

**Date of Report:** July 1, 2001

**Date of Work Program Approval:** June 16, 1999

**Project Completion Date:** June 30, 2001

**LCMR Final Work Program Report**

**I. Project Title: Urban Corridor Design: Green Infrastructure as Civic Amenity and Environmental Resource**

**Project Manager:**

Mary Vogel, Senior Research Fellow

**Affiliation:**

Department of Landscape Architecture  
College of Architecture and Landscape Architecture  
University of Minnesota

**Mailing Address:**

Department of Landscape Architecture  
110 Architecture Bldg.  
89 Church Street SE  
Minneapolis, Minnesota 55455

**Telephone Number, e-mail address, Fax:**

612-626-7417, vogel001@tc.umn.edu, 612-626-7424

**Web Page Address:**

[www.cala.umn.edu](http://www.cala.umn.edu)

**Total Biennial Project Budget:**

\$ LCMR \$400,000.00 \$ Match: not applicable

\$ LCMR Amount

\$ Spent: \$394,684.77

---

\$ LCMR Balance: \$ 5,315.23+\$ not applicable = \$5,315.23

**A. Legal Citation:** ML 1999, Chap 231, Sec.16, Subd. 8 (d)

**Appropriation Language:**

Urban Corridor

\$ 400,000 is from the future resources fund to the University of Minnesota to develop sustainability designs for selected urban corridors. One project must be inside the metropolitan area and one project must be outside the metropolitan area.

**B. Status of Match Requirement:**

Not applicable

**II. & III. FINAL PROJECT SUMMARY****Overall Project Outcome and Results**

The project developed a practical and user friendly three volume guide that can be used by officials and citizens who wish to avoid degrading the environment and incurring future mitigation costs by making more environmentally friendly planning/designs decisions when considering infrastructure projects. Infrastructure types that are commonly used across various geographic scales by cities, small towns, suburbs, and counties in Minnesota were studied in a corridor in Saint Paul and one on the Iron Range. The study identified prototypical infrastructure types, precedent studies were done in design studios, an investigation was made of sustainability strategies, barriers to implementation of strategies were identified, and selected designs were developed. A user-friendly three-volume handbook presenting material from the study in a printed and digital format was created. The Saint Paul volume presents an overall design framework, designs for five study areas, a section on organic infrastructure types, and a paper on the legal barriers to local and regional planning. The Iron Range Study presents green infrastructure design work in two volumes at the regional scale and a paper on the legal barriers to planning in a mining environment.

**Project Results Use and Dissemination**

Presentations of the work have been made to community groups and officials on the Iron Range and in Saint Paul. Public officials and citizens have used the materials from this study to discuss the future of their communities. Metropolitan Council staff intends to use material developed in the Saint Paul volume in the new development blueprint. The handbook is available on the web and on disks.

**IV. OUTLINE OF PROJECT RESULTS:****Result 1. Identification of prototypical infrastructure types in the two corridors and creating working relationships with the communities.**

Infrastructure types that are commonly used across various geographic scales by cities, small towns, suburbs, and counties in Minnesota were selected for study. Criteria for selection included the need to protect a resource, community interest in an infrastructure type, the frequency of use in the state, the potential for the development of a sustainable design, and the potential to integrate infrastructure design into environmental resource planning in expanded corridors with multi-functional characteristics, such as transportation and water conveyance and storage in combination with various orders of magnitude of settlement.

**Status of Result 1****Iron Range:**

Series of ten meetings with stakeholders currently involved in resource management and economic development have been held on the Iron Range. Stakeholders include DNR

officials, local elected and appointed officials, mining company representatives, and personnel from the Natural Resources Research Institute, the IRRRB, and Minnesota Power.

Two distinct types of environmental infrastructure were defined on the Iron Range, including:

- a) existing environmental infrastructure; and
- b) a framework for proposed environmental infrastructure.

