Proposal for a Feasibility Study to Address PAH Contamination in Thompson Lake

Submitted to the Lower Mississippi River WMO
RE: Request for Proposals

July 22, 2013
July 22, 2013

ATTN: Laura Jester
Lower Mississippi River WMO
c/o Dakota County Soil and Water Conservation District
4100 220th St. West, Suite 102
Farmington, MN 55024

Re: Thompson Lake Feasibility Study

Dear Ms. Jester:

We are pleased to submit this Proposal to prepare a feasibility study to address PAH contamination in Thompson Lake in West St. Paul. We have received the RFP and all subsequent information. This proposal shall remain valid for a period of not less than 90 days from the date of submittal.

As the centerpiece of Thompson County Park, Thompson Lake is an excellent example of an urban water body that enhances the neighborhood quality of life, connecting residents to local natural resources and helping to make this community a great place to live and work. However, as with so many other similar water bodies throughout the Metro Area, the presence of PAH contamination is a reality that must be addressed in a timely and effective way.

We formed our company in order to provide high level water resources expertise directly to our clients, and we are continuously adding to our knowledge base, particularly with regard to emerging issues such as PAH contamination in urban waters. As a starting point, we have already invested substantial time in developing our own pond maintenance manual that addresses both technical and regulatory issues for ponds in Minnesota.

We have valuable experience in water quality analysis, pond sampling and testing, and sediment removal/disposal planning, as well as feasibility studies and cost comparisons in general. We are able to assess conditions at a site and come up with sound solutions for a fraction of the fees charged by other firms. The fact that this study will be taking place right in our neighborhood also adds a positive sense of connection and commitment for our firm. We see this as an opportunity for the LMRWMO to develop decision making tools for addressing PAH concerns not only in Thompson Lake, but in other vulnerable water bodies as well.

We look forward to the chance to work with you on this project. Please feel free to contact me with any questions. I can be reached by phone at (763) 210-5713 or by email at kent.brander@hydromethods.com during or following the period of proposal evaluation. Thank you very much for your consideration.

Sincerely,

[Signature]

Kent Brander, PE, CFM
Principal Engineer
Hydromethods, LLC
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1. Team Organization

Project Manager

Kent E. Brander, P.E., will serve as Project Manager (PM) for this Project. He will be available at (612) 819-6581 (cell phone) or kent.brander@hydromethods.com to answer any questions or resolve any apparent discrepancies.

Organization Chart

Our project team consists of the four individuals listed in the table below. As a small firm with a clear focus on water resources engineering, we have the benefits of flexibility, constant communication, and a clear understanding of what is required to complete this Project. All team members contributing to this feasibility study are senior-level professionals fully invested in and committed to the soundness and integrity of the final project.

The work will be completed in a cooperative manner, with the PM coordinating efforts, maintaining the project timeline and budget, and being responsible for quality control. Although work will be approached as a team, responsibilities will be delegated to some extent according to individual expertise and skill sets.

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2. Conflict of Interest Statement

No Conflict of Interest

Hydromethods, LLC does not have any potential conflict of interest with respect to providing the services contemplated by the RFP and described in this proposal. Should any such conflict of interest arise or be identified in the future, Hydromethods, LLC will bring it to the attention of the LMRWMO so that it may be resolved appropriately.
3. Qualifications and Experience

Overview

Hydromethods was formed specifically to provide high quality technical services in the field of water resources, and we use the best available information to help clients address surface and ground water concerns. We are able to clearly quantify and document the expected benefits of implementation measures, in terms of pollutant load reductions or other criteria. In the past several years, we have completed numerous projects for Watershed Districts/Organizations and Cities, and have demonstrated our ability to achieve our clients’ goals. In addition to the 3 years in which Hydromethods has been in existence, our engineers have a great deal of past experience completing or implementing water resources projects for municipalities and watershed agencies.

Selected Project Experience

Hydromethods has completed numerous projects that include the elements identified in the RFP as being relevant to this Project. Specific project descriptions, including project name, date, location, and client name are provided in the pages below.

Project: Hagemeister Pond Assessment & Sediment Removal | 2011 | Crystal, MN
Client: City of Crystal; Tom Mathisen, (763) 531-1160

Hydromethods developed plans to dredge a portion of Hagemeister Pond, which is designated as Minnesota DNR Public Waters Wetland 642W. Our firm provided the planning, permitting, and design components for the project, including sediment quantity estimation, sampling and laboratory testing, completion of agency forms and permit applications, preparation of dredging and disposal construction documents, and completion of construction cost estimate. The project followed recommendations of the MPCA Publication “Managing Dredged Materials in the State of Minnesota”, June 2009, specifically the Modified Characterization and Permit Approach for Urban Stormwater Ponds

Project: Industrial Facility SWPPPs & BMP Assessments | 2010-2013 | Throughout Minnesota
Client: Multiple Industrial Facilities

As part of the SWPPP development process for facilities regulated under the MPCA’s general stormwater permit, Hydromethods assessed facility property for BMP retrofits and stormwater sampling locations. Guidance was provided for sampling and testing, as well as result-dependent action plans for management to remain compliant moving forward. This often included site-specific options for the reduction of concentrations of tested parameters (TSS, metals, COD, etc.). Expected improvement, construction cost estimates, and long-term maintenance costs and concerns were provided for a variety of BMPs.

Project: Sherren - Dellwood Drainage Assessment | 2013 | Roseville, MN
Client: City of Roseville; Deb Bloom, (651) 775-6266

Residents in this neighborhood experienced flooding and property damage during recent intense rainfall events. The City requested Hydromethods review their existing XP-SWMM surface water management model, and analyze the system for feasible solutions. Ultimately,
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four potential alternatives for stormwater conveyance and storage retrofitting were identified, including ponding, pervious pavement, and underground vault storage. The hydraulic benefit, estimated construction costs, and potential easement/property barriers were presented in a technical memorandum for Staff consideration.

Project: Riverfront Development Project | Peoria, IL
Client: US Army Corps of Engineers

This riverfront redevelopment project restored over 50 acres of river backwater area into critical fisheries habitat for Peoria Lake. Dredging of the area was aided through the innovative use of geotubes to construct a perimeter barrier while providing an area for dredged materials to be placed.*

Project: Pond Sediment Assessment | 2009 | Mound, MN
Client: Langdon Bay Townhome Association

The treatment pond constructed during the original site development operations near the northern shore of Lake Minnetonka’s Langdon Bay had become largely filled with sediment. Years of stormwater runoff passing through had reduced the hydraulic and sediment capacity of the pond, leading to reduced treatment effectiveness and aesthetic concerns. Pond bathymetry data was collected and compared to both the original design plans, as well as a redesigned pond sized to meet current standards. A dredging plan and cost estimate was provided to the client.*

Project: Reitz Lake East Side Treatment | 2012 | Carver County, MN
Client: Carver County Watershed Management Organization; Paul Moline, (952) 361-1825

The TMDL Implementation Plan for Reitz Lake indicates a reduction in phosphorus loading of up to 84%/year is necessary to meet the required State Standard. With approximately 2,000 acres of agricultural land draining untreated runoff into the eastern end of the lake, retrofitting BMPs into the watershed is a key strategy to achieve the desired load allocation limit. Hydromethods analyzed the watershed and identified treatment options that were feasible given the physical limitations of the site, as well as project funding restrictions. The cost-to-expected reduction ratio for phosphorus removal was compared, and a settling basin with a floating treatment wetland (FTW) and aeration system was chosen.

