

## Upper Latrobe Passive Treatment System Loyalhanna Watershed Association

### Construction Narrative and Bid

**July 24, 2009**

#### Project Overview

Founded in 1971, the Loyalhanna Watershed Association (LWA) strives to achieve its mission to protect, conserve, and restore the natural resources of the Loyalhanna Creek Watershed. Comprised of over 2,500 miles of waterways draining 300 square-miles of land, the watershed flows from its headwaters on Laurel Mountain to Saltsburg, Westmoreland County. Four major divisions of LWA's activities include water protection, land conservation, environmental education, and community outreach. Specifically, LWA is extremely active in addressing environmental issues through developing restoration plans for impacted waterways, offering educational opportunities for area residents, maintaining recycling programs and clean-up efforts in the community, and implementing projects to restore streams damaged by erosion and abandoned mine drainage (AMD) pollution.

This project involves the construction of a passive treatment system for a deep mine discharge flowing from a well installed several years ago. The AMD discharge is located on property owned by the Loyalhanna Watershed Association in Unity Township, Westmoreland County, PA. The project site is flat wooded ground adjacent to Loyalhanna Creek. The discharge currently flows from the well and down a ditch to a pond installed five years ago to provide partial treatment of the discharge. The treatment system will be substantially enlarged so that the full flow of mine water (up to 500 gpm) can be passively treated.

The water is alkaline and contaminated with 45-50 mg/L iron (Fe). The treatment system will function by aerating and retaining the mine water so that dissolved iron will oxidize to form an iron solid and settle in three ponds and a large constructed wetland. The system's installation includes the following components:

1. An access road will be constructed between the project area and Center Drive.
2. The project site will be cleared, grubbed, and approximately 14,550 CY of excess cut will be removed.
3. The water will be collected from the existing discharge pipe and split into two flows that are piped to Ponds A and B.
4. Water will discharge from Ponds A and B and flow through multiple troughs to Pond C.
5. Ponds A, B and C will be lined with a 60-mil HDPE textured liner.
6. Water will discharge from Pond C through multiple troughs to a constructed wetland.

7. The wetland will be sealed with a geosynthetic clay liner and covered with 12 inches of soil.
8. The wetland will be planted with a variety of native wetland plants.
9. The wetland will discharge through an existing inlet control structure to Loyalhanna Creek.

#### Project Management

LWA is the property and project owner and is the recipient of all project funding and holds all project permits. The project engineer and project manager is Iron Oxide Recovery, Inc (IOR). IOR developed the treatment system design, filed the permit applications, and will monitor construction activities. A contract will be established between IOR and the Prime Contractor. All invoices will be paid by IOR. All project modifications and change orders must be approved by IOR.

#### Project Website

The construction documents and information regarding the project and bidding process are available at <http://www.hedinenv.com/latrobe.htm>.

#### Project Permits

Applications have been submitted to Westmoreland Conservation District for a construction NPDES permit and to Unity Township for a Grading permit. The Erosion and Sediment Control Plan is under review by the WCD. It is anticipated that all approvals and permits will be obtained by September 1, 2009.

#### Road Bonds

The Contractor is responsible for securing all road bonds necessary to complete the project.

#### Prevailing Wage

This project is funded by a grant from the PADEP and is subject to prevailing wage regulations. The project is registered with the Department of Labor and Industry. A link to the approved wage rates is available at the project web site.

#### Payment Procedures

The Contractor will prepare monthly invoices that show charges against project tasks shown in the bid document. The invoice will show for each bid item: 1) the total value contained in the bid; 2) the amount previously invoiced to this task; 3) the current charge to this task; 4) the remaining funds for the task, and 5) percent completion of the task. Any approved modifications to the project will be added to the budget document as a new payment item. A copy of each invoice should be submitted to IOR for review and approval. The approved invoice will be submitted to LWA for payment processing.

The project is funded by a PADEP Growing Greener grant. PADEP has provided working capital that is replaced by a reimbursement process. The reimbursement process generally takes 6-10 weeks. The Contractor should consider this delay in invoice payment when developing his bid.

### Project Closure

PADEP withholds the final 10% of project funds until an authorized DEP employee has inspected the project and approved its completion. IOR and LWA will withhold the Contractor's last 10% of payment until this approval is received from PADEP. It is anticipated that when the Contractor, IOR and LWA are all satisfied with the project's completion, a meeting will occur with the PADEP to request closure of the construction portion of the project. The Contractor should consider that competency of the system's features may not be assessable until the system has operated for at least one month. It is likely that the final 10% of the contract will not be paid for 3-4 months after completion of construction activities.

