DOAN BROOK WATERSHED PARTNERSHIP

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Steven Cadwell
The Nature Center at
Shaker Lakes

Lester Stumpe
Northeast Ohio Regional
Sewer District

Victoria Mills
Interim Executive Director

RECEIVED JAN 0 7 2008

Mr. Chris Riddle
Ohio Lake Erie Commission
One Maritime Plaza, 4th Floor
Toledo, OH 43604

January 1, 2008

Dear Mr. Riddle,

Please find enclosed, copies of the Doan Brook Watershed Partnership's (DBWP) final report for our LEPF grant entitled, "Restoration of the Doan Brook on an Urban Public School Campus" The DBWP is proud of the results of this project and grateful for the role that the LEPF played in bringing it to fruition. The funding provided was a catalyst to other urban stream restoration projects and education throughout the Doan Brook Watershed. In addition, the entire LEPF team lent immeasurable support to the DBWP staff. The project encountered a considerable delay to accommodate the construction and installation of a new pedestrian bridge and LEPF showed gracious understanding towards this impediment. The project's worth was captured on the last day of student tree-planting, when teachers educated the next generation of leaders and those young people understand the fulfillment in taking action to improve community and the environment. The impact of this restoration will be felt for many generations.

Please feel free to contact me with any questions or concerns you may have with the report or the results of the grant work. It has been rewarding to work in partnership with LEPF to accomplish the goal of restoring this section of the Doan Brook as it flows across the campus of Shaker Heights School System. We look forward to future opportunities to collaborate in this important work.

Best Regards,

Victoria Mills

Victoria Mills
Interim Director, Doan Brook Watershed Partnership

P.O. Box 18700, Cleveland Heights, Ohio 44118 • Telephone 216-291-3304 • Fax 216-291-2656 • E-mail doanbrook@clvhts.com

Lake Erie Protection Fund – Final Report: Restoration of Doan Brook on an Urban Public School Campus

ABSTRACT

The South Branch of the Doan Brook runs through a section of property belonging to the Shaker School District, which is located in the upper section of the watershed, home to over 145,000 residents. Specifically, it traverses the campus belonging to elementary, middle and upper school students and faculty. Shortly after completing its watershed action plan, Doan Brook Watershed Partnership (DBWP), a 501(c) (3) organization, decided that this high-profile section of the Doan Brook should be the first candidate for restoration activities. It held significant potential for educating students and the public about the dynamics of healthy urban streams, save for the fact that it was very degraded.

The 300' section of stream was denuded of a riparian corridor, entrenched and channelized up-stream from the South Woodland Rd. bridge. The absence of a stage-two stream channel created stagnation that exacerbated eutrophication. As stated in the grant application, this project contributes to two of LEPF's stated goals: to establish riparian buffers on 80% of Lake Erie watershed streams, ditches and rivers; and to re-vegetate buffers on disturbed urban streams.

The DBWP strengthened its community network while completing the following restoration goals:

- ✓ A 480 foot section of the Doan Brook was bio-engineered to regain natural stream functions, including a stable stage-two channel with riffle/run sequences, meanders and floodplain access. (Note that the originally planned restoration of 300 feet was extended to include a total of 480 feet of stream)
- ✓ Stabilization of stream-banks with plantings of native trees, shrubs and herbaceous plants.
- ✓ Removal of in-stream concrete walls to facilitate stream-bank restoration; stream edges were re-graded to allow the brook to access to its floodplain.
- ✓ Replacement of an older bridge with an ADA compliant pedestrian bridge.
- ✓ Collaboration with the Nature Center at Shaker Lakes, the Northeast Ohio Regional Sewer District, Ohio Prairie Nursery, the Ohio Environmental Protection Agency, and Shaker School administrators, teachers, students and PTO.

TECHNICAL REPORT

Activities and Timelines:

Task 1 – Form Project Steering Committee: In January of 2006, former DBWP Executive Director Keith Jones met with Shaker's business administrator, several science teachers, the president of the PTO, and the Watershed Educator at the Nature Center at Shaker Lakes. After a number of meetings that month, a plan that included students,

parents and teachers was created for education and volunteering associated with the project.