A literature review indicated FTWs would be desirable due to their ability to effectively assimilate nutrients and other pollutants, as well as their simplicity, low cost, and relative ease of maintenance. The new pond would allow for the settling of the incoming particle load, while the FTW would remove a significant quantity of phosphorus. Hydromethods completed plans, specifications and cost estimates, as well as contract administration and management for the project in fall/winter, 2012. FTW mats were installed in Spring/Summer, 2013.

Project: Hydes Lake Soluble Phosphorus Removal Project | 2013 | Carver County, MN
Client: Carver County Soil & Water Conservation District (SWCD); Mike Wanous, (952) 466-5230

As part of the Hydes Lake TMDL Implementation Plan, the Carver SWCD desired to reduce the loading of dissolved phosphorus entering the lake from upstream, including the directly
Qualifications and Experience

connected Patterson Lake. Hydromethods provided concept alternatives and preliminary cost estimates for comparison; ultimately an iron-enhanced sand filter was selected for design and installation. After estimating soluble phosphorus loading from the Patterson watershed (rural development and agricultural) by completing an HSPF model, Hydromethods quantified pollutant reduction using recent findings from the University of Minnesota. Preliminary construction plans have been completed and implementation is expected in fall, 2013.

**Project:** Maplewood State Park Hydrologic Analysis | 2013 | Pelican Rapids, MN  
**Client:** Minnesota Department of Natural Resources; Doug Carter, (651) 259-5472

In an effort to alleviate roadway and horse trail flooding at multiple locations, the Minnesota DNR hired Hydromethods to develop a comprehensive hydrologic model for the park. Using available Digital Elevation Model / LiDAR information and other GIS data, as well as park survey records, an XP-SWMM model was developed to create a dynamic model of floodwaters in the park. A second phase will likely include calibration of the model using observed data obtained in the summer of 2013. The model will be used as a tool to identify areas for stormwater management improvements that will mitigate flooding issues throughout the park while minimizing construction disturbance and costs.

**Project:** St. Cloud Rain Garden Retrofit Project | 2012 | St. Cloud, MN  
**Client:** Sauk River Watershed District; Tara Ostendorf, (320) 352-2231

Private and public properties within the City were evaluated for the feasibility of retrofitting rain gardens, ultimately identifying multiple residences and parks in the northwest area of the city. After cursory location assessment was completed, work began with the recruitment of landowners interested in adding treatment to their properties, as well as verifying the feasibility of locating gardens in the city park areas. After meeting with residents and business owners, Hydromethods performed site borings to verify local hydraulic conductivity, and ultimately developed construction plans and specifications for multiple rain gardens throughout the city.

The gardens were installed at several locations, with most including fabricated pretreatment devices to increase rain garden lifespan and reduce ongoing maintenance costs. The expected pollutant and volume reductions associated with the new BMPs were estimated using the WinSLAMM pollutant modeling software, with results reported to the City for their records.

**Project:** Stormwater Treatment Retrofit Project | 2012 | New Germany, MN  
**Client:** Carver County Watershed Management Organization; Paul Moline, (952) 361-1825

Hydromethods was consulted to evaluate the City’s stormwater system for potential retrofit opportunities, and determine what BMPs would provide the highest treatment benefit for the least costs. An initial assessment of the Street Reconstruction Project area narrowed the choices down to three feasible options, including: proprietary hydrodynamic treatment structures, bioretention/rain gardens, and media filtration systems. The associated costs and benefits of each option were explored to arrive at a preliminary recommendation.
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The key factors considered in the evaluation of the treatment configurations included: installation costs, maintenance requirements, and expected treatment effectiveness. Treatment effectiveness was analyzed with the WinSLAMM modeling software, which quantified the pollutant load reductions that could be expected in a given year with each design. Ultimately, Hydromethods prepared construction documents to install a biofilter swale, a bioretention area, and custom catch basin media filters into the conveyance system.

**Project:** Mesabi Nugget EIS Hydrologic Model Review | 2010 | Hoyt Lakes, MN  
**Client:** Minnesota Department of Natural Resources

The Minnesota DNR was in charge of preparing the EIS for this mine expansion project. The consultant for the mining company performed a hydrologic analysis of the mine pits in the vicinity of the expansion, and used the results of the analysis to make a statement regarding the potential for groundwater contamination. The HEC-HMS analysis was reviewed and recommendations were made regarding how the investigation needed to be restructured in order to properly address concerns of local tribes. *

**Project:** Cold Spring Rain Gardens & Shoreland Restoration Project | 2012  
**Client:** Sauk River Watershed District; Tara Ostendorf, (320) 352-2231

Hydromethods assessed previously-identified properties for rain garden and/or shoreland restoration project feasibility. After contacting land owners and reviewing properties for suitability, Hydromethods developed construction plans, specifications and bidding documents for the project. The expected annual reductions of TSS, TP and runoff volume were estimated for the rain gardens using the Source Loading and Management Model (WinSLAMM).

**Project:** Local Surface Water Management Plans | 2004-2009 | Greater Metro Area  
**Client:** Multiple Cities | Multiple Locations

Local Surface Water Management Plans were completed for the cities of Mound, Tonka Bay, Deephaven, Greenwood, Woodland, Waconia, Watertown, Mayer, Cologne and Norwood Young America as required by State Statute. Included was an inventory of natural resources, an assessment of related issues, and a Capital Improvement Program (CIP), as well as a complete hydrologic and hydraulic model of the existing land use and projected 2030 city limits. *

**Project:** Outlet Channel Maintenance Cost-Share Determination | 2007 | Prior Lake, MN  
**Client:** Shakopee Mdewakanton Sioux Community (SMSC); Stan Ellison, (952) 496-6158

The Prior Lake Spring Lake Watershed District is responsible for the maintenance of the Prior Lake outlet channel, a channel which receives discharge from multiple government units. In an effort to cover the maintenance expenses and ensure adequate channel capacity, a fair cost split was needed for affected stakeholders. David took part in the technical committee that determined a weighted area-discharge mechanism would be used. Ultimately, a Memorandum of Understanding was developed for the impacted communities, outlining the annual cost-share responsibility for each. The model was updated yearly with land cover changes occurring during the previous year, changes which impacted the discharge to the ditch and subsequently the associated monetary contribution of the Community. *
Qualifications and Experience