### Project Schedule

The Project must be initiated as soon a contract is signed and all permits and approvals are received. Completion of the project by June 30, 2010 is mandatory. A schedule work schedule should be developed and provided to IOR and LWA before starting the project the ensure coordination with LUPRD on Task E detailed in Construction Narrative.

### Construction Plans

The construction plans are shown on sheets 1, 2, 3, and 4. The plans were developed on 1" = 40' and 1' contour elevation mapping developed by the Natural Resource Conservation District. The plans were developed using AutoCAD and a DWG file will be provided to the contractor upon request.

### Construction Narrative

The construction Narrative is attached. The construction narrative is broken down into work items that mirror the bidding document and the materials list.

## Construction Narrative

### Mine Discharge Management During Project

The discharge currently flows from a valved borehole into a channel that discharges into a settling pond that discharges to Loyalhanna Creek through a water flow control box. During the project construction, the discharge must remain flowing at its current rate through the current discharge point to Loyalhanna Creek. The contractor is free to use ditches, pipe, or hose to assure that the discharge is transferred to the discharge location during the project. During critical times where the discharge will impede work progress, the borehole valve may be shut off for a period of time not to exceed 48 hours during any 96 hour period of time. Pipe that was used to transfer the discharge directly to the pond is on site and may be utilized by the contractor. This pipe must be removed from the site during final cleanup activities. The cost to manage the water should be incorporated into Item H, Water Transfer Infrastructure.

### Task A: Mobilization and Demobilization

The contractor will be paid 80% of Item A upon substantial mobilization into the project and 20% upon complete demobilization.

### Task B: Erosion and Sediment Controls

The Erosion and Sediment Control plan is shown on sheets 3 and 4. The Plan must be implemented as shown before earth disturbance activities begin. The E&S controls should be inspected weekly and after each rainfall event to insure that they are functioning as intended. Repairs and/or replacements will be made as necessary. The contractor will be paid 80% for installation of E&S control measures and 20% for their satisfactory removal.

### Task C: Access Road Construction and Maintenance

Access to the project site will be off of Center Drive (TR 896). The first 320 feet of road will be placed within a 25' wide right-of-way owned by Barmah Co. (Harry Ridilla). The road will then be constructed on Barmah Co. property for an additional 550 feet. The additional 550 feet of road will pass behind the Barmah building through an empty lot to a point behind a gated road on Richard Ridilla property. Total length of new constructed road will be approximately 870 feet in length and 15 feet in width. The access will then continue onto an unimproved road located on Richard Ridilla and LWA property as shown on sheet 1 of the plans.

The new 870 feet long access road will be constructed as follows. The portion covering the 320 ft right of way shall be constructed upon existing soil with the use of 15 ft wide road fabric excepting the first 50 feet of road entrance. The first 50 ft of access road shall be excavated 20 inches in depth and filled with sandstone pit rock to grade. AASHTO #1 aggregate shall be placed on the surface at a depth of 6 inches to serve as a rock constructed entrance as required by the E&S control plan. Once the fabric is placed, the remaining 270 ft of the road within the right-of-way shall have 15 ft wide road fabric

placed upon the soil with 20 inches of sandstone pit rock placed covering the fabric. The sandstone pit rock shall be graded and tracked in with a track machine to produce a smooth road surface. Two sewer manholes have been located within the right of way. Manhole riser rings are to be used for the purpose of raising the elevation to equal the new road surface. At no time shall manholes be buried beneath the road surface. Trees and branches overhanging the road shall be removed from the right of way, as minimally as possible. A security gate and a 12' diameter HDPE, smooth-bore corrugated culvert pipe will be installed as shown on sheets 1 and 3 of the plans.

The remaining 550 ft of road shall have 20 inches of sandstone pit rock placed upon the existing land surface. The sandstone pit rock shall be graded and tracked in with a track machine to produce a smooth road surface. Once the amount of sandstone has been applied, 125 tons of Type A 2A crushed aggregate shall be tailgated to the surface to provide a smooth drive surface. The 125 tons is equivalent to 2 inches of material. One load of Type A 2A aggregate must be stockpiled on site to help maintain a smooth road surface to allow for safe travel of passenger vehicles. The Contractor is responsible for dust control and mud removal from Center Drive.

The road surface must be maintained in order to provide a smooth driving surface while trying to help control dust and mud from leaving the site. Repairs to the road shall be made when the need arises to prevent potholes from developing and to prevent excessive dust from becoming airborne and polluting the neighborhood. At no time shall mud be tracked out onto Center Drive. In the event the rock cleaning pad becomes clogged with soil the rock must be removed and replaced with new AASHTO #1 aggregate. In addition, the shoulder of Center Drive across from this new access road will be protected by placement of a 4 x 50 ft strip of Type A 2A sandstone at a depth equal to existing road surface as shown on sheet 1 of the plans.

