



SOLUTIONS for sustainable LIVING



Ecological Design Collaborative

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1.0 Credentials & Qualifications

SEEDS is a non-profit research, design and educational institution whose mission is to seek the development of socially and ecologically sustainable environments. The Ecological Design Collaborative (EDC), the engineering and design subsidiary of SEEDS, focuses on technical research, analysis, and design activities within a holistic and ecological framework. Our underlying design challenge is to help reconnect people with the built and natural infrastructure upon which we depend. The EDC:

- Uses technical skills to enhance the sustainability of communities large and small,
- Balances ecological, economic, and social exchanges,
- Promotes systems that go beyond sustainable and become restorative, and
- Fosters an atmosphere of learning, equity, locality, vitality and interdependence.

SEEDS and the EDC staff are experienced collaboration leaders and have worked with a variety of partners including state governments, universities, for-profit companies, non-profit organizations, and individuals. Our core staff includes four engineers, a community planner, an architect, and an energy analyst. Our staff collectively holds a Michigan Professional Engineer license (#53722), California Professional Engineer license (#C 71328), a Leadership in Energy and Environmental Design (LEED) accreditation, a Michigan Wastewater Treatment Plant Operator license (#5341), and a Home Energy Rater certification. Combined we have over 50 years of experience tackling sustainable engineering and design challenges. The EDC has several niche capacities including:

- Ecological Wastewater and Stormwater Treatment Design,
- Green Building Design Team Integration
- Participatory Design and Planning
- Life Cycle Analysis and Impact Assessment,
- Greenhouse Gas Emissions Inventorying/Modeling, and
- Ecological Footprint Analysis.

SEEDS' research and publication experience is built upon the work of staff engineers, Barton Kirk, Harold Leverenz, Maeve McBride and Pete Muñoz, who have extensive experience researching, editing, and preparing academic and education publications pertaining to centralized, decentralized, and onsite wastewater and stormwater treatment systems. Their research has been presented at a variety of venues nationally and internationally and recently published in books by Metcalf & Eddy, the Academic Journal of Water Research, and a report for the National Decentralized Water Resources Capacity Development Project (NDWRCDP).

2.0 Key Personnel

Pete Muñoz, PE, LEED AP – President and Director of Engineering

Mr. Muñoz directs all SEEDS engineering and design projects and has a major role, as President of SEEDS, in day-to-day activities. He is a licensed engineer in the State of Michigan (#53722), a Michigan Certified Wastewater Treatment Plant Operator – A-1g, A-2d, C-2c (#5341), and a Leadership in Energy and Environmental Design (LEED) Accredited Professional.

Barton Kirk, MS, EIT – Project Engineer and Researcher

Mr. Kirk has served as the project manager and co-investigator of a multi-year study through the National Decentralized Water Resources Capacity Development Project, leading an international team in the evaluation of sustainability analysis methods for comparing wastewater treatment options. Most recently, Mr. Kirk led a collaborative project between the University of Vermont and University of New Hampshire applying life-cycle approaches to stormwater best management practice (BMP) evaluation, including greenhouse gas emission inventories of all activities in the construction and operation of BMPs. He is currently a committee member of the United Nations Environment Programme – Society of Ecological Toxicologists and Chemists, Life Cycle Initiative’s Impact Assessment, Natural Resource working group.

Sarna Salzman, MS – Executive Director

Ms. Salzman leads all stakeholder and citizen integration activities. She also monitors communication with all project partners. Ms. Salzman is a skilled facilitator and has coordinated and led a variety of sustainability-focused design exercises, networking programs, workshops, and conferences. In her role as a liaison, her work is the embodiment of SEEDS’ commitment to building social and human capital in concert with technical solutions and analysis.

Maeve McBride, PhD – Project Manager and Engineer

Mrs. McBride manages several stream and river restoration projects for SEEDS. She is widely known for her expertise in floodplain restoration, geomorphic analysis, and engineered logjams. She also has experience with rain gardens and other urban stormwater solutions.

Jeremy Truog, MS – Energy Analyst

Mr. Truog manages several energy efficiency projects for SEEDS. He is the founder of Sustainable Environmental Services, a consulting firm that works to facilitate green building and energy efficiency. He is also a certified Energy Star™ home energy rater.

