

**CONCORDE CREEK CHANNEL RESTORATION PROJECT  
DESIGN REPORT**

**STEBEN COUNTY, INDIANA**

**May 26, 2008**



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## **Executive Summary**

The objective of this design study is to return approximately 570 feet (173 meters) of Concorde Creek to its historical path and abandon an eroding section of channel to protect and improve water quality in Lake Gage. Sediment generated from the eroding channel is a significant source of sediment input into the lake. The restored channel design seeks to balance a natural functioning channel with a stable channel design so that the new channel does not become a source of sedimentation into the lake. Natural habitat features include the creation of a riffle-pool-run sequence along the restored channel and incorporating rootwads to provide streambank stabilization and increase habitat diversity. A downstream berm will be installed to provide additional protection to downstream residents in the event of a historical rain event. The existing channel will be plugged and filled with earthen material from the site to prevent the channel from continuing to be a source of sediment into the lake. The total project cost is estimated at \$67,700 with the lake association pursuing funding for construction in 2008.

## **Acknowledgements**

The Concorde Creek Channel Restoration Design Study was made possible with funding from the Indiana Department of Natural Resources (IDNR) Division of Fish and Wildlife and the Lake Gage and Lime Lake Association. The Concorde Creek Channel Restoration Design Study was completed by JFNew with the help of Rowland and Associates from Angola, Indiana and Scott Banfield of Aquatic Survey and Enhancement in Angola, Indiana. Special thanks to the Joe Weaver and Allen Lefevre and the members of the Lake Gage and Lime Lake Association for their initiative and assistance in getting this study completed. Individuals from JFNew that participated in the design include Mark Pranckus, John Richardson, Dan Salas, Scott Dierks, Christine Dittmar, Betsy Ewoldt, Erin Switala, Valerie Strassberg, Aaron Johnson, and Heather Ceerle.

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# CONCORDE CREEK CHANNEL RESTORATION PROJECT DESIGN REPORT

## STEBEN COUNTY, INDIANA

### 1.0 Project Description and Purpose

Concorde Creek flows for approximately 1.3 miles (2.1 kilometers) in a generally northwestern direction from the outlet at Crooked Lake to the southeast corner of Lake Gage in Steuben County, Indiana (Figure 1). The total watershed area encompassing Concorde Creek is approximately 8052 acres (3258 hectares) and includes the Crooked Lake, Loon Lake, and Center Lake. The project site is wooded with a mixture of hardwood species within the uplands (oak and hickory species) and mesic species within the floodplain (cottonwood, elm species). Located on the site adjacent to the existing Concorde Creek channel is an abandoned mill pond dam and basin. At a point in the past, Concorde Creek was dammed to store water for a mill operation. After the mill stopped operating, Concorde Creek was re-routed around the pond and the historical path of Concorde Creek was abandoned. The resulting new channel was relatively straight and currently has a steep grade with eroding banks prior to its entry into Lake Gage.

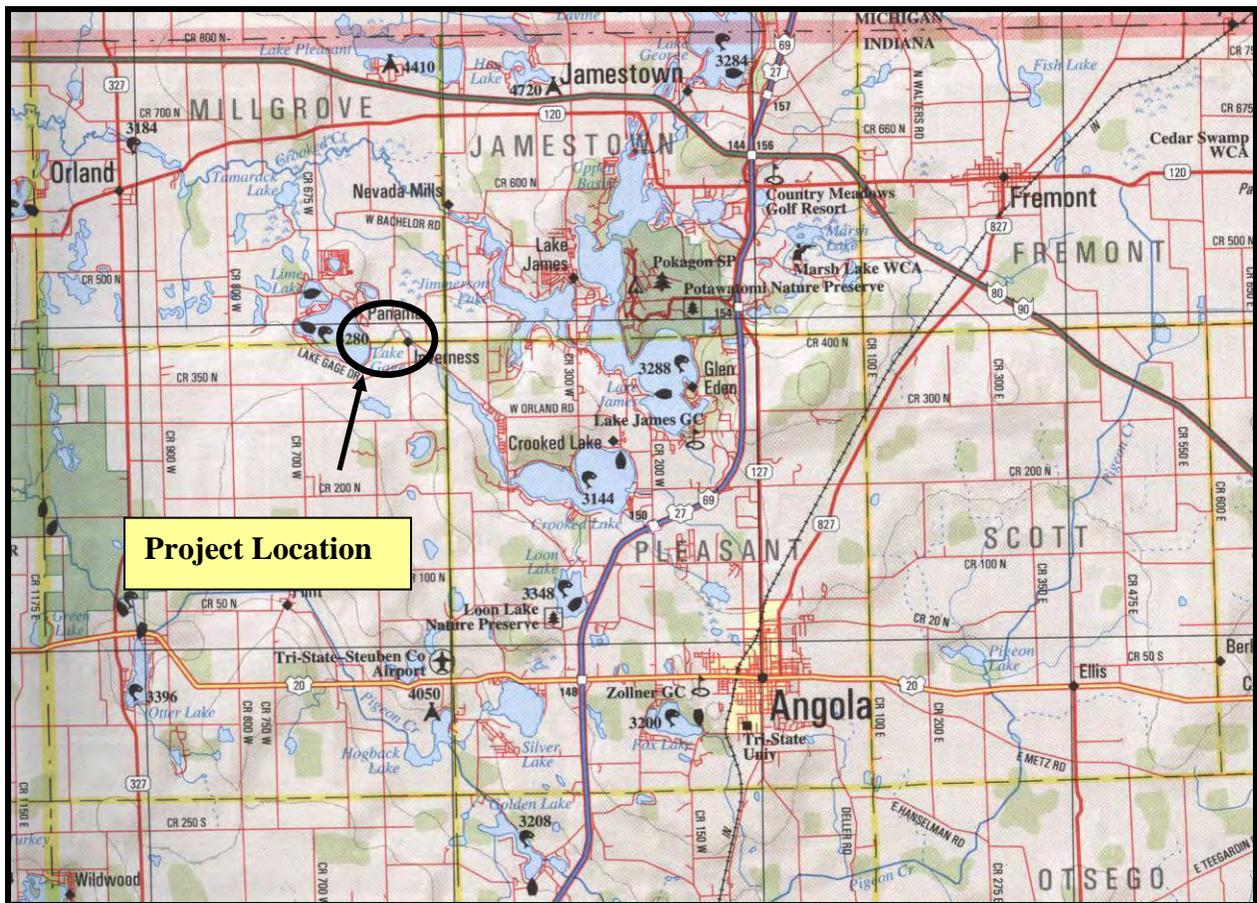
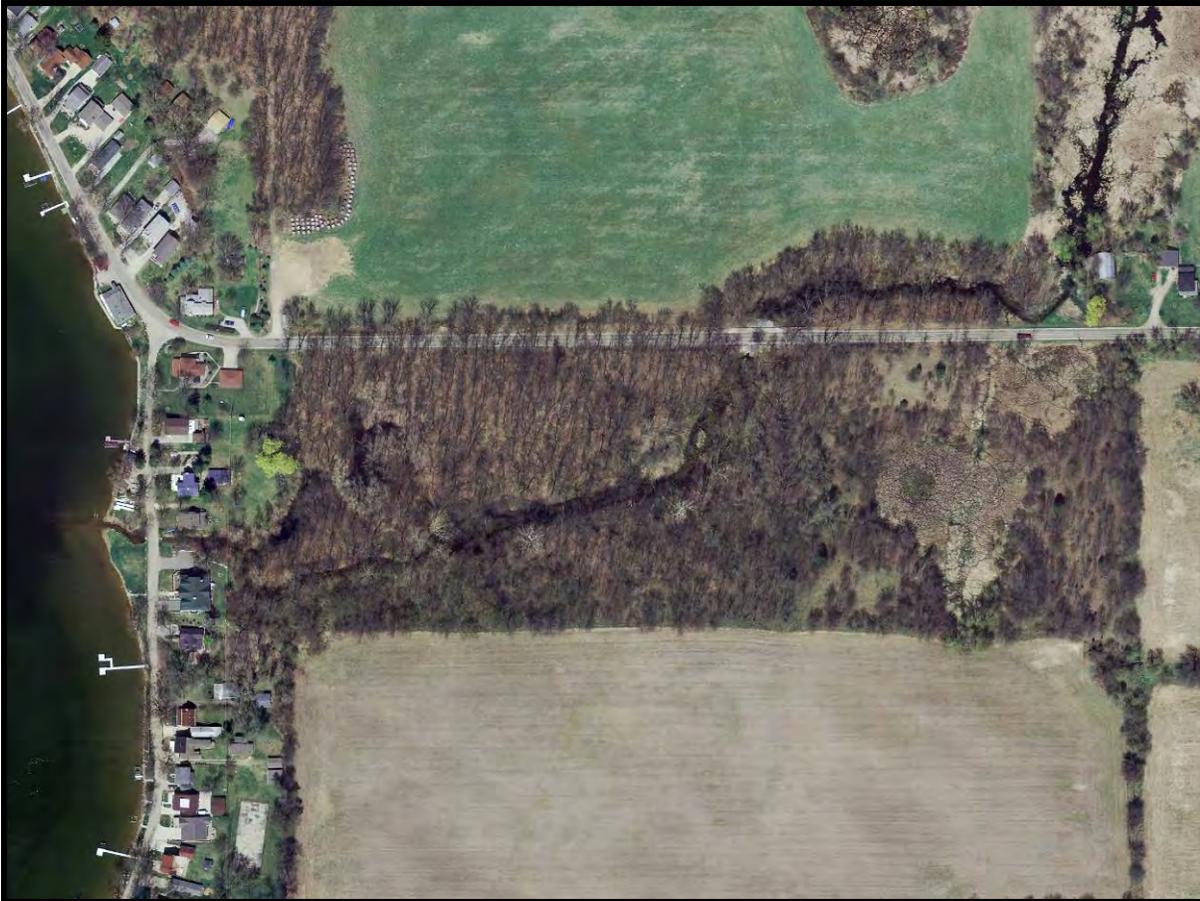


Figure 1. Approximate project location along Concorde Creek.

The objective of the project is to reduce the amount of sediment entering Lake Gage that is generated from within Concorde Creek. The eroding, excavated portion of Concorde Creek

directly upstream from the inlet into Lake Gage was identified in a previous study as a significant source of sediment into the lake (Gensic Engineering, 2005). During the feasibility study, several different options were evaluated including stabilizing the existing section of eroding channel and re-routing the stream back through its historical path while abandoning the eroding section. The channel stabilization option was not favored due to high cost and lack of landowner support. Re-routing and restoring the historical channel was the preferred course of action by both the landowner and the Lake Gage Lime Lake Association.



**Figure 2. Aerial view of project site near Angola, Indiana.**



**Figure 3. Example of erosion along the excavated channel upstream leading into Lake Gage.**



**Figure 4. Example of the mill pond dam located along the historical stream channel.**



**Figure 5. Example of the secondary dam located at the upstream end of the proposed channel restoration.**

## **2.0 Design Rationale**

To successfully return Concorde Creek back into its historical flow path, several things need to occur. The three berms or dams that impounded the stream while it was used as a mill pond need to be removed because they prevent water from flowing through the historical reach. A new channel needs to be constructed because sediment accumulated behind the mill pond dam and filled in the majority of the historical channel. A ditch plug needs to be installed to divert flow from the existing excavated channel into the restored channel. A diversion berm needs to be installed in a downstream residential lot due to the fact that a home has been constructed in the original floodplain.

The overall objective is to reduce sedimentation into Lake Gage by restoring the historic channel and abandoning the existing channel. This goal can be accomplished by creating a stable new channel that does not contribute sediment to Lake Gage. A secondary objective is to create a natural functioning channel that increases the aquatic resources of the Lake Gage system. This objective can run counter to the primary objective because natural channels can migrate across a floodplain over time and have a constant process of erosion and deposition along the banks. As these processes are occurring significant sediment can be generated. With the close proximity of Lake Gage, some sediment would end up in the lake. There can be a balance between a stable channel that effectively conveys the water and sediment and natural functioning channel that provides additional benefits such as increased habitat and stormwater retention. The project design incorporated the following ideas to provide maximum benefit to Lake Gage and the aquatic resources associated with it.

- Reduce erosion along existing channel
- Design a new channel that is stable
- Allow access to floodplain to remove additional sediments
- Minimize the risk of downstream flooding

The overall site design was based on information from data collected from a reference reach, a topographical survey, and a computer stormwater model. The topographical survey provided inputs for the stormwater model and allowed for computer-aided design. The reference reach

helped to calibrate the dimensions and classification of a typical natural channel for Concorde Creek and was used to check model outputs.

On January 24, 2007, JFNew along with a representative from the Lake Gage Lime Lake Association, and Aquatic Survey and Enhancement reviewed the project site and toured Concorde Creek between the outlet of Crooked Lake and the inlet of Lake Gage. A reference cross section was established along Concorde Creek south of the intersection of Orland Rd and West CR 400 N. Data was also collected by JFNew on the amount of accumulated sediment in the mill pond basin. On February 27, 2007 Rowland and Associates from Angola, Indiana performed a topographical survey of the project site. The resulting survey provided 1-foot contour information about the site. A copy of survey and sediment data can be found in Appendix A.

The EPA Storm Water Management Model, SWMM, ([www.epa.gov](http://www.epa.gov)) was used to estimate run-off quantity and quality. This model evaluated preliminary draft design features and helped to determine channel size and depth. Information about watershed size, land cover, topography, and soils were entered into the model along with information about precipitation amounts from different storm frequency events. A copy of model inputs, outputs and a narrative description on the model results can be found in Appendix A. Several different storm frequency return intervals were modeled to understand flow velocity and stream stage height during different storm events. The model was run for 6-month, 1-year, and 100-year storm events. Smaller, more frequent storm events are important to understand during channel design because they play a larger role in shaping the channel morphology than larger storm events (Dunne and Leopold, 1978). With homes downstream of the proposed channel, modeling a 100-year storm event allowed for an understanding of the stage height during what would be considered a flood event.

### **3.0 Design and Construction Specifics**

A complete plan set with construction drawings and specifications can be found in Appendix B.

#### **3.1 Permitting**

Three permits are required for the work to be performed because the work occurs within a “waters of the U.S.” An Indiana Department of Natural Resources (IDNR) Division of Water Floodway Construction permit, Indiana Department of Environmental Management (IDEM) 401 water quality certification permit, and an U.S. Army Corps of Engineers (ACOE) 404 permit must be obtained prior to the start of work. On August 23, 2007, an early coordination meeting was held with representatives from IDEM, ACOE, JFNew, and the IDNR LARE program. Permit applications to the respective agencies were submitted as part of the design study. Copies of the permits, which were received during March through May 2008, can be found in Appendix C.

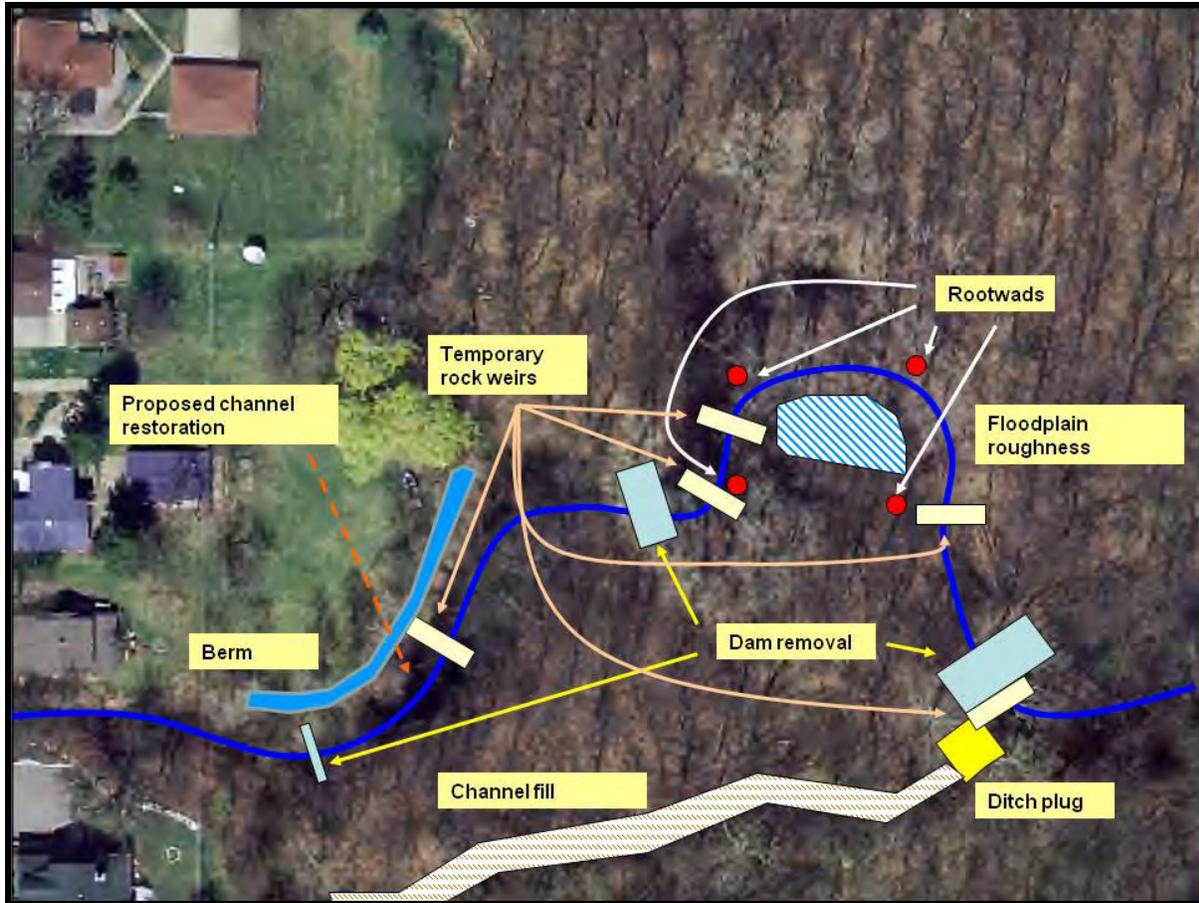
Steuben County Drainage Board approval is not required because Concorde Creek is not considered a legal drain. Correspondence during the feasibility project indicated that they would like to be notified of any project, but do not have jurisdiction (Gensic Engineering, 2005). A copy of the design report will be sent to the Drainage Board and the County Surveyor.

### **3.2 Landowner Agreements**

There are two main property owners involved with the project. Beverly Symonik owns the property that includes the existing channel, the mill pond dam, the secondary dam and the majority of the proposed restored channel. Bill Berghoff owns property on the downstream end of restored stream channel and where the proposed berm is located. Scott Banfield from Aquatic Survey and Enhancement was contracted by the Lake Gage Lime Lake Association to obtain landowner agreements for the project. During the design process, JFNew, the lake association, and Scott worked together to contact landowners and provide them with information about the project, as well as, allow them the opportunity to provide feedback about the design. At this current time, Ms. Symonik's written permission has been obtained while Mr. Berghoff's written permission is still being pursued. A copy of the signed Symonik agreement and an unsigned Berghoff agreement can be found in Appendix D. Once Mr. Berghoff's signed agreement becomes available, a copy will be sent to the LARE program as an addendum to the final report draft.

### **3.3 Restored Stream Channel**

The restored stream channel is designed to follow the historical flow path that was used by the stream prior to the installation of the mill pond dam and the excavation of the existing channel. Several habitat features including the installation of rootwads, creation of riffle-pool sequence, and increasing floodplain roughness are designed to increase natural stream/floodplain functions while providing channel stability (Figure 6).



**Figure 6. Approximate locations of design elements for Concorde Creek channel restoration.**

### ***3.3.1 Dam Removal***

Three dams or earthen berms need to be removed to allow Concorde Creek to flow through its historical path (Figure 6). The two most downstream dams, a small earthen dam at the downstream end of the historical flow path and the mill pond dam will be removed during channel construction. The material removed from each dam, 33 cubic yards (25 cubic meters) and 80 cubic yards (62 cubic meters) from the small berm and the mill pond dam, respectively, will be excavated to an elevation that matches the existing grade of the adjacent floodplain. The material will be placed in an upland location along the proposed abandoned channel for use during the channel fill process. The concrete material from the mill pond dam's spillway will also be removed and disposed of in an appropriate upland location. Where the ends of the mill pond dam intersect the hillside, the slope will be graded to match the existing hillside, seeded with a woodland grass seed mix, and covered with erosion control blanket.

The secondary dam, the most upstream dam, will be partially removed after the restored channel is constructed because of the need to build the channel "in the dry." A temporary culvert will be placed in the dam to allow water to flow into the new channel, but allow for equipment access across the dam while the excavated channel is being plugged and filled. After work on the excavated channel is complete, the culvert and the remaining portion of the secondary dam will be removed completely. The Material removed from the secondary dam, approximately 430

cubic yards (328 cubic meters), will be placed in an upland location and either used to fill the abandoned channel or graded to match the existing grade and seeded. As with the mill pond dam, the intersection of the dam and the hillsides will be graded, seeded, and covered with erosion control material.

### ***3.3.2 Channel Construction***

Approximately 570 feet of channel will be constructed as part of the channel restoration. The channel path was designed to minimize the number of trees required to be removed. The channel could have been designed to flow further north through the floodplain, which would have resulted in more stream length; however, significantly more trees would need to be removed and the nature and character of the property would change too much to obtain landowner permission. Along the channel a riffle-pool-run sequence will be established. On average, the channel will have a top width of 15 feet (4.6 meters) with 3:1 banks resulting in a bottom width of 9 feet (2.7 meters). Average bankfull depth will be between 1 - 1.5 feet (0.3 – 0.4 meters). Channel dimensions will vary between habitat types (pools, riffles, runs). Pools are designed to be constructed along the outside of the four major bends and have an average depth of 2 feet (0.6 feet). Riffles are designed to be constructed at five locations along the stream channel and have an average width of 18 feet (5.5 meters) with an average depth of 1 foot (0.3 meters). Runs are placed in the remaining sections of the channel and will have an average width of 12 feet (3.6 meters) and an average depth of 1.5 feet (0.4 meters). The channel will be over-excavated by approximately 0.5 feet (0.2 meters) and backfilled with medium-sized stone gravel (average diameter = 2 inches (5 centimeters)). As mentioned earlier, there is evidence that beneath approximately 1 - 1.5 feet (0.3 – 0.4 meters) of material there may be the gravel from the original stream bottom. However, the consistency and quality of the material cannot be guaranteed. It is better to plan for the cost and installation of outside material to line the channel bottom. The side slopes will be graded to approximately 3:1, seeded with a wooded wetland seed mix and covered with an erosion control blanket composed of straw and/or coconut material within a fiber or “bio-net” matrix. Material excavated from the channel will be placed in an upland location and used to fill in the abandoned channel.