#### Task D: Clearing/Grubbing/Demolition

The project area will be cleared and grubbed. Brush and stump disposal areas are shown on Sheet 2. The maximum height of the brush and stump disposal area is 10 ft. The available disposal areas are not large enough to accommodate the trees and roots so that a portion of the woody vegetation will need to be removed from the site or chipped with the chips being placed in the stump disposal areas. If burning of wood waste is preferred the contractor must secure permission from the Unity Township officials. Any value realized by the contractor for the removal of logs or chips from the site should be reflected in the bid on this item. All woody wastes removed from the site must be disposed of in a manner approved by IOR and the WCD.

There is an existing concrete structure in the project area that must be demolished. All demolition wastes must be removed from the site and legally disposed of.

#### Task E: Excess Cut Removal

The project has a calculated net cut of 14,550 CY. This value is calculated from the difference of current conditions (using the existing survey) and final grades. The value does not include a swell factor. The calculated value includes stumps and roots, which

will be removed during grubbing activities. All of the excess cut must be removed from the project area.

The soils at the site have been characterized through the excavation of several soil pits. The soils were uniformly silty clays with few stones larger than 2 inches. Analyses of several soils samples collected from the soil pits are attached. The soils are considered by the Owner to have value and it is anticipated that the Contractor will use the income produced from the excess soil to adjust his project bid.

A portion of the excess cut will be provided by LWA to the Latrobe Unity Parks and Recreation Department (LUPRD). The contractor shall provide LUPRD with excess cut that is of typical quality of the material produced at the site. The contractor will load triaxle trucks provided by the LUPRD. Notice of when loading can proceed should be given to IOR and LWA based upon construction schedule.

The disposal of the remainder of the excess cut is the responsibility of the Contractor. The disposal of the excess cut must be in an environmentally suitable manner. The contractor's plan for off-site disposal or storage of the excess cut must be approved by the WCD. The costs associated with any permits or approvals necessary for the off-site storage are the responsibility of the Contractor.

If the Contractor temporarily stores the excess cut in the project area, all storage areas must be protected with appropriate erosion and sediment controls at the responsibility of the Contractor.

The LUPRD is permitted to take as much as 8,000 CY of excess cut. In Item E, provide the bid price for assuming that either 4,000 CY or 8,000 CY of the excess cut is loaded onto LUPRD trucks and the remaining excess cut is handled by the contractor.

#### Task F: Pond Earthwork

Ponds A, B, and C will be constructed as shown on the construction drawings.

#### Task G: Pond Liners

Ponds A, B and C will be lined with a 60-mil HDPE rough texture liner. The liner will be keyed into surrounding berms by extending the liner 1 foot higher than designed water level with an additional 3 ft of excess material folded into a shallow trench and buried within the berm while maintaining 1 ft between top of exposed liner and design water level.

#### Task H: Water transfer infrastructure

This item includes all pipes, troughs, and spillways that transfer water within the system. Presently the mine discharges via a borehole in the southern portion of the site. The borehole is equipped with a 6 inch valve and 6 inch Schedule 40 PVC discharge pipe. All proposed plumbing to convey the discharge to the treatment system, which begins immediately downstream of the existing valve, will be 8 inch diameter Schedule 40 PVC

pipe. Pond 1 and Pond 2 will each have an 8 inch pipeline and 8 inch Valterra gate valve to supply mine water. See sheet 4 for details.

Flow distribution into Ponds 1 and 2 will be achieved by the installation of a field perforated 8 inch PVC Schedule 40 pipe set level on grade which terminates in an upturned elbow. The invert of the upturned pipe will be higher in elevation than the top of the perforated pipe so that the pipe is fully flooded at all times and so that the majority of the discharge flow will enter the pond via the perforations. IOR staff will determine the number, diameter and spacing of the perforations in the field. For bidding purposes, assume 5/8 inch diameter holes at one foot spacing.

Flow into Pond 3 and the Constructed Wetland will be via transfer troughs (see detail on sheet 4). The transfer troughs will be constructed of vinyl sheet pilings installed horizontally on the surface so that their profile forms a channel. The pilings will be set on compacted aggregate and secured with poured concrete. The pilings must be connected to the pond liners with a permanent water tight seal.

The final discharge from the system will utilize the existing water level control structure and plumbing in the existing pond. The structure and pipe should be cleaned out so that there are not obstructions and it functions as intended.

