Table B. Summary and Comparison of Candidate Plans

	No Action 1/ (Compared to Existing Condition)	Dikes plus Nonstructural (Recommended Plan)	Stream Rehabilitation plus Nonstructural
Measures	None	Flood Warning System Tributary Stabilization Wellsburg & Centerville Dikes Voluntary Nonstructural	Flood Warning System Tributary Stabilization Wellsburg Stream Rehabilitation Voluntary Nonstructural
Total Investment PL 83-566 Funds Other Funds	$0 ---------- ----------	$5,600,000 $5,420,000 $180,000	$5,270,000 $5,195,000 $75,000
National Economic Development Account 2/			
Average Annual Benefits Average Annual Costs Net Beneficial	$0 $0 $0	$570,000 $280,000 $290,000	$495,000 $255,000 $240,000
Environmental Quality Account			
Streambank Erosion	3,000 feet stabilized	19,000 additional feet stabilized	19,000 additional feet stabilized
Sedimentation	Substantial sediment loads	50% reduction in main stem 80% reduction in tributaries	50% reduction in main stem 80% reduction in tributaries
Flood Plain	Little change expected	5 acres restored to flood plain function	12 acres restored to flood plain function
Land Use	Little change in existing land use	5 acres residential to flood plain; 19 ac. meadow/lawn/trees and 1 ac. forest to dike & components	12 ac. residential to flood plain
Important Farmland	All located outside of the project area	No effect	No effect
Soil Resources	3,000 ft of trib. stream bank stabilized, but still excessive soil loss due to unstable stream banks	19,000 additional feet of tributary stream banks stabilized. Some excessive soil loss from stream banks continues	19,000 additional feet of tributary stream banks stabilized. 4,500 feet of Bentley Creek stabilized Some excessive soil loss from stream banks continues
Riparian Areas	Inadequate forested buffers on 33 miles of stream	No trees or shrubs permitted on 6,600 feet of dike embankment 19,000 feet improved in tributaries (of the 33 impaired miles)	4,500 feet of stream rehab. 19,000 feet improved in tributaries (of the 33 impaired miles
Forest Resources	About ½ watershed forested Little change expected.	One acre converted to meadow cover on diversions	Some trees removed during stream rehabilitation

Table B. Summary and Comparison of Candidate Plans (continued)

	No Action 1/ (Compared to Existing Condition)	Dikes plus Nonstructural (Recommended Plan)	Stream Rehabilitation plus Nonstructural
Wildlife Resources	Little change expected	Moderate improvement due to improved riparian habitat Temporary disruption during dike construction	Moderate improvement due to improved riparian habitat Temporary disruption during stream rehabilitation
Threatened/Endangered Species	Historical presence of two NY endangered plants and one F plant of concern	No effect	No effect
Wetlands	Most wetlands associated with streams, some in uplands. Few impacts expected	No effect	No effect
Water Quality	Slightly degraded due to sediment, iron, aluminum Downstream impacted by sediment and nutrients	Slight improvement due to substantial sediment reduction & associated nutrient reductions Temporary impacts during construction	Slight improvement due to substantial sediment reduction & associated nutrient reductions Temporary impacts during construction
Cultural Resources	One National Register (NR) of Historic Places eligible house remains floodprone. No other prehistoric or cultural features affected	One NR eligible house is removed from the floodplain and is mitigated in cooperation with The NYS Historic Preservation Office. Adverse impacts to unmarked graves, if present, are avoided	No effect
Visual / Aesthetic	"Raw" stream banks and substantial visual damages after floods	Substantial improvement to stream banks and substantially reduced visual flood damages Elevated mobile homes may be less attractive. Some visual impacts from dikes. The dikes are low to moderate height and will blend in well in many areas.	Substantial improvement to stream banks and substantially reduced visual flood damages Elevated mobile homes may be less attractive Additional visual improvements in stream rehabilitation area
Public Utilities/Services	Little change – floods disrupt emergency services, roads & bridges & most utilities	3 designed road closures during flood peaks, but less disruption to roads, bridges & utilities in diked areas. Less disruption & need for emergency services. Temporary gas line disruption during construction	Reduced flood levels in Wellsburg with less disruption & need for emergency services, roads, bridges & utilities