At four locations along the stream channel, temporary rock weirs will be installed across the stream channel. These structures will be composed of standard revetment rip rap or glacial field stone (average diameter = 6 inches (15 centimeters)) and have a height of 0.5 feet (0.2 meters) and a width of 2 feet (0.6 meters). Directly upstream of each structure, the channel will be over-excavated by 1.5 feet (0.4 meters) for a length of 10 feet (3.1 meters). These structures will be in place for approximately six months to a year to capture any sediment that might be moving downstream as a result of the secondary dam removal. After that time, the contractor will return to the site and level the structures by pushing the material into the excavated area on the upstream side of the structures. The resulting structure will serve as a riffle after leveling.

There is some debris and garbage that has been illegally dumped downstream of the mill pond dam within the floodplain. During the construction process, the debris will be removed and disposed of in a proper location. This excavation along with the dam removals will increase the overall amount of the floodplain by 0.12 acres (0.05 hectares).

### **3.3.3 Additional Habitat Features**

Along the outside of bends at four locations rootwads will be installed to provide channel stability and increase habitat diversity. Trees with a trunk diameter between 10 – 20 inches (25 – 50 centimeters) that are removed as part of the construction process will be used. A trench will be dug perpendicular to the stream channel and a log will be placed in the trench with the rootwad extending to the edge of the channel. Standard revetment rip rap will be placed on top of the log to approximately 0.5 feet (0.2 meters) below the existing grade to provide ballast and stabilize the rootwad from moving during high flow events. Soil will be filled in over the last 0.5 feet (0.2 meters) and sloped to match the existing grade.

To prevent the stream from attempting to create a cutoff channel across the floodplain during high flows, logs from trees removed during the construction process will be placed perpendicular to the stream and pinned to the floodplain using a combination of 1/4-inch (0.6 centimeter) steel cable and duckbill anchors. The pinned logs will lower the chances that a cut-off channel will form during high flow events. As flood water flows over the logs, the velocity will be reduced, which will allow sediment in the water to drop out of the water column.

### **3.4 Downstream Berm**

SWMM modeling indicated that the peak downstream elevation of a 100-year storm event is at an elevation of approximately 958 feet (292 meters). This corresponds to the height of the top of the floodplain on the right downstream bank at the end of the project boundary. To provide additional protection against flooding downstream neighbors, an earthen berm will be installed along the right downstream floodplain. The berm will start at the tie-in point of the existing stream and the restored channel and continue upstream approximately 170 feet (52 meters) and tie into the hillside. The height of the berm will be a minimum of 1 foot and a maximum of 2 feet (0.6 meters) depending on final landowner approval. The berm will have a top width of 3 feet (0.9 meters) with a 3:1 front slope and a 2:1 back slope. The berm will be seeded and covered with erosion control material upon completion of the grading. The back slope of the berm will be covered with field stone to a depth of one foot. Access to the berm area will be obtained by removing trees along the restored channel and moving material and equipment through the constructed channel to minimize impacts to the adjacent residential yards and wetland.

### **3.5 Abandoning the Excavated Channel**

The existing excavated channel will be abandoned by installing a ditch plug to direct water into the restored channel and filling the channel with material from the dam/berm removals and the restored channel excavation. The ditch plug will be installed at the start of the excavated channel and consist of 25 cubic yards (19 cubic meters) of soil free from debris with a minimum of 40% clay to allow adequate compaction. The plug will be approximately 4 feet (1.2 meters) high and span the width of the channel (approximately 16 feet (4.8 meters)). Soil will be compacted with machinery. The upstream face of the plug will be covered with approximately 20 tons (20 metric tons) of rip rap to prevent soil from washing out during a high flow event. The remaining portion of the channel will be filled with material from the dam/berm removal and restored channel excavation. Material will be placed throughout the channel to a minimum depth of 3 feet (0.9 meters), sloped to match the existing grade of the top of the banks and seeded with

a woodland seed mix. Prior to the application of erosion control materials along the filled channel, 75 1-gallon (4.5 liters) potted trees will be planted in a random fashion.

**3.6 Site Clean-up**

Any disturbed areas such as equipment or material landing areas will be seeded and mulched. No trash or debris will be left on-site. As equipment is being removed, the temporary access road will be graded to match the existing grade, seeded, and mulched. Several trees that were removed during the construction process will be pulled perpendicular across the access road to prevent ATV or vehicle access.

**4.0 Opinion of Probable Cost**

The opinion of the probable cost for the restoration of 570 feet of Concorde Creek channel, the installation of a downstream berm and the plugging and filling of the existing channel is \$67,700. Table 1 shows the cost breakdown based on major items associated with the project including construction services, materials, and construction oversight. Table 2 provides a cost breakdown of materials and labor within each feature.

**Table 1. Probable cost estimate for Concorde Creek channel restoration.**

<b>Task</b>	<b>Cost</b>
Mobilization/Demobilization	\$5,000
Construction Services	\$33,800
Materials	\$13,100
Construction Oversight	\$8,800
Contingency	\$7,000
<b>Total</b>	<b>\$67,700</b>

**Table 2. Worksheet estimates for individual work items within each feature for channel restoration.**

Task	Subtask	Item	Unit	Unit Cost	Quantity	Total
<i>New Channel Construction</i>	Construction Services		each	\$24,900	1	\$24,900
	Materials	Rock for Channel	ton	\$20	230	\$4,600
		Rock for Weirs	ton	\$25	15	\$375
		Rock for Rootwad Revetments	ton	\$25	10	\$250
		Erosion Control Blanket	square yard	\$1	733	\$733
		Duckbill Anchors	each	\$6	20	\$120
		Steel Cable and Connectors	linear foot	\$1	100	\$120
		Seed	acre	\$300	1	\$300
		Wood Stakes	each	\$1	800	\$800
	Staples	box of 1000	\$50	1	\$50	
<i>Downstream Berm Construction</i>	Construction Services		each	\$2,500	1	\$2,500
	Materials	Grass seed	lbs	\$2	10	\$20
		Field Stone	ton	\$50	13	\$650
		Erosion Control Blanket	square yard	\$3	396	\$1,069
		Staples	box of 1000	\$50	1	\$50
<i>Plug Existing Channel</i>	Construction Services		each	\$1,800	1	\$1,800
	Materials	Soil for Plug	ton	\$10	40	\$400
		Riprap for Plug	ton	\$25	20	\$500
		Temporary Culvert	each	\$100	1	\$100
		Erosion Control Blanket	square yard	\$2	560	\$1,120
		Seed	acre	\$300	1	\$300
		Staples	box of 1000	\$50	1	\$50
		Trees	each	\$20	75	\$1,500
Site Clean-up and	Construction Services		each	\$4,600	1	\$4,600
Mobilization/Demobilization			each	\$2,500	2	\$5,000
Construction Oversight			each	\$8,800	1	\$8,800
Contingency (15% of Project Costs)			each	\$7,000	1	\$7,000
<b>Total</b>						<b>\$67,700</b>

\*Material totals have been rounded during the summary.

### 5.0 Bidding Requirements

Example bid documents are included in Appendix E.

### 6.0 Specifications

Specifications can be found within the design plan set in Appendix B.

### 7.0 Construction Schedule

The Lake Gage Lime Lake Association plans to pursue an IDNR LARE construction grant in 2008. The LARE program typically makes a decision in July on which projects to fund. Once the grant is secured and the permits are obtained, construction can begin. Construction should take place when the site is dry to prevent unnecessary disturbance to the surrounding areas and make construction as efficient as possible. August through October 2008 is the best time for the work to be performed due to a lower potential for wet conditions and the opportunity for the plantings and cover crop to become established before the winter.

### **8.0 Monitoring and Maintenance Schedule**

Annual and seasonal maintenance and monitoring of the site is highly recommended. A designated member of the Lake Gage Lime Lake Association should periodically monitor the site after significant rain events and at the start of each season to make sure that plantings are established and no significant erosion is occurring. An example of maintenance and monitoring form is included in Appendix F.

After the rock weirs are leveled and the plants are established, there should be little to no anticipated annual maintenance. By the time the rootwads decay, the channel should be stable. If significant changes in watershed land use occur, additional maintenance may be required.

### **9.0 Project Summary**

One major source of sedimentation into Lake Gage comes from a portion of Concorde Creek directly upstream from its outlet into Lake Gage. This section of channel was excavated to bypass a mill pond that had been constructed on Concorde Creek. The objective of this design is to return approximately 570 feet of Concorde Creek to its historical path through the now abandoned mill pond basin and plug and fill the existing excavated channel. The restored channel design seeks to balance a natural functioning channel with a stable channel design that does not become a source of sedimentation into the lake. Natural habitat features include the creation of a riffle-pool-run sequence along the restored channel and incorporating rootwads to provide streambank stabilization and increase habitat diversity. A downstream berm will be installed to provide additional protection to downstream residents in the event of a historical rain event. The existing channel will be plugged and filled with earthen material from the site to prevent the channel from continuing to be a source of sediment into the lake. The total project cost is expected to be \$67,700 with the lake association pursuing funding for construction in 2008.

### **10.0 References**

- Dunne, T. and L.B Leopold. 1978. Water in environmental planning. W.H. Freeman and Co. San Francisco, CA. 818 p.
- Gensic Engineer. 2005. Lake Gage and Lime Lake engineering feasibility study. Angola, Indiana.

## **Appendix A:**

### **Survey Data, Engineering Calculations and Computer Model Information**





**Lake Gage Historic Channel Sediment Survey**

Date: 24-Jan-07

Surveyed By: MP and DS

Station (ft)	Depth to Gravel (cm)	Depth to Gravel (in)	Notes
15	10	3.9	Gravel D = 8-12mm
30	15	5.9	Photo
45	20	7.9	
60	35	13.8	Photo (mixed sediment and gravel)
75	25	9.8	
90	45	17.7	Photo
105	25	9.8	
105	30	11.8	Secondary DP; 10ft. to right of previous
120	20	7.9	Photo
135	80	31.4	
135	40	15.7	Secondary DP; 10ft. to left of previous
150	50	19.7	Photo
150	30	11.8	Secondary DP; 10ft. to right of previous
165	30	11.8	
180	30	11.8	Photo
195	20	7.9	
210	25	9.8	Photo
225	20	7.9	
240	15	5.9	Photo
255	25	9.8	
270	20	7.9	Photo
285	10	3.9	
300	65	25.5	
315	55	21.6	
325	N/A	N/A	Mill Dam
350	50	19.7	Photo
375	50	19.7	
400	30	11.8	Photo
425	60	23.6	
450	50	19.7	
475	45	17.7	Photo
500	50	19.7	

Right/Left indicated looking downstream.



6/23/07

Lake Gage Excavated Channel Site  
St 75 - 12" hole below stream grade

→ No water

St 00

- ~ 25' ups of walking bridge

- 12" hole below stream grade

- NO water

St 00 - 12" hole below stream grade

- Moist, but no ponding

St 00 - 12" hole below stream grade

- ponding ~ 6" below - more

alluvial substrate

- No seeps out of exc channel

Data from survey along excavated channel to look at potential groundwater influence and effects on channel fill.

# Lake Gage Design Summary - v 4

## 1 WATERSHED

Area  
8052 acres

Slope  
Soils

Series Name	Texture Class	Range of Infiltration
-------------	---------------	-----------------------

## 2 DRAINMOD

3 SINOUSITY		Sinosity	
Existing			
Proposed			

4 STREAM SLOPE	
Existing	
Proposed	

## 5 DRAIN TILE FLOWS\* These are very rough, but get us in the ball park

1-Year	
2-Year	
100-Year	

## 6 SWMM RUNOFF FOR 1-YR, 2-YR, AND 100-YR -

1-Year	
100-Year	

7 RADII GEOMETRY					
* sections base	Minimum Radius	Bankfull Width	Rc/bf	Shear Stress M.F.	
Section 1					
Section 2					
Section 3					
Section 4					

		Event Size					
		6-month (proposed)	6-month (exist)	1-Yr (proposed)	1-Yr (exist)	100-Yr (proposed)	100-Yr (exist)
Depths (feet)	Upstream (B)	1.5	1.9	1.67	2.1	2.16	2.7
	Downstream (D)	1.7	1.7	1.88	1.8	2.6	2.6
	Proposed 1	1.33		1.46		1.85	
	Proposed 2	1.61		1.78		2.27	
	5+02		1.4		1.55		2.1
	2+71		1.42		1.55		2
	2+01			1.625		2.1	
Velocities (fps)	Upstream (B)	2.78	0.7	2.97	1.7	3.54	0.8
	Downstream (D)	2.26	2.4	2.43	2.55	2.76	2.8
	Proposed 1	1.76		1.81		1.99	
	Proposed 2	0.89		0.87		1.06	
	5+02		2.5		2.75		3.5
	2+71		3.45		3.7		4.75
	2+01			1.55		1.85	
Flows (cfs)	Upstream (B)	47.31	46	61.27	57	113.07	115
	Downstream (D)	42.91	45	55.15	60	113.01	115
	Proposed 1	48.02		62.23		113.07	
	Proposed 2	46.99		61.28		113.04	
	5+02		46		60		115
	2+71		46		60		115
	2+01			60		115	

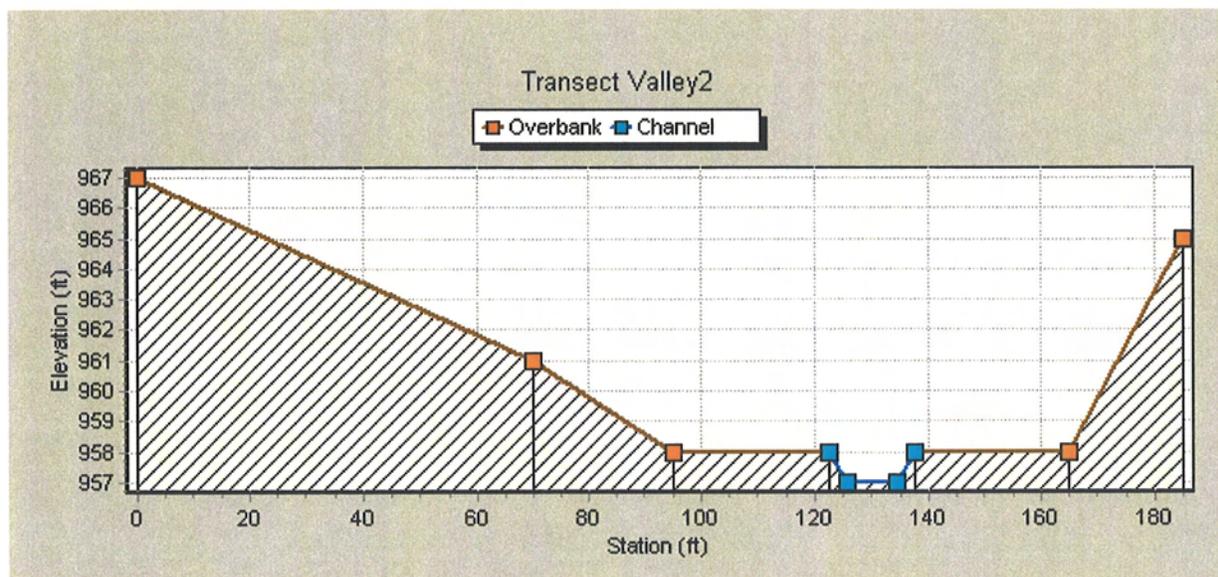
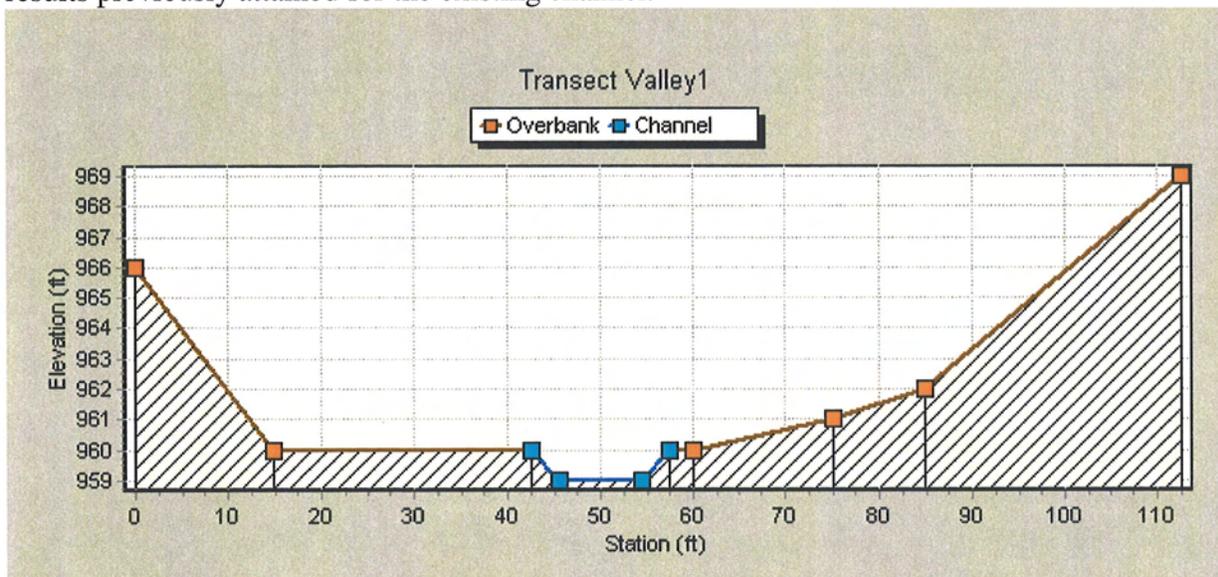
9 SHEAR STRESS ANALYSIS		Maximum particle size to mobilize, based on incipient motion analysis				
EXISTING		1-year $R_h$	Grain Size (mm)	Shear Stress (lbs/ft <sup>2</sup> )	Slope of Section (ft/ft)	
1-year						
5+02		1.0531	medium gravel	36	0.717	0.0109
2+71		0.876		17	0.325	0.00594
2+01		0.8307		46	0.912	0.017583333
100-year		100-year $R_h$				
5+02		1.438		49	0.979	0.0109
2+71		1.162		22	0.431	0.00594
		1.174		64	1.289	0.017583333
PROPOSED						
1-year		1-year $R_h$	Grain Size (mm)	Shear Stress (lbs/ft <sup>2</sup> )	Slope of Section (ft/ft)	
P1		0.646083	10	0.178	0.0044	
P2		0.747299	11	0.197	0.00422	
100-year		100-year $R_h$				
P1		0.936751	14	0.257	0.0044	
P2		1.093517	15	0.288	0.00422	

9a SHEAR STRESS ANALYSIS		From u*		
PROPOSED	Modeled u*	Shear Stress (lbs/ft <sup>2</sup> )	Grain Size (mm)	
1-year				
P1	1.81	3.5114	175	
P2	0.87	1.6878	85	
100-year				
P1	1.99	3.8606	192	
P2	1.06	2.0564	103	

## Summary of SWMM Model Results

### Summary of Inputs

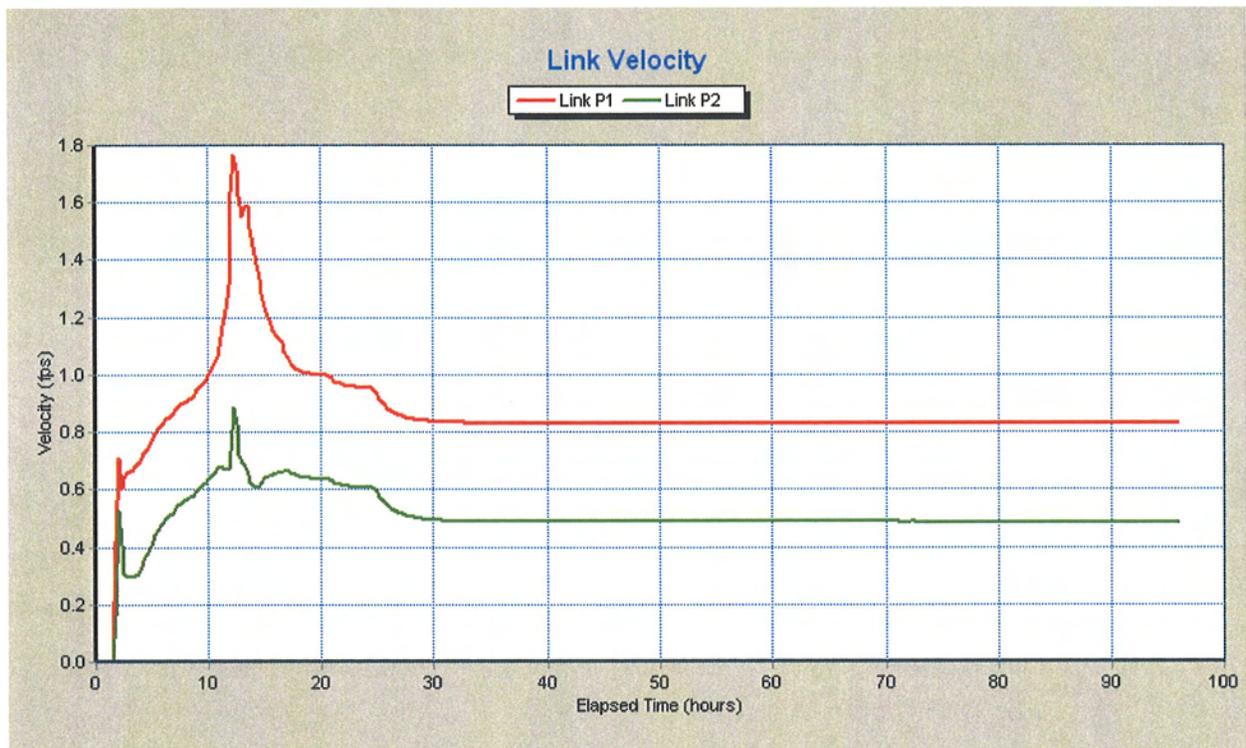
A two-stage channel design was modeled, using an excavated channel and the existing topography as flood plain. Channel dimensions were modeled uniformly along the proposed stream using a 1-foot depth and 15-foot top width, with a bank slope of 3:1. The existing topography (based on contours from Rowland and Associates) was used for the floodplain. The proposed channel was divided into two sections. Representative cross-sections for each section were evaluated to determine flood plain dimensions. Depth, velocity, and flow during the 6-month (1.75 inch), 1-year (2.16 inch), and 100-year (5.77 inch) 24-hour storm events were evaluated within the proposed channel, as well as channel sections immediately upstream and downstream of the proposed channel. These parameters were evaluated and compared to model results previously attained for the existing channel.