**Client: Capitol Region Watershed District; Bob Fossum, (651) 644-8888**

The Capitol Region Watershed District updated their watershed management plan, and created a comprehensive, user-friendly document informed by the community, numerous stakeholders, and watershed management principles. Kent Brander was part of the consulting team that helped CRWD put the plan together, and he made substantial contributions to the content and layout of the document. *

**Project: MS4 Pond Inventory | 2011 | Wayzata, MN**

**Client: City of Wayzata; Mike Kelly, (952) 404-5316**

Hydromethods completed the Stormwater Pond Inventory to be submitted to the MPCA upon issuance of the revised NPDES/SDS MS4 General Permit. The Inventory is required by the 2009 Minnesota Session Law, Ch. 172, Sec. 28, and it was completed according to the MPCA guidance document “Stormwater Pond Inventory Guidance” as well as the detailed instructions provided in the “MS4 Stormwater Pond Inventory Form” spreadsheet. Following initial development of the Inventory, field verification was performed where possible in order to improve reliability. A hand-held GPS unit was used to obtain coordinates for most of the inventoried system outfalls, and mapping was completed in GIS and AutoCAD.

**Project: Development Reviews – Water Resources Permit Compliance | Ongoing | Roseville, MN**

**Client: City of Roseville; Deb Bloom, (651) 775-6266**

Hydromethods was retained by the City of Roseville to review multiple development projects for conformance with applicable design standards. Standards include those of the City Code, as well as the Water Rules of the various jurisdictional Watershed Districts in the city. Review included checking designs for proper stormwater management, reviewing models and other submittals, and providing a review summary to the City for their consideration.

**Project: Auditors Road Redevelopment Harvesting & Reuse | 2008 | Mound, MN**

**Client: City of Mound; Carlton Moore, (952) 472-0603**

As part of the larger downtown redevelopment project, the City planned to create an aesthetic parkway with the reconstruction of Auditors Road. The feasibility of adding a stormwater reuse system to the area was considered, a feature that would simultaneously meet irrigation needs, reduce water consumption, and remove a portion of the pollutant load. A water balance was completed to determine the optimum cistern size for the subcatchment and irrigation areas, and various storage alternatives were compared as part of the cost analysis. Ultimately, construction plans and specifications were prepared for the installation of a pipe gallery consisting of 48” diameter polyethylene pipes. A pretreatment unit upstream of the storage vault and an inline distribution filter were installed to reduce wear on the irrigation system. *

**Project: BMP Assessment & Sand Filter Retrofit | 2012 | South St. Paul, MN**

**Client: Waterous Company; Don Feste, (651) 450-5213**

In a proactive effort to meet runoff pollutant benchmarks set by the MPCA’s Industrial Stormwater Permit, this metal manufacturing facility sought an assessment and
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recommendation for a cost-effective means to Permit compliance. Hydromethods was hired to assess the facility’s stormwater runoff patterns and identify treatment alternatives that would provide the necessary reduction in pollutant concentrations. A range of options were considered, and pollutant modeling was done to quantify and compare expected load reductions, as well as weigh these reductions with life-cycle costs for each BMP.

The owner decided to proceed with a retrofit alternative likely to result in immediate permit compliance. Given the site constraints, available funds, and considering the annual maintenance requirements of all options, it was determined that retrofitting an existing undersized dry pond with a media filter would be the most effective alternative. The construction documents included drafted plans for a new settling forebay to remove large particles, as well as a surface sand filter “finishing” area for removal of fine solids.

**Project:** Drainage Authority and Watershed District Technical Assistance | 2007-2009  
**Client:** Public Service – BWSR

While providing engineering technical assistance to drainage authorities throughout the State, Dr. Peterson conducted site visits and consulted with local drainage authority representatives on a regular basis. In addition, he delivered an informational presentation to the Minnesota Association of Watershed Districts on effective and sustainable drainage management. *

**Project:** TMDL CONCEPTS Modeling | 2007 | St. Paul, MN  
**Client:** Minnesota Pollution Control Agency

Dr. Peterson served as project manager and modeler for the MPCA Hardwood Creek TMDL CONCEPTS modeling project, the first implementation of the USDA ARS’ CONCEPTS model in the state of MN for a TMDL. First proposed by Dr. Peterson to the MPCA, use of this model is projected to become an industry standard for sediment TMDLs. CONCEPTS-based modeling has also been used to help develop guidance for appropriate outlet structure configurations to reduce excessive sediment loads in the Minnesota Stormwater Manual. Performed CONCEPTS modeling to aid the in the Middle Rice Creek feasibility restoration design. *

**Project:** Minnesota Stormwater Manual | 2005 | St. Paul, MN  
**Client:** Minnesota Pollution Control Agency

The Manual is the primary document for stormwater management and design guidance for the State of Minnesota. Kent Brander was the principal writer of the chapters dealing with stormwater pond design and hydrologic and hydraulic modeling. He also had a substantial role in editing the content of other chapters, and determining how the information should be presented for clarity and ease of use by practitioners. *

**Project:** Lake McCarrons Subwatershed Analysis and Feasibility Study | 2008 | Roseville, MN  
**Client:** Capitol Region Watershed District; Bob Fossum, (651) 644-8888

The CRWD performed a study of the subwatershed draining to Lake McCarrons, an important area resource and the only swimming lake in the District. Kent Brander’s role in the project involved substantial analysis and modeling of the subwatershed and storm sewer network, as well as the identification, conceptual design, and preliminary cost estimates of potential...
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approaches for phosphorus load reduction. An existing pond near the subwatershed outlet was identified as the best place for a stormwater treatment retrofit project.*

**Project:** Big Eagles Water Quality Improvement Project | 2010 | Prior Lake, MN

**Client:** Shakopee Mdewakanton Sioux Community (SMSC); Stan Ellison, (952) 496-6158

Working with the SMSC Land Department staff, Community land holdings were assessed for areas that would provide the highest degree of phosphorus reduction and volume removal benefit. Record drawings, 2’ LiDAR contour data, and site visits were used to narrow down the potential locations for treatment. These areas were further analyzed using the P8 software program to estimate annual phosphorus load reduction quantities. Construction documents included designs for new bioretention areas and underground treatment structures.*

**Project:** Browns Lake Sediment Reduction | 2003

**Client:** Public Service – USACOE

Dr. Joel Peterson was the lead project engineer tasked with formulating design alternatives to reduce sedimentation to Brown’s Lake, a backwater lake on the Mississippi River. Several years of data were assembled and analyzed to determine sediment loading rates, ultimately leading to sediment-trap alternatives and quantification of effective trapping capacity. In addition, a GIS-based model was developed to predict erosion from the contributing sub-watershed to better target sediment sources and loadings.

