

The Sustainable Community at UMore Park

Aspirational Goals and Action Plan for Sustainability

UMore Development LLC
A company of the University of Minnesota

March 2012



BioRegional

The 10 *One Planet* principles cover logo is courtesy of BioRegional, the UMore Park partner in the process to craft aspirational goals for sustainability outlined in this plan. BioRegional is an international nonprofit organization that coordinates the *One Planet Community* program, a network of sustainable master-planned communities that have been designed, built, and are operated according to the 10 *One Planet* principles. The framework is internationally recognized for helping projects strive towards the highest achievements in sustainable design and operation.

The Sustainable Community at UMore Park

Aspirational Goals and Action Plan for Sustainability

UMore Development LLC
A company of the University of Minnesota

March 2012

PREFACE

We are in the midst of creating the future. The “we” is expansive.

The University of Minnesota is the owner of the 5,000-acre property in Dakota County referred to as UMore Park – the University of Minnesota Outreach, Research and Education (UMore) Park. The University envisions creation of a unique, sustainable, University-founded community at UMore Park, a 25- to 30-year endeavor. But an undertaking of this size and scope cannot be accomplished alone. It is the work of many: Local governmental units, citizen organizations, local businesses and the broader private sector, nonprofit organizations that address the needs and elements that make communities vibrant, the range of educational institutions from early learning through a top-tier research university, state and federal agencies, and the University’s faculty, students and staff members, among others.

Through the expertise and efforts of many, a community will emerge that is economically, environmentally and socially sustainable – a community of innovation that can be a model for others.

From the day in December 2006 that the University’s Board of Regents affirmed the vision to create a University-founded sustainable community, public engagement has been core to planning. The University has benefitted from the ideas, comments and questions offered by citizens and organizational representatives during the initial years of listening sessions, public forums, discussion sessions and special projects. Our approach to more fully defining sustainability – and more important, outlining an action plan for sustainability – required the same. We needed the best thinking of many, especially given the multiple dimensions of sustainability. We were fortunate to have engaged 80 individuals for two days of intensive discussion in Rosemount, Minnesota, in April 2011 – followed by a public forum that expanded input and ideas from another 150 citizens. Volunteers continued to help draft and review the contents of the plan to bring it to its present form.

The aspirational goals that follow in this report are right for the time. But they will need to be periodically updated based on changes in the region; advances in technology and new knowledge; and the local and regional collective vision for economic, social and environmental sustainability. It is difficult in this day of rapid global change to predict what the future may bring. To envision the details of planning, change and development for the UMore Park property and the region over the next 30 years or more is impossible.

We have the information and the citizen expertise now, however, that has contributed to the development of aspirational sustainability goals and set a trajectory for attaining these goals.

Look back 30 years (if you are of a certain age). How has the world changed? How have your community, your personal goals, your vision for the future changed? Now, look forward 30 years. A new sustainable community at UMore Park can be a contribution toward innovation and quality of life that serves our children and grandchildren – a hallmark of optimism for the future.



Carla Carlson
Vice President for Operations, UMore Development LLC

ACKNOWLEDGMENTS

The UMore Park *Sustainability Action Plan* has evolved from the contributions of time and expertise of more than 250 people who have provided information and ideas through their participation in the April 6-7, 2011 sustainability workshop and public forum, written materials, and review comments.

This initial plan reflects a collective, thoughtful, optimistic approach toward economic, social and environmental sustainability that will be updated periodically. Crafting aspirations for the future – particularly for the development of a sustainable community of 20,000 to 30,000 people that will unfold over 30 or more years – is a challenge. The UMore Park team is grateful to all who helped to fashion this template for the future.

We acknowledge key groupings of individuals: The sustainability “champions,” the workshop participants, the BioRegional consultant team and members of the extended UMore Park team, in addition to all those individuals in the local community who contributed their insights and vision for the future during the public forum and through ongoing communications.

The Champions

Twelve individuals volunteered to summarize workshop and public forum comments and additional data that have been transformed into the 10 chapters of the plan. The work was challenging and detailed; the results are the pathway to the future. Significant contributions were made by:

Larry Baker, Research Professor, Bioproducts and Biosystems Engineering, University of Minnesota
Patrick C. Dwyer, Doctoral Student, Department of Psychology, University of Minnesota
Mary Hanks, Director, Agricultural Marketing and Development Division, Minnesota Department of Agriculture
Bonnie Keeler, Interdisciplinary Doctoral Fellow, Institute on the Environment, University of Minnesota
Mark Koegler, President, Hoisington Koegler Group, Inc. (HKGI)
Bob Kost, Director, Planning and Urban Design, Short Elliott Hendrickson (SEH) Inc.
John Lauber, Historic Preservation Planner, John Lauber and Company LLC
Alexander Maki, Doctoral Student, Department of Psychology, University of Minnesota
Helene Murray, Executive Director, Minnesota Institute for Sustainable Agriculture, University of Minnesota
Richard Strong, Senior Research Fellow, Center for Sustainable Building Research, University of Minnesota
Elizabeth Turner, Graduate Student, Architecture and Sustainable Design, College of Design, University of Minnesota
Sarah Wolbert, Founder, Designer UNDI

The UMore Park Sustainability Workshop Participants

The creativity and expertise of workshop participants, who generously contributed two days of their time to the UMore Park project, is at the core of the plan. We appreciate the ongoing interest, ideas and advice of the following individuals:

Jim Aiken, Vice President and Senior Environmental Consultant, Barr Engineering
Chrisa Arcan, Research Associate, Division of Epidemiology and Community Health, School of Public Health, University of Minnesota
Larry Baker, Research Professor, Bioproducts and Biosystems Engineering, University of Minnesota
Andy Barnett, Director of Community Development, Twin Cities Habitat for Humanity
Ruthe Batulis, President, Dakota County Regional Chamber of Commerce
Tim Becken, Senior Vice President of Operations, Cemstone Products Company
Jane Berenz, Superintendent, Independent School District 196
Christopher Bineham, Program Manager, HOURCAR Program, Neighborhood Energy Connection
David Block, Rosemount Rotary Club
Dan Bodette, Principal, School of Environmental Studies, Independent School District 196
Patrick Boylan, Senior Planner, Metropolitan Council
Scott Bradley, Director, Context Sensitive Solutions, Minnesota Department of Transportation
Andy Brotzler, Director of Public Works/City Engineer, City of Rosemount, and Senior Project Manager, WSB and Associates, Inc.
Marilyn Bruin, Associate Professor, Housing Studies, University of Minnesota
Gwen Cannon, Program Director, Metropolitan Regional Arts Council
Colleen Carey, President, The Cornerstone Group, and Representative, Minnesota Land Trust
John Carmody, Director, Center for Sustainable Building Research, University of Minnesota

Kurt Chatfield, Planning Supervisor, Office of Planning and Analysis, Dakota County
 Dale Darrow, Sustainability Officer, U.S. Department of Housing and Urban Development Field Office - Minneapolis
 William Droste, Mayor, City of Rosemount
 Adam Ducker, Managing Director, RCLCO
 Patrick C. Dwyer, Doctoral Student, Department of Psychology, University of Minnesota
 Ethan Fawley, Transportation Policy Director, Fresh Energy
 Kari Gill, Deputy Executive Director, Dakota County Community Development Agency
 Louise Goldberg, Director, Energy Systems Design Program, Bioproducts and Biosystems Engineering, University of Minnesota
 Mary Hanks, Director, Agricultural Marketing and Development Division, Minnesota Department of Agriculture
 Susan Hubbard, Chief Strategy Officer, Eureka Recycling
 Dwight Johnson, City Administrator, City of Rosemount
 Dean Johnson, Empire Township Planner, Resource Strategies Corporation
 Jan Jordev, Director, Development and Communications, Metropolitan Economic Development Association
 Matt Kearney, City Council Member, City of Rosemount
 Bonnie Keeler, Interdisciplinary Doctoral Fellow, Institute on the Environment, University of Minnesota
 Cathy Kindem, Science Teacher, Cedar Park Elementary STEM School, Independent School District 196
 Mark Koegler, President, Hoisington Koegler Group, Inc. (HKGI)
 Bob Kost, Director, Planning and Urban Design, Short Elliott Hendrickson (SEH) Inc.
 John Lauber, Historic Preservation Planner, John Lauber and Company LLC
 John Lee, Civil and Engineered Sales Manager, Cemstone Products Company
 Jason Lindahl, Planner, City of Rosemount
 Mark Lofthus, Director, Business and Community Development, Minnesota Department of Employment and Economic
 Development
 Alexander Maki, Doctoral Student, Department of Psychology, University of Minnesota
 Jeff Marr, Associate Director, St. Anthony Falls Laboratory, University of Minnesota
 Liz McMann, Consumer Affairs Manager, Mississippi Market Natural Foods Co-op
 Doug Mensing, Senior Ecologist, Applied Ecological Services
 Laura Millberg, Green Building Specialist, Sustainable Community Development, Minnesota Pollution Control Agency
 L. Burke Murphy, Consultant and Educator – Regional Economic Development
 Helene Murray, Executive Director, Minnesota Institute for Sustainable Agriculture, University of Minnesota
 Lance Neckar, Professor and Head, Department of Landscape Architecture, University of Minnesota
 Sharon Pfeifer, Community Assistance Manager, Minnesota Department of Natural Resources
 Mark Rathbun, Renewable Energy Lead, Great River Energy
 Fred Rozumalski, Landscape Ecologist, Barr Engineering
 Connie Rutledge, Associate Program Director, Carlson Ventures Enterprise, University of Minnesota
 Dan Schultz, Director, Parks and Recreation, City of Rosemount
 John Shardlow, Senior Associate, Stantec Consulting, Inc., and Chair, National Urban Land Institute's Sustainable Development
 Council
 Howell Shaw, Founder and CEO, Shaw Sustainable, and Past Chair, National Association of Minority Contractors Green Building
 Subcommittee
 Suzanne Sheridan, Coordinator, On The Move for Minnesota Families Program, University of Minnesota Extension, Dakota
 County
 Kim Shoe-Corrigan, City Council Member, City of Rosemount
 Amy Short, Sustainability Director, Office of the Vice President for University Services, University of Minnesota
 Dexter Sidney, Director, U.S. Department of Housing and Urban Development Field Office - Minneapolis
 Tim Smith, Director, NorthStar Initiative for Sustainable Enterprise, Institute on the Environment, and Associate Professor,
 Bioproducts and Biosystems Engineering, University of Minnesota
 Nyam Smith, Executive Director, YMCA in Eagan
 Ken Smith, President and CEO, Evergreen Energy
 Richard Strong, Senior Research Fellow, Center for Sustainable Building Research, University of Minnesota
 Geof Syphers, Chief Sustainability Officer, Coddling Enterprises
 Ronald Thomas, President, Dakota County Technical College
 William Toscano, Professor and Head, Environmental Health Sciences, School of Public Health, University of Minnesota
 Jesse Turck, Architect, BWBR, and Representative, American Institute of Architects - Minnesota
 Elizabeth Turner, Graduate Student, Architecture and Sustainable Design, College of Design, University of Minnesota
 Craig Wilson, Principal, Sustology, and President Elect, American Society of Landscape Architects Minnesota Chapter
 Sarah Wolbert, Founder, Designer UNDI

University of Minnesota Student Contributors

The following University of Minnesota students assisted by drafting summaries of the workshop discussions and key findings:

Joel Fischer, Master of Business Administration Candidate, Carlson School of Management, University of Minnesota
Jesse LaMaack, Undergraduate Student, College of Design, University of Minnesota
Keith Lindgren, Master of Business Administration candidate, Carlson School of Management, University of Minnesota
Mackenzie Lucca, Undergraduate Student, College of Design, University of Minnesota
Cecilia Marn, Master of Business Administration candidate, Carlson School of Management, University of Minnesota
Rodney Matthews, Undergraduate Student, College of Design, University of Minnesota
John Printy, Graduate Student, College of Design, University of Minnesota
Andrew Senn, Master of Urban and Regional Planning candidate, Hubert H. Humphrey School of Public Affairs, University of Minnesota
Andrew Thiel, Undergraduate Student, College of Design, University of Minnesota
Stephanie Zawistowski, Master of Business Administration candidate, Carlson School of Management, University of Minnesota

The BioRegional Team

We are indebted to our guide and advisor through the sustainability plan process, Greg Searle, executive director of BioRegional North America. His talent for ensuring the intersection of sustainability aspirations and the practicality of planning and development was critical to the development of the plan. We appreciate the additional facilitation, guidance and expertise of BioRegional colleagues Daniel Viliesid, director, BioRegional Mexico; Brett Hodnett, operations manager, BioRegional North America; and BioRegional consultants Rodney Wilts, partner, BuildGreen Solutions; and Geof Syphers, Syphers Consulting, Inc.

UMore Park Colleagues

For assistance in preparation for the workshop and public forum, suggestions and review we especially acknowledge Kathy Boudreau, contract and real estate manager, Rosemount Research Center; John Carmody, director, Center for Sustainable Building Research; William Brusman, consultant, and Deb Miller-Slipek, consultant.

The Editor

Julie Bodurtha, editor of the *Sustainability Action Plan* and the *Sustainability Summary* is acknowledged for her efforts to transform the ideas and information from many into two key publications on sustainability. We hope that the publications benefit others well beyond the focus on the sustainable community at UMore Park.

The UMore Park Management Team

Julie Bodurtha, External Relations Coordinator, UMore Development LLC and Office for UMore Park Academic Initiatives
Carla Carlson, Vice President for Operations, UMore Development LLC and Executive Director, Office for UMore Park Academic Initiatives
Lorri Chapman, Executive Assistant, UMore Development LLC and Office for UMore Park Academic Initiatives
Allie Klynderud, Public Engagement Assistant, UMore Development LLC
Ken Larson, legal advisor to the management team, Associate General Counsel, Office of the General Counsel, University of Minnesota
Thomas W. LaSalle, consultant, LaSalle Group, Ltd.
Larry Laukka, Vice President for Development, UMore Development LLC
Steven Lott, Project Manager, UMore Development LLC
Charles C. Muscoplat, President, UMore Development LLC and Senior Academic Adviser, Office for UMore Park Academic Initiatives

CONTENTS

Introduction	9
Executive Summary	13
Principles of Sustainability	19
1. Zero Carbon	21
2. Zero Waste	31
3. Sustainable Transport.....	39
4. Sustainable Materials.....	49
5. Local and Sustainable Food.....	57
6. Sustainable Water.....	67
7. Land Use and Wildlife.....	77
8. Culture and Community	87
9. Equity and Local Economy	97
10. Health and Happiness.....	105
Appendices	115
A. Key Opportunities for community sustainability at UMore Park	115
B. UMore Development Limited Liability Company.....	119
C. Office for UMore Park Academic Initiatives	120
D. University of Minnesota Board of Regents Policy on Sustainability and Energy Efficiency	121
References	123

INTRODUCTION

The University of Minnesota Outreach, Research and Education (UMore) Park is the University of Minnesota's 5,000-acre property located 25 miles southeast of the Twin Cities in Dakota County, Minnesota. The vision to develop a unique, sustainable community for 20,000 to 30,000 people over 25 to 30 years was affirmed by the University of Minnesota Board of Regents in December 2006. A concept master plan for development of the UMore Park property was completed in December 2008. Plans for UMore Park follow guiding principles established by the University's Board of Regents in February 2006 and align with the Regents Policy on Sustainability and Energy Efficiency (see Appendix D).

A Unique, University-founded Community

The University's vision for creation of a sustainable, University-founded community at UMore Park is guided by the following Board of Regents principles, established in February 2006:

- Protect and enhance the value of UMore Park through timely planning and action.
- Advance the University's research, education, and engagement mission through the physical and financial resources that UMore Park will provide over the long term.
- Improve the long-term financial health of the University through application of sound fiscal principles and stewardship, including investing the income generated through UMore Park in ways that support academic priorities to complement, supplement and leverage state and private support.
- Retain oversight of UMore Park's planning and development and remain accountable for the master plan.
- Plan in such a way so as to optimize the value of UMore Park utilizing short-term strategies without restricting options for long-term strategies.

- Utilize market value as a benchmark in assessing alternative development strategies.
- Ensure that all planning and development activities are conducted with the highest standards of fairness, integrity and sound business practice.
- Respect the needs of neighboring communities and local, regional and state governments.

The Board of Regents established the UMore Development Limited Liability Company (LLC) in October 2009 to manage real estate and commercial development activities on the property. In December 2009, the Board of Regents appointed nine individuals to the Board of Governors to direct the LLC. The Board of Governors members bring private sector and University expertise in planning, finance, real estate and land use to the planning and development process. The Office for UMore Park Academic Initiatives was created in July 2010 to complement the work of the LLC and to help ensure that the University's academic mission—research, teaching and outreach—remains core to the project.

The UMore Park leadership team incorporates both academic and development goals to manage a multifaceted portfolio of dynamic, integrated plans and activities to prepare the UMore Park property for development of a community that is sustainable in every way—environmentally, socially and economically.

The Sustainability Action Plan

Importantly, the time to describe what sustainability means for a community—this community—and its residents, is now, before development begins.