Table B. Summary and Comparison of Candidate Plans (continued)

	No Action 1/ (Compared to Existing Condition	Dikes plus Nonstructural (Recommended Plan)	Stream Rehabilitation plus Nonstructural
Other Social Effects Account			
Flood Damages (average annual $)	$770,000	$210,000	$285,000
Sediment Damage (average annual $)	$20,000	$10,000	$8,000
Public Safety	335 residential, commercial and public buildings with high flood risk High demand for emergency services during flood No advance flood warning	135 residential, commercial and public buildings with high flood risk Substantially less demand for flood emergency services Improved advance warning	160 residential, commercial and public buildings with high flood risk, 60 with reduced risk Much less demand for flood emergency services Improved advance warning
Social Issues	Little change from existing	Improved economic condition. 5 or 6 households displaced. Nearly 200 buildings with little flood risk	Improved economic condition. No households displaced. 115 buildings with little flood risk, 60 with reduced risk
Civil Rights / Environmental Justice	Little change from existing	All groups eligible and all groups with equal benefit	All groups eligible and all groups with equal benefit

1/ Future without project. Used zero dollar base for No Action alternative to streamline economic comparison of alternatives.
2/ Price Base 2010, amortized over 100 years at a discount rate of 4.125 percent.

CONSULTATION AND PUBLIC INVOLVEMENT

Consultation and Public Involvement Actions

Project Sponsors
Meetings were held between NRCS and the Sponsors throughout the development of the Watershed Project Plan to determine local needs and concerns regarding the project. The meetings were used to acquire data relative to the project area, ascertain the scope of the problem, begin developing alternative approaches, explain program criteria and operating procedures, develop measures to tailor the project to address local concerns and to work out other project details. In summer 2007 a meeting was held with project Sponsors to discuss alternatives reviewed and those alternatives that are potentially viable, including estimated federal and local costs and local responsibilities for land rights, operation and maintenance costs. Sponsor responsibilities for continuing the planning process were also reviewed.

Interdisciplinary Team
An interdisciplinary team was used to acquire data and develop information for the plan and environmental assessment. The team included Sponsor representatives, engineers, environmental specialist, cultural resources coordinator, resource conservationists, economist and others. The team helped gather basic project information, developed the preliminary determinations of the environmental and social effects of the alternatives and provided input for the development of this document. Landowners and other agencies were contacted during plan development to provide needed information.

Public/Agency Participation
Input from the public and other agencies was solicited during development of the plan. A public participation plan was developed by NRCS and the Sponsors to guide the process. The process included efforts to advertise meetings and opportunities for input for all interested parties, including low income and minority residents. The flood damage reduction efforts for the Bentley Creek Watershed via the PL 83-566 program has consumed many years. During this time NRCS personnel have participated in numerous meetings to explain the program and to gain input from Sponsors and the general public. Among those meetings has been a two day Coordinated Resource Management meeting held in the watershed and attended by agency representatives and private residents. When the 1997 Preliminary Investigation Report was completed there was a public meeting in Wellsburg, NY to explain the findings of the report and to gather input. NY-PENN Bentley Creek Watershed Association holds bi-monthly meetings at which NRCS personnel present updates of planning progress. Meeting attendees have input to the discussions concerning the plan development and influence the direction and content of the plan. This has been ongoing for 9 years. These meetings are regularly scheduled and are reported on in the association's newsletter. In July 2003 a meeting was held in the watershed with federal and state agencies with interest in the planning activities. The agencies were provided an opportunity to comment on the resource concerns, alternatives and environmental evaluations being conducted. In October 2005, a public meeting was held in Wellsburg at which alternatives for flood damage reduction were presented by NRCS personnel. The public had input into direction and alternatives considered in planning project. In March 2008, two public meetings were held, one in Pennsylvania and one in New York. The public was again provided the opportunity to be updated on findings and to provide comment. Input from these meetings was used by the Sponsors in selecting the recommended plan.

