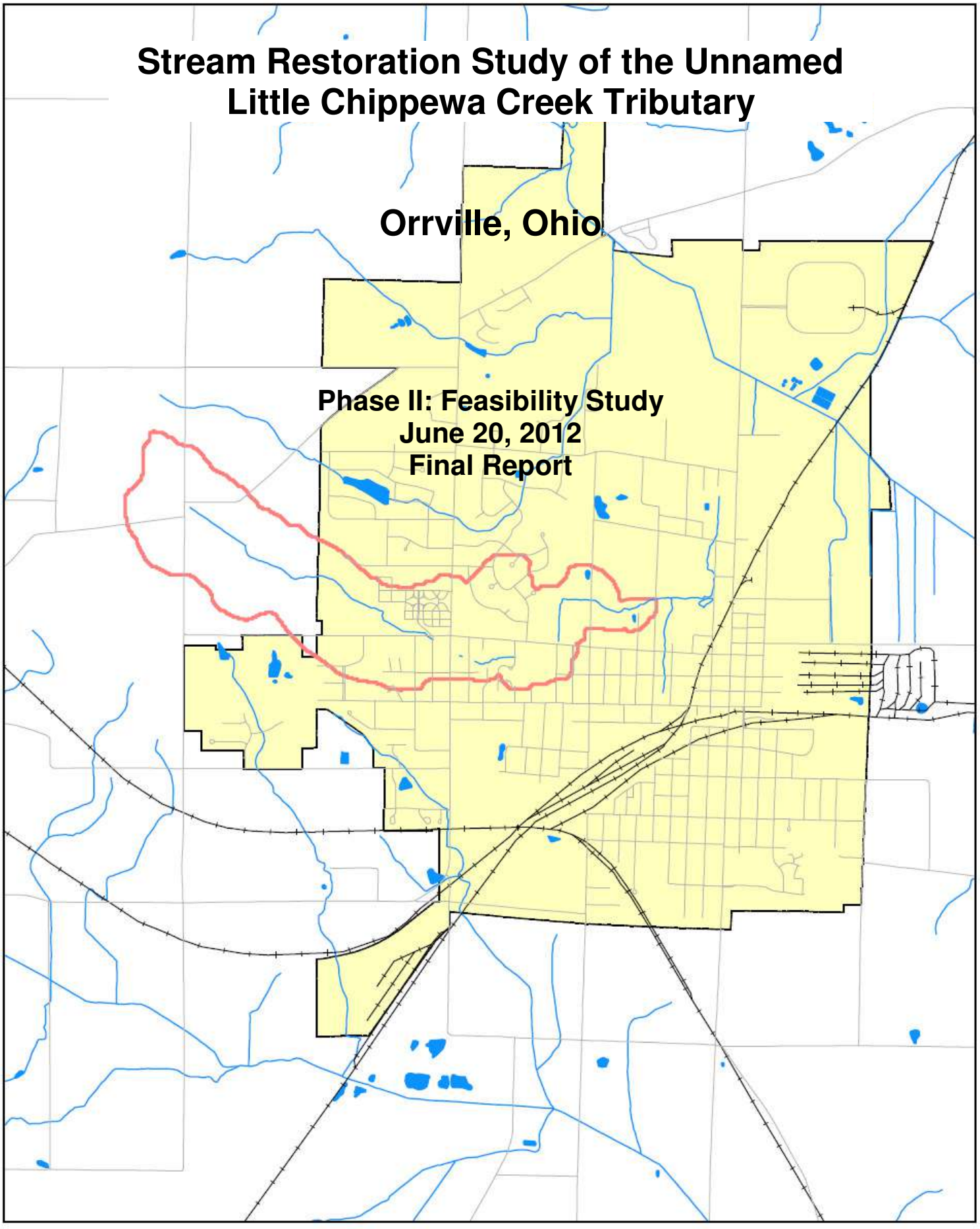
Stream Restoration Study of the Unnamed Little Chippewa Creek Tributary

Orrville, Ohio



Phase II: Feasibility Study
June 20, 2012
Final Report

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This report is the second phase of a study intended to develop a corporative approach to address the stream problems along this unnamed tributary stream to the Little Chippewa Creek. Information found in this phase of the report refers back to information contained in the *Phase I: Diagnostic Report*. It is recommended that you review Phase I before reading the information and recommendations contained in this report.

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I. Summary

- The purpose of the Feasibility Study is to develop a cooperative approach between residents, businesses, and the City of Orrville to address the stream problems along the unnamed tributary stream to the Little Cuyahoga.

- The recommendation for the stream between High Street and Ella Street is a two-stage ditch following the current path of the stream.
- Estimated cost range of the two-stage ditch is $30,900 - $40,170.
- Challenges for implementing the two-stage ditch are securing agreements with landowners, sufficient room, loss of landscape, abrupt 90 degree turn in the stream, and the likely need for a conservation easement.

- The recommended action for the stream between Elm Street and Ella Street is a stream restoration using natural channel design principles.
- The estimated cost of the natural channel design restoration is $150,000.
- Challenges for implementing the natural channel design stream restoration are costs and existing infrastructure in Orr Park.

- The stormwater basin in the Woods of Ellendale subdivision is recommended to be retrofitted to reduce the discharge from the basin during smaller storm events.
- Estimated cost of a stormwater basin retrofit is $15,000.
- Challenges for retrofitting the Woods of Ellendale stormwater basin are costs and neighborhood acceptance.

- Implementing a stormwater management program that promotes green infrastructure and protection of stream corridors and wetlands is recommended.

- Funding options include an Ohio EPA Section 319 grant, Ohio EPA Surface Water Improvement Fund (SWIF) grant, Partners in Watershed Management grant program from the Muskingum Watershed Conservancy District, and the Ohio Environmental Education Fund.

- Develop partnerships with organizations and entities that have experience in environmental education, grant writing/management, land conservation, and green infrastructure.

II. Feasibility Purpose

The overall purpose of this phase of the study is to develop a cooperative approach between residents, businesses, and the City of Orrville to address the stream related problems along this unnamed tributary to the Little Chippewa Creek. The stream issues and their causes are occurring on both private and public properties requiring understanding and cooperation among all of the watershed residents to bring about an agreeable solution(s).