### **Geographic Information Compiled**

Avenue of the Mines Regional Design Concept

LA 8303 – Making Regional Space, F99

UM Department of Landscape Architecture

<b>Thematic class</b>	<b>Theme</b>	<b>Source</b>
Geology	Bedrock geologic units	MN Geological Survey (MGS)
	Surficial geologic units	(MGS)
	Geomorphology	DNR Data Deli (Data Deli)
	Depth to bedrock	County Well Index (CWI)
	Bedrock fractures	MGS
Hydrogeology	Depth to Quaternary aquifer	(CWI)
	Depth to consolidated aquifers for each of the major aquifer systems	(CWI)
	Permeability of glacial drift	(MGS) and Data Deli
	Transmissivity of consolidated aquifers	MGS
Hydrography	Lakes and streams	Data Deli, MNDOT
	FEMA 100-year flood plains	Base map (MNDOT) Data Deli
Topography	20 foot topographic contours	USGS DEM
	5 foot topographic contours	DNR Minerals Division (Minerals)
	Watershed divides	Data Deli

Land use and land cover	Land use and land cover	Data Deli
	National Wetlands Inventory Sites	Data Deli
	Physical mining features	Minerals
	Policy related mining features	Minerals
	Forest habitat quality and diversity	Derived
	Grassland habitat quality and diversity	Derived
	Wetland habitat quality and diversity	Derived
	Existing recreation trails and abandoned railways	Data Deli
	Ecological classification system subsections	Data Deli
Landscape Character	Landscape Character Units	Derived
Historic Structures	Historic Structures	MN Historical Society
Land Ownership	Public and quasi-public land ownership	Data Deli
	Mineral leaseholds and mining permits	Minerals
Cultural Settlement	Highways and roads	MNDOT
	Hierarchy of central place service areas	UM Dept. of Geography Dissertation
	Postal zip codes	Land Mgt. Info. Ctr. (LMIC)
	School district boundaries	LMIC
Demographic characteristics	Population change for townships by decade	UM Dept. of Geography Dissertation
	Population age profile by municipality	US Census Bureau
	Ethnic composition of population, 1910	US Census Bureau
	Ethnic composition of population, 1990	US Census Bureau
	Separate themes prepared for German, French, English, Irish, Norwegian, Swedish, Finnish, Slavic, Italian enclaves.	

### Proposed Framework of Environmental Infrastructure

In addition to defining existing environmental infrastructure in the Iron Range landscape, a conceptual framework was developed to organize future infrastructure systems. The conceptual framework was initially conceived by the studio activity previously reported under Result 2. The framework amounts to a "toolkit" of ideas for thinking about redevelopment of Iron Range resources. It represents not "the" plan for the future of the Iron Range landscape, nor even does it represent "a" plan for the future. Rather, the framework is construed as a collection of landscape patterns that could be configured to fit specific locales on the Iron Range as is appropriate to the social, economic, and political contexts of these locales. The vision evolved as a linear "*Avenue of the Mines*" corridor to link the communities of the Range landscape into a hierarchical central place system, establishing a coherent and unifying identity for the political, social and economic diversity that exists among Range communities. The two terminal "*Bookends*" of the Avenue connect the Range with the larger regional landscapes of northern and northeastern Minnesota. A series of "*Heritage Loops*" from the Avenue bring visitors and local residents into and through Range communities to explore historic, cultural and recreational landscapes associated with the mining activity and with the miners' lives. The loops present a framework for developing future urban landscapes as well as creating heritage-based and natural resource-based tourism opportunities. Finally, a system of "*Connections Across the Divide*" establish a framework for guiding future mining and mined land reclamation activities to knit the landscapes located in the Hudson Bay drainage north of the Iron Range back together with the landscapes located in the Mississippi drainage and the Lake Superior drainage south of the Range. A summary document relating to the regional design concept was developed.

### Saint Paul:

Meetings with public officials, city staff members, and neighborhood representatives were held. Since the study area was entirely within the City of Saint Paul, a community involvement process that is compatible with city decision-making processes was agreed upon. Prototypes selected for study include street types, storm water types, and landscape/building types.

The work on the Maxson Steel and Dale Street Shops sites was presented at a neighborhood meeting in Saint Paul to a consortium of neighborhood groups, the District 6 Planning Council, the District 7 Planning Council. The North End Area Revitalization Corp., a not-for-profit community development corporation set up the meeting and requested the presentation. The presentation was structured to identify issues and potential design approaches and elements that the neighborhood group could use to negotiate with the Saint Paul Port Authority on the redevelopment of the sites. Sixty neighborhood residents, elected officials and business owners attended the meeting.