To best explore potential goals and actions for sustainability,

the UMore Development LLC engaged international nonprofit BioRegional to help the UMore Park team and its public and private sector colleagues identify goals and performance targets for sustainability at UMore Park and create a plan to achieve them. This planning process included a facilitated two-day workshop in April 2011, bringing together a diverse group of more than 80 participants to help shape sustainability goals and best practices. Participants were from local units of government, state and federal agencies, private sector and nonprofit organizations, citizens, and the University of Minnesota. Following the workshop, more than 150 citizens attended a public forum to share their ideas and input to further hone the goals and opportunities for the planned sustainable community.

Twelve individuals who participated in the two-day workshop contributed their time, insights and expertise to capture ideas from the workshop discussion and assist in transforming them into the chapters of the plan. Two publications have resulted: The UMore Park *Sustainability Action Plan* and *Sustainability Summary*. The UMore Park *Sustainability Action Plan*, based on BioRegional principles, addresses the following 10 broad areas of sustainability for the planned community: zero carbon, zero waste, sustainable transport, sustainable materials, local and sustainable food, sustainable water, land use and wildlife, culture and community, equity and local economy, and health and happiness. The Sustainability Summary is a companion publication highlighting aspects of the information that follows. For a short discussion of the most compelling aspects of the 10 principles and aspirational goals, please see The Sustainability Summary: Aspirational Goals for the Sustainable Community at UMore Park.

This plan reflects the collective thinking of workshop participants, citizens and the UMore Development LLC and BioRegional teams, as they discussed and identified a spectrum of ideas to support aspirational sustainability goals and the steps that could be taken to achieve them.

The BioRegional Approach

BioRegional is an international nonprofit organization that maintains the One Planet Community program, an independent endorsement and internationally recognized sign of the highest achievement in sustainable design and operation.

The One Planet Community

The concept behind the *One Planet Community* is that individuals and communities should consume only as much as the planet can renew or absorb. Globally, communities and individuals consume resources and pollute the planet at a level fifty percent higher than the Earth can renew or absorb. If everyone in the world consumed as many natural resources as the average person in North America, more than five planets would be required to support the Earth's people. The *One Planet Community* approach pairs an efficient, well-planned built environment with lifestyle choices to achieve sustainable use of the resources on the planet.

The *One Planet Community* initiative uses 10 guiding principles as a framework to help participating projects examine the sustainability challenges they face and develop appropriate solutions:

1. Zero Carbon—making buildings more energy efficient and delivering all energy with renewable technologies.
2. Zero Waste—reducing waste, reusing where possible and ultimately zero waste to landfill.
3. Sustainable Transport—encouraging low carbon modes of transport to reduce emissions.
4. Sustainable Materials—using sustainable and healthy products, such as those with low embodied energy, sourced locally and made from renewable resources.
5. Local and Sustainable Food—choosing low impact, local and seasonal diets and reducing food waste.
6. Sustainable Water—using water more efficiently in buildings and in everyday products; tackling local flooding and water course pollution.
7. Land Use and Wildlife—protecting and restoring existing biodiversity and natural habitats through appropriate land use and integration into the built environment.
8. Culture and Community—reviving local identity and wisdom, supporting and participating in the arts.
9. Equity and Local Economy—creating bioregional economies that support fair employment, inclusive communities and international fair trade.
10. Health and Happiness—encouraging active, sociable and meaningful lives to promote good health and well-being.

Each of the following 10 chapters explores one of the guiding principles for the community at UMore Park in depth, highlighting the goals, context, baselines, performance targets, potential strategies and additional relevant concepts to shape and maintain sustainability.

Key elements of each chapter include:

The Goals. Each chapter includes a range of goals that elaborate on the principle. They are broad aspirational statements that define a desired condition to be achieved, based on the specific context of the community. The goals have been identified through the synthesis of community engagement, existing policy, best practices, and sustainability research.

The Local Context. The local context section includes background information that sets the stage for current practice in the region in relation to the principle and answers this question: Why is this principle important to Minnesota and to UMore Park?

The Baselines. Baselines provide data on local, regional, state or U.S. consumption or standard practice.

The Key Performance Indicators. Key performance indicators are measurable performance targets that provide a common basis

for comparison. Generally, key performance indicators seek to “stretch” beyond local baselines.

Strategies. Strategies are potential approaches and actions that can be taken to achieve goals, in pursuit of meeting key performance indicators. Strategies tend to be measures taken during design, construction, and operation, while policies are rules or guidelines (such as leasing requirements) crafted to achieve outcomes during operation. The proposed strategies are not intended to represent a complete set, and are likely to change over time with the demands of the marketplace and innovations in technology.

The Approach for the UMore Park Community

The plan strives to establish a framework for advancing sustainable practices in the development and life of the community at UMore Park. It acknowledges the neighboring communities and the regional context for the UMore Park property as well as significant planning to date. The plan identifies a series of goals to guide community design and development decisions, and explores a variety of mechanisms that could be integrated into planning and the life of the community over time. It also identifies areas and key issues requiring additional research and broader understanding of the regional context and opportunities.

It is important to emphasize that the plan requires periodic updates and revisions to ensure that goals and strategies can meet changing needs in the region, incorporate emerging technologies and best practices and adapt to unforeseen circumstances that could occur over the next 30 years.

The UMore Park property presents challenges to the approach that BioRegional has applied to its five designated *One Planet Communities* worldwide, and to five others that are pursuing its *One Planet Community* highest sustainability certification. The UMore Park planning and development project is differentiated by three key characteristics:

1. **Size of the property.** At 5,000 acres, the UMore Park property is significantly larger than any other designated *One Planet Community* in the world. The size of the property offers potential for a variety of simultaneous activities and residential, commercial and retail development. Size also enables design options such as maximizing green space and activities that could be launched in advance of development. Definitive commitments to performance standards and action steps for the 5,000 acres are a challenge at this time, in the absence of the essential private sector developer partner(s), and without a specific phasing strategy for development. Phased development will be contingent on the joint decisions of the University, the developer partner(s) and others, including local governmental units. Steps toward the aspirational goals stated in this 2012 version of the plan must be enhanced and refined

periodically as development proceeds through multiple phases.

2. **Time line for development.** The time line for development goes hand-in-hand with the size of the property. The plan, based on the ideas of many individuals with local experience and expertise, lays the foundation and mechanisms that could support attainment of goals over time. It is difficult now, however, to anticipate the changing environment and needs over the next 30 years or more. A flexible plan will be refreshed periodically to accommodate demographic changes, state and local policy changes, advances in technology and other innovation, and ways that the University of Minnesota could add value through publicly-engaged research, education and outreach.
3. **Ownership by a public research University.** The UMore Park property is among the largest contiguous properties in the United States that is owned by a land-grant, first-tier research university. The University’s vision to develop the property as a sustainable community founded on the institution’s academic mission is unique. To date, endorsed *One Planet Communities* are significantly smaller in acreage and have been developed on notably shorter time lines. Importantly, the land for these communities has been purchased and developed by private real estate development entities. As a public institution, the University has an abiding commitment to proceed with planning and development through publicly-engaged, transparent processes. It will continue to seek the ideas and partnerships of many in both the public and private sectors, including University faculty, staff and students, and benefit from active citizen participation. Given the critical public nature of this endeavor, it is a challenge to now make long-term action commitments through the plan that will need the benefit of open public discussion and partnership over time.

Despite these three challenges to the BioRegional process, UMore Park offers a unique and unprecedented opportunity for the University to transport its land grant mission into the future. UMore Park is an asset that can generate a wealth of economic, environmental, social and academic benefits, not only for the region and the University but for the State of Minnesota and beyond.

Each chapter of the plan explores a specific yet interrelated aspect of sustainability for the planned community at UMore Park. Several important elements or issues related to planning and development of the community at UMore Park are threaded through the entire plan, including the proposed community sustainability center(s) and related sustainability concierge role, anticipated community governance structures and aggregate mining. These elements are explored in greater detail in the appendices.

EXECUTIVE SUMMARY

The term ‘sustainable’ has been applied over time to a multitude of initiatives, products and programs to describe an approach toward conserving resources or creating a healthier environment. However, given its broad usage, the term has come to mean different things to different people. The University of Minnesota’s strategic planning efforts to explore a best use of its 5,000-acre UMore Park property resulted in a vision to create a new community at UMore Park that would be sustainable. In the November 2006 report “Creating the Vision: The Future of UMore Park,” the UMore Park team defined sustainable development for UMore Park as “integrating environmental, socio-cultural and economic opportunities with a specific focus on innovation in health and wellness, renewable energy, and education and lifelong learning through sustainable design and programs.”¹

This plan reflects the aspirational goals and incremental performance targets for sustainability in the unique, University-founded community at UMore Park. In this publication, the University has identified desired conditions to be achieved in the UMore Park community across the 10 BioRegional principles for sustainability, informed by regional context and requirements, community engagement and local wisdom, as well as national and international best practices and research in sustainability.

Importantly, the University completed a companion publication highlighting aspects of the information that follows. For a short discussion of the most compelling aspects of the 10 principles and aspirational goals, please see The Sustainability Summary: Aspirational Goals for the Sustainable Community at UMore Park.

1. Zero Carbon

Mission Statement

Design and maintain the UMore Park community to achieve carbon neutrality by combining high-performance, energy-efficient building design; efficient distribution of innovative renewable energy sourced from within the community; and on-site carbon sequestration.

Goals

- ZC1 Employ best practices and innovation in land use planning and community designs, in conjunction with local partners, to minimize costs and energy losses over the life of the infrastructure.
- ZC2 Explore innovations with local partners and regional experts to achieve effective and efficient renewable energy generation and use; and enhancements to building energy codes and methods for community-based energy generation and distribution.
- ZC3 Employ district systems to the extent possible to provide electricity and heating and cooling to buildings, and balance energy between diverse uses.
- ZC4 Utilize control systems and metering to allow for maximum control, balance and accountability of energy use by residents and businesses, and employ smart grid technology so that energy can be used efficiently throughout the community.
- ZC5 Support energy-efficient practices for residents through educational programs on ways to monitor and reduce their energy use, generate energy on a micro scale and participate in community-based energy generation.
- ZC6 Employ methods to capture and store (sequester) carbon to offset any carbon produced throughout development and in the community over time.

- ZC7 Utilize building design standards that allow for capture of natural flows of energy including solar and wind energy, natural ventilation, shading and roof slopes for photovoltaic and solar thermal panels.
- ZC8 Explore novel incentives and funding mechanisms for individual property or building owners to generate renewable energy to support the energy demands within the UMore Park community.
- ZC9 Seek partnership opportunities with nearby governmental, commercial and industrial partners to capture waste energy for use in the community.
- ZC10 Incorporate closed-loop systems for organic matter in the community, allowing energy to be extracted before it is composted for soil amendments.
- ZC11 Develop standards for use of new, reused and recycled construction materials to reduce, reuse and recycle to minimize the embodied energy of the material.

2. Zero Waste

Mission Statement

Eliminate waste in the community at UMore Park to the extent practical through prevention, reuse, recycling and recovery, and employ education and programs to promote efficient and effective consumer behavior.

Goals

- ZW1 Minimize waste generation across community and business activities through reduction in product packaging, product stewardship and effective construction practices.
- ZW2 Promote integration of smart waste infrastructure at the individual and community level to stimulate broad-based participation and to accommodate the evolution of the community over time.
- ZW3 Establish educational programs and initiatives to inform and enhance consumer behavior around waste prevention and management.
- ZW4 Strive to foster a community and business zero-waste culture that encourages use of recyclable, compostable products and emphasizes sharing, reuse and swapping initiatives and programs.
- ZW5 Support monitoring strategies to measure the amount of waste diverted from landfill at a community-, neighborhood-, block- and single home-scale to encourage resident and community awareness of achievement or areas for improvement in waste reduction goals.
- ZW6 Foster the location and growth of eco-industries on the site that can utilize community and eco-industrial waste streams as inputs in closed-loop systems.
- ZW7 Reduce and manage construction waste through design specifications, reuse and recycling efforts.
- ZW8 Foster collaborative waste reduction efforts and initiatives with local governments and regional stakeholders.

- ZW9 Explore innovative solutions and emerging technologies to generate and extract energy from waste and reduce greenhouse gas emissions and other pollutants from waste.

3. Sustainable Transport

Mission Statement

Promote innovative, appealing and low-carbon transportation and transit choices for residents of the community at UMore Park and develop related initiatives focused on reductions in transportation-related emissions, through research, creation and evaluation of alternative transportation options.

Goals

- ST1 Minimize the need for personal automobile transportation.
- ST2 Foster reductions in transportation emissions through car-sharing and carpooling, and support the use of alternative automobile-propellant technologies.
- ST3 Strive to foster connections with regional public transit initiatives and explore opportunities for private or quasi-private transportation links to major employment and commercial centers and/or existing transit hubs.
- ST4 Support routine social and economic interaction among residents, local businesses and employers via a community transport system.
- ST5 Support active lifestyles by promoting healthy modes of transportation including walking and bicycling.
- ST6 Incorporate infrastructure and technologies to minimize the need for long-distance business travel.
- ST7 Employ effective land use planning to minimize travel distances for goods and services provided in the community.
- ST8 Foster safe, convenient transportation options for all residents, with special consideration for residents with reduced mobility.
- ST9 Integrate educational programming to demonstrate benefits of more sustainable modes of transportation to the environment, residents' health and reductions in residents' transportation-related expenses.

4. Sustainable Materials

Mission Statement

Maximize the use of low-embodied energy, local, recycled, salvaged and shared materials in the community at UMore Park to reduce the harvest of raw materials and manage local material resources in a sustainable way; and develop new materials and products for use in the community and introduction to outside markets.

Goals

- SM1 Minimize material use to the extent practical through effective design of the built environment, best construction management practices and building material recovery and reuse.

- SM2 Utilize community-scale demand for materials to promote production and use of high-quality, sustainably-manufactured goods from local manufacturers.
- SM3 Foster green-collar jobs in an eco-industrial area on-site in sustainable materials R&D, manufacturing and supply. Explore the creation of a sustainable materials local business incubator.
- SM4 Steward land and resources at UMore Park to produce materials for future use in the built environment of the community.
- SM5 Encourage use of regional and community waste streams to support identification and design of new materials and products.
- SM6 Promote opportunities for research, development, demonstration and evaluation of new, healthy, sustainable materials for buildings and consumer goods in the community.
- SM7 Encourage use of recyclable, compostable and healthier products and promote sharing, reuse and swapping programs for consumer and business goods and products.
- SM8 Establish educational programs and initiatives to inform and enhance consumer behavior around sustainable, healthy materials and products for inside and outside the home.

5. Local and Sustainable Food

Mission Statement

Promote consumer education and healthful diets high in local, seasonal and low-environmental impact foods while addressing local economic development and social interactions in the community at UMore Park.

Goals

- LSF1 Educate residents and individuals that work in the community—through materials, classes and events—on environmental impacts of food production and on diet and nutrition, gardening and preparation of healthy meals that include local foods.
- LSF2 Encourage at-home gardening and food preparation by providing opportunities for residents to grow and harvest their own food on-site through individual and community gardens at multiple locations.
- LSF3 Maximize local food production on-site. Extend seasonal practices to make local foods available year round through greenhouses and related facilities. Connect local food production to on-site processing and sales resources to support economic development and job creation.
- LSF4 Create green-collar jobs, such as coordinators for farmers' markets, edible landscapes, edible schoolyards, gardening parks as well as jobs in local foods restaurants, cafes, grocery stores, markets, vegetable stands, commercial processing, school and hospital kitchens, and in other small business start-ups.
- LSF5 Reduce food waste through education on composting and waste management.

- LSF6 Decrease vehicle miles travelled for food consumed by residents and businesses.
- LSF7 Strengthen food security for all people in and around the community at UMore Park.

6. Sustainable Water

Mission Statement

Conserve water in the community at UMore Park by taking advantage of natural hydrology, integrating water into public areas, and minimizing pollutants and the energy used to treat, cycle and recycle water, based on the recognition of the essential value of water to all human and ecological activity.

Goals

- SW1 Minimize the use of interior water through a combination of low-flow appliances, monitoring and feedback to homeowners, and consumer education.
- SW2 Reduce landscape water use to a minimum, using a combination of natural and/or drought-tolerant vegetation, small irrigated areas and weather-based irrigation systems.
- SW3 Mimic natural hydrology by using a combination of low water use; extensive use of pervious surfaces such as green rooftops, narrow roads and porous pavements; rainwater collection for irrigation and possibly non-potable interior use; and wastewater reuse.
- SW4 Achieve near-zero export of pollutants by a combination of source reduction, particularly for road salt, water softener brine, food (garbage disposal) wastes, fertilizer, pesticides and unnecessary home chemicals; recycling of greywater or wastewater; and isolation of potential pollutants such as blackwater separation to isolate drug metabolites.
- SW5 Minimize the energy used for provision of water and treatment of wastewater through a combination of volume reduction (water conservation, use of rainwater and stormwater), wastewater/greywater reuse, and "natural" wastewater treatment (without mechanical aeration); and by extracting energy from wastewater.
- SW6 Design to achieve multiple uses of water, including reuse and development of recreational and natural water features such as ponds and wetlands.
- SW7 Model optimization of water, energy and waste disposal to achieve the lowest cost solution that meets goals 1 through 6 above. Implement and demonstrate effective emerging technologies and innovations for closed-loop water, energy and waste disposal systems in the community.
- SW8 Utilize an adaptive water system that provides feedback to all water users and community authorities, by collecting real-time water balance information. Provide feedback, with the goal of continuously improving behavior-based conservation.
- SW9 Integrate innovative research, education and outreach programs into the UMore Park water and wastewater infrastructure.