The feasibility analysis is intended to utilize the information gathered in Phase I to provide recommendations on how to address the current stream problems by both the city and residents. The stream has banks that are eroding and the streambed is degrading resulting in a loss of property and the exposure of infrastructure that runs along and beneath the streambed. The majority of the documented problems are cited along the section of the creek between High Street and Ella Street, including Orr Park (Figure 1). However, the problems manifesting along this section of stream are not entirely the result of riparian management choices among the various landowners. Some of the problems are also the result of land use decisions made upstream of the impacted area as the watershed has transformed from open space and agriculture to houses and businesses.

This Phase of the report will look at options to repair and restore the tributary from High Street downstream to Ella Street. This will include restoration options, cost estimates, and various funding options available. This report will also look at options to reduce the impacts from stormwater runoff to this section of stream.

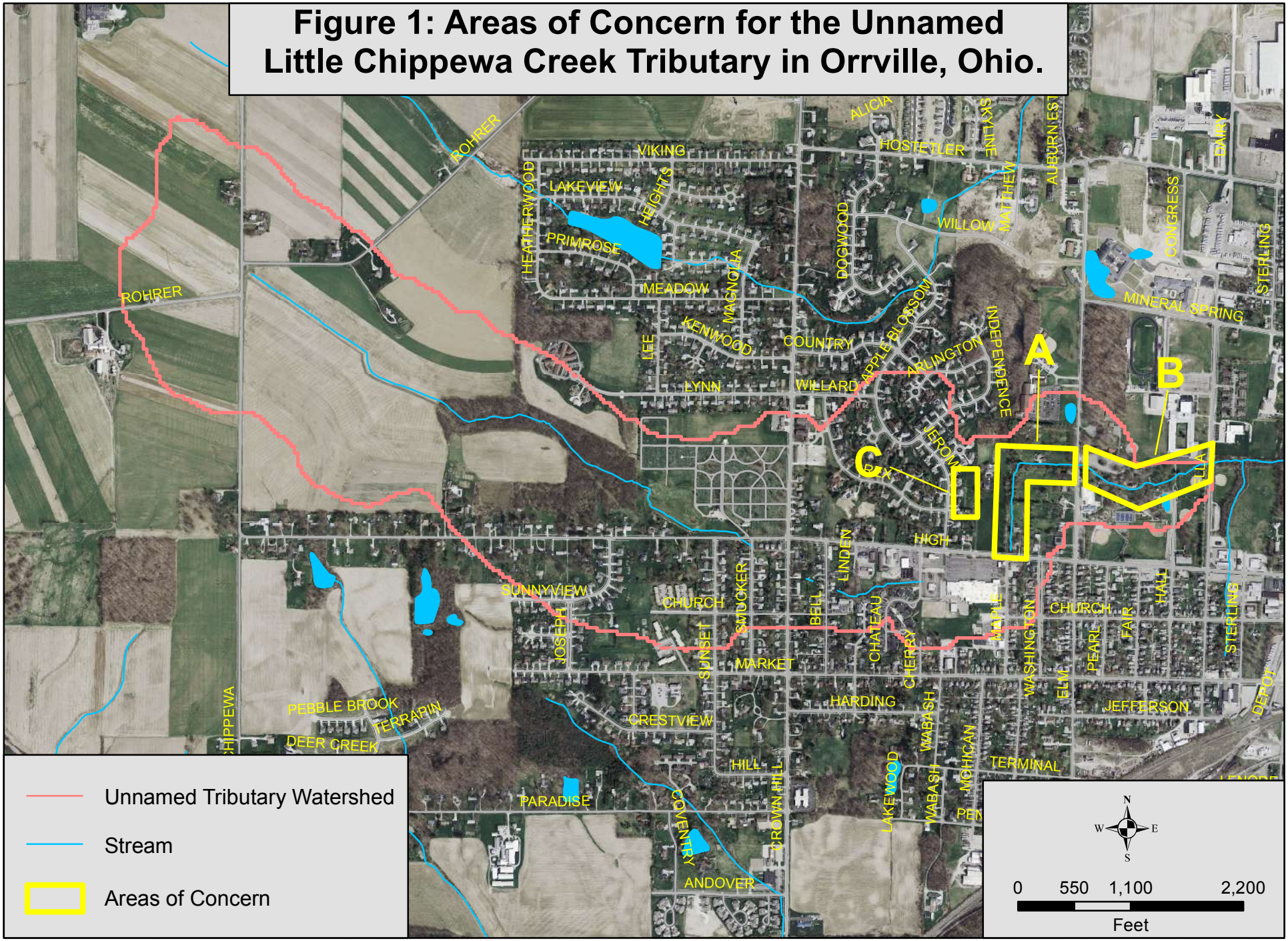
III. Recommended Restoration Plans

A. <u>High Street to Elm Street Area of Concern</u>

As shown in Figure 1, this area flows through eight residential properties. Issues along this stretch of creek include bank erosion, exposure of pipes along the stream bed, and the loss of property to stream migration. This section of stream was almost certainly channelized (ditched) at some point in the past and is now imbedded and disconnected from the floodplain. The length of this section of the stream is approximately 1,545 feet.

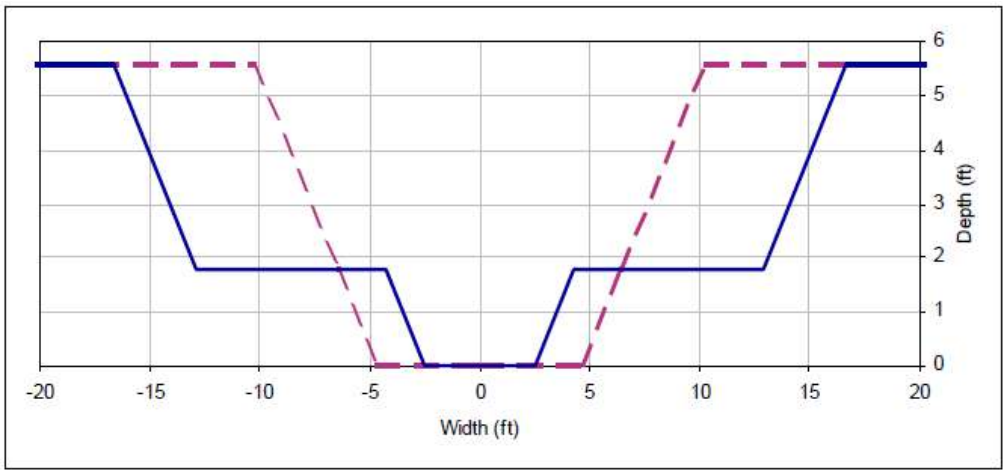
- **Restoration Needs:** The need in this section of stream is to stabilize the stream banks and bottom to prevent further property loss and damage to underlying infrastructure. The stream also needs to be reconnected to its floodplain which will allow the stream to develop stable dimension, pattern, and profile. Any restoration work should take into consideration the increase in stormwater runoff resulting from watershed development and increased impervious area upstream. Grade control also needs to be incorporated into any work to prevent further downcutting and exposure of underlying pipes. Lastly, restoration

Figure 1: Areas of Concern for the Unnamed Little Chippewa Creek Tributary in Orrville, Ohio.



efforts should, if possible, improve the aquatic habitat and water quality of the stream.