Budget: \$37,243.75

Budget Spent: \$37,243.75

Balance: \$0

Milestone Date: February 1, 2000

## **Result 2. Studio investigations**

In the context of the design studio regional, national, and international infrastructure systems and projects that already have been done were studied, and the potentials for those infrastructure types in each corridor were explored. Three design studios were involved in the investigations. Three studios (two on the Iron Range and one in Saint Paul) addressing these issues were held in the fall semester of academic year 1999-2000. Studio findings were compiled and used to inform design work and further investigations.

### **Status of Result 2**

#### **Iron Range:**

The Regional Design Studio: The regional design studio examined green infrastructure issues and opportunities at the regional scale. Professor Pitt led the investigation; nine graduate students participated. A group of 25 people from the Range representing the mining companies, economic development entities, the DNR, and various communities attended the final studio presentation. Students, faculty, and guests participated in a workshop that further developed the ideas presented.

The Residential Design Studio: Using an old mining dump site in the City of Virginia, the residential design studio of nine graduate students investigated opportunities and constraints inherent in the reclaiming these types of sites for residential development. Professor Sykes led this studio.

All of the work illustrated in the two-volumes of the Handbook pertaining to the Iron Range regional environmental infrastructure was initially generated by the Regional Design Studio. This work has been presented to the Laurentian Vision consortium, the MN Department of Natural Resources and the Western Mesabi Mine Planning Board. The studio served as a springboard for further refinement and development of the underlying conceptual framework.

#### **Saint Paul:**

Professor Neckar led a design studio that focused on green infrastructure issues in old industrial, institutional, and residential districts of an older city. Fifteen graduate students participated. A number of infrastructure strategies were investigated both at the district and site scales.

Budget: \$22,000

Budget Spent: \$22,000

Balance: \$0

Milestone Date: January 31, 2000

## **Result 3. Investigation of sustainability strategies**

Taking each infrastructure type, existing design practices were critiqued and alternative sustainable designs were investigated. Results were assembled as resource materials for the design work.

### **Status of Result 3**

#### Iron Range:

Geologic, physiologic, hydrographic, biological, and cultural data on the character of the Iron Range Landscape was compiled digitally. Current design practices were critiqued.

After developing the Avenue of the Mines conceptual framework, the Regional Design Studio prepared intermediate scale proposals to illustrate how the ideas contained in the toolkit might be developed into landscape patterns. Conceptual ideas explored included the Avenue of the Mines, the Bookends, the Heritage Loops, and Connections Across the Divide. Refinements made in the database that was used to define biological diversity, the hydrologic regime and water quality, suitability for future urban development, landscape hazards, and tourism resource values in the existing Green Infrastructure of the Iron Range landscape.

#### Saint Paul:

A number of characteristics of the Central Corridor landscape were mapped digitally. These include: transportation systems, green spaces, brownfields, topography, slope, watersheds, wetlands, storm sewers, water distribution system, historic hydrology, surficial geology, bedrock geology and geomorphology. A design framework for the Central Corridor was developed and prototype case study areas within the Corridor were identified. They are traditional neighborhood connective development (South Saint Anthony Park), Commercial Superblock Redevelopment (Minnehaha Mall), Industrial Brownfield Redevelopment (Maxfield Steel and Dale Street Shops Sites), Historic Parkway Corridor (Como Avenue), and Civic Amenity Corridor and Transit Reinvestment (Rice Street and North Capitol Area). Current design practices relevant to the prototypes were critiqued

Budget: \$71,295.00

Budget spent: \$71,295.00

Balance: \$0.00

Milestone Date: February 28, 2001

#### **Result 4: Identification of Barriers to Implementation of Strategies**

Physical and planning policies and laws were analyzed to identify the legal and public policy barriers to the implementation of the strategies identified in #3. Issues explored include zoning, water-and transportation-based conflicts and opportunities in the combined effect of federal, state, and local policies, laws, and regulations controlling land development, etc. An analysis of conflicts and opportunities were presented in two separate papers.