Task 2 – Study Existing Conditions with Students from Nearby Schools: Although the environmental science teachers at Shaker High School did incorporate a site-visit of section to be restored into their lesson-plans, the studies to document 'existing water quality conditions' were completed by chemistry students at John Carroll University. Under the guidance of Dr. Mike Nichols, John Carroll students tested water for dissolved oxygen, nitrates, chlorides, phosphates, and ammonium. A few smaller student engagement activities were also focused on the restoration project. In April of 2006, Hawken School middle-school student, Jonathan Borden (who lives across the street from the restoration project), started 'Stream Kleenrz' to conduct volunteer stream monitoring and watershed awareness throughout the Doan Brook and near-shore Lake Erie. The Nature Center at Shaker Lakes taught macro-invertebrate studies, including benthic testing and identification, with students from John F. Kennedy and Jane Adams High Schools. On May 7th, 2006 Doan Brook volunteer stream monitors were trained to collect benthic water quality samples, record data and submit their results to the Doan Brook Watershed Partnership and the Nature Center to better establish an on-going citizen science program within the watershed. On Saturday, June 10th, 2006, the Nature Center led a public stream walk to teach macro-invertebrate identification and habitat in the Doan Brook.

Task 3 – Plan Project, Secure Permits, Engage Design/build Consultant and Publicize Project: Mark Gronceski of the US Army Corps of Engineers approved the permit request, sent by the DBWP in the spring of 2006. The permit was granted on the basis of a detailed site plan, including location, restoration vision, cross-section profile, and channel and planting details. The Shaker School administrators and PTO developed a concept plan for the plantings which outlined the most propitious location for land-labs to focus on native plants, bird habitats and riparian zones. Oxbow River and Stream Inc. was hired to design and execute the restoration. Oxbow is recognized as a leader in stream restoration and bioengineering. They specialize in multi-disciplinary solutions to ecosystem and habitat restoration, stream stabilization, and stream protection. Oxbow has designed, managed and constructed more than 100 stream restoration projects throughout Ohio, Michigan, Pennsylvania, Kentucky and Tennessee. To publicize the project DBWP engaged two local reporters to capture the restoration story. The first was Karen Kurdziel of the Sun Press, a local newspaper with readership throughout the watershed communities of Shaker Heights, Cleveland Heights and Cleveland. The second was Beth Friedman-Rommell, who writes for Shaker Magazine.

Task 4 – Construct Project: In June 2006, Oxbow River and Stream removed in-stream concrete walls, removed the pedestrian foot-bridge, re-graded stream banks to widen the floodplain, created new riffles and stabilized and replanted the riparian corridor with 25 trees (2"), 10 small sycamores (1"), and 203 shrubs in 5 gallon containers. Due to wet weather delays, construction began after school terminated for the year. Student volunteers were unable to participate in the re-vegetation, as planned. A second, major delay occurred when Shaker School officials decided to seek additional funding to replace the foot-bridge with an up-dated ADA compliant alternative. The School did

eventually secure funding, but the grant application and approval process was not complete until July of 2007. The bridge was then ordered, fabricated and installed by Oxbow River and Stream by mid-October 2007. Fortunately, bridge installation coincided with the school calendar and the students were able to participate in the second round of stream-side planting. In collaboration with the Nature Center at Shaker Lakes who provided volunteer direction, education and tools, over 100 environmental science students planted the remaining trees, shrubs and native herbaceous plants in late October 2007. The following species were purchased from local grower, Ohio Prairie Nursery:

Asimina triloba
Amalanchier Canadensis
Cornus sericea
Viburnum dentatum
Ilex verticillata
Lindera benzoin
Sambucus Canadensis
Liatris spicata
Echinacea pupurea
Rudbeckia laciniata
Acer Rubrum
Acer Saccharum
Cercis Canadensis
Quercus bicolor
Physocarpus
Myrica pensylvanica
Viburnum lentago
Viburnum
Platanus occidentalis

An educational sign was created by the Watershed Educator at the Nature Center at Shaker Lakes and designed by Vista Color Lab. A prototype of the sign is enclosed with this report. It introduces the reader to the watershed concept, the particulars of the Doan Brook, stream restoration and the importance of collaborative efforts in community and ecological rejuvenation. The sign will be presented at the architectural review board for the City of Shaker Heights, at their January 2008 meeting.

Task 5 – Continue Publicizing the Project and Promoting the Site for Environmental Education: The students at Shaker High School celebrated their volunteer planting project through school media outlets. A power-point has been created about the bio-engineering success at this site, as well at an up-stream site. It is presented often to community groups and schools. Beth Friedman-Rommell hopes to write a sequel to her original piece in Shaker Magazine, which would high-light the site as it continues to evolve and serve educational needs at the school.

Task 6 – Maintain the Project through a Written Agreement: A written agreement will be signed between the DBWP and administrators at the Shaker School District. The document, yet to be vetted within levels of the school's administration, has been agreed

upon between the DBWP and the school. It will be submitted, as soon as it is made official.