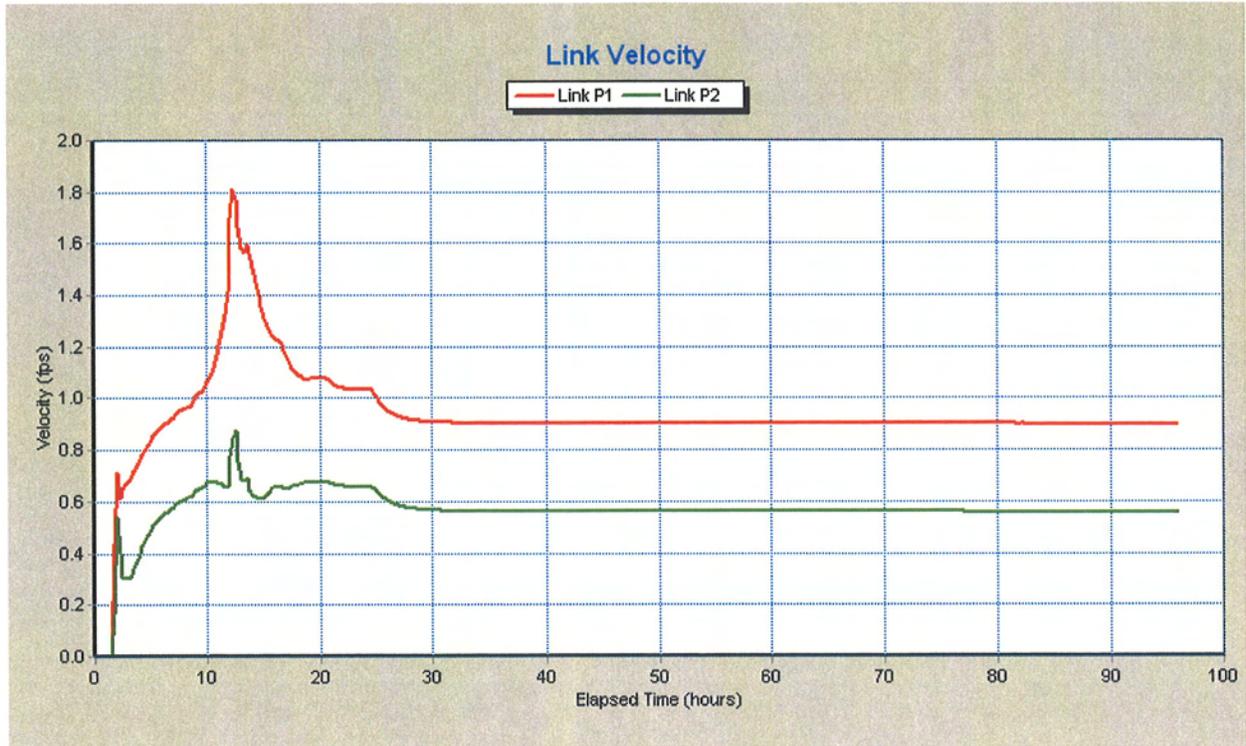
*Results*

See “Lake Gage Design Summary\_v4” for actual results.

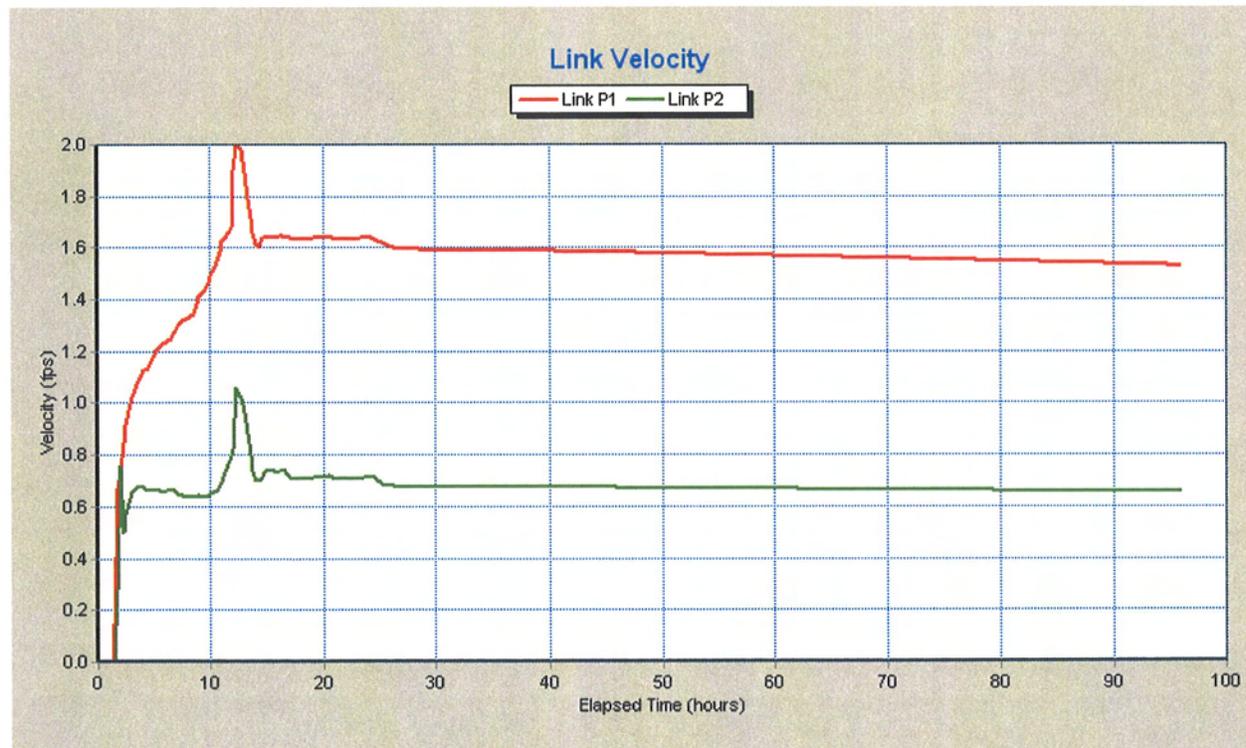
Modeled peak flows were generally similar (Relative Percent Difference less than 10%) between models using the existing channel and models using the proposed channel. Modeled peak velocities in the proposed channel were less than modeled velocities using the existing channel in all iterations. Modeled velocities within the proposed channel during all three storm events modeled can be seen below.



6-mo



1-yr



100-yr

### *Comments*

The existing topography should provide ample flood storage capacity. Even under the 100-year storm event, the stream would remain within the floodplain valley. The stream will access this floodplain after most rain events. However, the model indicates that the flood duration will be short, lasting less than half a day. Therefore, the size of the stream channel can likely be decreased without increasing the risk of flooding to adjacent properties.

Where the berm has been proposed, modeled depths reached 2.55 feet. This places the flood elevation at 958.05 feet. Since the location of the berm places it at an elevation of 958, the berm would likely not be needed. However, because of uncertainty and simplifications incorporated into the model, the actual water depth may differ from model predictions. Therefore, a 1-foot high berm is recommended to safeguard adjacent property-owners.

Shear stress calculations (see Lake Gage Design Summary\_v4) indicate that the proposed channel dimensions should be adequate to prevent erosion. The maximum grain size moved under all model permutations was calculated at less than 16 mm in size. Therefore, medium gravel would provide adequate stability. The modeled peak velocities are a little high since they exceed 1.5 feet/sec during all modeled storm events in the first section of the proposed stream. However, Manning's Equation (which SWMM is based on) can overestimate velocities. The peak velocities were less than those modeled for the existing channel and shear stress calculations for the proposed channel measure less than those calculated for the existing channel. Since erosion issues have not been documented for the existing channel, the proposed channel dimensions should ensure adequate protection provided erosion control measures are installed.

Summary of Design Parameters & Results for Rootwad Retentions

ROOTWAD DESIGN SPREADSHEET

Version: adw 7/18/02

PROJECT: Concorde Creek Restoration

Data Date: 8/17/2007

Rootwad # Bole Log w/o Footer

Designer: DJS

I. STREAM & BANK DATA

units

Stream velocity: fps

Bank slope: \_\_\_:1

Soil 1:

Height: ft

Density: pcf

Shear strength: degrees

Soil 2:

Height: ft

Density: pcf

Shear strength: degrees

II. HEADER LOG DATA

Header length: ft

Header diameter: inches

Header, exposed length: ft

Cable, header length: ft

Header contact on bole: ft

Header, submerged length: ft

Header angle: degrees

Spec. gravity, header: SG<sub>h</sub>

Coef. of drag, header: C<sub>dh</sub>

Coef. of friction soil, header: H<sub>d(s)h</sub>

Installation method:

Trench width, header: W<sub>th</sub>

(No cable=0)

Deflt=L<sub>ch</sub>

Deflt=L<sub>eh</sub>

Header species?

Soil #1

Soil #2

Deflt=d<sub>h</sub>



VI. BOLE LOG & WAD DATA

Bole length:	ft	<input type="text" value="6"/>	$L_b$
Bole diameter:	inches	<input type="text" value="8"/>	$d_b$
Bole, exposed length:	ft	<input type="text" value="1"/>	$L_{eb}$
Cable, bole length:	ft	<input type="text" value="0"/>	$L_{cb}$
Bole contact with header:	ft	<input type="text" value="0"/>	$L_{rbh}$
Bole contact with footer:	ft	<input type="text" value="0"/>	$L_{rnf}$
Bole, submerged length:	ft	<input type="text" value="0"/>	$L_{subb}$
Bole angle:	degrees	<input type="text" value="45"/>	$\beta_b$
Spec. gravity, bole		<input type="text" value="0.35"/>	$SG_b$
Coef. of drag, bole:		<input type="text" value="1.1 (function of &lt;math&gt;\beta_b&lt;/math&gt;)"/>	$C_{db}$
Coef of frict. on soil, bole		<input type="text" value="0.47"/>	$\mu_{(s)pb}$
Installation method:		<input type="text" value="In trench"/>	
Trench width, bole:	inches	<input type="text" value="12"/>	$W_{tb}$
Wad length:	ft	<input type="text" value="1"/>	$L_{rw}$
Wad diameter:	ft	<input type="text" value="2"/>	$d_{rw}$
Spec. gravity, wad:		<input type="text" value="0.35"/>	$SG_{rw}$
Porosity, wad:	%	<input type="text" value="20"/>	$\eta_{rw}$

Bole species?	<input type="text" value="Cottonwood"/>
Defll= $d_b$	<input type="text" value="12"/>
Defll= $SG_b$	<input type="text" value="0.35"/>
Defll=20	<input type="text" value="20"/>

Soil #1	<input type="text" value=""/>
Soil #2	<input type="text" value=""/>

VII. BOLE ROCK DATA

Spec.gravity, rock:	<input type="text" value="2.65"/>	$SG_{rb}$	Defll=2.65
Coef. of drag, ballast rock:	<input type="text" value="0.4"/>	$C_{drb}$	Rock exposure?
Coef. of frict., rock on log:	<input type="text" value="0.5"/>	$\mu_{(r)pb}$	Defll=0.5
Coef. of frict., rock on soil:	<input type="text" value="0.4 (based on same soil as bole log)"/>	$\mu_{(s)pb}$	

Exposed	<input type="text" value=""/>
Unexposed	<input type="text" value=""/>



XII. FOOTER BALLAST

	$r^1_f$	$r^2_f$	$r^3_f$	$r^4_f$	$r^5_f$	$r^6_f$	$r^7_f$	$r^8_f$
Rock max. dimension:	ft							
Rock mid. dimension:	ft							
Rock min. dimension:	ft							
or Rock weight:	lbs							
or Rock, equiv. diameter:	ft							
Rock, % on footer:	$d_f$							

FS, ballast sliding on footer:

$FS_{Dfr}$

XIII. FOOTER BUTTRESS

	$r^p_{1f}$	$r^p_{2f}$	$r^p_{3f}$	$r^p_{4f}$	$r^p_{5f}$	$r^p_{6f}$	$r^p_{7f}$	$r^p_{8f}$
Rock max. dimension:	ft							
Rock mid. dimension:	ft							
Rock min. dimension:	ft							
or Rock weight:	lbs							
or Rock equiv. diameter:	ft							

XIV. FACTORS OF SAFETY

Vertical

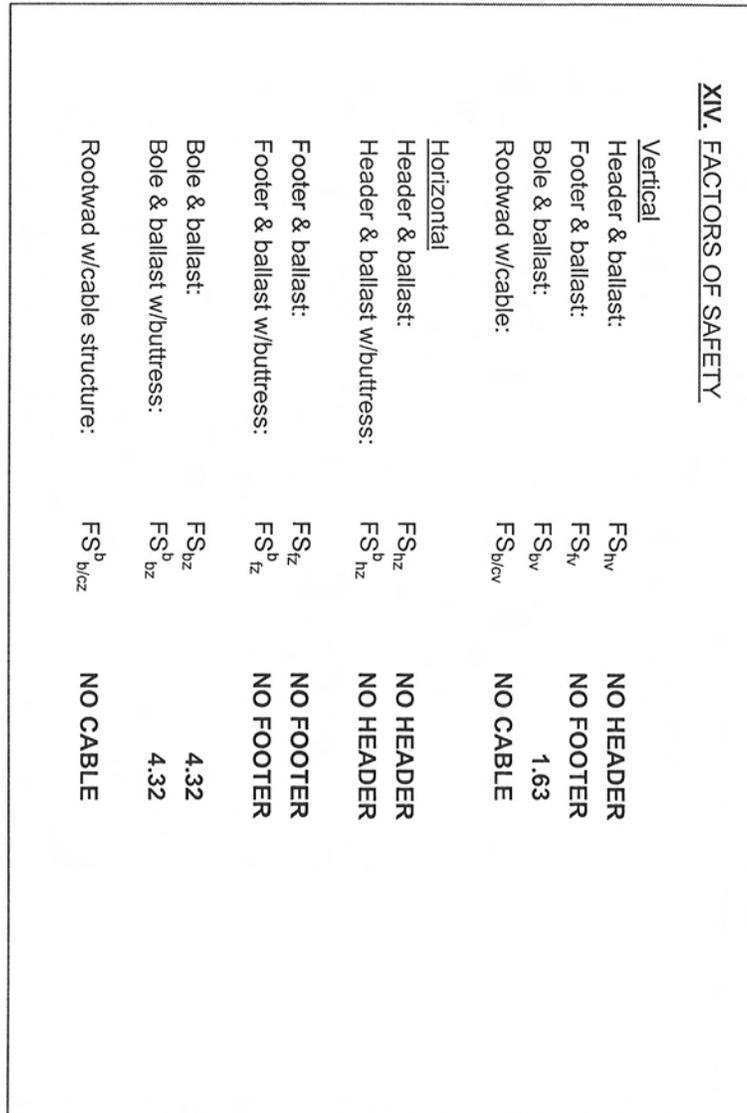
Header & ballast:  $FS_{nv}$  **NO HEADER**  
 Footer & ballast:  $FS_{fv}$  **NO FOOTER**  
 Bole & ballast:  $FS_{bv}$  **1.63**  
 Rootwad w/cable:  $FS_{b/cv}$  **NO CABLE**

Horizontal

Header & ballast:  $FS_{hz}$  **NO HEADER**  
 Header & ballast w/buttress:  $FS^b_{hz}$  **NO HEADER**  
 Footer & ballast:  $FS_{tz}$  **NO FOOTER**  
 Footer & ballast w/buttress:  $FS^b_{tz}$  **NO FOOTER**

Bole & ballast:  $FS_{bz}$  **4.32**  
 Bole & ballast w/buttress:  $FS^b_{bz}$  **4.32**

Rootwad w/cable structure:  $FS^b_{b/cz}$  **NO CABLE**



**Appendix B:**  
**Design Plan Set and Specifications**



# Concorde Creek Restoration Project ~ Lake Gage

## CONSTRUCTION PLAN

STEBEN COUNTY, INDIANA



Corporate Office  
708 Roosevelt Road  
Walkerton, Indiana 46574  
574-586-3400 fax 574-586-3448

Ohio Office  
11188 Luachek Drive  
Cincinnati, Ohio 45241  
513-489-2402 fax 513-489-2404

Illinois Office  
6805 Steger Road, Unit A  
Monee, Illinois 60449  
708-534-3460 fax 708-534-3480

Indianapolis Office  
3901 Industrial Blvd  
Indianapolis, Indiana 46254  
317-388-1982 fax 317-388-1980

Michigan Office  
11181 Marwill Avenue  
West Olive, Michigan 48480  
616-847-7620 fax 616-847-9970

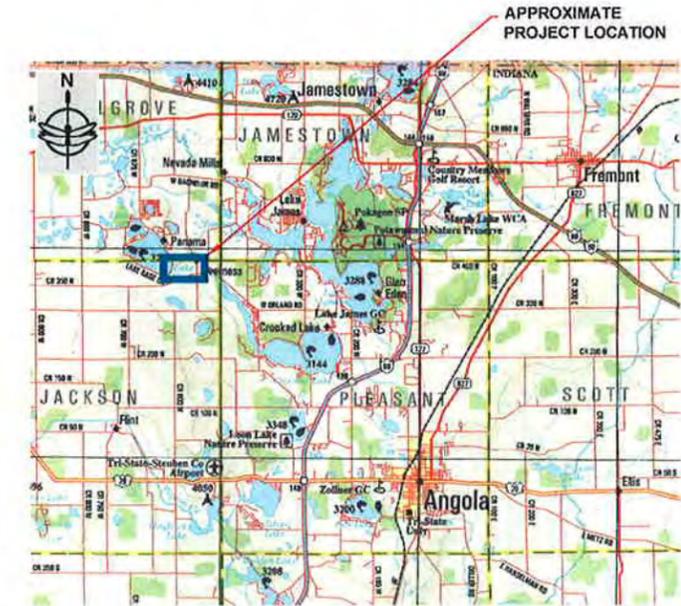
Wisconsin Office  
1402 Pankratz Street, Suite 302  
Madison, Wisconsin 53704  
608-240-1463

### SHEET INDEX

FIGURE	DESCRIPTION
1	COVER SHEET
2	SITE PLAN
3	PROFILE
4	PLANTING PLAN
5	DETAILS
6	DETAILS
7	SPECIFICATIONS



**SITE MAP**  
NOT TO SCALE



**VICINITY MAP**  
NOT TO SCALE



**NOTE:**

1. Rules and regulations governing the respective utilities shall be observed in executing all work under this section.
2. It shall be the responsibility of each contractor to verify all existing utilities and conditions pertaining to his phase of the work. It shall also be the contractor's responsibility to contact the owners of the various utilities before work is started. The contractor shall notify in writing the owners and the Design Engineer of any changes, errors or omissions found on the plans or in the field before work is started or resumes.
3. Where active utilities are encountered, but not shown on the drawings, the Design Engineer shall be advised before work is continued. If in conflict, the Design Engineer in consultation with the respective utility shall jointly determine a plan of action. The location of such active utilities shall be recorded on the construction record drawings.
4. Existing improvements: The contractor must maintain in operating condition, all active utilities, sewers and other pipe or cable systems that may be encountered.
5. Inactive and abandoned utilities encountered in excavating and grading operations shall be reported to the Design Engineer. They shall be removed, plugged or capped as directed and recorded on the construction record drawings.

Our mission is to provide the highest quality environmental services to our clients while positively impacting the lives of our employees and the conservation of natural resources through prosperity and stewardship.

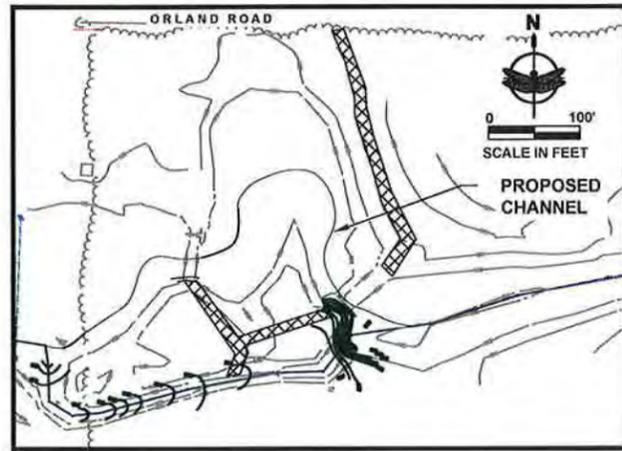
REVISION	NO.	DESCRIPTION

**COVER SHEET**  
Concorde Creek Restoration Project  
Lake Gage  
Steuben County, Indiana

DRAWN BY:	COD
DESIGNED BY:	MTP
DATE:	DEC 2007
JOB NO:	011128

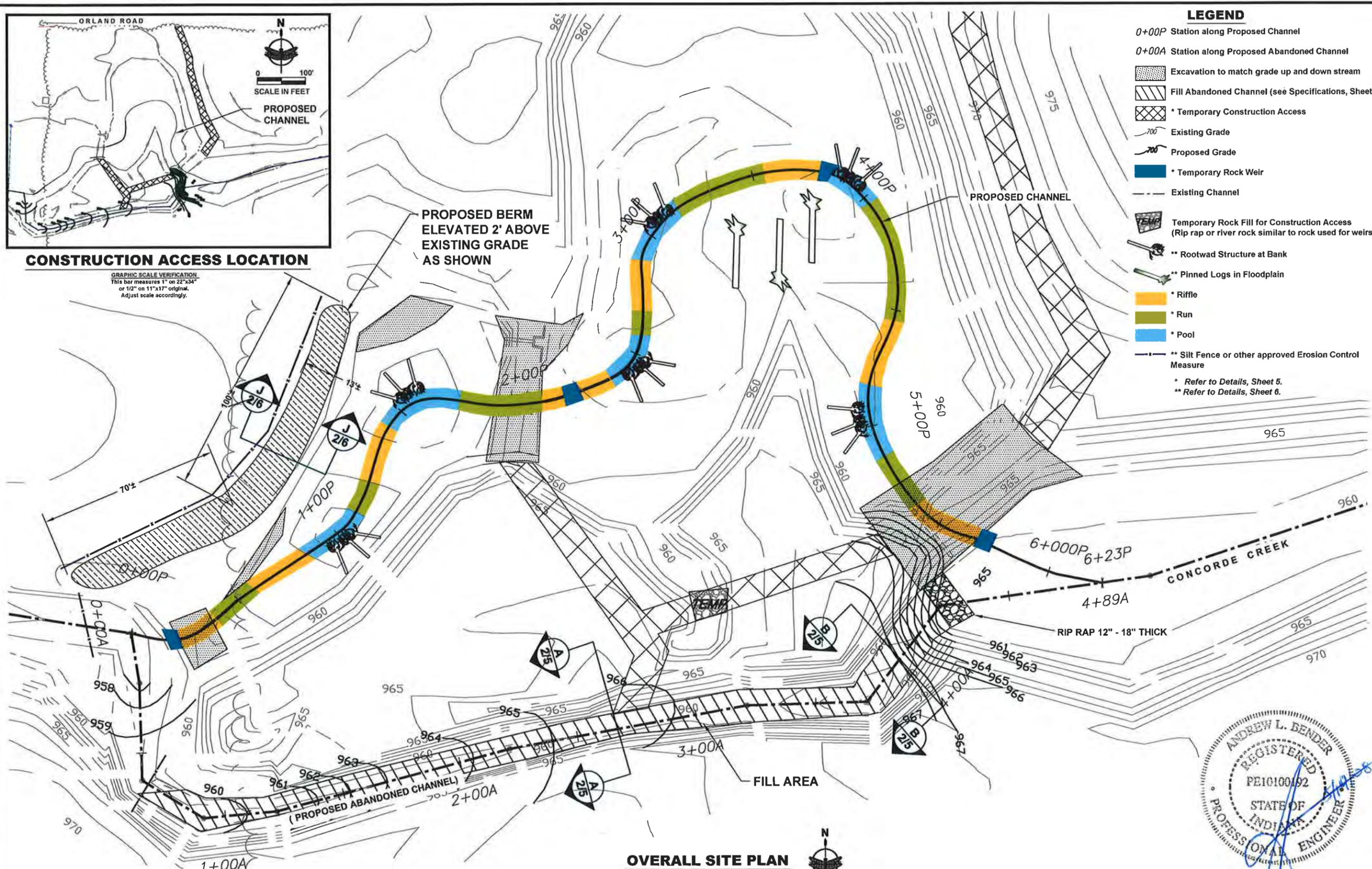
SHEET

**1**



**CONSTRUCTION ACCESS LOCATION**

GRAPHIC SCALE VERIFICATION  
 This bar measures 1" on 22"x34"  
 or 1/2" on 11"x17" original.  
 Adjust scale accordingly.