The following agencies and organizations will be contacted directly for comment and review of the Draft Watershed Plan-Environmental Assessment:

Athens Township, Pennsylvania
Smithfield Township, Pennsylvania
South Creek Township, Pennsylvania
Springfield Township, Pennsylvania
Bradford County Emergency Management Agency
Chemung County Emergency Management Office
Bradford County Planning Commission
Chemung County Planning Commission

Chemung County Health Department
Appalachian Regional Commission
Endless Mountains Resource Conservation and Development (RC&D) Area
North Central Pennsylvania Regional Planning & Development Commission
Southern Tier Central Regional Planning & Development Board
Seneca Nation of Indians
Susquehanna River Basin Commission
New York State Department of Environmental Conservation
New York State Department of Environmental Conservation, Region 8
New York State Department of Environmental Conservation, Water Division
New York State Department of Transportation
New York State Emergency Management Office
New York State Office of Parks, Recreation and Historic Preservation
New York State Soil and Water Conservation Committee
Pennsylvania Department of Agriculture
Pennsylvania Department of Conservation and Natural Resources
Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry
Pennsylvania Department of Environmental Protection, Bureau of Watershed Management
Pennsylvania Department of Environmental Protection, Bureau of Waterways Engineering, Division of Dam Safety
Pennsylvania Department of Environmental Protection, Office of Policy & Communications
Pennsylvania Department of Environmental Protection, Office of Water Management
Pennsylvania Department of Environmental Protection, River Basin Commission
Pennsylvania Department of Environmental Protection, Northcentral Regional Office
Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, Division of Watershed Protection
Pennsylvania Department of Transportation (PennDOT)
Pennsylvania Emergency Management Agency (PEMA)
Pennsylvania Fish & Boat Commission
Pennsylvania Game Commission
Pennsylvania Game Commission, Northcentral Region
Pennsylvania Historical and Museum Commission
State Conservation Commission
Federal Emergency Management Agency (FEMA)
U.S. Army Corps of Engineers, Baltimore District
U.S. Army Corps of Engineers, Buffalo District
U.S. Environmental Protection Agency, Region 2
U.S. Environmental Protection Agency, Region 3
U.S. Fish and Wildlife Service, New York Office
U.S. Fish and Wildlife Service, Pennsylvania Office
U.S. Geological Survey, Pennsylvania District
USDA Farm Service Agency
USDA Forest Service
USDA Rural Development
Governor's Policy Office, Pennsylvania
THE HONORABLE KIRSTEN E. GILLIBRAND, United States Senate, New York
THE HONORABLE CHARLES E. SCHUMER, United States Senate, New York
THE HONORABLE ROBERT P. CASEY, United States Senate, Pennsylvania
THE HONORABLE PATRICK J. TOOMEY, United States Senate, Pennsylvania
THE HONORABLE TOM REED, Congress of the United States, 29th New York
THE HONORABLE TOM MARINO, Congress of the United States, 10th Pennsylvania
THE HONORABLE ANDREW CUOMO, Governor of New York
THE HONORABLE TOM CORBETT, Governor of Pennsylvania
Bentley Creek Watershed Association
Chesapeake Bay Foundation
Pennsylvania Association of Conservation Districts, Inc. (PACD)
Ducks Unlimited
Sierra Club

Plan Review Comments and Responses

A preliminary draft of the Watershed Project Plan-Environmental Assessment (Plan-EA) was reviewed by the NRCS-National Water Management Center, Little Rock, Arkansas. Technical comments received from the National Water Management Center were addressed in this draft document.

The Draft Plan-EA will be made available to all interested agencies, organizations and the general public for a 30-day review period. Public meetings or other public opportunities to participate will be held during the review period. Comments will be addressed in the Final Plan-EA and, if necessary, coordinated with the party submitting them. Appendix A is reserved for Letters of Comment received on the draft Plan-EA.

RECOMMENDED PLAN

Purpose and Summary

The purpose of this Watershed Project Plan is to meet the Sponsors objectives for addressing the watershed problems, including reducing flood damage and sedimentation. The plan will provide authorization to use financial and technical assistance funds, as appropriated by Congress, under the Watershed Protection and Flood Prevention Act (Public Law 83-566). The PL 83-566 purpose is flood prevention. These funds are typically considered for annual appropriation under the Agricultural, Rural Development, Food and Drug Administration and Related Agencies Appropriations Bill, Title II – Conservation Programs, Natural Resources Conservation Service, Watershed and Flood Prevention Operations.

Refer to the Flood Plain Map (Appendix B) and the Project Map (Appendix F) for additional information on project measures and the area to be benefitted.

