Environment and Natural Resources Trust Fund (ENRTF)
2010 Work Program

Date of Report: January 11, 2010
Date of Next Progress Report: January 2011
Date of Work Program Approval:
Project Completion Date: June 30, 2014

I. PROJECT TITLE: Agricultural and Urban Runoff Water Quality Treatment Analysis

Project Manager: Craig Austinson
Affiliation: Blue Earth County
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Location: This project will occur within Mapleton and Beauford Townships in Blue Earth County. Specifically, water quality improvements are proposed for County Ditch No. 57 at a point approximately 0.5 miles to the southwest of the City of Mapleton through to its terminus at the Big Cobb River, approximately five miles to the northeast of the City of Mapleton. An exhibit is enclosed that identifies the project location within Blue Earth County.

Total ENRTF Project Budget:	**ENRTF Appropriation:**	**$**	485,000
	Minus Amount Spent:	**$**	0
	Equal Balance:	**$**	485,000

Legal Citation: M.L. 2010, Chp. 362, Sec. 2, Subd. 5d

Appropriation Language:
$485,000 is from the trust fund to the Board of Water and Soil Resources for an agreement with the Blue Earth County Drainage Authority to reduce soil erosion, peak water flows, and nutrient loading through a demonstration model evaluating storage and treatment options in drainage systems in order to improve water quality. This appropriation is available until June 30, 2014, by which time the project must be completed and final products delivered.

II. PROJECT SUMMARY AND RESULTS

This project is a model for future drainage projects across the state and represents a fundamental shift in the way rural drainage systems interact with the landscape. This is a community-based water quality and treatment demonstration project in which landowners, local government, and state agencies have developed a watershed approach to improving water quality and replacing outdated drainage systems. The project will improve water quality, improve wildlife habitat, and develop a process for future projects by constructing water quality features within the 6,000 acre watershed. The project focuses on Blue Earth County Ditch 57,

part of the Le Sueur River Minor Watershed of the Minnesota River Basin. This watershed includes runoff from agricultural as well as urban sources.

LCCMR funding will provide assistance to construct two surge basins, in-channel treatment, native grass buffer strips, and a rate control weir at the outlet of the ditch. Nine monitoring stations are also proposed that will record flow and water quality data for three years. In addition, this project will provide documentation on how successful water quality treatments can be incorporated into Drainage Law. Once monitoring is completed, public education via site visits, presentations, and information posted to web sites will be provided to describe the effect of project features on water quality and how these features can be incorporated into other drainage projects.

III. PROGRESS SUMMARIES

Progress Summary as of January 15, 2011
(This section is to be used later for periodic Work Program progress report submissions).

Progress Summary as of July 15, 2011
(This section is to be used later for periodic Work Program progress report submissions).

Progress Summary as of January 15, 2012
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Progress Summary as of June 30, 2014
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IV. OUTLINE OF PROJECT RESULTS

Result/Activity 1: Provide storage and treatment for agricultural and urban runoff to improve water quality and improve habitat diversity.

Description: To provide storage for runoff from agricultural and urban sources, two surge basins will be designed and constructed that will have a combined capacity for storage of 44 acre-feet of runoff. These basins will be constructed adjacent to the existing and proposed ditch improvements. Trust fund dollars will be used to purchase permanent easements on 7 acres for one of the basins and the landowners will purchase the land on another basin. Trust fund

dollars will also be utilized for the design, excavation and seeding for the basins. To improve water quality, a two-stage ditch and sediment trap will be constructed that will provide in-channel treatment. This will be accomplished by widening and over excavating existing and proposed new portions of ditch that will be constructed with landowner funding. Trust Fund dollars will be used to purchase 4 acres of land to widen the ditch. Also trust fund dollars will be used for the additional excavation to widen the ditch and the additional native seeding required on the ditch benches.

