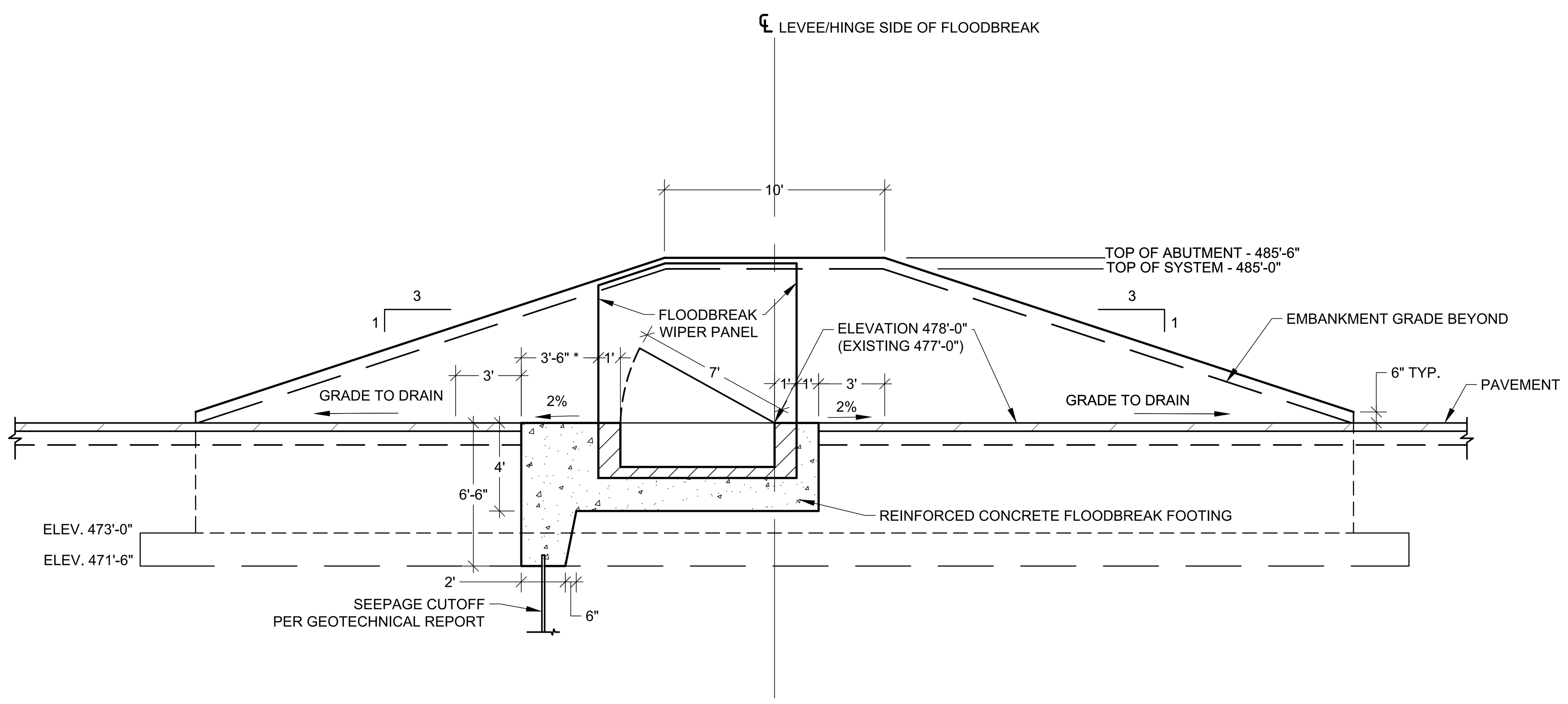
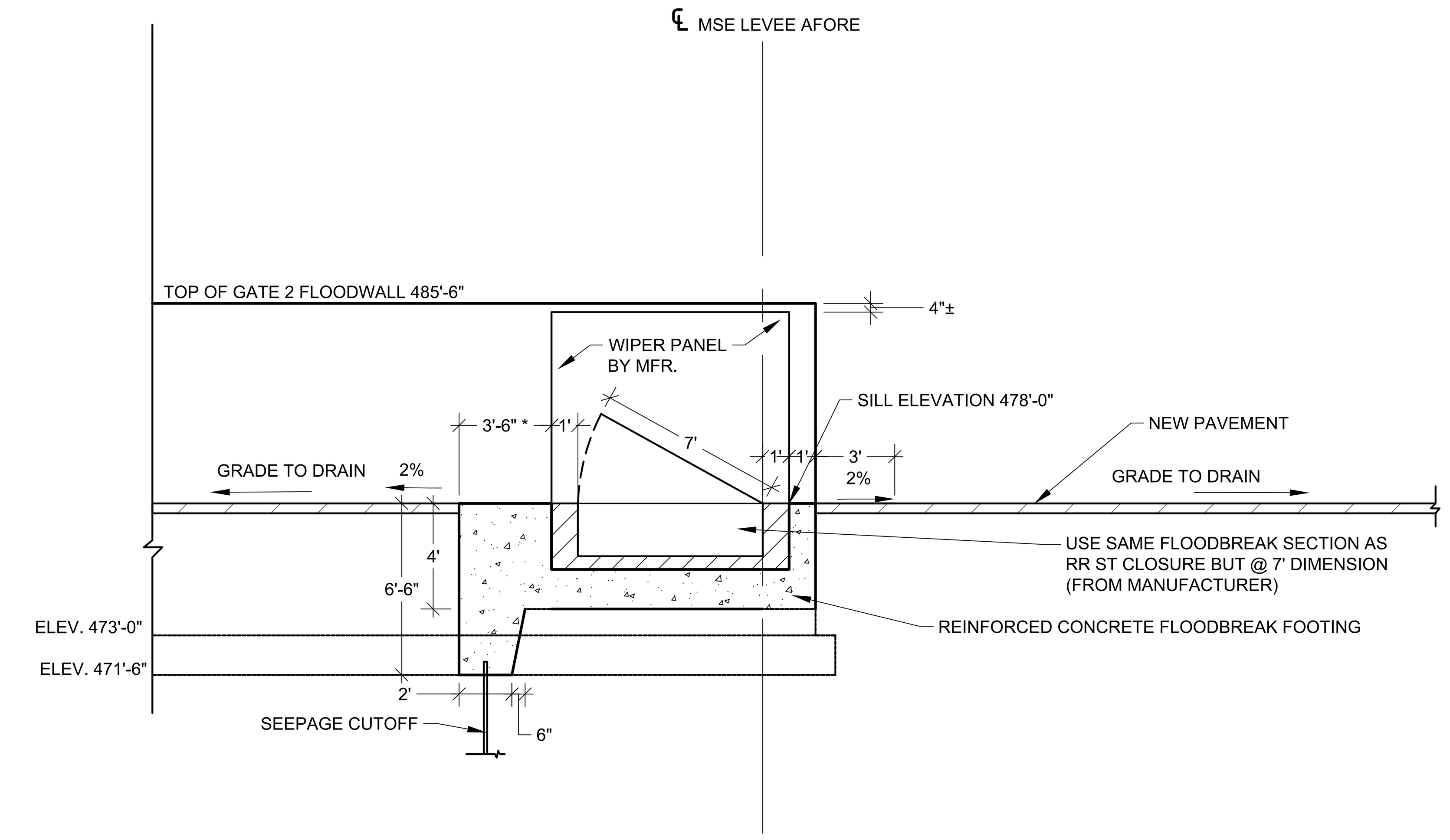
GATE 2A & 2B CLOSURES

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-903



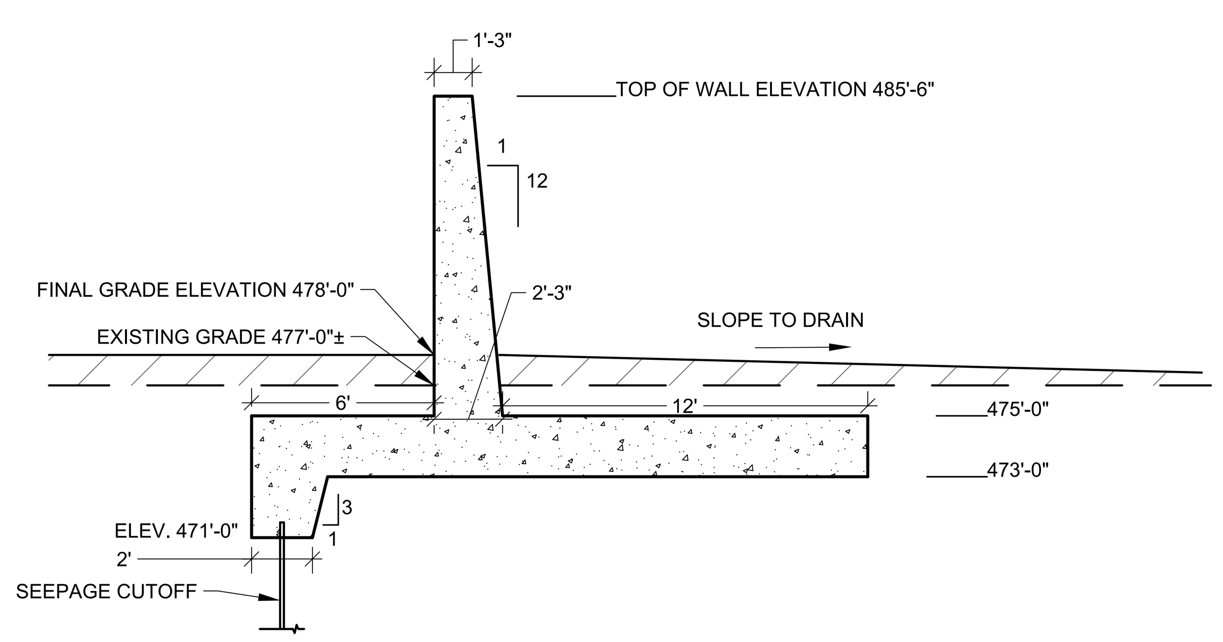
GATE 2A - CLOSURE
SECTION A



GATE 2 - CLOSURE 2B
SECTION B

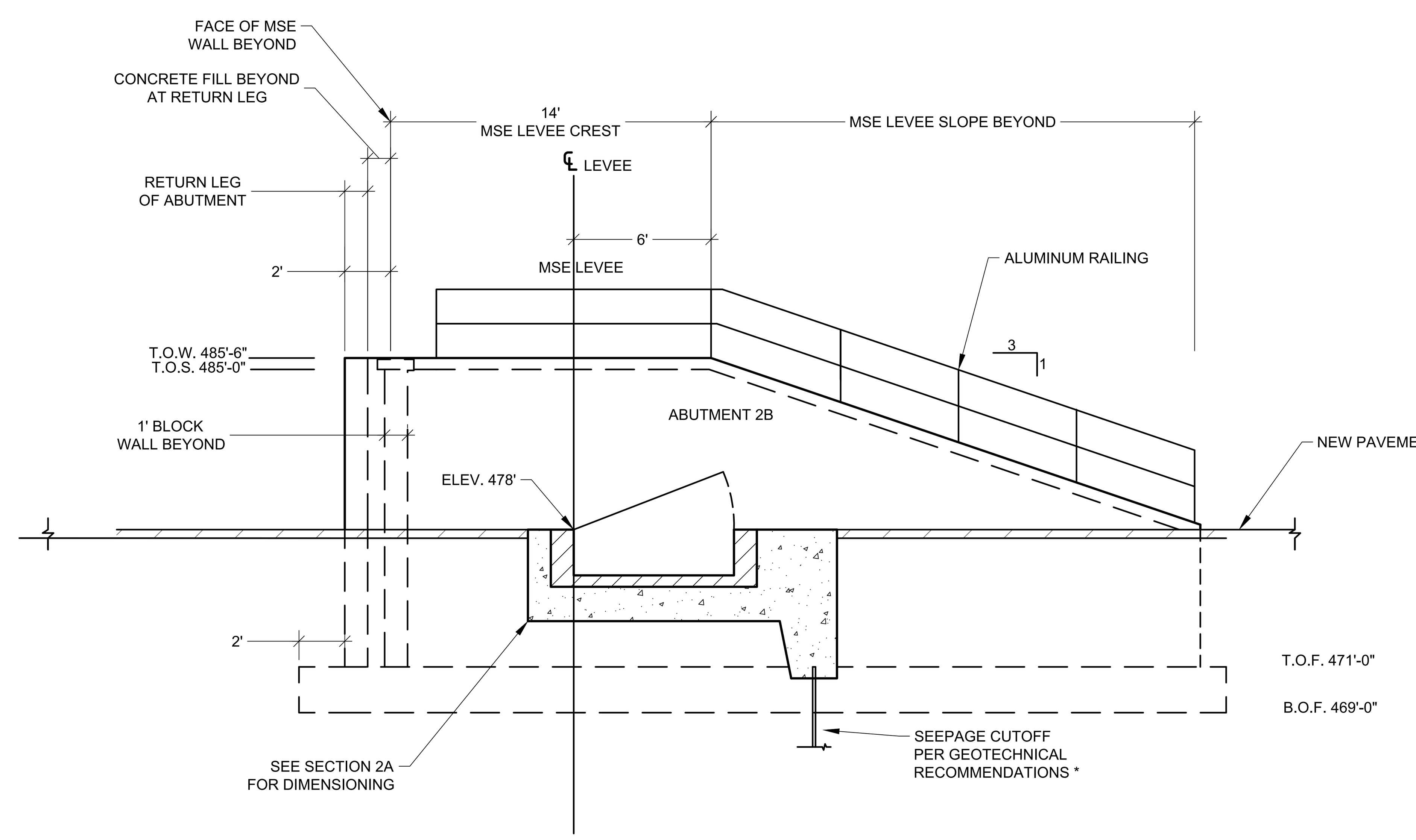
NOTE:
ALL DIMENSIONS TO BE
VERIFIED BY STRUCTURAL ENGINEER DURING DESIGN PHASE

* - TO BE VERIFIED



NOTE:
PROVIDE SEEPAGE CUTOFF
AS REQUIRED BY DETAILED
GEOTECHNICAL ANALYSIS. *

GATE 2A/2B - FLOODWALL
SECTION C



GATE 2 - CLOSURE 2B
SECTION D

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SEALS

CONCEPTUAL DESIGN

REVISIONS

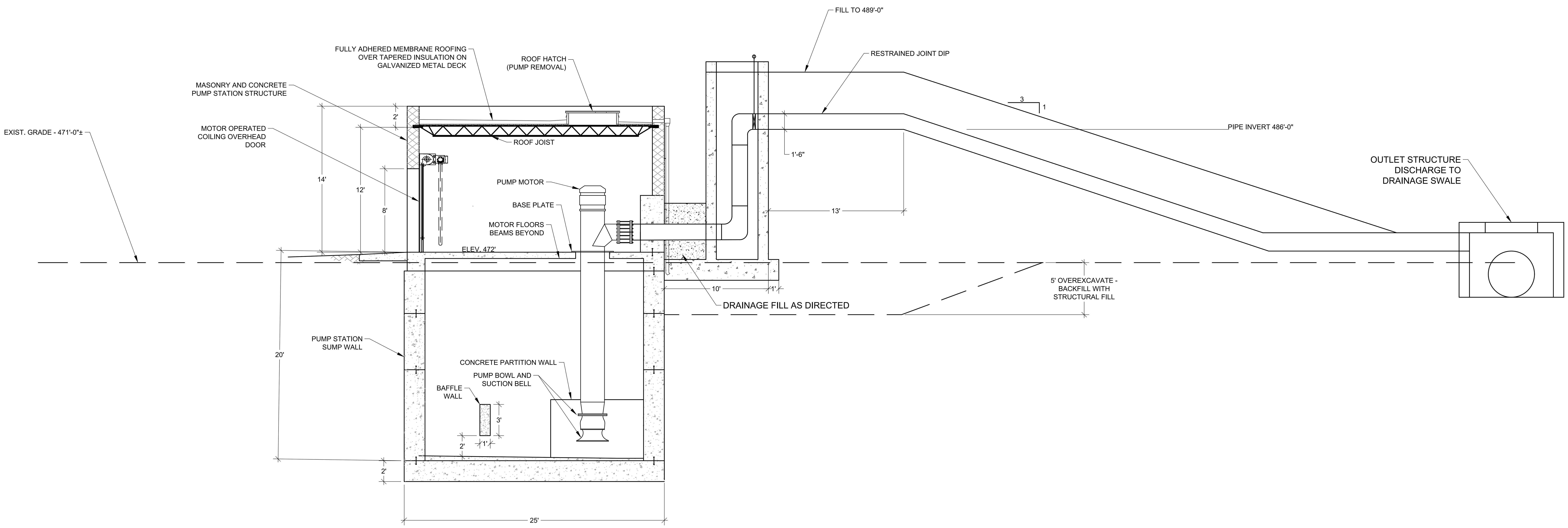
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

GATES 2 AND 2B - TYPICAL SECTIONS

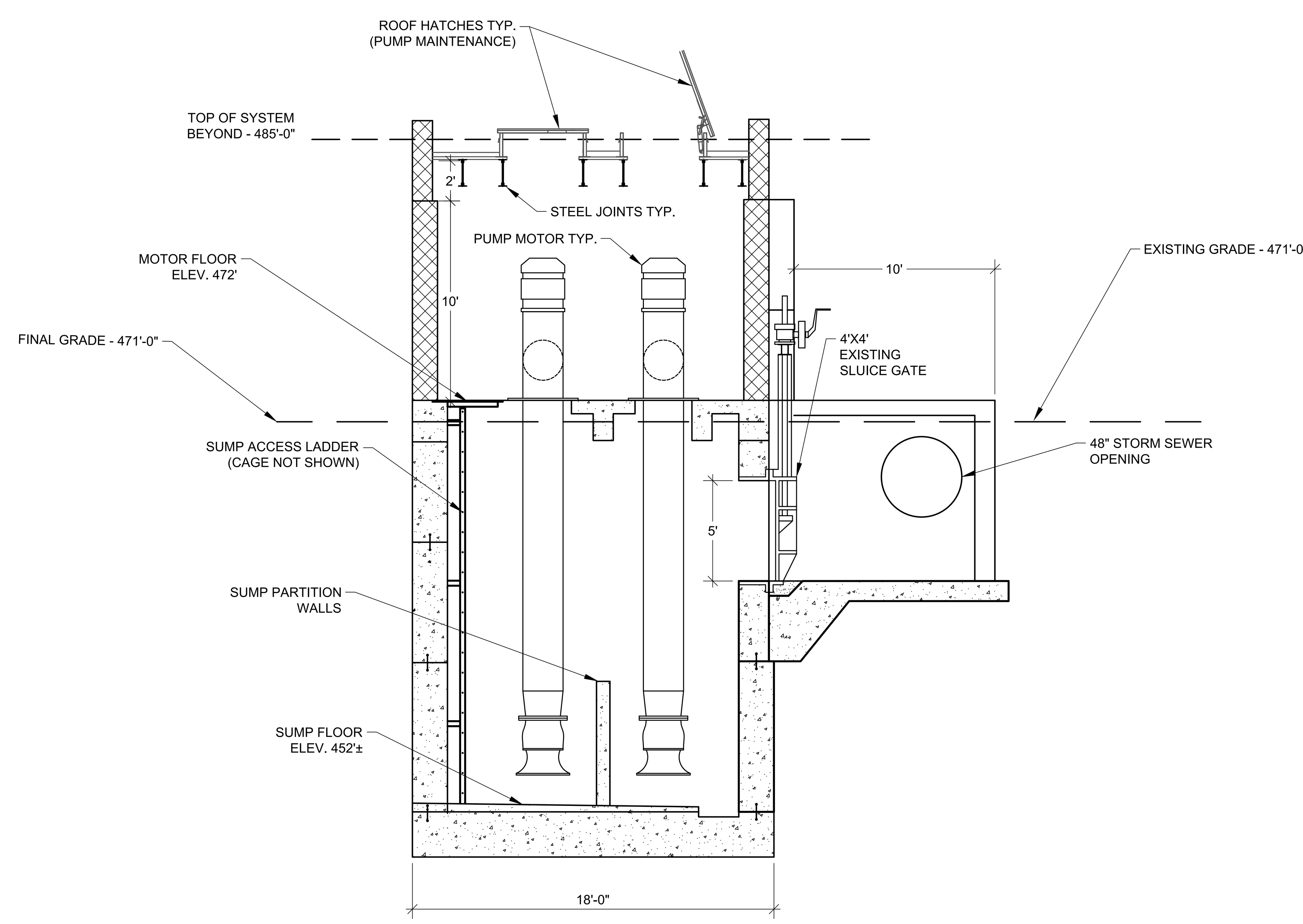
COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-904



PUMP STATION #1 - SECTION A

SCALE: NTS



PUMP STATION #1 - SECTION B

SCALE: NTS

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DRAWING TITLE & PROJECT NAME

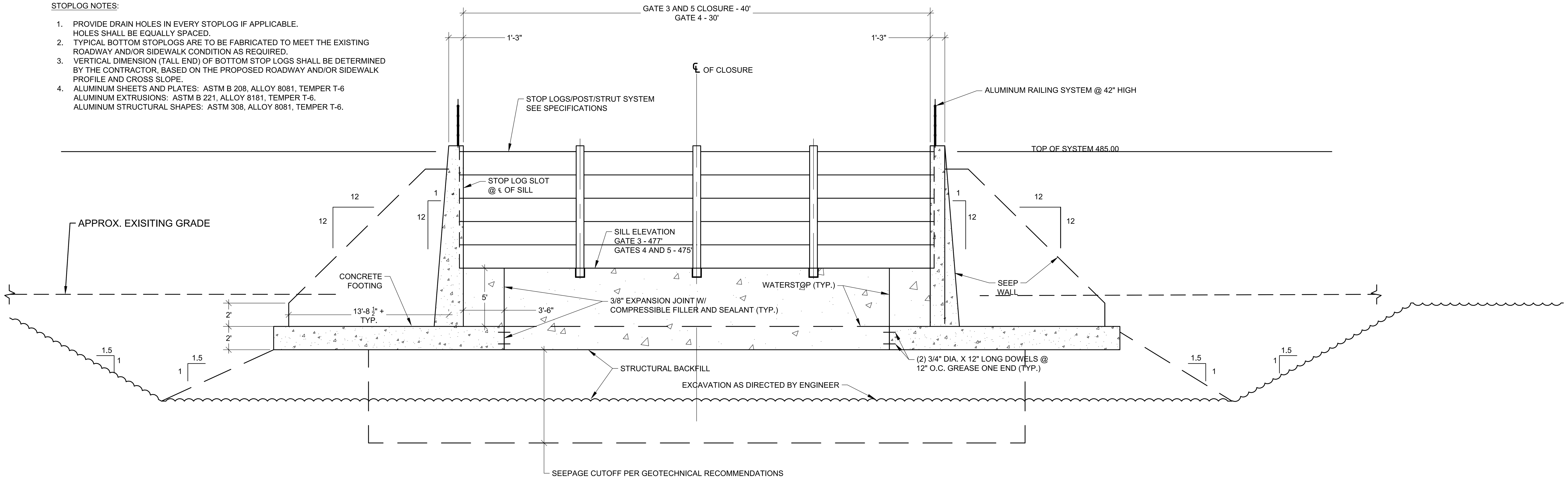
PUMP STATION 1 SECTIONS

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-905

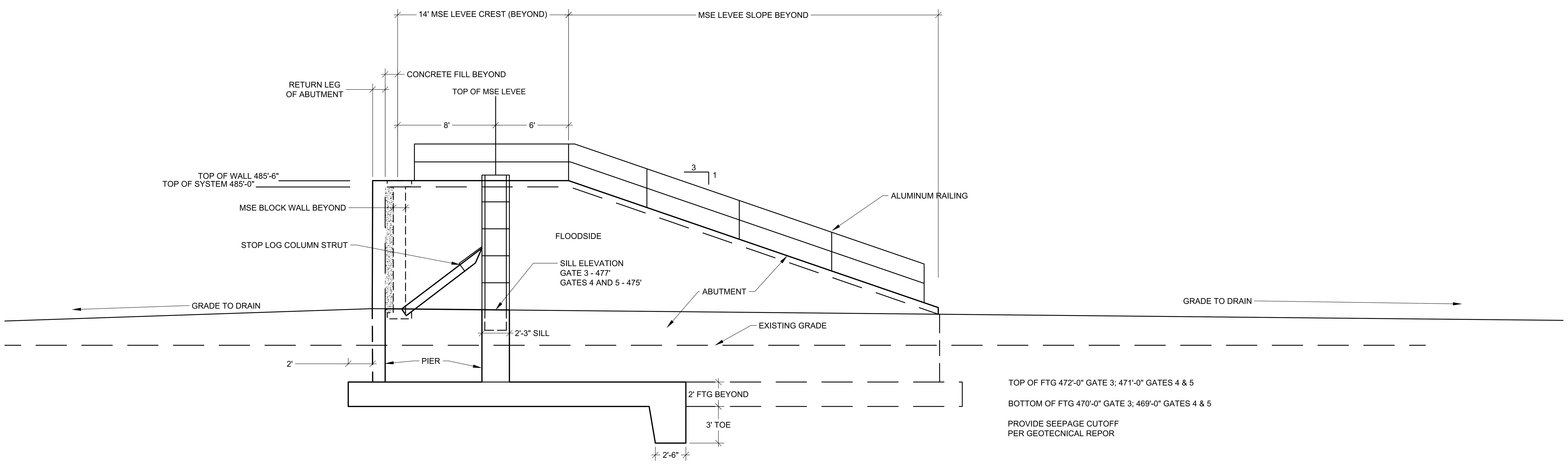
STOPLOG NOTES:

1. PROVIDE DRAIN HOLES IN EVERY STOPLOG IF APPLICABLE. HOLES SHALL BE EQUALLY SPACED.
2. TYPICAL BOTTOM STOPLOGS ARE TO BE FABRICATED TO MEET THE EXISTING ROADWAY AND/OR SIDEWALK CONDITION AS REQUIRED.
3. VERTICAL DIMENSION (TALL END) OF BOTTOM STOP LOGS SHALL BE DETERMINED BY THE CONTRACTOR, BASED ON THE PROPOSED ROADWAY AND/OR SIDEWALK PROFILE AND CROSS SLOPE.
4. ALUMINUM SHEETS AND PLATES: ASTM B 208, ALLOY 8081, TEMPER T-6
   ALUMINUM EXTRUSIONS: ASTM B 221, ALLOY 8181, TEMPER T-6.
   ALUMINUM STRUCTURAL SHAPES: ASTM 308, ALLOY 8081, TEMPER T-6.