- **Recommended Action: Two-Stage Ditch**
  The two-stage ditch incorporates a floodplain by pulling back or widening the ditch at about two feet above the stream bed. This allows water to have more area to spread out and dissipate energy during high flow events. The figure below illustrates the difference between a traditional ditch (dashed line) and a two-stage ditch (blue line).



Source: Mecklenburg, 2004.

The stream between High Street and Elm Street has a similar shape as the example dashed line channel shown above. By constructing a two-stage ditch along this section of stream, the width of the stream would be increased approximately five (5) feet on each side or ten (10) feet (Mecklenburg, 2004).

A two-stage ditch when compared to a traditional ditched stream provides improved drainage, stability, and ecological functions. During normal or low flow events, the stream would be confined to the bottom portion of the ditch which is narrower and deeper than a traditional ditch bottom. This more closely resembles natural channel characteristics providing better aquatic habitat for fish and macroinvertebrates. Plus the grass on the upper or second stage of the ditch can provide shading to the stream which helps with dissolved oxygen levels.

During higher flow, the water spills out of the lower channel and into the wider upper channel, in effect acting as a floodplain. The high water once out of the lower channel slows down because it has access to a "floodplain" which decreases the power of the stream to erode the toe or bottom of the stream/ditch banks. This results in greater stability of the channel or ditch. In addition, when the water spill onto the floodplain portion of the ditch and slows down, it will also drop out the finer

sediments which will reduce nutrients and pollutants being conveyed downstream.

This option is recommended for this section of stream because the area has already been ditched resulting in an unstable situation that will continue over time. The two-stage ditch will likely follow the current footprint of the existing ditch although two-stage ditch will likely be ten (10) to fifteen (15) feet wider at the top than the current ditch. There is sufficient area along most of the stream path for a two-stage ditch and it will result in greater stability, improved drainage, and better water quality.

- **Estimated Costs: $30,900 - $40,170**
  More than 30 two-stage ditches have been constructed in Ohio, Michigan, Indiana, and Minnesota. The total cost per linear foot for these projects has ranged from $5 to $50, with an average cost of around $26 per linear foot (D'Ambrosio, 2011). The higher costing two-stage ditch projects resulted from projects on large waterways involving extensive earthworks. These values include all costs associated with design and construction.

  Applying the range costs of $5 to $50 per linear for the 1,545 linear feet of stream between High Street and Elm Street, the cost could range from $7,725 to $77,250. At the average cost of $26 per linear foot, it would cost $40,170 to construct a two-stage ditch along this section.

  NEFCO reviewed similar projects in size and scope from Ohio EPA's grant program and the Ohio State University Extension and believes the cost per linear foot for this project would fall between $20 and $26 per linear foot resulting in and estimated cost range of $30,900 to $40,170.

  Two-stage ditch designs are eligible for funding assistance through various grant and financial assistance from local, state, and federal programs. Funding options are discussed in greater detail in Section IV below.

- **Challenges of Recommend Action**
  Although a two-stage ditch is the recommended action proposed by NEFCO, there are specific challenges to implementing this restoration project beyond cost. These include:

  - Landowner Agreement – This section of the waterway is entirely on the private property of eight separate landowners. In order for any comprehensive restoration project to be completed, including a two-stage ditch, **all** landowners must agree to a specific project. If this project is the focus of a grant or other financial assistance then the

funding entity will likely require a signed agreement to be in place among all the landowners for the project to be eligible for funding.

- **Sufficient Room** – Although the vast majority of the stream section has sufficient room for the construction of a two-stage ditch, there are areas especially near High Street and Elm Street where homes, driveways, garages, and other structures are close to the current stream. These areas can likely be designed and engineered with different options, but it could add additional costs to the project. . In addition, there are sanitary sewer lines near portions of this section of the stream which might limit the course and/or width of two-stage ditch.

- **Loss of Landscape** – The construction of a two-stage ditch will almost certainly necessitate the removal of certain landscape features including established trees. New trees and vegetation can be replanted as part of the project after the creation of the two-stage ditch, but it will take years for some of the vegetation (trees) to reach the height of the current vegetation.

- **90 Degree Turn** – The current stream/ditch flow north from High Street along the back of several properties before taking a 90 degree turn to the east and heading towards Elm Street. This abrupt change in direction of the stream may require additional engineering and technology to ensure stream stability. This could increase the total project cost.

- **Easement** – If the funding for this project is going to come from a grant or other government program, the stream restoration area will likely be required to establish a conservation easement to ensure that the project is monitored and maintained properly over time. A conservation easement is a voluntary restriction placed on land to protect a resource, in this case the stream. An outside party "holds" the easement to monitor and sometimes maintain the area in perpetuity. It is likely that all landowners would have to agree to a conservation easement and then find an appropriate entity to "hold" the easements. Easements are typically held by government entities, land trusts, or other nonprofit groups.

➢ **Other Considered Actions**:

- **Natural Channel Restoration** – This is a restoration process where the stream is restored by incorporation naturally occurring stream processes resulting in stability and providing maximum water quality benefits. The stream path, floodplain, riffles, pools, and other features are designed into the restoration. The primary benefits over a two-stage ditch design are that the stream is quickly restored to natural conditions, provides improved habitat, and is aesthetically more

appealing. However, natural channel design stream restorations are significantly more expensive, take up a greater area, and can have a higher rate of failure if not properly designed. This was not considered the preferred action because of the cost and area that would be needed to complete the project.

- **Bank Stabilization** – The stabilization of banks through various means including rip-rap (rocks), concrete, bioengineering, and other methods can be useful and appropriate in certain circumstances. This would also be the least expensive way in the short term to handle the stream bank erosion issue between High Street and Elm Street. However, exclusively using bank stabilization techniques is, at best, a short-term fix and does not address the underlying issues along this section of stream – connection to an active floodplain and handling the increased water volume from watershed development. In addition these techniques, especially concrete, will amplify any stream stability issues downstream by increase water velocity. This option also does not address the downcutting of the stream bed which is exposing pipes and other infrastructure.