LESSONS LEARNED

Restoration of the South Branch of the Doan Brook went very smoothly, though it did so over a much longer period of time than originally planned. The scope of work was defined clearly, so executing the plan was uncomplicated and rewarding. The contractor, Oxbow River and Steam, Inc., demonstrated great acumen for what's possible in rejuvenating a small section of stream. The DBWP and the Shaker Schools relied on their understanding of the science of bio-engineering, but also sought guidance from experts on the DBWP board and at the Northeast Ohio Regional Sewer District. Construction delays during projects involving multiple players is probably not a new lesson for the LEPF. For the DBWP, however, the perseverance that was exhibited by all project partners was a great lesson. Clearly defined roles at the beginning of the project eliminated confusion when unforeseen events arose. For example, when the Executive Director of the DBWP and the Shaker School administrator both left their positions mid-way through the project, the fact that a coherent plan was in place was critical to forward progress. The outline of the timeline and deliverables allowed successors to keep the project rolling; it was a significant thread over the entire length of the project. In addition, the fact that this project benefited every party involved meant that multiple people had incentive to see it through. There was cooperation and assistance between different combinations of the players at different junctures of the project, depending on what needed to be accomplished. The partner's increased financial support provided additional match for salaries and plant material during the extended project timeline. Securing the funding for the new bridge did take considerable time, but the final result was more satisfying for the school and its students. If the bridge had been eliminated the school administrators and students would have been dissatisfied, perhaps tarnishing partnership opportunities in the future. The bridge was not necessary restore the ecology of the stream; however it does promote the important goal of reconnecting people with their local watershed. In urban areas especially, increasing the number of opportunities for people to understand the hydrology underpinning our communities brings us one step closer to gaining popular support for additional progress towards sustainability.

LAKE ERIE PROTECTION FUND

SMALL GRANT - FINAL ACCOUNTING

Grant Number: SG 271-06

v2008

Budget Categories	Orignal Budget	Funds Spent	Current Balance	Matching Funds
A. Salaries & Wages				
DBWP Project Mgr.	$880	$880	-0-	$1600
DBWP Admin. Asst.			-0-	$300
NCSL Watershed Educator			-0-	$300
B. Fringe Benefits				
DBWP Project Mgr. (FICA)	$67	$67	-0-	$67
DBWP Admin. Asst. (FICA)			-0-	$23
NCSL Watershed Educator (FICA)			-0-	$75
C. Total Salaries & Benefits (A+B)	$947.00	$947.00	$0.00	$2,365.00
D. Non-expendable Equipment				
Educational Sign w/ hardware.	$400	$400	-0-	$400
Seed, plants, trees, & rock for riffles	$2000	$2000	-0-	$1245.50
E. Expendable Materials & Supplies				
CD's, notebooks, pens, etc	$53	$53	-0-	
F. Travel				
Vehicle to and from job site			-0-	$50
G. Services or Consultants				
Oxbow River and Steam design/build	$4000	$4000	-0-	$6500
Shaker School District. & NCSL			-0-	$2500
H. Computer Costs				
DBWP flyer design				$495
I. Publications/Presentations				
Printing 1000 flyers	$300	$300	-0-	
J. All other direct costs				
Woodbury School PTO			-0-	$3360
City of Shaker Hts.			-0-	$1,500
K. Total Direct Costs (C thru J)	$7,700.00	$7,700.00	$0.00	$16,917.00
L. Indirect Costs				
Total Costs (K + L)	$7,700.00	$7,700.00	$0.00	$16,917.00

Ohio Lake Erie Commission
One Maritime Plaza, 4th Floor
Toledo, OH 43604
p 419-245-2514
f. 419-245-2519
www.epa.state.oh.us/oleo

I certify that the grant expenitures listed and descriptions of the charges are true and accurate to the best of my knowledge. These expenditures represent approved grant costs that have been previously paid for and for which complete documentation is on file.