ELEVATION - TYPICAL GATES 3, 4, AND 5 CLOSURE STRUCTURE

SCALE: NTS



GATES 3, 4, AND 5 CLOSURES
TYPICAL SECTION AT ℄ OF CLOSURE STRUCTURE

SCALE: NTS

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SEALS

CONCEPTUAL DESIGN

REVISIONS

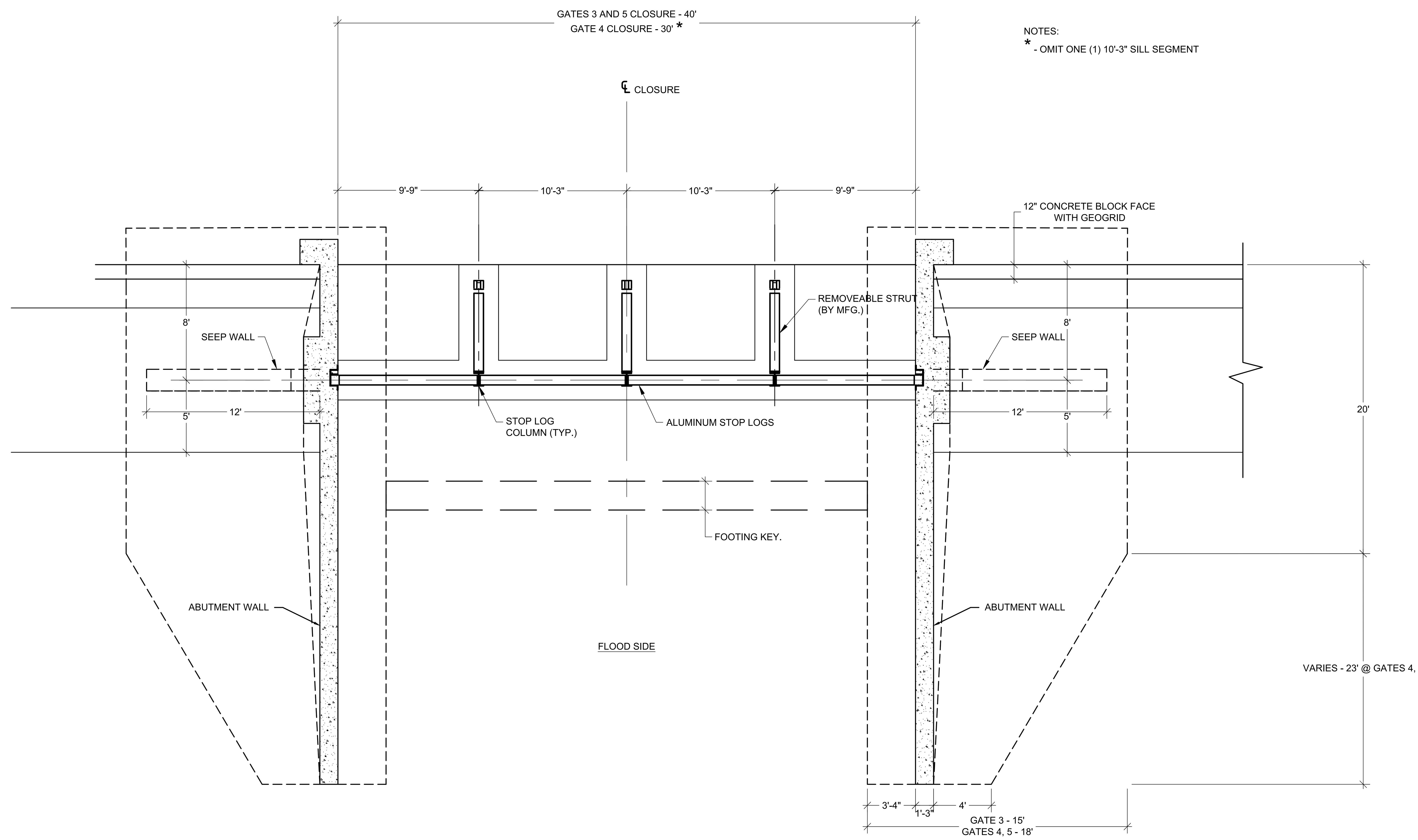
NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

GATES 3, 4, AND 5 DETAILS

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-906



GATES 3, 4, 5 CLOSURE PLAN

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SEALS

CONCEPTUAL DESIGN

REVISIONS

NO.	DATE	DESCRIPTION

DRAWING TITLE & PROJECT NAME

GATES 3, 4, AND 5 PLAN

COLUMBIA COUNTY
WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY, PENNSYLVANIA

DRAWN BY	SAS
CHECKED BY	TEL
DATE	FEBRUARY 2022
PROJECT NO.	2021-5134-001
PROJECT STATUS	CONCEPTUAL DESIGN
DRAWING NO.	S-907

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix F

Floodplain / Floodway, Depth of Flooding, and Depth of Flooding in Structures Maps

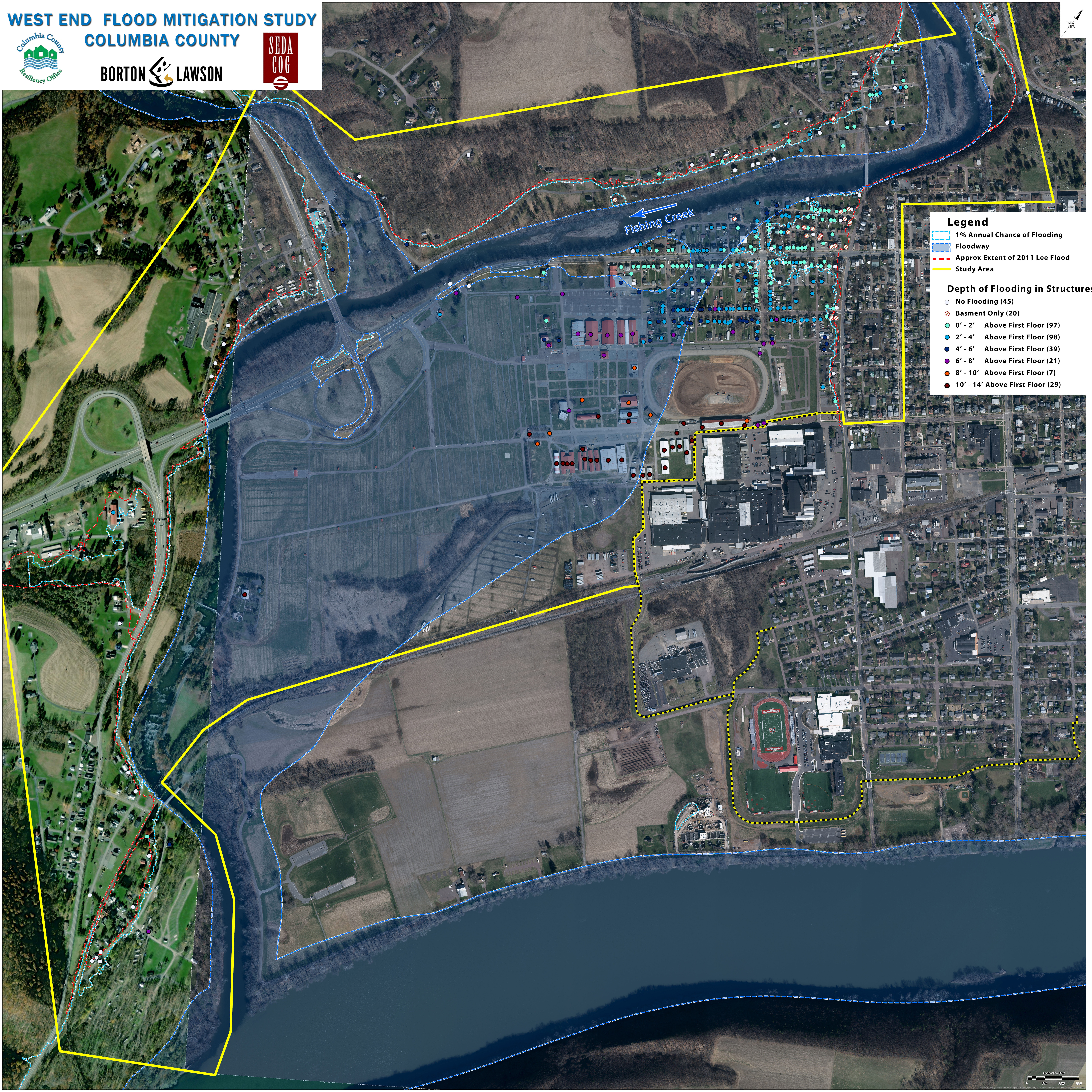
WEST END FLOOD MITIGATION STUDY

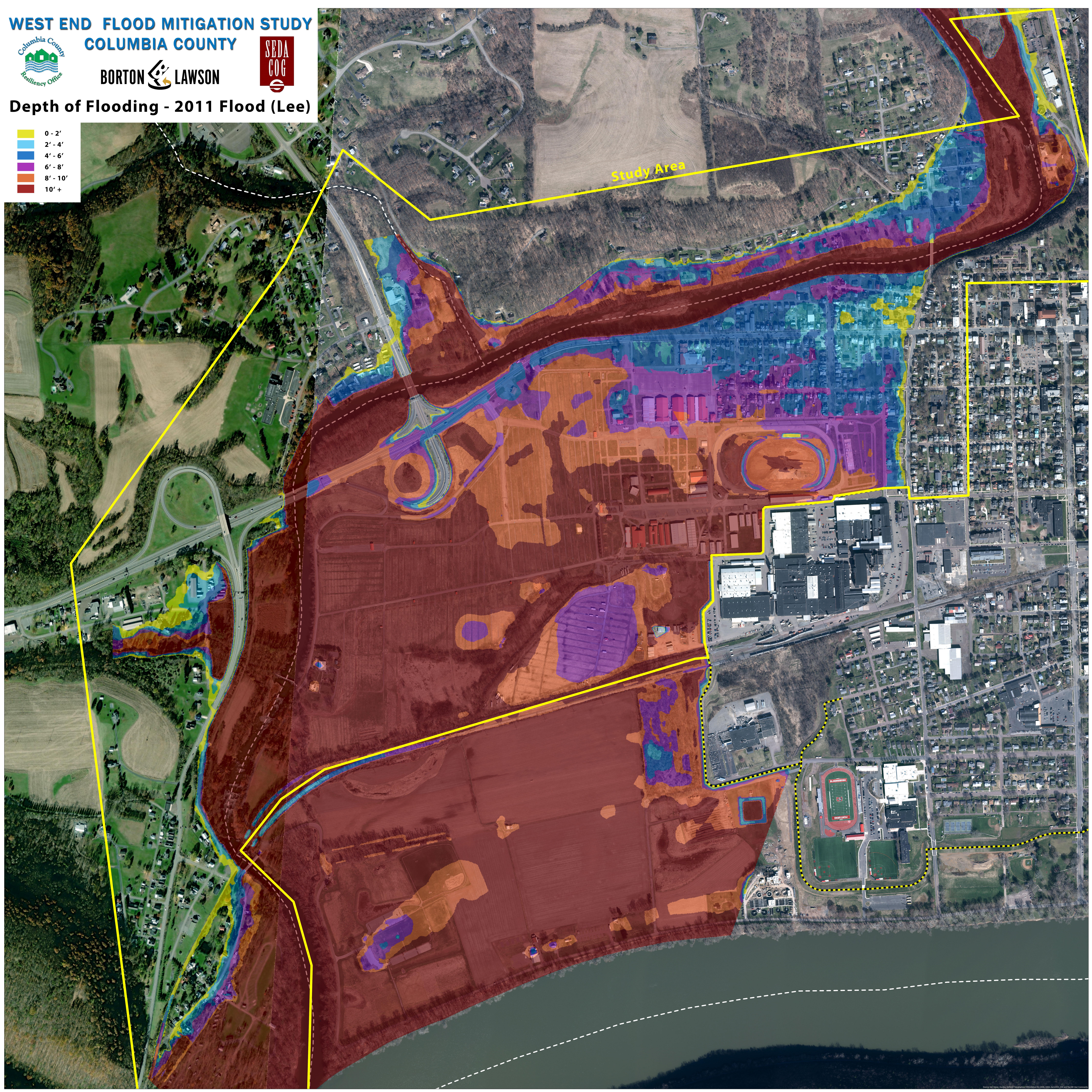
COLUMBIA COUNTY, PENNSYLVANIA

Appendix F

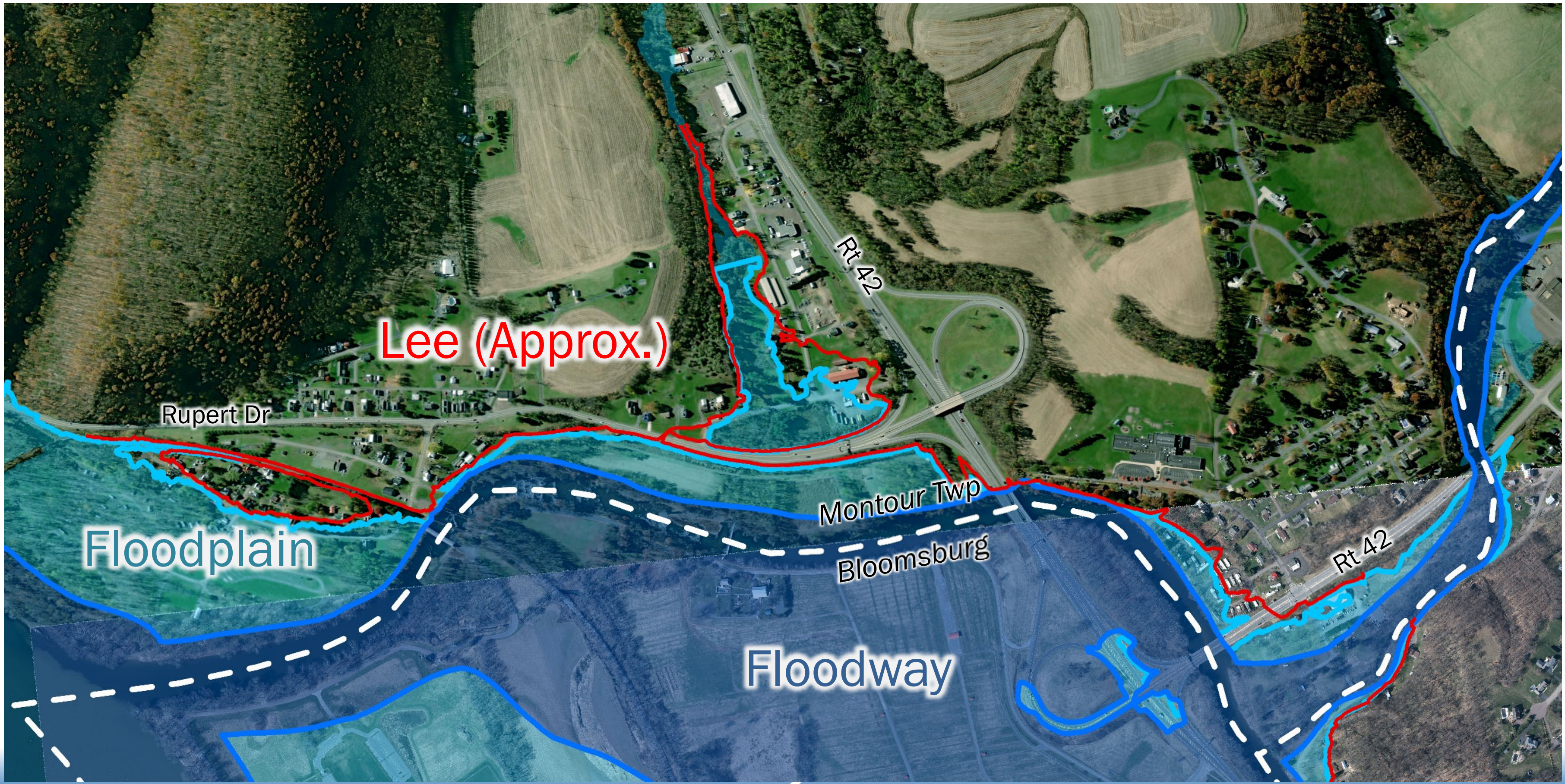
Floodplain, Depth of Flooding, and Depth of First Floor Flooding Maps

TABLE OF CONTENTS:

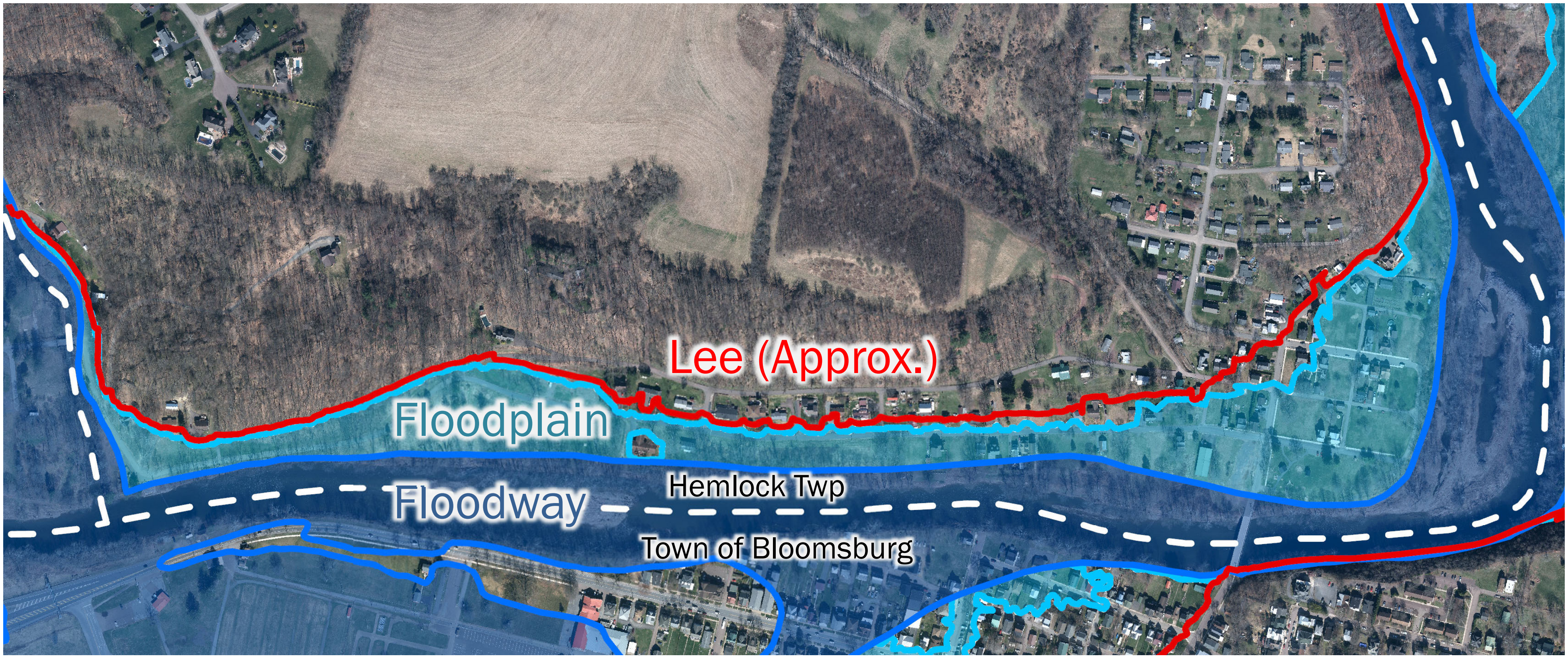

WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY
Columbia County Resiliency Office
BORTON LAWSON
SEDA COG
Fishing Creek
Legend
1% Annual Chance of Flooding
Floodway
Approx Extent of 2011 Lee Flood
Study Area
Depth of Flooding in Structures
No Flooding (45)
Basment Only (20)
0' - 2' Above First Floor (97)
2' - 4' Above First Floor (98)
4' - 6' Above First Floor (39)
6' - 8' Above First Floor (21)
8' - 10' Above First Floor (7)
10' - 14' Above First Floor (29)


WEST END FLOOD MITIGATION STUDY
COLUMBIA COUNTY
Columbia County Resiliency Office
BORTON LAWSON
SEDA COG
Depth of Flooding - 2011 Flood (Lee)
0 - 2'
2' - 4'
4' - 6'
6' - 8'
8' - 10'
10' +
Study Area

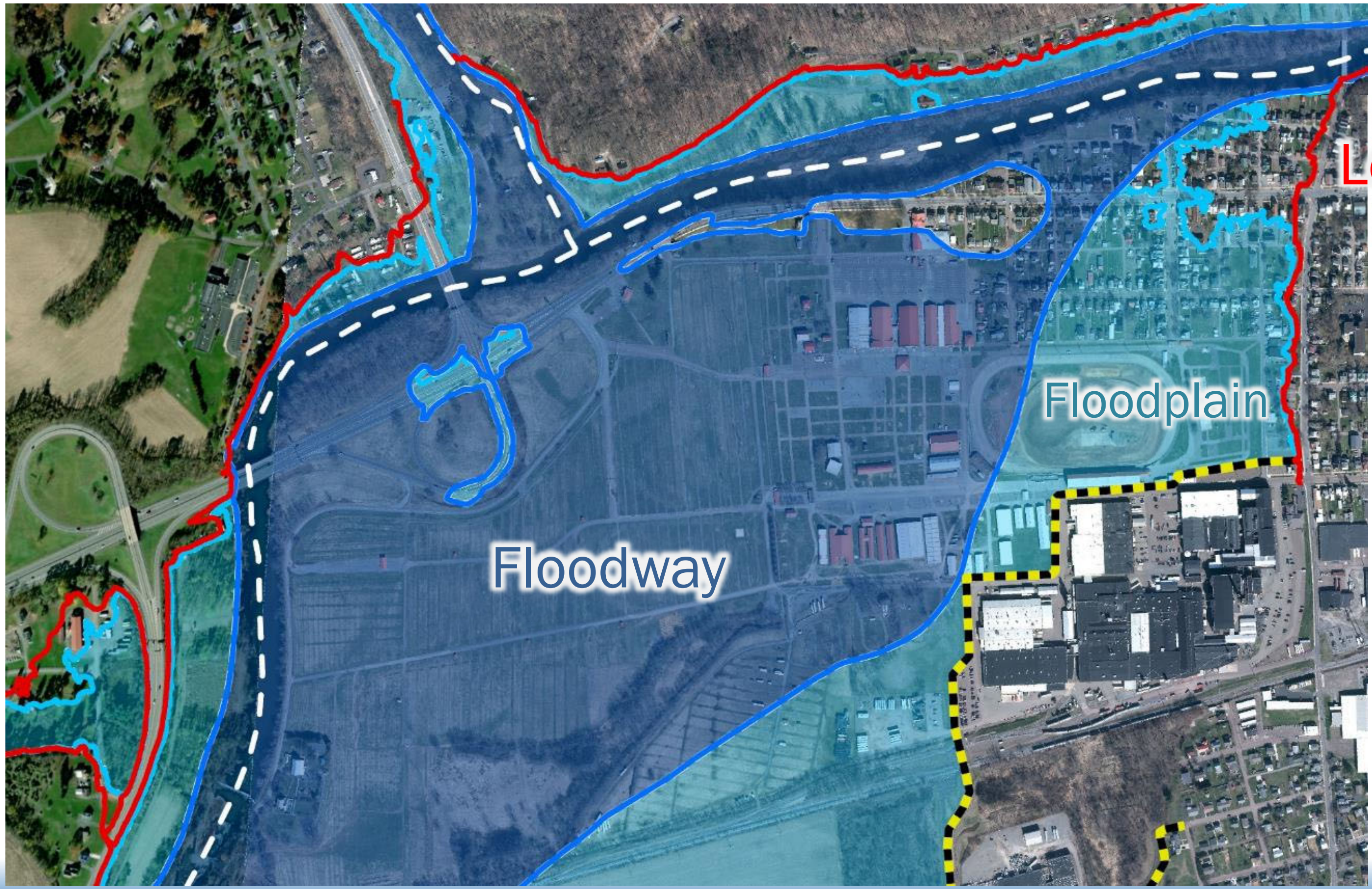
Montour Twp: Floodway, Floodplain, Lee Flood Limit



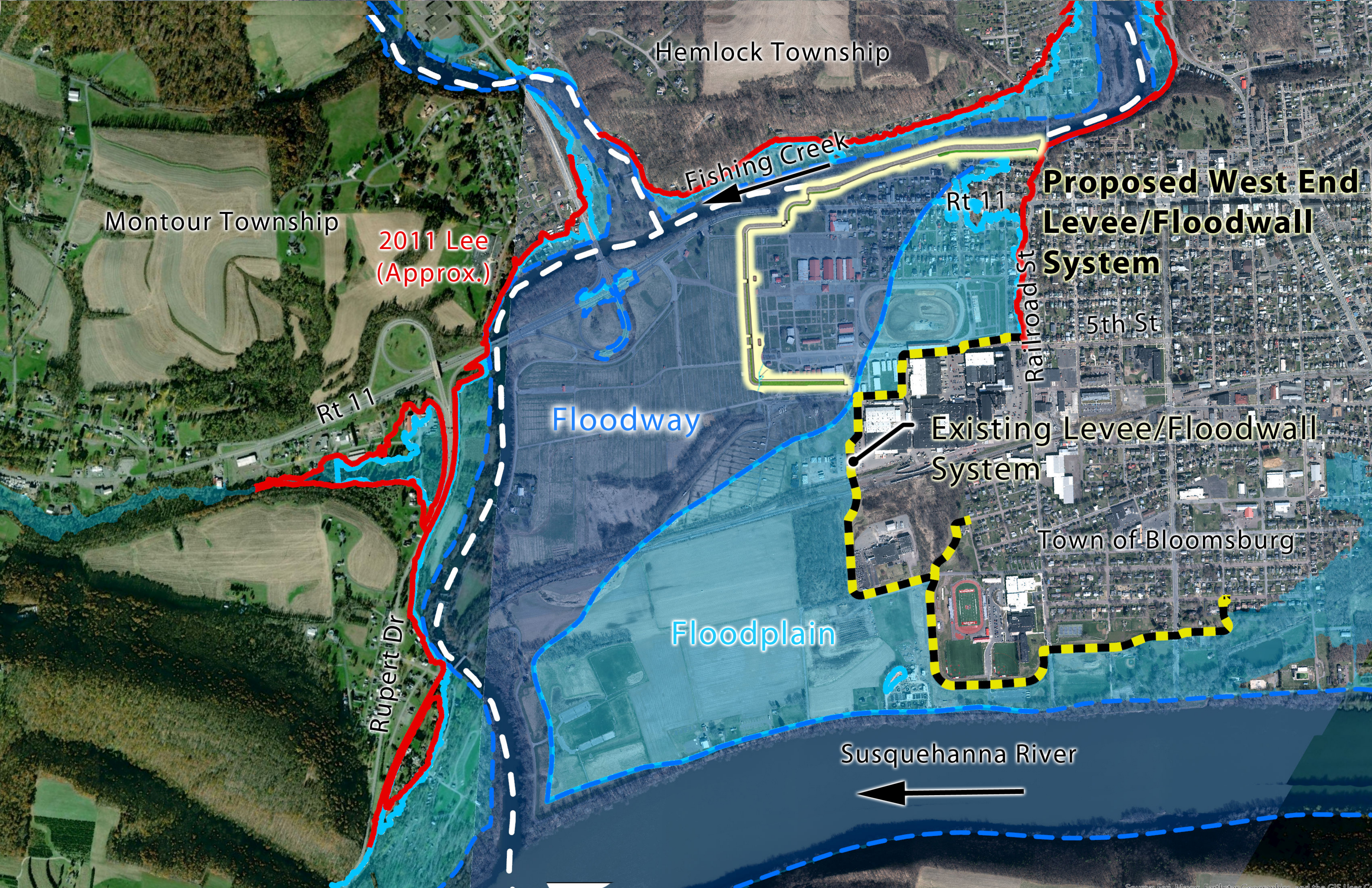
Hemlock Twp: Floodway, Floodplain, Lee Flood Limit



Bloomsburg: Floodway, Floodplain, Lee Flood Limit



BORTON LAWSON


Hemlock Township
Fishing Creek
Montour Township
2011 Lee
(Approx.)
Proposed West End
Levee/Floodwall
System
Rt 11
Railroad St
5th St
Rt 11
Floodway
Existing Levee/Floodwall
System
Town of Bloomsburg
Rupert Dr
Floodplain
Susquehanna River

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix G

Benefit Cost Analysis

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix G

Benefit Cost Analysis

TABLE OF CONTENTS:

Summary of FEMA BCA Tool Inputs
For Levee System
June 1, 2022

Column	Data source
Identifier*	Assigned by Borton Lawson (B-XXX)
Street Address*	From Columbia County GIS parcel data
City*	Bloomsburg
State*	Pennsylvania
Zip Code*	17815
County*	Columbia
Latitude	Center of Structure, From ESRI ArcPro
Longitude	Center of Structure, From ESRI ArcPro
Structure Type*	Just used Non-Residential & Residential. Identified in the Columbia County obtained GIS parcel data
	Residential was entered for houses apartment buildings with less than 4 units
Mitigation Action Type*	Floodproofing Measures - FEMA help desk directed us to use this for a "Levee"
Project Useful Life*	75 years
Mitigation Project Cost ($)*	Total estimated project cost of levee system diviided by the number of structures
Use Default Number of Years of Maintenance?	Yes - makes maintenance years equivalent to project useful life (This is the default setting)
Number of Years of Maintenance	75 years (default input)
Annual Maintenance Cost ($)	Estimated annual O&M cost of levee divided of number of structures (used $75,000 per year)
Lowest Floor Elevation of the Property (ft)	Used first floor elevations from BL survey (did ***NOT*** use basement elevations). If structure was elevated, used the elevated FF elevation which was an estimated elevation.
Streambed Elevation at Property Location (ft)	Fishing Creek Cross sections per Preliminary Flood Insurance Study, dated August 2021
Feet Lowest Floor Is Being Raised	Zero (0) feet, not required with a levee system
Elevation for the Top of Barrier or Floodproofing (ft)	Entered proposed Levee heights, broken out into different sections based on location of structure relative to proposed levee
	Railroad Street to Scott Street - 489.9'
	Scott Street to Barton Ave - 488.2'
	Barton Street to Leonard Street - 487.2'
	Leonard Street to Barton Ave - 486'
	Barton Ave to End - 485'
Building Type (Residential)	One story or two story - identified by BL from field survey
Building Use (Non-Residential)	BL identifed structure type. 73 total Non-residential structures (51- Fairgrounds, 16 other commercial properties, 6 garages/sheds). FEMA defined categories used in this analysis- COM1 Retail Trade, Apartments entered as COM3 Personal & Repair Services, Fairgrounds structures were entered as COM8 Entertainment & Recreation, Large garages and sheds entered as IND2 Industrial Light
Building Type (Non-Residential)	BL identified the specific type of use. More specific categories (apartment, offices, convience stores, etc.)
Is Building is located outside of hundred-year flood area (applies only to Non-Residential/Critical Facility)?	3 Non-Residential structures are located outside of 1% SFHA. Structures in 500-yr "tadpole" area shown on FIRM, we assume is 100-yr area
Building has Basement (Residential question only)	Data taken from homeowner survey & BL field survey to determine if home has a basement. For the houses that have basements, BL assumed all are unfinished basements. YES for 213 out 294 structures in Bloomsburg
Building is Engineered (Non-Residential or Critical Facility)	Assume none - no other information to indicate otherwise
Building has Active NFIP Policy	Used answers from Homeowner Surveys. Entered 51 properties with flood insurance
Damage Curve	USACE Generic was utilized - This curve is not specific to geographic location (this curve only applies to residential structures - commercial damage curve is selected based on building type)
First Floor Area (applies only to Non-Residential or Critical Facility - sq.ft)	Not provided in County parcel data. BL estimated commercial building SF using May 2021 BL aerial imagery to determine bldg perimeter
Size of Building (sq.ft)	This is total finished SF of structure. Residential - used SF from County parcel data; Commercial - BL estimated SF multiplied by # of stories of structure. BL has photos of all structures.
Use Default Building Replacement Value?	NO for Residential; NO for garages/ sheds; YES for fairgrounds; NO for all other Non-Residential Structures
Building Replacement Value ($/sq.ft)	Used $150/ SF for Residnential and Non-Residential structures- BL received quote from ; used $25/ SF for Garages/ sheds
Use Default Demolition Threshold?	Yes
Demolition Threshold (%)	blank
Use Default Building Contents Value?	Yes, Farigrounds is No