Harold Leverenz, PE – Director of Research

Mr. Leverenz is a licensed engineer in the State of California (#C 71328). His vast experience with community infrastructure has led to extensive experience writing and editing reference and educational materials, preparing data and statistical plots, and preparing conceptual and technical illustrations. Recent collaborative projects include some of the most used engineering and design texts including:

- 4th edition of Metcalf & Eddy Wastewater Engineering,
- 2nd edition of MWH Water Treatment, and
- McGraw-Hill’s Handbook of Solid Waste Management,

His latest collaboration, Water Reuse: Issues, Technologies, and Applications is a landmark textbook presenting an integrated approach to all aspects of water reuse from public health protection and water quality criteria to implementation issues.

3.0 Select Publications by SEEDS Staff (in bold)

McBride, M. and D.B. Booth. (*in review*) Urban impacts on streams: Effects of spatial scale, connectivity, and longitudinal trends. Journal of the American Water Resources Association.

Asano, T., F. L. Burton, **H. Leverenz**, R. Tsuchihashi, and G. Tchobanoglous (2007) Water Reuse: Issues, Technologies, and Applications, McGraw-Hill, New York.

Munoz, P.A., A. Drizo, W.C. Hession (2006) Flow Patterns of Dairy Wastewater Constructed Wetlands in a Cold Climate. Water Research.

Leverenz, H., and G. Tchobanoglous (2006) *Challenges for Sustainable Wastewater Management in the 21st Century*, Wastewater Professional, Vol. 42, No. 1.

Kirk, B.E., R. Roseen, C. Etnier (2006) *The Big Picture – Evaluating Stormwater BMPs through the Life-Cycle Lens*. Proceedings of the 5th Annual StormCon. Denver, CO.

Paranychianakis N.V., A.N. Angelakis, **H. Leverenz**, and G. Tchobanoglous (2006) *Treatment of wastewater with slow rate systems: A review of treatment processes and plant functions*, Critical Reviews In Environmental Science And Technology 36 (3): 187-259 2006.

Leverenz H., J Darby, G Tchobanoglous (2006) *Evaluation of Disinfection Units for Onsite Wastewater Treatment Systems*, Small Flows Journal (in peer review).

Kirk, B.E., C. Etnier, E. Kärrman (2005) *Peering Beyond the End of the Pipe: Non-Monetary Methods for Comparing Wastewater Treatment Options*. Eco-Eng Newsletter. Intl. Ecological Engineering Society. Wolhusen, Sweden. http://www.iees.ch/EcoEng051/EcoEng051_Kirk.html.

Kirk, B.E., C. Etnier, E. Kärrman (2005) *An Evaluation of Methods for Comparing the Sustainability of Wastewater Treatment Options*. Proceedings of the Engineering Sustainability 2005 Conference. Pittsburgh, PA.

Leverenz H., G. Tchobanoglous, and J. Darby (2004) *Comparison of Pretreatment Systems for the Onsite Management of Wastewater*, Onsite Wastewater Treatment X: Proceedings of the Tenth National Symposium on Individual and Small Community Sewage Systems, March 21-24, 2004 Sacramento, CA. ASAE, St. Joseph, MI.

Leverenz, H., G. Tchobanoglous, J. Darby (2003) *Review of Technologies for the Onsite Treatment of Wastewater in California*. Center for Environmental and Water Resources Engineering (02-2), University of California, Davis.

McBride, M. 2001. Spatial effects of urbanization on physical conditions in Puget Sound lowland streams. Washington Water Resource. 12(2):1-10.

Pizzuto, J.E., W.C. Hession, and **M. McBride**. 2000. Comparing gravel-bed rivers in paired urban and rural catchments of southeastern Pennsylvania. *Geology*. 28:79-82.

Hession, W.C., **M. McBride**, and M. Bennett. 2000. A statewide nonpoint source pollution assessment methodology. *Journal of Water Resources Planning and Management*. 126(3):146-155.

Tchobanoglous, G., L. Ruppe, **H. Leverenz**, J. Darby (1999) *Decentralized Wastewater Management Challenges and Opportunities for the Twenty-First Century*. 10th Onsite Wastewater Treatment Proceedings, Seattle, Washington.

4.0 Select Projects

SEEDS and the Ecological Design Collaborative pursue a broad range of projects including green building design integration, ecological waste and wastewater treatment, energy conservation and analysis, participatory planning, and environmental education. All of these project interests are unified under the common goal of reducing our collective ecological footprint and developing sustainable, restorative communities. Below are a few of our most recent projects.