		Date
Project Director		
Authorizing Agent		
Fiscal Agent		

LAKE ERIE PROTECTION FUND

SMALL GRANT - FINAL ACCOUNTING

Grant Number: 58-271-08

v2008

Budget Categories	Original Budget	Funds Spent	Current Balance	Matching Funds
A. Salaries & Wages				
DBWP Project Mgt.	$860	$860	-0-	$1800
DBWP Admin. Asst.			-0-	$300
NCSL Watershed Educator			-0-	$250
B. Fringe Benefits				
DBWP Project Mgt. (FICA)	$67	$67	-0-	$67
DBWP Admin. Asst. (FICA)			-0-	$23
NCSL Watershed Educator (FICA)			-0-	$75
C. Total Salaries & Benefits (A+B)	$947.00	$947.00	$0.00	$2,385.00
D. Non-expendable Equipment				
Educational Sign for hardware	$400	$400	-0-	$400
Seed, plants, trees, & rock for riffles	$2000	$2000	-0-	$1245.60
E. Expendable Materials & Supplies				
CD's, notebooks, pens, etc	$53	$53	-0-	
F. Travel				
Vehicle to and from job site			-0-	$50
G. Services or Consultants				
Oxbow River and Stream design/build	$4000	$4000	-0-	$6500
Shaker School District, & NCSL			-0-	$2500
H. Computer Costs				
DBWP flyer design				$485
I. Publications/Presentations				
Printing 1000 flyers	$300	$300	-0-	
J. All other direct costs				
Woodbury School PTO			-0-	$3360
City of Shaker Hts.			-0-	$1,500
K. Total Direct Costs (C thru J)	$7,700.00	$7,700.00	$0.00	$16,917.00
L. Indirect Costs				
Total Costs (K + L)	$7,700.00	$7,700.00	$0.00	$16,917.00

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Totally that the grant expenses listed and descriptions of the charges are true and accurate to the best of my knowledge. These expenses represent approved grant costs that have been previously paid for and for which complete documentation is on file.

Project Director: Victoria Mills — Date: 1/3/08
Authorizing Agent:
Fiscal Agent: James C. Ford — 1/8/08

INDEX OF SHEETS:

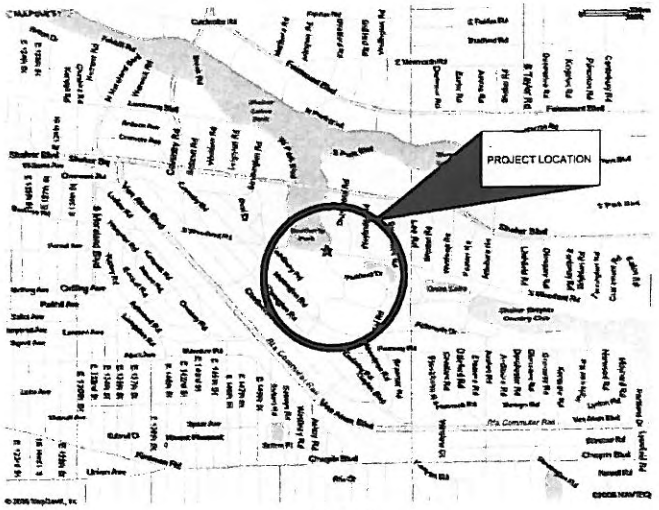
1 ..... TITLE AND SITE LOCATION
2 ..... SITE PLAN
3 ..... CROSS SECTIONS AND PROFILE
4 ..... CHANNEL AND PLANTING DETAILS

SIGNATURE BELOW SIGNIFY ONLY CONCURRENCE WITH THE GENERAL PURPOSE AND GENERAL LOCATION OF THIS PROJECT. ALL TECHNICAL DETAILS REMAIN THE RESPONSIBILITY OF OXBOW RIVER AND STREAM INC.

REGISTERED ENGINEER: _____ DATE _____

SHAKER HEIGHTS, OHIO
SHAKER HEIGHTS STREAM RESTORATION
FOR
DOAN BROOK WATERSHED PARTNERS
2006

PROJECT SITE
SCALE: NTS



VICINITY MAP
NTS

PRELIMINARY FOR REVIEW
NOT FOR CONSTRUCTION

2 WORKING DAYS
BEFORE YOU DIG
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OXBOW
RIVER and STREAM RESTORATION, Inc.
Specialists in Riverine Ecosystem Restoration