#### **Status of Result 4**

##### Iron Range:

Legal and the public policy barriers to implementation of strategies in mining environments include: the implication of DNR mining reclamation and mine plan requirements, the status of publicly held lands after depletion by mining, ground water and discharge issues, and possibilities and implications of the public access to private mined lands.

The implications of this research on creation of different components of the Iron Range environmental infrastructure were examined. This work is served as a basis for preparing the barriers section of the handbook.

**Saint Paul:**

Legal and public policy development and redevelopment issues have been identified and presented in pages 207 to 224 of the appendix of the Saint Paul Volume of the Handbook.

Budget: \$25,011.00

Budget Spent: \$25,009.97

Balance: \$1.03

Milestone Date: May 31, 2001

**Result 5. Development of selected designs**

Based on the potentials identified in #2, #3, and #4, a number of infrastructure types were selected for design development. Green infrastructure designs were created that demonstrate a more environmentally-friendly approach. Examples of the created designs include a parkway design that accommodates trucks, treats storm water, creates a buffer to a residential neighborhood, and provides for a recreational trail; alternate ways of using the overburden from mining operations to create amenities for the communities; and strategies for siting recreational trails that respect the environment while providing for amenity and economic opportunity for the adjacent communities, etc.

**Status of Result 5**

**Iron Range:**

The design work on the Iron Range is available in the two Iron Range volumes of the Handbook. The application of proposed framework of environmental infrastructure is demonstrated at the regional scale. Design proposals illustrating alternative applications of the Avenue of the Mines, Bookends/Gateways, Heritage Loops and Connections, and Across the Divide concepts are presented.

**Saint Paul:**

The design work presented in the Saint Paul volume of the Handbook. They include the five case study areas, [traditional neighborhood connective development (South Saint Anthony Park), Commercial Superblock Redevelopment (Minnehaha Mall), Industrial Brownfield Redevelopment (Maxfield Steel and Dale Street Shops Sites), Historic Parkway Corridor (Como Avenue), and Civic Amenity Corridor and Transit Reinvestment (Rice Street and North Capitol Area)] Also included in the Handbook are is a chapter on street types, storm water types, landscape & building types, and energy conservation types that were used in the case study areas.

Budget: \$184,910.75

Budget Spent: \$184,449.97

Balance: \$460.78

Milestone Date: May 31, 2001



**Result 6. Production of a user-friendly publication in printed and digital form and presentation of the work to the communities.**

A user-friendly, easily understood three-volume publication for use by citizens and officials was produced. Citizens and officials on the Iron Range, and in Saint Paul have found the project's materials useful. Metropolitan Council staff intends to use some of the Saint Paul work to inform Council policy. Some Handbook material will be used in the new development blueprint that they are currently creating.

**Status of Result 6**

**Iron Range:**

The Iron Range portion of the green infrastructure handbook consists of two volumes. The first volume addresses green infrastructure concepts that relate to the design and planning of regional landscape, presents a model of Green Infrastructure design that can be applied in regional landscape design in general, and applies the model to creating a toolkit of ideas for future design of the Iron Range landscape. Volume two is an atlas of Green Infrastructure systems in the Iron Range landscape.

**Saint Paul:**

The Saint Paul portion of the Handbook consists of the volume, *Organic Infrastructure as City Re/Building*. It addresses design at the corridor, study area, and site scales. Chapters include a design framework, a chapter on each of the five study areas, a chapter on street types, landscape/building types, storm water types, and energy strategies. The appendix includes a glossary, the paper, *Current Economic Development Authority Policies and Practices: Barriers to Local and Regional Planning and Design*, and geographic information maps of the Central Corridor.

Budget: \$59,550.50

Budget Spent: \$54,686.08

Balance: \$4,864.42

Completion Date: June 30, 2001

**V. DISSEMINATION:**

The three-volume handbook is available in digital form on the College of Architecture and Landscape Architecture's web site at [www.cala.umn.edu](http://www.cala.umn.edu) and on a disk from the College. A few printed copies have been given to officials. Printed copies are also available in the College's library. The design work has been presented on the Iron Range and in Saint Paul.