Measures To Be Installed

General
Structural and nonstructural flood damage reduction measures will be implemented, including an advanced flood warning system. Structural measures include earthen dikes in Wellsburg, New York and Centerville, Pennsylvania. Land stabilization will be addressed by tributary stabilization measures. Voluntary nonstructural measures include house acquisition, house dry "floodproofing, protection of house utilities and mobile home elevation. Additional requirements apply to mobile home parks which are detailed later in this section.

The proper functioning of all structural and nonstructural measures will be dependent on continuation and enhancement of flood plain ordinances, flood insurance and stormwater management. These measures will ensure flood frequency and peaks do not increase over time and ensure that new structures in the flood plain do not incur undue flood risks and flood loss.

The Sponsors will also need to ensure that all state classified high hazard dams, Miller Pond, Lake Ondawa Ridgebury Lake, and other upstream hazards identified by state or local authorities as having a substantial risk of failure, meet all applicable safety standards or demonstrate that a failure will not adversely affect the performance of the planned structural and nonstructural measures.

Detailed information on the project measures follows:

Flood Warning System
The flood warning system should consist of:

a. Rainfall gages equipped with telemetric communication equipment (perhaps 3 or 4 scattered throughout the watershed).
b. Stream flow gages equipped with telemetric communication equipment (perhaps 2 or 3 scattered along the main Bentley Creek).
c. Repeater station for the telemetric communication equipment.
d. Base station and computer (likely to use existing facility)
e. Computer terminals, maps, and weather radios in Emergency Management Agency (EMA) office (already found in existing facility).
f. Dike road closure structure information.
g. Other items as recommended by the existing EMA office.

The flood warning system will be developed in consultation with entities that are knowledgeable in the design of such systems. The system will include a plan and procedures for evacuation and dike road closure structure operations based on various flood frequencies. Provisions for emergency equipment and personnel stationing should be included in the warning system to ensure access to emergency services is efficiently allocated and utilized once road closures are in place. The flood warning system may be

fashioned after the one used along the Chemung River and its tributaries upstream from the confluence of Bentley Creek.

In the Bentley Creek watershed, rainfall and stream gages, as needed can be located on public or private lands. Easements or other arrangements will be used as needed to ensure continuous access to the gages.

Part of the flood warning system should include dam breach routings and Emergency Action Plans (EAP) on all existing high hazard dams, currently consisting of Miller Pond, Lake Ondawa and Ridgebury Lake; and all planned dikes in the Bentley Creek Watershed, currently comprised of Wellsburg and Centerville dikes.

Tributary Stabilization

Bentley Creek is plagued with having several of its tributary streams that are considered to be unstable and that introduce a large bedload of sediments into Bentley Creek. These sediments tend to settle at flow constriction points such as bridges. The capacity for flow within the channel is reduced by the settling of sediments causing increased frequency of flooding and higher maintenance costs. Four main tributaries have been identified as the largest contributors of sediment to the Bentley Creek system. The tributaries are Cowell Hill Creek, Terwiliger Creek, Justice Run and Wesleyan Church Creek. About 19,000 feet of these tributaries is to be stabilized using conventional stream rehabilitation practices. These practices include, but are not limited to stream barbs, rock sills, and root wads, which should significantly reduce the current delivery of sediments downstream. The Sponsors will be required to acquire all needed real property rights using their own resources. NRCS will provide a detailed land rights work map during design to ensure that all needed land rights are identified. All real property rights will need to be certified as acquired by the Sponsors before implementation may begin.

Dikes

Structural measures include two dikes as follows (see Figures 2 and 3):

- 4200 foot long earthen dike at Wellsburg, New York (PA-681)
- 2400 foot long earthen dike at Centerville, Pennsylvania (PA-680)

The constructed top of dike and road closure structure elevations will include freeboard (currently a minimum of 3 feet) above the 100-year flood elevation as required at the time of design.

The dikes will be NRCS Class I, high hazard. This classification is based on the potential for loss of life should the dike breach. High hazard structures are designed to the highest safety standards utilizing the latest techniques to ensure the structures will function as designed. The inundation area resulting from a breach of the dikes will not exceed what occurred prior to the dikes being placed. It is possible that a breach failure of the dike would result in a shorter warning time for affected residents to evacuate.