**LEGEND**

- 0+00P Station along Proposed Channel
- 0+00A Station along Proposed Abandoned Channel
- Excavation to match grade up and down stream
- Fill Abandoned Channel (see Specifications, Sheet 7)
- \* Temporary Construction Access
- Existing Grade
- Proposed Grade
- \* Temporary Rock Weir
- Existing Channel
- Temporary Rock Fill for Construction Access (Rip rap or river rock similar to rock used for weirs)
- \*\* Rootwad Structure at Bank
- \*\* Pinned Logs in Floodplain
- \* Riffle
- \* Run
- \* Pool
- \*\* Silt Fence or other approved Erosion Control Measure
- \* Refer to Details, Sheet 5.
- \*\* Refer to Details, Sheet 6.

**OVERALL SITE PLAN**

GRAPHIC SCALE VERIFICATION  
 This bar measures 1" on 22"x34"  
 or 1/2" on 11"x17" original.  
 Adjust scale accordingly.



**NOTES:**

- 1.) Survey performed by Rowland and Associates on February 27, 2007.



REVISION	DATE	DESCRIPTION

**SITE PLAN**  
**Concorde Creek Restoration Project**  
**Lake Gage**  
**Steuben County, Indiana**

DRAWN BY: COD  
 DESIGNED BY: MTP  
 DATE: DEC 2007  
 JOB NO: 011128

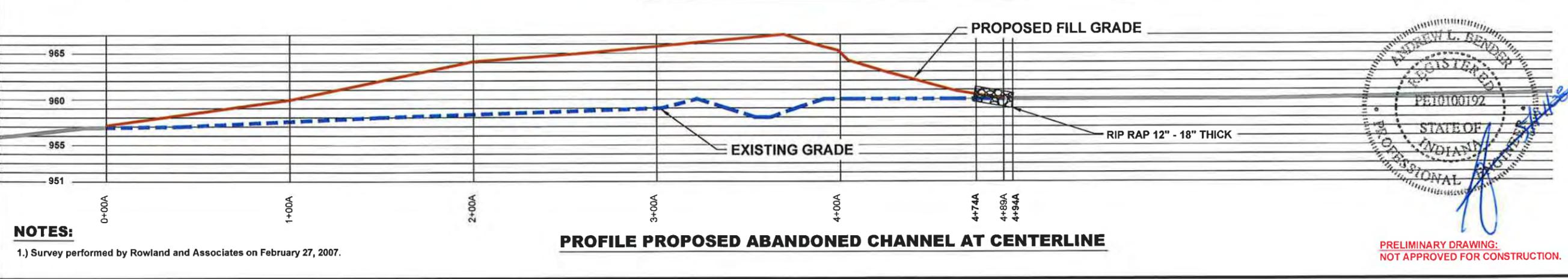
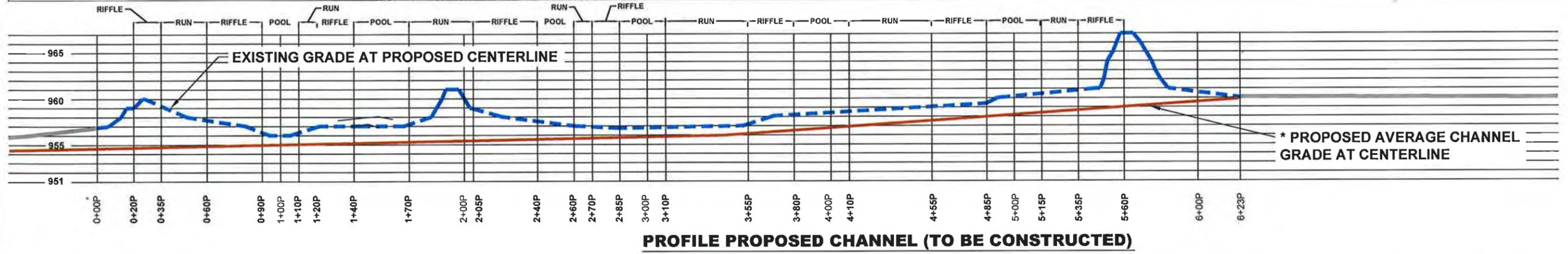
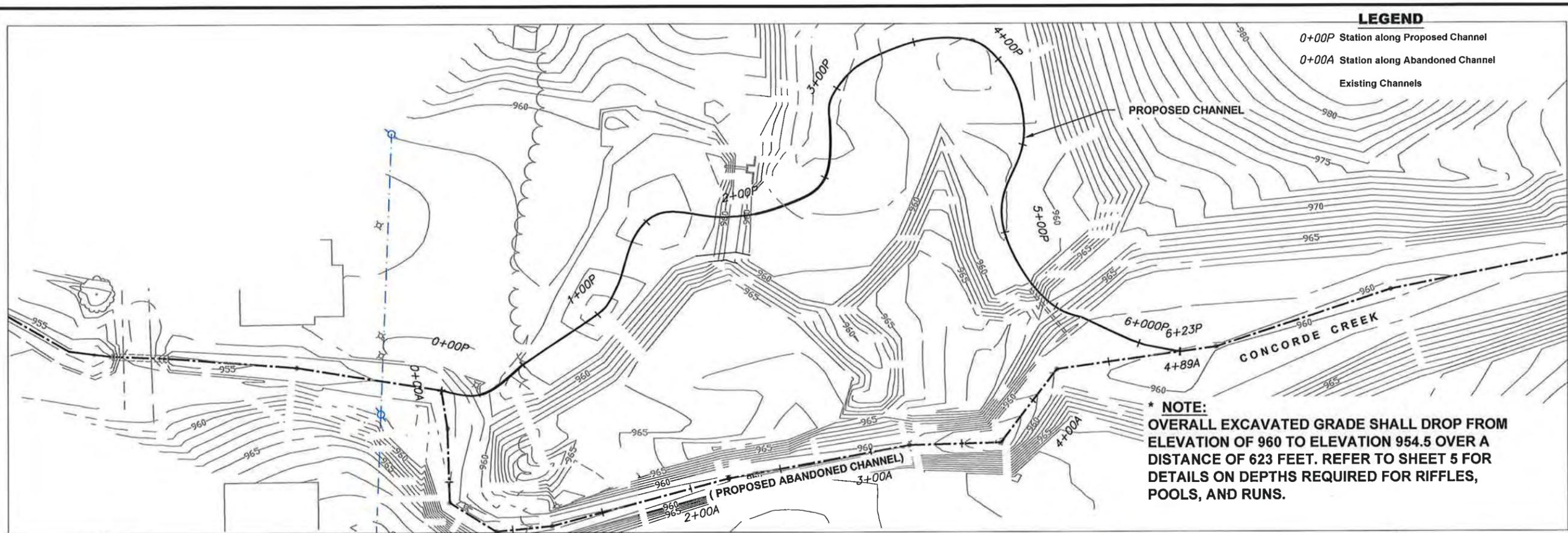


PRELIMINARY DRAWING:  
 NOT APPROVED FOR CONSTRUCTION.

SHEET

**2**

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**NOTES:**  
 1.) Survey performed by Rowland and Associates on February 27, 2007.

**LEGEND**  
 0+00P Station along Proposed Channel  
 0+00A Station along Abandoned Channel  
 Existing Channels

**HORIZONTAL SCALE**  
 0 30'

**GRAPHIC SCALE VERIFICATION**  
 This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

**JFNew**  
 Corporate/Northern Indiana  
 708 Roosevelt Road  
 Walkerton, Indiana 46574  
 574-588-3400

REVISION	DATE	BY	DESCRIPTION

**PROFILE**  
**Concorde Creek Restoration Project**  
**Lake Gage**  
 Steuben County, Indiana

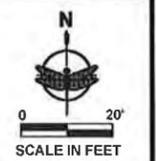
DRAWN BY: COD  
 DESIGNED BY: MTP  
 DATE: DEC 2007  
 JOB NO: 011128

**ANDREW L. BENDER**  
 REGISTERED  
 PE10100192  
 STATE OF INDIANA  
 PROFESSIONAL ENGINEER

**SHEET**  
**3**

**PRELIMINARY DRAWING:**  
**NOT APPROVED FOR CONSTRUCTION.**

L:\Projects\2007\011128\CONSTRUCTION\CONSTRUCTION.dwg  
 User: rowland  
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 Plot Scale: 1" = 100'



GRAPHIC SCALE VERIFICATION  
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or 1/2" on 11"x17" original.  
Adjust scale accordingly.

**JFNew**  
Corporation/Northern Indiana  
708 Roosevelt Road  
Walkerton, Indiana 46574  
574-586-3400

REVISION

**PLANTING PLAN**  
**Concorde Creek Restoration Project**  
**Lake Gage**  
**Steuben County, Indiana**

DRAWN BY: COD  
DESIGNED BY: MTP  
DATE: DEC 2007  
JOB NO: 011128

SHEET  
**4**



**Wooded Wetland Seed Mix**

Botanical Name	Common Name	PLS Ounces/Acre
<b>Permanent Grasses/Sedges:</b>		
<i>Calamagrostis canadensis</i>	Bluejoint Grass	1.00
<i>Carex crinita</i>	Fringed Sedge	2.00
<i>Carex lupulina</i>	Common Hop Sedge	4.00
<i>Carex lurida</i>	Bottlebrush Sedge	1.50
<i>Carex squarosa</i>	Narrow-leaved Cattail Sedge	2.00
<i>Carex sparganoides v. cephaloidea</i>	Rough-Clustered Sedge	1.50
<i>Carex typhina</i>	Common Cattail Sedge	2.00
<i>Carex vulpinoidea</i>	Brown Fox Sedge	4.00
<i>Elymus canadensis</i>	Canada Wild Rye	8.00
<i>Elymus virginicus</i>	Virginia Wild Rye	12.00
<i>Glyceria striata</i>	Fowl Manna Grass	2.00
<i>Leersia oryzoides</i>	Rice Cut Grass	2.00
<i>Scirpus atrovirens</i>	Green Bulrush	2.00
<i>Spartina pectinata</i>	Prairie Cord Grass	1.00
<b>Total</b>		<b>45.00</b>
<b>Temporary Cover:</b>		
<i>Avena sativa</i>	Common Oat	537.00
<i>Lolium multiflorum</i>	Annual Rye	112.00
<b>Total</b>		<b>649.00</b>
<b>Forbs:</b>		
<i>Alisma spp</i>	Water Plantain (Various Mix)	3.00
<i>Angelica altropurpurea</i>	Great Angelica	1.00
<i>Aster puniceus</i>	Bristly Aster	0.75
<i>Aster umbellatus</i>	Flat-Top Aster	0.25
<i>Bidens cernua</i>	Nodding Bur Marigold	2.50
<i>Campanula americana</i>	Tall Bell Flower	0.25
<i>Cephalanthus occidentalis</i>	Button Bush	0.50
<i>Helenium autumnale</i>	Sneezeweed	2.00
<i>Heracleum lanatum</i>	Cow Parsnip	0.75
<i>Hibiscus moscheutos</i>	Swamp Rose Mallow	2.00
<i>Lobelia siphilitica</i>	Great Blue Lobelia	1.50
<i>Mimulus ringens</i>	Monkey Flower	1.25
<i>Rudbeckia laciniata</i>	Cut-Leaf Coneflower	0.75
<i>Verbena alternifolia</i>	Wingstem	2.00
<b>Total</b>		<b>18.00</b>

**Woodland Seed Mix with Native Bare Root Tree Planting**

Botanical Name	Common Name	PLS Ounces/Acre
<b>Permanent Grasses/Sedges:</b>		
<i>Avena sativa</i>	Common Oat	512.00
<i>Elymus canadensis</i>	Canada Wild Rye	30.00
<i>Elymus virginicus</i>	Virginia Wild Rye	180.00
<i>Hystrix patula</i>	Bottlebrush Grass	3.00
<i>Lolium multiflorum</i>	Annual Rye	160.00
<b>Total</b>		<b>885.00</b>
<b>Native Bare Root Trees:</b>		
<i>Carya ovata</i>	Shag-bark hickory	25
<i>Platanus occidentalis</i>	American sycamore	25
<i>Quercus alba</i>	White oak	25
<b>Total</b>		<b>75</b>

**Turf Seed Mix**

Botanical Name	Common Name	PLS Ounces/Acre
<i>Festuca spp</i>	Tall Fescue	55.00
<i>Lolium multiflorum</i>	Annual Rye	45.00
<i>Poa Pratensis</i>	Kentucky Blue Grass	35.00
<b>Total</b>		<b>135.00</b>

**PLANTING LEGEND**

- \* Turf Seed Mix over Berm
- \* Wooded Wetland Seed Mix (including 2 1/2' strips each bank of the Proposed Channel)
- \* Woodland Seed Mix with Native Bare Root Tree Planting
- Existing Grade
- Channel Centerlines

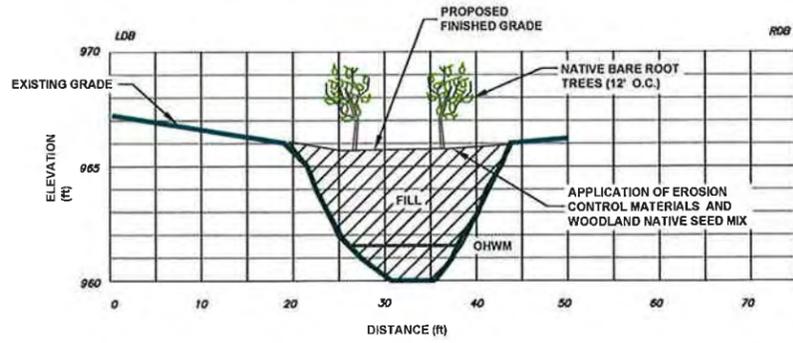


\* NOTE: Erosion Control Blankets shall be applied to all seeded areas as defined on Specification, Sheet 7.

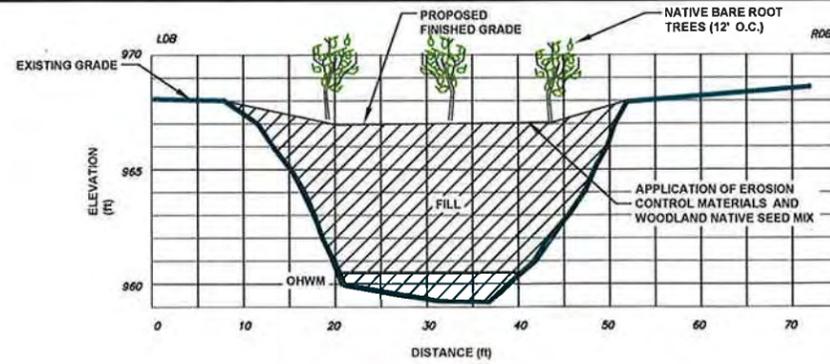
**NOTES:**

- 1.) Survey performed by Rowland and Associates on February 27, 2007.

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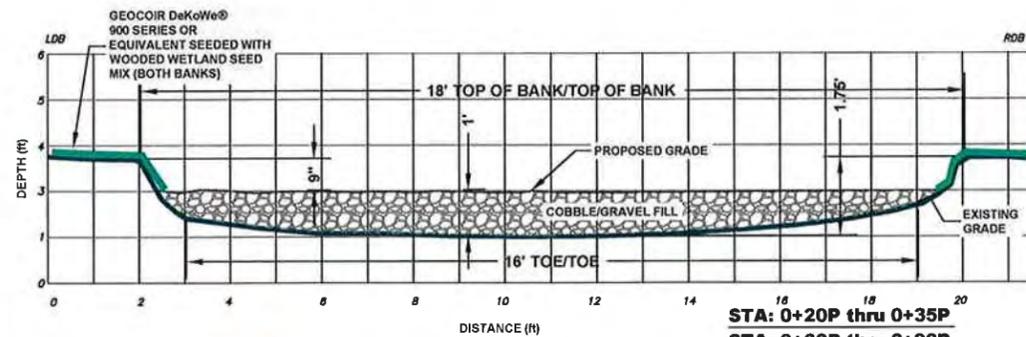


**A**  
SECTION (STA: 2+67)  
HORIZONTAL SCALE 1" = 20'  
VERTICAL SCALE 1" = 4'



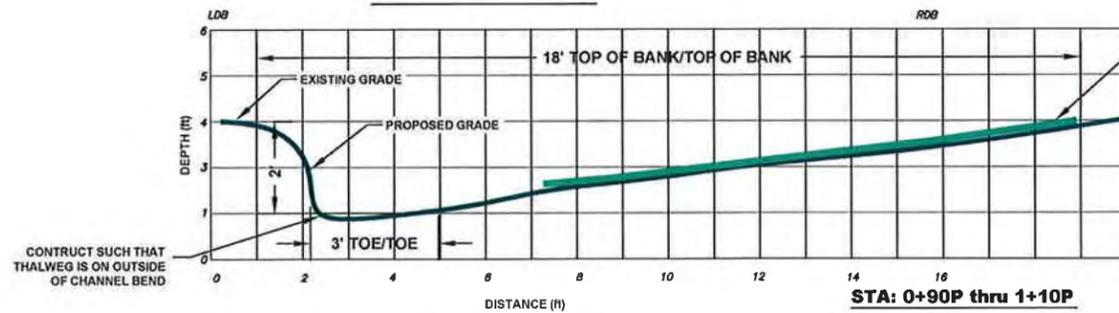
**B**  
SECTION (STA: 3+94)  
HORIZONTAL SCALE 1" = 20'  
VERTICAL SCALE 1" = 4'

**APPLICATION FILLING ABANDONED CHANNEL (STA: 0+00A thru 4+89A)**



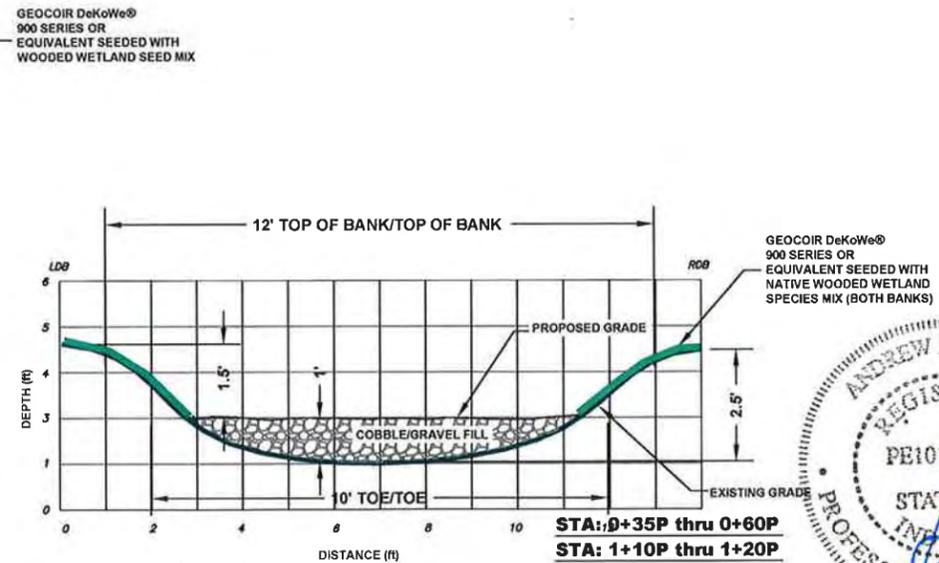
**C**  
TYPICAL RIFFLE HABITAT SECTION  
NOT TO SCALE

- STA: 0+20P thru 0+35P
- STA: 0+60P thru 0+90P
- STA: 1+20P thru 1+40P
- STA: 2+05P thru 2+40P
- STA: 2+70P thru 2+85P
- STA: 3+55P thru 3+80P
- STA: 4+55P thru 4+85P
- STA: 5+35P thru 5+60P



**D**  
TYPICAL POOL HABITAT SECTION  
NOT TO SCALE

- STA: 0+90P thru 1+10P
- STA: 1+40P thru 1+70P
- STA: 2+40P thru 2+60P
- STA: 2+85P thru 3+10P
- STA: 3+80P thru 4+10P
- STA: 4+85P thru 5+15P



**E**  
TYPICAL RUN HABITAT SECTION  
NOT TO SCALE

- STA: 0+35P thru 0+60P
- STA: 1+10P thru 1+20P
- STA: 1+70P thru 2+05P
- STA: 2+60P thru 2+70P
- STA: 3+10P thru 3+55P
- STA: 4+10P thru 4+55P
- STA: 5+15P thru 5+35P

**NOTE:**  
THALWEG SHALL BE CONSTRUCTED THROUGHOUT RIFFLE / POOL SEQUENCE AT A WIDTH OF 2' - 3' WIDE AND A DEPTH OF 0.2' TO 0.4' DEEPER THAN THE REMAINDER OF CHANNEL BOTTOM IN RUN SEGMENTS.

**RIFFLE, POOL, RUN APPLICATIONS**



PRELIMINARY DRAWING;  
NOT APPROVED FOR CONSTRUCTION.





**Appendix C:**  
**Regulatory Permits**

This authorization is contingent on compliance with the following terms and conditions:

a. The enclosed Nationwide Permit General Conditions.

b. The following special conditions:

1. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

2. If any archaeological or human remains are uncovered during construction, demolition or earthmoving activities, the permittee must stop work and immediately notify the District Engineer, and within two (2) days notify the Indiana Department of Natural Resources Division of Historic Preservation and Archaeology.

3. The contractor performing the actual operations must comply with Section 311 of the Federal Clean Water Act and with 327 IAC 2-6 (formerly Indiana Stream Pollution Control Board Regulation 330 IAC 1-6-1) concerning spills of oil and hazardous materials.

4. The bottom and banks of the proposed stream relocations shall be similar in grain size and type to those of the adjacent river outside the construction area.

5. Physical disturbance of banks, submerged vegetation and riparian vegetation, especially large trees which provide shade to the waterbody, should be limited to that which is absolutely necessary to the conduct of the project.

6. The movement of equipment within the wetland shall be limited to the minimum necessary to accomplish the work authorized herein.