Water quality will also be improved through the planting of native grass buffer strips along 4.1 miles of the ditch. The landowners will purchase the required 16.5 foot easements required by statute to complete this work, with a total of 17 acres being purchased for easement by the landowners. Trust funding will assist in funding planting of native grasses and purchasing easements for wider buffer areas up to 50 feet where necessary due to large amounts of flow and potential for erosion. The trust fund funding will also be utilized to provide maintenance of the native plantings during growth to provide an enhanced buffer for collection of the sediment that is entrained in overland flow before runoff reaches the ditch. The native plantings also represent an improvement in habitat diversity as compared to the monoculture typical of agricultural settings and the typically grasses planted in required buffers.

Finally, a weir will be placed at the outlet of the ditch near the confluence with the Big Cobb River. The purpose of the weir will be twofold. The weir will be designed to reduce peak flow along the ditch and also provide a means to divert runoff to US Fish and Wildlife (USFWS) property. The USFWS property is located to the north of the conjunction of the ditch with the Big Cobb River and will potentially utilize the diverted runoff to support a 40-acre wetland on USFWS property.

All of the water quality improvements that the trust fund is funding are not required by statute but are water quality features proposed by the landowners. The construction of these water quality improvements will occur on land under easements that will either be obtained by individual landowners or are already under the control of the Drainage Authority. All easements purchased will be permanent and the Blue Earth County Drainage Authority will be maintaining the easement and will monitor the condition of each of the water quality improvements. Any repairs to the proposed improvements will be paid for by the landowners in the system through the ditch repair fund which is controlled by the Blue Earth County Drainage Authority. The Drainage Authority has over 100 years of experience obtaining and maintaining permanent easements on drainage infrastructure. Some of these easements have included surge basins, in-channel easements, dams for lakes and other water quality structures. All easements are utilizing $5,000 per acre for estimate purchase. This number is based on recent land purchases in the area and the amount estimated for land purchase for RIM/WRP projects in this area for 2009.

A budget for each item as well as a timeline is presented in the table below.

Summary Budget Information for Result/Activity 1: **ENRTF Budget:** **$**281,000
Amount Spent: **$**0
Balance: **$**281,000

Deliverable/Outcome	Completion Date	Budget
Project Management, Hydrologic/Hydraulic Design,	November 31,	$30,000

Construction Plans, and Onsite Project Management completed by I&S Group, Inc.	2010	
Construct In Channel treatment in a new drainage ditch by widening 1610 feet of proposed new open ditch. Construction includes grading and seeding of benches with native seed.	November 31, 2010	$20,000
Easement Acquisition of 4 acres at $5000 per acre for widening of proposed and existing open ditch for construction of In-Channel Treatment by use of sediment basin and two stage ditch. Includes $1,000 for legal and appraisal services.	August 15, 2010	$21,000
Construct two surge basins for storage and treatment of agricultural and urban runoff, including grading construction, outlet construction and seeding. Completed by grading contractor.	November 31, 2010	$114,000
Easement Acquisition of 7 acres at $5,000 per acre for Surge Basin Construction. Includes $1,000 for legal and appraisal services.	August 15, 2010	$36,000
Construct and Maintain Native Grass Buffer Strips on 4.1 Miles of Existing Open Ditch. 16.5 foot buffers will be purchased by landowners as required by statute. Seeding and wider buffers up to 50 feet in selected areas will be completed with trust funds. Also 3 years of maintenance will be performed to ensure establishment of buffers.	November 31, 2013	$60,000

Result Completion Date: November 31, 2013

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Result/Activity 2: Monitor and Analyze how the proposed strategies improve water quality and reduce peak flows

Description: This item includes the construction and installation of control and monitoring structures including the time to gather the data from each structure. The control structures will meter flow throughout the system. Control structures will be constructed at the end of the system, at the downstream end of the in-channel treatment area, at the inlet to the in-channel treatment area, and at the outlet of each surge basin. Monitoring structures will be also be located along with the control structures where feasible and along strategically placed locations in the watershed. These areas include a portion of the system that have no water quality treatment and is primarily agricultural flow, a portion of the system that has primarily urban flow and the outlet for the potential wetland restoration area.