The Sponsors will prepare an Emergency Action Plan (EAP) for each dike. The EAP's will meet all NRCS, federal, state and local requirements.

The foundation for the dikes is largely within the coarse alluvial material prevalent in the Bentley Creek flood plain. This will necessitate that a plastic soil type (clay based) be used at the core of the dike and as fill in the cutoff trench to control seepage. This may require importing soil from off-site. The dikes are to be built such that they include the maximum freeboard specified by local, state, or federal laws or standards above the accepted 100-year flood elevation. Table 3a details pertinent features about each dike related to their length, height, top width, volume of fill, and erosion protection means. Select portions of the dikes will require rock rip rap protection along the toe where erodible Bentley Creek flow velocities are anticipated. Vegetative cover will serve where flow velocities are not as severe.

Road closure structures will be required wherever these dikes cross a road. These structures will need to be placed into operation in advance of a flood. Many designs require manual operation. The Bentley Creek watershed has a fast response to rainfall events and warning times may be short. It will be important that the design of the road closure system be compatible with the typical response time expected. Two closure structures are planned for Wellsburg, one for Centerville. Road closure operations will entail a flood

forecasting method that ties existing watershed hydrologic and climatic conditions with up to date satellite Doppler radar imagery to identify when road closure operations should be executed. The road closure system will require training of public works operators, periodic practice drills and maintenance of the gates and appurtenant structures so as to gain the experience needed to operate the gates efficiently and properly.

Upland diversions will be used to minimize water trapped behind the interior of the dike. Of particular note here is the planned diversion above Wellsburg being directed to the south crossing along a road adjacent to a cemetery before entering into Tyler Run (which is to be reconstructed along its historical path). This was deemed to be the most efficient route for the diversion during planning, since the only other viable route requires flows to be diverted to the north, descend down a steep hill, cross under state highway NY Rt. 427 and the railroad, and then empty into the Chemung River. The final route of this diversion will be determined during the design phase.

> Cultural Resource Survey - The cemetery route will require further investigation of the diversion outlet, at the time of design, to avoid adverse impacts to unmarked graves, if any.

Stormwater management ponds will be required to temporarily store trapped water arising from runoff from the land between the upland diversions and the dikes. These stormwater ponds will temporarily store runoff and release it back to Bentley Creek by gravity flow via a flap gate control structure, or other appropriate means, once the excessive creek flows have subsided.

The Wellsburg dike will require Tyler Run to be re-routed outside of the dike footprint so that water is not trapped behind the dike. The new location for Tyler Run will actually be its historic path based on historic maps of the area.

Houses in the path of the planned footprint of the Wellsburg dike may need to be acquired. Alteration of the dike alignment or the possible use of a concrete (vertical) wall may alleviate the need for removal. Final dike alignment and a cost comparison between house removal and dike modification will be used to determine the appropriate course of action during design. One home was identified during planning that is in the planned dike alignment. Since this home is within the current 100-year flood plain it would be eligible for Federal acquisition assistance.