7. Land Use and Wildlife

Mission Statement

Enhance habitat for wildlife, recreation opportunities and the provision of key ecosystem services^a in the community at UMore Park through efficient land use practices, and thoughtful planning of green spaces that emphasizes connectivity, restoration and multifunctionality.

Goals

- LW1 Foster restoration activities to improve habitat for native and desirable species, increase biodiversity, enhance aesthetics and provide resident access to nature.
- LW2 Promote regional connectivity by establishing greenways and wildlife corridors to facilitate wildlife movement and regional recreation.
- LW3 Enhance beneficial ecosystem services through effective natural area design and planning to support water purification, carbon sequestration, air quality improvement, pollination and biological pest control, among others.
- LW4 Increase functionality of green spaces and natural areas throughout the community to serve multiple purposes for added value to humans and wildlife.
- LW5 Employ adaptive management principles to monitor and respond to changes in social and ecological factors.
- LW6 Provide residents with both passive and active recreation opportunities through integrated green spaces, recreation trails, opportunities for wildlife viewing, as well as through athletic fields, parks and playgrounds, indoor green spaces, and areas for companion animals. Education and research should also be integrated with natural spaces and outdoor recreation areas.
- LW7 Emphasize sustainable and efficient land use principles, including preservation of open space, access to nature and multifunctionality in public spaces.

8. Culture and Community

Mission Statement

Enhance, expand and enrich the cultural life of the community by actively engaging citizens, fostering a strong sense of place based on history and unique attributes of the landscape, utilizing regional resources and reflecting the increasing diversity of its residents.

Goals

- CC1 Acknowledge, appreciate and celebrate the history of the UMore Park property within the regional context.
- CC2 Create a sense of place that connects new residents with the land, the history and each other so that UMore Park becomes their community.
- CC3 Reflect community values—knowing others and being known, the ability to shape and guide the evolution

of the community, access to local livelihood and enrichment, and safety and security.

- CC4 Foster integration with existing neighborhoods and communities to produce shared experiences and achieve common goals.
- CC5 Sustain a connection to the earth and environment through integration of green spaces and natural areas as well as personal and community gardening and food production.
- CC6 Encourage residents' participation in the life of the community by creating a community-driven governance structure, providing volunteer opportunities and supporting a system of institutions and organizations that rely on the active participation of their members.
- CC7 Celebrate and reflect diversity as the community seeks to embrace, learn from and provide opportunities for a resident-base that is diverse in every way—in age, gender, ethnicity, race, culture, income, housing, work and recreation opportunities and lifestyles.
- CC8 Emphasize the importance of the arts and culture to nurture the minds and hearts of area residents by providing opportunities for them to experience, participate in and present a broad range of artistic, cultural and intellectual events and activities.
- CC9 Position community sustainability centers across neighborhoods to engage residents and visitors in the culture, history, and future—and the goals for social, economic and environmental sustainability—of the UMore Park community.
- CC10 Foster a relevant and appealing culture of sustainability that is maintained across generations of residents as new opportunities and new challenges arise.

9. Equity and Local Economy

Mission Statement

Provide a diverse range of places to live, work and play in a manner that achieves social, environmental and economic equity in the community at UMore Park.

Goals

- ELE1 Evolve as a robustly diverse community comprised of different ages, cultures and lifestyles that links to surrounding neighborhoods, places of commerce and recreational opportunities in the City of Rosemount, Empire Township and the greater region and is accessible for people with reduced mobility.
- ELE2 Collectively act as a responsible steward of the land.
- ELE3 Feature a socio-economic mix, with both quality affordable and market-rate housing units available in an integrated setting.
- ELE4 Provide opportunities for all residents to actively

^a **Ecosystem services:** "Ecosystem services are the processes by which the environment produces resources that we often take for granted such as clean water, timber, and habitat for fisheries, and pollination of native and agricultural plants." *Ecosystem Services*, Ecological Society of America, http://www.esa.org/education_diversity/pdfDocs/ecosystems-services.pdf (Summer 2000).

- participate in the governance and management of their neighborhoods.
- ELE5** Promote equal access to healthy living including healthy lifestyle and disease prevention information, services, facilities and other amenities.
- ELE6** Foster on-site green collar jobs.
- ELE7** Foster a thriving local commercial sector that sets the example for fair commerce practices and value commercial and retail operations as key community “members.”
- ELE8** Foster living wage^b employment opportunities and a range and diversity of local jobs to help ensure that residents can live and work in the community.
- ELE9** Improve upon the values of equity and fair trade^c over time through evaluation and monitoring.
- HH3** Support the physical and emotional health and wellness of residents by emphasizing active lifestyles, healthy diets and nutrition in community design, access to local, healthy foods, and year-round indoor and outdoor recreational opportunities across mobility levels.
- HH4** Foster a sense of purpose and well-being among residents by promoting civic engagement and participation in initiatives within the community and in the surrounding area.
- HH5** Promote safety for all residents throughout the community utilizing best practices for the built environment as well as community services and neighborhood programs.
- HH6** Accommodate the ever-evolving needs of residents given the uncertainties of health, unforeseen circumstances and changes that occur with aging.
- HH7** Strive to attract businesses and foster job creation within the community and nearby areas to minimize the need for residents to commute long distances to and from work.
- HH8** Foster equity among residents while celebrating and encouraging a resident base that is diverse in every way—in age, gender, ethnicity, race, culture, income, housing, work and recreation opportunities and lifestyles.
- HH9** Facilitate practical conveniences and services to meet residents’ needs in proximity to their homes, encouraging healthy modes of transport.

10. Health and Happiness

Mission Statement

Provide the means for all residents in the community at UMore Park to live safe, happy, healthy lives marked by active minds and bodies, community engagement and social connectedness.

Goals

- HH1** Promote a strong sense of community and community connectedness through interpersonal contact and socialization opportunities that appeal to broad human interests and produce shared experiences and creative expressions.
- HH2** Promote the health of all residents through access to healthy lifestyle and disease prevention education, initiatives and services.

^b **Living wage:** “An above market wage mandate set at upwards of \$15 an hour. Traditional living wages apply only to government employees or employees of companies that contract with governments. Recently, efforts have been made to expand the reach of these ordinances to all local businesses.” *Glossary: Living Wage*, Employment Policies Institute, http://epionline.org/lw_glossary_list.cfm?gid=1 (2011).

^c **Fair trade:** “Fair trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South. Fair trade organizations, backed by consumers, are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade.” “What is Fair Trade?” Fair Trade Advocacy Office, http://www.fairtrade-advocacy.org/index.php?option=com_content&view=category&layout=blog&id=69&Itemid=143 (2010).

See also the University of Minnesota Board of Regents policies:

Policy on Equity, Diversity, Equal Opportunity and Affirmative Action, University of Minnesota Board of Regents, http://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html (July 2009).

Policy on Purchasing, University of Minnesota Board of Regents, <http://www1.umn.edu/regents/policies/financial/Purchasing.pdf> (July 2008)

PRINCIPLES OF SUSTAINABILITY

1. ZERO CARBON

Mission statement

Design and maintain the UMore Park community to achieve carbon neutrality by combining high-performance, energy-efficient building design; efficient distribution of renewable energy sourced from within the community; and on-site carbon sequestration.

Approach

An integrated planning process for the community at UMore Park seeks to balance energy efficiency requirements and renewable energy production capabilities with the marketability and livability of the community. As energy loads are reduced, on-site renewable energy generation should be maximized within the constraints of the on-site energy flows, available technologies and current energy regulations. For energy demands above what can be renewably produced on-site, synergetic partnerships and collaborations can be explored to utilize regional waste heat and energy and temporary off-site resources until a more local resource can be identified.

Importantly, participation and engagement of UMore Park community residents is integral to achieving carbon neutrality including ensuring that residents are aware of their energy use and the related-costs. Resident engagement in the zero carbon goals could include incentives and opportunities for micro-generation within the community as well as education, programming and services to support energy efficient buildings and lifestyles.

Energy solutions could be sought that offer the most cost-effective means, flexibility and enhanced community value to reduce the carbon footprint of the built environment to zero over the course of development. It is envisioned that strategies

will evolve over time as community development proceeds and with the advent of new technologies.

Goals

- ZC1 Employ best practices and innovation in land use planning and community designs, in conjunction with local partners, to minimize costs and energy losses over the life of the infrastructure.
- ZC2 Explore innovations with local partners and regional experts to achieve effective and efficient renewable energy generation and use; and enhancements to building energy codes and methods for community-based energy generation and distribution.
- ZC3 Employ district systems to the extent possible to provide electricity and heating and cooling to buildings, and balance energy between diverse uses.
- ZC4 Utilize control systems and metering to allow for maximum control, balance and accountability of energy use by residents and businesses, and employ smart grid technology so that energy can be used efficiently throughout the community.
- ZC5 Support energy-efficient practices for residents through educational programs on ways to monitor and reduce their energy use, generate energy on a micro scale and participate in community-based energy generation.
- ZC6 Employ methods to capture and store (sequester) carbon to offset any carbon produced throughout development and in the community over time.
- ZC7 Utilize building design standards that allow for capture of natural flows of energy including solar and wind energy, natural ventilation, shading and roof slopes for photovoltaic and solar thermal panels.
- ZC8 Explore novel incentives and funding mechanisms

for individual property or building owners to generate renewable energy to support the energy demands within the UMore Park community.

- ZC9 Seek partnership opportunities with nearby governmental, commercial and industrial partners to capture waste energy for use in the community.
- ZC10 Incorporate closed-loop systems for organic matter in the community, allowing energy to be extracted before it is composted for soil amendments.
- ZC11 Develop standards for use of new, reused and recycled construction materials to reduce, reuse and recycle to minimize the embodied energy of the material.

Local Context

- In 2009, Minnesota used 1.810 trillion British thermal units (Btu) of energy. By sector, energy use was as follows: 408,064 billion Btu by residential; 352,319 billion by commercial; 576,723 billion by industrial; and 472,403 billion by transportation.¹
- In Minnesota in 2009, carbon dioxide (CO₂) emissions from fossil fuel combustion totaled 92.24 million metric tons (MMt) of CO₂. Of these emissions, 6.29 resulted from commercial energy use; 14.98 from industrial; 8.93 from residential; 32.20 from transportation; and 29.85 from electric power.²
- Activities in Minnesota, including energy use, industrial non-fuel use processes, agriculture, waste management, forestry and land use, accounted for approximately 159.4 MMt of gross CO₂ equivalent (CO₂e) emissions (sources, or positive emissions) in 2008, an amount equal to about 2 percent of total U.S. gross greenhouse gas (GHG) emissions.³
- Rising faster than those of the nation as a whole, Minnesota's gross GHG emissions increased about 32 percent from 1990 to 2005, while national gross emissions rose by only 16 percent during this period.⁴ The growth in Minnesota's emissions from 1990 to 2005 is primarily associated with increases in emissions from the electricity supply and transportation sector. From 2005 to 2008, GHG emissions in Minnesota declined by 1.9 MMt, a 1.2 percent reduction.⁵
- From 1990 through 2005, electricity generated by coal-fired power plants in Minnesota accounted for 64 percent to 68 percent of total in-state generation and nuclear power, generated by two nuclear power plants near the Twin Cities, accounted for 25 percent to 30 percent of total in-state generation.⁶ Wind contributes nearly five percent of Minnesota's electricity production. The state generates electricity from other renewable sources as well, including hydroelectric dams, municipal solid waste, landfill gas and wood waste, which together contribute minimally to the state's total electricity production.⁷ The consumption of imported electricity has increased from 12 percent of total Minnesota demand in 1990 to 27 percent of total Minnesota demand in 2005.⁸
- Minnesota's coal-fired power plants receive most of their coal supply by rail from Montana and Wyoming.⁹
- Over two-thirds of Minnesota households use natural gas as their primary heating fuel.¹⁰
- Minnesota has no fossil fuel resources.¹¹
- Minnesota is among the nation's top producers of ethanol, with over a dozen corn-based production plants located primarily in the southern part of the state and with additional facilities under construction.¹²
- In 2009, Minnesota implemented one of the most stringent commercial building codes in the country. It combines best construction practices with acceptance testing to ensure that systems are working properly. Minnesota's new commercial building code will achieve a 30 percent better energy performance over a typical commercial building.¹³
- The Minnesota legislature overwhelmingly passed a bill in February 2007, requiring the state's utilities to generate at least 25 percent of their electricity from renewables by 2025. The mandate also requires Xcel Energy, the provider of about one-half of the state's electricity, to have one-third of its total power come from renewable sources by 2020. Under the new law, Minnesota will add between 5,000 to 6,000 megawatts of new renewable energy. This legislation is expected to reduce CO₂ emissions by about 16 percent over what they would otherwise have been if the bill had not passed.¹⁴
- The State of Minnesota, Hennepin County, and the Midwest Governors Accord have all committed to reduce emissions below 2005 levels by the following amounts: 15 percent by 2015, 30 percent by 2025 and 80 percent by 2050.¹⁵
- As of 2009, 969 U.S. Mayors had signed the U.S. Conference of Mayors Climate Protection Agreement, which says they will strive to meet or beat the Kyoto Protocol targets for greenhouse gas emissions of seven percent below 1990 levels by 2012 for their own communities. Included in the list of Minnesota cities are Apple Valley, Burnsville, Eagan, Inver Grove Heights, Rosemount and Sunfish Lake.¹⁶
- Dakota County has been a member of the Metropolitan Energy Policy Coalition (MEPC) since 1999. The MEPC is a forum of Twin Cities metropolitan counties assembled to address issues related to energy policy and industry restructuring by identifying key interests and issues to county government.¹⁷
- Dakota County was the first county in Minnesota to complete a government operations greenhouse gas inventory. The inventory found that in 2005, Dakota County government operations emitted 27,120 metric tons of CO₂. More than two-thirds of these emissions were attributed to building energy use via electricity and natural gas consumption. County transportation activities, including fleet travel and employee commute, were the second most significant sources of GHG emissions associated with internal operations, representing approximately one-third of the total.¹⁸
- In 2008 and 2009, Dakota County Commissioners included planning and action on energy use in their annual goals. In 2009, the goal stated: "Achieve a reduction in greenhouse gas

emissions and support transition to alternative/renewable energy by adopting and implementing a County energy plan and related sustainability strategies.¹⁹

- Dakota County jointly owns a hydroelectric facility with Goodhue County at the Lake Byllesby Dam. The facility generates 9,200 megawatt hours of electricity a year which is sold to Xcel Energy. In addition, the County operates a 39 kilowatt wind turbine in the Spring Lake Regional Park adjacent to the Schaar's Bluff Gathering Center. The energy generated by the turbine is first directed to the building for electricity and any excess electricity generated is sold to the power grid.²⁰
- Minnesota Sustainable Building 2030 (SB 2030) is a voluntary, progressive energy conservation program to significantly reduce the energy and carbon in Minnesota commercial, institutional and industrial buildings. This program calls for zero carbon buildings by 2030 through the gradual reduction of fossil fuel use in buildings in five year increments until 2030, when only renewable energy will be allowed. The local gas and electric utility, Xcel Energy, has adopted the SB 2030 program goals.²¹
- The State of Minnesota established Sustainable Building Guidelines: Buildings, Benchmarks, and Beyond (B3) are mandatory guidelines for all new buildings receiving state funding. There is good data available on energy use in buildings at the University of Minnesota and through the B3 Benchmarking Tool.²²

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to support carbon neutrality and enhance citizens' quality of life. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world. The University's Office for UMore Park Academic Initiatives is responsible for seamlessly integrating University research, teaching and learning, and outreach into planning and development in ways that add value to the property and enrich the community.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could

have expertise and interest in collaborative efforts to achieve sustainability in energy use and demand in the community at UMore Park:

Other potential stakeholders could include:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Local and regional energy utilities.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Non-profit organizations especially focused on energy policy and renewable energy generation.
- Local businesses, industry and commercial operations.
- Professional organizations and associations with emphases and expertise in aspects of design, development, construction and sustainability.
- Local energy efficiency supply and construction companies.

Site features

- The UMore Park property has good access to regional highways and transportation routes.
- A 2.5 megawatt wind turbine was commissioned fall 2011 on the UMore Park property for research and education programs focused on increased efficiency of turbines through turbine design and operation.
- The UMore Park property is suited for a variety of renewable energy sources such as solar, wind and biomass, as well as ground source heating and cooling.
- The large size of the property and infrastructure required by energy utilities may support creation of local district utilities.