Monitoring structures will monitor flow and allow for composite and grab samples to monitor Total Suspended Solids, Phosphorus, Nitrogen and other pollutants. Monitoring structures will be placed throughout the watershed to determine the effectiveness of each of the proposed water quality improvements. The flow will be monitored for a total of three years. After which, a monitoring report will be prepared to summarize the results and provide recommendations for future water quality improvements.

A budget for each item as well as a timeline is presented in the table below.

Summary Budget Information for Result/Activity 2: **ENRTF Budget:** **$**171,000
Amount Spent: **$**0
Balance: **$**171,000

Deliverable/Outcome	Completion Date	Budget
Construction of Rate Control Structures including structures at inlet and outlet of in-channel treatment area, the outlet for both surge basins, the outlet of the southern improvement and the including Rate Reduction Weir at End of System	November 31, 2010	$50,000
Construct 9 monitoring structures including samplers and data loggers. All structures will monitor flow and 6 structures will also have samplers	November 31, 2010	$36,000
Project Management, Hydrologic/Hydraulic Analysis, Develop Base Flow Report, Complete assessment of multiple treatment options and how they benefit a diverse watershed and improve water quality. Complete Monitoring Report.	June 30, 2014	$75,000
Testing Results of Samples estimated at $80 per sample	June 30, 2014	$10,000

with 125 samples taken over monitoring period		

Result Completion Date: June 30, 2014

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Result/Activity 3: Provide documentation on how the drainage/treatment system could be incorporated into Drainage Law

Description: A drainage law expert will be hired to assist with incorporating the drainage/treatment system into drainage law. The findings will also be presented in a report to the state legislature. It is anticipated that this will be completed by June 30, 2014.

Summary Budget Information for Result/Activity 3: **ENRTF Budget:** **$**10,000
Amount Spent: **$**0
Balance: **$**10,000

Deliverable/Outcome	Completion Date	Budget

Provide Report to Legislature on how treatment/storage options could be incorporated into new Drainage Law completed by Drainage Authority, Engineer and drainage law expert.	June 30, 2014	$10,000

Result Completion Date: June 30, 2014

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Result/Activity 4: Provide Outreach, Education, Field Days, and Website Development

Description: A final technical memorandum will be prepared to summarize the results of the monitoring. Field site presentations will be conducted to identify pertinent project features to interested parties including Drainage Authorities, Watershed Groups, Landowners, and State Agencies. In addition, presentations to organizations such as the annual Water Resources Conference are anticipated in order to demonstrate model effectiveness in other systems. Results, design, and other final products will then be posted to county, agency and firm websites. A budget for each item as well as a timeline is presented in the table below.

Summary Budget Information for Result/Activity 4: **ENRTF Budget:** **$**23,000
Amount Spent: **$**0
Balance: **$**23,000

Deliverable/Outcome	Completion Date	Budget
Completion of Final Technical Memorandum by I&S and Blue Earth County Drainage Authority.	June 30, 2014	$10,000

Provide five field days at site during and after construction inviting county drainage authorities and landowners, items included are copies, onsite signage, facility rentals, and personnel time by I&S.	June 30, 2014	$6,000
Provide multiple presentations to County Drainage Authorities, Watershed Organizations, and other organizations to demonstrate how model can be duplicated on other drainage systems. Items included are copies, facility rentals and personnel time by I&S.	June 30, 2014	$5,000
Post Results, Design Model, and provide Technical Memorandum on Partner Websites including updates during monitoring timeframe.	June 30, 2014	$2,000

Result Completion Date: June 30, 2014

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V. TOTAL ENRTF PROJECT BUDGET

Personnel: All personnel time by Blue Earth County is in Kind to the project – see Attachment B

Contracts: $427,000 Total:

$125,000 to I&S Group Inc. acting as Engineer for Blue Earth County Drainage Authority to assist Blue Earth County in the project management and completion of the hydrologic and hydraulic design for the water quality improvements, the construction plans and specifications, onsite project administration, environmental consultation and technical memorandums. I&S will

also perform monitoring, including downloading of data and collection of grab and composite samples and analysis. As results are documented I&S will coordinate presentations and website development to promote the water quality improvements and how they can be incorporated into future projects.