Any construction activity other than that shown on the plans may not qualify for the authorization. If you contemplate any changes or additional activities from those depicted on the plans, please submit them to this office for authorization review prior to any construction. On completion of the work, you must fill in and return the enclosed COMPLETION REPORT.



REPLY TO  
ATTENTION OF:

**DEPARTMENT OF THE ARMY**  
**DETROIT DISTRICT, CORPS OF ENGINEERS**  
**REGULATORY OFFICE**  
**P.O. BOX 1027**  
**DETROIT, MICHIGAN 48231-1027**

06 May, 2008

Engineering & Technical Services  
Regulatory Office  
LRE-2008-00266-176

Joe Weaver  
Lake Gage and Lime Lake Association  
6080 West Orland Road  
Angola, Indiana 46703

Dear Mr. Weaver:

Reference your application for a Department of the Army (DA) permit to conduct stream habitat restoration activities in the connecting waters of Lake Gage (Concorde Creek) approximately 1,000 feet downstream of the Orland Road bridge, Steuben County, Indiana (Section 2, Township 37N, Range 12E). We have verified that the project is authorized by nationwide permit as published in the Federal Register.

As indicated on the enclosed plans, the following work is authorized under NWP 27:

Discharge approximately 194 cubic yards of clean earthen material into approximately 350 linear feet of the existing stream channel. Restore approximately 550 linear feet of the previously abandoned channel by excavating approximately .16 acres of wetland. Discharge approximately 153 cubic yards of 3-4-inch diameter stone to line and stabilize the restored banks. Cover the banks of the new channel with erosion control material and seed with a native wooded wetland seed mix. Excavate three (3) earthen berms to floodplain elevation to restore .12 acres of wetland. Install 27 cubic yards of root wad revetments at three (3) along the restored channel to provide streambank stabilization and aquatic habitat. Discharge a total of eleven (11) cubic yards of stone in five (5) locations to create temporary sediment catch basins when the channel is initially opened. After habitat conditions have stabilized the temporary rock weirs will be leveled to create riffle habitat. After the new channel is opened, the abandoned channel will be brought to grade and seeded with a native woodland plant mix, native bare root trees and shrubs. The project will restore the original channel of Concorde Creek and eliminate erosion in the manmade channel.

## A. Nationwide Permit General Conditions:

To qualify for NWP authorization, the permittee must comply with the following general conditions, as appropriate. These conditions are selected from those published in the Federal Register that are particularly relevant to the construction and/or operation of this particular authorized activity. The complete text is available at [http://www.usace.army.mil/cw/cecwo/reg/nwp/nwp\\_2007\\_final.pdf](http://www.usace.army.mil/cw/cecwo/reg/nwp/nwp_2007_final.pdf) or you may contact the Detroit District. We have done our best to verify that your project complies with the others, where applicable.

1. Navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the

activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

15. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

16. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

17. Endangered Species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.html> respectively.

25. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

---

(Transferee)

(Date)

26. Compliance Certification. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;

(b) A statement that any required mitigation was completed in accordance with the permit conditions; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

28. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

#### **B. Further Information**

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project

NATIONWIDE PERMIT COMPLETION REPORT

CELRE-RG-A

06 May 2008

Chief, Enforcement Branch  
Regulatory Office  
U.S. Army Corps of Engineers  
P.O. Box 1027  
Detroit, MI 48231-1027

Dear Sir:

You are hereby notified that work under Department of the Army Permit No. LRE-2008-00266-176, issued to the Lake Gage and Lime Lake Association was completed in accordance with the permit on:

---

(Date work completed)

---

(Permittee's Signature)

---

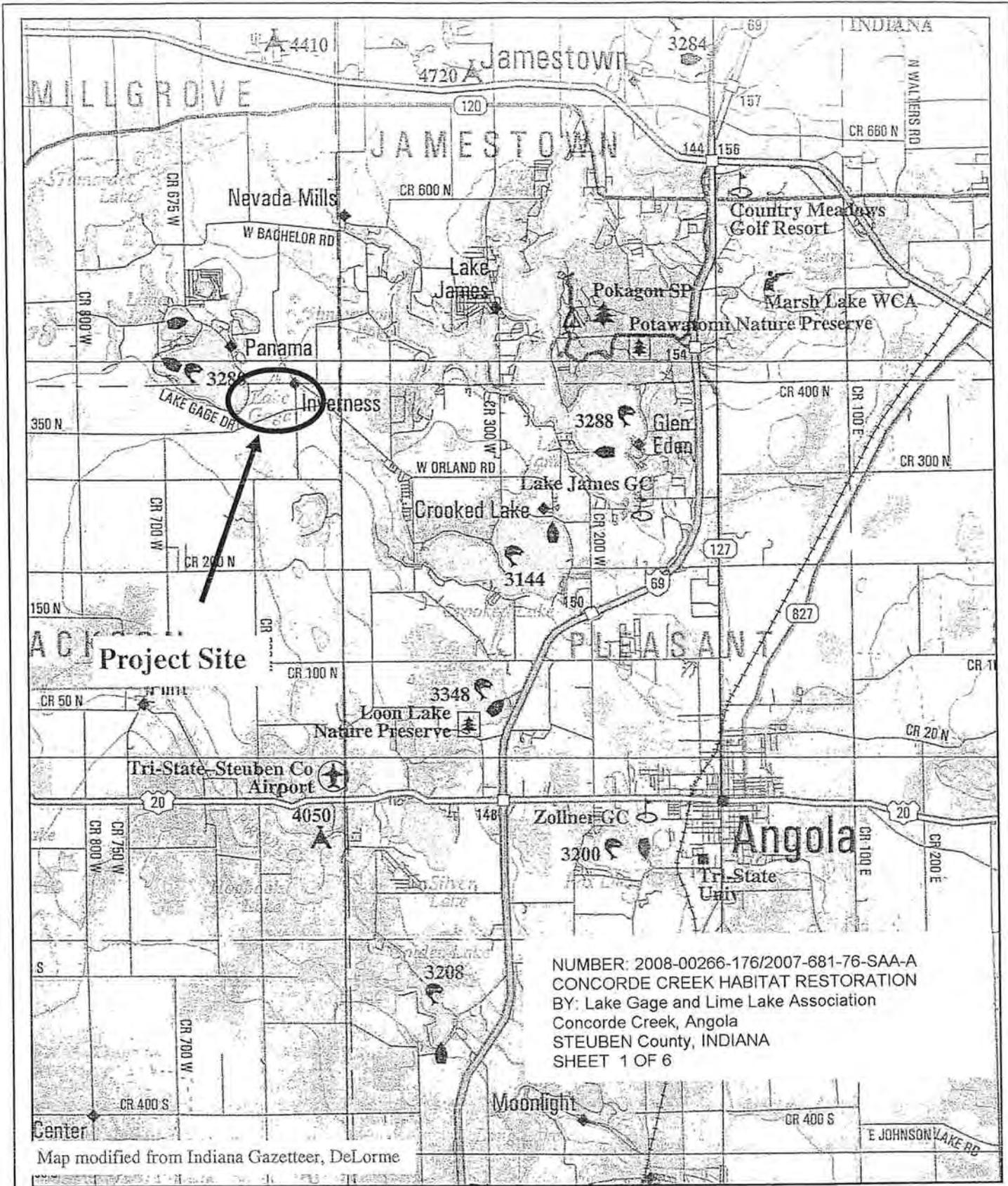
**IMPORTANT**

1. This COMPLETION REPORT MUST BE MAILED to the above addressee within 10 days after completion of work covered by the FEDERAL PERMIT to insure an accurate Government record of data affecting navigation.
2. Where dredging soundings are made of projects which include dredging, a copy of the soundings should accompany this report. If the soundings are measured from the water surface and have not been corrected to International Great Lakes Datum plane, the hour and date soundings was made should be noted on sounding reports.

NOTE: Although permits authorizing structures carry an expiration date, REPAIRS that conform to the permit plans are also within the scope of the authorization. Therefore, it is recommended that expired permits NOT be destroyed, but retained as proof that the work to be repaired has received the Corps of Engineers' approval.

NCE FL 191  
R 17 October 2007

(Edition of 23 July 1981 is obsolete)



**Figure 1: Project Location**  
 Concorde Creek  
 Lake Gage & Lime Lake Assoc.  
 Steuben County, IN



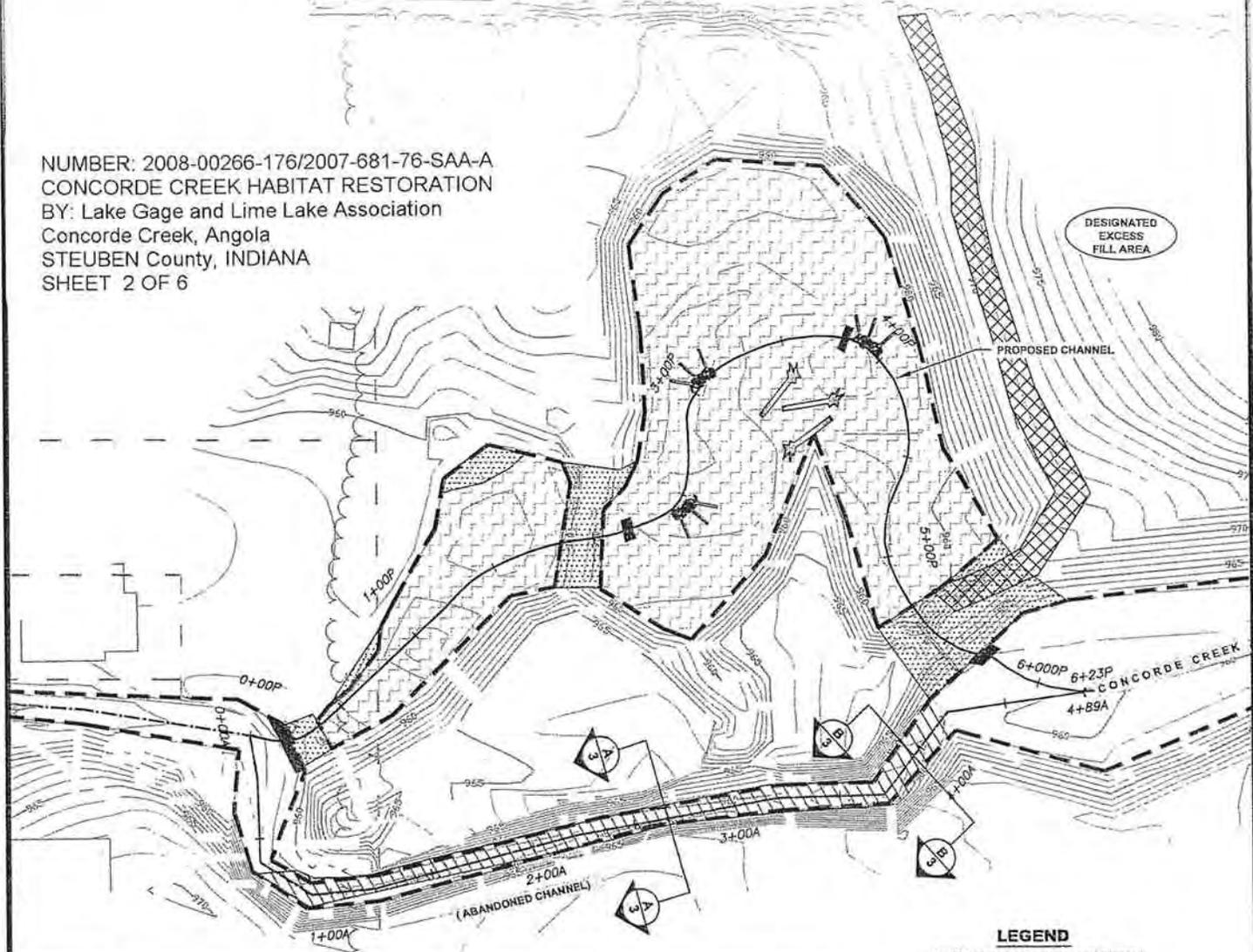
Not to Scale

JFNew # 01-11-28



708 Roosevelt Road, Walkerton, IN 46574  
 Phone 574-586-3400 / Fax 574-586-3446  
 www.jfnew.com

NUMBER: 2008-00266-176/2007-681-76-SAA-A  
 CONCORDE CREEK HABITAT RESTORATION  
 BY: Lake Gage and Lime Lake Association  
 Concorde Creek, Angola  
 STEUBEN County, INDIANA  
 SHEET 2 OF 6

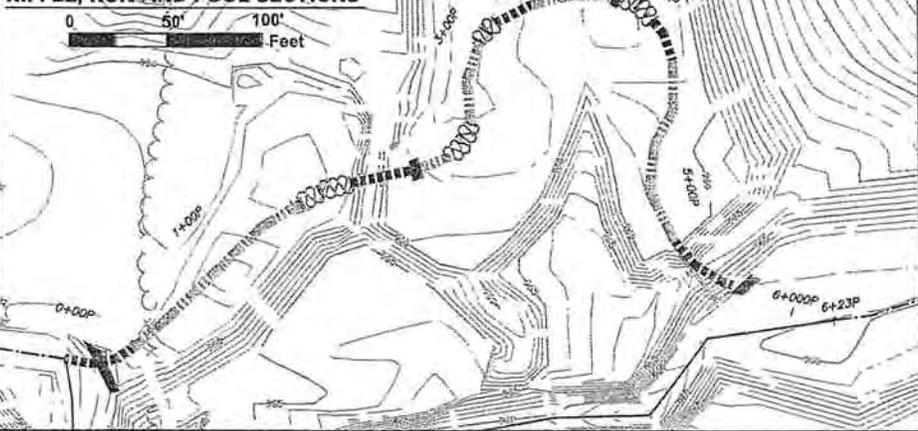


DESIGNATED EXCESS FILL AREA

**LEGEND**

- 0+00P Station along Proposed Channel
  - 0+00A Station along Abandoned Channel
  - Excavation to or below floodplain grade
  - Fill Abandoned Channel
  - Temporary Construction Access
  - Waters of the U.S.
  - Property Lines
  - Existing Grade
  - Existing Wetland
  - Temporary Rock Weir
  - Rootwad Structure at Bank, refer to Figure F/5
  - Pinned Logs in Floodplain, refer to Figure G/5
  - \*Rifle
  - \*Run
  - \*Pool
- \*NOTE: For Rifle, Pool, and Run  
 Habitat details refer to Figure 4.

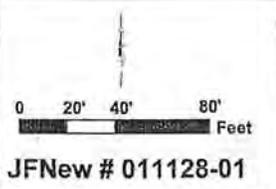
**RIFFLE, RUN AND POOL SECTIONS**



**NOTES:**

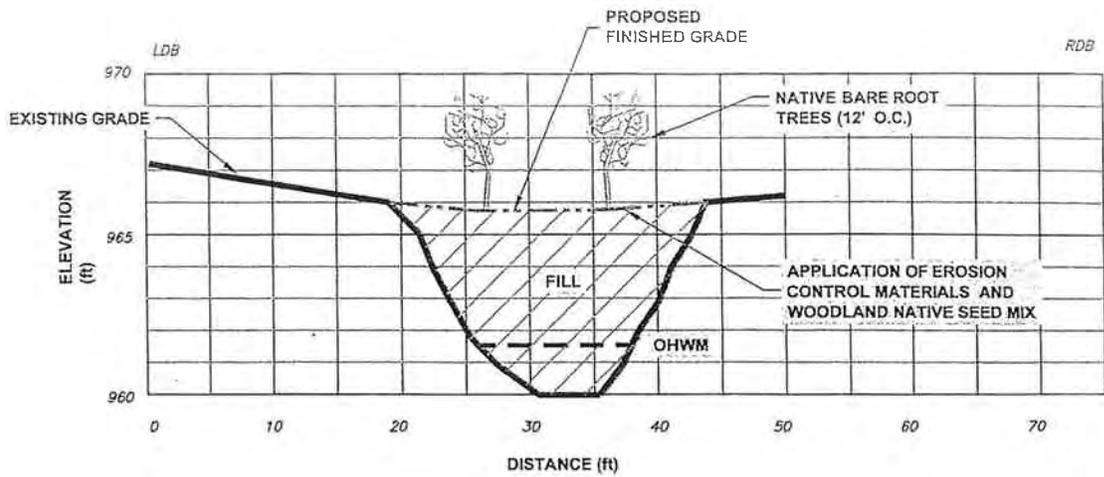
1.) Survey performed by Rowland and Associates on February 27, 2007.

**Figure 2: SITE LAYOUT**  
 Concorde Creek Restoration Project  
 Lake Gage  
 Steuben County, Indiana



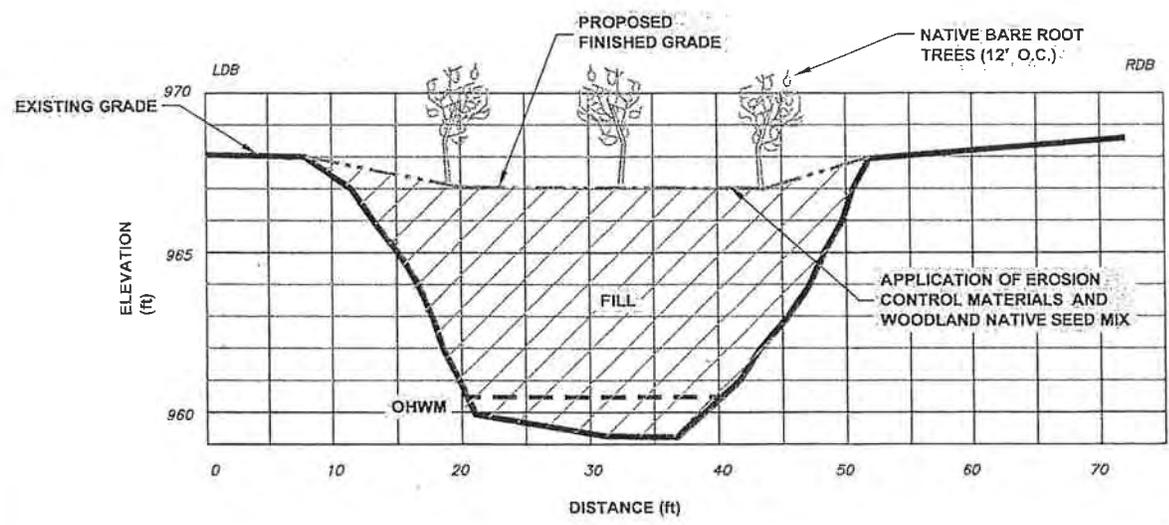
**JFNew**  
 708 Roosevelt Road, Walkerton, IN 46574  
 Phone 574-586-3400 / Fax 574-586-3446  
 www.jfnew.com

CDD



**SECTION**  
 A  
 3  
 HORIZONTAL SCALE  
 1" = 30'  
 VERTICAL SCALE  
 1" = 6'

NUMBER: 2008-00266-176/2007-681-76-SAA-A  
 CONCORDE CREEK HABITAT RESTORATION  
 BY: Lake Gage and Lime Lake Association  
 Concorde Creek, Angola  
 STEUBEN County, INDIANA  
 SHEET 3 OF 6



**SECTION**  
 B  
 3  
 HORIZONTAL SCALE  
 1" = 30'  
 VERTICAL SCALE  
 1" = 6'

Figure 3: EXISTING CROSS-SECTIONS  
 (ABANDONED CHANNEL)  
 Concorde Creek Restoration Project  
 Lake Gage  
 Steuben County, Indiana

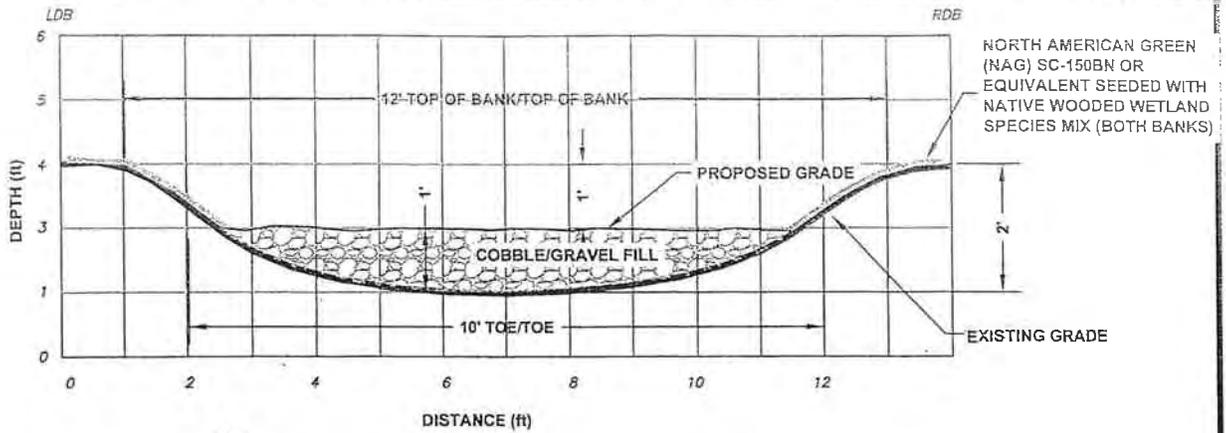
SCALE AS NOTED

JFNew # 011128-01

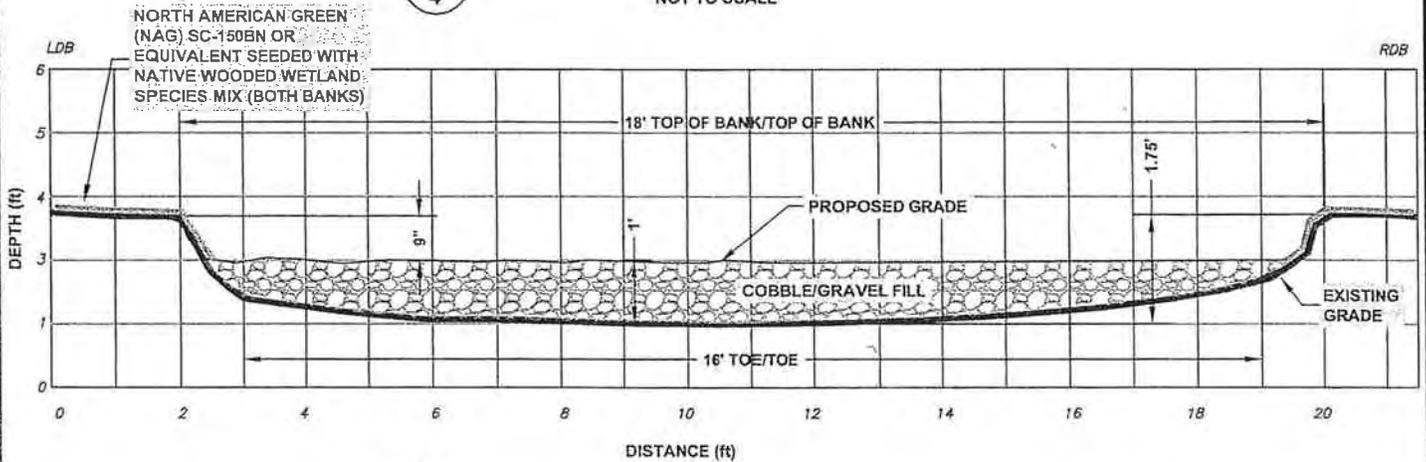


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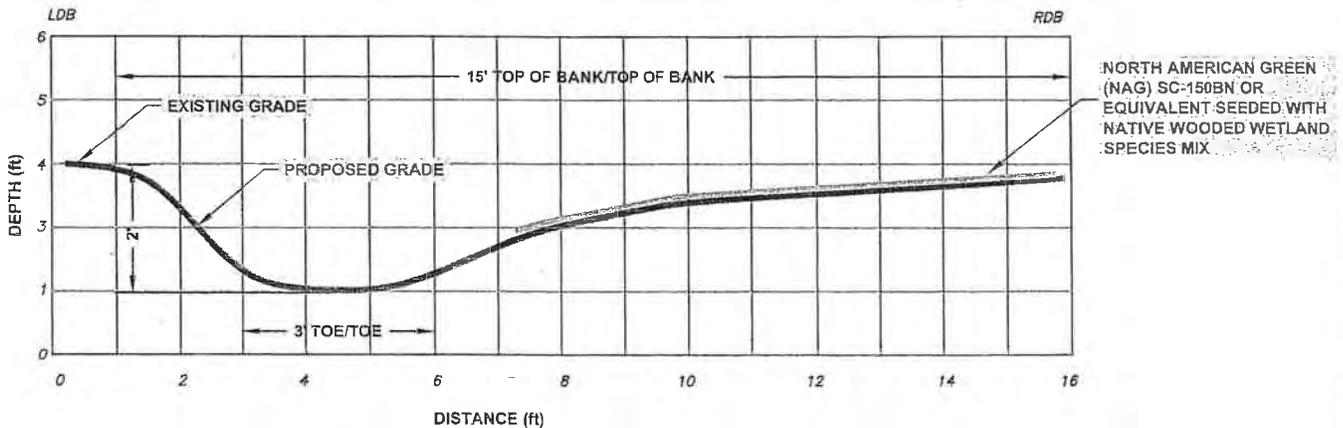
500