B. <u>Elm Street to Ella Street Area of Concern</u>

The second area of concern identified as Area B in Figure 1 is Orr Park. The stream runs through the 40 acre park for approximately 1,280 feet. Issues along this section of the stream include bank erosion, failing of past bank stabilization projects, and historic flooding at the Ella Street culvert. The erosion and meandering of the stream is a concern because of the close proximity to many of the park's amenities, including playground equipment, three foot bridges, picnic shelters, and the Rehm Gazebo.

- **Restoration Needs:** This section of stream is very visible since it resides in Orr Park. Removal of previous bank stabilization efforts in the form of concrete stream banks is needed. Not only are these aesthetically unappealing but they also impact the stability of the stream banks below the concrete slabs and provide poor habitat. Downstream of the previous bank stabilization efforts and upstream of the Rehm Gazebo, the banks are eroding and being undercut. This is an issue because of the infrastructure near (playground, picnic shelter, and parking lot) and over (foot bridges) this section of stream. Previous bank stabilization work near Rehm Gazebo is in better condition than the concrete stream banks near Elm Street, but some restoration work should be included to ensure that this area is structurally sound and stable. Lastly, downstream of Rehm Gazebo as you approach Ella Street, the stream becomes more incised and disconnected from the floodplain. Flooding has been an issue in the past at this location and restoration work needs to include reconnection of a functioning floodplain in this section of the stream.

- **Recommended Action: Stream Restoration Using Natural Channel Design Principles**

  Natural channel design is a general term used to describe stream restoration projects that restores natural channel stability and habitat to impaired streams. The restoration efforts incorporate naturally occurring stream processes which allow the stream to stabilize and provide good biological habitat for both aquatic and terrestrial ecosystems. The stream restoration designs technique uses undisturbed streams as models. Engineers take into account interactions of climate, geology, topography, vegetation, and land use when setting restoration goals.

  Essentially natural channel design engineers nature back into an impaired stream by adding natural features like bends, riffles, pools, floodplains, and streamside riparian vegetation. It is properly designed and sized for the setting it is located in to create a natural looking stable stream that provides excellent habitat for aquatic and terrestrial communities.

  This option is recommended for this section of the stream for two primary reasons. First, it is located in Orr Park. The goal of natural channel design projects is to restore a stream to its natural conditions which fits with the overall goal of a park setting. Being in a highly visible area and located near a school, this project would also provide educational opportunities for the residents of Orrville and visitors to the park. The second primary reason for selecting natural channel design stream restoration is that this section of stream has not been ditched, still has an active floodplain for most of this section of stream, and has enough room for the restoration. The downstream portion of this stream section near Ella road is disconnected from the floodplain which will also need to be addressed in the design.

- **Estimated Costs: $150,000**

  The Ohio EPA has funded 24 completed natural channel restoration projects throughout Ohio. For stream restoration projects with a watershed smaller than 5 square miles, the total cost ranged from $25 to $612 per linear foot. This section of stream is approximately 1,280 linear feet in length resulting in a potential project cost range from $32,000 to $783,360. The average cost of these projects was $120 per linear foot, which would work out to $153,600 for this section of stream.

  This section of stream, although located in Orr Park, is in the City of Orrville. Stream restorations in urban/suburban areas are generally more expensive because of existing infrastructure, utilities, and other encroachments on the stream corridor. However, a large portion of the stream is not incised and still connected to the floodplain and thus, will

require less earthmoving work. Also, the watershed area is less than one square mile making the watershed and the stream smaller than many of the projects used in determining the average cost of a natural channel restoration. Therefore, NEFCO puts a general estimate on this natural channel design stream restoration at $150,000, or a little below the average cost for restoration work completed in watersheds less than five square mile in size.

- **Challenges of Recommended Action:**
  - **Cost** – The cost of a natural channel design stream restoration is high. It is four to five times the cost of a two-stage ditch and an even greater discrepancy than bioengineered stream bank stabilization. However, natural channel design stream restorations do qualify for grant programs that can cover anywhere from 60 percent to 100 percent of the restoration costs. These are competitive grants usually on a statewide basis. More on funding options is presented in Section IV.

  - **Existing Infrastructure** – There is existing infrastructure within the stream corridor that would have to be considered with a stream restoration. Rehm Gazebo and the foot bridges in particular present issues that would have to be considered when designing the restoration. Keeping the stream in the current location around Rehm Gazebo will likely require an approach other than using a natural channel design. Also, the footbridges may need to be modified or replaced with a stream restoration project. Additional costs could be associated with designing and building around the current park infrastructures.

- **Other Considered Actions**:
  - **Bank Stabilization Utilizing Bioengineering Techniques**
    An alternative to doing a natural channel design stream restoration is to remove the existing concrete bank stabilization structures near Elm Street and stabilize the banks from Elm Street to Rehm Gazebo. The bank stabilization structures at Rehm Gazebo should be considered for replacement if deemed unstable currently or in the long-term. If this option is implemented then it is recommend that bioengineering techniques be used instead of more traditional methods of stream bank stabilization. Traditional solutions such as concrete or gabions may solve erosion problems, but are expensive and do so at the expense of habitat and streams natural beauty.

    Bioengineering uses plant materials in natural ways to reinforce and stabilize stream banks. This provides stream bank stabilization that is typically less expensive, provides better habitat, and is more natural looking than a traditional rip-rap or gabion control method. A typical bioengineered bank stabilization example is the use of dormant

cuttings like willow, shrub dogwoods, and other plants that can root easily and quickly stabilized a stream bank. More advanced and complex bioengineering solutions are also available from various companies that incorporate bioengineering principles into commercial products.

The costs associated with bioengineered stream bank stabilization are considerably less than a natural channel design stream restoration. However, this option was not recommended because bank stabilization alone would not address the stream's disconnection from the floodplain in the lower end of this section. This option also does not address the overall stability issues with the stream. In the areas were stream bank stabilization projects are installed the erosion problems would be addressed. However, stream instability could result in new areas eroding along this stream section. A natural channel design stream restoration would be designed to stabilize the whole stream system.

C. Woods of Ellendale Stormwater Basin

The Woods of Ellendale subdivision was constructed in the 1990s west of the High Street to Elm Road section of the stream. The development changed the land use from open space to a subdivision increasing the impervious or hard area on these 45 acres by 12 to 19 percent (CWP, 2003).