**Project:** McKenna Drainage Channel Enhancements | 2007 | Prior Lake, MN

**Client:** Shakopee Mdewakanton Sioux Community; Stan Ellison, (952) 496-6158

The channel passing through the SMSC property conveys runoff from a wide range of upstream land use, and the SMSC desired to add treatment to the system. The channel passes through an area of highly permeable soils, infiltrating much of the discharge heading its way. A pretreatment pool was added to the channel to remove sediment conveyed from nearby agricultural property and extend the infiltration functionality of the ditch. Also, the highly permeable areas were enhanced through grading and vegetation establishment to provide increased detention time and subsequently additional volume abstraction.*

**Project:** Hardwood Creek/ Judicial Ditch #2 Rehabilitation | 2004 | Hugo, MN

**Client:** Rice Creek Watershed District

The Rice Creek Watershed District embarked on a project to restore hydraulic capacity in this agricultural ditch, while avoiding negative wetland impacts and enhancing wildlife habitat. The project team identified and hydraulically evaluated a variety of potential ditch designs for the six-mile length of channel. The hydrologic and hydraulic model of the watershed and waterway was developed in XP-SWMM and used to analyze a range of channel restoration options.

**Project:** Guy Metals Rechannelization & Floodplain Modeling | 2008 | Hammond, WI

**Client:** Guy Metals

In this hydraulic design project, a manufacturer planned to construct a new building, but part of the site was located within the regulatory floodplain. A new channel for local drainage that circumvented the site and removed it from the floodplain had to be provided. Hydrologic
Qualifications and Experience

analysis for the site was performed using both regional regression equations and HydroCAD. The hydraulic analysis was performed using HEC-RAS, and included the design for the new channel as well as the evaluation of the revised floodplain. *

**Project:** Agricultural Watershed Restoration Projects | 2007-09 | State of Minnesota  
**Client:** Public Service – BWSR

While working at the Minnesota Board of Water and Soil Resources (BWSR), Dr. Peterson served as project manager for multiple Agricultural Watershed Restoration projects throughout the state. Six projects were designed to identify different means of achieving water quality goals on impaired water bodies with an emphasis on perennial crops. *

**Project:** Arlington-Pascal Stormwater Improvements Modeling and Design | 2008 | St. Paul, MN  
**Client:** Capitol Region Watershed District; Bob Fossum, (651) 644-8888

The CRWD needed to remove phosphorus and improve water quality for Como Lake, while addressing local flooding concerns. Kent used XP-SWMM to analyze existing conditions, evaluate and optimize designs, and construct and calibrate an as-built model for the system. His role also included preliminary design of the Como Golf Course, a high-visibility stormwater treatment retrofit, in which a small swamplike area was transformed into a large, attractive golf course pond that doubles as a stormwater treatment facility for the fully developed upstream neighborhood. A diversion structure was constructed in order to direct flow from the adjacent storm sewer into the pond, and major excavation was required in order to allow treated water to reenter the storm sewer via gravity drainage. *

* indicates project performed by Hydromethods staff while at a previous firm.
4. Key Personnel

Overview

All team members are senior-level water resources professionals, able to guide projects from start to finish, including client contact, analysis, design, and construction management. In this section we include a brief description of key personnel, followed by full résumés.

Kent Brander, P.E., CFM

Mr. Brander has worked for over 13 years in water resources engineering, performing a wide range of services for watershed districts and other clients. He has developed hydrologic, hydraulic, and water quality models in HSPF, XP-SWMM, HydroCAD, HEC-RAS, BATHTUB, and others. He has made significant contributions to Watershed District Plans and the Minnesota Stormwater Manual. He has been Principal Engineer at Hydromethods since 2010.

Between 2003 and 2010, Mr. Brander played a lead role in water resources modeling at Emmons & Olivier Resources, Inc., where he was responsible for design and analysis for a number of innovative stormwater management measures.

David Poggi, P.E., LEED AP BD+C

Mr. Poggi has worked for over 13 years in water resources engineering, including modeling, civil design & drafting, project management, and plan review. As Principal Engineer at Hydromethods, he has worked with numerous public and private clients throughout Minnesota on implementation of water resources protection projects and Rule development.

Previously, Mr. Poggi served as the water resources project manager and primary design engineer for the Chaska office of Bolton & Menk, Inc. He was responsible for drainage design and plan review for clients, as well as project development, technical analysis, drafting of construction plans & specifications, and project management.

Dan Fabian, P.E.

Mr. Fabian has over 25 years of experience in civil engineering, water resources management, and analysis of surface water systems. Mr. Fabian has served as the lead engineer on numerous projects, emphasizing client involvement and public participation. He has served as staff engineer to watershed and lake improvement districts and provided advice to District Boards of Managers on all engineering matters, including development review, water quality, erosion control, drainage plans and implementation of district permitting program when applicable.

Joel Peterson, P.E., Ph.D.

In addition to his academic background Dr. Peterson has over 10 years of experience in water resources engineering, serving as project manager on significant projects with the Army Corps of Engineers, Emmons & Olivier Resources, Inc., and the Minnesota Board of Water and Soil Resources (BWSR). He is currently Assistant Professor at UW River Falls Department of Agricultural Engineering Technology, and is a collaborating consultant with Hydromethods.
**Kent E. Brander, P.E.**

**Principal Engineer**

Kent has worked for over 12 years in the field of water resources engineering, performing a wide range of services for watershed districts and other public and private clients. He has substantial experience playing a lead role with respect to hydrologic and hydraulic modeling and analysis, and has constructed or developed hydrologic, hydraulic, and water quality models for many projects using various software packages, including XP-SWMM, StormNET, HydroCAD, HEC-RAS, BATHTUB, and others. He has made significant contributions to planning and guidance documents, including Watershed District Plans and the Minnesota Stormwater Manual.

**Expertise**

*Water Resources Modeling and Analysis (Hydrology, Hydraulics, Water Quality)*

- Models developed at a range of scales (single site to large watershed) for various applications (rate and volume control, floodplain mapping, phosphorus removal, etc.)
- Able to construct and work with models using all standard industry software packages (HSPF, EPA SWMM, XP-SWMM, HEC-HMS, HEC-RAS, WinSLAMM, WinHSPF, BASINS, SWAT, BATHTUB, others)
- Model construction, parameterization, calibration, and reporting is performed to maximize clarity, auditability, and efficiency of future modifications

*Stormwater Conveyance, Retention, and Treatment Engineering Design*

- Stormwater collection and conveyance structures, agricultural ditches, culverts
- Grading plans, infiltration/biofiltration stormwater BMPs, stormwater ponds
- Low Impact Development design and Minimal Impact Development Standards
- Stormwater harvesting and reuse for irrigation

**Watershed Management Planning**

- Able to synthesize issues from numerous stakeholders and develop clear broad goals
- Demonstrated understanding of technical issues, quality of writing, and awareness of community perceptions
- Able to translate broad goals into a detailed action plan and budget, and facilitate an objective evaluation of progress and success on plan intentions

**Experience**

2010 – Current: Hydromethods, LLC  
Principal Engineer


2003 - 2006: Emmons & Olivier Resources, Inc., Water Resources Engineer


2001 – 2002: WI Dept. of Transp., Bridge Hydraulics Unit, Civil Eng.