**C**  
4  
**TYPICAL RUN HABITAT SECTION**  
NOT TO SCALE



**D**  
4  
**TYPICAL RIFFLE HABITAT SECTION**  
NOT TO SCALE



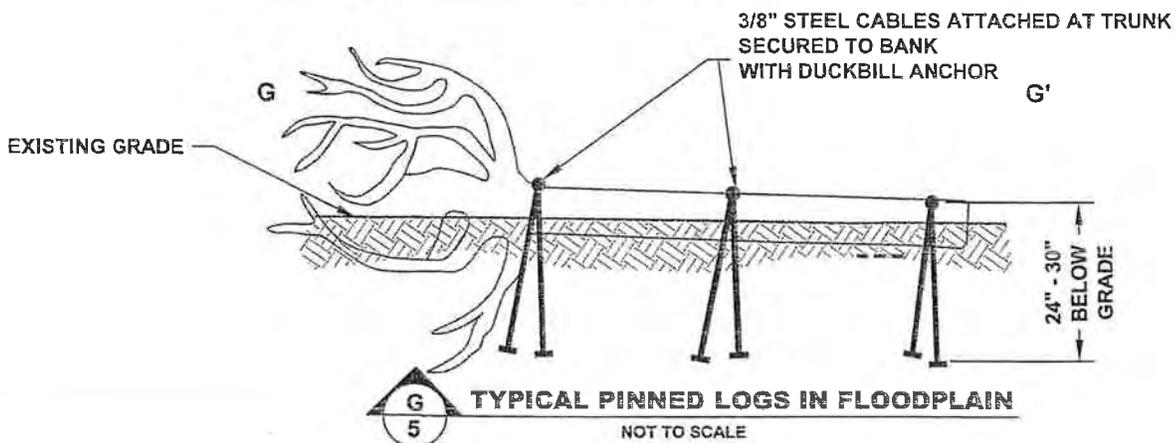
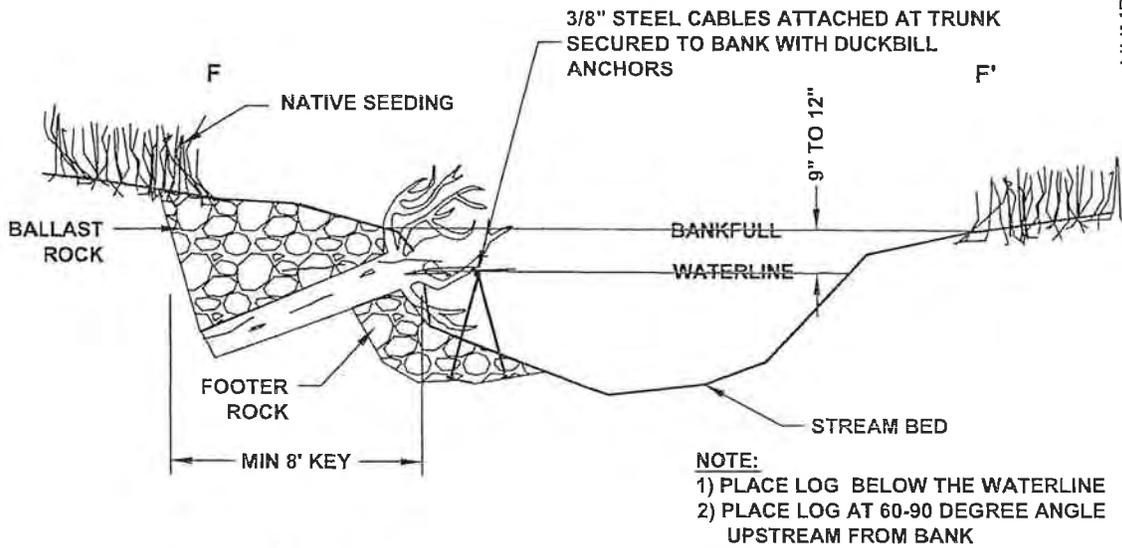
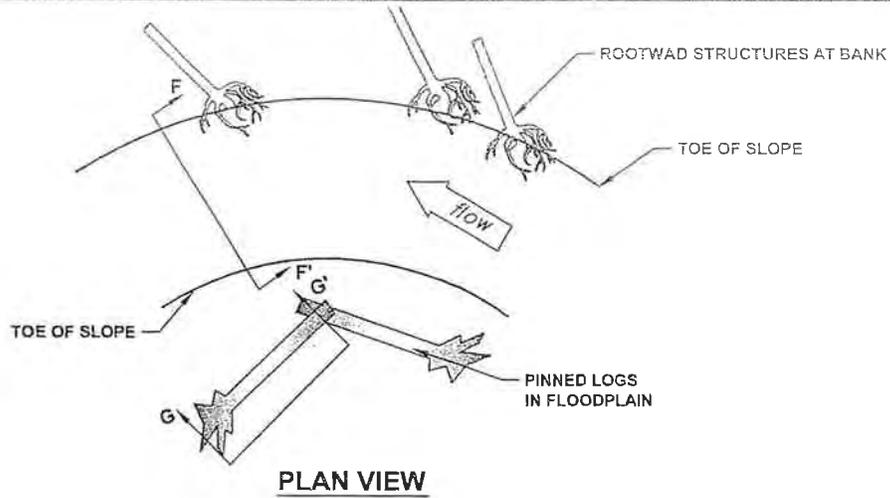
**E**  
4  
**TYPICAL POOL HABITAT SECTION**  
NOT TO SCALE

**Figure 4: TYPICAL RIFFLE / POOL / RUN HABITATS**  
Concorde Creek Restoration Project  
Lake Gage  
Steuben County, Indiana

NUMBER: 2008-00266-176/2007-681-76-SAA-A  
CONCORDE CREEK HABITAT RESTORATION  
BY: Lake Gage and Lime Lake Association  
Concorde Creek, Angola  
STEUBEN County, INDIANA  
SHEET 4 OF 6

JFNew # 011128-01

PHONE 317-506-3490 / FAX 317-506-3490  
www.jfnew.com



NUMBER: 2008-00266-176/2007-681-76-SAA-A  
 CONCORDE CREEK HABITAT RESTORATION  
 BY: Lake Gage and Lime Lake Association  
 Concorde Creek, Angola  
 STEUBEN COUNTY, INDIANA  
 SHEET 5 OF 6

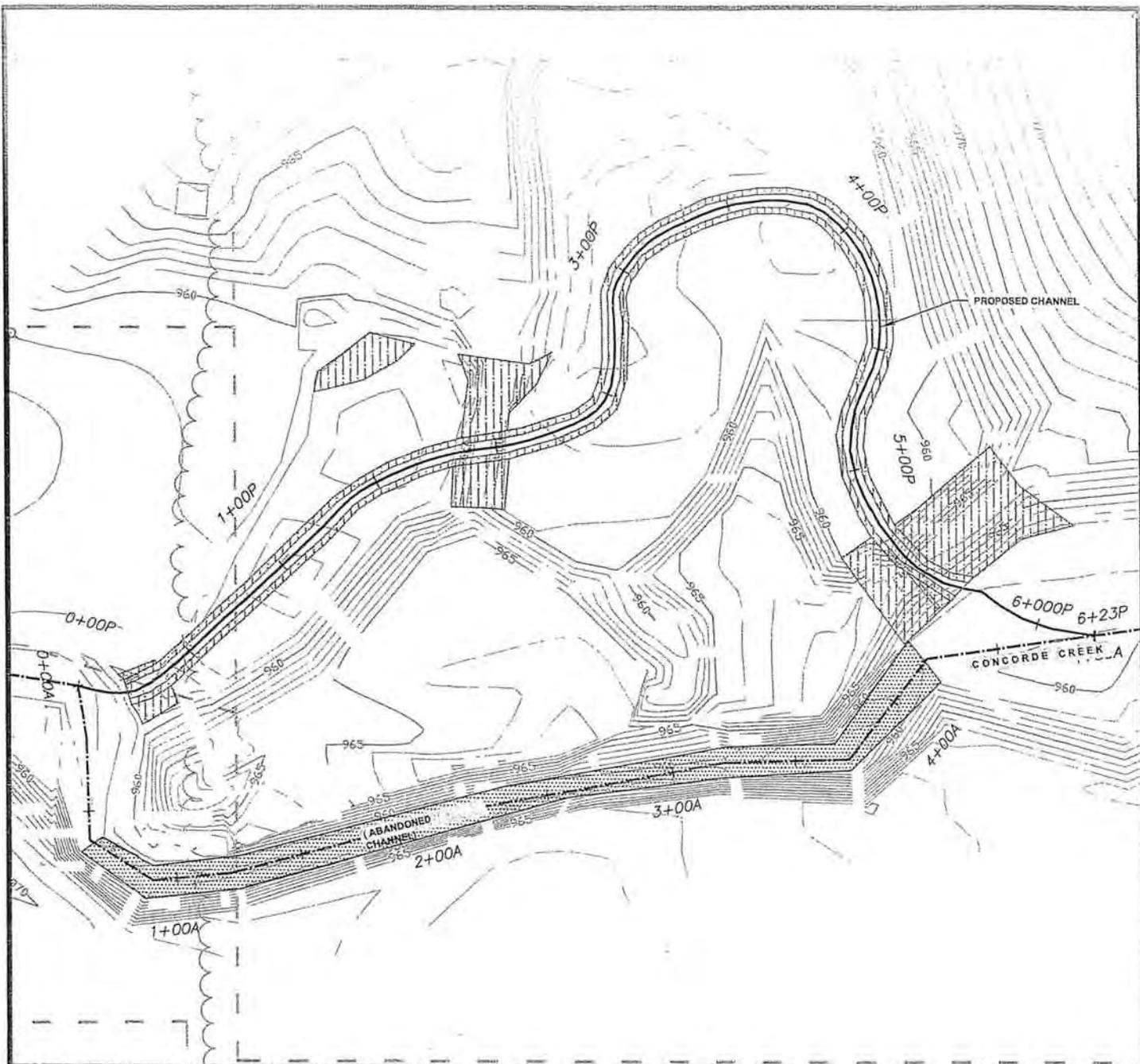
Figure 5: TYPICAL ROOTWAD STRUCTURE and PINNED LOGS IN FLOODPLAIN  
 Concorde Creek Restoration Project  
 Lake Gage  
 Steuben County, Indiana

NOT TO SCALE

JFNew # 011128-01



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NUMBER: 2008-00266-176/2007-681-76-SAA-A  
 CONCORDE CREEK HABITAT RESTORATION  
 BY: Lake Gage and Lime Lake Association  
 Concorde Creek, Angola  
 STEUBEN County, INDIANA  
 SHEET 6 OF 6

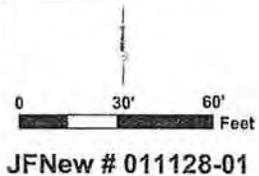
**PLANTING LEGEND**

-  \*Wooded Wetland Seed Mix (including 2 1/2' strips each bank of the Proposed Channel)
-  \*Woodland Seed Mix with Native Bare Root Tree Planting
-  Property Lines
-  Existing Grade
-  Existing Channel Centerlines
- \*Refer to Figure 7 for Planting List*

**NOTES:**

1.) Survey performed by Rowland and Associates on February 27, 2007.

Figure 6: PLANTING PLAN  
 Concorde Creek Restoration Project  
 Lake Gage  
 Steuben County, Indiana



706 Roosevelt Road, Walkerton, IN 46574  
 Phone 574-586-3400 / Fax 574-586-3446  
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INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We make Indiana a cleaner, healthier place to live.*

Mitchell E. Daniels, Jr.  
Governor

Thomas W. Easterly  
Commissioner

100 North Senate Avenue  
Indianapolis, Indiana 46204  
(317) 232-8603  
(800) 451-6027  
www.IN.gov/idem

March 6, 2008

VIA CERTIFIED MAIL 7002 0510 0003 0022 2729

Mr. Joe Weaver  
Lake Gage and Lime Lake Association  
6080 West Orland Road  
Angola, Indiana 46703-9727

Dear Mr. Weaver:

Re: Section 401 Water Quality Certification  
Project: Restoration of Concorde Creek  
IDEM No.: 2007-681-76-SSA-A  
County: Steuben

Office of Water Quality staff has reviewed your application for Section 401 Water Quality Certification dated November 29, 2007, and received December 6, 2007. According to the application, you propose to fill approximately 350 linear feet of existing man-made channel with 194 cubic yards of clean earthen material as part of a project to restore Concorde Creek to its original channel and to reduce erosion and sedimentation into Lake Gage. Approximately 550 linear feet of previously abandoned channel will be restored as part of this project. In addition, you propose to excavate 0.16 acre of existing wetland for the footprint of the restored channel. The excavated channel will be lined with approximately 153 cubic yards of 3" to 4" diameter stone to provide stability. The banks of the new channel will be covered with erosion control material and seeded with a native wooded wetland mix. You also propose to excavate three existing earthen berms to floodplain elevation, resulting in 0.12 acre of restored wetland and to install 27 cubic yards of rootwad revetments at three locations along the proposed channel to provide streambank stabilization and habitat. Temporary rock weirs totaling 11 cubic yards will be installed at five (5) locations within the proposed channel to capture sediment when the channel is initially opened. Weirs will be leveled to create riffle habitat a few months after construction. Upon the opening of the new channel, the abandoned channel will be brought to grade and seeded with a native woodland plant mix and planted with native bare-root trees and shrubs. The project is located in Section 2, Township 37 North, Range 12 East, Angola West USGS Quad, Steuben County.

Based on available information, it is the judgment of this office that the proposed project will comply with the applicable provisions of 327 IAC 2 and Sections 301, 302, 303, 306, and 307 of the Clean Water Act if the recipient of the certification complies with the conditions set

forth below. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants Section 401 Water Quality Certification for the project described in your application received December 6, 2007, and modifications received February 1, 2008. Any changes in project design or scope not detailed in the application described above or modified by the conditions below are not authorized by this certification.

#### **CONDITIONS OF THE SECTION 401 WATER QUALITY CERTIFICATION:**

The recipient of the certification shall:

- 1) Deposit any dredged material in a contained upland disposal area to prevent sediment runoff to any waterbody.
- 2) Install erosion control methods prior to any soil disturbance to prevent soil from leaving the construction site. Appropriate erosion control methods include, but are not limited to, straw bale barriers, silt fencing, erosion control blankets, phased construction sequencing, and earthen berms. Monitor and maintain erosion control structures and devices regularly, especially after rain events, until all soils disturbed by construction activities have been permanently stabilized.
- 3) Install silt fence or other erosion control measures around the perimeter of any wetlands and/or other waterbodies to remain undisturbed at the project site.
- 4) Allow the commissioner or an authorized representative of the commissioner (including an authorized contractor), upon the presentation of credentials:
  - a) to enter the property of the recipient of the certification;
  - b) to have access to and copy at reasonable times any records that must be kept under the conditions of this certification;
  - c) to inspect, at reasonable times, any monitoring or operational equipment or method; collection, treatment, pollution management or discharge facility or device; practices required by this certification; and any mitigation wetland site;
  - d) to sample or monitor any discharge of pollutants or any mitigation wetland site.
- 5) Complete all approved discharges no later than two (2) years of the date of issuance of this Section 401 Water Quality Certification. The applicant may request a one (1) year extension to the Section 401 Water Quality Certification by submitting a written request ninety (90) days prior to the deadline stated above. The written request shall contain an account of which discharges and mitigation have been completed and list the reasons an extension is requested.
- 6) Submit photographs and brief documentation of the restored stream and wetland site to this office by December 31 for three years. The reports shall include the following:
  - a) The IDEM identification number.
  - b) As-built plans (in the first year's report).

- c) Discussion of plant community development at the mitigation wetland site.
  - d) Photographs representative of the site.
- 
- 7) Submit as-built plans with the first year's monitoring report for the mitigation stream and/or wetland. As-built plans shall include the final grade elevations at one foot contours, including a plan view and cross sections. For relocated streams, this shall include a longitudinal profile, and lateral cross sections at the apex of each meander and at the midpoint between meanders. For wetlands, this shall include a cross section along the primary axis and secondary axis. In addition, as-built plans shall include locations and elevations of structures (e.g., culvert inverts, outfalls, inlets, berms, piezometers, wells, etc.). As-built plans shall also include the species and quantities of each species that were planted. Deviations from this approved Water Quality Certification must be highlighted and explained. Wouldn't these violations of the 401.
  - 8) File a signed and recorded environmental notice, which describes the compensatory mitigation contained in the mitigation plan, with the department within sixty (60) days of the release from monitoring requirements. You may substitute a copy of a properly recorded deed restriction or conservation easement protecting the mitigation site(s) to satisfy this condition.
  - 9) Allow no construction equipment, temporary run-arounds, coffer dams, temporary causeways, temporary crossings, or other such structures to enter or be constructed within Concorde Creek, unless specifically stated, depicted, or detailed in the aforementioned correspondence and project plans. A modification of this Section 401 Water Quality Certification is required from this office if any of the aforementioned items are needed for project construction.
  - 10) Remove any temporary causeway or other approved temporary structures used to facilitate construction or access upon completion of construction activities.

This certification does not relieve the recipient of the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person. You may wish to contact the Indiana Department of Natural Resources at 317-232-4160 (toll free at 877-928-3755) concerning the possible requirement of natural freshwater lake or floodway permits. In addition, you may wish to contact IDEM's Stormwater Permits Section at 317-233-1864 concerning the possible need for a 327 IAC 15-5 (Rule 5) permit if you plan to disturb greater than one (1) acre of soil during construction.

This certification does not:

- (1) authorize impacts or activities outside the scope of this certification;
- (2) authorize any injury to persons or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
- (3) convey any property rights of any sort, or any exclusive privileges;
- (4) preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or

(5) authorize changes in the plan design detailed in the application.

Failure to comply with the terms and conditions of this Section 401 Water Quality Certification may result in enforcement action against the recipient of the certification. If an enforcement action is pursued, the recipient of the certification could be assessed up to \$25,000 per day in civil penalties. The recipient of the certification may also be subject to criminal liability if it is determined that the Section 401 Water Quality Certification was violated willfully or negligently.

This certification is effective eighteen (18) days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18-day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of the certification within the scope of the petition for stay is stayed for fifteen (15) days, unless or until an Environmental Law Judge further stays the certification in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

- 1) You must petition for review in writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.
- 2) You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

Office of Environmental Adjudication  
100 North Senate Avenue  
IGCN Room N1049  
Indianapolis, IN 46204

- 3) You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the certification, decision, or other order for which you seek review by number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings,

hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

If you have procedural questions regarding filing a petition for review you may contact the Office of Environmental Adjudication at 317-232-8591.

If you have any questions about this certification, please contact Ms. Sara Slater-Atwater, Project Manager, of my staff at 317-234-1221, or you may contact the Office of Water Quality through the IDEM Environmental Helpline (1-800-451-6027).

Sincerely,

A handwritten signature in black ink, appearing to read "Marylou Poppa Renshaw". The signature is fluid and cursive, with a large initial "M" and a long, sweeping tail.

Marylou Poppa Renshaw, Chief  
Watershed Planning Branch  
Office of Water Quality

cc: USACE-South Bend Field Office  
Liz McCloskey, USFWS  
Keith Poole, IDNR  
Mark Pranckus, JFNew



**STATE OF INDIANA**  
**DEPARTMENT OF NATURAL RESOURCES**  
**CERTIFICATE OF APPROVAL**  
**CONSTRUCTION IN A FLOODWAY**

**APPLICATION #** : FW-24619

**STREAM** : Unnamed Tributary Lake Gage

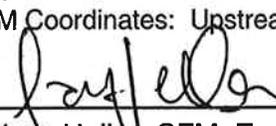
**APPLICANT** : Lake Gage and Lime Lake Association, Inc  
Joe Weaver  
6080 West Orland Road  
Angola, IN 46703-9727

**AGENT** : JFNew and Associates  
Mark Pranckus  
708 Roosevelt Road  
Walkerton, IN 46574

**AUTHORITY** : IC 14-28-1 with 312 IAC 10

**DESCRIPTION** : Approximately 350' of the Unnamed Tributary of Lake Gage (Concorde Creek) channel will be realigned and straightened to restore and return flow to the channel. The new channel will be approximately 550' long and 1' deep, with bottom widths ranging from 3' to 16' and top widths ranging from 12' to 18'. Three earthen berms, totaling approximately 510 cubic yards, and debris and earthen material in the wetland area adjacent to the proposed channel, totaling approximately 40 cubic yards, will be removed and excavated down to the surrounding existing elevation. At three locations along the proposed channel, approximately 27 cubic yards of rootwad revetments will be installed to provide streambank stabilization and habitat complexity. Throughout the upper portion of the project area, approximately 10 cubic yards of logs will be anchored or pinned horizontally to increase roughness. At five locations within the proposed channel, temporary rock weirs, measuring 15' wide by 2' high by 2' long will be installed 0.5' above the channel bottom to help capture sediment during the removal of the most upstream berm. Both streambanks along the proposed channel will be covered in erosion control material and seeded with a native wooded wetland mix. All excavation material will be temporarily placed in an upland location until it is used to fill the abandoned channel. The abandoned channel will be filled with approximately 194 cubic yards of earthen material and graded to match the existing elevation. The abandoned channel will be covered with erosion control material, seeded with a native wood plant mix and planted with native bare-root trees and shrubs. Details of the project are contained in information received electronically at the Division of Water on November 27, 2007 and in plans and information received at the Division of Water on December 5, 2007, December 21, 2007 and February 8, 2008.