A detention basin, identified as Area C in Figure 1, was added to moderate the runoff from the subdivision entering the creek. The outlet was designed to allow all flow up to the 2-year storm event to pass through the basin. During heavy rains greater than the 2-year event, the basin detains a portion of the water slowly releasing it back at 14.7 cubic feet per second (cfs). The outlet pipe for the basin resides downstream of the High Street culvert located between High Street and Elm Street which is one of the areas of concern.

Although the basin does its job of preventing large flows from reaching the stream quickly, the basin does not prevent the flow of smaller storm events from reaching the stream at a faster rate and greater volume than before development. Stream flows at or near the bankfull stage do the most work in shaping the stream channel (see Phase I - Section IV). The recurrence interval of these flows is generally about 1.5 years. The detention basin was designed for a 2-year flow event, so it does not regulate the lesser bankfull flows. Therefore, the bankfull discharge will actually increase downstream of the outlet resulting in greater ability of the stream to move sediment and erode stream banks.

Using the StreamStats estimates from Table 4 in Phase I of this study for a 2-year storm event, the 14.7 cfs discharge allowed from the detention pond

outlet would be about 25 percent of the entire estimated peak discharge of 56.7 cfs. A maximum discharge of 14.7 cfs from the detention basin would be an even greater percentage of the bankfull discharge since it is less than the 2-year event.

- **Restoration Needs**
  The flow discharging into the stream from the Woods of Ellendale stormwater basin needs to be reduced for smaller rain events. Currently the basin does not regulate flow for the less than 2-year rain events. This increased flow from the basin during these smaller rain events is adding to stream stability problems occurring between High Street and Ella Street.

- **Recommended Action: Storm Basin Retrofit**
  Stormwater retrofit is a general term used to describe structural strom water management practices that are inserted into the landscape where prior control did not exist. In this case the recommendation is to retrofit the existing Wood of Ellendale dry basin to convert it into a more functional basin for smaller storm events. The goal is to maintain the original design purpose of the basin (flood control) as much as possible, while providing additional pollutant treatment and flow control for smaller storm events.

  The figure below is a general example of converting a dry detention pond into a shallow marsh stormwater wetland basin (this is not a diagram of the actual Woods of Ellendale basin).

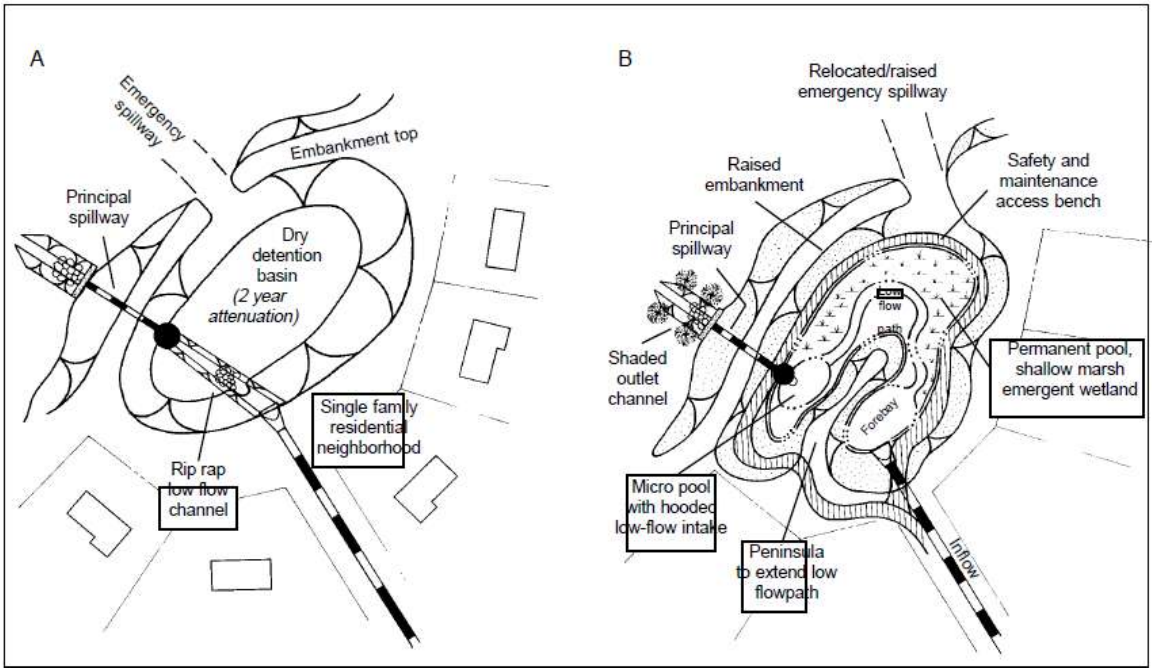


Figure 1: Existing Dry Detention Basin (A) and Shallow Marsh Stormwater Wetland Retrofit (B)

Source: Center for Watershed Protecton, 2000

The retrofit would likely involve removing the current channel in the basin, digging out a forebay at the inlet, constructing a low peninsula to extend the flow path of the stormwater for smaller rain events, installing wetland plants, constructing a pool at the outlet structure, and modifying the outlet structure for low flows. There are also other retrofit options available besides a wetland basin that accomplishes the goal of regulating small storm discharges from the detention basin while improving water quality.

This type of retrofit is generally considered to be the easiest option since the stormwater is already managed and diverted to the existing basin and the residents are already accustomed to having a detention basin in their neighborhood. Also the retrofit can be completed with minimal impacts to the surrounding environment (CWP, 2000).

- **Estimated Costs: $15,000**
  The estimated cost was determined by talking with stormwater professionals in northeast Ohio. The price is based on converting the existing dry basin to stormwater wetland basin as described above. Cost can be reduced if modifications are made just to the outlet structure and forgoing the construction of a low peninsula and the forebay. Cost could increase if the outlet structure needs to be significantly modified or replaced and/or if excavation is needed to create more storage capacity.

- **Challenges of Recommended Action**
  - **Neighborhood Acceptance** – Even though a retrofit at this location involves modifying an existing stormwater basin, it is changing it from a dry basin to a wetland or wet basin. It is likely that this will raise concerns from some neighborhood residents about mosquitoes, maintenance, children safety, and other issues. Education will have to accompany this project to properly address these concerns. The entity that owns and maintains the basin, assumed to be a neighborhood association, will have to agree to the retrofit. Neighbors that have property adjacent to the basin will also need to be met with to explain the project.