Summary of FEMA BCA Tool Inputs
For Levee System
June 1, 2022

Contents Value ($)	Used default value for residential structures; entered value for Fairgrounds building from Schedule of Property from insurance company (contents value provided for 7 buildings); used $500 for garages and sheds
Utilities are Elevated (Residential)	Assumed none
Annual Street Maintenance Budget ($)	Not an option for Floodproofing Model
Number of Street Miles Maintained	Not an option for Floodproofing Model
Street Miles that will not require future maintenance	Not an option for Floodproofing Model
Annual Operating Budget ($) - for Non-residential properties	Entered $0
Use Default Monthly Cost of Temporary Space?	Yes
Monthly Cost of Temporary Space ($/sq.ft/month)	N/A using default
Use Default One Time Displacement Cost?	Yes for residential; No for garages & sheds & Fairgrounds; default for commercial
One Time Displacement Cost ($/sq.ft)	$0 for garages & sheds & Fairgrounds
Use Default Lodging Per Diem?	Yes
Current Federal Lodging Per Diem ($/night)	blank
Use Default Meals Per Diem?	Yes
Current Federal Meals Per Diem ($/day)	blank
Number of Building Residents	2 per structure, 2 per aparmtnet unit, unless known otherwise (from flood survey)
Number of Volunteers Required	Did not enter anything
Enter the Number of Days Lodging for Volunteers	Did not enter anything
Use Default Per-Person Cost of Lodging?	Yes
Enter the Per-Person Cost of Lodging for a Volunteer ($)	Did not enter anything
Number of Workers	Assumed 2 per structure
Use Acres?	Yes
Total Project Area (acres or sq.ft)	Did not enter anything
Green Open Space (%)	Did not enter anything
Riparian (%)	Did not enter anything
Wetlands (%)	Did not enter anything
Forests (%)	Did not enter anything
Marine & Estuary (%)	Did not enter anything

FEMA

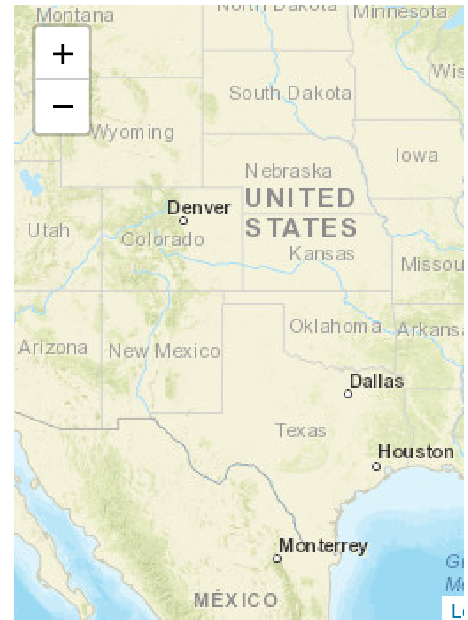
Benefit-Cost Calculator

V.6.0 (Build 20220513.1658 | Release Notes)

Benefit-Cost Analysis

Project Name: Levee $29 Million

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	1			Riverine Flood	$ 919	$ 102,261	0.01	
☑	2			Riverine Flood	$ 171,051	$ 102,280	1.67	
☑	3			Riverine Flood	$ 0	$ 102,261	0.00	
☑	4			Riverine Flood	$ 23,779	$ 102,261	0.23	
☑	5			Riverine Flood	$ 35,016	$ 102,261	0.34	
☑	6			Riverine Flood	$ 22,159	$ 102,261	0.22	
☑	7			Riverine Flood	$ 8,857	$ 102,261	0.09	
☑	8			Riverine Flood	$ 44,262	$ 102,261	0.43	
☑	9			Riverine Flood	$ 42,834	$ 102,261	0.42	
☑	10			Riverine Flood	$ 51,485	$ 102,261	0.50	
☑	11			Riverine Flood	$ 43,027	$ 102,261	0.42	
☑	12			Riverine Flood	$ 129,322	$ 102,261	1.26	
☑	13			Riverine Flood	$ 121,410	$ 102,261	1.19	
☑	14			Riverine Flood	$ 50,724	$ 102,261	0.50	
☑	15			Riverine Flood	$ 34,589	$ 102,261	0.34	



Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	16			Riverine Flood	$ 30,290	$ 102,261	0.30	
☑	17			Riverine Flood	$ 22,165	$ 102,261	0.22	
☑	18			Riverine Flood	$ 52,117	$ 102,261	0.51	
☑	19			Riverine Flood	$ 26,741	$ 102,261	0.26	
☑	20			Riverine Flood	$ 25,830	$ 102,261	0.25	
☑	21			Riverine Flood	$ 26,172	$ 102,261	0.26	
☑	22			Riverine Flood	$ 1,129	$ 102,261	0.01	
☑	23			Riverine Flood	$ 107,149	$ 102,280	1.05	
☑	24			Riverine Flood	$ 730,452	$ 102,261	7.14	
☑	25			Riverine Flood	$ 14,106	$ 102,261	0.14	
☑	26			Riverine Flood	$ 17,224	$ 102,261	0.17	
☑	27			Riverine Flood	$ 28,364	$ 102,261	0.28	
☑	28			Riverine Flood	$ 26,134	$ 102,261	0.26	
☑	29			Riverine Flood	$ 53,141	$ 102,261	0.52	
☑	30			Riverine Flood	$ 35,616	$ 102,261	0.35	
☑	31			Riverine Flood	$ 186	$ 102,261	0.00	
☑	32			Riverine Flood	$ 73,503	$ 102,261	0.72	
☑	33			Riverine Flood	$ 56,801	$ 102,261	0.56	
☑	34			Riverine Flood	$ 24,068	$ 102,261	0.24	
☑	35			Riverine Flood	$ 22,576	$ 102,261	0.22	
☑	36			Riverine Flood	$ 23,720	$ 102,261	0.23	
☑	37			Riverine Flood	$ 70,917	$ 102,261	0.69	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	38			Riverine Flood	$ 33,026	$ 102,261	0.32	
☑	39			Riverine Flood	$ 30,608	$ 102,261	0.30	
☑	40			Riverine Flood	$ 37,870	$ 102,261	0.37	
☑	41			Riverine Flood	$ 47,057	$ 102,261	0.46	
☑	42			Riverine Flood	$ 30,212	$ 102,261	0.30	
☑	43			Riverine Flood	$ 55,910	$ 102,261	0.55	
☑	44			Riverine Flood	$ 41,873	$ 102,261	0.41	
☑	45			Riverine Flood	$ 25,796	$ 102,261	0.25	
☑	46			Riverine Flood	$ 65,947	$ 102,261	0.64	
☑	47			Riverine Flood	$ 118,953	$ 102,261	1.16	
☑	48			Riverine Flood	$ 31,709	$ 102,261	0.31	
☑	49			Riverine Flood	$ 66,375	$ 102,261	0.65	
☑	50			Riverine Flood	$ 7,894	$ 102,261	0.08	
☑	51			Riverine Flood	$ 12,040	$ 102,261	0.12	
☑	52			Riverine Flood	$ 13,379	$ 102,261	0.13	
☑	53			Riverine Flood	$ 11,663	$ 102,261	0.11	
☑	54			Riverine Flood	$ 29,092	$ 102,261	0.28	
☑	55			Riverine Flood	$ 14,293	$ 102,261	0.14	
☑	56			Riverine Flood	$ 28,507	$ 102,261	0.28	
☑	57			Riverine Flood	$ 33,299	$ 102,261	0.33	
☑	58			Riverine Flood	$ 5,339	$ 102,261	0.05	
☑	59			Riverine Flood	$ 26,665	$ 102,261	0.26	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	60			Riverine Flood	$ 59,020	$ 102,261	0.58	
	61			Riverine Flood	$ 21,051	$ 102,261	0.21	
	62			Riverine Flood	$ 16,552	$ 102,261	0.16	
	63			Riverine Flood	$ 22,840	$ 102,261	0.22	
	64			Riverine Flood	$ 507	$ 102,261	0.00	
	65			Riverine Flood	$ 24,286	$ 102,261	0.24	
	66			Riverine Flood	$ 30,128	$ 102,261	0.29	
	67			Riverine Flood	$ 13,127	$ 102,261	0.13	
	68			Riverine Flood	$ 11,124	$ 102,261	0.11	
	69			Riverine Flood	$ 15,876	$ 102,261	0.16	
	70			Riverine Flood	$ 17,957	$ 102,261	0.18	
	71			Riverine Flood	$ 17,111	$ 102,261	0.17	
	72			Riverine Flood	$ 31,328	$ 102,261	0.31	
	73			Riverine Flood	$ 0	$ 102,261	0.00	
	74			Riverine Flood	$ 13,669	$ 102,261	0.13	
	75			Riverine Flood	$ 16,648	$ 102,261	0.16	
	76			Riverine Flood	$ 13,249	$ 102,261	0.13	
	77			Riverine Flood	$ 27,993	$ 102,261	0.27	
	78			Riverine Flood	$ 32,762	$ 102,261	0.32	
	79			Riverine Flood	$ 13,819	$ 102,261	0.14	
	80			Riverine Flood	$ 9,066	$ 102,261	0.09	
	81			Riverine Flood	$ 27,440	$ 102,261	0.27	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	82			Riverine Flood	$ 29,473	$ 102,261	0.29	
☑	83			Riverine Flood	$ 39,511	$ 102,261	0.39	
☑	84			Riverine Flood	$ 27,321	$ 102,261	0.27	
☑	85			Riverine Flood	$ 18,757	$ 102,261	0.18	
☑	86			Riverine Flood	$ 22,945	$ 102,261	0.22	
☑	87			Riverine Flood	$ 34,015	$ 102,261	0.33	
☑	88			Riverine Flood	$ 23,575	$ 102,261	0.23	
☑	89			Riverine Flood	$ 53,880	$ 102,261	0.53	
☑	90			Riverine Flood	$ 131,793	$ 102,261	1.29	
☑	91			Riverine Flood	$ 21,570	$ 102,261	0.21	
☑	92			Riverine Flood	$ 21,928	$ 102,261	0.21	
☑	93			Riverine Flood	$ 14,371	$ 102,261	0.14	
☑	94			Riverine Flood	$ 12,853	$ 102,261	0.13	
☑	95			Riverine Flood	$ 4,159	$ 102,261	0.04	
☑	96			Riverine Flood	$ 1,100	$ 102,261	0.01	
☑	97			Riverine Flood	$ 5,108	$ 102,261	0.05	
☑	98			Riverine Flood	$ 15,194	$ 102,261	0.15	
☑	99			Riverine Flood	$ 201,120	$ 102,261	1.97	
☑	100			Riverine Flood	$ 23,563	$ 102,261	0.23	
☑	101			Riverine Flood	$ 46,249	$ 102,261	0.45	
☑	102			Riverine Flood	$ 32,224	$ 102,261	0.32	
☑	103			Riverine Flood	$ 70,503	$ 102,261	0.69	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	104			Riverine Flood	$ 24,595	$ 102,261	0.24	
	105			Riverine Flood	$ 34,192	$ 102,261	0.33	
	106			Riverine Flood	$ 21,264	$ 102,261	0.21	
	107			Riverine Flood	$ 32,593	$ 102,261	0.32	
	108			Riverine Flood	$ 32,750	$ 102,261	0.32	
	109			Riverine Flood	$ 136,748	$ 102,261	1.34	
	110			Riverine Flood	$ 36,247	$ 102,261	0.35	
	111			Riverine Flood	$ 14,915	$ 102,261	0.15	
	112			Riverine Flood	$ 42,477	$ 102,261	0.42	
	113			Riverine Flood	$ 151,338	$ 102,261	1.48	
	114			Riverine Flood	$ 197,258	$ 102,261	1.93	
	115			Riverine Flood	$ 23,686	$ 102,261	0.23	
	116			Riverine Flood	$ 54,369	$ 102,261	0.53	
	117			Riverine Flood	$ 46,785	$ 102,261	0.46	
	118			Riverine Flood	$ 19,610	$ 102,261	0.19	
	119			Riverine Flood	$ 4,852	$ 102,261	0.05	
	120			Riverine Flood	$ 9,446	$ 102,261	0.09	
	121			Riverine Flood	$ 6,214	$ 102,261	0.06	
	122			Riverine Flood	$ 12,908	$ 102,261	0.13	
	123			Riverine Flood	$ 19,561	$ 102,261	0.19	
	124			Riverine Flood	$ 63,068	$ 102,261	0.62	
	125			Riverine Flood	$ 118,322	$ 102,261	1.16	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	126			Riverine Flood	$ 34,424	$ 102,261	0.34	
☑	127			Riverine Flood	$ 5,049	$ 102,261	0.05	
☑	128			Riverine Flood	$ 12,014	$ 102,261	0.12	
☑	129			Riverine Flood	$ 7,077	$ 102,261	0.07	
☑	130			Riverine Flood	$ 21,051	$ 102,261	0.21	
☑	131			Riverine Flood	$ 19,062	$ 102,261	0.19	
☑	132			Riverine Flood	$ 26,886	$ 102,261	0.26	
☑	133			Riverine Flood	$ 38,605	$ 102,261	0.38	
☑	134			Riverine Flood	$ 33,262	$ 102,261	0.33	
☑	135			Riverine Flood	$ 40,655	$ 102,261	0.40	
☑	136			Riverine Flood	$ 24,373	$ 102,261	0.24	
☑	137			Riverine Flood	$ 44,564	$ 102,261	0.44	
☑	138			Riverine Flood	$ 15,919	$ 102,261	0.16	
☑	139			Riverine Flood	$ 25,931	$ 102,261	0.25	
☑	140			Riverine Flood	$ 29,763	$ 102,261	0.29	
☑	141			Riverine Flood	$ 22,245	$ 102,261	0.22	
☑	142			Riverine Flood	$ 54,529	$ 102,261	0.53	
☑	143			Riverine Flood	$ 40,279	$ 102,261	0.39	
☑	144			Riverine Flood	$ 1,541	$ 102,261	0.02	
☑	145			Riverine Flood	$ 58,188	$ 102,261	0.57	
☑	146			Riverine Flood	$ 65,925	$ 102,261	0.64	
☑	147			Riverine Flood	$ 34,290	$ 102,261	0.34	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	148			Riverine Flood	$ 58,388	$ 102,261	0.57	
	149			Riverine Flood	$ 39,002	$ 102,261	0.38	
	150			Riverine Flood	$ 65,571	$ 102,261	0.64	
	151			Riverine Flood	$ 26,703	$ 102,261	0.26	
	152			Riverine Flood	$ 30,426	$ 102,261	0.30	
	153			Riverine Flood	$ 58,646	$ 102,261	0.57	
	154			Riverine Flood	$ 1,680	$ 102,261	0.02	
	155			Riverine Flood	$ 49,471	$ 102,261	0.48	
	156			Riverine Flood	$ 56,171	$ 102,261	0.55	
	157			Riverine Flood	$ 65,368	$ 102,261	0.64	
	158			Riverine Flood	$ 57,647	$ 102,261	0.56	
	159			Riverine Flood	$ 55,937	$ 102,261	0.55	
	160			Riverine Flood	$ 64,182	$ 102,261	0.63	
	161			Riverine Flood	$ 55,376	$ 102,261	0.54	
	162			Riverine Flood	$ 51,353	$ 102,280	0.50	
	163			Riverine Flood	$ 4,516	$ 102,280	0.04	
	164			Riverine Flood	$ 110,290	$ 102,280	1.08	
	165			Riverine Flood	$ 17,830	$ 102,261	0.17	
	166			Riverine Flood	$ 11,789	$ 102,261	0.12	
	167			Riverine Flood	$ 17,582	$ 102,261	0.17	
	168			Riverine Flood	$ 12,586	$ 102,261	0.12	
	169			Riverine Flood	$ 16,283	$ 102,261	0.16	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	170			Riverine Flood	$ 7,517	$ 102,261	0.07	
	171			Riverine Flood	$ 2,023	$ 102,261	0.02	
	172			Riverine Flood	$ 2,284	$ 102,261	0.02	
	173			Riverine Flood	$ 262	$ 102,261	0.00	
	174			Riverine Flood	$ 293	$ 102,261	0.00	
	175			Riverine Flood	$ 1,914	$ 102,261	0.02	
	176			Riverine Flood	$ 69,087	$ 102,261	0.68	
	177			Riverine Flood	$ 118,391	$ 102,261	1.16	
	178			Riverine Flood	$ 46,019	$ 102,261	0.45	
	179			Riverine Flood	$ 19,895	$ 102,261	0.19	
	180			Riverine Flood	$ 27,863	$ 102,261	0.27	
	181			Riverine Flood	$ 19,115	$ 102,261	0.19	
	182			Riverine Flood	$ 50,080	$ 102,261	0.49	
	183			Riverine Flood	$ 59,877	$ 102,261	0.59	
	184			Riverine Flood	$ 31,308	$ 102,261	0.31	
	185			Riverine Flood	$ 0	$ 102,261	0.00	
	186			Riverine Flood	$ 131	$ 102,261	0.00	
	187			Riverine Flood	$ 11,739	$ 102,261	0.11	
	188			Riverine Flood	$ 11,067	$ 102,261	0.11	
	189			Riverine Flood	$ 13,422	$ 102,261	0.13	
	190			Riverine Flood	$ 12,068	$ 102,261	0.12	
	191			Riverine Flood	$ 16,365	$ 102,261	0.16	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	192			Riverine Flood	$ 25,497	$ 102,261	0.25	
☑	193			Riverine Flood	$ 41,877	$ 102,261	0.41	
☑	194			Riverine Flood	$ 101,632	$ 102,261	0.99	
☑	195			Riverine Flood	$ 36,455	$ 102,261	0.36	
☑	196			Riverine Flood	$ 99,942	$ 102,261	0.98	
☑	197			Riverine Flood	$ 1,227	$ 102,261	0.01	
☑	198			Riverine Flood	$ 2,526	$ 102,261	0.02	
☑	199			Riverine Flood	$ 2,395	$ 102,261	0.02	
☑	200			Riverine Flood	$ 7,732	$ 102,261	0.08	
☑	201			Riverine Flood	$ 8,651	$ 102,261	0.08	
☑	202			Riverine Flood	$ 2,417	$ 102,261	0.02	
☑	203			Riverine Flood	$ 30,074	$ 102,261	0.29	
☑	204			Riverine Flood	$ 3,812	$ 102,261	0.04	
☑	205			Riverine Flood	$ 4,418	$ 102,261	0.04	
☑	206			Riverine Flood	$ 18,959	$ 102,261	0.19	
☑	207			Riverine Flood	$ 18,641	$ 102,261	0.18	
☑	208			Riverine Flood	$ 3,233	$ 102,261	0.03	
☑	209			Riverine Flood	$ 9,376	$ 102,261	0.09	
☑	210			Riverine Flood	$ 10,556	$ 102,261	0.10	
☑	211			Riverine Flood	$ 2,359	$ 102,261	0.02	
☑	212			Riverine Flood	$ 18,888	$ 102,261	0.18	
☑	213			Riverine Flood	$ 1,000	$ 102,261	0.01	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	214			Riverine Flood	$ 15,682	$ 102,261	0.15	
☑	215			Riverine Flood	$ 12,913	$ 102,261	0.13	
☑	216			Riverine Flood	$ 4,709	$ 102,261	0.05	
☑	217			Riverine Flood	$ 10,356	$ 102,261	0.10	
☑	218			Riverine Flood	$ 9,447	$ 102,261	0.09	
☑	219			Riverine Flood	$ 5,411	$ 102,261	0.05	
☑	220			Riverine Flood	$ 0	$ 102,261	0.00	
☑	221			Riverine Flood	$ 11,052	$ 102,261	0.11	
☑	222			Riverine Flood	$ 7,155	$ 102,261	0.07	
☑	223			Riverine Flood	$ 7,125	$ 102,261	0.07	
☑	224			Riverine Flood	$ 2,397	$ 102,261	0.02	
☑	225			Riverine Flood	$ 744	$ 102,261	0.01	
☑	226			Riverine Flood	$ 5,611	$ 102,261	0.05	
☑	227			Riverine Flood	$ 4,921	$ 102,261	0.05	
☑	228			Riverine Flood	$ 15,351	$ 102,261	0.15	
☑	229			Riverine Flood	$ 24,532	$ 102,261	0.24	
☑	230			Riverine Flood	$ 15,655	$ 102,261	0.15	
☑	231			Riverine Flood	$ 10,043	$ 102,261	0.10	
☑	232			Riverine Flood	$ 18,067	$ 102,261	0.18	
☑	233			Riverine Flood	$ 21,216	$ 102,261	0.21	
☑	234			Riverine Flood	$ 31,919	$ 102,261	0.31	
☑	235			Riverine Flood	$ 12,239	$ 102,261	0.12	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	236			Riverine Flood	$ 11,913	$ 102,261	0.12	
☑	237			Riverine Flood	$ 22,768	$ 102,261	0.22	
☑	238			Riverine Flood	$ 120,003	$ 102,261	1.17	
☑	239			Riverine Flood	$ 578,941	$ 102,261	5.66	
☑	240			Riverine Flood	$ 81,600	$ 102,261	0.80	
☑	241			Riverine Flood	$ 308,539	$ 102,261	3.02	
☑	242			Riverine Flood	$ 318,431	$ 102,261	3.11	
☑	243			Riverine Flood	$ 11,607	$ 102,261	0.11	
☑	244			Riverine Flood	$ 10,084	$ 102,261	0.10	
☑	245			Riverine Flood	$ 15,644	$ 102,261	0.15	
☑	246			Riverine Flood	$ 23,039	$ 102,261	0.23	
☑	247			Riverine Flood	$ 735,627	$ 102,261	7.19	
☑	248			Riverine Flood	$ 4,038	$ 102,261	0.04	
☑	249			Riverine Flood	$ 684,981	$ 102,261	6.70	
☑	250			Riverine Flood	$ 380,143	$ 102,261	3.72	
☑	251			Riverine Flood	$ 238,137	$ 102,261	2.33	
☑	252			Riverine Flood	$ 824,319	$ 102,261	8.06	
☑	253			Riverine Flood	$ 33,606	$ 102,261	0.33	
☑	254			Riverine Flood	$ 103,583	$ 102,261	1.01	
☑	255			Riverine Flood	$ 60,894	$ 102,261	0.60	
☑	256			Riverine Flood	$ 7,414	$ 102,261	0.07	
☑	257			Riverine Flood	$ 575,067	$ 102,261	5.62	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	258			Riverine Flood	$ 785,078	$ 102,261	7.68	
☑	259			Riverine Flood	$ 3,056	$ 102,261	0.03	
☑	260			Riverine Flood	$ 795,078	$ 102,261	7.77	
☑	261			Riverine Flood	$ 322,583	$ 102,261	3.15	
☑	262			Riverine Flood	$ 287,437	$ 102,261	2.81	
☑	263			Riverine Flood	$ 300,454	$ 102,261	2.94	
☑	264			Riverine Flood	$ 633,690	$ 102,261	6.20	
☑	265			Riverine Flood	$ 554,814	$ 102,261	5.43	
☑	266			Riverine Flood	$ 1,890,675	$ 102,261	18.49	
☑	267			Riverine Flood	$ 1,296,960	$ 102,261	12.68	
☑	268			Riverine Flood	$ 309,610	$ 102,261	3.03	
☑	269			Riverine Flood	$ 297,697	$ 102,261	2.91	
☑	270			Riverine Flood	$ 31,195	$ 102,261	0.31	
☑	271			Riverine Flood	$ 623,484	$ 102,261	6.10	
☑	272			Riverine Flood	$ 622,547	$ 102,261	6.09	
☑	273			Riverine Flood	$ 934,306	$ 102,261	9.14	
☑	274			Riverine Flood	$ 893,853	$ 102,261	8.74	
☑	275			Riverine Flood	$ 202,907	$ 102,261	1.98	
☑	276			Riverine Flood	$ 874,669	$ 102,261	8.55	
☑	277			Riverine Flood	$ 868,925	$ 102,261	8.50	
☑	278			Riverine Flood	$ 453,022	$ 102,261	4.43	
☑	279			Riverine Flood	$ 277,102	$ 102,261	2.71	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	280			Riverine Flood	$ 3,555,878	$ 102,261	34.77	
☑	281			Riverine Flood	$ 8,786	$ 102,261	0.09	
☑	282			Riverine Flood	$ 55,501	$ 102,261	0.54	
☑	283			Riverine Flood	$ 29,912	$ 102,261	0.29	
☑	284			Riverine Flood	$ 18,978	$ 102,261	0.19	
☑	285			Riverine Flood	$ 29,137	$ 102,261	0.28	
☑	286			Riverine Flood	$ 36,859	$ 102,261	0.36	
☑	287			Riverine Flood	$ 435,153	$ 102,261	4.26	
☑	288			Riverine Flood	$ 574,702	$ 102,261	5.62	
☑	289			Riverine Flood	$ 161,717	$ 102,261	1.58	
☑	290			Riverine Flood	$ 13,813	$ 102,261	0.14	
☑	291			Riverine Flood	$ 114,327	$ 102,261	1.12	
☑	292			Riverine Flood	$ 12,633	$ 102,261	0.12	
☑	293			Riverine Flood	$ 590	$ 102,261	0.01	
☑	294			Riverine Flood	$ 622	$ 102,261	0.01	
TOTAL (SELECTED)					**$ 31,664,794**	**$ 30,064,829**	**1.05**	
TOTAL					**$ 31,664,794**	**$ 30,064,829**	**1.05**	

FEMA

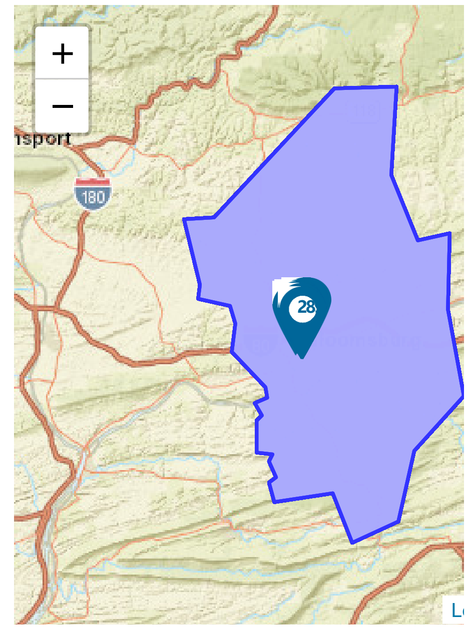
Benefit-Cost Calculator

V.6.0 (Build 20220513.1658 | Release Notes)

Benefit-Cost Analysis

Project Name: Levee $26 Million

Select ☑	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	1			Riverine Flood	$ 919	$ 92,057	0.01	
☑	2			Riverine Flood	$ 171,051	$ 92,075	1.86	
☑	3			Riverine Flood	$ 0	$ 92,057	0.00	
☑	4			Riverine Flood	$ 23,779	$ 92,057	0.26	
☑	5			Riverine Flood	$ 35,016	$ 92,057	0.38	
☑	6			Riverine Flood	$ 22,159	$ 92,057	0.24	
☑	7			Riverine Flood	$ 8,857	$ 92,057	0.10	
☑	8			Riverine Flood	$ 44,262	$ 92,057	0.48	
☑	9			Riverine Flood	$ 42,834	$ 92,057	0.47	
☑	10			Riverine Flood	$ 51,485	$ 92,057	0.56	
☑	11			Riverine Flood	$ 43,027	$ 92,057	0.47	
☑	12			Riverine Flood	$ 129,322	$ 92,057	1.40	
☑	13			Riverine Flood	$ 121,410	$ 92,057	1.32	
☑	14			Riverine Flood	$ 50,724	$ 92,057	0.55	
☑	15			Riverine Flood	$ 34,589	$ 92,057	0.38	



Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	16			Riverine Flood	$ 30,290	$ 92,057	0.33	
	17			Riverine Flood	$ 22,165	$ 92,057	0.24	
	18			Riverine Flood	$ 52,117	$ 92,057	0.57	
	19			Riverine Flood	$ 26,741	$ 92,057	0.29	
	20			Riverine Flood	$ 25,830	$ 92,057	0.28	
	21			Riverine Flood	$ 26,172	$ 92,057	0.28	
	22			Riverine Flood	$ 1,129	$ 92,057	0.01	
	23			Riverine Flood	$ 107,149	$ 92,075	1.16	
	24			Riverine Flood	$ 730,452	$ 92,057	7.93	
	25			Riverine Flood	$ 14,106	$ 92,057	0.15	
	26			Riverine Flood	$ 17,224	$ 92,057	0.19	
	27			Riverine Flood	$ 28,364	$ 92,057	0.31	
	28			Riverine Flood	$ 26,134	$ 92,057	0.28	
	29			Riverine Flood	$ 53,141	$ 92,057	0.58	
	30			Riverine Flood	$ 35,616	$ 92,057	0.39	
	31			Riverine Flood	$ 186	$ 92,057	0.00	
	32			Riverine Flood	$ 95,861	$ 92,057	1.04	
	33			Riverine Flood	$ 56,801	$ 92,057	0.62	
	34			Riverine Flood	$ 24,068	$ 92,057	0.26	
	35			Riverine Flood	$ 22,576	$ 92,057	0.25	
	36			Riverine Flood	$ 23,720	$ 92,057	0.26	
	37			Riverine Flood	$ 93,275	$ 92,057	1.01	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	38			Riverine Flood	$ 33,026	$ 92,057	0.36	
☑	39			Riverine Flood	$ 30,608	$ 92,057	0.33	
☑	40			Riverine Flood	$ 37,870	$ 92,057	0.41	
☑	41			Riverine Flood	$ 47,057	$ 92,057	0.51	
☑	42			Riverine Flood	$ 30,212	$ 92,057	0.33	
☑	43			Riverine Flood	$ 55,910	$ 92,057	0.61	
☑	44			Riverine Flood	$ 41,873	$ 92,057	0.45	
☑	45			Riverine Flood	$ 25,796	$ 92,057	0.28	
☑	46			Riverine Flood	$ 65,947	$ 92,057	0.72	
☑	47			Riverine Flood	$ 118,953	$ 92,057	1.29	
☑	48			Riverine Flood	$ 31,709	$ 92,057	0.34	
☑	49			Riverine Flood	$ 66,375	$ 92,057	0.72	
☑	50			Riverine Flood	$ 7,894	$ 92,057	0.09	
☑	51			Riverine Flood	$ 12,040	$ 92,057	0.13	
☑	52			Riverine Flood	$ 13,379	$ 92,057	0.15	
☑	53			Riverine Flood	$ 11,663	$ 92,057	0.13	
☑	54			Riverine Flood	$ 29,092	$ 92,057	0.32	
☑	55			Riverine Flood	$ 14,293	$ 92,057	0.16	
☑	56			Riverine Flood	$ 28,507	$ 92,057	0.31	
☑	57			Riverine Flood	$ 33,299	$ 92,057	0.36	
☑	58			Riverine Flood	$ 5,339	$ 92,057	0.06	
☑	59			Riverine Flood	$ 26,665	$ 92,057	0.29	

Select ☑	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	60			Riverine Flood	$ 59,020	$ 92,057	0.64	
☑	61			Riverine Flood	$ 21,051	$ 92,057	0.23	
☑	62			Riverine Flood	$ 16,552	$ 92,057	0.18	
☑	63			Riverine Flood	$ 22,840	$ 92,057	0.25	
☑	64			Riverine Flood	$ 507	$ 92,057	0.01	
☑	65			Riverine Flood	$ 24,286	$ 92,057	0.26	
☑	66			Riverine Flood	$ 30,128	$ 92,057	0.33	
☑	67			Riverine Flood	$ 13,127	$ 92,057	0.14	
☑	68			Riverine Flood	$ 11,124	$ 92,057	0.12	
☑	69			Riverine Flood	$ 15,876	$ 92,057	0.17	
☑	70			Riverine Flood	$ 17,957	$ 92,057	0.20	
☑	71			Riverine Flood	$ 17,111	$ 92,057	0.19	
☑	72			Riverine Flood	$ 31,328	$ 92,057	0.34	
☑	73			Riverine Flood	$ 0	$ 92,057	0.00	
☑	74			Riverine Flood	$ 13,669	$ 92,057	0.15	
☑	75			Riverine Flood	$ 16,648	$ 92,057	0.18	
☑	76			Riverine Flood	$ 13,249	$ 92,057	0.14	
☑	77			Riverine Flood	$ 27,993	$ 92,057	0.30	
☑	78			Riverine Flood	$ 32,762	$ 92,057	0.36	
☑	79			Riverine Flood	$ 13,819	$ 92,057	0.15	
☑	80			Riverine Flood	$ 9,066	$ 92,057	0.10	
☑	81			Riverine Flood	$ 27,440	$ 92,057	0.30	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	82			Riverine Flood	$ 29,473	$ 92,057	0.32	
	83			Riverine Flood	$ 39,511	$ 92,057	0.43	
	84			Riverine Flood	$ 27,321	$ 92,057	0.30	
	85			Riverine Flood	$ 18,757	$ 92,057	0.20	
	86			Riverine Flood	$ 22,945	$ 92,057	0.25	
	87			Riverine Flood	$ 34,015	$ 92,057	0.37	
	88			Riverine Flood	$ 23,575	$ 92,057	0.26	
	89			Riverine Flood	$ 53,880	$ 92,057	0.59	
	90			Riverine Flood	$ 131,793	$ 92,057	1.43	
	91			Riverine Flood	$ 21,570	$ 92,057	0.23	
	92			Riverine Flood	$ 21,928	$ 92,057	0.24	
	93			Riverine Flood	$ 14,371	$ 92,057	0.16	
	94			Riverine Flood	$ 12,853	$ 92,057	0.14	
	95			Riverine Flood	$ 4,159	$ 92,057	0.05	
	96			Riverine Flood	$ 1,100	$ 92,057	0.01	
	97			Riverine Flood	$ 5,108	$ 92,057	0.06	
	98			Riverine Flood	$ 15,194	$ 92,057	0.17	
	99			Riverine Flood	$ 201,120	$ 92,057	2.18	
	100			Riverine Flood	$ 23,563	$ 92,057	0.26	
	101			Riverine Flood	$ 46,249	$ 92,057	0.50	
	102			Riverine Flood	$ 32,224	$ 92,057	0.35	
	103			Riverine Flood	$ 92,861	$ 92,057	1.01	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	104			Riverine Flood	$ 24,595	$ 92,057	0.27	
☑	105			Riverine Flood	$ 34,192	$ 92,057	0.37	
☑	106			Riverine Flood	$ 21,264	$ 92,057	0.23	
☑	107			Riverine Flood	$ 32,593	$ 92,057	0.35	
☑	108			Riverine Flood	$ 32,750	$ 92,057	0.36	
☑	109			Riverine Flood	$ 136,748	$ 92,057	1.49	
☑	110			Riverine Flood	$ 36,247	$ 92,057	0.39	
☑	111			Riverine Flood	$ 14,915	$ 92,057	0.16	
☑	112			Riverine Flood	$ 42,477	$ 92,057	0.46	
☑	113			Riverine Flood	$ 151,338	$ 92,057	1.64	
☑	114			Riverine Flood	$ 197,258	$ 92,057	2.14	
☑	115			Riverine Flood	$ 23,686	$ 92,057	0.26	
☑	116			Riverine Flood	$ 54,369	$ 92,057	0.59	
☑	117			Riverine Flood	$ 46,785	$ 92,057	0.51	
☑	118			Riverine Flood	$ 19,610	$ 92,057	0.21	
☑	119			Riverine Flood	$ 4,852	$ 92,057	0.05	
☑	120			Riverine Flood	$ 9,446	$ 92,057	0.10	
☑	121			Riverine Flood	$ 6,214	$ 92,057	0.07	
☑	122			Riverine Flood	$ 12,908	$ 92,057	0.14	
☑	123			Riverine Flood	$ 19,561	$ 92,057	0.21	
☑	124			Riverine Flood	$ 63,068	$ 92,057	0.69	
☑	125			Riverine Flood	$ 118,322	$ 92,057	1.29	

Select ☑	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	126			Riverine Flood	$ 34,424	$ 92,057	0.37	
☑	127			Riverine Flood	$ 5,049	$ 92,057	0.05	
☑	128			Riverine Flood	$ 12,014	$ 92,057	0.13	
☑	129			Riverine Flood	$ 7,077	$ 92,057	0.08	
☑	130			Riverine Flood	$ 21,051	$ 92,057	0.23	
☑	131			Riverine Flood	$ 19,062	$ 92,057	0.21	
☑	132			Riverine Flood	$ 26,886	$ 92,057	0.29	
☑	133			Riverine Flood	$ 38,605	$ 92,057	0.42	
☑	134			Riverine Flood	$ 33,262	$ 92,057	0.36	
☑	135			Riverine Flood	$ 40,655	$ 92,057	0.44	
☑	136			Riverine Flood	$ 24,373	$ 92,057	0.26	
☑	137			Riverine Flood	$ 44,564	$ 92,057	0.48	
☑	138			Riverine Flood	$ 15,919	$ 92,057	0.17	
☑	139			Riverine Flood	$ 25,931	$ 92,057	0.28	
☑	140			Riverine Flood	$ 29,763	$ 92,057	0.32	
☑	141			Riverine Flood	$ 22,245	$ 92,057	0.24	
☑	142			Riverine Flood	$ 54,529	$ 92,057	0.59	
☑	143			Riverine Flood	$ 40,279	$ 92,057	0.44	
☑	144			Riverine Flood	$ 1,541	$ 92,057	0.02	
☑	145			Riverine Flood	$ 58,188	$ 92,057	0.63	
☑	146			Riverine Flood	$ 65,925	$ 92,057	0.72	
☑	147			Riverine Flood	$ 34,290	$ 92,057	0.37	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	148			Riverine Flood	$ 58,388	$ 92,057	0.63	
	149			Riverine Flood	$ 39,002	$ 92,057	0.42	
	150			Riverine Flood	$ 65,571	$ 92,057	0.71	
	151			Riverine Flood	$ 26,703	$ 92,057	0.29	
	152			Riverine Flood	$ 30,426	$ 92,057	0.33	
	153			Riverine Flood	$ 58,646	$ 92,057	0.64	
	154			Riverine Flood	$ 1,680	$ 92,057	0.02	
	155			Riverine Flood	$ 49,471	$ 92,057	0.54	
	156			Riverine Flood	$ 56,171	$ 92,057	0.61	
	157			Riverine Flood	$ 65,368	$ 92,057	0.71	
	158			Riverine Flood	$ 57,647	$ 92,057	0.63	
	159			Riverine Flood	$ 55,937	$ 92,057	0.61	
	160			Riverine Flood	$ 64,182	$ 92,057	0.70	
	161			Riverine Flood	$ 55,376	$ 92,057	0.60	
	162			Riverine Flood	$ 51,353	$ 92,075	0.56	
	163			Riverine Flood	$ 4,516	$ 92,075	0.05	
	164			Riverine Flood	$ 110,290	$ 92,075	1.20	
	165			Riverine Flood	$ 17,830	$ 92,057	0.19	
	166			Riverine Flood	$ 11,789	$ 92,057	0.13	
	167			Riverine Flood	$ 17,582	$ 92,057	0.19	
	168			Riverine Flood	$ 12,586	$ 92,057	0.14	
	169			Riverine Flood	$ 16,283	$ 92,057	0.18	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	170			Riverine Flood	$ 7,517	$ 92,057	0.08	
	171			Riverine Flood	$ 2,023	$ 92,057	0.02	
	172			Riverine Flood	$ 2,284	$ 92,057	0.02	
	173			Riverine Flood	$ 262	$ 92,057	0.00	
	174			Riverine Flood	$ 293	$ 92,057	0.00	
	175			Riverine Flood	$ 1,914	$ 92,057	0.02	
	176			Riverine Flood	$ 91,445	$ 92,057	0.99	
	177			Riverine Flood	$ 118,391	$ 92,057	1.29	
	178			Riverine Flood	$ 46,019	$ 92,057	0.50	
	179			Riverine Flood	$ 19,895	$ 92,057	0.22	
	180			Riverine Flood	$ 27,863	$ 92,057	0.30	
	181			Riverine Flood	$ 19,115	$ 92,057	0.21	
	182			Riverine Flood	$ 50,080	$ 92,057	0.54	
	183			Riverine Flood	$ 59,877	$ 92,057	0.65	
	184			Riverine Flood	$ 31,308	$ 92,057	0.34	
	185			Riverine Flood	$ 0	$ 92,057	0.00	
	186			Riverine Flood	$ 131	$ 92,057	0.00	
	187			Riverine Flood	$ 11,739	$ 92,057	0.13	
	188			Riverine Flood	$ 11,067	$ 92,057	0.12	
	189			Riverine Flood	$ 13,422	$ 92,057	0.15	
	190			Riverine Flood	$ 12,068	$ 92,057	0.13	
	191			Riverine Flood	$ 16,365	$ 92,057	0.18	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	192			Riverine Flood	$ 25,497	$ 92,057	0.28	
☑	193			Riverine Flood	$ 41,877	$ 92,057	0.45	
☑	194			Riverine Flood	$ 101,632	$ 92,057	1.10	
☑	195			Riverine Flood	$ 36,455	$ 92,057	0.40	
☑	196			Riverine Flood	$ 99,942	$ 92,057	1.09	
☑	197			Riverine Flood	$ 1,227	$ 92,057	0.01	
☑	198			Riverine Flood	$ 2,526	$ 92,057	0.03	
☑	199			Riverine Flood	$ 2,395	$ 92,057	0.03	
☑	200			Riverine Flood	$ 7,732	$ 92,057	0.08	
☑	201			Riverine Flood	$ 8,651	$ 92,057	0.09	
☑	202			Riverine Flood	$ 2,417	$ 92,057	0.03	
☑	203			Riverine Flood	$ 30,074	$ 92,057	0.33	
☑	204			Riverine Flood	$ 3,812	$ 92,057	0.04	
☑	205			Riverine Flood	$ 4,418	$ 92,057	0.05	
☑	206			Riverine Flood	$ 18,959	$ 92,057	0.21	
☑	207			Riverine Flood	$ 18,641	$ 92,057	0.20	
☑	208			Riverine Flood	$ 3,233	$ 92,057	0.04	
☑	209			Riverine Flood	$ 9,376	$ 92,057	0.10	
☑	210			Riverine Flood	$ 10,556	$ 92,057	0.11	
☑	211			Riverine Flood	$ 2,359	$ 92,057	0.03	
☑	212			Riverine Flood	$ 18,888	$ 92,057	0.21	
☑	213			Riverine Flood	$ 1,000	$ 92,057	0.01	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
	214			Riverine Flood	$ 15,682	$ 92,057	0.17	
	215			Riverine Flood	$ 12,913	$ 92,057	0.14	
	216			Riverine Flood	$ 4,709	$ 92,057	0.05	
	217			Riverine Flood	$ 10,356	$ 92,057	0.11	
	218			Riverine Flood	$ 9,447	$ 92,057	0.10	
	219			Riverine Flood	$ 5,411	$ 92,057	0.06	
	220			Riverine Flood	$ 0	$ 92,057	0.00	
	221			Riverine Flood	$ 11,052	$ 92,057	0.12	
	222			Riverine Flood	$ 7,155	$ 92,057	0.08	
	223			Riverine Flood	$ 7,125	$ 92,057	0.08	
	224			Riverine Flood	$ 2,397	$ 92,057	0.03	
	225			Riverine Flood	$ 744	$ 92,057	0.01	
	226			Riverine Flood	$ 5,611	$ 92,057	0.06	
	227			Riverine Flood	$ 4,921	$ 92,057	0.05	
	228			Riverine Flood	$ 15,351	$ 92,057	0.17	
	229			Riverine Flood	$ 24,532	$ 92,057	0.27	
	230			Riverine Flood	$ 15,655	$ 92,057	0.17	
	231			Riverine Flood	$ 10,043	$ 92,057	0.11	
	232			Riverine Flood	$ 18,067	$ 92,057	0.20	
	233			Riverine Flood	$ 21,216	$ 92,057	0.23	
	234			Riverine Flood	$ 31,919	$ 92,057	0.35	
	235			Riverine Flood	$ 12,239	$ 92,057	0.13	

Select ☑	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	236			Riverine Flood	$ 11,913	$ 92,057	0.13	
☑	237			Riverine Flood	$ 22,768	$ 92,057	0.25	
☑	238			Riverine Flood	$ 120,003	$ 92,057	1.30	
☑	239			Riverine Flood	$ 578,941	$ 92,057	6.29	
☑	240			Riverine Flood	$ 81,600	$ 92,057	0.89	
☑	241			Riverine Flood	$ 308,539	$ 92,057	3.35	
☑	242			Riverine Flood	$ 318,431	$ 92,057	3.46	
☑	243			Riverine Flood	$ 11,607	$ 92,057	0.13	
☑	244			Riverine Flood	$ 10,084	$ 92,057	0.11	
☑	245			Riverine Flood	$ 15,644	$ 92,057	0.17	
☑	246			Riverine Flood	$ 23,039	$ 92,057	0.25	
☑	247			Riverine Flood	$ 735,627	$ 92,057	7.99	
☑	248			Riverine Flood	$ 4,038	$ 92,057	0.04	
☑	249			Riverine Flood	$ 684,981	$ 92,057	7.44	
☑	250			Riverine Flood	$ 380,143	$ 92,057	4.13	
☑	251			Riverine Flood	$ 238,137	$ 92,057	2.59	
☑	252			Riverine Flood	$ 824,319	$ 92,057	8.95	
☑	253			Riverine Flood	$ 33,606	$ 92,057	0.37	
☑	254			Riverine Flood	$ 103,583	$ 92,057	1.13	
☑	255			Riverine Flood	$ 60,894	$ 92,057	0.66	
☑	256			Riverine Flood	$ 7,414	$ 92,057	0.08	
☑	257			Riverine Flood	$ 575,067	$ 92,057	6.25	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	258			Riverine Flood	$ 785,078	$ 92,057	8.53	
☑	259			Riverine Flood	$ 3,056	$ 92,057	0.03	
☑	260			Riverine Flood	$ 795,078	$ 92,057	8.64	
☑	261			Riverine Flood	$ 322,583	$ 92,057	3.50	
☑	262			Riverine Flood	$ 287,437	$ 92,057	3.12	
☑	263			Riverine Flood	$ 300,454	$ 92,057	3.26	
☑	264			Riverine Flood	$ 633,690	$ 92,057	6.88	
☑	265			Riverine Flood	$ 554,814	$ 92,057	6.03	
☑	266			Riverine Flood	$ 1,890,675	$ 92,057	20.54	
☑	267			Riverine Flood	$ 1,296,960	$ 92,057	14.09	
☑	268			Riverine Flood	$ 309,610	$ 92,057	3.36	
☑	269			Riverine Flood	$ 297,697	$ 92,057	3.23	
☑	270			Riverine Flood	$ 31,195	$ 92,057	0.34	
☑	271			Riverine Flood	$ 623,484	$ 92,057	6.77	
☑	272			Riverine Flood	$ 622,547	$ 92,057	6.76	
☑	273			Riverine Flood	$ 934,306	$ 92,057	10.15	
☑	274			Riverine Flood	$ 893,853	$ 92,057	9.71	
☑	275			Riverine Flood	$ 202,907	$ 92,057	2.20	
☑	276			Riverine Flood	$ 874,669	$ 92,057	9.50	
☑	277			Riverine Flood	$ 868,925	$ 92,057	9.44	
☑	278			Riverine Flood	$ 453,022	$ 92,057	4.92	
☑	279			Riverine Flood	$ 277,102	$ 92,057	3.01	

Select	Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Copy
☑	280			Riverine Flood	$ 3,555,878	$ 92,057	38.63	
☑	281			Riverine Flood	$ 8,786	$ 92,057	0.10	
☑	282			Riverine Flood	$ 55,501	$ 92,057	0.60	
☑	283			Riverine Flood	$ 29,912	$ 92,057	0.32	
☑	284			Riverine Flood	$ 18,978	$ 92,057	0.21	
☑	285			Riverine Flood	$ 29,137	$ 92,057	0.32	
☑	286			Riverine Flood	$ 36,859	$ 92,057	0.40	
☑	287			Riverine Flood	$ 435,153	$ 92,057	4.73	
☑	288			Riverine Flood	$ 574,702	$ 92,057	6.24	
☑	289			Riverine Flood	$ 161,717	$ 92,057	1.76	
☑	290			Riverine Flood	$ 13,813	$ 92,057	0.15	
☑	291			Riverine Flood	$ 114,327	$ 92,057	1.24	
☑	292			Riverine Flood	$ 12,633	$ 92,057	0.14	
☑	293			Riverine Flood	$ 590	$ 92,057	0.01	
☑	294			Riverine Flood	$ 622	$ 92,057	0.01	
TOTAL (SELECTED)					**$ 31,754,226**	**$ 27,064,848**	**1.17**	
TOTAL					**$ 31,754,226**	**$ 27,064,848**	**1.17**	