An emergency spillway will be installed in the constructed wetland at the location of the current degraded spillway. See sheet 2 for location of the spillway and sheet 4 for spillway details. Materials that exist in the current spillway may be utilized by the contractor for the new spillway construction.

#### Task I: Wetland Earthwork

The constructed wetland will be installed as shown in Sheets 1 and 2.

#### Task J: Wetland Liner

A geosynthetic clay liner will be installed beneath the wetland. The liner will be Akwaseal geosynthetic clay liner or equivalent (with approval from IOR). The wetland will be over excavated by 12 inches to allow for the placement of the liner and the eventual replacement of 12 inches of soil on top of the liner. Once the 12 inches of soil has been removed from bottom of wetland, the bottom shall be graded and compacted with a smooth drum roller to provide for a flat rock free subgrade for the liner. No sharp objects shall protrude from the bottom that could damage the liner.

The liner should extend up the wetland internal berm and terminate 1 foot above the design water level (sheet 3).

Once the liner has been placed it should be covered with 1 foot of soil. Care shall be taken to prevent damaging the liner when spreading the soil. The liner will be installed in a manner consistent with the manufacturer's specification.

**Task K: Wetland Planting**

The wetland will be planted at 2.5 ft intervals with bareroot or potted plants listed in table 1. No individual species may account for more than 25% of the total mixture. At least eight species will be planted. The entire wetland will be seeded with an obligate wetland seed mix suitable for western PA. The seed mix should be equivalent to Ernst Conservation Seeds Obligate Wetland Mix ERNMX-131 and the seeding rate should be 15 lb/acre.

The wetland seeding can occur as soon as the wetland substrate is suitable. The wetland planting should only occur between April 1, 2010 and June 30, 2010. In the event that the treatment system is completed in fall 2009 but wetland planting is delayed until spring 2010, then payment for Task K will be withheld until planting is completed.

**Table 1. Planting Specifications for LWA Latrobe Constructed Wetland**

| Surface Area           | Plant Spacing | Total Needed  | Plant choices  |
|------------------------|---------------|---------------|--|
| 88,251 ft <sup>2</sup> | 2.5 ft        | 14,120 plants | <i>Typha latifolia</i> or <i>T. angustifolia</i> (Cattail)<br><i>Scirpus validus</i> (Soft Stem Bulrush)<br><i>Leersia oryzoides</i> (Rice Cutgrass)<br><i>Sparganium americanum</i> (Lesser Burreed)<br><i>Pontederia cordata</i> (Pickerelweed) <i>Peltandar virginica</i> (Arrow Arum)<br><i>Scirpus validus</i> (Softstem Bulrush)<br><i>Alisma plantago aquatica</i> (Water Plantain)<br><i>Carex stricta</i> (Tussock Sedge)<br><i>Sagittaria latifolia</i> (Duck Potato)<br><i>Scirpus cyperinus</i> (Woolgrass)<br>No single species comprising more than 25% of total |
| <b>Wetland Seeding</b> |               |               |  |
| 88,251 ft <sup>2</sup> | 15 lb/ac      | 30 lb         | Obligate wetland seed mix  |

Task L: Sludge Basin

The sludge basin will be installed as shown on sheet 2.

Task M : Seeding and mulching

All disturbed areas should be graded to a condition suitable for public use, seeded and mulched per the following rates.

|                       |   |
|-----------------------|---|
| Straw Mulch           | 2.5 tons/acre or 100 bales/acre. Must use chain flail mulcher or mulched by hand if using square bales. No mulcher with knives can be used. |
| Fertilizer (10-20-20) | 400 lbs/acre  |
| Perennial Rye Grass   | 10 lbs/acre   |
| Red Fescue Grass      | 10 lbs/acre   |
| White Dutch Clover    | 5 lbs/acre  |
| Crimson Clover        | 5 lbs/acre  |
| Birdsfoot Trefoil     | 3 lbs/acre  |
| Rye or Wheat Grain    | 2 bushel/acre   |
| Lime                  | 4 tons/acre   |

Task N: Other

If the Bidder believes that additional tasks are necessary to install the project, and these tasks cannot be incorporated into the listed Tasks, then the Bidder may provide an attachment that lists and explains these tasks. A cost for the tasks should be provided on the bid form.

Task O: Performance Bond

The Contractor will post a performance bond to assure that the work is completed as indicated in the project documents and to assure that all sub-contractors are paid. The cost of the performance bond can be included in the first invoice, after the initiation of project activities.

Total Bid Price to Install the Complete System

This price should be the sum of Items A through O. This price should include the price for both quantities described in Task E..