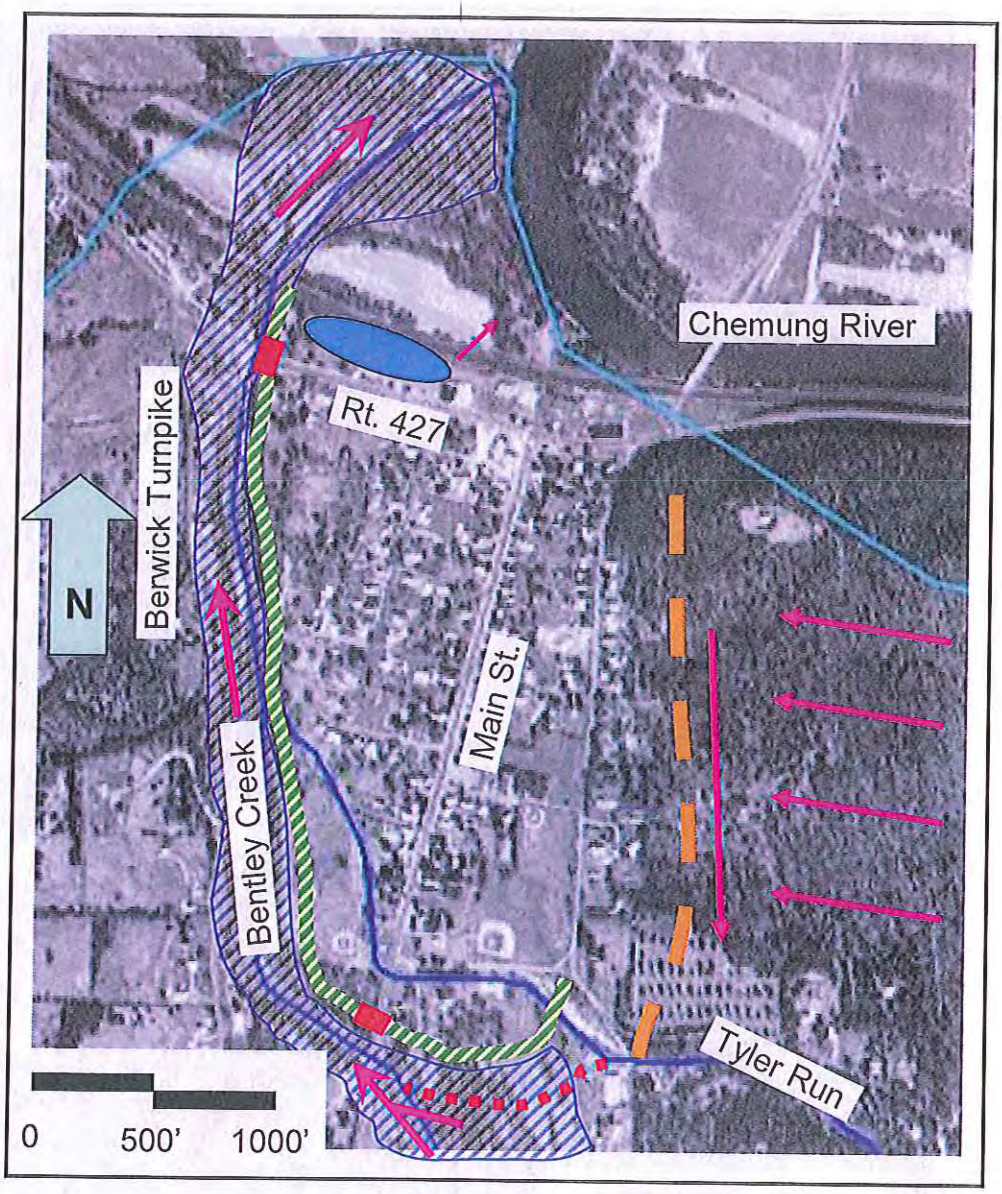
Houses on the west side of Bentley Creek that will be subject to increased flooding because of the dike must be acquired. Five homes were identified during planning that would be impacted. Two of these were not previously subject to 100-year flooding and are therefore the full responsibility of the Sponsors to acquire using their own resources. The other three homes will also need to be acquired by the Sponsors, but these homes are eligible for Federal acquisition assistance since they are part of the planned flood damage reduction measures that were developed in conjunction with the dike.

All homes acquired as part of dike implementation will be eligible for assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646. Acquired homes that do not require special considerations, such as for hazardous wastes or cultural resources, can be left for demolition as part of dike construction.

> Mitigation - One house to be removed from the floodplain in Wellsburg is eligible for the National Register of Historic Places (Birchwood Archaeological Services, 2008). Mitigation will be coordinated with the New York State Office of Parks, Recreation and Historic Preservation (NY State Historic preservation Office).

Other real property rights required for both dikes will include the dike footprints, stormwater basins, hillside diversions, Tyler Run stream reconstruction in Wellsburg and other needs identified during design. In addition, written assurances must be acquired from the railroad in Wellsburg to ensure the continued maintenance and stability of the railroad embankment. The Sponsors will be required to acquire these real property rights using their own resources. NRCS will provide a detailed land rights work map during design to ensure that all needed land rights are identified. All real property rights will need to be certified as acquired by the Sponsors before implementation may begin.