Opportunities for innovation

Existing requirements

- Opportunities exist to achieve higher energy code standards than current Minnesota State Energy Code. However, additional analysis is needed to explore means of establishing a more rigorous community energy code.
- The community at UMore Park can provide the means to demonstrate benefits of implementing renewable-generated

energy at a community scale including increasing the net metering 39 kilowatt limit for individual properties as well as exploring sale and sharing options among community members for energy generated on properties in the community.

- A new model for mixed-use development to support energy sharing and energy balancing across the community can demonstrate potential effective modifications to current zoning regarding land uses.
- Development of the community at UMore Park can benefit the local design and construction professional community, generating additional expertise and experience creating net-zero carbon residential, commercial and industrial buildings in Minnesota's climate.
- Costs and length of payback time associated with renewable energy and energy efficient technologies and construction techniques can produce a disincentive to adoption.

Site conditions

- The UMore Park property infrastructure is not well connected to the community around it and might require significant investment if not designed with district systems.
- The property is not located near major employment centers, thus requiring commuting.
- The climate in Minnesota has an 140 degree swing from coolest to warmest temperatures due to its location in the middle of a large continent, experiencing what is known as the "continental effect." Also, winters are cool and dry and summers are hot and humid. Weather conditions make it challenging to employ natural ventilation.

Research and knowledge creation

- Market research on the housing and commercial markets perceptions of the value of low-energy, carbon-free living and working would provide valuable insights to inform community designs and marketing efforts.
- Research is needed to identify techniques, mechanisms and incentives for effective measurement and monitoring of zero carbon buildings on a community level, given the potential significant variety of building types.
- Additional analysis can help to identify the benefits and incentives for renewable energy at individual, district and community scales.

- Research is needed to explore opportunities and potential collaborations for waste heat capture in the region to produce energy for the community at UMore Park.

Baselines for key performance indicators

Carbon emissions

- On a per capita basis, Minnesotans emitted about 30 metric tons of CO₂e emissions in 2005, compared to the national per capita average of about 24 tons of CO₂e in 2005.
- The baseline for CO₂e emissions per capita for buildings is estimated as 14.8 tons.^a
- The baseline for performance targets is the equivalent of the energy requirements of average Minnesota building built in 2003, as determined by the Minnesota Sustainable Building 2030 Energy Standard Calculator.^b

Energy from waste

- Approximately 20 percent of municipal waste in the Twin Cities metropolitan region is diverted to energy recovery facilities for conversion to energy.

On-site energy generation and monitoring

- Currently, there is no on-site production of renewable energy at UMore Park. However, the 2.5 megawatt turbine constructed in the fall of 2011 at UMore Park for wind energy research and education can produce enough energy to power up to 700 homes.

Key performance indicators

Carbon emissions

- Demonstrate reductions in carbon emissions over the course of development to achieve carbon neutrality in buildings by 2030.
- Reduce carbon emissions from buildings to zero using the Minnesota Sustainable Buildings 2030 milestones and percentage reductions below. (Note: The initial reduction in the first phase of 60 percent in Energy Use Intensity and Carbon Emission Intensity from 2003 levels can be achieved in buildings in Minnesota through the integration of energy efficient appliances and related available and cost-effective technologies.)

^a This baseline was calculated as follows: Of 30 tons of per capita emissions, 34 percent of emissions are from electrical use and buildings consume 70 percent of all electricity in the state, 20 percent resulted from heating of buildings and three percent from waste. So 30 tons (.34*.70) for electrical + 20 percent heating + 3 percent waste + 2.5 percent fuel production = 49.3 percent of 30 tons or 14.8 tons.

^b The Energy Standard Tool is a non-biased energy modeling tool that benchmarks each proposed building with or against itself. Therefore, special energy considerations of the building program can be considered with each of the buildings and these special energy considerations are treated similarly with each project.

Reduction Phases	Percentage Energy Use Intensity (EUI)* Reduction from an average Minnesota Building in 2003 as determined by the SB 2030 Energy Standard Tool (saving)	Percentage Carbon Emission Intensity (CEI)* Reduction from an average Minnesota Building in 2003 as determined by the SB 2030 Energy Standard Tool (saving)	Tons of CO ₂ e Greenhouse Gases Emitted per Person per Year in Buildings
Baseline	--	--	14.8
First phase	60 percent	60 percent	5.9
Second phase	70 percent	70 percent	4.4
Third phase	80 percent	80 percent	3.0
Fourth phase	90 percent	90 percent	1.5
Final phase	100 percent	100 percent	0

*EUI is measured in kBtus/square foot/year

*CEI is measured in pounds of CO₂e/square foot/year

Energy from waste

Extract energy from available organic matter including agricultural bi-products, household organic waste, commercial organic waste and industrial organic waste.

Reduction Phases	Percentage of the total organic waste created that will be recycled and used for renewable energy (bio-gas) and soil amendment each year in the UMore Park community
Baseline	0 percent
First phase	30 percent
Second phase	70 percent
Final phase	100 percent

On-site energy generation and monitoring

- Design accommodations should be made for all residential, commercial and industrial structures to provide between 30 to 50 percent of their total annual consumption from active thermal solar heating and photovoltaic energy.
- Ensure that community built-environment designs can accommodate future community-based renewable energy generation and distribution to make up the remaining heating and electrical supply, to achieve zero carbon design and operations.
- Foster integration of smart grid technologies and infrastructure including smart meters and a user interface in all buildings in the community.

Monitoring plan

An important step in demonstrating effective design and construction in the community is ongoing monitoring of energy use. Through collaborative partnerships and unique research and education activities, a variety of monitoring and evaluation

techniques should be utilized as the community unfolds, such as:

- Monitor energy use in buildings at UMore Park for at least 10 years after completion. If a building is using more energy than the design standard, explore and identify solutions in conjunction with building owners.
- Develop a community-wide CO₂e tracking program for all carbon producing emissions that will illustrate the total annual carbon emission for the community in each sector of the built environment (residential, commercial, industrial, transportation, etc.).
- Report total emissions from buildings at UMore Park annually on a gross and per capita basis.
- Integrate in-building metering that illuminates total household greenhouse gas emissions on an annual basis to create a positive feedback loop to help occupants improve their sustainable practices.
- Ensure that each community authority or association can have access to actual energy data in their sector in order to support strategies for reducing both energy and carbon.

Design strategies

Strategies for achieving carbon neutrality in the planned UMore Park community integrate designs for the built environment, enhancements to existing requirements, community-based systems, organic and other waste energy recovery, and carbon sequestration, throughout the planning and development of the community as well as over time.

Goals	Design strategies	Milestones
ZC1 ZC3 ZC7	Design land use patterns for effective land use mix, building density, massing, orientation and open space to optimize infrastructure cost and energy needs.	Planning phases.
ZC1 ZC4 ZC5	Design and construct well-designed model home(s) to demonstrate, educate and promote low and zero-carbon living.	Design phases.
ZC1 ZC2 ZC7	Establish design guidelines for residential, commercial and industrial properties and buildings in the community to support solar orientation, wind access, landscaping for microclimate regulations and to accommodate natural ventilation.	Design phases.
ZC11	Promote use of sustainable materials and design buildings with emphasis on standard dimensions of materials in order to avoid the need to cut materials, reducing material waste and construction time.	Design phases.
ZC4	Explore control systems to integrate into homes and buildings to reduce phantom energy loads.	Design phases.
ZC1 ZC9 ZC11	Explore designs and building site orientations for maximum reduction in heating, cooling and electrical requirements such that each residential structure has an Energy Use Intensity (EUI) of 20 kBtus per square foot per year; each commercial structure has an EUI of 30 kBtus per square foot per year; and each industrial structure has an EUI of 40 kBtus per square foot per year.	Design phases.
ZC4 ZC5	Explore partnerships around innovations and incentives for metering energy use by dwelling unit (DU) and building for energy reduction.	Planning phases.
ZC2 ZC3 ZC8	Explore challenges and rewards for allowing adoption of a community-based energy code that requires additional energy efficiency such that all buildings are designed to run on only renewable energy or to be converted to only renewable energy as it becomes available on-site.	Planning phases.
ZC2 ZC3 ZC8	Explore opportunities for generation and distribution of renewable energy from individual properties to a community-based energy organization or to other properties.	Planning phases.
ZC2 ZC3 ZC9	Evaluate the feasibility of establishing a community-based district heating, cooling and electrical plant(s) to service residential and non-residential buildings.	Planning phases.
ZC1 ZC2 ZC3	Explore models for integration of district heating and cooling plant(s) based on the most energy and cost-effective technologies available. Loop district systems together for greater efficiency.	Design phases.
ZC1 ZC2 ZC7 ZC10	Study the on-site renewable energy production potential including wind, biomass/biogas cogeneration and solar to evaluate the opportunity for site-generated electricity. Explore electrical storage opportunities for peak-load reduction. Develop an energy cost pro-forma to evaluate the impact of renewable electricity costs and benefits.	Planning phases.
ZC2 ZC3	Develop a plan for combining heat and power at a district scale for residential and commercial facilities.	Planning phases.

ZC2 ZC3 ZC9 ZC10	Create a plan for providing on-site renewable electrical power in excess of the available solar photovoltaic capacity using electrical generation from bio-diesel, gasification of biomass from on-site and nearby sources or methane production from food and human waste.	Planning phases.
ZC1 ZC2 ZC3 ZC4 ZC7	Incorporate capacity and flexibility in first phase infrastructure design to allow buildings to be serviced from district heating, cooling and electrical systems, if feasible. Design buildings to accommodate future photovoltaic and integrated solar thermal systems.	Planning and design phases
ZC1 ZC7	Employ passive solar heating where appropriate for residential, commercial and industrial building energy generation.	Design phases.
ZC2 ZC3 ZC9 ZC10	Design a closed-loop system to produce bio-gas renewable energy from organic waste created on-site, and utilize the byproduct for community soil amendments. Explore closed-loop systems design at a small individual home or business scale and/or a neighborhood or community scale.	Planning and design phases.
ZC9 ZC10	Identify necessary infrastructure and programs to support conversion of community organic matter to bio-gas and compost for soil amendments.	Design phases.
ZC9	Evaluate the feasibility of waste heat recovery opportunities with nearby government, commercial and industrial organizations to complement on-site renewable energy production.	Planning phases.
ZC1 ZC6 ZC11	Explore appropriate on-site carbon sequestration methods, including carbon sinks, to offset the carbon intensity of construction materials and development-related activities.	Planning phases.

Construction strategies

Goals	Construction strategies	Milestones
ZC1	Strive to achieve equal or lower carbon intensity for construction electricity than electricity currently supplied to the site. Avoid burning diesel or other fossil fuels on-site to produce temporary power.	Construction phases.
ZC1	Encourage use of bio-gas fueled construction vehicles.	Construction phases.
ZC11	Identify alternatives with materials suppliers for transport of construction materials by less carbon-intense means.	Construction phases.
ZC11	Foster on-site manufacturing of construction materials, if possible, to reduce waste.	Construction phases.
ZC11	Order construction materials to the length and width required by the design to reduce cutting and material waste.	Construction phases.
ZC10	During construction, recycle all organic waste into a closed-loop system to extract renewable energy and soil amendments.	Construction phases.

Community life strategies

Lifestyle and behavior changes are fundamental to achieving community sustainability in energy use and carbon emissions. Community members can be actively engaged in reducing community energy demands through access to energy use data and educational programs and participation in community-based and individual energy generation initiatives.

Goals	Promoting sustainable behaviors	Milestones
ZC4 ZC5	Place energy meter in a highly visible location in each dwelling unit, providing data to consumers in accessible, easy-to-read and comprehensible formats.	Design phases.

Goals	Education and engagement	Milestones
ZC4 ZC5	Conduct an ongoing education program to promote efficient energy use and reductions in carbon emissions. Programs and services to provide guidance and education on energy reduction strategies and means to decrease peak electrical loads could be coordinated through the community sustainability center(s) and website. The community sustainability center(s) could facilitate bulk ordering or purchase of low cost, energy-efficient consumer products such as light bulbs, appliances, and solar and wind technology.	By phases of occupancy.
Goals	Community website and communications	Milestones
ZC4 ZC5	Explore development of an energy website/weblog which could include the following functions: <ul style="list-style-type: none"> • Allows people to share stories and links to information about energy efficiency including appliances, emerging technologies and best practices. • Allows residents and property owners to monitor their energy use alongside data for comparable properties. • Informs residents of energy-saving devices and practices. • Reports community energy use and the average energy use for each of the community carbon producing sectors. This data should be in an easy-to-understand format and encourage residents to reduce carbon emissions. • Demonstrates success and gaps toward achieving zero carbon goals. 	By phases of occupancy.
Goals	Collaborative opportunities	Milestones
ZC2 ZC5	Explore collaborative relationships for establishing a community-based energy services and utility company.	Planning phases.
ZC9	Explore relationships with nearby government, commercial and industrial organizations for waste heat recovery for use in the UMore Park community.	Planning phases.

Management plan strategies

Key policies can encourage an energy-efficient and sustainable built environment for residents and organizations, and also ensure fair and equitable opportunities for businesses and retail operations.

Goals	On-site policies and property management	Milestones
ZC1 ZC10	Ensure a viable base load for district systems allowing all buildings the option to tie into the district energy system unless they are self-sufficient and net-zero for all energy needs.	By phases of commercial and residential occupancy.
ZC4 ZC5	Explore tiered energy pricing depending on the amount and time of day the energy is used and to the amount of carbon emissions produced. Higher rates could apply at peak energy consumption and carbon emission times and as the cumulative consumption rises in a given billing period.	Planning phases.
ZC5 ZC8	Create opportunities for residents to invest in the creation of renewable energy either on-site or off-site.	By phases of occupancy.
ZC5	Create a comprehensive and detailed plan for a Zero Carbon Property Management education campaign. These education efforts could include a Zero Carbon Property Manager Certificate to facilitate education on zero carbon building management. Additionally, explore formation of a cooperative association for the purchase of low cost or bulk ordering of energy efficient consumer products such as light bulbs, appliances, solar and wind technology, and cleaning products. This cooperative could provide guidance and education on energy reduction strategies and means to decrease peak electrical loads.	By phases of occupancy.

ZC2 ZC6 ZC8	Seek commercial and industrial community members with a strong commitment to reducing energy use and carbon emissions through on-site renewable energy production for energy use and the purchase of carbon offsets.	By phases of commercial occupancy.
ZC4 ZC5	Provide opportunities for building owners and managers to share best practices for reducing energy use either on-line or in-person.	By phases of occupancy.
ZC5 ZC8	Explore formation of a standard metering plan and lease agreement for building tenants such that everyone using energy will pay for their own energy use tracked by the community-wide CO ₂ e tracking program.	Design phases.

HR plan and job creation

Strategies for achieving sustainability in energy production and efficiency across the UMore Park community include opportunities for creation of new jobs, both short- and long-term. Specific job opportunities related to this principle include:

- Consultants to assist in development of plans for community renewable energy production and community-based heating and cooling and electricity plants.
- Construction, operations and maintenance positions for on-site, renewable energy or district heating, cooling and electricity plants.
- Unique manufacturing, construction and operations jobs to construct energy-efficient residential housing, and retail, commercial and industrial buildings on the property.
- Sustainability concierge(s), educators and trainers to support programs and services for residents, property owners and commercial and industrial tenants around energy-efficient practices and technologies.
- Property managers and maintenance staff to support zero carbon buildings operations.
- Researchers to assess the ongoing performance of the UMore Park community against goals.

Synergies

- Zero Carbon and Sustainable Water. The use of local sustainable water will reduce the operational carbon footprint by providing and treating water resources closest to the user. Closed-loop water management strategies for the community at UMore Park can substantially reduce energy use and carbon emissions.
- Zero Carbon, Sustainable Materials and Zero Waste. Nearly 10 to 15 percent of the total energy use of a building over its life is contained in the building materials consisting of the amount of energy required to manufacture these materials and any waste that results from excess materials and deconstruction. However, minimizing the consumption of building materials and maximize their reuse can reduce the amount of construction and deconstruction waste.
- Zero Carbon and Land Use and Wildlife. Community land use planning is critical to provide beneficial solar orientation and wind access. These two natural flows of energy that freely flow across the site could account for 70 percent of all the energy required by residential homes. Similarly, UMore Park's green spaces can support carbon capture and storage

(sequestration) to offset carbon emissions. These so-called "carbon sinks" can be used for a variety of other uses such as stormwater cleaning areas, natural habitats or prairie grass fields.

- Zero Carbon, Local and Sustainable Food, and Zero Waste. Growing local, healthy foods can support carbon sequestration if the organic products are composted and returned to the soil as supplements. This closed-loop organic composting system could produce a low-carbon energy source as well as sequestering the carbon into the soil, making it more resilient and fertile.

Strategic positioning

Community benefits

- Residents and property owners benefit from reduced energy costs resulting from high-efficiency buildings.
- Living environments are improved through the use of healthy, sustainable building materials. Neighborhood and community green spaces can provide residents an enhanced quality of life while supporting carbon sequestration, wildlife habitat, local food production and other environmental benefits.
- Residents and community members can learn and participate in community-based energy generation and energy efficient practices.
- Planning with energy minimization may result in a more cohesive and connected community infrastructure, helping people connect with each other.