**VI. CONTEXT:**

**A. Significance:**

The creation of public infrastructure is essential to providing for human habitation and urban and rural development. Historically Minnesota public officials have taken their civic responsibility to protect the health, safety, and welfare of the people of the state by

building roads, sanitary systems, floodwalls and other public works in fulfillment of this responsibility. However, often these great public structures were created at the expense of the environment. Currently some existing public works are part of the environmental problem because they are important contributors to the environmental degradation of Minnesota's basic resources of land, water, and air. As such, they are significant barriers to reaching the goal of sustainability.

The infrastructure decisions made by city, suburban, small town, township, and county officials impact the current and the future condition of environmental resources and the quality of the places in which we live and work. Too often these important civic investments have been made without fully considering the opportunities to create new or enhance existing roads, parks, flood prevention systems, and utility networks so that they contribute substantially to the goal of sustainability while at the same time providing their important functions of collecting storm water, reducing the risk of flooding, providing recreational amenities, etc. This project addresses this opportunity by developing of a variety of prototypical public infrastructure designs that serve the function of providing traditional needed public function and simultaneously contribute to the goal of sustainability.

The Saint Paul part of the project presents designs that respond to the Metropolitan Council's development policies as articulated in the Regional Blueprint. It demonstrates how to do environmentally sensitive urban infill and redevelopment in underutilized industrial, commercial, institutional, and residential areas of older cities.

#### **B. Time:**

The duration of this project was two years: July 1,1999 to June 30,2001.

#### **C. Budget Context:**

This work builds on the work of the researchers in the Department of Landscape Architecture for many years including:

- Preventing Stormwater Runoff Problems through Watershed Land Design: LCMR \$280,000,
- Seven grants for studying transportation and city making from the Center for Transportation Studies, \$450,000,
- Water Quality Cooperatives Pilot Project: Minnesota State Legislature (PCA) \$300,000,
- Urban Brownfield Project: Minnesota State Legislature (DNR) \$100,000.

#### **PERSONNEL**

	<b>Budget</b>	<b>Final</b>
Professor Robert Sykes	\$14,251.00	\$14,142.29
Professor David Pitt	\$15,849.00	\$15,848.98
Professor Lance Neckar	\$ 0.00	\$ 0.00
Professor Aaron Parker	\$ 9,343.00	\$ 9,343.00

Senior Research Fellow Mary Vogel	\$62,836.29	\$62,749.50
Senior Research Fellow James Pettinari	\$42,888.00	\$41,640.90
Senior Research Fellow Jon Erik Kingstad	\$25,011.00	\$25,009.97
Research Fellow M. Christine Carlson	\$ 9,281.00	\$ 9,281.00
Researcher Carlos J. Fernandez	\$14,924.57	\$14,864.04
Research Fellow Kathryn McFadden	\$11,975.00	\$11,974.57
Research Fellow Jason Aune	\$28,901.00	\$28,901.00
Research Fellow Aaron Mikonowicz	\$37,468.89	\$37,468.89
Research Fellow Steve Roos	\$34,808.26	\$34,765.07
Research Specialist	\$15,285.09	\$15,138.20
Research Assistant I	\$20,422.50	\$20,422.50
Research Assistant II	\$10,277.50	\$10,277.19
Research Assistant III	\$ 5,532.00	\$ 5,532.00
Research Assistant IV	\$ 3,798.00	\$ 3,797.48
Research Assistant V	<u>\$ 7,476.00</u>	<u>\$ 3,856.29</u>
<b>Total Research Personnel</b>	<b>\$370,328.10</b>	<b>\$365,012.87</b>

Support staff		
<i>Secretary, accounting &amp; computer technician</i>	\$11,460.07	\$11,460.07
In-state Travel	\$ 3,261.83	\$ 3,261.83
Supplies and Copying	\$ 4,950.00	\$ 4,950.00
Editing	\$ 2,000.00	\$ 2,000.00
Printing and Preparation for Printing	<u>\$ 8,000.00</u>	<u>\$ 8,000.00</u>
<b>Total Expense Budget</b>	<b>\$29,671.90</b>	<b>\$29,671.90</b>