Figure 2. Wellsburg Dike (PA-681) with appurtenant structures

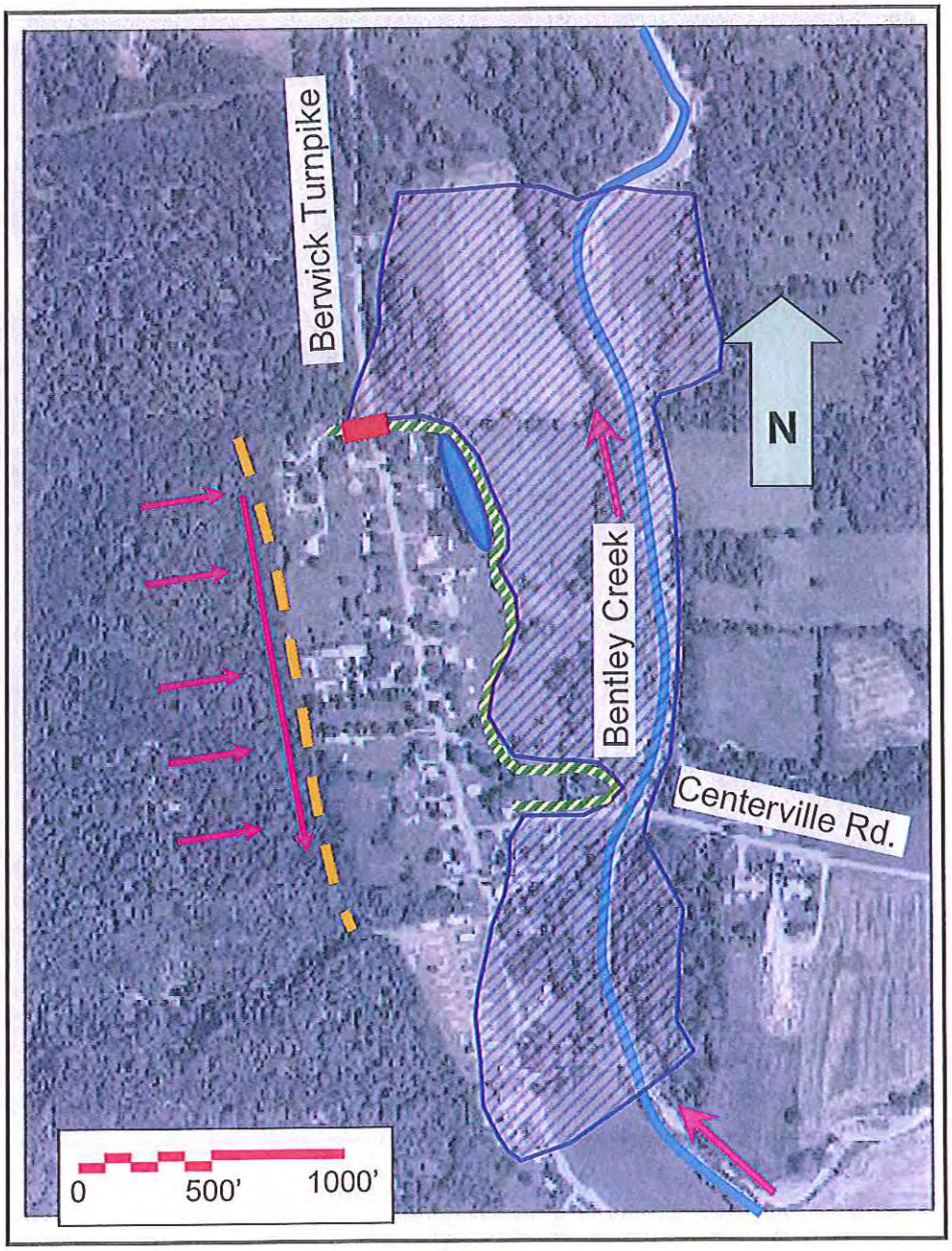


WELLSBURG DIKE

Legend:

- Earthen Dike
- Approximate 100-year flood inundation area
- Reconstructed stream
- Diversion
- Stormwater Basin
- Road Closure Structure
- Flow Direction
- Watershed Boundary

Figure 3. Centerville Dike (PA-680) with appurtenant structures



CENTERVILLE DIKE

Legend:

- Earthen Dike
- Approximate 100-year flood inundation area
- Diversion
- Stormwater Basin
- Road Closure Structure
- Flow Direction