Environmental benefits

- Eliminating greenhouse gas emissions from buildings and the built environment can help to slow climate change and related environmental implications.
- Carbon reducing practices can improve the air quality in the UMore Park community.
- Fresh, healthy foods grown on-site can sequester carbon. Local native grasses and abundant urban trees will provide aesthetic landscapes for local residents and sequester carbon.
- Local district energy systems provide reasonable cost, power and heat, and reduce carbon emissions into the environment.

Marketing

- There are currently no carbon neutral communities in the United States. UMore Park could be a model sustainable

- community both nationally and internationally.
- Create public awareness of the process, cost, benefits and value of achieving the goals of zero carbon.
- Demonstrate opportunities to participate in the energy future by investing in renewable energy that will be reliable, cost neutral and abundant.

- ◆ Combined Heat and Power (CHP) plants.
- ◆ Ground-source heating and cooling systems.
- ◆ Stormwater, water and wastewater systems.
- ◆ Small biomass refineries.
- ◆ Smart grids and micro-grids to manage electric energy distribution.
- ◆ Solar installations for electricity and thermal heating.

Wider community and municipal engagement

During community engagement process

- Collaborate with the surrounding communities and local units of government around regional opportunities for the following renewable energy technologies:
 - ◆ Wind resources for electrical production.
 - ◆ Organic waste recovery to produce fuel and energy.

Post first occupancy

- The broader community should receive regular updates on the success of the UMore Park community toward achieving the goals for sustainability and on any decisions or details pertaining to the development of renewable energy.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is that all buildings will be energy efficient and run completely from renewable energy.

One Planet common international targets

In order to achieve zero carbon, all buildings and structures will either be designed to be net zero carbon (capable of being powered by renewable sources) or constructed to adopt net zero carbon by 2030; powered and heated by a combination of on- and off- site renewable energy, using the power grid only as a storage battery and perhaps as a backup energy source. However off-site renewable energy sources are to be temporary in nature until on-site resources can be obtained. In any truly sustainable community, it must learn to live within its own resources.

All buildings and structures are designed or retrofitted to be net zero carbon energy efficient to the highest, country-specific best practice standards and assessed using a specified green building standard. However, these do not need to achieve the highest ratings in these systems where the costs outweigh the environmental benefits.

Having minimized energy demand through good design and energy efficiency measures, the remaining energy demand (including all electricity demand from plug loads) will be met by renewables, for example wind, solar, ground source heating and cooling, and biomass. Consideration is given initially to on-site renewable energy generation, particularly heat and hot water to determine if it is practical and economically feasible. Adequate levels of on-site generation will be assessed on a project-by-project basis but all opportunities for renewable generation should be considered.

There should not be any fossil fuel energy supplies on-site except as a backup to the renewable supply. Any remaining energy demands may be met from off-site renewable energy that, where possible, represents newly installed capacity, or purchased through renewable energy power agreements. However, these off-site resources would be only temporary until a local resource could be developed because a truly sustainable community learns to live within its resources.

One Planet national and international context

Each person in the United States is responsible for about 22 tons of CO₂ emissions each year, of which 4.5 tons per person (about 17 percent of total U.S. emissions) results from energy consumption in their homes. CO₂ contributes to global warming, which is predicted to result in a rise in global temperatures between 1.4° and 5.8° by 2100. This rise affects our weather patterns and sea levels, damaging the ecosystems upon which we depend, and increasing the frequency of natural disasters. This trend has already begun. The years 1998, 2005 and 2010 were the hottest years on record globally, and the 10 years from 2001 to 2010 are the highest ever recorded for a 10 year period.

2. ZERO WASTE

Mission statement

Eliminate waste in the community at UMore Park to the extent practical through prevention, reuse, recycling and recovery, employing education and programs to promote efficient and effective consumer behavior.

Approach

The approach for eliminating waste in the UMore Park community acknowledges how waste is created, seeking solutions at the individual- and family-scale up through businesses and the broader community. The community at UMore Park can employ processes and educational programs that support effective reuse and recycling of domestic and construction waste, recovering usable elements and energy from waste to meet the needs of other community systems.

The approach for the UMore Park community seeks to optimize strategies based on cost and environmental benefits, community function and ease of implementation. A comprehensive, community-wide waste management system and related strategies will evolve over time given considerations for economies of scale, phased development and capacity for technological innovation and advancement.

Goals

- ZW1 Minimize waste generation across community and business activities through reduction in product packaging, product stewardship and effective construction practices.
- ZW2 Promote integration of smart waste infrastructure at the individual and community level to stimulate broad-based participation and to accommodate the evolution of the community over time.

- ZW3 Establish educational programs and initiatives to inform and enhance consumer behavior around waste prevention and management.
- ZW4 Strive to foster a community and business zero-waste culture that encourages use of recyclable, compostable products and emphasizes sharing, reuse and swapping initiatives and programs.
- ZW5 Support monitoring strategies to measure the amount of waste diverted from landfill at a community-, neighborhood-, block- and single home-scale to encourage resident and community awareness of achievement or areas for improvement in waste reduction goals.
- ZW6 Foster the location and growth of eco-industries on the site that can utilize community and eco-industrial waste streams as inputs in closed-loop systems.
- ZW7 Reduce and manage construction waste through design specifications, reuse and recycling efforts.
- ZW8 Foster collaborative waste reduction efforts and initiatives with local governments and regional stakeholders.
- ZW9 Explore innovative solutions and emerging technologies to generate and extract energy from waste and reduce greenhouse gas emissions and other pollutants from waste.

Local Context

- In the United States and in Minnesota, solid waste is defined by the U.S. Environmental Protection Agency as any material that is discarded including materials abandoned, recycled or inherently waste-like and/or disposed of as a waste (hazardous, buried, burned, etc.). Recyclable materials are treated as solid waste while accumulated,

stored and treated before they are recycled.¹

- In Dakota County, mixed municipal solid waste (MSW) is defined in as garbage refuse and other solid waste from residential commercial, industrial and community activities that the generator of the waste aggregates for collection.² Solid waste is defined as “garbage, refuse, sludge from water supply treatment plant or air contaminant treatment facility or other discarded waste materials and sludges in solid, semisolid, liquid or contained gaseous form, resulting from industrial, commercial, mining, agricultural operations and community activities.”³
- In Dakota County, recyclable materials are defined as “materials that are separated from solid waste for the purpose of recycling including but not limited to paper, glass, plastics, metals, automobile, oil, and batteries.”⁴
- Dakota County hosts the only two sanitary landfills in the seven county metropolitan area, making it a net importer of waste. The county also hosts a major industrial waste landfill, as well as several demolition debris landfills and composting facilities making it one of two counties in the metropolitan area that have a significant net inflow of waste material.⁵
- Dakota County has adopted a Minnesota-established solid waste management hierarchy that prioritizes policy preference and incentives regarding wastes from most to least preferred.⁶
 1. Waste reduction and reuse.
 2. Recycling.
 3. Composting of yard waste and food waste.
 4. Resource recovery, including waste-to-energy.
 5. Landfilling with methane recovery.
 6. Landfilling without methane recovery.
- The Minnesota Pollution Control Agency (MPCA) acknowledges that although landfilling without processing is a last resort, there will always be a need for landfilling.⁷ The 2011 Metropolitan Solid Waste Management Policy Plan 2010-2030 sets forth policy goals and metrics for reducing waste generation, increasing recycling and reducing landfilling.
- The current Dakota County Solid Waste Management Plan includes an emphasis on product stewardship as a means to shift management of waste and policy upstream from government to the producers of these materials. This concept is based on the fact that the total societal cost of a product is not fully embedded in the price of the product; instead it falls upon local government and taxpayers.⁸
- According to the MPCA, despite the recent downturn in the economy and its dampening effect on waste generation, over the past 10 years the following solid waste trends are apparent: “municipal waste generation has continued to climb; recycling rates (about 40 to 50 percent of waste stream) have not increased enough to counteract waste generation; resource recovery facility usage has declined; and landfilling has been on the rise.” These trends are expected to continue, particularly as the economy picks up again.⁹
- Solid waste activities are regulated by the MPCA, while

cooperative waste management goals within the Twin Cities metropolitan area are developed by the Solid Waste Management Coordinating Board (SWMCB). The board publishes a comprehensive solid waste management plan and annual reports. Individual counties contribute their planned initiatives and goals for each five year period. The current five year revision for Dakota County is in progress.¹⁰

- Waste policy in and around UMore Park is administered primarily by Dakota County staff, rather than local officials and includes well established recycling and waste reduction programs, that are staffed partly from the proceeds of county fees from disposal at host landfills.
- The Twin Cities metropolitan counties license approximately 240 waste hauling businesses, with about 1,600 vehicles to collect and transport municipal solid waste. Waste haulers that collect and transport non-MSW, recycling or organic waste are not licensed by the state.¹¹
- Some metropolitan cities and townships arrange for collection service by contract or provide their own service, referred to as “organized collection.” Communities with organized collection represent 30 percent of the households in the Twin Cities metropolitan area. However, not all multi-family residences in these cities are included in these collection services.
- There are currently Dakota County programs for recycling, composting and management of household hazardous waste, and special wastes and electronic wastes. There is currently no management of household pharmaceutical waste.¹²
- The Minnesota solid waste tax is split between the Solid Waste Fund for landfill cleanup, MPCA groundwater and solid waste activities and the general fund.¹³ The statewide tax is 17 percent for non-residential MSW, 9.75 percent for residential services.¹⁴ Some counties levy additional charges that can bring the tax up to 70 percent of the trash bill.¹⁵ Materials source-separated for recycling, composting or food-to-livestock are exempted from both county and state fees.
- The 53.75 percent recycling rate for Dakota County is slightly higher than the approximately 50 percent metropolitan area and statewide recycling rates.¹⁶
- There are 20 *Fortune 500* firms headquartered in Minnesota. Some have specific policies regarding product stewardship initiatives and many have sustainability programs that include waste minimization and recycling.

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota’s only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to demonstrate innovative waste reduction and management techniques. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can

participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota seeks to establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to attain high goals for waste reduction and management utilizing innovative and adaptive technologies and strategies:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government, and waste management authorities and policymakers.
- State and federal agencies.
- Professional organizations, especially those focused on aspects of sustainable system design for the environment and waste management.
- Non-profit organizations especially focused on a variety of reuse, recycling, composting, advocacy and educational initiatives.
- Architecture, landscape architecture and planning firms with expertise in sustainable land use and waste management strategies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Funders and grant-making organizations.
- Local businesses, industry and commercial operations, including producers and manufacturers.

Site features

- The UMore Park property has good access to regional highways and transportation routes including U.S. Highway 52.
- Nearby rural agricultural land uses can generate agricultural wastes for potential recovery.
- Both the scale of the community at UMore Park and phased development over a period of 25 to 30 years offers opportunities for testing and demonstrating different technologies and programs related to waste management that

are more likely to be economically viable and competitive with traditional alternatives.

- A major sewer collector line carrying black water to the Empire Sewage Treatment Plant is located on the western and northern boundaries of the UMore Park property. An adjacent return line carries treated water to the Mississippi River.

Opportunities for innovation

Existing requirements

- Court decisions prevent local jurisdictions from dictating where waste is delivered because it is considered an unconstitutional restriction on commerce.
- Solid wastes must be managed in accordance with Dakota County Ordinance 110 and Minnesota Rules Chapters 7000 and 7035.
- The Solid Waste Management Coordinating Board plans and Minnesota Pollution Control Agency policy should be followed, but considered as minimum requirements for the community at UMore Park.

Site conditions

The community at UMore Park presents both challenges and opportunities for achieving sustainability in waste management, especially given current waste management practices and operations in Minnesota. The community at UMore Park will unfold over time with phased development based on market demands anticipated to encompass 30 years or more. Impacts of phased development on innovations in waste management can include the following:

- A critical mass of residents may be needed to feasibly and economically employ certain community-based waste management systems such as waste-to-energy operations. Fortunately, neighborhood-scale efforts allow program and system piloting to identify best practices and successful strategies.
- A community-wide system for waste management may incur significant infrastructure development costs. Building flexibility into the infrastructure will allow innovation and monitoring to identify effective waste management technologies and operations that can be deployed across the community throughout phases of development.

Research and knowledge creation

- Awareness and personal responsibility. Research is needed to identify what factors influence personal decisions regarding product reuse, recycling and management of the individual and family, business and community waste footprint. The analysis can support innovations in the design of a community that provides many options for waste reduction, reuse and recycling, and that provides measurement, allowing residents receive frequent feedback on their success.
- Product stewardship and waste prevention. Analysis can help to identify effective policies and incentives to impact manufacturers' operations and practices toward product stewardship, so that the design of the product achieves a

balance between the utility of the product, its total lifecycle and energy cost, and competitiveness among similar products.

- Public demand and participation. Additional information can help to explore the role of public demand for products and services that minimize waste generation and identify examples of public involvement in the decisions that help design, test and refine products and services that prevent generation of waste.
- Market dynamics. Studies could explore how the community at UMore Park could serve as both an incubator and a demonstration site for new methods, new marketing strategies and new products for preventing and managing waste.

Baselines for key performance indicators

Waste systems

- Sixty percent of municipal solid waste is landfilled in Minnesota.¹⁷
- In 2006, Dakota County estimated that area landfills had five to seven years capacity left.¹⁸
- Yard waste and kitchen scraps make up almost one-sixth of Dakota County's trash.¹⁹
- Burning and on-site burial of waste is practiced by 45 percent of rural residents.²⁰
- Recycling/processing rates in Minnesota are between 40 percent and 50 percent of annual total waste generated.

Consumer behavior and education

- On average, every resident of Dakota County generates about seven pounds of garbage each day.²¹
- Dakota County sponsors outreach and education in waste management through the Rethink Recycle campaign of the Solid Waste Management Coordinating Board.²²

Business operations and eco-industries

- There are currently no commercial entities located on the property that reuse or recycle waste for another product or energy recovery.

Key performance indicators

Waste systems

- Employ community waste management systems and strategies to reduce amount of waste exported to landfills to less than five percent through effective reuse, recycling, composting and waste-to-energy initiatives, among others.
- Ensure no waste is burned or buried on-site.
- Increase waste diverted to energy/fuel.
- Increase recycling/processing rates to 80 to 90 percent of annual total waste generated.
- Increase on-site processing of organics to reduce compostable items from the waste stream.

Explore innovative solutions and emerging technologies

- Demonstrate and test innovative programs and technologies in waste management, reduction and recovery in the community.

Consumer behavior and education

- Promote full participation in waste management efforts through convenient and accessible recycling, composting and collection/treatment initiatives.
- Promote a 50 percent reduction in waste produced by each resident to approximately 3.5 pounds of total waste per day.
- Develop a curriculum for local schools on waste prevention, reuse, recycling and composting.
- Promote collaborative efforts with regional stakeholders and local units of government for innovative and effective waste management.

Business operations and eco-industries

- Foster collaboration and partnership with community and regional businesses to highlight and market product stewardship.
- Encourage location of businesses on-site that have complementary industrial and commercial business operations to allow the byproduct of one to be used as an input for another process.

Monitoring plan

Ongoing monitoring to assess performance against waste reduction and management targets ensures the effectiveness of strategies over time. Monitoring for sustainable waste management in the community at UMore Park should be conducted at a variety of levels including the individual home, neighborhoods, businesses, institutions and community-wide. The technology and means for broad-based monitoring of waste management mechanisms are not currently well-developed or widely deployed and can evolve as the technology allows. Community groups should have access to data to support identifying, prioritizing and implementing appropriate courses of action to reduce waste and optimize lifecycles of products or resource. The community should also collaborate with other organizations to position the data collection in relation to regional metrics. Development of a more comprehensive and easily accessible tracking system will evolve as the community unfolds.

Monitoring could include:

- Documentation of individual households in minimizing waste and increasing recycling.
- Level of participation in waste management initiatives and educational programs on composting, reuse and recycling.
- Level of community member participation in resource sharing and swapping programs.
- Commercial and retail business participation in product stewardship initiatives and efforts to procure products with reduced packaging.

Design strategies

Key strategies to achieve zero waste goals incorporate individual, local and regional partnerships as well as public engagement to promote awareness of real waste costs and the benefits to preventing and managing waste effectively.