Prepared: March 2022

FEMA FLOOD ASSESSMENT STRUCTURE TOOL (FAST) OUTPUT
2011 FLOOD LEE

INPUT FIELDS	FIELD ID	STRUCTURE ID	Occupancy/ Zoning	Total County Fair Market Value ($)	Total County Assessed Value x CLR ($)	# of Stories	Foundation Type	1st Floor Height above Grade (Ft)	Total SF	Latitude	Longitude	Depth of Flood Lee	Lee Flood Elev	OUPUT FIELDS	Depth of Flood from Ground (Ft)	Depth of Flood in Structure (Ft)	Floodng Expected?	Struc Occup ID	Bldg Depth Damage ID	% Bldg Damage	Bldg Loss $$	Contents Value $$	Contents Depth Damage ID	% Contents Damage	Content Loss $$	Commercial Inventory Cost ($)	Comm Inventory Depth Damage ID	% Comm Inventory Damage	Comm Inventory Loss $$	Debris ID	Debris_Fin	Debris from Struc	Debris from Foundation	Debris Total	Min Days to Restore Struc	Max Days to Restore Struc	GridName
	1	B-003	COM1	512190	1326572.1	3	3	-0.012387168	16354	40.99798	-76.4608	-0.50739	483.2268		-0.61954	-0.60715	0	C1LN	0	0	0	1326572	0	0	0	112679.06	0	0	0						0	0	Depth.tif
	2	B-004	RES1	39559	102457.81	2	4	2.933105465	1493	40.99757	-76.4609	5.706825	483		5.699882	2.766777	1	R12B	108	28.30033	28995.67	51228.5	24	28.06711	14378.36	0	0	0	0	RES1BSG0	13.1384	0	0	13.1384	180	360	Depth.tif
	3	B-005	RES1	42624	110396.16	2	4	1.373709306	1904	40.99742	-76.4603	2.187266	483		2.184738	0.811029	1	R12B	108	20.62206	22765.93	55198	24	17.62206	9727.023	0	0	0	0	RES1BSG0	16.7552	0	0	16.7552	180	360	Depth.tif
	4	B-006	RES1	39298	101781.82	3	4	2.229872566	2436	41.00108	-76.4635	2.736238	484.7437		2.72538	0.495507	1	R13B	110	12.99101	13222.38	50890.5	26	18.46855	9398.737	0	0	0	0	RES1BSG0	21.4368	0	0	21.4368	180	360	Depth.tif
	5	B-007	RES3A	37856	98047.04	2	4	2.456922456	2112	41.00102	-76.4638	2.881273	484.6706		2.833309	0.376387	1	R3A1B	205	13.12916	12872.75	49023.5	82	16.50555	8091.597	0	0	0	0	RES3ANBS	8.6592	0	0	8.6592	180	360	Depth.tif
	6	B-008	RES1	57084	147847.56	2	4	1.782625563	2223	41.00097	-76.4639	3.495756	484.6113		3.446168	1.663543	1	R12B	108	24.31771	35953.01	73923.5	24	22.6448	16739.83	0	0	0	0	RES1BSG0	19.5624	0	0	19.5624	180	360	Depth.tif
	7	B-009	RES1	37357	96754.63	2	4	0.911190667	1384	41.00064	-76.464	2.648974	484.3323		2.56756	1.656369	1	R12B	108	24.28185	23493.66	48377	24	22.59458	10930.58	0	0	0	0	RES1BSG0	12.1792	0	0	12.1792	180	360	Depth.tif
	8	B-010	RES1	43061	111527.99	2	4	1.627379489	1456	41.00086	-76.4642	4.468245	484.4659		4.557298	2.929918	1	R12B	108	28.78975	32108.35	55763.5	24	28.71967	16015.09	0	0	0	0	RES1BSG0	12.8128	0	0	12.8128	180	360	Depth.tif
	9	B-011	RES1	34720	89924.8	2	4	2.581807928	1400	41.00075	-76.4644	5.635397	484.3169		5.663198	3.08139	1	R12B	108	29.40695	26443.91	44962	24	29.32556	13185.36	0	0	0	0	RES1BSG0	12.32	0	0	12.32	180	360	Depth.tif
	10	B-012	RES1	21378	55369.02	2	3	1.735531709	933	41.00055	-76.4643	3.925266	484.1949		3.975002	2.239471	1	R12N	107	14.95788	8282.03	27684.5	23	19.95788	5525.24	0	0	0	0	RES1NBFT1	3.8253	0	0	3.8253	180	360	Depth.tif
	11	B-013	RES1	32715	84731.85	3	4	2.276737623	1152	41.00075	-76.4646	5.292456	484.2677		5.340778	3.064041	1	R13B	110	25.38424	21508.32	42365.5	26	28.06404	11889.47	0	0	0	0	RES1BSG0	10.1376	0	0	10.1376	180	360	Depth.tif
	12	B-014	RES1	55439	143587.01	3	4	2.402549888	2440	41.00069	-76.4646	5.422522	484.1936		5.434814	3.032264	1	R13B	110	25.19358	36174.71	71793.5	26	28.03226	20125.34	0	0	0	0	RES1BSG0	21.472	0	0	21.472	180	360	Depth.tif
	13	B-015	RES1	38905	100763.95	2	4	1.908990148	1904	41.00036	-76.4649	3.334428	483.9654		3.332542	1.423552	1	R12B	108	23.11776	23294.15	50381.5	24	20.96486	10562.41	0	0	0	0	RES1BSG0	16.7552	0	0	16.7552	180	360	Depth.tif
	14	B-016	RES1	51536	133478.24	3	4	3.117529605	2304	41.00024	-76.4648	3.873653	483.9387		3.905029	0.787499	1	R13B	110	13.575	18119.64	66739	26	20.51249	13689.83	0	0	0	0	RES1BSG0	20.2752	0	0	20.2752	180	360	Depth.tif
	15	B-017	COM1	143115	370667.85	2	3	0.520618778	625	40.99992	-76.4646	4.148505	483.8793		4.007844	3.487225	1	C1LN	217	16.97445	62918.68	370667	90	61.8467	229245.3	4306.25	1	70.35947188	3029.85476	COM1NBF	1.125	0	0	1.125	360	540	Depth.tif
	16	B-018	RES1	47310	122532.9	3	4	7.498650264	2604	40.99988	-76.4644	3.078622	483.881		2.996383	-4.50227	1	R13B	110	3	3675.96	61266	26	0	0	0	0	0	0						0	0	Depth.tif
	17	B-019	RES1	67825	175666.75	3	4	0.457914978	2676	40.99994	-76.4644	2.276919	483.9035		2.321374	1.863459	1	R13B	110	19.18076	33694.07	87833	26	26.3173	23115.27	0	0	0	0	RES1BSG0	23.5488	0	0	23.5488	180	360	Depth.tif
	18	B-020	COM1	65223	168927.57	2	4	2.025469741	1285	40.99956	-76.4643	3.629855	483.8092		3.535514	1.510044	1	C1LB	217	11.55022	19511.44	168927	90	34.1607	57706.65	8853.65	1	40.18079017	3557.46653	COM1NBS	2.313	0	0	2.313	360	540	Depth.tif
	19	B-021	RES1	31429	81401.11	3	4	2.240551631	1572	40.99939	-76.4641	3.761753	483.7654		3.759883	1.519331	1	R13B	110	17.11599	13932.59	40700.5	26	24.59666	10010.96	0	0	0	0	RES1BSG0	13.8336	0	0	13.8336	180	360	Depth.tif
	20	B-022	RES1	47108	122009.72	2	4	2.661951566	1644	40.9993	-76.4641	3.852046	483.7418		3.875998	1.214046	1	R12B	108	22.07023	26927.67	61004.5	24	19.49832	11894.85	0	0	0	0	RES1BSG0	14.4672	0	0	14.4672	180	360	Depth.tif
	21	B-023	RES1	49790	128956.1	2	4	2.363482631	1572	40.99914	-76.4639	4.086535	483.7004		4.107386	1.743903	1	R12B	108	24.71952	31877.3	64478	24	23.20732	14963.62	0	0	0	0	RES1BSG0	13.8336	0	0	13.8336	180	360	Depth.tif
	22	B-024	RES1	45265	117236.35	2	4	0.994	1844	40.99962	-76.4641	2.833157	483.8336		2.832928	1.838928	1	R12B	108	25.19464	29537.19	58618	24	23.8725	13993.58	0	0	0	0	RES1BSG0	16.2272	0	0	16.2272	180	360	Depth.tif
	23	B-025	RES1	64210	166303.9	2	3	-0.100611052	2310	40.99964	-76.4641	2.860723	483.8417		2.857257	2.957868	1	R12N	107	17.83147	29654.27	83151.5	23	22.83147	18984.71	0	0	0	0	RES1NBFT1	9.471	0	0	9.471	180	360	Depth.tif
	24	B-027	RES1	32815	84990.85	2	5	5.492057531	1392	40.99972	-76.4639	3.439799	483.8781		3.455767	-2.03629	1	R12N	107	0	0	42495	23	0	0	0	0	0	0						0	0	Depth.tif
	25	B-028	RES3A	43691	113159.69	2	7	10	2080	40.99926	-76.4637	2.766985	483.7501		2.881125	-7.11888	1	R3A1N	204	0	0	56579.5	81	0	0	0	0	0	0						0	0	Depth.tif
	26	B-029	RES1	35382	91639.38	2	4	1.686626891	1440	40.99975	-76.4638	3.541205	483.8921		3.512747	1.82612	1	R12B	108	25.1306	23029.43	45819.5	24	23.78284	10897.18	0	0	0	0	RES1BSG0	12.672	0	0	12.672	180	360	Depth.tif
	27	B-030	RES1	40131	103939.29	2	4	1.576400004	1700	40.9998	-76.4637	3.510613	483.9139		3.507697	1.931297	1	R12B	108	25.65649	26667.1	51969.5	24	24.51908	12742.44	0	0	0	0	RES1BSG0	14.96	0	0	14.96	180	360	Depth.tif
	28	B-031	COM1	38340	99300.6	1	3	0.360120002	1917	40.99955	-76.4633	3.872121	483.8727		3.87681	3.51669	1	C1LN	217	17.03338	16914.15	99300	90	62.20028	61764.88	13208.13	1	70.68358817	9335.98021	COM1NBF	3.4506	0	0	3.4506	360	540	Depth.tif
	29	B-032	RES1	25071	64933.89	3	4	0.658302925	1288	40.99984	-76.4636	3.241465	483.9406		3.228522	2.570219	1	R13B	110	22.85109	14837.9	32466.5	26	27.57022	8951.085	0	0	0	0	RES1BSG0	11.3344	0	0	11.3344	180	360	Depth.tif
	30	B-033	RES1	32726	84760.34	3	4	0.871680952	1982	40.99988	-76.4635	3.00812	483.9579		3.010552	2.138871	1	R13B	110	20.69436	17540.54	42380	26	27.13887	11501.45	0	0	0	0	RES1BSG0	17.4416	0	0	17.4416	180	360	Depth.tif
	31	B-034	RES1	155321	402281.39	2	4	2.265110808	2040	40.99993	-76.4634	2.999981	483.9873		3.00465	0.739539	1	R12B	108	20.47908	82383.44	201140.5	24	17.47908	35157.51	0	0	0	0	RES1BSG0	17.952	0	0	17.952	180	360	Depth.tif
	32	B-035	COM1	94868	245708.12	2	4	2.176889023	4128	40.99997	-76.4633	3.034444	484.025		3.032059	0.85517	1	C1LB	217	7.841363	19266.86	245708	90	22.52409	55343.49	28441.92	1	27.08960102	7704.80265	COM1NBS	7.4304	0	0	7.4304	360	540	Depth.tif
	33	B-036	RES1	77165	199857.35	3	4	1.701810545	2781	41	-76.4631	3.077094	484.0924		3.076119	1.374308	1	R13B	110	16.24585	32468.46	99928.5	26	23.87154	23854.47	0	0	0	0	RES1BSG0	24.4728	0	0	24.4728	180	360	Depth.tif
	34	B-037	RES1	27802	72007.18	2	4	1.887018036	1848	40.99967	-76.4628	3.97605	483.9787		3.979192	2.092174	1	R12B	108	26.27652	18920.93	36003.5	24	25.36869	9133.618	0	0	0	0	RES1BSG0	16.2624	0	0	16.2624	180	360	Depth.tif
	35	B-038	RES1	77230	200025.7	2	4	1.92834956	2268	40.99896	-76.4638	4.567879	483.6509		4.566522	2.638172	1	R12B	108	27.91452	55836.01	100012.5	24	27.55269	27556.13	0	0	0	0	RES1BSG0	19.9584	0	0	19.9584	180	360	Depth.tif
	36	B-039	RES1	44210	114503.9	2	4	2.200661742	1747	40.99888	-76.4637	4.628679	483.628		4.62706	2.426398	1	R12B	108	27.27919	31235.5	57251.5	24	26.70559	15289.35	0	0	0	0	RES1BSG0	15.3736	0	0	15.3736	180	360	Depth.tif
	37	B-040	RES1	29319	75936.21	3	4	2.271366659	1248	40.9988	-76.4637	4.607155	483.6056		4.610056	2.338689	1	R13B	110	21.69345	16473.14	37968	26	27.33869	10379.95	0	0	0	0	RES1BSG0	10.9824	0	0	10.9824	180	360	Depth.tif
	38	B-041	RES1	35021	90704.39	3	4	2.075613985	1314	40.9987	-76.4636	4.577939	483.5755		4.577849	2.502235	1	R13B	110	22.51117	20418.54	45352	26	27.50223	12472.81	0	0	0	0	RES1BSG0	11.5632	0	0	11.5632	180	360	Depth.tif
	39	B-042	RES1	46338	120015.42	3	4	2.699737508	1776	40.9986	-76.4635	5.350337	483.5432		5.330444	2.630706	1	R13B	110	23.15353	27787.71	60007.5	26	27.63071	16580.5	0	0	0	0	RES1BSG0	15.6288	0	0	15.6288	180	360	Depth.tif
	40	B-043	RES1	38004	98430.36	2	4	1.778650142	1109	40.9987	-76.4633	4.713005	483.5848		4.745386	2.966736	1	R12B	108	28.90021	28446.47	49215	24	28.86694	14206.87	0	0	0	0	RES1BSG0	9.7592	0	0	9.7592	180	360	Depth.tif
	41	B-044	RES1	56126	145366.34	2	4	1.94	2884	40.99877	-76.4632	4.615868	483.6168		4.616476	2.676476	1	R12B	108	28.02943	40745.26	72683	24	27.7059	20137.48	0	0	0	0	RES1BSG0	25.3792	0	0	25.3792	180	360	Depth.tif
	42	B-045	RES1	77391	200442.69	2	4	0.988162238	3502	40.99886	-76.463	4.691152	483.6552		4.692047	3.703884	1	R12B	108	32.51942	65182.58	100221	24	31.81554	31885.85	0	0	0	0	RES1BSG0	30.8176	0	0	30.8176	180	360	Depth.tif
	43	B-046	RES1	75203	194775.77	1	4	2.165534777	1330	40.99905	-76.4629	4.753698	483.7317		4.758309	2.592775	1	R11B	704	43.14942	84044.29	97387.5	535	23.77832	23157.12	0	0	0	0	RES1BSG0	11.704	0	0	11.704	180	360	Depth.tif
	44	B-048	RES1	54315	140675.85	1	4	3.015499198	1392	40.99941	-76.4626	5.746198	483.898		5.638287	2.622788	1	R11B	704	43.35952	60996	70337.5	535	23.86836	16788.41	0	0	0	0	RES1BSG0	12.2496	0	0	12.2496	180	360	Depth.tif
	45	B-050	RES1	67774	175534.66	1	4	2.443423119	1286	40.99932	-76.462	3.903815	483.9374		3.902717	1.459294	1	R11B	704	35.21505	61814.39	87767	535	20.37788	17885.05	0	0	0	0	RES1BSG0	11.3168	0	0	11.3168	180	360	Depth.tif
	46	B-051	RES1	29509	76428.31	2	4	1.264012376	1080	40.99934	-76.4618	2.815883	483.9812		3.005189	1.741177	1	R12B	108	24.70589	18882.21	38214	24	23.18824	8861.154	0	0	0	0	RES1BSG0	9.504	0	0	9.504	180	360	Depth.tif
	47	B-052	RES1	47511	123053.49	3	4	1.34379804	1905	40.9994	-76.4617	0.65663	484.0235		0.506498	-0.8373	1	R13B	110	10.3254	12705.71	61526.5	26	9.138896	5622.843	0	0	0	0						0	0	Depth.tif
	48	B-053	RES1	55644	144117.96	3	4	3.657283242	2124	40.99918	-76.4616	0.448244	483.9375		0.329001	-3.32828	1	R13B	110	3	4323.51	72058.5	26	3.358588	2420.148	0	0	0	0						0	0	Depth.tif
	49	B-054	RES1	40820	105723.8	3	4	2.690217263	1440	40.99912	-76.4617	2.429659	483.8882		2.393045	-0.29717	1	R13B	110	11.40565	12058.4	52861.5	26	12.91979	6829.595	0	0	0	0						0	0	Depth.tif
	50	B-055	RES1	45623	118163.57	2	4	2.970999456	1708	40.99909	-76.4619	4.695395	483.8519		4.541211	1.570212	1	R12B	108	23.85106	28183.13	59081.5	24	21.99148	12992.9	0	0	0	0	RES1BSG0	15.0304	0	0	15.0304	180	360	Depth.tif
	51	B-056	COM1	55580	143952.2	1	7	-0.268228033	2688	40.99864	-76.4616	5.679567	483.6581		5.685636	5.953864	1	C1LN	217	22.86159	32909.72	143952	90	82.76932	119148.1	18520.32	1	89.769318	16625.565	COM1NBS	6.72	0	0	6.72	450	630	Depth.tif
	52	B-057	RES1	46480	120383.2	2	4	3.469259284	1784	40.99897	-76.462	5.757796	483.7798		5.749882	2.280622	1	R12B	108	26.84187	32313.05	60191.5	24	26.12249	15723.52	0	0	0	0	RES1BSG0	15.6992	0	0	15.6992	180	360	Depth.tif
	53	B-058	RES1	49230	127505.7	3	4	2.261153878	1724	40.99888	-76.4621	5.746178	483.724		5.748995	3.487841	1	R13B	110	27.92705	35608.38	63752.5	26	28.48784	18161.71	0	0	0	0	RES1BSG0	15.1712	0	0	15.1712	180	360	Depth.tif
	54	B-059	RES1	50768	131489.12	3	4	3.106615397	1892	40.99879	-76.4623	5.669703	483.6699		5.67397	2.567355	1	R13B	110	22.83677	30027.85	65744.5	26	27.56735	18124.02	0	0	0	0	RES1BSG0	16.6496	0	0	16.6496	180	360	Depth.tif
	55	B-060	RES1	61929	160396.11	2	4	1.602809001	1972	40.99874	-76.4625	5.535691	483.6378		5.523879	3.92107	1	R12B	108	33.60535	53901.63	80198	24	32.68428	26212.14	0	0	0	0	RES1BSG0	17.3536	0	0	17.3536	180	360	Depth.tif
	56	B-061	RES1	47878	124004.02	3	4	3.288226328	1664	40.99862	-76.4627	5.573701	483.5831		5.571716	2.28349	1	R13B	110	21.41745	26558.49	62002	26	27.28349	16916.31	0	0	0	0	RES1BSG0	14.6432	0	0	14.6432	180	360	Depth.tif
	57	B-062	RES1	26571	68818.89	2	4	2.352586198	1360	40.99859	-76.4628	5.558649	483.5638		5.559959	3.207373	1	R12B	108	30.03687	20670.77	34409	24	29.82949	10264.03	0	0	0	0	RES1BSG0	11.968	0	0	11.968	180	360	Depth.tif
	58	B-063	RES1	19419	50295.21	2	4	2.265002558	1232	40.99856	-76.4629	5.550318	483.5506		5.551637	3.286635	1	R12B	108	30.43317	15306.36	25147.5	24	30.14654	7581.101	0	0	0	0	RES1BSG0	10.8416	0	0	10.8416	180	360	Depth.tif
	59	B-064	RES1	61204	158518.36	2	4	2.596399441	1496	40.99852	-76.463	5.520655	483.5321		5.522175	2.925776	1	R12B	108	28.77733	45617.24	79259	24	28.7031	22749.79	0	0	0	0	RES1BSG0	13.1648	0	0	13.1648	180	360	Depth.tif
	60	B-065	RES1	36804	95322.36	2	4	-0.641757616	1091	40.99844	-76.4632	5.338833	483.4997		5.365696	6.007454	1	R12B	108	44.04472	41984.31	47661	24	42.02982	20031.83	0	0	0	0	RES1BSG6	11.1282	34.912	27.275	73.3152	270	450	Depth.tif
	61	B-066	RES1	46574	120626.66	3	4	1.664803843	1566	40.99837	-76.4633	4.640378	483.4717		4.59162	2.926817	1	R13B	110	24.63408	29715.11	60313	26	27.92682	16843.5	0	0	0	0	RES1BSG0	13.7808	0	0	13.7808	180	360	Depth.tif
	62	B-067	RES1	39607	102582.13	3	4	1.644263799	1414	40.99799	-76.463	5.841966	483.3331		5.858112	4.213849	1	R13B	110	32.06924	32897.27	51291	26	29.21385	14984.08	0	0	0	0	RES1BSG4	12.4432	0	0	12.4432	270	450	Depth.tif
	63	B-068	COM1	76320	197668.8	1	7	0.491274513	4000	40.99852	-76.4614	5.607913	483.6033		5.608216	5.116941	1	C1LN	217	20.35082	40227.07	197668	90	78.58471	155336.8	27560	1	85.58470648	23587.1451	COM1NBS	10	0	0	10	450	630	Depth.tif
	64	B-069	COM1	145630	377181.7	2	7	0.21985076	5709	40.99837	-76.4614	5.522305	483.5219		5.518813	5.298962	1	C1LN	217	20.89689	78819.09	377181	90	79.49481	299839.3	39335.01	1	86.49481187	34022.7429	COM1NBS	14.2725	0	0	14.2725	450	630	Depth.tif
	65	B-071	RES1	67256	174193.04	2	4	1.917433968	2750	41.00009	-76.4628	3.196913	484.1695		3.171054	1.25362	1	R12B	108	22.2681	38789.47	87096.5	24	19.77534	17223.63	0	0	0	0	RES1BSG0	24.2	0	0	24.2	180	360	Depth.tif
	66	B-072	RES1	40599	105151.41	3	4	1.335404575	2288	40.99977	-76.4625	4.124041	484.058		4.120027	2.784622	1	R13B	110	23.92311	25155.39	52575.5	26	27.78462	14607.9	0	0	0	0	RES1BSG0	20.1344	0	0	20.1344	180	360	Depth.tif
	67	B-073	COM1	80960	209686.4	3	4	1.682328041	4186	41.00022	-76.4628	3.242588	484.2514		3.241573	1.559245	1	C1LB	217	11.79623	24735.03	209686	90	34.94792	73280.9	28841.54	1	41.06641098	11844.1853	COM1NBS	7.5348	0	0	7.5348	360	540	Depth.tif
	68	B-074	RES3A	47550	123154.5	2	4	2.326288011	2717	41.00018	-76.4626	3.246903	484.2444		3.248615	0.922327	1	R3A1B	205	14.76698	18186.13	61577	82	18.68931	11508.31	0	0	0	0	RES3ANBS	11.1397	0	0	11.1397	180	360	Depth.tif
	69	B-075	RES1	70311	182105.49	3	4	3.306986815	3304	41.00024	-76.4624	2.310155	484.3026		2.226191	-1.0808	1	R13B	110	9.676816	17621.97	91052.5	26	7.919204	7210.633	0	0	0	0						0	0	Depth.tif
	70	B-076	RES1	77982	201973.38	2	4	2.960234323	2052	40.99966	-76.4649	3.595434	483.7792		3.583789	0.623555	1	R12B	108	20.24711	40893.69	100986.5	24	17.24711	17417.25	0	0	0	0	RES1BSG0	18.0576	0	0	18.0576	180	360	Depth.tif
	71	B-077	RES1	36219	93807.21	2	4	1.184	1490	40.99967	-76.465	2.771984	483.7681		2.765715	1.581715	1	R12B	108	23.90857	22427.92	46903.5	24	22.072	10352.54	0	0	0	0	RES1BSG0	13.112	0	0	13.112	180	360	Depth.tif
	72	B-078	RES1	55090	142683.1	3	4	2.958400832	2439	40.99902	-76.4653	4.227438	483.5729		4.177611	1.21921	1	R13B	110	15.31526	21852.27	71341.5	26	23.09605	16477.07	0	0	0	0	RES1BSG0	21.4632	0	0	21.4632	180	360	Depth.tif
	73	B-080	RES1	51347	132988.73	3	4	1.697607187	3025	40.99914	-76.4651	4.625683	483.6204		4.62659	2.928983	1	R13B	110	24.64492	32774.78	66494	26	27.92898	18571.1	0	0	0	0	RES1BSG0	26.62	0	0	26.62	180	360	Depth.tif
	74	B-081	RES1	65680	170111.2	3	4	2.247	3600	40.99881	-76.4649	5.561846	483.5623		5.562331	3.315331	1	R13B	110	26.89198	45746.22	85055.5	26	28.31533	24083.75	0	0	0	0	RES1BSG0	31.68	0	0	31.68	180	360	Depth.tif
	75	B-082	RES1	41764	108168.76	3	4	1.733335544	1600	40.9992	-76.465	4.756678	483.6538		4.737947	3.004611	1	R13B	110	25.02767	27071.93	54084	26	28.00461	15146.01	0	0	0	0	RES1BSG0	14.08	0	0	14.08	180	360	Depth.tif
	76	B-083 gara	RES1	6996	18119.64	2	7	2.055742347	0	40.99896	-76.4647	6.714155	483.6133		6.701124	4.645382	1	R12N	107	21.29076	3857.673	9059.5	23	31.22691	2829.002	0	0	0	0	RES1NBSG	0	0	0	0	270	450	Depth.tif
	77	B-084	COM1	149010	385935.9	1	3	1.551941824	1903	40.99924	-76.4647	3.563546	483.6905		3.546997	1.995055	1	C1LN	217	13.97528	53935.49	385935	90	41.92089	161787.4	13111.67	1	48.91099873	6413.04875	COM1NBF	3.4254	0	0	3.4254	360	540	Depth.tif
	78	B-085	RES1	46248	119782.32	1	4	2.76246094	1004	40.99913	-76.4644	4.715561	483.6745		4.720179	1.957718	1	R11B	704	38.70403	46360.46	59891	535	21.87315	13100.05	0	0	0	0	RES1BSG0	8.8352	0	0	8.8352	180	360	Depth.tif
	79	B-086	RES1	30554	79134.86	3	4	2.493467744	1402	40.99902	-76.4644	4.656311	483.6456		4.653062	2.159594	1	R13B	110	20.79797	16458.27	39567	26	27.15959	10746.24	0	0	0	0	RES1BSG0	12.3376	0	0	12.3376	180	360	Depth.tif
	80	B-087	RES1	33707	87301.13	3	4	2.203	1348	40.99897	-76.4643	4.630522	483.631		4.631763	2.428763	1	R13B	110	22.14381	19331.77	43650.5	26	27.42876	11972.79	0	0	0	0	RES1BSG0	11.8624	0	0	11.8624	180	360	Depth.tif
	81	B-088	RES1	44156	114364.04	3	4	3.047	1960	40.99886	-76.4642	4.60163	483.6021		4.601576	1.554576	1	R13B	110	17.32746	19816.37	57182	26	24.77288	14165.63	0	0	0	0	RES1BSG0	17.248	0	0	17.248	180	360	Depth.tif
	82	B-089	RES1	50329	130352.11	3	4	2.748068846	2378	40.9988	-76.4642	4.586106	483.5866		4.587297	1.839229	1	R13B	110	19.03537	24812.99	65176	26	26.19614	17073.6	0	0	0	0	RES1BSG0	20.9264	0	0	20.9264	180	360	Depth.tif
	83	B-090	RES1	58879	152496.61	3	4	2.651888757	3130	40.99871	-76.4641	4.562739	483.5623		4.56423	1.912342	1	R13B	110	19.47405	29697.15	76248	26	26.56171	20252.77	0	0	0	0	RES1BSG0	27.544	0	0	27.544	180	360	Depth.tif
	84	B-091.1	RES1	55577	143944.43	3	4	2.761171672	2953	40.9986	-76.464	4.548648	483.5294		4.537339	1.776168	1	R13B	110	18.65701	26855.64	71972	26	25.88084	18626.96	0	0	0	0	RES1BSG0	25.9864	0	0	25.9864	180	360	Depth.tif
	85	B-092	RES1	57880	149909.2	3	4	3.06460731	2228	40.99841	-76.4639	5.572471	483.4752		5.705569	2.640962	1	R13B	110	23.20481	34786.1	74954.5	26	27.64096	20718.14	0	0	0	0	RES1BSG0	19.6064	0	0	19.6064	180	360	Depth.tif