**LOCATION** : **DOWNSTREAM:** Beginning approximately 500' downstream of the Orland Road bridge and continuing downstream for 400' near Angola, Jackson Township, Steuben County  
NW¼, NW¼, NW¼, Section 1, T 37N, R 12E, Angola West Quadrangle  
UTM Coordinates: Downstream 4618121 North, 657864 East  
**UPSTREAM:**  
UTM Coordinates: Upstream 4618163 North, 658002 East

**APPROVED BY** :   
Larissa Heller, CFM, Environmental Scientist  
Division of Water

**APPROVED ON** : April 3, 2008

Attachments: Notice Of Right To Administrative Review  
General Conditions  
Special Conditions  
Service List

**STATE OF INDIANA**  
**DEPARTMENT OF NATURAL RESOURCES**  
**NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW**  
**APPLICATION #: FW- 24619**

This signed document constitutes the issuance of a permit by the Department of Natural Resources, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 312 IAC 3-1.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director  
Division of Hearings  
Indiana Government Center North, Room N501A  
100 North Senate Avenue  
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

**STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES**

**GENERAL CONDITIONS**

**APPLICATION #: FW- 24619**

- ( 1 ) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State Law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology  
Room W274  
402 West Washington Street  
Indianapolis, IN 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

- ( 2 ) This permit must be posted and maintained at the project site until the project is completed.
- ( 3 ) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
*US Army Corps of Engineers, Detroit District	(502) 315-6676
Steuben County Drainage Board	(260) 668-1000
Indiana Department of Environmental Management	(317) 233-8488 or (800) 451-6027
Local city or county planning or zoning commission	

- ( 4 ) This permit must not be construed as a waiver of any local ordinance or other state or federal law.
- ( 5 ) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.
- ( 6 ) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation or applicable statute or rule.
- ( 7 ) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. Michael W. Neyer, PE, Director  
Division of Water  
Room W264  
402 West Washington Street  
Indianapolis, IN 46204

Telephone: (317) 232-4160, Toll Free: (877) 928-3755  
FAX: (317) 233-4579

- ( 8 ) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.
- ( 9 ) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

**STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES**

**SPECIAL CONDITIONS**

**APPLICATION #: FW- 24619**

**PERMIT VALIDITY** : This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by April 03, 2010 the permit will become void and a new permit will be required in order to continue work on the project.

This permit becomes effective 18 days after the "MAILED" date shown on the first page. If both a petition for review and a petition for a stay of effectiveness are filed before this permit becomes effective, any part of the permit that is within the scope of the petition for stay is stayed for an additional 15 days.

**CONFORMANCE** : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: November 27, 2007, December 5, 2007, December 21, 2007 and February 8, 2008. Any deviation from the information must receive the prior written approval of the Department.

- | Number | Special Condition   |
|--------|---|
| ( 1 )  | revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue), legumes, and native shrub and hardwood tree species as soon as possible upon completion   |
| ( 2 )  | minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush  |
| ( 3 )  | do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife  |
| ( 4 )  | do not cut any trees suitable for Indiana bat roosting (greater than 5 inches in diameter, living or dead, with loose hanging bark) from April 1 through October 1.   |
| ( 5 )  | appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized |
| ( 6 )  | implement the mitigation plan received at the Division of Water on December 21, 2007 by the end of spring 2009  |
| ( 7 )  | except for the material used as backfill as shown on the above referenced project plans on file at the Division of Water, place all excavated material landward of the floodway   |
| ( 8 )  | all work must conform with the existing bank at the upstream and downstream limits of the project site  |
| ( 9 )  | do not leave felled trees, brush, or other debris in the floodway   |
| ( 10 ) | riprap placed for bank stabilization must conform to the bank   |
| ( 11 ) | backfill the existing channel to existing ground elevations   |
| ( 12 ) | upon completion of the project, remove all construction debris from the floodway  |

**STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES**

**SERVICE LIST**

**APPLICATION #: FW- 24619**

Lake Gage and Lime Lake Association, Inc  
Joe Weaver  
6080 West Orland Road  
Angola, IN 46703-9727

JFNew and Associates  
Mark Prancus  
708 Roosevelt Road  
Walkerton, IN 46574

\*US Army Corps of Engineers, Detroit District  
James M Townsend  
Regulatory Office  
PO Box 1027  
Detroit, MI 48231-1027

Steuben County Drainage Board  
County Surveyor  
County Office Building  
317 South Wayne Street, Suite 3K  
Angola, IN 46703-1958

Steuben County Lakes Council, Inc  
Sue Myers, Secretary  
207 South Wayne Street, Suite B  
Angola, IN 46703-1936

Angola Plan Commission  
210 North Public Square  
Angola, IN 46703-1960

Indiana Department of Natural Resources  
Division of Law Enforcement  
North Region Headquarters Dist 2  
1124 North Mexico Road  
Peru, IN 46970-7522

Ms. Dawn Schuler  
Plan Commission  
317 S. Wayne Street --Suite 3L  
Angola, IN 46703

Steuben County Plan Commission  
317 South Wayne Street  
Suite 3-L  
Angola, IN 46703-1966

Steuben County Soil and Water Conservation  
District  
Peachtree Plaza 200  
1220 North 200 West  
Angola, IN 46703-9171

**Staff Assignment:**

Administrative : Jennifer L. Ware  
Technical : Jennifer L. Ware  
Environmental : Christie L. Stanifer



## **Appendix D:**

### **Landowner Agreements**



# Lake Gage and Lime Lake Association, Inc.

## Landowner Participation Agreement

### A. Participant and Tract Information

Name: David and Beverly J. Butler Symonik Phone: 831-454-9386

Street Address: 139B Southampton Ln.

City: Santa Cruz State: CA Zip Code: 95062

County: Steuben Township: Jackson T37N R12E Sections: 1 and 2

Parcel #'s 005-00407-00, 005-00405-03, 005-00-405-04 (Steuben County Auditor)

### B. Participation Terms and Conditions

The above-named participant hereby agrees to allow the improvement/modification of his/her property at the above location to assist with the protection and improvement of water quality and wildlife habitat in the Lime Lake and Lake Gage watershed in accordance with the following provisions of this agreement.

1. The participant certifies that he/she has control of this/these tract(s) of land.
2. The participant agrees to allow the project to be constructed/carried out by the Lake Gage and Lime Lake Association and their contractors and construction personnel as expressed verbally, in writing, and in drawings provided by the Lake Gage and Lime Lake Association, Inc. and its representatives and consultants. The proposed stream restoration and filling/repair of the old streambed is to be located approximately as shown on the attached drawing labeled Exhibit A and shall contain the basic project elements listed in Exhibit B.
3. Upon receiving notification from the Lake Gage and Lime Lake Association, Inc. the participant agrees to allow the Lake Gage and Lime Lake Association, Inc. and its contractor's reasonable access to the participant's property to maintain a natural and biologically diverse stream habitat after project establishment by performing routine maintenance, erosion control or project repairs as necessary..
4. The participant may at his/her option grant the Lake Gage and Lime Lake Association access to the participant's property for the purpose of managing invasive/aggressive wetland plant species or otherwise managing vegetation within the project area after the installation of the project is complete.

5. The participant agrees not to unnecessarily remove, destroy, or defeat the function of any portion of the project unless a significant threat to life or property exists as a result of the project, provided, however, this project shall not in any way prevent participant from developing such portions of the participant's property not currently located in the stream or a wetland area.

6. The Lake Gage and Lime Lake Association, Inc. agrees not to damage or significantly alter the participants land or property outside the basic modifications necessary for the installation of the stream restoration project without the specific permission of the participant.

7. The Lake Gage and Lime Lake Association, Inc. agrees to save and hold harmless the participant from any and all damages, lawsuits, or liability arising out of the installation or maintenance of the project.

8. Unless otherwise specifically granted by the participant, the Lake Gage and Lime Lake Association, Inc. and its contractors shall have no ownership, property rights, use of, access to, or entrance upon the participant's portion of the project area outside those expressly granted in this agreement.

9. The Lake Gage and Lime Lake Association, Inc. shall be wholly responsible for the maintenance and upkeep of the project.

10. This agreement may be amended by written mutual consent of both the participant and Lake Gage and Lime Lake Association, Inc.

11. Participant has been advised that in order for the Lake Gage and Lime Lake Association, Inc. to obtain the appropriate permits to perform the restoration work, the Indiana Department of Environmental Management or other governmental agencies might ask for certain deed restrictions to be placed on participant's property. It is understood that by execution of this Landowner Participation Agreement, participant is not agreeing to any deed restrictions and if the Indiana Department of Environmental Management or any other governmental agency asks that the participant execute any type of deed restriction, participant may or may not, at participant's sole discretion, execute such deed restriction and the execution of this Landowner Participation Agreement shall not in any way obligate participant to place any type of deed restriction on participant's property.

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**Participant**

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**Date**

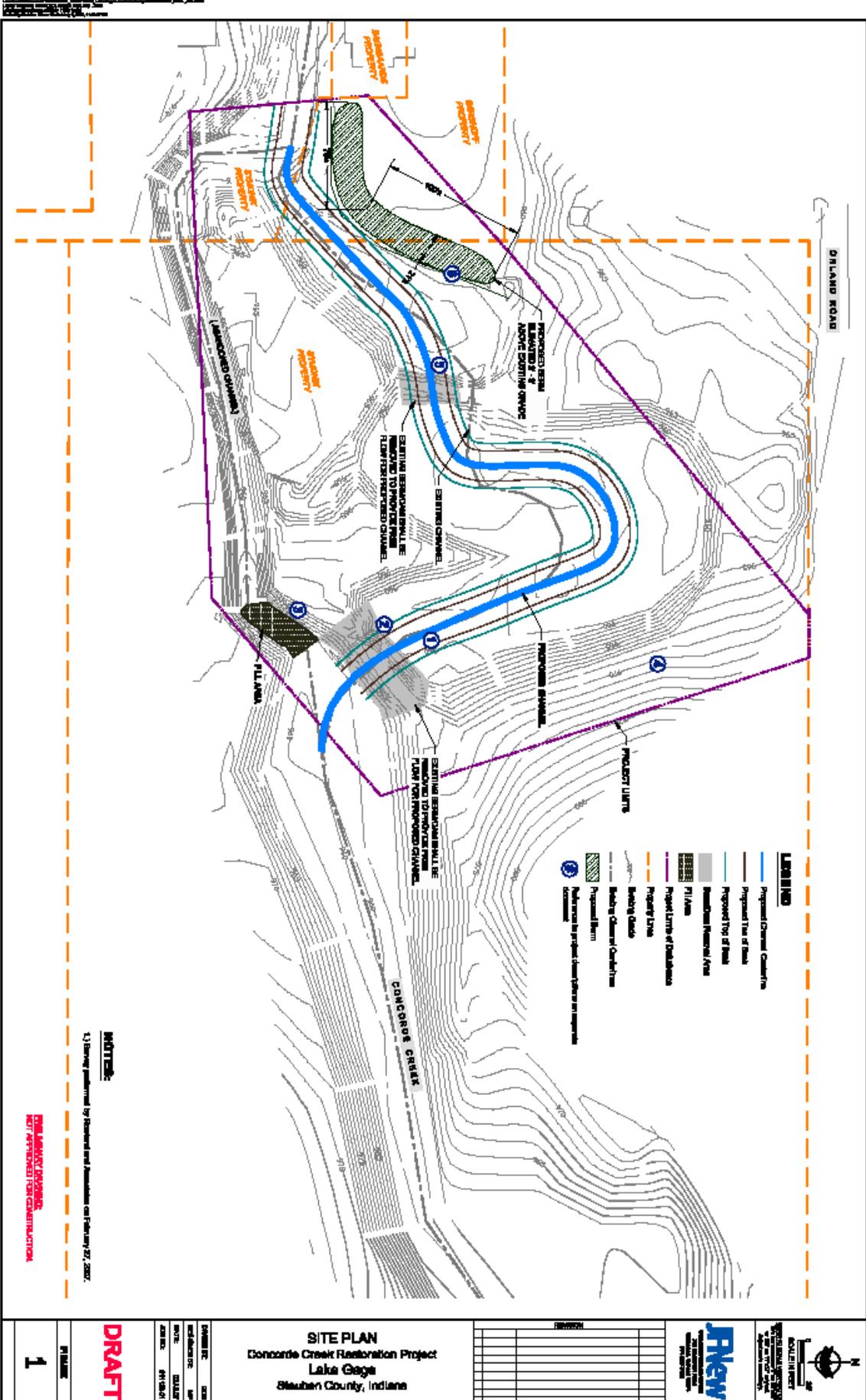
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**Lake Gage and Lime Lake Association**

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**Date**

# Exhibit A



**NOTES:**  
 1) Drawing prepared by Standard and Associates on February 27, 2007.  
**FINAL LAYOUT DESIGN NOT APPROVED FOR CONSTRUCTION**

<b>DRAFT</b>	DATE	BY
	DATE	BY
DATE	BY	DATE
DATE	BY	DATE

**SITE PLAN**  
 Concorde Creek Restoration Project  
 Lake Gage  
 Steuben County, Indiana


N

## **Exhibit B. Descriptions of Conceptual Design Elements for Concorde Creek Channel Restoration**

### *Design Element No. 1: Restored Concorde Creek Channel*

The historical channel of Concorde Creek will be restored from the secondary dam through the Mill Pond Dam and tied back into the active drainage downstream approximately 160 feet from the Mill Pond Dam. The total restored length will be approximately 500 feet. The channel will make one major meander and two minor meanders through the historical floodplain. The location of the channel is designed to mimic the original stream channel. The designed channel will have a two-stage trapezoidal shape. In general, the channel will be approximately 30 feet wide at the top of bank with a depth of 2 feet during high flows. The low flow channel will be approximately 20 feet wide at the base with 2:1 slopes along the streambanks. During low flow conditions, there will be less than one foot of flowing water. The majority of the restored stream channel bottom will be composed of stone and gravel that will be sized to withstand elevated flows without being transported downstream. The slopes of the streambanks will be seeded with native vegetation and covered with biodegradable erosion control material to provide immediate stabilization. Additional habitat features may include cross channel logs, root wads, or pools. The overall channel dimensions and morphology will allow for the stream to access the floodplain during elevated flows and provide a minimum amount of flow during low flow periods.

### *Design Element No. 2: Removal of the Secondary Dam*

It is proposed to remove the entire secondary dam to provide as much access to the historical floodplain as possible. In addition, the removed material can be used elsewhere within the site. Material will be removed from the dam down to the surrounding elevations. The sides of the dam will be graded to a 3:1 slope, seeded with native plant species, and covered with biodegradable erosion control material. A grade control structure will be installed at the start of the channel restoration to prevent materials upstream from migrating through the new channel. The grade control in this section will potentially look like a large riffle for approximately 50 feet.

### *Design Element No. 3: Fill of Abandoned Channel*

The material removed from the secondary dam will be used to abandon the active, excavated channel. Additional clean fill material and rock will be brought in from an outside source to create a stable plug for the channel. The plug will be constructed to an elevation that will prevent any flow through the abandoned channel under a set of designed conditions i.e. 100-year storm flow. Completely shutting down the abandoned channel reduces the significant risk of potential plug failure associated with partial flows during storm conditions. This is especially true given that the floodplain of the historical channel will provide enough space for a 100-year storm event. The material excavated from the abandoned channel will be used to fill as much of the channel as possible starting at the upstream end. The channel plug will be graded to match the existing topography and seeded with native vegetation. The remaining portion of the abandoned channel will be allowed to heal naturally.

### *Design Element No. 4: Temporary Construction Access*

As part of the construction process, temporary access paths will need to be created to move construction materials and equipment to the site. To minimize disturbance, temporary access paths will utilize existing paths and the construction zone of the stream channel. During a site visit, a potential historical access path from Orland Road to the secondary dam was identified. This path was probably created during the construction of the secondary dam. The goal would be to use it to move materials and equipment to and from the secondary dam removal area and the abandoned channel fill area. The path is

fairly flat and would require the disturbance of smaller trees rather than larger, mature trees. A second access path would branch from the main access path down to the proposed stream channel. During construction, materials and equipment would be moved up and downstream along the proposed stream channel, minimizing the disturbance to the adjacent floodplain. Prior to construction, trees to be removed would be inventoried and marked with flagging so that the contractor knows to remove the minimum number of trees. Every attempt would be made to re-use trees within the new stream channel for floodplain habitat enhancement. Disturbance to the areas outside of the stream channel and within the project limits will be minimized. At the end of the project, the temporary access paths and any disturbed areas will be naturalized by seeding with native vegetation and applying the appropriate erosion control material. Trees removed from the stream channel construction would be placed in the access paths to prevent vehicles from using the path and to provide a visual barrier to the existence of a path.

*Design Element No. 5: Mill Pond Dam Removal*

The earthen berm portion of the Mill Pond Dam will be removed as part of the historical channel restoration. The concrete structure will be left in place and can be used as a marker to the past use of the area. The sides of the excavated area will be graded to a 3:1 slope, seeded with native vegetation, and covered with biodegradable erosion control material. Material removed from the Mill Pond Dam will be used to create the berm at the downstream end of the project.

*Design Element No. 6: Floodplain Berm*

A berm will be constructed at the downstream end of the restored stream channel to prevent water from impacting the yards of lake residents during elevated flows. A berm approximately 2 – 3 feet high will be installed along 170 feet of the stream channel. The berm will be approximately 25 feet wide at the base with 3:1 slopes and the top being 3 feet wide. It will wrap from the woodland edge through the backyard of the downstream landowner and tie into a point along the existing stream channel. The berm will be planted to either turf grass or a mixture of native vegetation depending on the feedback from the landowner.

# Lake Gage and Lime Lake Association, Inc.

## Landowner Participation Agreement Amendment

This following amendment modifies the current landowner agreement between David and Beverly J. Butler Symonik and the Lake Gage and Lime Lake Association, Inc. as follows:

### A. Participant and Tract Information

Whereas the Steuben County government has changed the parcel numbers for the land in the existing agreement the parcel numbers below shall replace the parcel numbers in the previous agreement.

Parcel #'s 05-01-000-018.000-05, 05-02-110-130.000-05 (Steuben County Auditor)

### Exhibit A

The floodplain berm area shall now conform to the approximate depiction below in Exhibit A. The detail depicted in Exhibit A below shall replace the detail indicated in the same area on the Exhibit A of the original agreement. All other areas remain as depicted in the original agreement.

### Design Element No. 6: Floodplain Berm

The description below replaces the description of design element 6 in the original agreement.

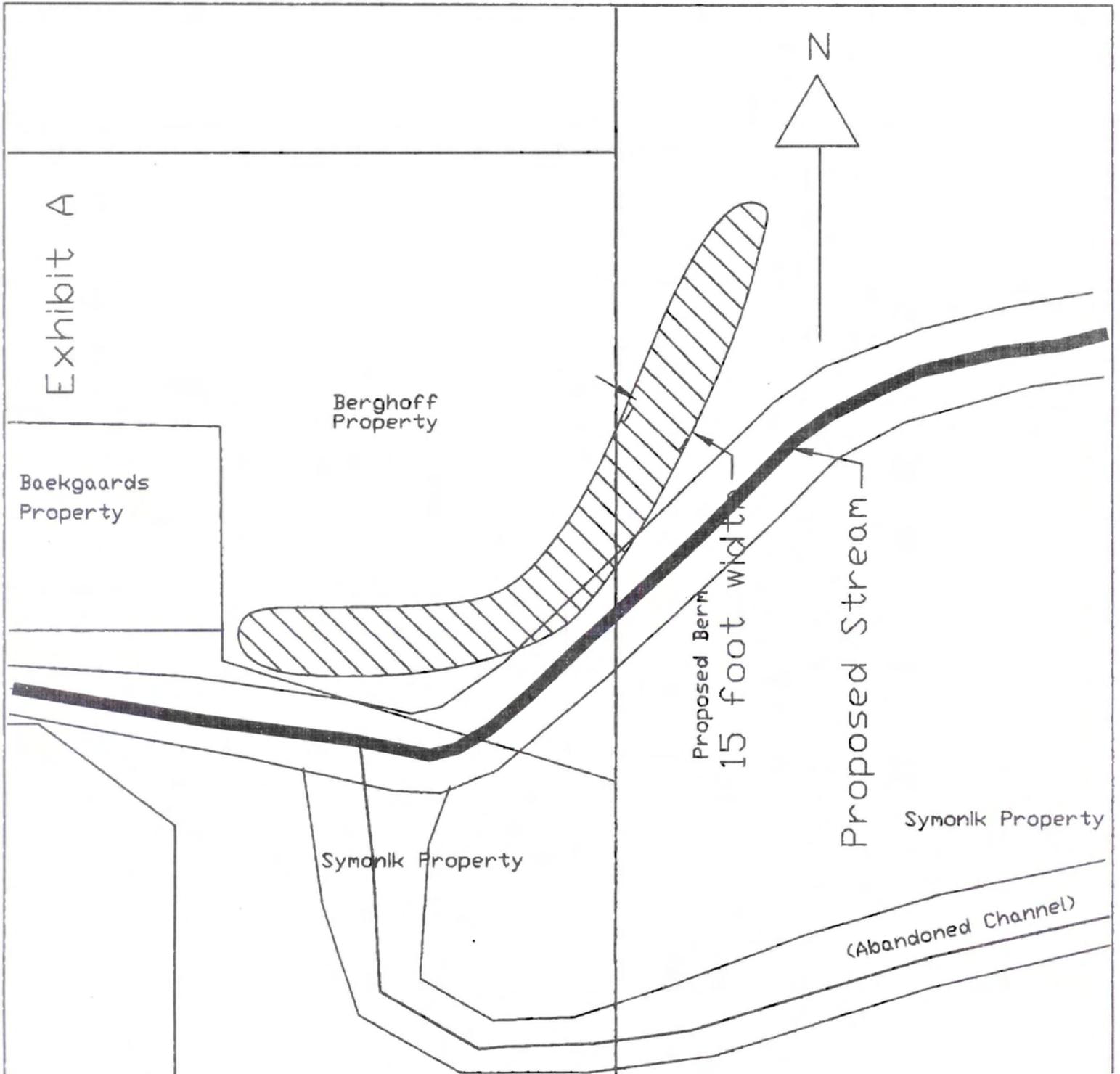
A berm will be constructed at the downstream end of the restored stream channel to prevent water from impacting the yards of lake residents during elevated flows. A berm approximately 18 inches high will be installed along 170 feet of the stream channel. The berm will be approximately 15 feet wide at the base. It will wrap from the woodland edge behind the backyard of the downstream landowner and tie into a point along the existing stream channel. The yard-side of the berm will be planted to either turf grass or a mixture of native vegetation depending on the feedback from the landowner. The stream side of the berm will be stabilized with a covering of glacial stone.