Goals	Design strategies	Milestones
ZW1 ZW7	Explore effective design and construction guidelines to reduce waste such as reusability, ease of disassembly and deconstruction.	Planning phases.
ZW6	Identify complementary industrial and commercial business operations and facilitate the location of facilities near one another to allow the byproduct of one to be used as an input for another process. Explore opportunities for a business incubator for waste treatment technologies and systems.	Design phases.
ZW1 ZW6	Explore strategies and mechanisms to foster an incubator for green materials businesses that are committed to waste prevention, reduction and recovery.	Planning phases.
ZW2	Incorporate consumer-friendly strategies into community design to make recycling and reuse easier such as single sort recycling and reuse exchanges.	Planning phases.
ZW4	Explore economic incentives that support waste prevention and reduction as well as waste diversion.	Planning phases.
ZW4	Foster opportunities for innovation, demonstration and analysis to inform existing processes, products and policies.	Planning and design phases.
ZW5	Explore mechanisms for measuring materials that are diverted and/or reused as well as those that are disposed or treated.	Planning phases.
ZW5	Design and implement in-home monitoring systems to provide feedback on individual and community success in minimizing waste generation and increasing recycling.	Planning and design phases.
ZW7	Compile resources to assist contractors and developers in design for dis-assembly, low-or-no-waste building systems, techniques for separation- reuse- recycling- repurposing.	Planning phases.
ZW8	Collaborate with regional stakeholders and experts on waste management and recycling options to explore and demonstrate new strategies that can augment and optimize existing operations. Explore approaches including incentives, policies and business strategies.	Planning phases.
ZW9	Design and demonstrate zero waste product design guidelines and treatment systems with innovative and adaptive characteristics.	Design phases.
ZW9	Explore appropriate community-based facilities or systems to extract and in some cases repurpose or sell usable resources from the waste stream. Explore types of mobile, temporary and permanent centralized stations.	Planning phases.

Construction strategies

Goals	Construction strategies	Milestones
ZW1 ZW7	Preserve desirable existing site features and utilize existing materials and elements, if feasible, during construction.	Design and construction phases.
ZW1 ZW5	Integrate alternative waste collection, conveyance, recycling and materials reuse systems.	Construction phases.
ZW1 ZW9	Reduce construction waste through on-site separation, reuse and recycling.	Construction phases.
ZW1 ZW9	Install access panels to allow easier upgrades and modifications to infrastructure to accommodate innovations and upgrades of community systems.	Construction phases.

ZW1 ZW2 ZW6	Establish space for material separation to promote reclamation and reuse.	Construction phases.
ZW1 ZW7	Prioritize materials in construction that can be repurposed for other uses and use standard dimensions to eliminate construction waste.	Construction phases.

Community life strategies

Engaging members of the community in zero waste efforts is fundamental to achieving the goals for sustainable waste prevention and management. Effective strategies can help to ensure continued awareness of the role community members can play in maintaining healthy, renewable resources.

Goals	Promoting sustainable behaviors	Milestones
ZW1 ZW2 ZW3 ZW4	Establish a community hub in the neighborhood community sustainability centers that enables residents to share and reuse products like tools, lawnmowers, recreation equipment such as skis, roller blades and others.	By phases of occupancy.
ZW4 ZW8	Collaborate with transit and transportation initiatives and organizations to establish car- and bicycle-sharing programs and mobility services for those with limited mobility in the UMore Park community, with shared vehicle parking scattered conveniently throughout the community.	By phases of occupancy.
ZW1 ZW2 ZW4 ZW8	Establish annual collection events to promote responsible disposal for electronics and household hazardous waste.	By phases of occupancy.
ZW2 ZW4 ZW3	Promote service positions and businesses in the community to support product repair over disposal such as shoe repair, tailors and mechanics.	By phases of occupancy.
ZW1 ZW4	Ensure that the central community sustainability center and neighborhood community sustainability centers include shared spaces such as kitchen facilities. Make information available on local education programs for food waste reduction, food preservation and canning and composting.	By phases of occupancy.
Goals	Education and engagement	Milestones
ZW1	Develop consumer guidelines that promote the use of products that are designed to be reused and have documented product stewardship policies.	By phases of occupancy.
ZW3	Establish programs and curriculum in local schools around waste processing and energy recovery.	By phases of occupancy.
ZW3 ZW4	Establish a sustainability concierge at the community sustainability center(s) that guides UMore Park residents on ways to live sustainably and orients visitors to the community. Provide resources to support residents' participation in waste reduction, recycling, composting and product swapping initiatives.	By phases of occupancy.
Goals	Community website and communications	Milestones
ZW3 ZW4	Establish a website and program that connects residents who are willing to share, loan or get rid of their own property, such as cars, boats, fine china, rental property, etc.	By phases of occupancy.
ZW2 ZW3 ZW4 ZW5 ZW8	Establish regular and prominent reporting on waste management efforts and initiatives to inform community members and demonstrate results of systems and strategies outside the community.	By phases of occupancy.

ZW2 ZW4	Commission public art and structures (park benches, tables and rails) made of recycled or repurposed materials.	By phases of occupancy.
Goals	Collaborative opportunities	Milestones
ZW8	Explore collaborative relationships with existing waste management authorities, businesses and nonprofit organizations.	By phases of occupancy.
ZW8	Establish collaborative partnerships with companies to test new concepts for marketable sustainability initiatives including lifecycle packaging and products that are designed for multiple uses.	By phases of occupancy.

Management plan strategies

Effective property management plans and policies can promote sustainable options for resource procurement, and construction and remodeling projects for residents, property owners and businesses.

Goals	On-site policies and property management	Milestones
ZW1	Promote policies for commercial, industrial and retail businesses in the community to support packaging reduction, increased bulk transport, construction waste reduction, recycling and composting.	By phases of commercial, industrial and retail occupancy.
ZW3 ZW4	Establish positions to support community waste reduction efforts including a sustainability concierge, educators and others.	By phases of occupancy.

HR plan and job creation

Job creation to support waste prevention and reduction efforts for the community at UMore Park could include the following positions and responsibilities:

- Planner and coordinator roles could establish an adaptive management plan for waste minimization, collection, sorting and other strategies.
- Positions could be needed to develop and maintain waste monitoring programs and related communications.
- Researchers to explore innovative waste management technologies and systems, and educators to develop programs and resources to support waste management initiatives.
- New companies could locate in the community at UMore Park for waste recovery and repurposing.

Synergies

- Zero Waste, Zero Carbon and Sustainable Water. Wastes involve energy to produce, collect, sort, recycle and dispose. All of these energy inputs have a cost in carbon that must be balanced with the benefit of the waste or waste averted. Sustainable water strategies complement energy and waste reduction strategies through effective means for treatment and reuse of sewage, use of water in recycling or processing waste, as well as composting of organic wastes to reduce landfill exports.
- Zero Waste, Sustainable Water, Local and Sustainable Food and Land Use and Wildlife. Goals for sustainable waste management influence and are influenced by effective land use strategies with regard to having land available for composting, not using land for disposal. Complementary strategies are required to ensure efficient land use for residential and community gardens for local foods. The byproducts of the food waste can be composted on-site and serve as biomass for energy production and diverted from landfills.

- Zero Waste and Sustainable Materials. Construction materials that fit standardized designs limit waste. These materials can also be manufactured using recycled materials and zero-landfill methods.
- Zero Waste, Culture and Community and Equity and Local Economy. Waste and ecological business can be a source of shared commitment in the community and offer jobs for smart waste and efficient products that limit waste and foster a Zero Waste understanding.

Strategic positioning

Community benefits

- Effective community engagement in waste management can empower personal responsibility.
- Community waste management programs and initiatives can create jobs.
- A focus on utilization and reutilization of resources can foster energy independence and less dependency on external products and processes.
- Effective practices can result in reductions in sound, smell and other aspects of waste management.
- By optimizing society's use of energy investments and material flows, all environmental indicators will be improved.

Environmental benefits

- Less energy wasted on products results in less carbon.
- Waste prevention, reuse and recovery can result in less land locked into waste management.
- Reduction in toxicity means less exposure to potential human and ecological health risks.
- Waste prevention can reduce the introduction of pollutants to the air and groundwater.

Marketing

- The UMore Park community could be a model for

sustainable community development in the U.S., especially producing innovative research, and creating educational and outreach materials.

- Waste prevention has immediate economic, environmental, and equitable effects.
- The attention of *Fortune 500* firms based in the region on community initiatives will open new opportunities for products to be tested for environmental marketing strategies.

Wider community and municipal engagement

- Waste is extremely personal and creates complex interactions between individual actions and broad economic practices. This shift toward zero waste needs to grow from within the community, not mandated from an outside entity, economical framework, or corporate process. Solutions should be specific to the each resident's lifestyle, on-site industries, existing and proposed infrastructure, best available technologies and new experimental technologies.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is of a future where resources are created and used efficiently, waste levels are close to zero and ultimately zero waste is sent to landfill.

One Planet common international targets

The waste management system for a *One Planet Community* is designed around the waste hierarchy, prioritizing waste prevention first, then re-use, recycling and composting and lastly, energy recovery before disposal to landfill. Standards and systems vary from international best practices, emission thresholds and waste reduction. Best Available Technologies (BATs) should be required to meet Best Management Practices (BMPs) in the United States. Key aspects are:

- There is a presumption of promoting resource efficiency and avoiding wasteful consumption. *One Planet Communities* promote recycling of waste to high value uses,^a fostering closed-loop^b recycling and avoiding down-cycling^c to lower value uses.
- By 2020, at least 70 percent of the weight of domestic waste will be reclaimed, recycled or composted. Ideally no more than two percent of waste by weight should be sent to landfill. Country specific targets for total waste production per capita will be set. The approach to construction waste will include application of a reuse - deconstruct - demolish hierarchy meaning waste from existing buildings is retained and reused in its present location wherever possible. Best practice standards in waste minimization during construction will be employed. At least 95 percent of waste by weight generated by construction and demolition will be reclaimed or recycled.
- Businesses and industries should be able to achieve even higher recycling rates than domestic properties. Consideration will be given to the provision of recycling facilities when building. Business units and commercial tenants will be engaged through mechanisms such as green leases and training to ensure the waste hierarchy is followed. Surplus products will be monitored and benchmarked against good practice in their sector. All surplus waste will follow a trajectory towards zero waste by 2020.

One Planet national and international context

The majority of the planet's extracted and refined resources are used once, and then discarded. Global waste generation is estimated to increase five-fold from 2005 levels by 2025, with disproportionately high increases in industrialized countries. According to the United Nations, a majority of the world's ecosystem services are in decline from unsustainable consumption, and the planet's capacity to absorb current waste production is inadequate. Land-filled organic waste emits methane, a greenhouse gas 20 times more potent than CO₂.

^a Highest value uses refer to the waste management hierarchy of preferred uses for materials. An example would be preference of reuse before incineration since that retains the majority of the material qualities, and would allow for future incineration for energy recovery from the materials.

^b Closed-loop recycling connects the waste or byproducts of one process or product to use as inputs for another process or product.

^c Down-cycling is the process of converting waste materials into new materials of lesser quality and reduced functionality.

3. SUSTAINABLE TRANSPORT

Mission statement

Promote innovative, appealing and low-carbon transportation and transit choices for residents of the community at UMore Park and develop related initiatives focused on reductions in transportation-related emissions, through research, creation and evaluation of alternative transportation options.

Approach

The approach at UMore Park seeks to eliminate carbon emissions for travel within the community and minimize emissions as much as possible when residents leave. While the Twin Cities region is in the midst of implementing its 30-year vision for an integrated mass transit system of commuter rail, light rail and bus rapid transit lines, enhanced mass transit service to the City of Rosemount and the UMore Park property is in the preliminary planning stages. Realizing the mission of reducing emissions attributed to transportation activities to a sustainable level will require a strong commitment to collaborate closely with public and private sector partners.

Sustainable transportation objectives can be achieved by reducing the need to travel and when travel occurs, reducing use of greenhouse gas-emitting transportation modes. The approach to achieving sustainable transport considers the following two travel needs for UMore Park community members: 1) travel that occurs within the boundaries of the community, and 2) travel to and from the community. Within the UMore Park community, proximity to jobs, amenities, the design of the built and natural environments and specific transportation strategies can eliminate the need for polluting forms of transportation. When traveling outside the community, every effort must be made to reduce the impact of residents' transportation choices.

This can be accomplished by working closely with the existing public transportation infrastructure and fostering new regional transit initiatives.

A host of programmatic, educational and lifestyle decisions can also contribute to the ability of residents, workers and visitors to achieve the necessary emissions reductions. Similarly, emerging technologies and innovation are anticipated to influence the ability of UMore Park to achieve sustainable transport. A phased strategy for transportation at UMore Park is important given that the development of the community will unfold over time.

Goals

- ST1 Minimize the need for personal automobile transportation.
- ST2 Foster reductions in transportation emissions through car-sharing and carpooling, and support the use of alternative automobile-propellant technologies.
- ST3 Strive to foster connections with regional public transit initiatives and explore opportunities for private or quasi-private transportation links to major employment and commercial centers and/or existing transit hubs.
- ST4 Support routine social and economic interaction among residents, local businesses and employers via a community transport system.
- ST5 Support active lifestyles by promoting healthy modes of transportation including walking and bicycling.
- ST6 Incorporate infrastructure and technologies to minimize the need for long-distance business travel.
- ST7 Employ effective land use planning to minimize travel distances for goods and services provided in the community.

- ST8 Foster safe, convenient transportation options for all residents, with special consideration for residents with reduced mobility.
- ST9 Integrate educational programming to demonstrate benefits of more sustainable modes of transportation to the environment, residents' health and reductions in residents' transportation-related expenses.

Local context

- Minnesota is one of the few states that require the statewide use of oxygenated motor gasoline blended with 10 percent ethanol. Minnesota also offers incentives to encourage the adoption of E85—a mixture of 85 percent ethanol with 15 percent motor gasoline—throughout the state, and now has more E85 refueling stations than any other state. Minnesota is among the nation's top producers of ethanol, with over a dozen corn-based production plants located primarily in the southern part of the state and additional facilities under construction.¹
- In 2005, 155 million metric tons of carbon dioxide equivalent (MMtCO_{2e}) gases were emitted from all sources in Minnesota. Minnesota's transportation sector produced approximately 24 percent of this total, or 7.3 metric tons (Mt) of emissions per capita.²
- In 2009, carbon dioxide (CO₂) emissions from transportation for Minnesota totaled 32.20 million metric tons of CO₂.³
- In 2005, vehicle miles travelled (VMT) per person in Minnesota was 11,200 per year, a 30 percent increase from 1995 and higher than the average VMT in the United States which was 10,100 miles per year.⁴
- Greenhouse gas (GHG) emissions from transportation fuel use have risen steadily in Minnesota. From 1990 to 2005, transportation GHG emissions have increased at an average rate of 1.7 percent annually.⁵
- Dakota County is served by both the Minnesota Valley Transit Authority and the Metropolitan Transit Authority. Most of the bus routes are aimed at commuter services but limited cross-community transit is available. The commuter routes are served by four transit hubs and several park and ride parking lots.⁶
- Dakota County's bikeway system was established in 1978 and most communities within the county have local bike trail systems. The county has a total of 161 miles of paved bike trails along county roads. The county Parks and Open Space Department has developed and maintains 19.3 miles of regional bike trails within Dakota County. The county is also developing a countywide greenway system that will connect places residents want to go, including parks, shopping and home with hundreds of miles of off-road trails in natural setting. This system will not only create a very efficient transportation and recreation system, but also wildlife habitat and a system to improve water quality. The county has further supported the use of non-motorized transportation by installing bike lockers at the Western Service Center, a wellness area with changing rooms and

showers at the Northern Service Center, and bike racks at most county buildings to facilitate non-motorized commuting.⁷

- The percentage of workers in Dakota County who commute to a different county for work is 53.1 percent.⁸ Only three percent used public transportation.⁹
- In 2004, 7,929 Rosemount residents were employed while there were only 6,144 jobs offered by the businesses within Rosemount, necessitating residents to seek employment outside of Rosemount. In the various industries in which residents are employed, the disparity between where residents work and what employment opportunities are available in Rosemount is most prevalent in four industries: wholesale trade; transportation, warehousing and utilities; finance, insurance and real estate; and professional, scientific, management and administration.^{10 11}
- UMore Park is located in close proximity to U.S. Highway 52, a four lane expressway running north-south, and by County Roads 42 and 46 running east to west. Regional transit authorities are exploring extending mass transit from downtown St. Paul (approximately 17.5 miles) to the UMore Park property and other transportation modes to serve UMore Park in the future. Express bus service, bus rapid transit and light rail transit are all under consideration.¹²

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens' quality of life and support regional transportation initiatives. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to achieve sustainability in transportation and transit management in the UMore Park community and in the region:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong

partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.

- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Non-profit organizations especially focused on multi-modal transportation and transit initiatives.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on aspects of community development and sustainability.
- Regional and local transit providers and authorities and other transit and transportation management organizations.
- Car- and bicycle-sharing organizations.
- Health and health insurance providers and national health associations and organizations with local chapters.

Site features

- The UMore Park property is relatively flat allowing easy walking and biking within its boundaries.
- The property is easily accessible from major and minor arterial roads including: U.S. Highway 52, a four lane expressway running north-south providing access to St. Paul to the north and Rochester to the south; County Road (CR) 42 running east-west along the north border and CR 46 running east-west through the middle of the property. Beyond the existing roads, Dakota County completed a transportation study in 2010 that identified future alignment alternatives for roads within and surrounding UMore Park. The local units of government will be involved in future roadway plans as development proceeds.
- Two north-south arterials, Akron Avenue and Blaine Avenue, pass through UMore Park and are currently maintained by the University of Minnesota.
- Dakota County is currently conducting master planning efforts for a regional park adjacent to the western portion of the UMore Park property that would include a north-south greenway connecting UMore Park to Lebanon Hills Regional Park; the Vermillion Highlands: A Research, Recreation and Wildlife Management Area; and the Vermillion River.
- Cedar Avenue Bus Rapid Transit (BRT) Line and Park and Ride facility is approximately five miles to the west.