FEMA FLOOD ASSESSMENT STRUCTURE TOOL (FAST) OUTPUT
2011 FLOOD LEE

INPUT FIELDS	FIELD ID	STRUCTURE ID	Occupancy/ Zoning	Total County Fair Market Value ($)	Total County Assessed Value x CLR ($)	# of Stories	Foundation Type	1st Floor Height above Grade (Ft)	Total SF	Latitude	Longitude	Depth of Flood Lee	Lee Flood Elev	OUPUT FIELDS	Depth of Flood from Ground (Ft)	Depth of Flood in Structure (Ft)	Floodng Expected?	Struc Occup ID	Bldg Depth Damage ID	% Bldg Damage	Bldg Loss $$	Contents Value $$	Contents Depth Damage ID	% Contents Damage	Content Loss $$	Commercial Inventory Cost ($)	Comm Inventory Depth Damage ID	% Comm Inventory Damage	Comm Inventory Loss $$	Debris ID	Debris_Fin	Debris from Struc	Debris from Foundation	Debris Total	Min Days to Restore Struc	Max Days to Restore Struc	GridName
	86	B-093	RES1	24416	63237.44	3	4	2.450309113	1024	40.99836	-76.4641	5.450679	483.4586		5.451352	3.001043	1	R13B	110	25.00626	15813.21	31618.5	26	28.00104	8853.51	0	0	0	0	RES1BSG0	9.0112	0	0	9.0112	180	360	Depth.tif
	87	B-094	RES1	56295	145804.05	3	4	2.339171752	1720	40.99832	-76.4642	5.491868	483.44		5.438138	3.098966	1	R13B	110	25.59379	37316.78	72902	26	28.09897	20484.71	0	0	0	0	RES1BSG0	15.136	0	0	15.136	180	360	Depth.tif
	88	B-095	RES1	5419	14035.21	2	4	3.303398356	1240	40.99824	-76.4644	5.842066	483.4092		5.88516	2.581762	1	R12B	108	27.74528	3894.051	7017.5	24	27.32705	1917.675	0	0	0	0	RES1BSG0	10.912	0	0	10.912	180	360	Depth.tif
	89	B-096	RES1	35258	91318.22	3	4	1.604774937	1304	40.99816	-76.4646	4.995481	483.3792		5.007567	3.402792	1	R13B	110	27.41675	25036.43	45659	26	28.40279	12968.43	0	0	0	0	RES1BSG0	11.4752	0	0	11.4752	180	360	Depth.tif
	90	B-097	RES1	43790	113416.1	3	4	1.88420935	1792	40.99813	-76.4646	4.837	483.3667		4.832192	2.947983	1	R13B	110	24.73991	28059.02	56708	26	27.94798	15848.74	0	0	0	0	RES1BSG0	15.7696	0	0	15.7696	180	360	Depth.tif
	91	B-098	RES1	49113	127202.67	3	4	2.485897374	1632	40.99808	-76.4647	5.090152	483.3489		5.041039	2.555142	1	R13B	110	22.77571	28971.16	63601	26	27.55514	17525.35	0	0	0	0	RES1BSG0	14.3616	0	0	14.3616	180	360	Depth.tif
	92	B-099	RES1	48571	125798.89	2	4	1.292809341	1864	40.99802	-76.4649	5.416137	483.3249		5.42795	4.135141	1	R12B	108	34.6757	43621.34	62899	24	33.54056	21096.68	0	0	0	0	RES1BSG4	16.4032	0	0	16.4032	270	450	Depth.tif
	93	B-100	RES1	43274	112079.66	2	4	2.30027986	1760	40.99799	-76.465	5.94896	483.3126		5.898264	3.597984	1	R12B	108	31.98992	35853.98	56039.5	24	31.39193	17591.88	0	0	0	0	RES1BSG0	15.488	0	0	15.488	180	360	Depth.tif
	94	B-101	COM1	19112	49500.08	1	7	-0.301741168	1365	40.99795	-76.4651	6.822743	483.2963		6.777255	7.078996	1	C1LN	217	26.31598	13026.41	49500	90	85.15799	42153.21	9404.85	1	92.07899575	8659.89143	COM1NBS(	3.4125	0	0	3.4125	450	630	Depth.tif
	95	B-102	RES1	38821	100546.39	2	4	2.094484242	1238	40.99779	-76.4654	7.206121	483.2327		7.208312	5.113828	1	R12B	108	39.56914	39785.19	50273	24	37.56914	18887.13	0	0	0	0	RES1BSG4	10.8944	0	0	10.8944	270	450	Depth.tif
	96	B-103	RES1	57819	149751.21	2	4	1.725	1852	40.99753	-76.4653	6.161586	483.1621		6.162746	4.437746	1	R12B	108	36.18873	54192.99	74875.5	24	34.75099	26019.97	0	0	0	0	RES1BSG4	16.2976	0	0	16.2976	270	450	Depth.tif
	97	B-104	RES1	50349	130403.91	3	4	2.666708173	1476	40.9976	-76.4651	6.205479	483.1922		6.202349	3.535641	1	R13B	110	28.21384	36791.7	65201.5	26	28.53564	18605.67	0	0	0	0	RES1BSG0	12.9888	0	0	12.9888	180	360	Depth.tif
	98	B-105	RES1	47021	121784.39	3	4	2.378480973	1488	40.99768	-76.4649	6.200464	483.2242		6.206086	3.827605	1	R13B	110	29.96563	36493.34	60892	26	28.8276	17553.71	0	0	0	0	RES1BSG0	13.0944	0	0	13.0944	180	360	Depth.tif
	99	B-106	RES1	90532	234477.88	3	4	1.615444458	2804	40.99773	-76.4647	5.226798	483.2452		5.227158	3.611713	1	R13B	110	28.67028	67225.21	117238.5	26	28.61171	33543.94	0	0	0	0	RES1BSG0	24.6752	0	0	24.6752	180	360	Depth.tif
	100	B-107	RES1	39978	103543.02	3	4	1.107172635	1424	40.99779	-76.4646	4.304662	483.2669		4.266673	3.1595	1	R13B	110	25.957	26876.66	51771.5	26	28.1595	14578.6	0	0	0	0	RES1BSG0	12.5312	0	0	12.5312	180	360	Depth.tif
	101	B-108	RES1	50186	129981.74	3	4	1.992342655	2007	40.9978	-76.4645	4.737452	483.2751		4.894782	2.902439	1	R13B	110	24.51219	31861.2	64990.5	26	27.90244	18133.93	0	0	0	0	RES1BSG0	17.6616	0	0	17.6616	180	360	Depth.tif
	102	B-109	RES1	50432	130618.88	2	4	1.044	3041	40.99786	-76.4644	4.294201	483.2947		4.292383	3.248383	1	R12B	108	30.24192	39501.39	65309	24	29.99353	19588.48	0	0	0	0	RES1BSG0	26.7608	0	0	26.7608	180	360	Depth.tif
	103	B-110	COM1	2779	7197.61	1	7	-0.800911238	3316	40.99768	-76.4642	5.279176	483.2496		5.248427	6.049339	1	C1LN	217	23.14802	1665.963	7197	90	83.09868	5980.612	22847.24	1	90.09867726	20585.061	COM1NBS(	8.29	0	0	8.29	450	630	Depth.tif
	104	B-111	RES1	36439	94377.01	2	4	1.158169303	1368	40.998	-76.4642	5.800556	483.347		5.710297	4.552127	1	R12B	108	36.76064	34693.59	47188.5	24	35.20851	16614.37	0	0	0	0	RES1BSG4	12.0384	0	0	12.0384	270	450	Depth.tif
	105	B-113	RES1	45715	118401.85	3	4	1.863742919	1681	40.99803	-76.4641	6.355821	483.3572		6.353939	4.490196	1	R13B	110	33.45098	39606.29	59200.5	26	29.4902	17458.34	0	0	0	0	RES1BSG4	14.7928	0	0	14.7928	270	450	Depth.tif
	106	B-114	RES1	56399	146073.41	3	4	2.03529621	2114	40.99806	-76.464	6.375226	483.3639		6.363929	4.328633	1	R13B	110	32.64317	47682.85	73036.5	26	29.32863	21420.61	0	0	0	0	RES1BSG4	18.6032	0	0	18.6032	270	450	Depth.tif
	107	B-115	RES1	58342	151105.78	2	4	1.38601569	1953	40.99816	-76.4639	5.661881	483.3951		5.577049	4.191034	1	R12B	108	34.95517	52819.01	75552.5	24	33.76413	25509.65	0	0	0	0	RES1BSG4	17.1864	0	0	17.1864	270	450	Depth.tif
	108	B-116	RES1	61913	160354.67	3	4	2.24452664	3176	40.99817	-76.4637	5.410216	483.3994		5.417168	3.172642	1	R13B	110	26.03585	41749.53	80177	26	28.17264	22587.98	0	0	0	0	RES1BSG0	27.9488	0	0	27.9488	180	360	Depth.tif
	109	B-117	RES1	44786	115995.74	3	4	1.416515342	2372	40.99797	-76.4635	5.393843	483.3308		5.340166	3.923651	1	R13B	110	30.5419	35427.08	57997.5	26	28.92365	16774.99	0	0	0	0	RES1BSG0	20.8736	0	0	20.8736	180	360	Depth.tif
	110	B-118	RES1	30710	79538.9	3	4	1.405393882	1516	40.99781	-76.4634	6.022544	483.276		5.950752	4.545358	1	R13B	110	33.72679	26825.62	39769	26	29.54536	11749.89	0	0	0	0	RES1BSG4	13.3408	0	0	13.3408	270	450	Depth.tif
	111	B-120	RES1	48620	125925.8	2	4	1.246781088	2364	41.00084	-76.465	6.212793	484.145		6.185619	4.938838	1	R12B	108	38.69419	48725.66	62962.5	24	36.75535	23142.09	0	0	0	0	RES1BSG4	20.8032	0	0	20.8032	270	450	Depth.tif
	112	B-121	RES1	67766	175513.94	2	4	3.124448818	2040	41.00094	-76.4646	5.808239	484.3576		5.83739	2.712942	1	R12B	108	28.13882	49387.3	87756.5	24	27.85177	24441.74	0	0	0	0	RES1BSG0	17.952	0	0	17.952	180	360	Depth.tif
	113	B-122	RES1	74160	192074.4	2	7	7	2408	41.00134	-76.4642	4.721364	484.7811		4.771792	-2.22821	1	R12N	107	0	0	96037	23	0	0	0	0	0	0					0		0	Depth.tif
	114	B-123	RES1	50635	131144.65	3	4	3.646175998	2240	41.00118	-76.4639	4.781135	484.7744		4.779534	1.133358	1	R13B	110	14.80015	19409.51	65572	26	22.66679	14863.07	0	0	0	0	RES1BSG0	19.712	0	0	19.712	180	360	Depth.tif
	115	B-124	RES1	39806	103097.54	2	4	2.933335017	1225	41.00122	-76.4638	4.368815	484.8175		4.356832	1.423497	1	R12B	108	23.11749	23833.43	51548.5	24	20.96448	10806.87	0	0	0	0	RES1BSG0	10.78	0	0	10.78	180	360	Depth.tif
	116	B-125	RES1	34053	88197.27	2	4	2.337196134	1764	41.00126	-76.4637	3.858367	484.8611		3.859264	1.522068	1	R12B	108	23.61034	20823.61	44098.5	24	21.65448	9549.3	0	0	0	0	RES1BSG0	15.5232	0	0	15.5232	180	360	Depth.tif
	117	B-126	RES1	33876	87738.84	2	4	2.302843806	1230	41.0013	-76.4635	3.901118	484.9019		3.901235	1.598391	1	R12B	108	23.99195	21050.06	43869	24	22.18874	9733.976	0	0	0	0	RES1BSG0	10.824	0	0	10.824	180	360	Depth.tif
	118	B-127	RES1	48967	126824.53	2	4	1.763178602	1714	41.00134	-76.4634	3.306087	484.9375		3.338361	1.575182	1	R12B	108	23.87591	30280.39	63412	24	22.02628	13967.3	0	0	0	0	RES1BSG0	15.0832	0	0	15.0832	180	360	Depth.tif
	119	B-128	RES1	21088	54617.92	3	4	2.175755638	1806	41.00142	-76.4632	2.523096	485.0087		2.482876	0.30712	1	R13B	110	12.61424	6889.519	27308.5	26	17.14984	4683.364	0	0	0	0	RES1BSG0	15.8928	0	0	15.8928	180	360	Depth.tif
	120	B-129	RES1	37861	98059.99	2	4	3.114822716	1133	41.00146	-76.4631	2.403604	485.0872		2.408684	-0.70614	1	R12B	108	15.46931	15169.05	49029.5	24	10.35089	5074.989	0	0	0	0					0		0	Depth.tif
	121	B-130	RES1	24798	64226.82	2	4	2.08256943	780	41.00154	-76.463	2.158563	485.2114		2.222059	0.139489	1	R12B	108	19.27898	12382.12	32113	24	16.27898	5227.668	0	0	0	0	RES1BSG0	6.864	0	0	6.864	180	360	Depth.tif
	122	B-131	RES1	32930	85288.7	1	4	4.397525158	715	41.00161	-76.4629	1.389432	485.3398		1.426532	-2.97099	1	R11B	704	0.406096	346.3513	42644	535	0.319076	136.0666	0	0	0	0					0		0	Depth.tif
	123	B-132	COM1	10752	27847.68	1	3	5.141557237	224	41.00203	-76.4628	-0.11968	486.0082		-1.18504	-6.3266	0	C1LN	0	0	0	27847	0	0	0	1543.36	0	0	0					0		0	Depth.tif
	124	B-133	RES1	60769	157391.71	2	4	1.892727684	1117	41.00163	-76.4628	1.463604	485.3955		1.45904	-0.43369	1	R12B	108	16.83156	26491.36	78695.5	24	12.5305	9860.939	0	0	0	0					0		0	Depth.tif
	125	B-134	RES1	40120	103910.8	3	4	1.927348889	1440	41.00068	-76.4648	6.136556	484.1207		6.132457	4.205108	1	R13B	110	32.02554	33271.53	51955	26	29.20511	15173.51	0	0	0	0	RES1BSG4	12.672	0	0	12.672	270	450	Depth.tif
	126	B-135	RES1	37594	97368.46	3	4	2.435	1568	41.00057	-76.4651	6.767647	483.7682		6.771589	4.336589	1	R13B	110	32.68294	31822.73	48684	26	29.33659	14282.22	0	0	0	0	RES1BSG4	13.7984	0	0	13.7984	270	450	Depth.tif
	127	B-136	RES1	59716	154664.44	2	4	3.062942483	1845	41.00042	-76.465	5.824659	483.9587		5.799236	2.736294	1	R12B	108	28.20888	43628.98	77332	24	27.94518	21610.56	0	0	0	0	RES1BSG0	16.236	0	0	16.236	180	360	Depth.tif
	128	B-137	RES3A	77153	199826.27	2	4	11.875	0	41.00007	-76.4659	5.427545	483.4953		5.486622	-6.38838	1	R3A1B	205	0	0	99913	82	0	0	0	0	0	0					0		0	Depth.tif
	129	B-138	RES1	37426	96933.34	2	4	2.668557332	988	41.00067	-76.4655	5.6812	483.4286		5.642072	2.973515	1	R12B	108	28.92054	28033.55	48466.5	24	28.89406	14003.94	0	0	0	0	RES1BSG0	8.6944	0	0	8.6944	180	360	Depth.tif
	130	B-140	RES1	40958	106081.22	2	3	2.304941326	1792	41.00029	-76.4653	5.23098	483.8062		5.299951	2.99501	1	R12N	107	17.98004	19073.41	53040.5	23	22.98004	12188.73	0	0	0	0	RES1NBFT1	7.3472	0	0	7.3472	180	360	Depth.tif
	131	B-141	RES3A	110906	287246.54	2	7	0.881699008	5840	41.00004	-76.4652	3.896996	483.8503		3.894351	3.012652	1	R3A1N	204	28.01265	80465.22	143623	81	35.0253	50304.39	0	0	0	0	RES3ANBS(	23.944	0	0	23.944	180	360	Depth.tif
	132	B-142	RES1	49028	126982.52	3	4	2.422364126	2128	40.99994	-76.465	4.165251	483.8377		4.189959	1.767594	1	R13B	110	18.60557	23625.72	63491	26	25.83797	16404.79	0	0	0	0	RES1BSG0	18.7264	0	0	18.7264	180	360	Depth.tif
	133	B-143	RES3A	120000	310800	3	4	0.916871579	0	40.99954	-76.4652	3.168772	483.7146		3.235799	2.318928	1	R3A3B	205	20.95678	65133.68	155400	82	23.91357	37161.68	0	0	0	0	RES3ANBS(	0	0	0	0	180	360	Depth.tif
	134	B-144	RES1	56396	146065.64	2	4	2.040541615	2160	40.99945	-76.4654	3.56912	483.6743		3.608324	1.567782	1	R12B	108	23.83891	34820.3	73032.5	24	21.97447	16048.51	0	0	0	0	RES1BSG0	19.008	0	0	19.008	180	360	Depth.tif
	135	B-145.3	RES1	43193	111869.87	2	4	1.924730459	2160	40.99991	-76.4657	3.652237	483.6893		3.654945	1.730214	1	R12B	108	24.65107	27576.91	55934.5	24	23.1115	12927.3	0	0	0	0	RES1BSG0	19.008	0	0	19.008	180	360	Depth.tif
	136	B-146	RES1	68574	177606.66	2	4	1.33898029	2784	40.99939	-76.4655	3.805814	483.6481		3.854472	2.515491	1	R12B	108	27.54647	48924.19	88803	24	27.06197	24031.84	0	0	0	0	RES1BSG0	24.4992	0	0	24.4992	180	360	Depth.tif
	137	B-147.2	RES3A	76684	198611.56	3	4	2.064877971	4016	40.99929	-76.4657	3.836607	483.6051		3.893276	1.828398	1	R3A3B	205	19.14199	38018.1	99305.5	82	21.48519	21335.98	0	0	0	0	RES3ANBS(	16.4656	0	0	16.4656	180	360	Depth.tif
	138	B-148.2	RES1	33919	87850.21	2	4	0.73775414	1772	40.99976	-76.4661	4.211703	483.5389		4.533209	3.795455	1	R12B	108	32.97728	28970.54	43925	24	32.18182	14135.86	0	0	0	0	RES1BSG0	15.5936	0	0	15.5936	180	360	Depth.tif
	139	B-149.2	RES1	100915	261369.85	2	4	1.708400558	3168	40.99926	-76.4658	3.785937	483.563		4.576821	2.868421	1	R12B	108	28.60526	74765.29	130684.5	24	28.47368	37210.69	0	0	0	0	RES1BSG0	27.8784	0	0	27.8784	180	360	Depth.tif
	140	B-150.2	RES3A	71906	186236.54	3	4	1.905381293	4260	40.99962	-76.4664	4.322435	483.5287		4.426392	2.521011	1	R3A3B	205	21.56303	40158.13	93118	82	25.12606	23396.89	0	0	0	0	RES3ANBS(	17.466	0	0	17.466	180	360	Depth.tif
	141	B-151.2	RES1	62377	161556.43	3	4	1.899908275	2694	40.99908	-76.4662	4.469866	483.4925		4.485719	2.585811	1	R13B	110	22.92905	37043.26	80778	26	27.58581	22283.27	0	0	0	0	RES1BSG0	23.7072	0	0	23.7072	180	360	Depth.tif
	142	B-152	RES1	44375	114931.25	2	4	1.73911217	1646	40.99904	-76.4663	4.46375	483.4622		4.463375	2.724263	1	R12B	108	28.17279	32379.27	57465.5	24	27.89705	16031.18	0	0	0	0	RES1BSG0	14.4848	0	0	14.4848	180	360	Depth.tif
	143	B-153.2	RES1	28447	73677.73	3	4	1.7400104	1476	40.99898	-76.4664	4.454024	483.4381		4.45356	2.713549	1	R13B	110	23.56775	17364.01	36838.5	26	27.71355	10209.26	0	0	0	0	RES1BSG0	12.9888	0	0	12.9888	180	360	Depth.tif
	144	B-154	RES1	24223	62737.57	3	4	1.954211342	1218	40.99897	-76.4664	4.438184	483.4231		4.441688	2.487477	1	R13B	110	22.43738	14076.54	31368.5	26	27.48748	8622.409	0	0	0	0	RES1BSG0	10.7184	0	0	10.7184	180	360	Depth.tif
	145	B-155	RES1	77235	200038.65	3	4	2.889622315	2872	40.99891	-76.4666	5.376001	483.3916		5.285731	2.396109	1	R13B	110	21.98054	43969.44	100019	26	27.39611	27401.31	0	0	0	0	RES1BSG0	25.2736	0	0	25.2736	180	360	Depth.tif
	146	B-156.2	RES1	63285	163908.15	3	4	3.552617229	2365	40.99886	-76.4667	5.081933	483.3632		5.052251	1.499634	1	R13B	110	16.9978	27860.76	81954	26	24.49817	20077.23	0	0	0	0	RES1BSG0	20.812	0	0	20.812	180	360	Depth.tif
	147	B-157	RES3A	388800	1006992	3	3	1.842539171	14932	40.99888	-76.4669	4.504844	483.3212		4.553958	2.711419	1	R3A3N	204	27.13426	273239.8	503496	81	34.42284	173317.6	0	0	0	0	RES3ANBF	61.2212	0	0	61.2212	180	360	Depth.tif
	148	B-158.2	RES1	55576	143941.84	3	4	2.401	2674	40.99869	-76.4672	4.256591	483.257		4.244276	1.843276	1	R13B	110	19.05965	27434.66	71970.5	26	26.21638	18868.06	0	0	0	0	RES1BSG0	23.5312	0	0	23.5312	180	360	Depth.tif
	149	B-159	RES1	39686	102786.74	2	3	0.960164168	954	40.99906	-76.4675	5.064969	483.1298		5.0617	4.101536	1	R12N	107	20.20307	20765.93	51393	23	28.50768	14650.95	0	0	0	0	RES1NBFT4	6.4872	0	0	6.4872	270	450	Depth.tif
	150	B-160.2	COM1	126537	327730.83	3	4	3.611314851	3572	40.99849	-76.4676	4.177846	483.159		3.923992	0.312677	1	C1LB	217	3.501418	11475.2	327730	90	9.504255	31148.3	24611.08	1	12.44228726	3062.18127	COM1NBS(	6.4296	0	0	6.4296	360	540	Depth.tif
	151	B-162	RES1	96466	249846.94	2	4	1.052781381	3106	40.99844	-76.4678	4.031635	483.0792		4.032997	2.980215	1	R12B	108	28.94065	72307.05	124923	24	28.92086	36128.81	0	0	0	0	RES1BSG0	27.3328	0	0	27.3328	180	360	Depth.tif
	152	B-163	RES3A	53724	139145.16	3	4	1.124	2300	40.99843	-76.4681	5.03541	483.0356		5.035461	3.911461	1	R3A3B	205	27.55731	38344.62	69572.5	82	32.55731	22650.93	0	0	0	0	RES3ANBS(	9.43	0	0	9.43	180	360	Depth.tif
	153	B-164.1	RES1	44264	114643.76	3	4	2.610594223	2240	40.99826	-76.4681	4.938419	483.0195		4.929151	2.318556	1	R13B	110	21.59278	24754.61	57321.5	26	27.31856	15659.41	0	0	0	0	RES1BSG0	19.712	0	0	19.712	180	360	Depth.tif
	154	B-165 2nd	RES1	58626	151841.34	2	3	8.75	1120	40.9982	-76.4682	4.966336	483		4.966499	-3.7835	1	R12N	107	0	0	75920.5	23	0	0	0	0	0	0					0		0	Depth.tif
	155	B-167	RES1	42145	109155.55	3	3	5.763572584	1393	40.99555	-76.4722	4.950842	482.5		4.905789	-0.85778	1	R13N	109	0.711082	776.1811	54577.5	25	0.995514	543.3268	0	0	0	0					0		0	Depth.tif
	156	B-170	RES1	89064	230675.76	2	4	4.328300142	1991	40.9967	-76.4704	4.700742	482.5		4.770984	0.442684	1	R12B	108	19.88537	45870.57	115337.5	24	16.88537	19475.16	0	0	0	0	RES1BSG0	17.5208	0	0	17.5208	180	360	Depth.tif
	157	B-172	COM1	95262	246728.58	1	3	-0.447332097	30082	40.9974	-76.4681	4.637308	483		4.624875	5.072207	1	C1LN	217	20.21662	49880.07	246728	90	78.36104	193338.6	207264.98	1	85.36103583	176923.534	COM1NBF	75.205	0	0	75.205	450	630	Depth.tif
	158	B-173	RES1	88802	229997.18	2	2	8	1728	40.99753	-76.4677	5.167292	483		5.165399	-2.8346	1	R12N	107	0	0	114998.5	23	0	0	0	0	0	0					0		0	Depth.tif
	159	B-174	RES1	50623	131113.57	2	4	2.981	1628	40.99835	-76.4669	4.215473	483.216		4.215848	1.234847	1	R12B	108	22.17424	29073.31	65556.5	24	19.64393	12877.87	0	0	0	0	RES1BSG0	14.3264	0	0	14.3264	180	360	Depth.tif
	160	B-175	RES1	50958	131981.22	2	4	3.547136003	1528	40.99841	-76.4668	4.744438	483.2439		4.722843	1.175707	1	R12B	108	21.87853	28875.51	65990.5	24	19.22995	12689.94	0	0	0	0	RES1BSG0	13.4464	0	0	13.4464	180	360	Depth.tif
	161	B-176	RES1	45732	118445.88	2	4	3.650775186	1560	40.99847	-76.4666	5.277303	483.2756		5.277614	1.626838	1	R12B	108	24.13419	28585.74	59222.5	24	22.38787	13258.66	0	0	0	0	RES1BSG0	13.728	0	0	13.728	180	360	Depth.tif
	162	B-177	RES1	30409	78759.31	2	4	3.708246256	1446	40.99852	-76.4665	5.305421	483.3047		5.305958	1.597712	1	R12B	108	23.98856	18893.15	39379.5	24	22.18398	8735.942	0	0	0	0	RES1BSG0	12.7248	0	0	12.7248	180	360	Depth.tif
	163	B-178.1 ga	AGR1	2160	5594.4	1	3	1.134974951	0	40.99812	-76.4662	5.980993	483.2426		5.978435	4.84346	1	A1LN	616	24.06076	1345.959	5594	460	65.84346	3683.283	0	116	100	0	AGR1NBFT	0	0	0	0	30	210	Depth.tif
	164	B-179	RES1	33852	87676.68	2	4	2.45945776	1104	40.9983	-76.4662	4.88518	483.2938		4.848926	2.389468	1	R12B	108	27.1684	23820.17	43838	24	26.55787	11642.44	0	0	0	0	RES1BSG0	9.7152	0	0	9.7152	180	360	Depth.tif
	165	B-180	RES1	44855	116174.45	3	4	2.948986597	1820	40.99857	-76.4664	4.763232	483.3347		4.75838	1.809394	1	R13B	110	18.85636	21906.19	58087	26	26.04697	15129.9	0	0	0	0	RES1BSG0	16.016	0	0	16.016	180	360	Depth.tif
	166	B-181.2	RES1	78777	204032.43	3	4	2.956919712	2912	40.99867	-76.4662	4.340228	483.3722		4.279533	1.322613	1	R13B	110	15.93568	32513.88	102016	26	23.61307	24089.11	0	0	0	0	RES1BSG0	25.6256	0	0	25.6256	180	360	Depth.tif
	167	B-182	RES1	40638	105252.42	3	4	2.685465474	1352	40.99871	-76.4661	4.281375	483.403		4.259645	1.574179	1	R13B	110	17.44507	18361.29	52626	26	24.8709	13088.56	0	0	0	0	RES1BSG0	11.8976	0	0	11.8976	180	360	Depth.tif
	168	B-183	RES1	46177	119598.43	1	4	3.76297283	1056	40.9984	-76.4658	5.601602	483.36		5.740264	1.977291	1	R11B	704	38.84103	46453.1	59799	535	21.93187	13115.04	0	0	0	0	RES1BSG0	9.2928	0	0	9.2928	180	360	Depth.tif
	169	B-184 gara	RES1	9208	23848.72	1	7	0.048333937	0	40.9984	-76.4656	5.439146	483.3829		5.440469	5.392135	1	R11N	129	55.35281	13200.54	11924	45	60.35281	7196.469	0	0	0	0	RES1NBSG	0	0	0	0	270	450	Depth.tif
	170	B-185.1	RES1	60405	156448.95	3	4	1.704831867	2952	40.99873	-76.4659	4.093348	483.4292		4.23594	2.531108	1	R13B	110	22.65554	35444.14	78224	26	27.53111	21535.93	0	0	0	0	RES1BSG0	25.9776	0	0	25.9776	180	360	Depth.tif