D. Watershed Program

The stream stability problems documented along the stream from Allen Street to Ella Street are in part the adjustment of the stream to the development that has occurred in the watershed over the last several years. Between 1994 and 2001 the watershed increased its developed areas while decreasing open space, forested areas, and farmland. This has resulted in a substantial increase in the stormwater runoff reaching the stream (Phase I – Table 13). The impervious or hard cover (parking lots, roads, roofs, etc.) in 2001 was 17.1 percent (Phase I – Table 14). When a watershed's impervious area climbs above 10 percent stream degradation usual occurs

(Ohio EPA, 1997). The problems associated with this unnamed tributary to the Little Chippewa Creek are largely the result of alterations to the watershed over time.

- **Restoration Needs**
  It is obviously impossible to restore the watershed to natural, pre-development conditions and often impractical to significantly reduce impervious area in a watershed. However, actions can be done within the watershed to reduce the impacts from developed and impervious areas on local waterways. This involves handling stormwater at the source instead of once it has entered a storm sewer or stream. Reducing the water reaching the stream lessens the stress on the stream and aids in stabilizing the stream ecosystem.

- **Recommended Actions: Implement a Stormwater Management Program**
  The associated impact from stormwater runoff in developed areas can be countered with a wide variety of practices, policies, and environmental education. This diversity in implementation options should allow the City of Orrville to develop a stormwater management program that fits the community's need and budget. The City of Orrville is working on revised stormwater regulations. The following recommendations are based on successful practices from other communities in northeast Ohio that could be considered by the City for the updated regulations.

  - **Promote Green Infrastructure** – Green infrastructure as used in stormwater management refers to handling stormwater at the source rather than once it has entered the storm sewer or local stream. Green infrastructure uses natural systems such as vegetation, wetlands, and open space to handle stormwater in populated areas. Green infrastructure can also be constructed or manufactured solutions like rain barrels, permeable pavement, infiltration trenches, and rain gardens. Green infrastructure provides two benefits: 1) it reduces the volume of water reaching the storm sewer or stream; and 2) most practices improve the water quality by removing nutrients and sediment from stormwater runoff.

    It is recommended that the City of Orrville develop a stormwater management program to at minimum promote and educate residents about green infrastructure. There are several established programs in surrounding counties that could be used as models. Plain Township in Stark County has an active program that promotes the installation of rain barrels and rain gardens in their community. Workshops and the installation of rain gardens and rain barrels on public lands is an effective way for a community to demonstrate these practices. Some

communities have provided rain barrels free of charge or at a reduced price as an incentive for people to establish these practices.

Another sector where green infrastructure can be effective is dealing with runoff from parking lots. Practices like bio-retention cells, porous pavement, and infiltration ditches installed in large parking lots can significantly reduce stormwater runoff into local streams and storm sewers. Reducing runoff from parking lots can be particular useful in this watershed. Upstream of the areas of concern in Figure 1, there are several large parking lots along High Street that contribute stormwater runoff to the stream. The stream is culverted under the parking area that serves the patrons of Buehler Foods and other business in this strip mall. Green infrastructure installed in this parking lot would provide the greatest benefit for the steam.

- **Review Building and Zoning Codes** – Often many established building and zoning regulations make it difficult if not forbid the use of green infrastructure practices from being established. It is recommended the current codes be reviewed and updated if needed to at minimum allow for the green infrastructure practices outline above to be installed in the City of Orrville. The next step would be incorporating these green practices into the building and zoning codes to insure future development will have minimal impact on local water resources.

- **Riparian and Wetland Setback Ordinance** – It is recommended that the City of Orrville adopt a riparian and wetland setback ordinance. A riparian and wetland setback ordinance prevents/minimizes the alteration of the riparian zone along stream segments and wetlands to ensure that functions provided by these areas are protected. The riparian zone generally covered by a setback ordinance includes the vegetative corridor adjacent to a perennial or intermittent stream. Building setbacks may be necessary to protect the riparian zone and may range from 75 to 300 feet depending on the stream's characteristics (slope, size, soil type, land use, function, etc.). Wetland setbacks are generally 75 to 120 feet depending on the quality of the wetland as determined by Ohio EPA's wetland assessment method.

The setback ordinance applies to new construction, new subdivisions and major redevelopment actions. Riparian and wetland protection programs encourage the restoration of previously disturbed areas where practical, but do not affect existing structures or uses.

Riparian zones and wetlands provide several important functions including flood control, erosion control, nonpoint source pollution control, groundwater purification, and habitat protection. Economic

benefits are realized by a community when it protects these functions and when it acts to minimize future property damage by preventing encroachment on the stream channel. Enforcement mechanisms need to be clearly developed as part of any ordinance. Over 20 cities and villages in Portage, Summit, and Stark Counties have a riparian setback ordinance in place.

- **Estimated Costs – Variable**
  The cost of developing and implementing a program can vary depending on the level of commitment by a community. There are several nearby communities who are already implementing a stromwater program that can be studied to determine the best program for the City of Orrville. Fortunately many of the implementation items within a stormwater management program can be incorporated into existing city programs and departments which can reduce the overall program costs.

- **Challenge of Recommended Actions**
  - **Riparian and Wetland Setback Ordinance** – Riparian setbacks are a very useful tool to limit future impacts on local waterway by keeping development and re-development away from local streams and wetlands. However, there are some who feel that a riparian and wetland setback is a land taking by government. In very rare cases in communities that have implemented setbacks has the ordinance resulted in a land taking. And as with any ordinance, variances can be issued in extreme cases. But overall, wetland and riparian setbacks are not seen as takings under federal and state law. Riparian setbacks are strongly validated as a simple cost-effective zoning tool to mimimize encroachment and disturbance of the connected riparian corridor (CRWP, 2006). Education and inclusion of affected landowners, developers, and other stakeholders in the process of developing the ordinance has been successful in countering most setback opposition in communities that have adopted ordinances.

  - **Voluntary Programs** – Many of the effective practices associated with a stormwater management program are based on voluntary implementation by property owners. This is particularly true when you are looking at retrofits and green infrastructure practices in areas that have already been developed. A focused education effort is needed to inform landowners why they should adopt these practices. Often incentive programs for landowners help “get the ball roll” for these projects. Implementation of these projects also requires time to take hold and succeed. One option in starting a stormwater management program in the City of Orrville is to focus initial efforts on this stream’s watershed residents as a type of pilot program. There is an obvious need for this type of program in the watershed with clear visual examples of the impact to the stream from High Street to Ella Street.