Opportunities for innovation

Existing requirements

Current Rosemount zoning codes related to transportation and vehicle issues within developments include:

- Off-street parking facilities must be located on the same property as the use it is intended to serve.
- “Minimum” parking requirements are employed instead of “maximum.”
- Minimum of two parking spaces per dwelling unit is required for residential uses (single and multiple dwelling units).
- Minimum of six spaces per 1,000 gross square feet of retail can result in large-scale parking lots sized for periods of maximum use and intensity rather than typical daily use.
- Convenience grocery stores are required to provide a minimum of seven parking spaces per 1,000 gross square feet.
- All dwellings are required to be separated by a minimum width of 24 feet.
- Home occupation standards are not supportive of vertically integrating business activities (mixed-use) with residential use.
- Mixing residential building types such as single-family detached alongside row houses or small apartment blocks, is not permitted on the same block “by right.” All mixed use development other than in the Downtown District must be done under the Planned Unit Development (PUD) regulations. The City of Rosemount and the University of Minnesota launched an Alternative Urban Areawide Review (AUAR)^a in the spring of 2011, an important step toward comprehensive plan amendments and first phase development, including any necessary PUD applications.

Site conditions

- The UMore Park property is not currently served by daily transit service.
- The communities that surround the UMore Park property are likely to remain auto-oriented and low density, placing continued demands on UMore Park’s residents for personal auto use. These rural and low-density residential communities are not conducive to investments in mass transit facilities.
- The location of the property within the metropolitan region places it beyond a reasonable cycling or walking distance from concentrations of employment and retail goods and services.

Research and knowledge creation

- Research and analysis is needed to identify benefits of modifications to existing regional requirements related to

^a An **Alternative Urban Areawide Review (AUAR)** is a broad environmental assessment that identifies any potential impacts of development across key community features such as utilities, groundwater, surface water and transportation, among others.

land use and transportation issues including: opportunities to employ shared- or district-parking facilities, options to reduce excess parking spaces and associated over-paving, design alternatives that can reduce multiple-automobile ownership and use and decrease the cost of housing, design options to encourage walking and bicycling access to retail, and benefits of design flexibility and increased densities such as row house building types.

- More information and analysis is needed on regional organization and industry interest and expertise in bio-gas research.
- An inventory of the regional availability of fossil fuels would help to analyze short- to medium-term affordability of fossil fuels for transportation and home use.
- More information is needed to identify annual vehicle miles traveled, vehicle hours traveled and transit ridership data in Dakota County and the City of Rosemount to establish baseline conditions to measure the success of sustainable transportation policies and programs.

Baselines for key performance indicators

- The 2009 daily vehicle miles traveled (VMT) estimate for the Twin Cities' seven county metropolitan area was approximately 62 miles per household.
- An estimated 4.9 metric tons of carbon dioxide equivalent (CO₂e) emissions are produced by the average passenger vehicle.^b
- The 2009 daily vehicle hours traveled (VHT) estimate for the Twin Cities' seven county metropolitan area was approximately two hours per household.
- Mean travel time to work for residents of Dakota County is 23.7 minutes for a total daily commute of 47.4 minutes.¹³
- Greenhouse gas emissions from transportation in Minnesota accounted for 24 percent of the total 155 million metric tons emitted from all sources.¹⁴
- According to 2000 U.S. Census data, 2.3 percent of Rosemount residents worked from home, 23.4 percent commuted less than 15 minutes, 38.6 percent commuted from 15 to 29 minutes, 24.4 percent from 30 to 44 minutes, and 11.3 percent for 45 minutes or more.¹⁵

- Based on 2010 census data, motor vehicle ownership rates for the seven county metropolitan area are 1.9 per household.

Key performance indicators

- Reduce automobile emissions through reductions in personal automobile ownership at UMore Park by 50 percent of the regional average at full occupancy and as opportunities for public transit come online. Accomplishing this performance target can reduce needs for parking accommodations and increase residents' available disposable income.
- By the appropriate phase of occupancy, ensure the availability of regular hybrid or alternative-fuel transportation service to major commercial and employment centers, and/or the nearest park-and-ride transit facility.
- Throughout phases of occupancy, ensure connections to the physical transportation and electronic networks throughout the community at UMore Park to support business location and job creation on-site and nearby.
- Reduce greenhouse gas emissions attributable to road travel to one ton per person on-site.

Monitoring plan

To assess progress toward reaching the goals and performance targets for sustainable transportation, monitoring efforts could include surveying individuals about their transportation habits when they decide to buy or rent property, or locate their business at UMore Park. Additionally, volunteers could be recruited for active monitoring including conducting annual mileage checkups for personal and shared automobiles in the community. Potential metrics to survey could include:

- Average commuting distance.
- Percentage of trips by sustainable transport means such as public transit, bicycle or walking versus car travel.
- Participation in car club and/or carpooling programs.
- Percentage of hybrid and alternative-fueled vehicles.
- Total vehicle miles traveled per year.
- Total air travel per year.
- Total per capita GHG emissions.

Additionally, the community transit and transportation providers and programs could provide data on bicycle, pedestrian, transit and automobile usage by community members.

^b This data was estimated using EPA MOBILE6.2 Vehicle Emission Modeling Software (<http://www.epa.gov/oms/m6.htm>) fuel economy numbers using the following equation:
 Metric tons of CO₂e for the average passenger vehicle/2.1 people per household =
 (VMT/passenger vehicle avg. MPG) x CO₂ per gallon x (100/95)/1000/2.1 =
 ((23 725/20.3) x 8.8 x (100/95)/1000)/2.1 = 4.9 metric tons of carbon dioxide equivalent (CO₂e) emissions for the average passenger vehicle

Design strategies

Steps to achieve identified goals and performance targets for sustainable transport incorporate strategies for overall site design and community infrastructure, job creation and telecommuting support, and education and service programs. The following tables explore these strategies and identify a potential timeline for when they might occur within the overall phasing plan for the future community.

Goals	Design strategies	Milestones
ST1 ST7	Explore modifications to existing codes and requirements for street width and off-street parking by various place-based street typologies and development types and uses through project-specific land development codes or design standards.	Planning phases.
ST1 ST3 ST4 ST7 ST8	Integrate sustainable transport into final site design by mixing compatible land uses and concentrating development density and intensity on small, walkable block sizes within 10 minute (quarter-mile radius) walking neighborhoods, employment and commercial nodes.	Design phases.
ST3 ST4 ST5 ST7	Incorporate highly-connected, system of multi-modal streets, trails and auto-free zones into final site design.	Design phases.
ST1 ST5 ST8	Incorporate extensive bike facilities including on-street bike lanes, off-road trails, bike storage and parking facilities at transit, shopping, employment and recreational facilities into final site design.	Design phases.
ST3 ST7	Establish space such as right-of-way preservation and station stops in final site design, to incorporate future mass transit service via bus rapid transit and light rail.	Design phases.
ST1 ST6	Design reliable, high-performance telecommunications infrastructure to support routine telecommuting/live-work lifestyles.	Planning phases.
ST2	Incorporate infrastructure for charging and maintaining quantity and variety of electric vehicles.	Design phases.

Construction strategies

Goals	Construction strategies	Milestones
ST1 ST2 ST3	Establish park and ride - van pool facility (using low carbon vehicles) to collect and transport construction workers to and from the project site.	Construction phases through development and build out.
ST2	Utilize low and zero carbon fuels in construction vehicles. Fuel construction vehicles with renewable sources – waste vegetable oil diesel and other non-food based fuels.	Construction phases through development and build out.
ST2 ST7	Move construction materials to site by less carbon-intense means.	Construction phases through development and build out.

Community life strategies

Safe and effective transportation networks that provide access to nearby conveniences including work, retail shopping and recreation, foster residents' satisfaction with their community. Multi-modal transportation options including walking and biking support active, healthy lifestyles and overall quality of life for individuals. Participation in transportation sharing programs and initiatives can promote connections and interaction among community members, contributing to a sense of community.

Goals	Promoting sustainable behaviors	Milestones
ST1 ST4 ST5 ST7	Utilize best practices of sustainable development approaches to create "1/4 mile," mixed-use, walking neighborhoods that allow residents to meet their daily needs on foot and bicycle.	Design phases.

ST1 ST4 ST7	Foster a variety of on-site employment opportunities within compact, mixed-use development.	By appropriate phase of occupancy.
ST7 ST8 ST9	Ensure easily accessible sites for local food production are integrated into land use patterns.	Design phases.
ST1 ST5 ST6 ST7	Design to accommodate telecommuting and/or live-work spaces. Ensure availability of cooperative office space with hot-desking, shared office equipment and entrepreneurial support.	Design phases and by appropriate phase of occupancy.
ST3 ST4	Plan and implement a program to promote shopping locally and for using locally-provided services.	By appropriate phase of occupancy.
ST1 ST2 ST3 ST5	Collaborate with car- and bicycle-sharing programs and organizations to establish car- and bicycle-sharing opportunities in the UMore Park community, with shared vehicle parking scattered conveniently throughout the community. Ensure low-carbon vehicles are utilized in the car-sharing fleet.	By appropriate phase of occupancy.
ST1 ST2 ST5 ST8	Design efficient bicycle lane layout, access and parking in all parts of the community. Ensure safe and secure covered parking is available for bicycles.	Design phases and by appropriate phase of occupancy.
ST2 ST5	Ensure availability of appropriate facilities for car and bicycle clubs.	By appropriate phase of occupancy.
ST1 ST5 ST7	Incorporate interconnected groomed cross-country skiing trails for winter and biking and walking trails for summer into the site design.	Design phases.
ST2 ST8	Promote safe pedestrian access across the community. Consider car-free areas within the community, while allowing drop-off locations and promoting accessibility for individuals with limited mobility.	Design phases.
ST2	Encourage use of alternative fuels. Explore incorporation of electric car charging spaces in parking areas and potential for on-site biodiesel production.	Planning and design phases.
ST4 ST5 ST7	Ensure that commercial shopping districts provide a variety of goods and support services, including wireless cafés, entertainment and recreation facilities, are pedestrian-friendly and located within easy walking distance to residential areas.	Phases of retail/commercial occupancy.
ST1 ST3	Explore opportunities for community transit operations to serve residents' commute to and from major commercial and employment centers, and/or existing transit hubs, until regional public transit options become available.	By phases of occupancy.
ST1 ST3	Integrate a community bus service with convenient stops located within and around UMore Park.	By appropriate phase of occupancy.
ST1 ST2 ST8	Encourage community pedicab business opportunity.	By appropriate phase of occupancy.
Goals	Education and engagement	Milestones
ST3 ST9	Plan and implement a car sharing co-op recruitment campaign.	By appropriate phase of occupancy.
ST1 ST2 ST9	Provide resources and education on low-emission transportation options on community website.	By first phase occupancy.

ST1 ST2 ST3 ST5 ST9	Create materials explaining potential financial savings and environmental benefits of alternative transportation including transit, car sharing and bicycling.	By first phase occupancy.
ST1 ST5 ST9	Explore commuter competitions or initiatives in the community to encourage sustainable transportation behaviors.	By appropriate phase of occupancy.
ST1 ST3 ST5 ST9	Integrate new media technologies into transit, car share and bike-share facilities to provide mode-relevant environmental, health and cost data to educate and promote benefits of using alternative transportation.	By appropriate phase of occupancy.
Goals	Community website and communications	Milestones
ST1 ST2 ST9	Create a transportation page highlighting carpool opportunities, car-share and bike-share availability and reservations, mileage reduction strategies, and overall success toward performance targets to date.	By appropriate phase of occupancy.
ST4 ST9	Provide links to local businesses and organizations that provide goods and services.	By appropriate phase of occupancy.
ST9	Create online logbook for voluntary tracking of individual transportation habits.	By first phase occupancy.
ST3	Include links to public transportation schedules.	By first phase occupancy.
ST3	Follow regional and national transportation issues.	By first phase occupancy.
ST1 ST3 ST9	Develop an online and/or mobile app transportation planner to identify the best transportation options based on connectivity, carbon use, travel time and fees or costs at any particular time of day.	By appropriate phase of occupancy.
Goals	Collaborative opportunities	Milestones
ST1 ST3	Work with regional transit and transportation authorities and local units of government to support regional transit initiatives.	Planning stage and ongoing throughout development.
ST1 ST2	Explore collaborative partnerships with car-sharing and bicycle-sharing program providers.	By appropriate phase of occupancy.
ST1 ST2 ST3	Work with regional transit authorities to implement new park 'n ride commuter bus facility in the community, emphasizing alternate fuel vehicle transit service to St. Paul, Minneapolis and the Minneapolis/St. Paul International Airport.	By appropriate phase of occupancy.

Management plan strategies

Effective policies and requirements can promote sustainable infrastructure for residential, retail and commercial operations, while ensuring safety for citizens and encouraging active, healthy lifestyles.

Goals	On-site policies and property management	Milestones
ST1 ST2 ST9	Promote sustainable parking strategies including reduced parking requirements, shared parking at different peak times of the day, real cost parking fees, priority reserved parking for car-sharing a variety of parking space sizes for small vehicles and reserved parking for car-sharing throughout the community.	Planning and design phases.
ST1 ST2 ST9	Provide consistent support for alternative transportation modes through regular analysis of emerging technologies.	Phases of occupancy.
ST2	Ensure that property management vehicles are electric or low-carbon, alternative-energy powered.	Phases of occupancy.
ST7 ST8	Establish low traffic speeds in high activity areas.	Phases of occupancy.

ST3 ST4 ST5 ST8	Require bike storage and parking facilities at all transit, shopping, employment, education and recreation facilities.	Phases of occupancy.
ST1 ST2 ST5	Explore providing a sustainable community-branded bicycle with each housing unit.	Phases of occupancy.
ST1 ST5 ST8	Provide high-level of year-round maintenance of sidewalks and trails to ensure safety and support regular use.	Phases of occupancy.
ST2	Utilize low- or no-emission equipment for landscape management and ensure landscape organic wastes are composted.	Phases of occupancy.
ST1 ST2	Work closely with car- and bicycle-sharing program providers to guide roll-out of vehicle-sharing programs in the community.	By appropriate phase of occupancy.
ST1 ST5 ST9	Promote pedestrian activities through ongoing programs and events.	Phases of occupancy.
ST1 ST2 ST3	Collaborate with local entrepreneurs to establish business opportunities providing alternative transit and delivery services such as pedicabs and bike deliveries.	Phases of occupancy.

HR plan and job creation

Potential job creation related to this principle could include:

- Maintaining shared transportation vehicles and facilities.
- Providing on-site transit and delivery services.
- A community eco-industrial area that recruits companies engaged in research and development of alternative low-carbon fuels, manufacturing and/or assembly of bicycles, bike accessories and transit vehicles.
- Establishing a community wireless internet system to support telecommuting opportunities.
- Positions through supporting services and programs such as car and bicycle clubs.

Synergies

- Sustainable Transport, Zero Carbon and Land Use and Wildlife. Designing and implementing a compact mix of walkable and bikeable neighborhoods, business centers and commercial nodes with reliable high-speed internet connectivity integrated with well-functioning natural systems and habitats can help residents and workers meet their daily needs on foot or bicycle.
- Sustainable Transport and Health and Happiness. As walking, biking and car-sharing activities become more routine, people can also become healthier and better connected with their environment and their neighbors.
- Sustainable Transport and Equity and Local Economy. Establishing an effective jobs-housing land use balance, encouraging local entrepreneurship and establishing a variety of living wage jobs within the community as early in the development cycle as possible can strengthen the case for serving the community with public mass transit. This can also reduce commuting as well as long-distance (air) business travel.

Strategic positioning

Community benefits

Potential direct benefits for members of the community could include:

- Reduction in the reliance on fossil fuels and their consumption.
- Reduced costs related to transport.
- Improved local air quality.
- Fitness and health benefits through active transportation.
- Strengthened community interaction and cohesion through increased use of walking and biking pathways, public transit and car- and bicycle-sharing programs.
- Increase in personal time through commute time reductions.
- Smaller individual carbon footprint.
- Improved safety and reductions in accidents from minimal use of automobile transportation and increased use of alternative modes.
- Potential new transportation options for nearby neighbors.
- Financial savings from reductions in automobile infrastructure can be used to augment development of other amenities.
- An emphasis on local business that helps to improve the on-site economy.

Environmental benefits

Potential environmental benefits can include:

- Reduced greenhouse gas emissions.
- Reduction in smog and other noxious pollutants.
- Natural environment enhancement through reduced requirements for paved services such as benefits to stormwater management, biodiversity and natural habitats.
- Fewer heavy metals from brake pads and oil run-off from vehicles.