INPUT FIELDS	FIELD ID	STRUCTURE ID	Occupancy/ Zoning	Total County Fair Market Value ($)	Total County Assessed Value x CLR ($)	# of Stories	Foundation Type	1st Floor Height above Grade (Ft)	Total SF	Latitude	Longitude	Depth of Flood Lee	Lee Flood Elev	OUPUT FIELDS	Depth of Flood from Ground (Ft)	Depth of Flood in Structure (Ft)	Floodng Expected?	Struc Occup ID	Bldg Depth Damage ID	% Bldg Damage	Bldg Loss $$	Contents Value $$	Contents Depth Damage ID	% Contents Damage	Content Loss $$	Commercial Inventory Cost ($)	Comm Inventory Depth Damage ID	% Comm Inventory Damage	Comm Inventory Loss $$	Debris ID	Debris_Fin	Debris from Struc	Debris from Foundation	Debris Total	Min Days to Restore Struc	Max Days to Restore Struc	GridName
	171	B-186	RES1	46182	119611.38	2	4	2.569962627	2832	40.99882	-76.4658	4.467731	483.468		4.466331	1.896368	1	R12B	108	25.48184	30479.08	59805.5	24	24.27458	14517.53	0	0	0	0	RES1BSG0	24.9216	0	0	24.9216	180	360	Depth.tif
	172	B-187.2	RES1	76558	198285.22	2	4	3.783947409	3152	40.99891	-76.4656	4.359217	483.5054		4.074455	0.290507	1	R12B	108	19.58101	38826.22	99142.5	24	16.58101	16438.83	0	0	0	0	RES1BSG0	27.7376	0	0	27.7376	180	360	Depth.tif
	173	B-188	RES1	57211	148176.49	2	4	2.312567093	2102	40.99895	-76.4655	4.227582	483.5369		4.175976	1.863409	1	R12B	108	25.31705	37513.79	74088	24	24.04386	17813.62	0	0	0	0	RES1BSG0	18.4976	0	0	18.4976	180	360	Depth.tif
	174	B-189	RES1	36923	95630.57	2	4	2.789650096	1216	40.99788	-76.4652	7.25921	483.2703		7.25905	4.4694	1	R12B	108	36.347	34758.64	47815	24	34.8776	16676.72	0	0	0	0	RES1BSG4	10.7008	0	0	10.7008	270	450	Depth.tif
	175	B-190	RES1	48493	125596.87	3	4	2.962222389	2560	40.99776	-76.4655	7.151996	483.2234		7.151717	4.189494	1	R13B	110	31.94747	40124.75	62798	26	29.18949	18330.42	0	0	0	0	RES1BSG4	22.528	0	0	22.528	270	450	Depth.tif
	176	B-191	COM1	4224	10940.16	1	7	0.45	0	40.99815	-76.4658	5.30206	483.3025		5.303999	4.853998	1	C1LN	217	19.708	2156.055	10940	90	76.53998	8373.474	0	1	83.68598623	0	COM1NBS(	0	0	0	0	450	630	Depth.tif
	177	B-192	COM1	47868	123978.12	2	7	8.67	2544	40.99802	-76.4659	5.672724	483.2567		5.599358	-3.07064	1	C1LN	217	0	0	123978	90	0	0	17528.16	1	0	0						0	0	Depth.tif
	178	B-193	RES1	45483	117800.97	3	4	1.468338844	1728	40.99766	-76.4657	6.25063	483.1841		6.259891	4.791552	1	R13B	110	34.95776	41180.24	58900	26	29.79155	17547.22	0	0	0	0	RES1BSG4	15.2064	0	0	15.2064	270	450	Depth.tif
	179	B-194	RES1	41423	107285.57	3	4	1.560748295	1484	40.99761	-76.4658	6.16022	483.1651		6.161639	4.60089	1	R13B	110	34.00445	36481.68	53642.5	26	29.60089	15878.66	0	0	0	0	RES1BSG4	13.0592	0	0	13.0592	270	450	Depth.tif
	180	B-195	RES1	65177	168808.43	3	4	3.092921348	1280	40.99756	-76.4659	6.137694	483.1442		6.1389	3.045978	1	R13B	110	25.27587	42667.69	84404	26	28.04598	23671.93	0	0	0	0	RES1BSG0	11.264	0	0	11.264	180	360	Depth.tif
	181	B-196	RES1	40446	104755.14	3	4	3.412781968	1400	40.99749	-76.4661	6.112471	483.1152		6.113701	2.700919	1	R13B	110	23.50459	24622.24	52377.5	26	27.70092	14509.05	0	0	0	0	RES1BSG0	12.32	0	0	12.32	180	360	Depth.tif
	182	B-197	RES1	37619	97433.21	3	4	2.494278057	1477	40.99786	-76.4665	5.15924	483.1502		5.162599	2.668321	1	R13B	110	23.3416	22742.42	48716.5	26	27.66832	13479.04	0	0	0	0	RES1BSG0	12.9976	0	0	12.9976	180	360	Depth.tif
	183	B-198	RES1	42538	110173.42	2	4	1.475444638	1716	40.99744	-76.4662	6.163869	483.0853		6.15515	4.679705	1	R12B	108	37.39852	41203.08	55086.5	24	35.71882	19676.25	0	0	0	0	RES1BSG4	15.1008	0	0	15.1008	270	450	Depth.tif
	184	B-199	RES1	38498	99709.82	3	4	3.244619221	1632	40.99731	-76.4665	6.320881	483.0173		6.364141	3.119522	1	R13B	110	25.71713	25642.29	49854.5	26	28.11952	14018.85	0	0	0	0	RES1BSG0	14.3616	0	0	14.3616	180	360	Depth.tif
	185	B-200	RES1	38498	99709.82	3	4	3.776608371	1632	40.99727	-76.4665	6.689067	483.0125		6.635143	2.858534	1	R13B	110	24.29267	24221.98	49854.5	26	27.85853	13888.73	0	0	0	0	RES1BSG0	14.3616	0	0	14.3616	180	360	Depth.tif
	186	B-201	RES1	47787	123768.33	3	4	2.892061103	1826	40.9974	-76.4665	6.032688	483.0331		6.032445	3.140384	1	R13B	110	25.8423	31984.5	61884	26	28.14038	17414.4	0	0	0	0	RES1BSG0	16.0688	0	0	16.0688	180	360	Depth.tif
	187	B-202	RES1	69988	181268.92	2	4	2.703	2536	40.99768	-76.4669	5.055725	483.0563		5.057368	2.354368	1	R12B	108	27.0631	49056.75	90634	24	26.41747	23943.21	0	0	0	0	RES1BSG0	22.3168	0	0	22.3168	180	360	Depth.tif
	188	B-204	RES1	15525	40209.75	1	3	1.204193518	0	40.99741	-76.4674	6.001097	483		6.001279	4.797085	1	R11N	129	51.78251	20821.23	20104.5	45	56.78251	11415.84	0	0	0	0	RES1NBFT4	0	0	0	0	270	450	Depth.tif
	189	B-205	RES1	46078	119342.02	2	4	3.120311108	1568	40.9969	-76.4667	7.018264	483		7.021759	3.901448	1	R12B	108	33.50724	39988.21	59671	24	32.60579	19456.2	0	0	0	0	RES1BSG0	13.7984	0	0	13.7984	180	360	Depth.tif
	190	B-206	RES1	28726	74400.34	2	4	2.512892985	680	40.99653	-76.4664	7.27219	483		7.374329	4.861436	1	R12B	108	38.30718	28500.54	37200	24	36.44574	13557.82	0	0	0	0	RES1BSG4	5.984	0	0	5.984	270	450	Depth.tif
	191	B-207	RES1	89494	231789.46	2	4	2.472820359	1966	40.99671	-76.4661	6.242031	483		6.342334	3.869513	1	R12B	108	33.34757	77295.99	115894.5	24	32.47805	37640.28	0	0	0	0	RES1BSG0	17.3008	0	0	17.3008	180	360	Depth.tif
	192	B-208	RES1	30518	79041.62	2	4	2.492533512	1057	40.99702	-76.4664	7.000897	483		7.002517	4.509984	1	R12B	108	36.54992	28889.42	39520.5	24	35.03993	13847.96	0	0	0	0	RES1BSG4	9.3016	0	0	9.3016	270	450	Depth.tif
	193	B-209	RES1	43520	112716.8	3	4	4.193232571	1490	40.99708	-76.4663	6.901617	483		6.923749	2.730517	1	R13B	110	23.65258	26660.25	56358	26	27.73052	15628.36	0	0	0	0	RES1BSG0	13.112	0	0	13.112	180	360	Depth.tif
	194	B-210	RES1	48092	124558.28	2	4	1.529095588	1589	40.99721	-76.466	6.203743	483.0367		6.226328	4.697233	1	R12B	108	37.48616	46692.02	62279	24	35.78893	22288.99	0	0	0	0	RES1BSG4	13.9832	0	0	13.9832	270	450	Depth.tif
	195	B-211	RES1	37000	95830	3	4	1.403707817	1236	40.99691	-76.4658	7.468663	483		7.424837	6.021129	1	R13B	110	38.06339	36476.14	47915	26	32.06339	15363.17	0	0	0	0	RES1BSG6	12.6072	39.552	30.9	83.0592	270	450	Depth.tif
	196	B-212	RES1	52573	136164.07	1	4	2.472205325	1248	40.99716	-76.4658	6.037518	483.0307		6.041438	3.569233	1	R11B	704	49.4154	67285.98	68082	535	26.13847	17795.59	0	0	0	0	RES1BSG0	10.9824	0	0	10.9824	180	360	Depth.tif
	197	B-213.2	RES1	58040	150323.6	3	4	2.414269905	2913	40.99727	-76.4658	6.491528	483.075		6.134195	3.719925	1	R13B	110	29.31955	44074.03	75161.5	26	28.71993	21586.33	0	0	0	0	RES1BSG0	25.6344	0	0	25.6344	180	360	Depth.tif
	198	B-214	RES1	40614	105190.26	2	4	1.975373701	1444	40.99733	-76.4656	6.900227	483.0889		6.961759	4.986385	1	R12B	108	38.93192	40952.49	52595	24	36.94554	19431.51	0	0	0	0	RES1BSG4	12.7072	0	0	12.7072	270	450	Depth.tif
	199	B-215	RES1	54524	141217.16	2	4	2.591666563	2376	40.99736	-76.4655	6.757774	483.1029		6.785839	4.194172	1	R12B	108	34.97086	49384.8	70608.5	24	33.77669	23849.21	0	0	0	0	RES1BSG4	20.9088	0	0	20.9088	270	450	Depth.tif
	200	B-216	COM1	91573	237174.07	1	0	0.746	2522	40.99461	-76.4726	4.5	482.5		4.5	3.754	1	C1LN	217	17.508	41524.42	237174	90	65.048	154276.9	17376.58	1	73.294	12735.9905	COM1NBFT	4.5396	0	0	4.5396	360	540	Depth.tif
	201	B-217	RES1	47835	123892.65	2	7	0.076575045	896	40.99525	-76.4725	6.443313	482.5		6.434193	6.357618	1	R12N	107	24.71524	30620.2	61946	23	40.78809	25266.59	0	0	0	0	RES1NBSG4	6.0928	0	0	6.0928	270	450	Depth.tif
	202	B-219	COM1	42240	109401.6	2	7	8.125	880	40.99538	-76.4728	6.477253	482.5		6.480997	-1.644	1	C1LN	217	0	0	109401	90	0	0	6063.2	1	0	0						0	0	Depth.tif
	203	B-220.1 f-	COM1	380	984.2	1	7	1.046628784	384	40.99588	-76.4707	8.94266	482.5		8.891994	7.845365	1	C1LN	217	29.38146	289.1136	984	90	86.69073	853.0368	2645.76	1	92.84536474	2456.46552	COM1NBS(	0.96	0	0	0.96	450	630	Depth.tif
	204	B-220.10 f	COM1	16160	41854.4	1	7	0.579	4488	40.99568	-76.4674	7.5	482.5		7.5	6.921	1	C1LN	217	25.763	10782.85	41854	90	84.842	35509.77	30922.32	1	91.842	28399.6771	COM1NBS(	11.22	0	0	11.22	450	630	Depth.tif
	205	B-220.11 f	COM1	74880	193939.2	2	7	0.435900251	20800	40.99614	-76.4676	7.998811	483		8.000573	7.564673	1	C1LN	217	28.25869	54804.62	193939	90	86.12935	167038.4	143312	1	92.56467291	132656.284	COM1NBS(	52	0	0	52	450	630	Depth.tif
	206	B-220.12 f	COM1	3510	9090.9	1	7	0.765958168	2000	40.99577	-76.4664	9.511623	483		9.441018	8.67506	1	C1LN	217	32.70024	2972.452	9090	90	87.67506	7969.663	13780	1	93.67505994	12908.4233	COM1NBS(	8.6	0	0	8.6	540	720	Depth.tif
	207	B-220.13 f	COM1	45360	117482.4	2	7	0.879166505	12600	40.9963	-76.4673	7.993344	483		7.989729	7.110562	1	C1LN	217	26.44225	31064.88	117482	90	85.22112	100119.5	86814	1	92.11056195	79964.8632	COM1NBS(	31.5	0	0	31.5	450	630	Depth.tif
	208	B-220.14 f	COM1	0	0	2	7	0.060227223	0	40.99646	-76.467	7.039487	483		7.023584	6.963357	1	C1LN	217	25.89007	0	0	90	84.92671	0	0	1	91.92671429	0	COM1NBS(	0	0	0	0	450	630	Depth.tif
	209	B-220.15 f	COM1	15840	41025.6	2	7	3.060526308	2200	40.99642	-76.4665	7.004356	483		7.005117	3.944591	1	C1LN	217	17.88918	7339.037	41025	90	67.33509	27624.22	15158	1	75.39050219	11427.6923	COM1NBS(	3.96	0	0	3.96	360	540	Depth.tif
	210	B-220.16 f	COM1	2050	5309.5	1	7	-0.333753762	570	40.99779	-76.4632	6.264212	483.2594		6.266578	6.600332	1	C1LN	217	24.801	1316.685	5309	90	84.20066	4470.213	3927.3	1	91.20066392	3581.72367	COM1NBS(	1.425	0	0	1.425	450	630	Depth.tif
	211	B-220.17 f	COM1	4320	11188.8	1	7	0.391595992	1200	40.9979	-76.4629	6.437976	483.2974		6.409935	6.018339	1	C1LN	217	23.05502	2579.395	11188	90	83.03668	9290.144	8268	1	90.03667801	7444.23254	COM1NBS(	3	0	0	3	450	630	Depth.tif
	212	B-220.18 f	COM1	5760	14918.4	1	7	-0.012273915	1600	40.99754	-76.4631	6.168264	483.1679		6.167876	6.18015	1	C1LN	217	23.54045	3511.764	14918	90	83.3603	12435.69	11024	1	90.36030032	9961.31951	COM1NBS(	4	0	0	4	450	630	Depth.tif
	213	B-220.19 f	COM1	33790	87516.1	1	7	0.511223586	12035	40.99497	-76.466	9.698781	482.5		9.70208	9.190856	1	C1LN	217	34.76342	30423.56	87516	90	88.19086	77181.11	82921.15	1	94.19085619	78104.1411	COM1NBS(	51.7505	0	0	51.7505	540	720	Depth.tif
	214	B-220.2 f-	COM1	0	0	1	7	0.779757065	0	40.99648	-76.4695	7.133491	482.5		7.165694	6.385937	1	C1LN	217	24.15781	0	0	90	83.77187	0	0	1	90.77187339	0	COM1NBS(	0	0	0	0	450	630	Depth.tif
	215	B-220.20 f	COM1	19710	51048.9	1	7	-0.083859572	9360	40.99473	-76.4658	10.46066	482.5		10.46419	10.54805	1	C1LN	217	40.1922	20517.31	51048	90	89.54805	45712.49	64490.4	1	95	61265.88	COM1NBS(	40.248	0	0	40.248	540	720	Depth.tif
	216	B-220.21 f	COM1	2850	7381.5	1	7	1.709097138	5760	40.99496	-76.4652	11.65123	483		11.6779	9.968805	1	C1LN	217	37.87522	2795.57	7381	90	88.96881	6566.788	39686.4	1	94.96880508	37689.6999	COM1NBS(	24.768	0	0	24.768	540	720	Depth.tif
	217	B-220.22 f	COM1	7860	20357.4	1	7	0.204266374	2800	40.99457	-76.4657	11.29215	482.5		11.36017	11.1559	1	C1LN	217	42.77952	8708.628	20357	90	90.1559	18353.04	19292	1	95.15590494	18357.4772	COM1NBS(	12.04	0	0	12.04	540	720	Depth.tif
	218	B-220.23 f	COM1	12920	33462.8	1	7	0.651392072	7360	40.99432	-76.4666	12.46159	482.5		12.45769	11.80629	1	C1LN	217	46.03147	15403.05	33462	90	90.80629	30385.6	50710.4	1	95.8062934	48583.7546	COM1NBS(	31.648	0	0	31.648	540	720	Depth.tif
	219	B-220.24 f	COM1	2050	5309.5	2	7	0.555361974	570	40.99448	-76.4673	10.50229	482.5		10.50235	9.946991	1	C1LN	217	37.78796	2006.163	5309	90	88.94699	4722.196	3927.3	1	94.94699074	3728.85317	COM1NBS(	2.451	0	0	2.451	540	720	Depth.tif
	220	B-220.25 f	COM1	6240	16161.6	1	7	4.384206576	4623	40.9941	-76.4675	11.49638	482.5		11.49684	7.112628	1	C1LN	217	26.45051	4274.667	16161	90	85.22526	13773.25	31852.47	1	92.11262818	29340.1473	COM1NBS(	11.5575	0	0	11.5575	450	630	Depth.tif
	221	B-220.26 f	COM1	0	0	1	7	1.002981384	0	40.99304	-76.4679	10.48397	482.5		10.48728	9.484301	1	C1LN	217	35.93721	0	0	90	88.4843	0	0	1	94.48430137	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	222	B-220.27 f	COM1	0	0	1	7	-0.537200791	0	40.99315	-76.4683	9.625587	482.5		9.646643	10.18384	1	C1LN	217	38.73537	0	0	90	89.18384	0	0	1	95	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	223	B-220.28 f	COM1	0	0	1	7	0.520750741	0	40.99285	-76.4671	11.50082	482.5		11.50076	10.98001	1	C1LN	217	41.92005	0	0	90	89.98001	0	0	1	95	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	224	B-220.29 f	COM1	0	0	1	7	0.044030518	0	40.99292	-76.4669	11.50002	482.5		11.50002	11.45599	1	C1LN	217	44.27993	0	0	90	90.45599	0	0	1	95.45598569	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	225	B-220.3 f-	COM1	15840	41025.6	2	4	2.946694702	2200	40.99572	-76.4696	4.239294	482.5		4.280417	1.333722	1	C1LB	217	10.66861	4376.798	41025	90	31.33956	12857.05	15158	1	37.00700074	5609.52117	COM1NBS(	3.96	0	0	3.96	360	540	Depth.tif
	226	B-220.30 f	COM1	12920	33462.8	1	7	0.275426119	7360	40.99303	-76.4666	11.82457	482.5		11.93845	11.66303	1	C1LN	217	45.31513	15163.35	33462	90	90.66303	30337.66	50710.4	1	95.6630266	48511.1034	COM1NBS(	31.648	0	0	31.648	540	720	Depth.tif
	227	B-220.31 f	COM1	0	0	1	7	0.289	0	40.99296	-76.4668	11.5	482.5		11.5	11.211	1	C1LN	217	43.055	0	0	90	90.211	0	0	1	95.211	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	228	B-220.32 f	COM1	14130	36596.7	1	7	1.146363289	3925	40.99346	-76.4666	11.68783	482.5		11.77463	10.62826	1	C1LN	217	40.51306	14826.16	36596	90	89.62826	32800.36	27043.25	1	95	25691.0875	COM1NBS(	16.8775	0	0	16.8775	540	720	Depth.tif
	229	B-220.33 f	COM1	14130	36596.7	1	7	0.355330734	3925	40.99327	-76.4663	11.1046	482.5		11.11593	10.7606	1	C1LN	217	41.04241	15019.88	36596	90	89.7606	32848.79	27043.25	1	95	25691.0875	COM1NBS(	16.8775	0	0	16.8775	540	720	Depth.tif
	230	B-220.34 f	COM1	12920	33462.8	1	7	-0.149997614	7360	40.99332	-76.4662	10.97037	482.5		10.96638	11.11638	1	C1LN	217	42.58188	14248.75	33462	90	90.11638	30154.74	50710.4	1	95.11637678	48233.8951	COM1NBS(	31.648	0	0	31.648	540	720	Depth.tif
	231	B-220.35 f	COM1	12920	33462.8	1	7	0.172889674	7360	40.99339	-76.466	10.851	482.5		10.83753	10.66464	1	C1LN	217	40.65854	13605.16	33462	90	89.66464	30003.58	50710.4	1	95	48174.88	COM1NBS(	31.648	0	0	31.648	540	720	Depth.tif
	232	B-220.36 f	COM1	0	0	1	7	-0.198528649	0	40.99352	-76.4657	10.52258	482.5		10.5229	10.72142	1	C1LN	217	40.88569	0	0	90	89.72142	0	0	1	95	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	233	B-220.37 f	COM1	0	0	1	7	-0.092316821	0	40.99369	-76.4653	10.50584	482.5		10.50539	10.59771	1	C1LN	217	40.39082	0	0	90	89.59771	0	0	1	95	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	234	B-220.38 f	COM1	9000	23310	1	7	0.683377758	4000	40.9935	-76.4648	11.48435	482.5		11.48428	10.8009	1	C1LN	217	41.20361	9604.562	23310	90	89.8009	20932.59	27560	1	95	26182	COM1NBS(	17.2	0	0	17.2	540	720	Depth.tif
	235	B-220.39 f	COM1	9000	23310	1	7	0.491658276	4000	40.99361	-76.4645	11.13567	482.5		11.14403	10.65238	1	C1LN	217	40.6095	9466.075	23310	90	89.65238	20897.97	27560	1	95	26182	COM1NBS(	17.2	0	0	17.2	540	720	Depth.tif
	236	B-220.4 f-	COM1	4850	12561.5	2	7	0.483842602	3596	40.9953	-76.4693	5.501764	482.5		5.501979	5.018137	1	C1LN	217	20.05441	2519.034	12561	90	78.09068	9808.971	24776.44	1	85.09068375	21082.4422	COM1NBS(	8.99	0	0	8.99	450	630	Depth.tif
	237	B-220.40 f	COM1	4000	10360	1	7	0.466638822	9000	40.99371	-76.4643	10.94825	482.5		10.93197	10.46533	1	C1LN	217	39.86131	4129.632	10360	90	89.46533	9268.608	62010	1	95	58909.5	COM1NBS(	38.7	0	0	38.7	540	720	Depth.tif
	238	B-220.41 f	COM1	16200	41958	1	7	0.399099376	7200	40.99403	-76.464	11.53354	482.5		11.52897	11.12987	1	C1LN	217	42.64934	17894.81	41958	90	90.12987	37816.69	49608	1	95.12986753	47192.0247	COM1NBS(	30.96	0	0	30.96	540	720	Depth.tif
	239	B-220.42 f	COM1	20450	52965.5	1	7	0.326451261	9709	40.99439	-76.4643	11.69467	482.5		11.74181	11.41536	1	C1LN	217	44.07681	23345.28	52965	90	90.41536	47888.5	66895.01	1	95.41536144	63828.1156	COM1NBS(	41.7487	0	0	41.7487	540	720	Depth.tif
	240	B-220.43 f	COM1	4000	10360	1	7	1.000935475	9000	40.99455	-76.4641	12.47554	482.5		12.47706	11.47612	1	C1LN	217	44.38061	4597.831	10360	90	90.47612	9373.326	62010	1	95.47612198	59204.7432	COM1NBS(	38.7	0	0	38.7	540	720	Depth.tif
	241	B-220.44 f	COM1	2110	5464.9	1	7	0.785331856	1200	40.9949	-76.4642	13.48227	482.5		13.47575	12.69042	1	C1LN	217	49.76167	2718.978	5464	90	91.69042	5009.964	8268	1	96.69041811	7994.36377	COM1NBS(	6	56.52	30	92.52	720	900	Depth.tif
	242	B-220.45 f	COM1	4000	10360	1	7	1.101	9000	40.99465	-76.4639	12.5	482.5		12.5	11.399	1	C1LN	217	43.995	4557.882	10360	90	90.399	9365.336	62010	1	95.399	59156.9199	COM1NBS(	38.7	0	0	38.7	540	720	Depth.tif
	243	B-220.46 f	COM1	19800	51282	1	7	1.046	8800	40.9946	-76.4636	12.5	482.5		12.5	11.454	1	C1LN	217	44.27	22702.54	51282	90	90.454	46386.62	60632	1	95.454	57875.6693	COM1NBS(	37.84	0	0	37.84	540	720	Depth.tif
	244	B-220.47 f	COM1	7860	20357.4	1	7	0.136426806	2800	40.99518	-76.4642	12.49477	482.5		12.53687	12.40044	1	C1LN	217	48.60177	9893.862	20357	90	91.40044	18606.39	19292	1	96.40044224	18597.5733	COM1NBS(	14	131.88	70	215.88	720	900	Depth.tif
	245	B-220.48 f	COM1	8570	22196.3	1	7	0.371994799	2380	40.99491	-76.4637	11.4358	482.5		11.44516	11.07317	1	C1LN	217	42.36583	9403.52	22196	90	90.07317	19992.64	16398.2	1	95.07316607	15590.2879	COM1NBS(	10.234	0	0	10.234	540	720	Depth.tif
	246	B-220.49 f	COM1	79920	206992.8	1	7	0.190965117	22200	40.99524	-76.4635	12.4928	482.5		12.88221	12.69124	1	C1LN	217	49.76498	103009.5	206992	90	91.69124	189793.5	152958	1	96.69124466	147896.994	COM1NBS(	111	1045.62	555	1711.62	720	900	Depth.tif
	247	B-220.5 f-	COM1	4720	12224.8	1	4	2.305400264	1312	40.99546	-76.4689	6.385321	482.5		6.374236	4.068835	1	C1LB	217	18.13767	2217.149	12224	90	68.68835	8396.464	9039.68	1	76.61951829	6926.15927	COM1NBS(	3.28	0	0	3.28	450	630	Depth.tif
	248	B-220.50 f	COM1	0	0	1	7	1.079871265	0	40.9955	-76.463	11.5152	482.5		11.38595	10.30608	1	C1LN	217	39.2243	0	0	90	89.30608	0	0	1	95	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	249	B-220.51 f	COM1	0	0	1	7	-3.710734786	0	40.99576	-76.4625	7.404484	482.5		7.585872	11.29661	1	C1LN	217	43.48303	0	0	90	90.29661	0	0	1	95.29660696	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	250	B-220.52 f	COM1	0	0	2	7	1.340414172	0	40.99597	-76.4624	9.694895	482.9961		9.547223	8.206809	1	C1LN	217	30.82724	0	0	90	87.20681	0	0	1	93.20680892	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	251	B-220.53 f	COM1	4680	12121.2	1	7	0.688963401	1300	40.99601	-76.4621	7.515618	482.5		7.518397	6.829433	1	C1LN	217	25.4883	3089.437	12121	90	84.65887	10261.5	8957	1	91.65886691	8209.88471	COM1NBS(	3.25	0	0	3.25	450	630	Depth.tif
	252	B-220.54 f	COM1	3020	7821.8	1	7	0.855841804	840	40.99612	-76.4619	7.641419	482.5		7.667428	6.811586	1	C1LN	217	25.43476	1989.252	7821	90	84.62317	6618.378	5787.6	1	91.62317453	5302.78273	COM1NBS(	2.1	0	0	2.1	450	630	Depth.tif
	253	B-220.6 f-	COM1	3510	9090.9	1	7	-0.000465869	2000	40.99524	-76.4691	6.116993	482.5		6.131818	6.132284	1	C1LN	217	23.39685	2126.774	9090	90	83.26457	7568.749	13780	1	90.26456833	12438.4575	COM1NBS(	5	0	0	5	450	630	Depth.tif
	254	B-220.7 f-	COM1	0	0	1	7	2.707847961	0	40.9934	-76.4677	11.48364	482.5		11.48393	8.776078	1	C1LN	217	33.10431	0	0	90	87.77608	0	0	1	93.77607786	0	COM1NBS(	0	0	0	0	540	720	Depth.tif
	255	B-220.8 f-	COM1	74880	193939.2	1	7	-0.044	20800	40.99582	-76.4685	6.5	482.5		6.5	6.544	1	C1LN	217	24.632	47771.05	193939	90	84.088	163079.4	143312	1	91.088	130540.035	COM1NBS(	52	0	0	52	450	630	Depth.tif