**Equipment:**

None

**Acquisition:**

Does not apply

**Development:**

Does not apply

**BUDGET TOTAL:**

**\$400,000.00      \$394,684.77**

**BALANCE:**

**\$ 5,315.23**

**VII. COOPERATION:**

Does not apply

**VIII. LOCATION:**

The two project locations are:

- Central Corridor in Saint Paul: an area between Interstate 35E and Highway 280.
- The Iron Range

### ***Budget Detail***

#### **Result 1: Identification of prototypical infrastructure types in the two corridors and the creation of working relationships with the communities.**

Budget \$37,243.75

Budget Spent: \$37,243.75

Balance: \$0.00

Milestone Date: January 31, 2000

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Pitt, Land. Arch.	\$2,686.00	\$2,686.00
Prof. Neckar, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Aaron Parker	\$ 0.00	\$ 0.00
Sr. Research Fellow Vogel	\$7,100.50	\$7,100.50
Sr. Research Fellow Pettinari	\$4,652.00	\$4,652.00
Sr. Research Fellow Kingstad	\$ 0.00	\$ 0.00
Research Fellow Carlson	\$5,162.00	\$5,162.00
Research Fellow, McFadden	\$5,200.00	\$5,200.00
Research Fellow, Mikonowicz	\$5,043.75	\$5,043.75
Research Fellow, Roos	\$2,000.00	\$2,000.00
Land. Arch. Research Asst. I	\$1,267.50	\$1,267.50
Land. Arch. Research Asst. II	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. III	\$ 0.00	\$ 0.00
Other – Clerical/Accounting	\$2,000.00	\$2,000.00
Travel 7 trips to Range	\$ 132.00	\$ 132.00
Supplies & Copying	<u>\$2,000.00</u>	<u>\$2,000.00</u>
Total Expenditures - Result 1	<b>\$37,243.75</b>	<b>\$37,243.75</b>

#### **Budget 2. Studio investigations**

Budget: \$22,000.00

Budget Spent: \$22,000.00

Balance: \$0.00

Milestone Date: January 31, 2000

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Pitt, Land. Arch.	\$3,586.00	\$3,586.00

Prof. Neckar,	\$ 0.00	\$ 0.00
Prof. Aaron Parker	\$ 0.00	\$ 0.00
Sr. Research Fellow Vogel	\$1,267.00	\$1,267.00
Sr. Research Fellow Pettinari	\$5,000.00	\$5,000.00
Sr. Research Fellow Kingstad	\$ 0.00	\$ 0.00
Research Fellow Carlson	\$4,119.00	\$4,119.00
Research Fellow McFadden	\$ 0.00	\$ 0.00
Research Fellow, Mikonowicz	\$ 0.00	\$ 0.00
Research Fellow Roos	\$5,000.00	\$5,000.00
Land. Arch. Research Asst. I	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. II	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. III	\$ 0.00	\$ 0.00
Other – Clerical/Accounting	\$ 881.00	\$ 881.00
Travel	\$2,147.00	\$2,147.00
Supplies & Copying	<u>\$ 0.00</u>	<u>\$ 0.00</u>
<b>Total Expenditures: Result 2</b>	<b>\$22,000.00</b>	<b>\$22,000.00</b>

**Budget 3. Investigation of sustainability strategies**

Budget: \$71,295.00

Budget Spent: \$71,295.00

Balance: \$0.00

Milestone Date: February 28, 2001

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 6,000.00	\$ 6,000.00
Prof. Pitt, Land. Arch.	\$ 6,000.00	\$ 6,000.00
Prof. Neckar, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Aaron Parker, Arch.	\$ 0.00	\$ 0.00
Sr. Research Fellow Vogel	\$13,045.00	\$13,045.00
Sr. Research Fellow Pettinari	0.00	0.00
Sr. Research Fellow Kingstad	0.00	0.00
Research Fellow Carlson	0.00	0.00
Researcher Fernandez	\$ 4,380.00	\$ 4,380.00
Research Fellow McFadden	\$ 6,775.00	\$ 6,775.00
Research Fellow Aune	\$ 2,625.00	\$ 2,625.00
Research Fellow Mikonowicz	\$10,087.50	\$10,087.50
Research Fellow Roos	\$ 8,000.00	\$ 8,000.00
Land. Arch. Research Asst. I	\$ 6,807.50	\$ 6,807.50
Land. Arch. Research Asst. II	\$ 3,000.00	\$ 3,000.00
Land. Arch. Research Asst. III	\$ 0.00	\$ 0.00