IV. Funding Opportunities

A. Ohio EPA Section 319 Grant

In 1987 the federal Clean Water Act amendments created a national program to control nonpoint source (NPS) pollution, established under Section 319 of the Clean Water Act. The Ohio EPA is the designated water quality agency responsible for administering the Ohio 319 program. Since 1990, Ohio EPA has annually applied for, received and distributed Section 319 grant funds to correct NPS pollution caused water quality impairment to Ohio's surface water resources. Section 319(h) implementation grant funding is targeted to Ohio waters where NPS pollution is a significant cause of aquatic life use impairments. The cornerstone of Ohio's 319 Program is working with watershed groups and others who are implementing locally developed watershed management plans and restoring surface waters impaired by NPS pollution.

Eligibility*: Section 319 grant funding is available statewide to local watershed groups, land conservancies or trusts, nonprofit organizations, units of county, municipal and township governments, park districts and other local land managing agencies, soil and water conservation districts, conservation organizations and others. In limited instances, Section 319(h) grants may be awarded to state agencies with land management responsibilities or state universities.

Award Amount*: Up to $350,000

Local Match Requirement*: 20% of the Total Project Cost

Fundable Projects*:

- Stream Restoration and/or Dam Removal/Modification Projects
- Wetland Restoration and/or Renaturalization
- Innovative Stormwater Demonstration Projects
- Inland Lake Management and Restoration
- Agricultural Best Management Practices and Projects
- Acid Mine Drainage Abatement and Abandoned Mine Land Reclamation Projects
- Riparian Restoration Projects
- Riparian and Wetland Protection and Conservation Easement Projects

* Information based on the Ohio EPA's 2012 Section 319 Request for Proposals (RFP). This information could change for the next RFP.

B. Surface Water Improvement Fund (SWIF) Grant

The Surface Water Improvement Fund was created in 2008 and authorizes the Ohio EPA to provide grant funding to applicants such as local governments, park districts, and conservation organizations. During

2012, it is expected that approximately $1 million will be available for statewide Surface Water Improvement Fund grants. SWIF grants are targeted to Ohio waters where nonpoint source pollution is a significant cause of aquatic life use impairments. Projects that eliminate such impairments and/or that restore impaired waters will score significantly higher in the review process and receive more favorable consideration.

Eligibility*: The following entities are eligible to receive grant funding from the Surface Water Improvement Fund:

- Local municipalities, counties and townships
- County and municipal park districts
- Soil & water conservation districts
- 501(c)(3) nonprofit conservation groups with land management responsibilities
- Watershed groups (with local government sponsorship)
- State agencies with land managing responsibilities

Award Amount*: Up to $100,000

Local Match Requirement*: No local match required, but projects providing local match will score higher.

Fundable Projects*:

- Stream restoration and re-naturalization
- Riparian restoration and protection
- Wetland restoration and protection
- Innovative stormwater demonstration
- Inland lake management and restoration
- Highly targeted agricultural BMP demonstration projects

* Information based on the Ohio EPA's 2012 Request for Proposals: Surface Water Improvement Fund Grants. This information could change for the next RFP.

C. <u>Partners in Watershed Management Grant Program</u>

The Muskingum Watershed Conservancy District (MWCD), in an effort to support the work of agencies and groups involved in conservation programs, water quality issues, and flood reduction and mitigation projects, has developed the "Partners in Watershed Management" Project Assistance Program. This program provides assistance to local communities, agencies and groups involved in projects and programs that support the conservation and flood control aspects of the Mission of the MWCD. This program reimburses recipients up to 100% for project costs.

Eligibility: Political subdivisions of the state, IRS Section 501 groups, and other organizations involved in programs or projects related to watershed management and water

quality improvements in the Muskingum River watershed, are eligible for potential assistance through this program. Eligible costs include design and engineering, project or program specific labor, special service contracts, equipment rental, materials and supplies, and land acquisition if for conservation and/or flood control purposes.

Award Amount: No Set Limit

Local Match Requirement: No local match required, but projects providing local match will score higher.

Fundable Projects: Any project that promotes and supports the conservation and flood control aspects of the Mission of the MWCD. Projects previously funded include:

- Watershed Management Plan Development
- Conservation Corridor Parcel Acquisitions
- Flood Mitigation Projects
- Stormwater Retention Basin

D. <u>Clean Ohio Fund – Green Space Conservation</u>

The Clean Ohio Fund was approved by voters in 2000 and 2008. It provides for competitive funds from a statewide bond program which serve to preserve greenspace, retain farmland, create recreational trails and clean up brownfields and return them to productive use. The City of Orrville has utilized this funding source for Orr Park Annex Stream Restoration and Walking Trail Extension that was completed in 2006. Clean Ohio Fund money can be used to preserve and restore riparian (streamside) corridors.

If funding for the Clean Ohio Fund is appropriated in Ohio's budget, there are nineteen Natural Resources Assistance Councils (NRACs) that are responsible for approving projects to send to the Ohio Public Works Commission. Wayne County is in NRAC District 16 and all project applications are rated and ranked against others in the NRAC District. The most competitive applications will receive funding. Each NRAC establishes selection methodology tailored to the region.

Eligibility: Eligible applicants include county, municipal corporation, township, conservancy district, soil and water conservation district, joint recreational district, park district/authority, nonprofit organization and possibly others to be determined by the Director of the Ohio Public Works Commission.

Award Amount: Variable

Local Match Requirement: At least 25% of Total Project Cost

Fundable Projects:

- Protect habitat for rare, threatened or endangered species;
- Preserve high quality wetlands and other scarce natural resources;
- Preserve streamside forests, natural stream channels, functioning floodplains, and other natural features of Ohio's waterways;
- Support comprehensive open space planning;
- Secure easements to protect stream corridors, which may be planted with trees or vegetation to help reduce erosion and fertilizer/pesticide runoff;
- Enhance eco-tourism and economic development related to outdoor recreation in economically challenged areas;
- Provide pedestrian or bicycle passageways between natural areas and preserves;
- Reduce or eliminate nonnative, invasive plant and animal species;
- Provide safe areas for fishing, hunting and trapping in a manner that provides a balanced eco-system.