DOAN BROOK SHAKER HEIGHTS
CLEVELAND, OHIO
STREAM RESTORATION

TITLE SHEET

SCALE: AS NOTED

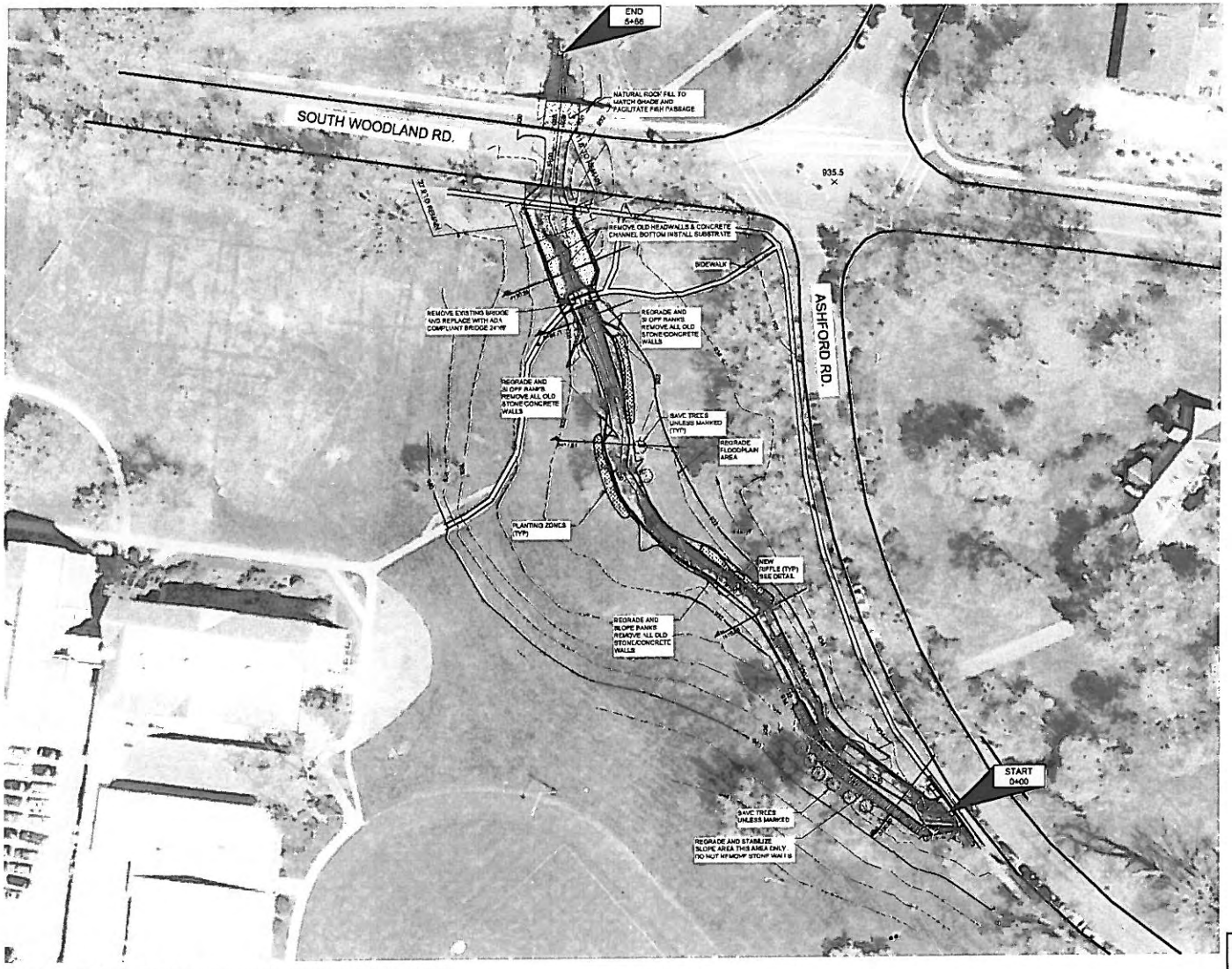
NORTH

NO.	DATE

PROJECT: SHAKER HEIGHTS

DATE: 5-12-06

SHEET:
1/4



LEGEND

- MANHOLE
- STORM SEWER
- SANITARY SEWER
- BANK STABILIZATION
- PLANTING ZONE (SHRUBS)
- PROPOSED CONTOUR
- BASE ALIGNMENT
- EXISTING STREAM CHANNEL

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STREAM CHANNEL RESTORATION

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Specialists in Riverine Ecosystem Restoration