Jean Noble Parsons Center (Eastern Michigan Univ.) – Benzie County, Michigan: Wastewater Design

SEEDS designed waste and wastewater infrastructure for a low impact development including construction of a new access driveway, 14 parking spaces, improved utility infrastructure, and construction of six buildings with a combined footprint of 8,158 square feet. SEEDS completed all site investigation, permitting, and system design of the wastewater infrastructure to ensure a solid foundation for growth of the center while remaining sensitive to current and long-term needs, surrounding landscape, and regional watershed. SEEDS also consulted on the development master plan to ensure that all erosion, sedimentation, and stormwater issues were adequately addressed.

Manitou Arbor Ecovillage – Kalamazoo County, Michigan: Infrastructure Design

Manitou Arbor Ecovillage is a low impact development which includes construction of a new access road, stormwater management areas, approximately 60 parking spaces, improved utility infrastructure, and construction of thirty-three residences, an eleven-unit apartment building, and common kitchen all within a combined footprint of approximately 50,000 square feet. SEEDS is designing and permitting a unique advanced waste and wastewater treatment system that employs composting toilets, constructed wetlands and drip irrigation reuse.

Living Future – Huntington, Vermont: Infrastructure Design

SEEDS was contracted to consult on the water and wastewater infrastructure for a multi-million dollar sustainability and environmental center. SEEDS designed and built an advanced wastewater treatment constructed wetland for four buildings. SEEDS also consulted on other portions of the project including greenroofs, water reuse, composting toilets and wastewater source separation.

The Living Future center will host demonstration projects in sustainable design, educational programs and strategic retreats for activists and world leaders in the sustainability movement. The center's heat will come from solar hot water tubes and a high-efficiency wood gasification boiler. Electricity will be produced by a windmill, solar photovoltaic panels and a micro-hydropower generator operating in the outflow of the property's spring-fed pond. Wastewater will be handled by composting toilets and constructed wetlands. All the lumber for the house renovations is harvested onsite using low-impact forestry techniques. Logs are being milled with a portable sawmill and dried in a solar kiln right on the property.

Lake Fenton Town Park – Genesee County, Michigan: Design Criteria Development & Conceptual Design

SEEDS is the green building consultant and lead organizer of a conceptual design and design development team for a 33-acre high density mixed-use development in Fenton, MI. Working with the developer, SEEDS coordinated a team of architects, engineers, landscape architects, and urban planners to outline the low impact development. SEEDS developed the Plan Unit Development (PUD) proposal to Fenton Township for a unique development that includes stipulations that all buildings will follow LEED design and building standards and requires 50% of the commercial buildings to install greenroofs. (See www.torreyroaddevelopment.com for more details.)

Redesigning the American Neighborhood Project – Burlington, Vermont: Life Cycle Comparison

SEEDS Engineer, Barton Kirk, was engaged in a multi-institutional, participatory effort to develop and evaluate strategies for mitigating the stormwater impacts of an existing suburban development. Mr. Kirk and the multi-disciplinary project team worked directly with municipal officials and community citizens to identify and evaluate economically and socially appropriate strategies to address critical environmental issues from a community-wide and watershed-wide perspective. Mr. Kirk's primary contribution included an extensive life-cycle comparison of stormwater management options, including a greenhouse gas inventory of municipal construction and maintenance activities.

Oryana Natural Food Market – Traverse City, Michigan: Water Infrastructure, Expansion, and Renovation

SEEDS was contracted to coordinate an integrated design team for an expansion and renovation project to complete a 12,000 square foot Leadership in Energy and Environmental Design (LEED) rated building including café, production and retail space. This project focuses not just on the economic bottom line, but also the social/ethical and environmental impacts. SEEDS helped facilitate an integrated design team of over a dozen professionals. This multi-faceted team designed a building that showcases a variety of green and sustainable building practices. During the construction and renovation phase, SEEDS remains an integral part of the project, facilitating communications between the construction manager, the store staff, and shoppers.

(See www.oryana.coop/expansion for more details.)

Stormwater Best Management Practices – Concord, New Hampshire: Life-Cycle Analysis

SEEDS has been contracted by the University of New Hampshire to continue Mr. Kirk's stormwater best management practice evaluations originally developed within the University of Vermont's Redesigning the American Neighborhood program. This study includes life-cycle environmental impact assessment and cost analysis of two bioretention and porous pavement installations under evaluation at the Stormwater Center. The approach is utilizing a number of advanced emissions inventorying and impact assessment tools including the USEPA's Mobile 6.2 and NONROAD 2005 emission inventorying models, the USEPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts, and Carnegie-Mellon University's Environmental Input-Output Life Cycle Assessment model.