$5,000 for a to be determined drainage law expert to assist in completing report to Legislature on how treatment/storage options could be incorporated into new Drainage Law.

$184,000 to a Grading Contractor to be determined by publically bidding the project. The selected contractor will complete the grading of the surge basins, the grading of in-channel treatment, installation of the rate reduction weir, and all control structures associated with the water quality improvements.

$60,000 to a Seeding Contractor to be determined by publically bidding the project. The selected contractor will complete the seeding of the native grass buffers along 4.1 miles of open ditch. The contractor will also perform routine maintenance of the plantings for 3 years to ensure establishment. This will include 20 acres of seeding with the seed, weed control, re-seeding, and maintenance estimated at $3,000 per acre.

$36,000 to a Monitoring Equipment Supplier to purchase and install 9 monitoring stations with equipment appropriate to each location. This equipment will include water samplers, flow monitoring and data loggers.

$10,000 to a Testing Lab to test the Grab and Composite Samples throughout the monitoring period. Testing of Samples estimated at $80 per sample with an estimated125 samples taken over monitoring period.

Equipment/Tools/Supplies: $1,000 for project website development and postings to Blue Earth County, Minnesota Department of Agriculture, and other agency websites.

Acquisition (Fee Title or Permanent Easements): $57,000 for easement acquisition for 11 acres of property. A four acre easement will be acquired for additional land needed to construction the in-channel treatment basin. A 7 acre easement will be acquired for the land needed to construct a surge basin to treat agricultural and urban runoff from the southern portion of the watershed. $5,000 per acre will be paid to each land owner. $2,000 will be paid for professional services to complete the acquisition. Easement acquisition is typical in similar projects completed by the Blue Earth County Drainage Authority and the procedures used on previous projects will be utilized for the water quality easement acquisition. All easement will be permanent easements.

Additional Budget Items:
$3,000 for 10 Facility Rentals at $300 each for presentations and field days. Based on current Blue Earth County Library Rates.

$2,500 for completion of mailings, notices, handouts for Field Days and for Presentations. This is estimated at $250 per field day or presentation.

$500 completion of onsite project signs for field days and public viewing

VI. PROJECT STRATEGY

A. Project Partners

Partner	Duties/Function	Appropriation Funding Amount
Blue Earth County Drainage Authority	• Project Management • Project Administration • Review and Approval of Project • Distribute ENRTF Funding for Drainage Improvements	$353,000[1]
Minnesota Department of Agriculture	• Co-Sponsor • Assist with Design, Monitoring, Technical Memorandum, and Presentations	$0 (All Time is in-kind)
Minnesota Department of Natural Resources (DNR)	• Provide Review of the Proposed System	$0 (all time is in-kind and required by Drainage Law)
Land Owners in Blue Earth County Ditch No. 57	• Funding source for majority of project costs • Recipients of project improvements	$0
I&S Group, Inc.[1]	• Provide Design • Assist with Project Administration, Monitoring, and Technical Memorandum • Presentations of Results	$132,000[1]
Blue Earth Soil and Water Conservation District	• Provide Review and Funding for 7 acre surge basin	$0
Greater Blue Earth River Basin Alliance (GBERBA)	• Provide Review and Funding for 7 acre surge basin	$0
Natural Resources Conservation Service (NRCS)	• Funding source for Wetland Restoration Project	$0

[1]I&S Group will be acting as engineer for the Blue Earth County Drainage Authority. Blue Earth County Drainage Authority will distribute $132,500 of funds to I&S Group for Design, Monitoring, Reports and Presentations. I&S will also complete project signs and printing, mailings and handouts for field days and presentations.