Other – Clerical/Accounting	\$ 3,000.00	\$ 3,000.00
Travel	\$ 0.00	\$ 0.00
Supplies & Copying	<u>\$ 1,575.00</u>	<u>\$ 1,575.00</u>
<b>Total Expenditures: Result 3</b>	<b>\$71,295.00</b>	<b>\$71,295.00</b>

**Result 4: Identification of Barriers to Implementation of Strategies**

Budget: \$25,011.00

Budget Spent: \$25,009.97

Balance: \$ 1.03

Milestone Date: February 28, 2001

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Pitt, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Neckar, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Aaron Parker	\$ 0.00	\$ 0.00
Sr. Research Fellow Vogel	\$ 0.00	\$ 0.00
Sr. Research Fellow Pettinari	\$ 0.00	\$ 0.00
Sr. Research Fellow Kingstad	\$25,011.00	\$25,009.97
Research Fellow Carlson	\$ 0.00	\$ 0.00
Researcher Fernandez	\$ 0.00	\$ 0.00
Research Fellow McFadden	\$ 0.00	\$ 0.00
Research Fellow, Mikonowicz	\$ 0.00	\$ 0.00
Research Fellow, Roos	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. I	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. II	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. III	\$ 0.00	\$ 0.00
Other – Clerical/Accounting	\$ 0.00	\$ 0.00
<i>Travel</i>	\$ 0.00	\$ 0.00
<i>Supplies &amp; Copying</i>	<u>\$ 0.00</u>	<u>\$ 0.00</u>
<b>Total Expenditures: Result 4</b>	<b>\$25,011.00</b>	<b>\$25,009.97</b>

**Result 5. Development of selected designs**

Budget: \$184,910.75

Budget Spent: \$ 184,449.97

Balance: \$ 460.78

Milestone Date: May 31, 2001

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 8,251.00	\$ 8,142.29
Prof. Pitt, Land. Arch.	\$ 3,577.00	\$ 3,576.85

Prof. Neckar, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Parker	\$ 9,343.00	\$ 9,343.00
Sr. Research Fellow Vogel	\$33,000.00	\$33,000.00
Sr. Research Fellow Pettinari	\$27,236.00	\$27,000.00
Sr. Research Fellow Kingstad	\$ 0.00	\$ 0.00
Research Fellow Carlson	\$ 0.00	\$ 0.00
Researcher Fernandez	\$10,545.00	\$10,484.04
Research Fellow McFadden	\$ 0.00	\$ 0.00
Research Fellow Aune	\$20,076.00	\$20,076.00
Research Fellow, Mikonowicz	\$13,000.00	\$13,000.00
Research Fellow, Roos	\$14,375.25	\$14,332.07
Research Specialist	\$13,231.00	\$13,231.00
Land. Arch. Research Asst. I	\$12,347.50	\$12,347.50
Land. Arch. Research Asst. II	\$ 4,900.00	\$ 4,899.69
Land. Arch. Research Asst. III	\$ 5,532.00	\$ 5,532.00
Land. Arch. Research Asst. IV	\$ 3,798.00	\$ 3,797.48
Land. Arch. Research Asst. V	\$ 0.00	\$ 0.00
Other -Clerical/Accounting	\$ 3,805.00	\$ 3,805.00
Travel	\$ 800.00	\$ 800.00
Supplies & Copying	<u>\$ 1,083.00</u>	<u>\$ 1,083.00</u>
<b>Total Expenditures: Result 5</b>	<b>\$184,899.75</b>	<b>\$184,449.92</b>

**Result 6. Production of a user-friendly publication in printed and digital form and presentation of the work to the communities.**