DOAN BROOK SHAKER HEIGHTS
CLEVELAND, OHIO
STREAM RESTORATION

PLAN VIEW

SCALE: 1:30

NORTH

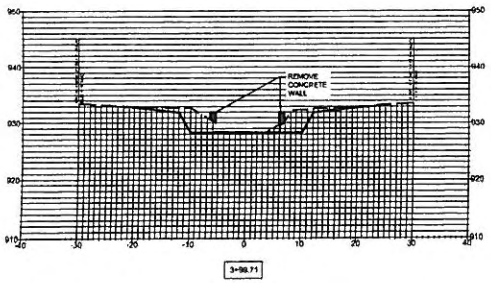
REV.	DATE

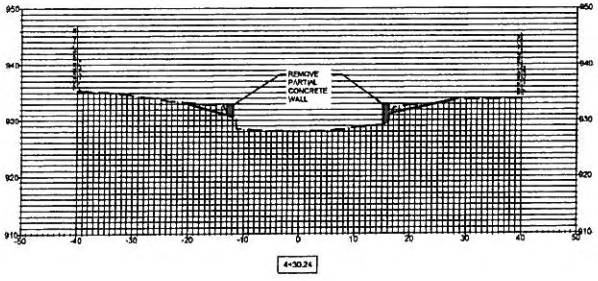
PROJECT: SHAKER HEIGHTS

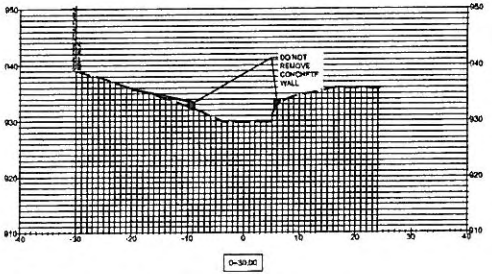
DATE: 5-12-06

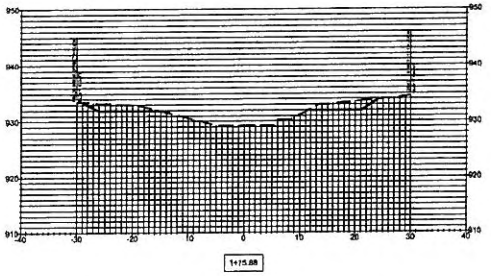
SHEET:

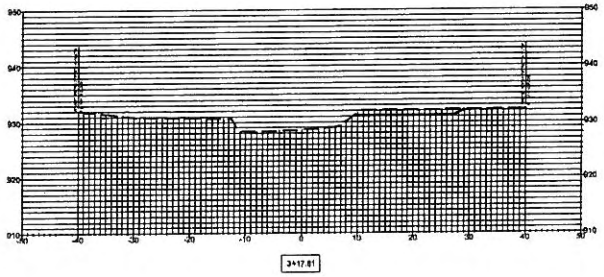
2/4





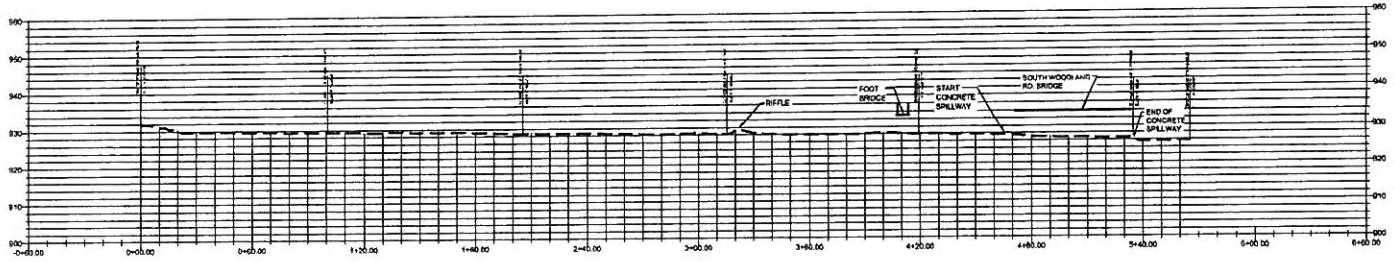






EXISTING STREAM CROSS SECTIONS

SCALE: 1:10 HORZ 1X VERT. EXAGGERATION
DASHED LINE=EXISTING GROUND, BOLD= PROPOSED



EXISTING STREAM BOTTOM PROFILE

SCALE: 1:30 HORZ 2X VERT EXAGGERATION

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CLEVELAND, OHIO
STREAM RESTORATION