B. Project Impact and Long Term Strategy

The Blue Earth County Ditch No. 57 (BECD57) system drains into the Big Cobb River, which drains into the Le Sueur River, which drains into the Blue Earth River just before the Blue Earth River converges with the Minnesota River, which eventually drains into Lake Pepin and then the Gulf of Mexico. The BECD57 Watershed also encompasses 6,000 acres including the entire City of Mapleton (population 1,662). The Minnesota River and its tributaries are impaired water for turbidity, aquatic life, fecal coliform, aquatic recreation, aquatic consumption, etc. The project seeks to impact the area by improving water quality in the Minnesota River Basin by providing storage and treatment of both agricultural and urban runoff in the Big Cobb River Watershed while increasing yield and reducing flooding in portions of the watershed. The project will also develop a model that could be incorporated

into new Drainage Law and utilized on deteriorating drainage systems as they need to be updated. A reduction of total suspended solids, nitrogen and phosphorus runoff from this area is expected. If results are positive this model utilizing a multiple treatment options could be utilized on other agricultural systems and could be incorporated into new ditch legislature.

In addition, after project completion, the monitoring of the system could continue indefinitely. This could be funded by others or taken up by another public entity or university program to determine the longer term effects of the system. If successful, this system could also be duplicated in other portions of the Minnesota River Basin and additional projects could be added in this watershed could be added.

C. Other Funds Proposed to be Spent during the Project Period

Land Owners will pay $30,000 to acquire permanent easement on 5 acres of land for one surge basin and temporary construction easements for excess material and land disturbance during construction. Land Owners will construct $726,105 of drainage improvements replacing 100 year old portions of the drainage system. These improvements include construction of 1610 feet of new open ditch, construction of1640 feet of 54-inch tile, construction of field crossings sized to control peak flow, 3.1 acres of permanent easement acquisition for open ditch construction, 16 acres of temporary easement acquisition for land disturbance and spoil placement, seeding of the open ditch, directional boring of tile under inplace county roads, construction of 2290 feet of 24-inch tile, construction of 1250 feet of 18-inch tile, tile connections to the new tiles, drop intakes, design of the system, hiring viewers to view the ditch per statue, legal fees, and administration costs. Owners will acquire 17 acres of land for 16.5 foot wide buffer strips estimated at $85,000. Cobb River Watershed will contribute $26,700 (Pending) for additional excavation costs for the construction of one of the surge basins. NRCS will purchase easement and construct 40-acre wetland for $300,000 (Pending). I&S Group has donated approximately $15,000 for preliminary design, grant research, grant writing and other project work to obtain funds through the LCCMR and other sources.

Total estimated other funding is $1,182,805.

D. Spending History

Land Owners have spent approximately $80,000 on the preparation of surveys, preliminary designs, preliminary engineering reports, grants, ditch viewing, land owner meetings, and presentations in order for the project to achieve its current progression.

VII. DISSEMINATION

Blue Earth County, I&S Group and speakers from other agencies, potentially including Minnesota Department of Agriculture, Minnesota Department of Natural Resources, and others, will conduct as many as five field visits to the site to identify project features to interested parties. In addition, Blue Earth County and I&S Group will provide multiple presentations how the model can be replicated on other drainage systems. The results and design model will then be posted on partner and firm websites along with a technical memorandum. Websites include Blue Earth County (www.co.blue-earth.mn.us), Minnesota Department of Agriculture (www.mda.state.mn.us), and I&S Group (www.is-grp.com).

VIII. REPORTING REQUIREMENTS

Periodic work program progress reports will be submitted in January and July of each year between 2010 and 2014. A final Work Program report and associated products will be submitted between on June 30, 2014 as requested by the LCCMR.