Budget: \$59,550.50

Budget Spent: \$54,686.08

Balance: \$4,864.42

Completion Date: June 30, 2001

<u>Personnel</u>	<u>Budget</u>	<u>Actual</u>
Prof. Sykes, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Pitt, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Neckar, Land. Arch.	\$ 0.00	\$ 0.00
Prof. Aaron Parker	\$ 0.00	\$ 0.00
Sr. Research Fellow Vogel	\$ 8,423.00	\$ 8,336.17
Sr. Research Fellow Pettinari	\$ 6,000.00	\$ 4,988.90
Sr. Research Fellow Kingstad	\$ 0.00	\$ 0.00
Research Fellow Carlson	\$ 0.00	\$ 0.00
Research Fellow Fernandez	\$ 0.00	\$ 0.00
Research Fellow-McFadden	\$ 0.00	\$ 0.00

Research Fellow Aune	\$ 6,200.00	\$ 6,200.00
Research Fellow, Mikonowicz	\$ 9,337.75	\$ 9,337.75
Research Fellow, Roos	\$ 5,433.00	\$ 5,433.00
Research Specialist	\$ 2,053.75	\$ 1,907.20
Land. Arch. Research Asst. I	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. II	\$ 2,377.50	\$ 2,377.50
Land. Arch. Research Assist. III	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. IV	\$ 0.00	\$ 0.00
Land. Arch. Research Asst. V	\$ 7,476.00	\$ 3,856.29
Other –Clerical/Accounting	\$ 1,774.50	\$ 1,774.50
Travel	\$ 183.00	\$ 183.00
Supplies & Copying	\$ 292.00	\$ 292.00
Editing	\$ 2,000.00	\$ 2,000.00
Printing and print preparation	<u>\$ 8,000.00</u>	<u>\$ 8,000.00</u>
<b>Total Expenditures: Result 6</b>	<b>\$59,550.50</b>	<b>\$54,686.31</b>

---

	<i>Original Budget</i>	<i>Final</i>
<b>TOTAL PROJECT EXPENDITURES:</b>	<b>\$400,000.00</b>	<b>\$394,684.77</b>
<b>PROJECT BALANCE:</b>	<b>\$0.00</b>	<b>\$ 5,315.23</b>



# FINAL REPORT

JAN 31 2002

## 1999 Project Abstract

For the Period Ending June 30, 2001

**TITLE:** Urban Corridor Design: Green Infrastructure as Civic Amenity and Environmental Resource

**PROJECT MANAGER:** Mary Vogel

**ORGANIZATION:**

Department of Landscape Architecture,  
College of Architecture and Landscape Architecture  
University of Minnesota

**ADDRESS:**

144 Architecture and Landscape Architecture  
89 Church Street SE  
Minneapolis, MN 55455

**WEB SITE ADDRESS:** [www.cala.umn.edu](http://www.cala.umn.edu)

**FUND:** Minnesota Futures Fund

**LEGAL CITATION:** ML 1999, Ch. 231, Sec. 16, Subd. 8 (d)

**APPROPRIATION AMOUNT:** \$400,000

### Overall Project Outcome and Results

The project developed a practical and user friendly three volume guide that can be used by officials and citizens who wish to avoid degrading the environment and incurring future mitigation costs by making more environmentally friendly planning/designs decisions when considering infrastructure projects. Infrastructure types that are commonly used across various geographic scales by cities, small towns, suburbs, and counties in Minnesota were studied in a corridor in Saint Paul and one on the Iron Range. The study identified prototypical infrastructure types, precedent studies were done in design studios, an investigation was made of sustainability strategies, barriers to implementation of strategies were identified, selected designs were developed. A user-friendly three-volume handbook presenting material from the study in a printed and digital format was created. The Saint Paul volume presents an overall design framework, designs for five study areas, a section on organic infrastructure types, and a paper on the legal barriers to local and regional planning. The Iron Range Study presents green infrastructure design work in two volumes at the regional scale and a paper on the legal barriers to planning in a mining environment.

### Project Results Use and Dissemination

Presentations of the work have been made to community groups and officials on the Iron Range and in Saint Paul. Public officials and citizens have used the materials from this study to discuss the future of their communities.

The handbook is available on the web and on disks.