**Credentials**

Minnesota P.E.  
Wisconsin P.E.  
Illinois P.E.  
ASFPM Certified Floodplain Manager (CFM)

**Education**

M.S. Civil & Environmental Engineering, UW – Madison, 2002  
B.S. Geological Engineering, UW - Madison, 2000
1. Maplewood State Park Hydrologic Analysis | Pelican Rapids, MN | 2013
   GIS / LiDAR / DEM analysis, XP-SWMM model development
2. Hydes Lake Soluble Phosphorus Removal Project | Carver County, MN | 2013
   HSPF modeling, BMP selection, load removal estimates, iron sand filter design
   XP-SWMM model, double-ring infiltration testing, investigation and summary report
4. Bevens Creek Bioengineering Restoration | Carver County, MN | 2012
   XP-SWMM model, 2-stage ditch design, soil bioengineering, technical handout creation
5. Stormwater Treatment Retrofit Project | New Germany, MN | 2012
   BMP cost/benefit analysis, media filter/biofilter design, WinSLAMM, plans & specifications
   Rain garden site identification, WinSLAMM load removals, construction plans & estimates
7. LF Manufacturing Fiberglass Structure Verification | St. Paul, MN | 2013
   Structural integrity verification of fiberglass pipe and manholes, buckling & rib analysis
8. Various Industrial Facility SWPPPs & BMP Retrofit Assessments | Minnesota | 2010-13
   Site visit & assessment, WinSLAMM modeling, BMP recommendation, SWPPP design
9. Reitz Lake East Side Treatment | Carver County, MN | 2012
   Concept development, FTW design, construction plans, cost estimates & admin.
    Sediment sampling & testing, dredging plan, construction plans and cost estimates
11. MS4 Pond Inventory | Wayzata, MN | 2011
    GIS analysis, GPS data collection, BMP identification & inventory, shapefile delivery
12. TE Miller Development Water Reuse Feasibility Assessment | Edina, MN | 2011
    Water budget analysis, cost/benefit assessment, concept layout & preliminary design
    Stakeholder involvement, revised plan development
    HEC-HMS model review for DNR, revision recommendation per local issues & needs
15. Wetland Bank Hydrologic Modeling | Blaine, MN | 2009
    XP-SWMM modeling for restoration hydrology, wetland outlet control, flood prevention
16. Lake McCarrons Subwatershed Analysis and Feasibility Study | Roseville, MN | 2008
    XP-SWMM analysis of sewer network, BMP recommendation & cost estimates for CRWD
    Flood reduction and phosphorus removal design with XP-SWMM, model calibration
    Channel design, HydroCAD and HEC-RAS modeling, regulatory floodplain revisions
    Principal writer of pond design & hydrologic / hydraulic modeling sections
DAVID M. POGGI, P.E.
Principal Engineer

David has worked for over 12 years in the fields of civil and water resources engineering, and has extensive experience with hydraulic design, stormwater modeling, site design & plan development, project management, development plan review, and permit acquisition. He has worked with public and private clients throughout Minnesota and Wisconsin, including Cities, Watershed Management Organizations, land owners, and industrial facilities.

EXPERTISE

**Hydraulic, Hydrologic and Pollutant Modeling and Design**
- Extensive water resources modeling experience, including: XP-SWMM, EPA-SWMM, HydroCAD, StormCAD, HEC-RAS, P8, WinSLAMM, WaterCAD, HEC-2, HEC-6
- Low Impact Development design and sustainable development standards
- Streambank and shoreland restoration and stabilization, including soil bioengineering
- Design of BMPs for runoff quantity and quality, including: bioretention, infiltration, media filters, retention ponds, permeable pavements, stormwater harvesting & reuse, proprietary treatment units, underground storage, stormwater wetlands, etc.
- Design of site development plans, including: grading and drainage, earthwork, underground utilities, streets & trails, SWPPPs, conveyance mechanisms, etc.
- Pump system selection & design
- Survey data collection and AutoCAD plan drafting; GIS analysis and map making

**Site Design, Plan Review & Construction Management**
- Development plan review on behalf of City or other water management authority to ensure conformance with local Code requirements
- Internal company review of project plans and designs for conformance with City, Watershed District, State and Federal requirements
- Cost estimate completion and construction project administration

**Watershed Management Planning**
- Working with local government units to define goals and identify issues to synthesize surface water management plan to meet local needs
- Participation on multiple Technical Advisory Committees with Watershed Districts for Rule development and revision
- Capital improvement planning for water resources projects within communities
- Treatment pond and BMP maintenance planning, sediment sampling, and analysis
- Wetland Conservation Act administration and Technical Evaluation Panel participation

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<thead>
<tr>
<th>Summary</th>
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<tbody>
<tr>
<td><strong>EXPERIENCE</strong></td>
</tr>
<tr>
<td>2010 – Current: Hydromethods, LLC Principal Engineer</td>
</tr>
<tr>
<td>2001 – 2002: WisDOT, Hydraulic Bridge Design Unit, Civil Engineer</td>
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<tr>
<td>1999 – 1999: Strand Associates, Inc., Civil Engineer, Co-op</td>
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<tr>
<td><strong>CREDENTIALS</strong></td>
</tr>
<tr>
<td>Minnesota P.E. LEED AP BD+C Mn/DOT SWPPP Designer</td>
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<tr>
<td><strong>EDUCATION</strong></td>
</tr>
<tr>
<td>M.S. Civil &amp; Environmental Engineering, UW – Madison, 2002</td>
</tr>
<tr>
<td>B.S. Environmental Engineering, Michigan Tech. University, 2000</td>
</tr>
<tr>
<td>B.S. Biological Sciences, Michigan Technological University, 2000</td>
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</tbody>
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**SELECTED PROJECTS**

1. Sherren-Dellwood Drainage Assessment | Roseville, MN | 2013
   XP-SWMM model revisions, development of alternatives, cost / benefit summary memo

2. North Minneapolis Interceptor Rehabilitation | Minneapolis, MN | 2013
   Pump system design & certification, AutoCAD drafting, Metropolitan Council approval

3. Hydes Lake Soluble Phosphorus Removal Project | Carver County, MN | 2013
   Iron sand filter, load removal estimates, construction plans, specifications and estimates

4. Development / Re-development Reviews – Multiple | Roseville, MN | 2013
   Plan design and modeling reviews for conformance with City/Watershed Standards

5. Stormwater Treatment Retrofit Project | New Germany, MN | 2012
   BMP cost/benefit analysis, media filter/biofilter design, WinSLAMM, plans & specifications

6. Miller Lake Upstream Treatment | Carver County, MN | 2012
   PondNet analysis, load reduction quantification, AutoCAD drafting

7. BMP Assessment & Sand Filter Retrofit | South St. Paul, MN | 2012
   Concept development, hydraulic modeling, plans & specifications, construction admin.