STREAM BED PROFILE EXISTING

SCALE: AS NOTED

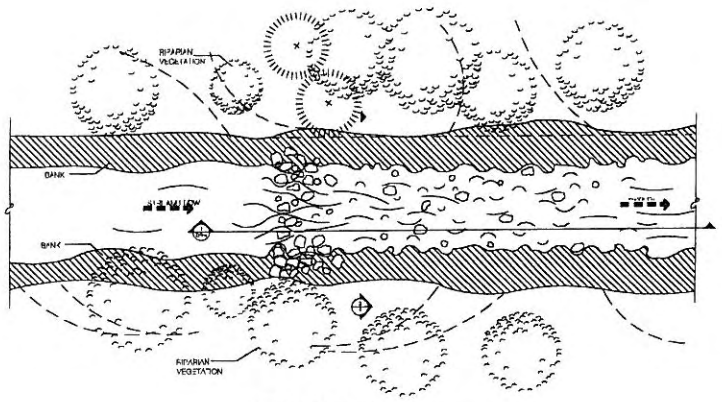
NORTH

REV	DATE

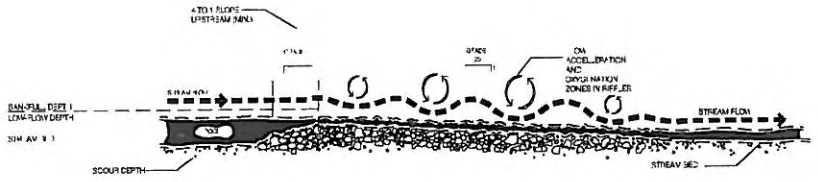
PROJECT: SHAKER HEIGHTS

DATE: 5-12-06

SHEET:
3/4



1 DS-7 TYPICAL RIFFLE DETAIL PLAN



2 DS-7 TYPICAL RIFFLE DETAIL PLAN SCALE: 3/16" = 1'-0"

NOTES:

RIFFLES TO BE CONSTRUCTED WITH A WELL SORTED MIX OF SAND, GRAVEL AND STONE. MATERIAL MUST ALLOW FOR INTERSTITIAL FLOW.

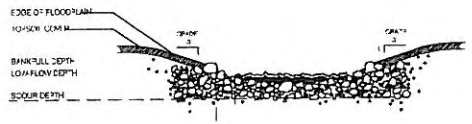
RIFFLE ZONES TO BE EXCAVATED TO THE CALCULATED SCOUR DEPTH OF THE STREAM AT THE RIFFLE ZONE. SCOUR DEPTH IS TYPICALLY 1/2 OF THE BANKFULL DEPTH OF THE STREAM AT THE RIFFLE ZONE.

THE WIDTH OF EXCAVATION (ACROSS STREAM) FOR RIFFLE SUBSTRATE (OR TS-1 IN TRAPEZOIDAL WIDTH.

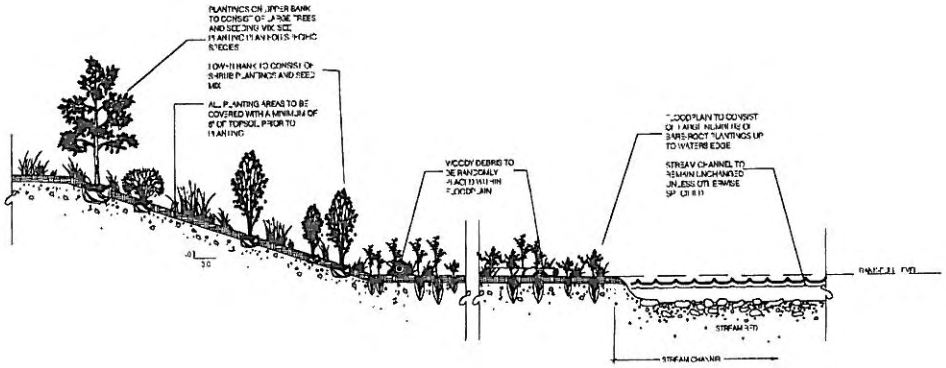
RIFFLES TO BE CONSTRUCTED FOR CALCULATED LOW-FLOW WIDTH.

UPSTREAM SIDE OF RIFFLE TO BE CONSTRUCTED AT A 4:1 SLOPE.

DOWNSTREAM SIDE OF RIFFLE TO BE CONSTRUCTED AT A MINIMUM OF A 20:1 SLOPE.



3 DS-7 TYPICAL RIFFLE DETAIL PLAN SCALE: 3/16" = 1'-0"



4 DS-7 TYPICAL STREAMBANK RESTORATION - PROPOSED Cross Section SCALE: N.T.S.

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Oxbow River And Stream Restoration
Cincinnati, Ohio 45216
ph. / 513.563.4134
fax. 513.563.4234
www.oxbowriver.com