  
\_\_\_\_\_  
Participant

05 | 13 / 08  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Lake Gage and Lime Lake Association

5/5/08  
\_\_\_\_\_  
Date



# Lake Gage and Lime Lake Association, Inc.

## Landowner Participation Agreement

### A. Participant and Tract Information

Name: William G. Berghoff Phone: 831-454-9386

Street Address: 4202 Old Mill Rd.

City: Fort Wayne State: IN Zip Code: 46807

County: Steuben Township: Jackson T37N R12E Section: 2

Parcel #'s 05-02-110-104.000-05 (Steuben County Auditor)

### B. Participation Terms and Conditions

The above-named participant hereby agrees to allow the improvement/modification of his/her property at the above location to assist with the protection and improvement of water quality and wildlife habitat in the Lime Lake and Lake Gage watershed in accordance with the following provisions of this agreement.

1. The participant certifies that he/she has control of this/these tract(s) of land.
2. The participant agrees to allow the project to be constructed/carried out by the Lake Gage and Lime Lake Association and their contractors and construction personnel as expressed verbally, in writing, and in drawings provided by the Lake Gage and Lime Lake Association, Inc. and its representatives and consultants. The proposed stream restoration and partial filling/repair of the old streambed is to be located approximately as shown on Exhibit B (attached) and shall contain the basic project elements in Exhibit A. The berm placed on the Berghoff and Symonik Parcels is to be approximately 15 feet in width by 18 inches in height and shall not impinge on the portion of the Berghoff property that currently contains manicured turfgrass and is considered to be the portion of the yard useable for recreational activity. The berm shall be of such a steepness that lawn maintenance can be performed on the side toward the Berghoff home. The opposite side of the berm is to be stabilized with a covering of glacial stone.
3. Upon receiving notification from the Lake Gage and Lime Lake Association, Inc. the participant agrees to allow the Lake Gage and Lime Lake Association, Inc. and its contractor's reasonable access to the participant's property to perform routine maintenance, erosion control or repairs as necessary to the project after installation to maintain a natural and biologically diverse stream habitat.

4. The participant may at his/her option grant the Lake Gage and Lime Lake Association access to the participant's property for the purpose of managing invasive/aggressive wetland plant species or otherwise managing vegetation within the project area after the installation of the project is complete.

5. The participant agrees not to unnecessarily remove, destroy, or defeat the function of any portion of the project unless a significant threat to life or property exists as a result of the project.

6. The Lake Gage and Lime Lake Association, Inc. agrees not to damage or significantly alter the participants land or property outside the basic modifications necessary for the installation of the stream restoration project without the specific permission of the participant.

7. The Lake Gage and Lime Lake Association, Inc. agrees to save and hold harmless the participant from any and all damages, lawsuits, or liability arising out of the installation or maintenance of the project.

8. Unless otherwise specifically granted by the participant, the Lake Gage and Lime Lake Association, Inc. and its contractors shall have no ownership, property rights, use of, access to, or entrance upon the participant's portion of the project area outside those expressly granted in this agreement.

9. The Lake Gage and Lime Lake Association, Inc. shall be wholly responsible for the maintenance and upkeep of the project.

10. This agreement shall be binding on the successors and assigns of the parties and may be amended by written mutual consent of both the participant and Lake Gage and Lime Lake Association, Inc.

11. Participant has been advised that in order for the Lake Gage and Lime Lake Association, Inc. to obtain the appropriate permits to perform the restoration work, the Indiana Department of Environmental Management or other governmental agencies might ask for certain deed restrictions to be placed on participant's property. It is understood that by execution of this Landowner Participation Agreement, participant is not agreeing to any deed restrictions and if the Indiana Department of Environmental Management or any other governmental agency asks that participant execute any type of deed restriction, participant may or may not, at participant's sole discretion, execute such deed restriction and the execution of this Landowner Participation Agreement shall not in any way obligate participant to place any type of deed restriction on participant's property.

---

**Participant**

---

**Date**

---

**Lake Gage and Lime Lake Association**

---

**Date**

## **Exhibit A. Descriptions of Conceptual Design Elements for Concorde Creek Channel Restoration**

### *Design Element No. 1: Restored Concorde Creek Channel*

The historical channel of Concorde Creek will be restored from the secondary dam through the Mill Pond Dam and tied back into the active drainage downstream approximately 160 feet from the Mill Pond Dam. The total restored length will be approximately 500 feet. The channel will make one major meander and two minor meanders through the historical floodplain. The location of the channel is designed to mimic the original stream channel. The designed channel will have a two-stage trapezoidal shape. In general, the channel will be approximately 30 feet wide at the top of bank with a depth of 2 feet during high flows. The low flow channel will be approximately 20 feet wide at the base with 2:1 slopes along the streambanks. During low flow conditions, there will be less than one foot of flowing water. The majority of the restored stream channel bottom will be composed of stone and gravel that will be sized to withstand elevated flows without being transported downstream. The slopes of the streambanks will be seeded with native vegetation and covered with biodegradable erosion control material to provide immediate stabilization. Additional habitat features may include cross channel logs, root wads, or pools. The overall channel dimensions and morphology will allow for the stream to access the floodplain during elevated flows and provide a minimum amount of flow during low flow periods.

### *Design Element No. 2: Removal of the Secondary Dam*

It is proposed to remove the entire secondary dam to provide as much access to the historical floodplain as possible. In addition, the removed material can be used elsewhere within the site. Material will be removed from the dam down to the surrounding elevations. The sides of the dam will be graded to a 3:1 slope, seeded with native plant species, and covered with biodegradable erosion control material. A grade control structure will be installed at the start of the channel restoration to prevent materials upstream from migrating through the new channel. The grade control in this section will potentially look like a large riffle for approximately 50 feet.

### *Design Element No. 3: Fill of Abandoned Channel*

The material removed from the secondary dam will be used to abandon the active, excavated channel. Additional clean fill material and rock will be brought in from an outside source to create a stable plug for the channel. The plug will be constructed to an elevation that will prevent any flow through the abandoned channel under a set of designed conditions i.e. 100-year storm flow. Completely shutting down the abandoned channel reduces the significant risk of potential plug failure associated with partial flows during storm conditions. This is especially true given that the floodplain of the historical channel will provide enough space for a 100-year storm event. The material excavated from the abandoned channel will be used to fill as much of the channel as possible starting at the upstream end. The channel plug will be graded to match the existing topography and seeded with native vegetation. The remaining portion of the abandoned channel will be allowed to heal naturally.

### *Design Element No. 4: Temporary Construction Access*

As part of the construction process, temporary access paths will need to be created to move construction materials and equipment to the site. To minimize disturbance, temporary access paths will utilize existing paths and the construction zone of the stream

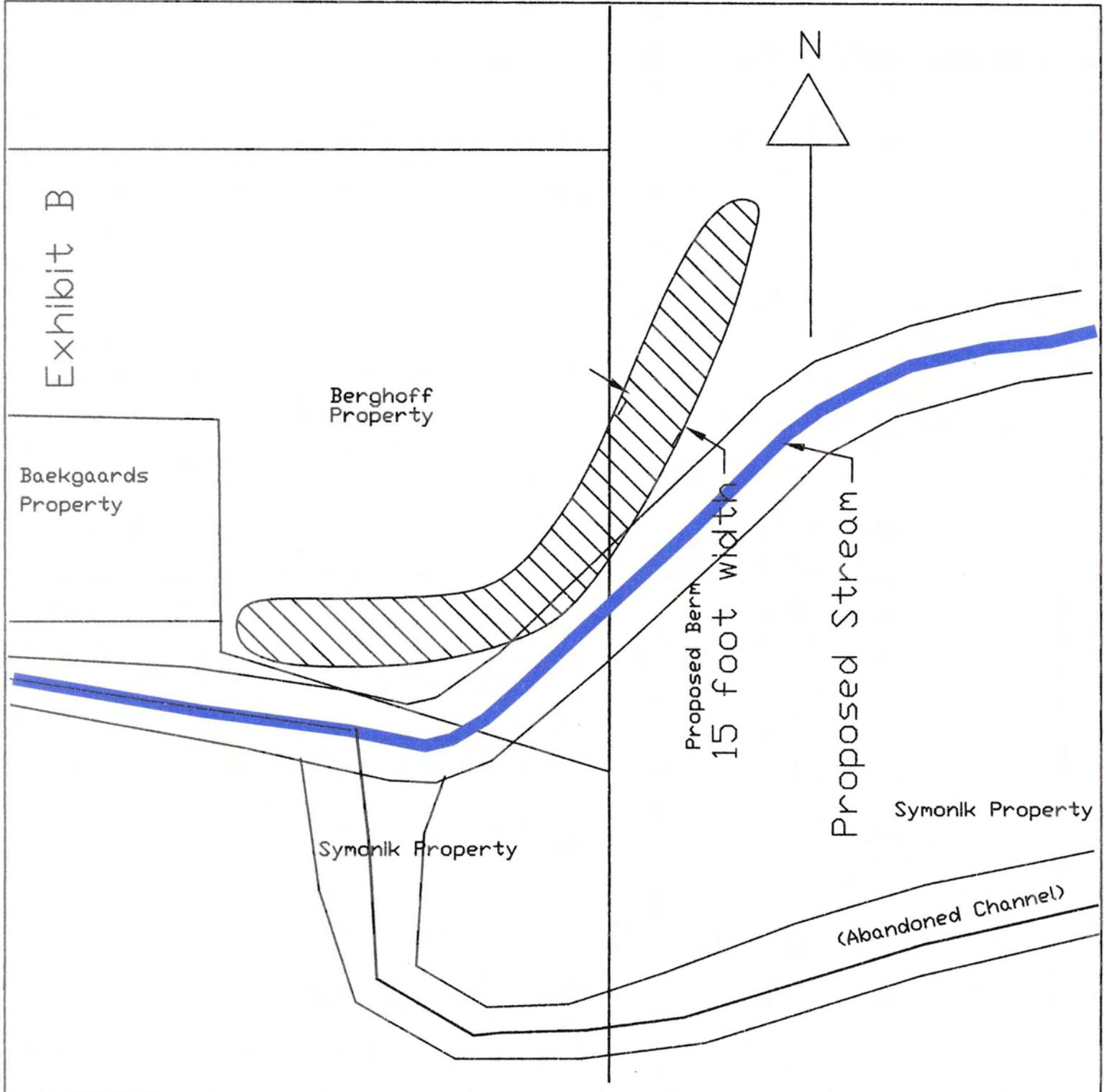
channel. During a site visit, a potential historical access path from Orland Road to the secondary dam was identified. This path was probably created during the construction of the secondary dam. The goal would be to use it to move materials and equipment to and from the secondary dam removal area and the abandoned channel fill area. The path is fairly flat and would require the disturbance of smaller trees rather than larger, mature trees. A second access path would branch from the main access path down to the proposed stream channel. During construction, materials and equipment would be moved up and downstream along the proposed stream channel, minimizing the disturbance to the adjacent floodplain. Prior to construction, trees to be removed would be inventoried and marked with flagging so that the contractor knows to remove the minimum number of trees. Every attempt would be made to re-use trees within the new stream channel for floodplain habitat enhancement. Disturbance to the areas outside of the stream channel and within the project limits will be minimized. At the end of the project, the temporary access paths and any disturbed areas will be naturalized by seeding with native vegetation and applying the appropriate erosion control material. Trees removed from the stream channel construction would be placed in the access paths to prevent vehicles from using the path and to provide a visual barrier to the existence of a path.

*Design Element No. 5: Mill Pond Dam Removal*

The earthen berm portion of the Mill Pond Dam will be removed as part of the historical channel restoration. The concrete structure will be left in place and can be used as a marker to the past use of the area. The sides of the excavated area will be graded to a 3:1 slope, seeded with native vegetation, and covered with biodegradable erosion control material. Material removed from the Mill Pond Dam will be used to create the berm at the downstream end of the project.

*Design Element No. 6: Floodplain Berm*

A berm will be constructed at the downstream end of the restored stream channel to prevent water from impacting the yards of lake residents during elevated flows. A berm approximately 18 inches high will be installed along 170 feet of the stream channel. The berm will be approximately 15 feet wide at the base. It will wrap from the woodland edge behind the backyard of the downstream landowner and tie into a point along the existing stream channel. The yard-side of the berm will be planted to either turf grass or a mixture of native vegetation depending on the feedback from the landowner. The stream side of the berm will be stabilized with a covering of glacial stone.



## **Appendix E:**

### **Example Bid Documents**



## **Bid Documents and Specifications: Section 1**

### **INVITING BIDS FOR LAKE GAGE LIME LAKE ASSOCIATION CONCORDE CREEK CHANNEL RESTORATION PROJECT AT THE SOUTHEAST END OF LAKE GAGE IN STEUBEN COUNTY, INDIANA**

Pursuant to I.C. 5-3-1 the Lake Gage Lime Lake Association (Owner), Steuben County, Indiana, will receive bid proposals until 4:00 pm on **September 1, 2008** at the location stated below for the construction of the: **“CONCORDE CREEK CHANNEL RESTORATION PROJECT”**.

Bids shall be submitted on the enclosed documents. After a satisfactory bid is received the Lake Gage Lime Lake Association shall award a contract to the lowest responsible and responsive bidders.

Pursuant to I.C. 36-1-12-4(10), in determining whether a bidder is responsive the Lake Gage Lime Lake Association may consider the following factors:

- (1) Whether the bidder has submitted a bid or quote that conforms in all material respects to the specifications
- (2) Whether the bidder has submitted a bid that complies specifically with the invitation to bid and the instructions to the bidder.
- (3) Whether the bidder has complied with all applicable statutes, ordinances, resolutions, or rules pertaining to the award of a public contract.

Pursuant to I.C. 36-1-12-4(11), in determining whether a bidder is a responsible bidder, the Lake Gage Lime Lake Association may consider the following factors:

- (1) The ability and capacity of the bidder to perform the work.
- (2) The integrity, character, and reputation of the bidder.
- (3) The competency and experience of the bidder.

Bids shall be submitted to:

**JFNew  
Mark Pranckus  
708 Roosevelt Rd  
Walkerton, IN 46574**

## **Bid Documents and Specifications: Section 2**

### **INSTRUCTIONS TO BIDDERS**

**TITLE AND LOCATION OF THE WORK:** The work on this contract is identified as: **Concorde Creek Channel Restoration Project**, located at the south side of Orland Rd east of the Intersection of Orland Rd and South Lake Gage Rd.

**SPECIFICATIONS:** Specifications to be used in the construction of this project are contained herein.

**PROPOSALS:** Bid proposals shall be submitted on the forms provided herein.

**INTERPRETATION OF THE PLANS AND SPECIFICATIONS:** If any person contemplating submitting a bid for this work is in doubt as to the true meaning of any part of the Plans, Specifications or other proposed contract documents, he or she may submit a written request to the Owner for interpretation thereof. The Owner will not be responsible for any other explanations or interpretations of the contract documents.

**ADDENDA:** Any addenda issued during the time of bidding, or forming a part of the contract documents given to the bidder for preparation of his or her proposal, shall be covered in the proposal and shall be made a part of the proposal. Receipt of each addendum shall be acknowledged and attached to the proposal.

**AWARD OF THE CONTRACT:** After a satisfactory bid is received the Lake Gage Lime Lake Association shall award a contract to the lowest responsible and responsive bidders on or before September 15, 2008.

**Bid Documents and Specifications: Section 3**

**BIDDERS LUMP SUM PROPOSAL**

Steuben County, Indiana

*Instructions to Bidders:*

*All Bidders shall utilize this form. Except as otherwise specifically provided, all parts shall be fully and accurately filled in and completed.*

Project: **CONCORDE CREEK CHANNEL RESTORATION PROJECT**

Date: \_\_\_\_\_

To: Mark Pranckus  
JFNew  
Concorde Creek Channel Restoration Project  
708 Roosevelt Rd  
Walkerton, IN 46574

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PART 1  
BIDDER INFORMATION  
(Print or Type)

1.1 Bidder Name: \_\_\_\_\_

1.2 Bidders Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: ( \_\_\_\_\_ ) \_\_\_\_\_ Fax: \_\_\_\_\_

1.3 Bidder is a/an [mark one]:

\_\_\_\_\_ Individual          \_\_\_\_\_ Partnership          \_\_\_\_\_ Indiana Corporation  
\_\_\_\_\_ Foreign (Out of State) Corporation  
\_\_\_\_\_ Joint Venture          \_\_\_\_\_ Other: \_\_\_\_\_

1.4 Bidders Federal ID No. \_\_\_\_\_

PART 2  
PROPOSAL (BID)

2.1 The undersigned Bidder proposes to furnish all necessary labor, equipment, tools, apparatus, materials, equipment, service and other necessary supplies, and to perform and fulfill all obligations incident thereto in strict accordance with and within the time(s) provided by the terms and conditions of the Contract Documents, including any and all addenda thereto, to construct approximately five hundred and seventy (570) feet of channel, remove three (3) earthen berms/dams, install rootwad revetments at three (3) locations, four (4) temporary rock weirs, ten (10) floodplain logs, and one (1) berm, remove approximately forty (40) cubic yards of debris from the floodplain, fill three hundred and fifty (350) feet of existing channel with approximately seven hundred and fifty (750) cubic yards of earthen material. Bidder agrees to furnish and install seed, trees, and erosion control material in areas indicated on construction plan set. Clean-up and mobilization/demobilization fees will be included. All work outlined in the plan set will be completed for the total sum of: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

Signed the \_\_\_\_\_ day of \_\_\_\_\_, 2008

\_\_\_\_\_  
Bidder/Contractor - Signature

\_\_\_\_\_  
Name - Printed

PART 3  
BID SCOPE OF SERVICES

Bidder shall construct approximately five hundred and seventy (570) feet of channel, remove three (3) earthen berms/dams, install rootwad revetments at three (3) locations, four (4) temporary rock weirs, ten (10) floodplain logs, and one (1) berm, remove approximately forty (40) cubic yards of debris from the floodplain, fill three hundred and fifty (350) feet of existing channel with approximately seven hundred and fifty (750) cubic yards of earthen material. Bidder agrees to furnish and install seed, trees, and erosion control material in areas indicated on construction plan set. Clean-up and mobilization/demobilization fees will be included as part of bid. Bidder shall regularly provide written or verbal communication to the Lake Gage Lime Lake Association and/or their agent, on the progress of the project.

PART 4  
CONTRACT DOCUMENTS AND ADDENDA

- 4.1 The bidder agrees to be bound by the terms and provisions of all Contract Documents and incorporates such Contract Documents herein by reference.
- 4.2 The Bidder acknowledges receipt of the following addenda:

<u>Addendum Number</u>	<u>Date</u>
_____	_____
_____	_____

## **Bid Documents and Specifications: Section 4**

### **CONTRACT**

THIS AGREEMENT, made and entered into by and between the Lake Gage Lime Lake Association, as party of the first part, hereinafter called the "Owner and \_\_\_\_\_", as party of the second party, hereinafter called the "Contractor"

#### **WITNESSTH**

That for and in consideration of the mutual covenants herewith enumerated, the Owner does hereby hire and employ the Contractor to furnish all materials, equipment and labor necessary to fully construct the work designated as follows:

#### **CONCORDE CREEK CHANNEL RESTORATION PROJECT STEUBEN COUNTY, INDIANA**

According to the plans, standard specifications, supplemental specifications, profiles and drawings therefrom, and any supplemental or special provisions set out or referred to in the Contractor's attached Proposal, and hereby agrees to pay the Contractor therefor, for the actual amount of work done and materials in place, as measured and approved by the Engineer or duly authorized representative, for the lump sum price as stated in the Contractor's attached Lump Sum Bid Proposal dated \_\_\_\_\_, which sum the Contractor agrees to accept as full payment for such construction work; and

#### **IT IS FUTHER MUTALLY AGREED:**

That the accompanying Proposal together with the plans, standard and supplemental specifications and special provisions herein designated and referred to, are hereby made a part of the Contract the same as if herein fully set forth; and

That the Contract amount may be paid to the Contractor upon progress estimates of completed and approved work prepared by the Engineer, in an amount not exceed Eighty Five Percent (85%) of such estimates, Fifteen Percent (15%) shall be withheld by the Crooked Lake Association for a period sixty (60) days after the completion of the work, for the purpose of securing payment of all properly prepared and certified statements of indebtedness which shall have been filed against the Contractor for labor performed and materials furnished or other services rendered in carrying forward, performing and the completing of this contract, and such estimates shall also be subject to the provisions of the Standard Specifications on file in the office of the Owner and made a part hereof; and that before any estimate is paid to the Contractor, he shall furnish receipts for all debts incurred in the prosecution of such work or satisfactory evidence and assurance that the same have been paid; or shall consent to the withholding by Owner from his final estimate of sums sufficient to cover such indebtedness, which sums may be held until such indebtedness is settled, or until conclusion of any litigation in the relation thereto filed within such period; and that no monies due on this final estimate shall be paid until the work is fully completed and accepted as provided in the Specifications.

IN TESTIMONY WHEREOF, the Bidder has hereunto set his hand this \_\_\_\_\_ day of \_\_\_\_\_, 2008.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
By

IN TESTIMONY WHEREOF, the Lake Gage Lime Lake Association does hereby accept the foregoing agreement and has herewith set their hands this day \_\_\_\_\_ of \_\_\_\_\_, 2008.

Lake Gage Lime Lake Association  
Angola, Indiana

\_\_\_\_\_  
Allen Lefevre, President

## **Appendix F:**

### **Example Maintenance and Monitoring Form**



Concorde Creek Channel Restoration Maintenance and Monitoring Form

Date: \_\_\_\_\_

Inspected by: \_\_\_\_\_

**Restored Channel:**

1. Is erosion occurring along the channel? If so, where?
2. Are the rootwad revetments in place?
3. Are the floodplain logs in place?
4. Is the vegetation becoming established?

**Downstream Berm:**

1. Is the vegetation becoming established?
2. Are there tree seedlings present on the berm?

**Channel Fill:**

1. Is erosion occurring where Concorde Creek meets the channel plug?
2. Is the vegetation becoming established?
3. Are the planted trees in generally good condition? If not, how many are dead or dying?

General Site Observations and Comments:

Is there water in the channel? Is it flowing? Depth?

Are there fish or other aquatic organisms present in the channel?

**Suggested Maintenance:**

<b>Problem</b>	<b>Course of Action</b>	<b>Requested (Date)</b>	<b>Action Taken (Date)</b>
No vegetation	Re-seed with appropriate seed mix		
Significant tree die-off	Replant in spring of year		
Erosion occurring on channel	Consult natural resource professional		
Erosion occurring along channel fill area	Consult natural resource professional		

If questions or concerns exist, please contact JFNew, county NRCS representative, or DNR representative.