8. Various Industrial Facility SWPPPs & BMP Retrofit Assessments | MN, WI | 2010-13
   Site visit & assessment, WinSLAMM modeling, BMP recommendation, SWPPP design

9. Reitz Lake East Side Treatment | Carver County, MN | 2012
   Concept development, FTW design, construction plans, cost estimates & admin.

    Site design and construction plans, environmental permitting, cost estimates, drafting

11. Federal Courthouse Stormwater Reuse Assessment | Minneapolis, MN | 2011
    Feasibility analysis, hydrologic modeling, cost/benefit assessment, recommendation

    Site design & construction plans, P8 modeling, permit approvals, cost estimates

13. Big Eagles Water Quality Improvement Project | SMSC-Prior Lake | 2010
    Concept development & BMP siting, construction cost estimates and plans/specs

    Reuse concept development, load reduction, design, plans & specifications

    Resource inventory, XP-SWMM/HydroCAD modeling, CIP development, P-load red.

    Pervious parking lot, bioretention areas, design, construction plans & specifications

17. Johnson Park Streambank Restoration | Watertown, MN | 2008
    Soil bioengineering, cost estimates, construction plans & specifications

18. Trunk Highway 10 / Eagle Road Reconstruction | Big Lake, MN | 2007
    Hydraulic analysis, underground storage & infiltration design, cost estimates

19. East Village Development | SMSC-Prior Lake, MN | 2004
    Low impact development, infiltration basins, HEC-RAS channel analysis, cost estimates
**Daniel A. Fabian, P.E.**  
Senior Water Resources Engineer

Daniel is a Water Resources Engineer with over 25 years of experience in civil engineering, water resources management, water system analysis, and hydraulic and hydrologic analysis of surface water systems. Dan has served as the lead engineer on several projects and excels in project management, client involvement, and public participation. His level of dedication and depth of experience is invaluable on any project he is involved with.

**Expertise**

Water Resources Engineering & Agricultural Land Management
- Comprehensive Surface Water Management Plans
- Hydraulic/Hydrologic Studies to Determine Flood Profiles
- Comprehensive Drinking Water System Studies
- Project Management
- Sustainable Farming Practices

**Selected Projects**

1. *Watershed District Engineer (joint) | Carnelian-Marine-St. Croix WD, Comfort Lake-Forest Lake WD, Chisago Lakes Lake Improvement District*
   Dan served as the staff engineer to the Districts and provided advice to District Boards of Managers on the work of other consultants and on all engineering matters – including review and comment on all proposed developments, water quality, erosion control, drainage plans, and implementation of district permitting program when applicable. Served as district technical representative to Technical Advisory Committees (TAC), Citizen Advisory Committees (CAC), and attended meetings with local community, state, and federal agencies.

   As project manager and author, worked with District Staff to obtain input from Managers, Citizen and Technical Advisory Committees identifying district needs, priorities and implementation strategies. Updated individual resource management plans for district’s lakes, wetlands, streams, and groundwater resources. Plan includes the development of the district’s “Focused Watershed Management Strategy” for managing district resources & programs in a cost-effective manner.

3. *First Generation Watershed Management Plan | Sunrise River WMO | 1991*
   Oversaw and was responsible for the completion of this first generation stormwater management plan.

4. *Revised Rule Development | CMSCWD | 2010*
   As Watershed District Engineer, provided technical review and comment (specifically-provided historical perspective to the rule development process). Assisted district managers and local government and citizens in understanding the use of the proposed rules.
5. **Sunrise Flowage Comprehensive Watershed Restoration Plan | Comfort Lake-forest Lake Watershed District**  
   Served as lead designer for watershed based reduction in pollutant loading to Comfort Lake from the Sunrise Flowage. The design integrates restoration of six aquatic and terrestrial systems throughout the contributing watershed of several thousand acres.

6. **Comprehensive Surface Water Management Plans | City of Andover and Town of White Bear**  
   Project engineer and author responsible for the preparation of the plans.

7. **Water Quality Improvement Project – Lamotte Ditch | Rice Creek Watershed District**  
   Project management and preparation of plans, specifications, as well as oversaw construction.

8. **Development Review | Andover, MN**  
   Provided engineering review of drainage, grading and erosion control plans for proposed developments.

9. **Flood Control Construction Inspector | CMSCWD**  
   Performed construction inspections of flood control facilities on Big Marine, Big and Little Carnelian Lakes.

10. **FEMA Floodway Revisions | St. Paul, MN**  
    Revised existing HEC-2 Model to reflect proposed floodway and mapped proposed floodway boundary.

11. **Flooding Investigation - 3M Medical Division Plant | Cambridge, MA**  
    Conducted field investigations of flooding problem and summarized findings and recommendations in report to client.

12. **County Landfill Design | Pipestone, MN**  
    Assisted with the upgrading and expansion design of the landfill and provided groundwater flow modeling.

13. **Dam Safety Evaluation | Blair, WI**  
    Assisted in the preparation for the safety review and provided hydraulic modeling for dam failure analysis using the National Weather Service’s Simplified Dam Break Flood Forecasting Model (SMPBRK).

14. **Lock and Dam Action Plans | US Corps of Engineers | St. Paul, MN**  
    Prepared emergency plans for Lock and Dams No. 2, 3, 4 and 10 of the Mississippi River.

15. **Water Quality Monitoring Program | Carnelian-Marine Watershed District**  
    Assisted district with obtaining data on flow, rainfall and water quality samples. Information was then submitted to the Metropolitan Council for analysis.

16. **Hydrologic Modeling | Carnelian-Marine Watershed District**  
    Manager and engineer for hydrologic studies of the Carnelian Creek drainage area and the Silver Creek drainage area.

17. **Comprehensive Drinking Water System Studies | Municipalities Throughout Minnesota**  
    Conducted comprehensive water system studies using KYPIPE2 and CYBERNET modeling programs to model existing systems and propose improvements.

18. **Design and Construction Plans & Specifications | Multiple Projects in Various Communities, MN**  
    Responsible for plans, specifications, and construction administration services for municipal wells, pumphouses and production facilities.
JOEL R. PETERSON, P.E., PH. D.
Senior Water Resources Engineer

In addition to his academic background Joel has over 10 years of experience in the water resources engineering industry, serving as project manager on a number of significant projects with the Army Corps of Engineers, the Minnesota Board of Water and Soil Resources (BWSR), and a Twin-Cities based civil engineering consulting firm. He is currently Assistant Professor at UW River Falls Department of Agricultural Engineering Technology, and is a collaborating consultant with Hydromethods.