DOAN BROOK SHAKER HEIGHTS CLEVELAND, OHIO STREAM RESTORATION

CHANNEL AND PLANTING DETAILS

SCALE: AS NOTED

NORTH

REV.	DATE

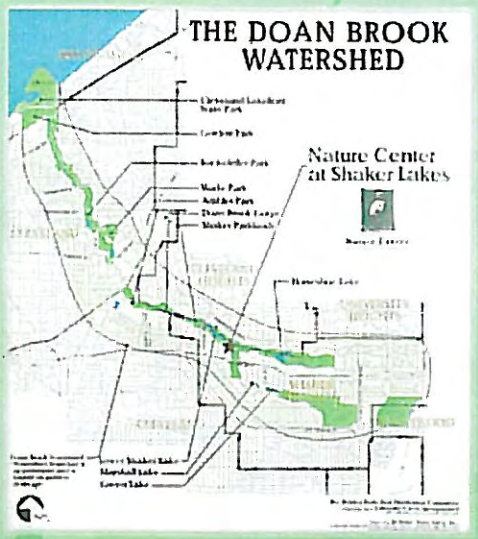
PROJECT: SHAKER HEIGHTS

DATE: 5-12-06

SHEET:

4/4

The Doan Brook Watershed is your **Ecological Address**



Everyone lives in a **watershed**. A watershed is the area of land that drains into a stream or river. The shaded area of this map is the general outline of the Doan Brook's watershed—YOUR watershed.

With every road, roof, parking lot, etc., that we build, we have an impact on our local waterways.

Before this section of the brook was restored, it was stagnant and mired with algae. There were no trees or shrubs to filter out pollutants and keep the stream shady and cool for the aquatic life.

Now the stream has new curves to slow flow and erosion, and the stream banks have been replanted with native shrubs and flowers.

Communities are learning how to work together to rejuvenate their local environments. The future will be filled with opportunities to work with nature and restore the ecosystems upon which all life depends.

Thank you to the following groups who assisted in this restoration project:

- Shaker Hts. High School Students, Teachers and PTO
- Citizen Volunteers
- The Doan Brook Watershed Partnership, representing the cities of Shaker Hts., Cleveland Hts., and Cleveland
- The Nature Center at Shaker Lakes
- The Northeast Ohio Regional Sewer District
- Oxbow River and Stream
- The Lake Erie Protection Fund
- The Ohio EPA

SUN PHOTO BY JOSEPH DARWAL

RESTORING ORDER

Steve Phillips of Oxbow River and Stream Restoration worked on a small stretch of Doan Brook last week that flows past Woodbury School in Shaker Heights. The project, along with a recent similar one at Shaker Heights Country Club, was coordinated by the Doan Brook Watershed Partnership, which watches over the brook, and the Shaker Lakes that are a part of it. The restorations will help stabilize the stream channel, improve water quality and provide wildlife habitat. Local and state grants paid the $162,000 cost of improving the two sites. Shaker teachers plan to use the Woodbury site for science education.

DOAN
BROOK
OURS TO PROTECT

5 Years

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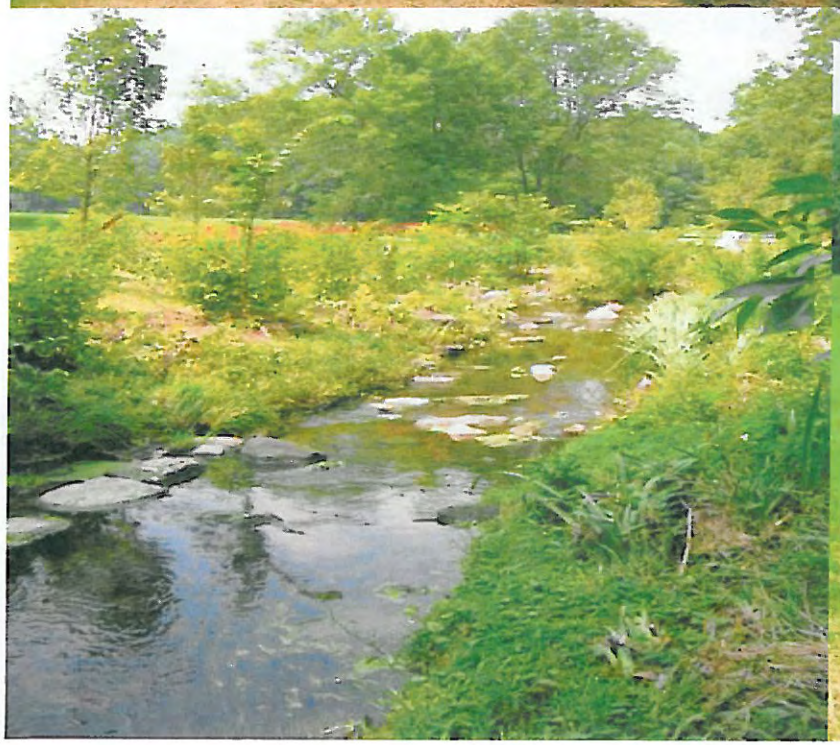
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