Attachment A: Budget Detail for 2010 Projects - Summary and a Budget page
Submital Date: November 24, 2009
Project Title: Mapleton Area Agricultural/Urban Runoff Water Quality Treatment Analysis

Project Manager Name: Craig Austinson, Blue Earth County

Trust Fund Appropriation: $ 485,000

2010 Trust Fund Budget	Result 1 - Provide storage and treatment for agricultural and urban runoff to improve water quality	Result 1 Budget:	Amount Spent (11/24/09)	Balance (11/24/09)	Result 2 - Monitor and Analyze how the proposed strategies improve water quality and reduce peak flows	Result 2 Budget:	Amount Spent (11/24/09)	Balance (11/24/09)	Result 3 - Provide documentation on how the drainage/treatment system could be incorporated into Drainage Law	Result 3 Budget:	Amount Spent (11/24/09)	Balance (11/24/09)	Result 4 - Provide Outreach, Education, Field Days, and Website Development	Result 4 Budget:	Amount Spent (11/24/09)	Balance (11/24/09)	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Design and Construction of Two Surge Basins, In-Channel Treatment, Control Structure on Outlet, and Seeding of Grass Strip with Native Buffers				Construct and Install Control Structures, and Monitoring Structures, Monitor Flow for 3 years, Complete Monitoring Report and Technical Memorandum				Completion of Report on Drainage Law				Provide five field days at site, Provide multiple presentations how model can be duplicated on other drainage systems, Post Results, Design Model, and provide Technical Memorandum on Partner Websites including updates during monitoring timeframe					
PERSONNEL: wages and benefits (ALL PERSONNEL TIME IS IN-KIND)																		
Contracts																		
Professional/technical	I&S Group, Inc - Project Management, Design, Specifications, Hydrology/Hydraulics, Onsite Project Administration and Environmental Consultation	30,000	0	0	I&S Group, Inc - Project Management, Technical Writing, Hydrology/Hydraulics, Monitoring, Grab Samples, and Analysis	75,000			I&S Group, Inc - Project Management, Technical Writing, Hydrology/Hydraulics Analysis	4,000	0	0	I&S Group, Inc - Project Management, Technical Input, Coordination of Presentations and Completion of Technical Memorandum	16,000	0	0	125,000	125,000
									Hire a Drainage Law Expert to Review and Provide Documentation for report and to present report to Legilature	5,000	0	0		0	0	0	5,000	5,000
Other contracts	Grading Contractor to build In-Channel Treatment Basins and Surge Basins	134,000	0	0	Grading Contractor to Furnish and Install Control Structures	50,000	0	0									184,000	184,000
	Seeding Contractor for Seeding and Maintainence of Vegative Strips along 4.1 Miles of Open Ditch with Native Buffers	60,000	0	0	Supplier for Monitoring Equipment to Furnish and Install Samplers and Data Loggers	36,000	0	0									96,000	96,000
		0	0	0	Testing Lab to Test Grab Samples estimated at $80 per sample with 125	10,000	0	0									10,000	10,000
Non-capital Equipment / Tools													Website Development and Postings to Blue Earth County, Minnesota Department of Agriculture and other agency websites	1,000	0	0	1,000	1,000
Land acquisition																	0	0
Easement acquisition	**4 Acres for In-Channel Treatment**	20,000	0	0													20,000	20,000
	7 Acres for Surge Pond	35,000	0	0													35,000	35,000
Professional Services for Acq.	**Realator/Apraiser to be Determined**	2,000	0	0													2,000	2,000
Facility Rental for Field Days and Presentations													10 Facility Rentals at $300 each (Based on Blue Earth County Library Rates) for Field Days and Presentations	3,000			3,000	3,000
Coping/Printing/Mailings									Mailings and Report Presentation Handouts	1,000	0	0	Mailings, Notices, Handouts for Field Days and for Presentations Estimated at $250 per field day or presentation	2,500			3,500	3,500
Onsite Signage													Provide Onsite Project Signage for Field Days	500			500	500
Travel expenses in Minnesota	**Blue Earth County Travel all In Kind**	0	0	0													0	0
COLUMN TOTAL		**$281,000**	**$0**	**$281,000**		**$171,000**	**$0**	**$171,000**		**$10,000**	**$0**	**$10,000**		**$23,000**	**$0**	**$23,000**	**$485,000**	**$485,000**