EXPERTISE

Water Resources Analysis and Watershed Planning
- Agricultural drainage and management
- Statistical analysis and data management
- Hydrologic and hydraulic modeling
- Geomorphology and fluvial processes
- Water quality modeling
- Erosion & sediment control

SELECTED PROJECTS

1. Reitz Lake East Side Treatment Retrofit | Carver County
   Joel conducted a literature review to approximate the expected pollutant removal rates associated with floating treatment wetlands. Vegetated treatment mats are relatively new to the region, and it was important to fully understand the assumptions and variables present in studies completed at various locations. Given project space and funding limitations, it was determined that a floating treatment wetland could provide an aesthetically pleasing phosphorus removal mechanism for the nutrient-impaired water body.

2. Agricultural Erosion Control and Water Quality Improvement (EPA 319 Grant)
   Joel developed a successful research proposal in collaboration with University of Minnesota BBE faculty to investigate side inlet controls to reduce erosion and improve water quality in tile drained agricultural areas. [BWSR]

3. Agricultural Watershed Restoration Projects
   Served as project manager for Agricultural Watershed Restoration projects, six projects throughout the state designed to identify different means of achieving water quality goals on impaired water bodies with an emphasis on perennial crops. [BWSR]
4. **Lateral Effect Estimates**  
Developed BWSR’s capability to perform lateral effect estimates for wetland scope and effect, and consulted with BWSR field staff and drainage authority contacts. [BWSR]

5. **Habitat Rehabilitation and Enhancement**  
Lead project engineer for two multi-million dollar U.S. Army Corps of Engineers Habitat Rehabilitation and Enhancement Program projects. Both projects had a large-scale dredging component and associated in-water placement. Responsible for project schedule, budget, incorporating input from federal and state partners, and development of plans and specifications. [USACOE]

6. **Brown’s Lake Sedimentation Reduction**  
Lead project engineer tasked with formulating design alternatives to reduce sedimentation to Brown’s Lake, a backwater lake on the Mississippi River. Assembled and analyzed several years of data to determine sediment loading rates, developed sediment trap alternatives and calculated effective trapping capacity. Developed a GIS-based model of erosion from the contributing sub-watershed to better target sediment sources. [USACOE]

7. **TMDL CONCEPTS Modeling**  
Served as project manager and modeler for the MPCA Hardwood Creek TMDL CONCEPTS modeling project. This was the first implementation of the USDA ARS’ CONCEPTS model in the state of MN for a TMDL. First proposed by Dr. Peterson to PCA, use of this model is projected to become an industry standard for sediment TMDLs. CONCEPTS-based modeling has also been used to help develop guidance for appropriate outlet structure configurations to reduce excessive sediment loads in the Minnesota Stormwater Manual. Performed CONCEPTS modeling to aid the in the Middle Rice Creek feasibility restoration design. [EOR]

8. **Water Resources Project Management and Engineering**  
Served as project manager and project engineer on numerous water resources projects, in the areas of streambank stabilization, stream restoration, sediment transport modeling, hydrologic and hydraulic modeling, rain garden and infiltration practice design, and wetland restoration design. Key Twin Cities Metro Area clients include the University of Minnesota, City of Saint Paul, Capitol Region Watershed District, Minnehaha Watershed District, and the Minnesota Pollution Control Agency. [EOR]

9. **Steel Dam Fish Passage**  
Project engineer for the Steel Dam Fish Passage Project. Formulated several different alternatives to enable fish passage at the low-head Steel Dam on the Rock River in Illinois. Alternatives ranged from ‘natural’ riffle and pool designs to concrete or Denil type fish passages. [USACOE]

10. **Peoria Riverfront Development Project**  
Lead project engineer for the $7.5 million Peoria Riverfront Development Project. This project will restore over 50 acres of critical fisheries habitat to the Peoria Lake backwater of the Illinois River. The final design incorporates an innovative use of geotubes to construct a perimeter into which dredged sediment will be placed. Responsible for project design, schedule, budget and plans and specifications [USACOE]

11. **Drainage Authority and Watershed District Technical Assistance**  
Provided engineering technical assistance to drainage authorities. Conducted site visits and consulted with local drainage authority representatives. Delivered informational presentation to the Minnesota Association of Watershed Districts on drainage management [BWSR]
5. Work Plan and Budget

Overview

In this section we outline a proposed work plan and budget for achieving the objectives of the feasibility study, based on our understanding of the RFP and our experience working on similar projects. We understand that the specific tasks will likely need to be adjusted based on how the Project evolves as well as the preferences of LMRWMO staff. However, the approach presented here is an effective way to complete the Project within the required timeframe.

The proposed Project Tasks are as follows. Further details regarding each Task are presented below. An estimated schedule for completion of tasks is provided; the actual schedule will depend on the starting date as well as stakeholder availability and other factors. Note that Task 6 (Additional Data Collection / Analysis) will be performed on an as-needed basis, depending on whether additional site data is required in order to properly characterize the extent of contamination. A separate fee estimate, to be applied only if the service is required, is identified for that Task.

<table>
<thead>
<tr>
<th>Task #</th>
<th>Task Name</th>
<th>Completion Date</th>
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<tbody>
<tr>
<td>Task 1</td>
<td>Existing Data Compilation / Evaluation</td>
<td>August 31, 2013</td>
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<tr>
<td>Task 2</td>
<td>Stakeholder Identification / Meeting</td>
<td>September 15, 2013 (Initial Meeting)</td>
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<tr>
<td>Task 3</td>
<td>PAH Literature Review and Research</td>
<td>September 30, 2013</td>
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<td>Task 4</td>
<td>Assessment of Govt Regulations / Resources</td>
<td>September 30, 2013</td>
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<tr>
<td>Task 5</td>
<td>Identification of Options / Recommendation</td>
<td>November 15, 2013</td>
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<tr>
<td>Task 6 / Alternate</td>
<td>Additional Data Collection / Analysis</td>
<td>(As Needed)</td>
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Task 1: Existing Data Compilation / Evaluation (24 HRS TOTAL / $1,776)

Task 1.1: Gather existing water and sediment sampling data (8 hours). The first step will be to gather and analyze all the data that has been collected up to this point. A significant amount of valuable work has already been done in characterizing Thompson Lake and it will be important to use the results of that work and not repeat effort. This will also provide an opportunity to initiate discussion with other project stakeholders.

Task 1.2: Review subwatershed / land use characteristics (4 hours). In addition to the lake itself, it is vitally important to understand the nature of the contributing area. A review of available GIS data and other related information will be conducted, along with a field tour of the lake and contributing area, focusing on locations with the most potential impact.