FEMA FLOOD ASSESSMENT STRUCTURE TOOL (FAST) OUTPUT
2011 FLOOD LEE

INPUT FIELDS	FIELD ID	STRUCTURE ID	Occupancy/ Zoning	Total County Fair Market Value ($)	Total County Assessed Value x CLR ($)	# of Stories	Foundation Type	1st Floor Height above Grade (Ft)	Total SF	Latitude	Longitude	Depth of Flood Lee	Lee Flood Elev	OUPUT FIELDS	Depth of Flood from Ground (Ft)	Depth of Flood in Structure (Ft)	Floodng Expected?	Struc Occup ID	Bldg Depth Damage ID	% Bldg Damage	Bldg Loss $$	Contents Value $$	Contents Depth Damage ID	% Contents Damage	Content Loss $$	Commercial Inventory Cost ($)	Comm Inventory Depth Damage ID	% Comm Inventory Damage	Comm Inventory Loss $$	Debris ID	Debris_Fin	Debris from Struc	Debris from Foundation	Debris Total	Min Days to Restore Struc	Max Days to Restore Struc	GridName
	256	B-220.9 f-	COM1	74880	193939.2	1	7	-0.273070724	20800	40.99596	-76.4681	6.761898	482.5		6.805468	7.078538	1	C1LN	217	26.31415	51033.41	193939	90	85.15708	165152.8	143312	1	92.07853833	131959.595	COM1NBS(	52	0	0	52	450	630	Depth.tif
	257	B-221	RES1	259279	671532.61	2	3	-4.135752118	3128	40.98644	-76.4737	6.99596	482.5		6.746078	10.88183	1	R12N	107	38.88183	261103.9	335766	23	59.76366	200666	0	0	0	0	RES1NBFT8	21.2704	20.332	37.536	79.1384	360	720	Depth.tif
	258	B-226	RES1	90134	233447.06	2	4	2.222849221	1488	41.00615	-76.4597	-13.4344	488.9473		-13.4466	-15.6694	0	R12B	0	0	0	116723.5	0	0	0	0	0	0	0						0	0	Depth.tif
	259	B-227.1	RES1	99709	258246.31	3	4	3.510460719	2520	41.00134	-76.4627	0.604887	484.9723		0.613711	-2.89675	1	R13B	110	3.309752	8547.301	129123	26	5.206501	6722.79	0	0	0	0						0	0	Depth.tif
	260	B-228	RES1	38113	98712.67	3	4	2.399823175	1460	41.00135	-76.4629	1.721863	484.972		1.717144	-0.68268	1	R13B	110	10.63464	10497.67	49356	26	10.22124	5044.797	0	0	0	0						0	0	Depth.tif
	261	B-229	RES1	51093	132330.87	3	4	3.222861823	1408	41.00127	-76.463	2.400492	484.9138		2.387076	-0.83579	1	R13B	110	10.32843	13667.61	66165	26	9.1495	6053.767	0	0	0	0						0	0	Depth.tif
	262	B-230	RES1	35571	92128.89	3	4	2.714607571	2133	41.00121	-76.4631	2.817971	484.8583		2.816981	0.102373	1	R13B	110	12.20475	11243.99	46064	26	15.71661	7239.7	0	0	0	0	RES1BSG0	18.7704	0	0	18.7704	180	360	Depth.tif
	263	B-231	RES1	45226	117135.34	3	4	2.479113127	1920	41.00117	-76.4632	2.840127	484.8251		2.840323	0.361209	1	R13B	110	12.72242	14902.41	58567.5	26	17.52847	10265.98	0	0	0	0	RES1BSG0	16.896	0	0	16.896	180	360	Depth.tif
	264	B-232	RES1	38578	99917.02	3	4	2.445362348	1486	41.00078	-76.4636	1.179568	484.5071		1.061024	-1.38434	1	R13B	110	8.462647	8455.623	49958.5	26	7.615662	3804.67	0	0	0	0						0	0	Depth.tif
	265	B-233	RES1	36913	95604.67	2	4	-0.405576106	2028	41.00074	-76.4637	1.413624	484.4599		1.393914	1.79949	1	R12B	108	24.99745	23898.56	47802	24	23.59643	11279.56	0	0	0	0	RES1BSG0	17.8464	0	0	17.8464	180	360	Depth.tif
	266	B-234	RES1	40665	105322.35	3	4	2.529137255	2028	41.0007	-76.4638	2.041874	484.4158		2.051697	-0.47744	1	R13B	110	11.04512	11632.94	52661	26	11.65791	6139.175	0	0	0	0						0	0	Depth.tif
	267	B-235	RES1	25230	65345.7	3	4	2.353497069	1064	41.00034	-76.4644	2.405813	484.004		2.374689	0.021192	1	R13B	110	12.04238	7869.096	32672.5	26	15.14834	4949.342	0	0	0	0	RES1BSG0	9.3632	0	0	9.3632	180	360	Depth.tif
	268	B-236	RES1	25211	65296.49	3	4	-0.102048234	1064	41.00035	-76.4644	2.227778	484.0328		2.241793	2.343841	1	R13B	110	21.7192	14181.77	32648	26	27.34384	8927.217	0	0	0	0	RES1BSG0	9.3632	0	0	9.3632	180	360	Depth.tif
	269	B-237	RES1	98611	255402.49	2	4	0.4584605	1767	41	-76.4642	2.530892	483.9347		2.529712	2.071251	1	R12B	108	26.21375	66950.45	127701	24	25.285	32289.2	0	0	0	0	RES1BSG0	15.5496	0	0	15.5496	180	360	Depth.tif
	270	B-238	RES1	41724	108065.16	3	4	2.525013673	1667	41.00007	-76.464	2.973303	483.9729		2.973834	0.44882	1	R13B	110	12.89764	13937.84	54032.5	26	18.14174	9802.437	0	0	0	0	RES1BSG0	14.6696	0	0	14.6696	180	360	Depth.tif
	271	B-239	RES1	38794	100476.46	2	4	2.169556754	1468	41.0001	-76.4639	2.992277	483.9855		2.986429	0.816872	1	R12B	108	20.63374	20731.96	50238	24	17.63374	8858.84	0	0	0	0	RES1BSG0	12.9184	0	0	12.9184	180	360	Depth.tif
	272	B-240	RES1	35544	92058.96	2	4	4.65	2064	41.00042	-76.4642	2.152221	484.1193		2.197146	-2.45285	1	R12B	108	6.188586	5697.088	46029	24	6.094293	2805.142	0	0	0	0						0	0	Depth.tif
	273	B-241	RES1	73943	191512.37	3	4	1.786196956	2061	41.00016	-76.4638	3.023516	484.0257		3.025791	1.239594	1	R13B	110	15.43756	29564.79	95756	26	23.19797	22213.45	0	0	0	0	RES1BSG0	18.1368	0	0	18.1368	180	360	Depth.tif
	274	B-242	RES1	53684	139041.56	3	4	2.19386437	2102	41.00019	-76.4637	3.122255	484.0827		3.124701	0.930836	1	R13B	110	13.86167	19273.41	69520.5	26	21.51585	14957.93	0	0	0	0	RES1BSG0	18.4976	0	0	18.4976	180	360	Depth.tif
	275	B-243	RES1	32586	84397.74	2	4	1.468167108	1164	41.00025	-76.4636	3.125233	484.1413		3.140619	1.672452	1	R12B	108	24.36226	20561.02	42198.5	24	22.70716	9582.082	0	0	0	0	RES1BSG0	10.2432	0	0	10.2432	180	360	Depth.tif
	276	B-244	RES1	35164	91074.76	3	4	3.07864005	2792	41.00056	-76.4637	2.342564	484.3424		2.339351	-0.73929	1	R13B	110	10.52142	9582.279	45537	26	9.824973	4473.998	0	0	0	0						0	0	Depth.tif
	277	B-245	RES1	45283	117282.97	2	4	1.641391222	1884	41.00029	-76.4635	2.291692	484.1896		2.329486	0.688095	1	R12B	108	20.37619	23897.6	58641	24	17.37619	10189.57	0	0	0	0	RES1BSG0	16.5792	0	0	16.5792	180	360	Depth.tif
	278	B-246	RES1	51768	134079.12	2	4	1.65843755	1766	41.00035	-76.4633	2.347307	484.2643		2.26981	0.611373	1	R12B	108	20.22275	27114.45	67039.5	24	17.22275	11546.04	0	0	0	0	RES1BSG0	15.5408	0	0	15.5408	180	360	Depth.tif
	279	B-247	RES1	32839	85053.01	2	4	2.708016919	1459	41.00066	-76.4635	2.422798	484.4402		2.426173	-0.28184	1	R12B	108	17.59078	14961.49	42526.5	24	13.74525	5845.373	0	0	0	0						0	0	Depth.tif
	280	B-248	RES1	55508	143765.72	1	4	4.202604424	2092	41.00079	-76.4624	0.97608	484.6172		0.442141	-3.76046	1	R11B	704	0	0	71882.5	535	0	0	0	0	0	0						0	0	Depth.tif
	281	B-249	RES1	53647	138945.73	2	4	2.181714474	2770	41.00069	-76.4627	1.552042	484.5532		1.553687	-0.62803	1	R12B	108	15.85986	22036.49	69472.5	24	10.97578	7625.15	0	0	0	0						0	0	Depth.tif
	282	B-250	RES1	52873	136941.07	3	4	2.643789217	2700	41.00062	-76.4628	2.008879	484.5044		2.036922	-0.60687	1	R13B	110	10.78627	14770.82	68470.5	26	10.75193	7361.901	0	0	0	0						0	0	Depth.tif
	283	B-251	RES1	27318	70753.62	2	3	1.480765473	2400	41.00089	-76.463	1.656456	484.6574		1.656617	0.175851	1	R12N	107	11.17585	7907.25	35376.5	23	8.527554	3016.75	0	0	0	0	RES1NBFT(	9.84	0	0	9.84	180	360	Depth.tif
	284	B-252	COM1	28890	74825.1	1	7	1.284288009	1091	41.00059	-76.4631	1.450435	484.4516		1.455698	0.17141	1	C1LN	217	2.371281	1774.311	74825	90	6.113843	4574.683	7516.99	1	8.628073335	648.57141	COM1NBS(	1.9638	0	0	1.9638	360	540	Depth.tif
	285	B-253	RES1	30945	80147.55	3	4	2.236057201	1334	41.00066	-76.4633	2.162766	484.4706		2.18029	-0.05577	1	R13B	110	11.88847	9528.248	40073.5	26	14.60963	5854.59	0	0	0	0						0	0	Depth.tif
	286	B-254	RES1	30945	80147.55	3	4	1.841862726	1334	41.00073	-76.4633	1.627009	484.515		1.626046	-0.21582	1	R13B	110	11.56837	9271.698	40073.5	26	13.48928	5405.626	0	0	0	0						0	0	Depth.tif
	287	B-255	RES1	41562	107645.58	2	4	2.500409618	1614	40.99863	-76.4673	4.194839	483.211		4.195379	1.69497	1	R12B	108	24.47485	26345.95	53822.5	24	22.86479	12306.4	0	0	0	0	RES1BSG0	14.2032	0	0	14.2032	180	360	Depth.tif
	288	B-256	RES3A	62400	161616	3	4	2.877892959	3228	40.99773	-76.4683	4.04278	483		4.061598	1.183705	1	R3A3B	205	15.91853	25726.89	80808	82	19.55112	15798.87	0	0	0	0	RES3ANBS(	13.2348	0	0	13.2348	180	360	Depth.tif
	289	B-257.3	RES1	60810	157497.9	3	4	3.279334384	2544	40.99771	-76.4679	4.012649	483		4	0.720666	1	R13B	110	13.44133	21169.69	78748.5	26	20.04466	15784.87	0	0	0	0	RES1BSG0	22.3872	0	0	22.3872	180	360	Depth.tif
	290	B-258	RES1	40175	104053.25	3	4	3.047542869	1443	40.99788	-76.468	4.001942	483		4.004354	0.956811	1	R13B	110	13.91362	14477.54	52026.5	26	21.69768	11288.54	0	0	0	0	RES1BSG0	12.6984	0	0	12.6984	180	360	Depth.tif
	291	B-259	RES1	50776	131509.84	3	4	2.299531023	1725	40.99794	-76.4678	4.031212	483		4.034932	1.735401	1	R13B	110	18.4124	24213.97	65754.5	26	25.677	16883.79	0	0	0	0	RES1BSG0	15.18	0	0	15.18	180	360	Depth.tif
	292	B-260	RES1	60694	157197.46	3	4	3.057168666	3056	40.99801	-76.4677	4.031916	483.0257		4.036515	0.979346	1	R13B	110	13.95869	21942.65	78598.5	26	21.85542	17178.03	0	0	0	0	RES1BSG0	26.8928	0	0	26.8928	180	360	Depth.tif
	293	B-260.1	RES1	41339	107068.01	3	4	2.695801041	1664	40.99802	-76.4677	5.641578	483		4.044024	1.348223	1	R13B	110	16.08934	17226.53	53534	26	23.74111	12709.57	0	0	0	0	RES1BSG0	14.6432	0	0	14.6432	180	360	Depth.tif
	294	B-262	RES1	37320	96658.8	3	4	2.629263679	1400	40.99806	-76.4676	4.062726	483.0543		4.064489	1.435225	1	R13B	110	16.61135	16056.2	48329	26	24.17613	11684.08	0	0	0	0	RES1BSG0	12.32	0	0	12.32	180	360	Depth.tif
	295	B-263	RES1	42920	111162.8	2	4	3.063828177	1536	40.99812	-76.4674	4.310612	483.088		4.33273	1.268902	1	R12B	108	22.34451	24838.6	55581	24	19.88231	11050.79	0	0	0	0	RES1BSG0	13.5168	0	0	13.5168	180	360	Depth.tif
	296	B-264	RES1	61418	159072.62	3	4	2.831573696	2882	40.99823	-76.4672	4.167974	483.1442		4.176419	1.344846	1	R13B	110	16.06907	25561.4	79536	26	23.72423	18869.3	0	0	0	0	RES1BSG0	25.3616	0	0	25.3616	180	360	Depth.tif
	297	B-270	AGR1	1950	5050.5	1	3	3.347517541	0	40.99863	-76.4647	5.375931	483.516		5.446269	2.098751	1	A1LN	616	11.39501	575.4478	5050	460	44.48127	2246.304	0	116	52.46878736	0	AGR1NBFT	0	0	0	0	30	210	Depth.tif
	298	h-001 buil	RES1	144712	374804.08	1	4	-0.853782812	2501	40.99564	-76.475	10.91857	482.5		10.77289	11.62667	1	R11B	704	81	303591.2	187402	535	39	73086.78	0	0	0	0	RES1BSG8	25.5102	80.032	62.525	168.0672	360	720	Depth.tif
	299	h-002 buil	RES1	47011	121758.49	2	4	-12.98790097	1514	40.99656	-76.477	-8.11361	482.5		-7.77168	5.216225	0	R12B	0	0	0	60879	0	0	0	0	0	0	0						0	0	Depth.tif
	300	h-003 shed	AGR1	3650	9453.5	0	0	0.862733919	0	41.00391	-76.4627	5.873619	487.8789		5.868116	5.005382	1	A1LN	616	25.02691	2365.794	9453	460	66	6238.98	0	116	100	0	AGR1NBFT	0	0	0	0	30	210	Depth.tif
	301	h-004	RES3A	19020	49261.8	1	7	1.764422455	0	41.00286	-76.464	3.881852	486.0831		3.71887	1.954448	1	R3A1N	204	24.59003	12113.29	24630.5	81	32.59003	8027.087	0	0	0	0	RES3ANBS(	0	0	0	0	180	360	Depth.tif
	302	h-005	RES1	40867	105845.53	3	3	7.244547816	1160	41.00116	-76.4675	-5.85283	483.5588		-5.96901	-13.2136	0	R13N	0	0	0	52922.5	0	0	0	0	0	0	0						0	0	Depth.tif
	303	h-006	RES1	79470	205827.3	2	4	1.67338565	1604	41.00114	-76.4671	1.941953	483.4849		1.956982	0.283597	1	R12B	108	19.56719	40274.57	102913.5	24	16.56719	17049.88	0	0	0	0	RES1BSG0	14.1152	0	0	14.1152	180	360	Depth.tif
	304	h-007	RES1	31712	82134.08	2	4	1.399141502	1144	41.00139	-76.4668	1.102888	483.5433		0.839336	-0.55981	1	R12B	108	16.20097	13306.51	41067	24	11.52156	4731.559	0	0	0	0						0	0	Depth.tif
	305	h-009	RES1	32420	83967.8	2	3	2.077167295	1120	41.00234	-76.4656	2.715341	484.7024		2.643591	0.566424	1	R12N	107	11.56642	9711.979	41983.5	23	9.699272	4072.094	0	0	0	0	RES1NBFT(	4.592	0	0	4.592	180	360	Depth.tif
	306	h-010	RES1	26884	69629.56	1	4	0.577821185	708	41.00272	-76.4651	2.905187	485.1274		2.994772	2.41695	1	R11B	704	41.91865	29187.54	34814.5	535	23.25085	8094.667	0	0	0	0	RES1BSG0	6.2304	0	0	6.2304	180	360	Depth.tif
	307	h-011 2nd	RES1	64253	166415.27	3	3	7.11	1354	41.00287	-76.4649	3.913006	485.5164		3.930389	-3.17961	1	R13N	109	0	0	83207.5	25	0	0	0	0	0	0						0	0	Depth.tif
	308	h-012	RES1	35011	90678.49	1	4	2.91370146	1196	41.00333	-76.4647	0.23016	486.2254		0.226869	-2.68683	1	R11B	704	4.384345	3975.637	45339	535	3.444843	1561.857	0	0	0	0						0	0	Depth.tif
	309	h-013.1	RES1	28273	73227.07	2	4	2.552919448	1072	41.0033	-76.4642	4.352333	486.3204		4.353683	1.800763	1	R12B	108	25.00382	18309.54	36613.5	24	23.60534	8642.742	0	0	0	0	RES1BSG0	9.4336	0	0	9.4336	180	360	Depth.tif
	310	h-014.1	RES1	34106	88334.54	2	4	2.598521548	1384	41.0034	-76.464	4.461299	486.4585		4.458692	1.86017	1	R12B	108	25.30085	22349.25	44167	24	24.02119	10609.44	0	0	0	0	RES1BSG0	12.1792	0	0	12.1792	180	360	Depth.tif
	311	h-016.1	RES1	39333	101872.47	3	4	3.548573168	2064	41.00485	-76.4632	5.546585	488.6189		5.547106	1.998533	1	R13B	110	19.9912	20365.43	50936	26	26.99267	13748.98	0	0	0	0	RES1BSG0	18.1632	0	0	18.1632	180	360	Depth.tif
	312	h-017	RES1	40857	105819.63	3	4	2.605442156	1776	41.00476	-76.4633	5.078743	488.5083		5.202049	2.596607	1	R13B	110	22.98304	24320.42	52909.5	26	27.59661	14601.23	0	0	0	0	RES1BSG0	15.6288	0	0	15.6288	180	360	Depth.tif
	313	h-018 2nd	RES1	41554	107624.86	3	7	6	1695	41.00469	-76.4635	5.325978	488.4062		5.418547	-0.58145	1	R13N	109	2.092733	2252.283	53812	25	2.929827	1576.598	0	0	0	0						0	0	Depth.tif
	314	h-019	RES1	35180	91116.2	2	4	2.583018333	1444	41.00434	-76.4639	3.665962	487.8411		3.659058	1.07604	1	R12B	108	21.3802	19480.78	45558	24	18.53228	8442.935	0	0	0	0	RES1BSG0	12.7072	0	0	12.7072	180	360	Depth.tif
	315	h-020	RES1	23000	59570	2	4	1.016604549	1200	41.00428	-76.464	2.732155	487.6729		2.688185	1.67158	1	R12B	108	24.3579	14510	29785	24	22.70106	6761.511	0	0	0	0	RES1BSG0	10.56	0	0	10.56	180	360	Depth.tif
	316	h-021	RES1	23000	59570	2	4	1.34021794	1200	41.00425	-76.4641	2.850475	487.5999		2.899616	1.559398	1	R12B	108	23.79699	14175.87	29785	24	21.91578	6527.616	0	0	0	0	RES1BSG0	10.56	0	0	10.56	180	360	Depth.tif
	317	h-022.1	COM1	30850	79901.5	1	4	3.325253554	1160	41.00521	-76.464	4.377637	488.9544		4.421125	1.095872	1	C1LB	217	9.479359	7574.103	79901	90	27.53395	21999.9	7992.4	1	32.72569344	2615.56832	COM1NBS(	2.088	0	0	2.088	360	540	Depth.tif
	318	h-023	RES1	44590	115488.1	3	4	2.854	1688	41.00559	-76.4641	-0.9	489.1		-0.9	-3.754	0	R13B	0	0	0	57744	0	0	0	0	0	0	0						0	0	Depth.tif
	319	h-024	RES1	90854	235311.86	2	4	-2.882416912	2452	41.00013	-76.4687	-1.57547	483.3236		-1.55111	1.331303	0	R12B	0	0	0	117655.5	0	0	0	0	0	0	0						0	0	Depth.tif
	320	h-025	RES1	57873	149891.07	1	4	8	1248	41.0007	-76.4679	-1.51054	483.4342		-1.66185	-9.66185	0	R11B	0	0	0	74945.5	0	0	0	0	0	0	0						0	0	Depth.tif
	321	h-026	RES1	58596	151763.64	2	4	-0.294588543	2420	40.99569	-76.4746	4.870486	482.5		4.780592	5.07518	1	R12B	108	39.3759	59758.05	75881.5	24	37.3759	28361.39	0	0	0	0	RES1BSG4	21.296	0	0	21.296	270	450	Depth.tif
	322	h-028	RES1	57055	147772.45	3	3	503.718	1712	40.99755	-76.4808				0	-503.718	0	R13N	0	0	0	73886	0	0	0	0	0	0	0						0	0	Depth.tif
	323	h-029	RES1	29203	75635.77	2	4	2.69168189	783	41.00229	-76.4651	6.49645	484.8368		6.500651	3.808969	1	R12B	108	33.04484	24993.47	37817.5	24	32.23588	12190.8	0	0	0	0	RES1BSG0	6.8904	0	0	6.8904	180	360	Depth.tif
	324	h-031	RES1	40460	104791.4	3	3	8.75	1584	41.00179	-76.4658	6.305531	484.2903		6.311257	-2.43874	1	R13N	109	0	0	52395.5	25	0	0	0	0	0	0						0	0	Depth.tif
	325	h-032	RES1	71326	184734.34	2	3	10.625	1491	41.00151	-76.4661	6.11294	483.3713		6.034875	-4.59013	1	R12N	107	0	0	92367	23	0	0	0	0	0	0						0	0	Depth.tif
	326	h-033	RES1	31642	81952.78	2	3	10.625	888	41.00141	-76.4662	5.363318	483.3634		5.367984	-5.25702	1	R12N	107	0	0	40976	23	0	0	0	0	0	0						0	0	Depth.tif
	327	h-035 gara	RES1	62551	162007.09	2	7	10	1753	41.00109	-76.4667	6.2362	483.3284		6.312969	-3.68703	1	R12N	107	0	0	81003.5	23	0	0	0	0	0	0						0	0	Depth.tif
	328	h-037	RES1	115554	299284.86	1	4	5.24	2733	40.99907	-76.4695				2.068901	-3.1711	1	R11B	704	0	0	149642	535	0	0	0	0	0	0						0	0	Depth.tif
	329	h-038	RES1	51383	133081.97	2	4	2.1	1828	41.00395	-76.463				4.52483	2.42483	1	R12B	108	27.27449	36297.16	66540.5	24	26.69932	17765.86	0	0	0	0	RES1BSG0	16.0864	0	0	16.0864	180	360	Depth.tif
	330	h-039	RES1	41036	106283.24	3	4	1.57	1408	41.00441	-76.4638				4.269363	2.699363	1	R13B	110	23.49681	24973.12	53141.5	26	27.69936	14719.86	0	0	0	0	RES1BSG0	12.3904	0	0	12.3904	180	360	Depth.tif
	331	h-040	RES1	47531	123105.29	2	4	2.96	1324	41.00495	-76.4634				4.694326	1.734326	1	R12B	108	24.67163	30372.01	61552.5	24	23.14028	14243.42	0	0	0	0	RES1BSG0	11.6512	0	0	11.6512	180	360	Depth.tif
	332	h-050 tel	RES1	5175	13405.84	3	7	9.33	1150	41.00387	-76.4632				4.141509	-5.18849	1	R13N	109	0	0	6702.5	25	0	0	0	0	0	0						0	0	Depth.tif
	333	m-003	COM1	141130	365526.7	1	7	0.579977306	9880	40.98501	-76.4797	-0.4047	482.5		-0.38755	-0.96753	0	C1LN	0	0	0	365526	0	0	0	68073.2	0	0	0						0	0	Depth.tif
	334	m-004	RES1	42718	110639.62	2	4	0.17452147	1785	40.98517	-76.4774	0.096723	482.5		0.082271	-0.09225	1	R12B	108	18.53875	20511.09	55319.5	24	15.262	8442.861	0	0	0	0						0	0	Depth.tif
	335	m-005	RES1	49610	128489.9	2	4	1.887618055	1412	40.98438	-76.4767	-8.53961	482.5		-8.51787	-10.4055	0	R12B	0	0	0	64244.5	0	0	0	0	0	0	0						0	0	Depth.tif
	336	m-006	RES1	73770	191064.3	1	4	3.00000763	1900	40.99146	-76.4781	-27.5231	482.5		-27.5218	-30.5218	0	R11B	0	0	0	95532	0	0	0	0	0	0	0						0	0	Depth.tif
	337	m-007	COM1	455232	1179050.88	2	4	2.024306367	18372	40.99509	-76.4774	2.466225	482.5		2.453861	0.429554	1	C1LB	217	4.436435	52307.79	1179050	90	12.30931	145132.9	126583.08	1	15.5979686	19744.3891	COM1NBS(	33.0696	0	0	33.0696	360	540	Depth.tif
	338	m-008	RES1	29347	76008.73	2	4	-1.202432437	1122	40.99465	-76.4768	1.291448	482.5		1.410328	2.61276	1	R12B	108	27.83828	21159.32	38004	24	27.45104	10432.49	0	0	0	0	RES1BSG0	9.8736	0	0	9.8736	180	360	Depth.tif
	339	m-009	AGR1	8396	21745.64	0	0	3.19137609	0	40.99429	-76.4763	7.514311	482.5		7.676079	4.484703	1	A1LN	616	21.90822	4763.942	21745	460	65.48447	14239.65	0	116	100	0	AGR1NBFT	0	0	0	0	30	210	Depth.tif
	340	m-010 belo	RES1	43463	112569.17	2	4	1.671121526	1794	40.98032	-76.4719	7.300672	482.5		7.383752	5.71263	1	R12B	108	42.56315	47912.91	56284.5	24	40.56315	22830.77	0	0	0	0	RES1BSG4	15.7872	0	0	15.7872	270	450	Depth.tif

FEMA FLOOD ASSESSMENT STRUCTURE TOOL (FAST) OUTPUT
2011 FLOOD LEE

INPUT FIELDS	FIELD ID	STRUCTURE ID	Occupancy/ Zoning	Total County Fair Market Value ($)	Total County Assessed Value x CLR ($)	# of Stories	Foundation Type	1st Floor Height above Grade (Ft)	Total SF	Latitude	Longitude	Depth of Flood Lee	Lee Flood Elev	OUPUT FIELDS	Depth of Flood from Ground (Ft)	Depth of Flood in Structure (Ft)	Floodng Expected?	Struc Occup ID	Bldg Depth Damage ID	% Bldg Damage	Bldg Loss $$	Contents Value $$	Contents Depth Damage ID	% Contents Damage	Content Loss $$	Commercial Inventory Cost ($)	Comm Inventory Depth Damage ID	% Comm Inventory Damage	Comm Inventory Loss $$	Debris ID	Debris_Fin	Debris from Struc	Debris from Foundation	Debris Total	Min Days to Restore Struc	Max Days to Restore Struc	GridName
	341	m-011	RES1	43036	111463.24	1	0	5.7	1428	40.97705	-76.472	1.914062	481.5		1.84899	-3.85101	1	R11N	129	0	0	55731.5	45	0	0	0	0	0	0						0	0	Depth.tif
	342	m-014	RES1	22096	57228.64	2	4	0.741101932	1008	40.97697	-76.4722	-0.67943	481.5		-0.65658	-1.39768	0	R12B	0	0	0	28614	0	0	0	0	0	0	0						0	0	Depth.tif
	343	m-015.1	RES1	36737	95148.83	2	4	1.741521616	1868	40.97709	-76.4722	-0.07269	481.5		-0.11604	-1.85756	0	R12B	0	0	0	47574	0	0	0	0	0	0	0						0	0	Depth.tif
	344	m-016	RES1	27292	70686.28	2	4	1.673955672	1353	40.97726	-76.4721	-1.71217	481.5		-1.687	-3.36095	0	R12B	0	0	0	35343	0	0	0	0	0	0	0						0	0	Depth.tif
	345	m-018.2 ga	RES1	82050	212509.5	2	4	0.289580253	2811	40.98022	-76.4726	0.468148	482.5		0.46277	0.173189	1	R12B	108	19.34638	41112.8	106254.5	24	16.34638	17368.76	0	0	0	0	RES1BSG0	24.7368	0	0	24.7368	180	360	Depth.tif
	346	m-019.1	RES1	42812	110883.08	2	4	-1.868504285	1800	40.97858	-76.4719	-3.43511	482		-3.38707	-1.51857	0	R12B	0	0	0	55441.5	0	0	0	0	0	0	0						0	0	Depth.tif
	347	m-020	RES1	120663	312517.17	2	4	-1.283515186	3288	40.97984	-76.4723	-1.504	482.5		-1.50315	-0.21963	0	R12B	0	0	0	156258.5	0	0	0	0	0	0	0						0	0	Depth.tif
	348	m-021 fenc	COM1	40658	105304.22	0	0	0.6507704	0	40.97832	-76.4733	-9.86465	482.2225		-9.51347	-10.1642	0	C1LN	0	0	0	105304	0	0	0	0	0	0	0						0	0	Depth.tif
	349	m-022	RES1	47702	123548.18	1	4	-0.22855277	1232	40.98134	-76.4742	-1.91911	482.5		-1.74327	-1.51472	0	R11B	0	0	0	61774	0	0	0	0	0	0	0						0	0	Depth.tif
	350	m-024	COM1	139032	360092.88	1	7	-0.795891249	9688	40.98663	-76.4786	2.43425	482.5		2.431172	3.227063	1	C1LN	217	16.45413	59249.99	360092	90	58.72475	211463.1	66750.32	1	67.49769195	45054.9254	COM1NBS(	17.4384	0	0	17.4384	360	540	Depth.tif
	351	m-025.1 bu	RES3A	461130	1194326.7	2	7	-0.618989087	4038	40.97824	-76.4711	6.567588	482		6.529396	7.148385	1	R3A1N	204	43	513560.2	597163	81	50.74192	303012	0	0	0	0	RES3ANBS(	27.4584	0	0	27.4584	270	450	Depth.tif
	352	m-026	RES1	67188	174016.92	1	4	5.170381556	1620	40.99064	-76.478	-19.1739	482.5		-18.1476	-23.318	0	R11B	0	0	0	87008	0	0	0	0	0	0	0						0	0	Depth.tif
	353	m-027	RES1	88060	228075.4	1	4	5.252830233	1830	40.99096	-76.4781	-24.6621	482.5		-24.1074	-29.3603	0	R11B	0	0	0	114037.5	0	0	0	0	0	0	0						0	0	Depth.tif
	354	m-028	RES1	131594	340828.46	1	4	1.028815775	2160	40.9919	-76.4783	-31.1997	482.5		-31.1038	-32.1326	0	R11B	0	0	0	170414	0	0	0	0	0	0	0						0	0	Depth.tif
	355	m-031	RES1	34738	89971.42	2	4	-1.176534261	1503	40.98104	-76.4737	-2.67668	482.5		-2.74534	-1.5688	0	R12B	0	0	0	44985.5	0	0	0	0	0	0	0						0	0	Depth.tif
	356	m-032	RES1	24170	62600.3	2	4	2.204876165	2952	40.99536	-76.4766	6.435298	482.5		6.436244	4.231368	1	R12B	108	35.15684	22008.18	31300	24	33.92547	10618.67	0	0	0	0	RES1BSG4	25.9776	0	0	25.9776	270	450	Depth.tif

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix H

Opinion of Probable Costs

WEST END FLOOD MITIGATION STUDY

COLUMBIA COUNTY, PENNSYLVANIA

Appendix H – Opinion of Probable Costs

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Alternate 1 System
Floodwall Around Fairgrounds
Summary of Opinion of
Total Project Cost

Columbia County - West Study Levee Costs	
Alternate AlignmentSheet Pile Wall Around Perimeter of Fairgrounds	
Summary of Project Costs (2022 Costs)	
Item Description	**Cost**
SubTotal Construction Cost with 25% Contingency	$ 25,133,842.85
Stream Channelization	$3,000,000.00
Total Construction Cost with 25% Contingency	**$ 28,133,842.85**
Environmental/Cultural resources	$ 500,000.00
Legal, Administration of Grant	$ 275,000.00
Engineering/Geotechnical	$ 2,450,000.00
Permitting	$ 300,000.00
Construction Inspection	$ 675,000.00
Total Project Cost	**$ 32,333,842.85**

Alternate 2 System (Preferred System)
Itemized Opinion of Probable Construction Cost

West End Flood Mitigation Study Cost Estimate			
Date Rev: 3.31.2022			
Line Item	Item Description	Cost	
1	Project Maintenance and Protection of Traffic (Entire Project)	$	125,000
2	Project Sign	$	5,000
3	Section A - W. First Street Levee- Station 0+35 to Sta.11+50 = 1115 LF	$	1,540,850
4	R/W Takes	$	600,000
5	MSE Levee (Single Sided) Sta 11+50 to 17+60 = 610 LF	$	1,126,000
6	R/W Takes	$	350,000
8	Sheetpile Floodwall Sta 16+50 to 22+25 = 575 LF	$	1,719,725
9	R/W Takes	$	375,000
10	Earth Levee Sta 22+25 To 25+55(Rt. 11 Closure) = 330 LF	$	426,000
11	Route 11 Closure Structure	$	488,925
12	Earth Levee Station 26+20 to Station 30+41 = 421 LF (Bloom University Property)	$	423,356
13	Closure Structure 2A Floodbreak 24 Foot Width - 7 Feet High	$	455,300
14	Closure Structure 2B	$	358,475
15	MSE Levee - Sta 31+60 to Sta. 40+45 - Ave. 11' Height 885' Length	$	1,299,166
16	Closure 3 - Stoplogs- Sta 40+45 to 40+75 8' Ht. X 30' Wide	$	409,700
17	MSE Levee- 40+75 to Sta. 46+00 - Ave. 11' Height 525' Length	$	769,623
18	Closure 4 - Sta 46+00 to Sta 46+30 - 10' Ht. X 30' Width	$	409,425
19	MSE Levee - Station 46+30 to 46+90 = 60 LF	$	93,800
21	Closure 5 - Sta 46+90 to Sta 47+30 - 10' Ht. X 40' Width	$	463,775
22	MSE Levee (Single Sided) Sta 47+30 to 60+00 - Length = 1270' Ave. - 12' High	$	1,952,000

23	Concrete retaining Wall Tie-out to existing system at 6th Street	$	175,000
24	PUMPING STATION 1 (Fairgrounds)20,000 GPM	$	1,200,100
25	Drainage Items	$	363,350
26	Roadway / Paving Items	$	328,325
27	Miscellaneous Items	$	319,050
28	Electrical Utility Trench w/conduits for Primary Feed	$	90,000
29	Utilities	$	63,000
30	Erosion and Sedimentation Control	$	220,200
31	Fairgrounds	$	130,000
33	SubTotal Opinion of Construction Cost for Schematic Level Design	$	16,280,145
34	Project Mobilization and Demobilization 8% of Subtotal	$	1,302,412
36	Opinion of Probable Construction Cost	$	17,582,556
37	Contingencies - 25%	$	4,395,639
38	Total	$	21,978,195
39	Induced Flooding Mitigation		
40	Stream Channelization	$	3,000,000
41	Total Project Construction Cost	$	24,978,195

Alternate 2 System
Summary of Opinion of Total Project Cost

Columbia County - West Study Levee Costs	
Summary of Project Costs (2022 Costs with 25% Contingency)	
Item Description	**Cost**
Maintenance of Traffic	$ 156,250.00
New Levees	$ 16,801,399.69
Stormwater Pumping Station	$ 1,500,000.00
Drainage Items	$ 454,187.50
Roadway Items / Miscellaneous Work	$ 1,438,343.75
Mobilization	$ 1,628,014.48
Subtotal	$ 21,978,195.41
TOTAL Construction	**$ 21,978,195**
Flood Mitigation - Stream Channelization/ Property Elevations	$ 3,000,000.00
Environmental/Cultural resources	$ 500,000.00
Legal, Administration of Grant	$ 275,000.00
Engineering/Geotechnical	$ 2,300,000.00
Permitting	$ 300,000.00
Construction Inspection	$ 675,000.00
Total Project Cost with 25% Contingency	$ 29,028,195