E. <u>Ohio Environmental Education Fund (OEEF)</u>

The OEEF was created by the General Assembly in 1990 to enhance Ohio citizens' awareness and understanding of environmental issues. It is administered by the Director of the Ohio EPA and provides approximately $1 million annually in grants to support environmental education efforts within the state of Ohio. The OEEF derives its monies from one-half of the civil penalties collected from violations of Ohio's air and water pollution control regulations.

The OEEF funds education projects that target three audiences: (1) pre-school through university students and teachers; (2) the general public; and (3) the regulated community. OEEF supports innovative projects that increase public awareness and knowledge about environmental issues, and provide the skills to make informed decisions and take responsible actions. Funding from OEEF could be used to implement portions of a stormwater program in the City.

Eligibility: Any organization based in Ohio (e.g., public or private, tax-exempt or proprietary associations, formal or non-formal educational) that holds a federal tax ID number is eligible.

Award Amount: $500 - $5,000 for Mini-Grants
Up to $50,000 for General Grants

Local Match Requirement: 10%, but applications with higher local match will be awarded extra points.

Fundable Projects: OEEF's 2012 educational priorities in are:

- Compliance Assistance;
- Community Issues;
- Environmental Public Health;
- Standards-Based Education;
- Career Development; and
- Environmental Sustainability.

F. Other Funding Options

Options presented above are the funding sources that have been utilized most often for stream restoration, environmental education, and stormwater management programs in Ohio. However, there are several local, state, and federal programs that could be utilized to assist in funding watershed work along the unnamed tributary to the Little Chippewa Creek and other areas in the City of Orrville. Some of these options include:

- **Stream Mitigation Project**
  Stream mitigation is a process where an entity that has to disturb a stream for development, road construction, or other reasons can offset that loss by paying for a stream restoration or enhancement project at another location near where the stream is being disturbed. Stream mitigation can be used to help fund portions of this project. However, it is often difficult to predict when this funding might be available. Also, entities needing stream mitigation work prefer projects that are ready or nearly ready to break ground. The Wayne County Engineer and the Ohio Department of Transportation District 3 could be contacted to see if there are any current or future road construction projects in need stream mitigation projects.

- **Stormwater Utility**
  A stormwater utility is a means to provide a consistent, predictable, long-term revenue source to manage and improve a community's stormwater system. Typically a fee is assessed to each property owner based on the amount of impervious (hard) surface on each property. The fee is generally a couple of dollars per month for residential properties, but it is higher for industries and businesses that contribute more runoff. The money collected is used by the community to deal with stormwater infrastructure problems, flooding, erosion, and other impacts from stormwater. Political considerations and economic conditions may prevent a stormwater utility from being established in a community.

- **Ohio EPA Water Resource Restoration Sponsorship Program (WRRSP)**
  The WRRSP is a program through the Ohio EPA Department of Environmental and Financial Assistance (DEFA) that can finance the planning and implementation of projects that protect or restore water resources. The money becomes available when a wastewater treatment plant uses a DEFA loan to finance a project. DEFA reduces the rate of these loans if the treatment plant sponsors a water resource restoration project. An entity must submit a nomination for a project to be considered for funding that year, and the project must be ready to proceed to construction during the year. Any project funded by the WRRSP will require property use restrictions and will need to develop a management plan to insure the long-term stewardship of the project.

  The WRRSP project can fund up to 100 percent of the project cost. This is a very popular and competitive statewide program. Natural channel design and stream bank stabilization are eligible for funding under this program, but it is likely that it would not rate high enough to receive funding in most years even if a sponsor is secured.

V. Partnerships and Assistance

The overall purpose of this phase of the study is to develop a cooperative approach between residents, businesses, and the City of Orrville to address the stream problems along this unnamed tributary stream to the Little Chippewa Creek. Assistance and partnerships with other organizations and businesses may help in completing this goal. The entities below have experience in implementing projects that deal with stream restoration, land owner education, grant management, and/or land conservation.

A. Wayne Soil and Water Conservation District (SWCD)

The Wayne SWCD is a political subdivision of the State of Ohio, Department of Natural Resources, Division of Soil and Water. Each one of Ohio's 88 counties has a local office. The Wayne office was established by local election of the populace in 1947. The Wayne SWCD provides programs and services for agricultural practices, stormwater management, and environmental education. The Wayne SWCD could assist with environmental education efforts in implementing stormwater management programs. The SWCD might be able to provide assistance for other aspects of the project once a course of action has been selected.

B. Northeast Ohio Four County Regional Planning and Development Organization (NEFCO)

NEFCO was formed in 1974 as a regional council of governments by the elected officials within Portage, Stark, Summit and Wayne Counties. NEFCO was created as a voluntary organization to enable local officials to discuss problems facing the Region and to develop strategies to cope with them. NEFCO also serves as a forum through which local, state and federal planning programs can be more effectively coordinated. NEFCO's primary purpose is to serve the county, city, village and township governments, and the citizens within the four-county area. On behalf of these local units of government, NEFCO produces a series of studies or plans supporting the local plans in order to help maximize the return of federal tax dollars to the Region.

NEFCO has been doing watershed planning since the 1980s. NEFCO has experience in developing action plans, grant management, public outreach, mapping, and coordinating stakeholders in addressing specific issues. NEFCO could assist in implementing any proposed action that is determined to be needed by the City of Orrville and the residents along the creek. However, because Wayne County and the City of Orrville are no longer dues-paying member to NEFCO, the rate for services from NEFCO would be at a non-member rate.

C. Western Reserve Land Conservancy (WRLC)

The Western Reserve Land Conservancy is a nonprofit conservation organization dedicated to preserving the natural resources of northern Ohio. It works with landowners, communities, government agencies, park systems and other nonprofit organizations to permanently protect natural areas and farmland. Its primary tool is the conservation easement, which allows property owners to permanently preserve their land without surrendering ownership. This protection remains with the land, even if it is sold. Once a property is permanently preserved with a conservation easement, the WRLC ensures it remains protected.

The WRLC region includes Wayne County. They might be able to assist the City and/or residence if a conservation easement is needed to protect the riparian (streamside) corridor of the unnamed tributary through private property. They also have experience in small urban stream restoration projects in the City of Akron.

D. Private Consultants Firms

There are several private consulting firms that can assist with implementing the recommendations above. Although a specific firm is not recommended, if this is the direction chosen by the City and/or landowners, it is recommended to use a firm with experience in the type of

recommendations listed in Section III. There are several consulting firms that have experience in natural channel design, green infrastructure, stormwater basin retrofits, and/or other bioengineer techniques that would be beneficial for this section of creek.

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