Task 1.3: Evaluate/map contamination extents and severity (10 hours). In this task, we will process all the available data and develop a technical memo and accompanying map showing our interpretation of the data in terms of contamination extents and severity. This will serve as a guiding tool for other project tasks, essentially defining the problem at hand in quantitative terms.
Work Plan and Budget

Task 1.4: Identify data gaps (if any) (2 hours). After processing and mapping the available data, the information will be reviewed thoroughly in order to identify if any additional information is required in order to properly analyze options. If so, such gaps will be identified and a plan will be made to collect needed data. Data collection will be performed as part of Task 6 / Alternate.

Task 2: Stakeholder Identification / Meetings (38 HRS TOTAL / $2,812)

Task 2.1: Identify and contact all key stakeholders (8 hours). This task involves identifying and making initial contact with all the individuals linked specifically to this feasibility study, or more generally to those concerned about PAH contamination in Thompson Lake. In addition to the municipal and agency contacts, this would be a good opportunity to identify local property owners who ultimately will be most affected by any projects done on the lake.

Task 2.2: Individual stakeholder discussions (8 hours). Sufficient time will be allotted for individual discussions to ensure that we obtain as much valuable information as we can from each of the stakeholders identified in Task 2.1.

Task 2.3: Plan and convene stakeholder meetings (2) (20 hours). To some extent, this task will depend on the nature of the initial discussions with stakeholders. One meeting (at least) will be scheduled near the beginning of the project as a project kickoff meeting, and another one will be held later in the process, as a progress report and an opportunity to obtain feedback on the options under consideration.

Task 2.4: Documentation of stakeholder input and responses (2 hours). A record will be kept of stakeholder input and how specific concerns are answered or addressed.

Task 3: PAH Literature Review and Research (46 HRS TOTAL / $3,404)

Task 3.1: Identify/review studies on PAH impacts (12 hours). A thorough review of available studies and reports will be conducted in order to describe how PAHs affect the health of human beings and natural resources. This will provide an important perspective on the level of contamination in Thompson Lake. This information will also be useful into the future as the LMRWMO and other stakeholders face similar issues in other water bodies.

Task 3.2: Identify similar situations in MN and other states (8 hours). There are numerous communities in Minnesota and other states that have also begun to address the issue of PAH contaminated sediments in local water bodies. We will identify similar projects and studies that have already been conducted, particularly those of similar size and amount of contamination, and public interest in the water body, and find out what was done in those locations.

Task 3.3: Contact other agencies that have addressed PAHs (6 hours). We will get in touch with the people that have already gone through a similar process in dealing with PAH contamination, and learn as much as possible from both their successes and their difficulties. This will also be an opportunity to learn about potential solutions that we had not previously considered.
Work Plan and Budget

Task 3.4: Identify/review published guidance on PAH management (8 hours). We will identify the technical resources available for the various methods of dealing with PAH contamination (dredging, capping, etc.), including information about costs, materials, equipment, and maintenance. We have already compiled some of this information as part of previous efforts.

Task 3.5: Summarize research/review and relate to Thompson Lake (12 hours). We will provide a report summarizing the literature review, explaining how the published information relates to Thompson Lake and how it will impact selection of a mitigation alternative.

Task 4: Assessment of Gov’t Regulations / Resources (26 HRS TOTAL / $1,924)

Task 4.1: Determine applicability of relevant MPCA requirements (4 hours). We have already completed much of this step, because we have had to go through this process previously both for other projects and for the development of our in-house summary pond maintenance manual. We will make sure that we have the MPCA’s latest guidance documents and that we are aware of any new MPCA rules regarding contaminated sediment.

Task 4.2: Determine applicability of relevant DNR requirements (4 hours). Similar to Task 4.1, we have gone through the regulatory process with the DNR and have an understanding of the applicable rules. However, it will still be important to check for any new information and any special requirements that would apply to Thompson Lake.

Task 4.3: Identify potential grant funding options (6 hours). A number of grant programs exist that should be reviewed for applicability to this project, some of which relate specifically to cleaning up PAH contamination. This is another task that will be very useful into the future as the LMRWMO addresses similar concerns throughout its jurisdiction.

Task 4.4: Review other agency requirements for applicability (4 hours). We will check with staff from the Army COE or other agencies typically involved in surface water projects. Discussions with stakeholders may provide additional information on project requirements.

Task 4.5: Summary report and timeline on governmental information (8 hours). A report on applicable governmental regulations and resources will be developed. This will be a useful tool both now and in the future. A timeline showing relevant permitting cycles will be included.

Task 5: Identification of Options / Recommendation (54 HRS TOTAL, $3,996)

Task 5.1: Describe "no-action" alternative (2 hours). Based on information gathered in previous steps, discuss what can be expected if no mitigation measures are implemented.

Task 5.2: Sediment removal option and preliminary costs (12 hours). Provide a preliminary plan and estimated costs for removal and disposal of contaminated sediment via dredging.

Task 5.3: Sediment capping/arming option and preliminary costs (12 hours). Provide a preliminary plan and cost estimate for isolating contaminated sediment via capping/armoring.
Task 5.4: Sediment remediation option and preliminary costs (12 hours). Provide a discussion of sediment remediation and whether it may apply in this situation. Provide preliminary cost estimate.

Task 5.5: Discussion of other potential options (8 hours). Through stakeholder discussions, other innovative ways for addressing the contamination may be identified. It will be important to explore such options and provide preliminary plans and cost estimates as needed.

Task 5.6: Options for PAH source control and removal from lake water (8 hours). In addition to dealing with sediment contamination through removal, capping, or remediation, it may be worthwhile to reduce PAH concentrations in the incoming runoff or the lake water itself. To reduce runoff concentrations it may be possible to identify specific sources of PAHs and then implement source control measures. For reducing dissolved phosphorus concentrations, it would be helpful to consider options such floating treatment wetlands or similar practices.

Task 6 / Alternate: Additional Data / Analysis As Needed ($2,532 / 3 SAMPLES)

Task 6.1: Collect/summarize additional sediment samples (3 assumed) (15 hours). Additional sediment samples will be collected on an as-needed basis. For purposes of this proposal, we will assume that 3 sediment samples need to be taken, but the actual number may vary.

Task 6.2: Laboratory Analyses (3 assumed) ($1200). Lab analyses of sediment samples are approximately $400 each. We will pass along this cost directly with no markup for Hydromethods.

Task 6.3: Review analysis results (3 hours). Some time will be required to review the lab results and incorporate them into the rest of the feasibility study.

Budget Summary

The following is our estimate of fees for completing the work as described above. This is a Not-To-Exceed estimate. Billing will be based on actual hours worked on the project. Other than laboratory analysis fees (if needed), we do not anticipate charging anything beyond our hourly fees, and all Hydromethods staff will bill at the rate of $74/hr. Estimated fees are $13,912.

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<tr>
<th>Task #</th>
<th>Task Name</th>
<th>Estimated Fees</th>
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<td>Task 1</td>
<td>Existing Data Compilation / Evaluation</td>
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<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>$13,912</strong></td>
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| Task 6 / Alternate | Additional Data Collection / Analysis | $2,532 / 3 Samples |