Marketing

- Convenient alternative transportation results in two significant marketable benefits:
 - ◆ Reduces a significant amount of personal CO₂ emissions.
 - ◆ Minimizes the need for and costs of a personal vehicle. Studies estimate the average automobile costs at \$9,000 per year.
 - The availability of reliable, high-speed wireless technology and on-site business centers supports distance-business opportunities.
 - Fostering entrepreneurial opportunities and business incubation will draw potential residents.
 - Green space and recreational amenities including paths for jogging, walking, bicycling and cross-country skiing are important to potential residents.
 - Market research data indicates compact, walkable, mixed-use communities maintain higher property values with more reliable, faster resale potential.
- on the UMore Park website.
 - Distribute press releases and news reports to local and regional newspaper.
 - Take part in project information meetings, open houses and workshops related to project planning and entitlement processes to seek public input, in conjunction with local units of government.
 - Participate in local celebrations and events such as picnics, art fairs, races and festivals.
 - Attend regular meetings of local jurisdictional boards and commissions to share updates on aspects of community development and its potential benefits to the greater community.
 - Host events promoting and celebrating milestones of the project.

Wider community and municipal engagement

During community engagement process

The University of Minnesota has been actively engaging local area communities in the planning for a future community at UMore Park for a number of years. Continued opportunities for community engagement include:

- Provide regular project updates and identify current activities

Post first occupancy

As the community at UMore Park will be a model for sustainability, the following efforts can help to inform and engage with the broader community and region:

- Share information on project performance and best practices with local units of government.
- Participate in and host regional community events such as garage sales, festivals, theater and music events and art fairs.
- Invite community members to participate in car- and bicycle-sharing programs, clubs and community education activities.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is one where the need to travel has been reduced and low and zero carbon modes of transport are provided. Communities create a green transport plan that results in carbon emissions consistent with the overarching greenhouse gas emissions reduction target.

One Planet common international targets

The green transport plan will consider how best to reduce the need for people to travel. Site selection will consider the proximity of local services such as schools, healthcare, business districts, shops and leisure facilities. On-site facilities complement local facilities as appropriate. Having reduced the need to travel, the development provides access to sustainable transport modes. Access to pedestrian and cycle networks, public transport hubs, car clubs and car and bike sharing will all be prioritized.

Consideration should also be given to future green technologies and how the site could be developed to enable these technologies to be incorporated at a later date – for example by installing electric vehicle charging points. Biofuels may be used to help meet the transport target, but there must be robust proof it is derived from sustainable sources, to be assessed on project by project basis. For example biofuels locally grown on marginal land or waste cooking oil could be considered sustainable.

In North America, the *One Planet Communities* program requires projects to strive towards a maximum of 1.0 tons of carbon emissions per person in the transportation sector - some urban projects have set targets as low as 0.7 tons per person.

One Planet national and international context

Transport is the fastest growing contributor to CO₂ emissions. The Energy Information Administration reports that vehicle-related emissions in the United States amounted to 958,600,000 metric tons, accounting for 33 percent of total U.S. energy-related carbon dioxide emissions in 2005. American vehicles travelled over 3 trillion miles in 2005, yielding an annual vehicle miles travelled (VMT) of 10,200 per capita. Recent information cited by the Brookings Institution cites the average cost of automobile ownership at \$9,000 per year.

4. SUSTAINABLE MATERIALS

Mission Statement

Maximize the use of low-embodied energy, local, recycled, salvaged and shared materials in the community at UMore Park to reduce the harvest of raw materials and manage local material resources in a sustainable way; and develop new materials and products for use in the community and introduction to outside markets.

Approach

The approach for sustainable material use in the community at UMore Park integrates design and construction innovation and best practice for the built environment, innovative programs and education to promote sustainable consumer behavior, and resource stewardship initiatives.

The large demand for materials created by the development of a community at UMore Park can provide an opportunity to research, design, produce and procure more sustainable materials and processes, incubate new sustainable materials businesses on-site, and encourage sustainable practices in existing suppliers. Partnership with the University of Minnesota and commercial, industrial and retail stakeholders can help to shape innovative guidelines and standards for materials and explore new possibilities for material development, procurement, processing, marketing and delivery through interdisciplinary research and experiential learning.

Goals

- SM1 Minimize material use to the extent practical through effective design of the built environment, best construction management practices and building material recovery and reuse.
- SM2 Utilize community-scale demand for materials

to promote production and use of high-quality, sustainably-manufactured goods from local manufacturers.

- SM3 Foster green-collar jobs in an eco-industrial area on-site in sustainable materials R&D, manufacturing and supply. Explore the creation of a sustainable materials local business incubator.
- SM4 Steward land and resources at UMore Park to produce materials for future use in the built environment of the community.
- SM5 Encourage use of regional and community waste streams to support identification and design of new materials and products.
- SM6 Promote opportunities for research, development, demonstration and evaluation of new, healthy, sustainable materials for buildings and consumer goods in the community.
- SM7 Encourage use of recyclable, compostable and healthier products and promote sharing, reuse and swapping programs for consumer and business goods and products.
- SM8 Establish educational programs and initiatives to inform and enhance consumer behavior around sustainable, healthy materials and products for inside and outside the home.

Local context

- The State of Minnesota-established Sustainable Building Guidelines: Buildings, Benchmarks, and Beyond (B3) are mandatory guidelines for all new buildings receiving state funding and include a materials and waste component. The guidelines are moving away from prescriptive requirements toward material selection based on Life Cycle Assessment

(LCA) which provides a more comprehensive review of real effects and costs of materials used.¹

- The Sustainable Building Guidelines (B3) provides strategies for the diversion of 80 percent of demolition debris and 75 percent of construction waste (both by volume) from landfills through salvage, recycling and/or recovery.²
- Dakota County provides a set of Sustainable Design and Building Standards (2000), used for the design of several public buildings in the county, including Lebanon Hills Trailhead and Visitor Center, the Northern Service Center, and Thompson Park Center/Dakota Lodge. The document establishes guidelines for recycled content of building materials.³
- The Minnesota Pollution Control Agency provides a database of products with recycled content made in Minnesota.⁴
- The Minnesota Recycling Markets Directory has a listing of brokers, processors and end users of construction and demolition wastes. Markets for shingles and gypsum wallboard are also being developed.⁵
- The Minnesota Materials Exchange program is a free service that links organizations that have reusable goods they no longer need to those who can use them. In the last five years, the program has helped businesses save over seven million dollars and exchange over 30 million pounds of material.⁶
- The Twin Cities Free Market is a free online service sponsored by Eureka Recycling which allows consumers to discard household items they no longer need and search for items they could use. The program does not currently accept listings for items in Dakota County.⁷
- The top commercial and industrial sectors in Rosemount include wholesale trade; transportation, warehousing and utilities; finance, insurance and real estate.⁸
- Rosemount has 23 manufacturing operations employing 1,264 individuals with an average yearly salary of \$70,000 in 2007.⁹

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens' quality of life and support sustainable management of material resources. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to achieve sustainability in material and resource management.

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Product developers, manufacturers and distributors, especially those with expertise in green and recycled products including construction materials, windows and cleaning products.
- Local area farmers.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Non-profit organizations, especially focused on materials and resource reuse and recycling.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on aspects of sustainable resource management.

Site features

- The UMore Park property contains one of the last and largest remaining high-quality aggregate deposits in Minnesota. The University completed a 40-year lease agreement with Dakota Aggregates, LLC, in June 2011 for phased aggregate mining on 1,722 acres of the UMore Park property. This agreement followed the completion of an Environmental Impact Statement (EIS) that identified any potential impacts of mining and mitigation commitments to address those impacts, and authorization by the University Board of Regents to execute the lease, both in November 2010.
- The property contains remnants of the former Gopher Ordnance Works, a WWII federal smokeless gunpowder manufacturing facility, which consist of an estimated 263,000 tons of concrete.
- At 5,000 acres, the size of the property could potentially support growth of lumber or other building materials for future on-site use.
- The close proximity of UMore Park to the Twin Cities provides opportunities to salvage building materials from metropolitan area construction projects.

Opportunities for innovation

Existing requirements

Current Rosemount codes related to building materials and construction within developments include:

- Metal roofs are not allowed on single-family dwellings, aside from those designed to look like traditional shingles.
- For single-family dwellings, steel siding with exposed panels exceeding sixteen inches in width is not permitted.
- For townhomes, no exterior building finish shall be sheet aluminum, asbestos, iron, steel, corrugated aluminum or untreated block.

Site conditions

- Dakota Aggregates, LLC, is pursuing local jurisdictional approvals to conduct phased aggregate mining on the western edge of the UMore Park property, per the terms of the lease agreement with the University of Minnesota. Aggregate mining is anticipated to commence in the spring of 2012. Objectives for the aggregate mining operations include minimizing the environmental impacts of this process while maximizing the benefits of a regionally-significant material. Additional information on sustainable practices related to the aggregate mining operations can be found in the appendix.
- The University of Minnesota launched a Remedial Investigation (RI) on the eastern 3,500 acres of UMore Park in late 2010 to collect important information regarding the environmental condition of the property resulting from historical uses, including the Gopher Ordnance Works, a federal smokeless gunpowder manufacturing facility during World War II, as well as activities following the University's acquisition of the property. The RI will include collection of soil and groundwater samples for laboratory analysis to assess any potential environmental impacts.

Research and knowledge creation

- Research and analysis could help to identify baselines and local best practices for use of sustainable materials in community development in Minnesota.
- More information is needed to identify available local and regional material waste streams that could become resources for production of new materials or energy for the community at UMore Park. Potential waste streams could include:
 - ◆ Fly ash.
 - ◆ Construction waste.
 - ◆ Organics.
- Further study could help to identify potential challenges to experimentation with new materials including property insurance as well as government health and safety regulations.
- Research and evaluation is needed to explore and develop new regulations that encompass the initial environmental cost, intended use, life cycle and future adaptability of a material.

Baselines for key performance indicators

Sustainable material use in buildings

- Since there are only mandates for sustainable material use in state funded buildings, a baseline for sustainable material use for all new construction is unknown.¹⁰
- Out of 14 available checklists for Leadership in Energy and Environmental Design (LEED) for New Construction projects in Minnesota, the following sustainable material use rates were attained:¹¹
 - ◆ For recycled content of building materials, two reached 20 percent, 10 achieved 10 percent and one project reached five percent use of recycled content.
 - ◆ In 13 of the projects, at least 20 percent of materials were manufactured locally.
 - ◆ In seven projects, 50 percent of the locally manufactured materials were also harvested locally.
 - ◆ Only seven projects used Forest Stewardship Council-certified wood materials, and none of the projects used rapidly renewable materials.

Construction waste diversion

- Eleven of the above LEED projects achieved 75 percent diversion of construction waste, and an additional three achieved a 50 percent diversion of construction waste from landfills.¹²
- Dakota County promoted reuse and recycling of construction waste in several recent county building and transportation projects. Of the 27 tons of construction and demolition waste generated during these projects, 18 tons were recycled, for an overall recycling rate of 71 percent.¹³

Key performance indicators

These performance targets can be considered as part of a holistic approach to the use of materials throughout the community. Appropriate material strategies could be determined based on anticipated use. These targets could be updated regularly, to incorporate emerging technologies, innovation and best practices identified through previous phases.

Material composition

- Strive to utilize building materials with at least five percent reuse/salvage content, 20 percent recycled content and 2.5 percent rapidly renewable content (by value).
- Ensure that at least 50 percent of wood-based products are Forest Stewardship Council certified.
- Avoid use of items on the Living Building Challenge Red List, whenever possible.¹⁴

Product processing, manufacturing and/or assembling

- Establish on-site carbon sequestration or other activities to offset the carbon emissions produced through the process to manufacture building materials.
- Consider the environmental and employment practices of the manufacturers in procurement.

Origin and transport of materials

- Strive to procure at least 20 percent of building materials within 500 miles.
- Foster on-site businesses to support manufacture of at least 20 percent of building materials for the community.
- Ensure mechanisms exist on-site for organics composting for use as soil amendments.

Lifecycle through use and decomposition

- Achieve 75 percent recycling of construction waste created by community development.
- Conduct lifecycle assessment on designs for residential, commercial and industrial space to measure embodied CO₂ and other environmental impacts. Apply this information in decision-making about material choices to reduce these impacts.
- Produce more durable buildings in the community.
- Design buildings that are flexible to adapt to changing uses.
- Design buildings for disassembly and deconstruction.

Local goods

- Increase amount of goods and products used by residents on-site that are produced on-site or nearby to reduce products' vehicle miles traveled, and enhance social engagement.
- Engage residents in sustainable consumption of goods and products including recycling, reusing and sharing goods, and purchasing healthy, locally-made products. Neighborhood community sustainability centers will be the focal point for resource information and classes.

Monitoring plan

Monitoring to assess progress toward above performance targets can begin during the planning and design phases and continue throughout construction phases. Buildings within the community at UMore Park could undergo lifecycle analysis for

building materials utilizing available tools such as Pharos, Athena or Building for Environmental and Economic Sustainability (BEES). Importantly, annual post-occupancy evaluation of buildings at UMore Park could analyze the performance and durability of the materials utilized, and recommend any necessary revisions to the performance targets and requirements based on this analysis. Over time, additional monitoring can help to identify changes in use and the ability of structures to accommodate change and produce little to no material waste.

Additionally, collaborating with local retail and commercial businesses as well as residents in the community would identify trends for purchasing local and sustainable products.

Retail and commercial business surveys could include:

- Procurement of healthy, locally-made goods.
- Amount and types of sustainable goods.
- Amount of local goods sold.
- Goods produced on-site.
- Challenges and successes.

Residents' surveys could include:

- Percentage of goods budget spent on-site.
- Percentage of goods budget spent off-site on local and sustainable products.
- Participation in composting, recycling and sharing programs.
- Use of recycled goods or products and compost.

Design strategies

Strategies for utilizing healthy, sustainable materials and products in the community at UMore Park integrate effective design guidelines, lifecycle analysis for building materials, new product research and development, and demonstration and evaluation of materials and products for broader implementation.

Goals	Design strategies	Milestones
SM1 SM6	Encourage innovation and flexibility in designs to reduce material use. Explore collaborations to demonstrate and test new materials and technologies.	Design phases.
SM1 SM5	Identify complementary industrial and commercial business operations and facilitate the location of facilities near one another to allow the byproduct of one to be used as an input for another process.	Design phases.
SM2 SM5	Identify regional resources and assets including materials R&D and manufacturers, salvaged and recycled products and potential byproducts for recovery and reuse.	Planning phases.
SM2 SM6	Engage and collaborate with local companies and enterprises who have studied sustainable building practices and materials in cold climates.	Planning phases.
SM1 SM6 SM8	Explore opportunities to involve University of Minnesota faculty and students in research and monitoring while providing hands-on, interdisciplinary learning experiences for students.	Planning phases.

SM1 SM2 SM6 SM7	Explore effective design and construction guidelines for materials using cost-benefit analysis and lifecycle analysis, and establish regular revision to ensure they evolve with improvements in technology. These guidelines can include: <ul style="list-style-type: none"> • Recycled content. • Reusability, ease of disassembly, deconstruction. • Products on the Living Building Challenge Materials Red List, volatile organic compounds (VOCs). • Green chemistry and desired material properties. • Distance from site. 	Planning phases.
SM3	Explore strategies and mechanisms to foster an incubator for green materials businesses.	Planning phases.
SM6	Design and construct well-designed model home(s) on the UMore Park property representing best practices in material use and construction technology.	Design phases.
SM6	Explore Minnesota Vernacular ^a materials and design to inform new housing or public building designs for the community at UMore Park.	Planning phases.
SM1 SM6	Consider designs for disassembly, flexibility and reuse.	Design phases.
SM1 SM6	Establish a building durability plan for each building. Evaluate material options for best use, recognizing that a longer lifespan is not always the best choice (concrete versus wood).	Design phases.
SM1 SM6	Explore partnerships with product and material R&D-based companies, manufacturers and researchers for monitoring of material use in buildings throughout the community during construction, and evaluation of durability and performance over time.	Planning phases.

Construction strategies

Goals	Construction strategies	Milestones
SM1 SM4 SM5	Preserve desirable existing site features and utilize existing materials and elements, if feasible, during construction.	Design and construction phases.
SM1 SM4	Consider establishing forested areas on the property to provide future resources for green infrastructure and building materials and to invest in natural amenities on-site. Ensure ecologically-sensitive harvesting of any existing or planted resources.	Planning, design and construction phases.
SM2 SM3 SM5	Source construction materials as locally as possible.	Construction phases.
SM5	Utilize site aggregate in construction.	Construction phases.
SM1 SM2 SM7	Avoid materials on Living Building Challenge Red List in materials procurement, whenever possible.	Construction phases.
SM2 SM7	Procure materials with high recycled content.	Construction phases.
SM1	Procure materials available via salvage or reuse.	Construction phases.

^a Vernacular architecture promotes the use of locally available materials, traditional building techniques, culturally and climatically relevant building design. Center for Vernacular Architecture, <http://www.vernarch.com/index.html> (2006).

SM6	Incorporate educational opportunities for students during construction to learn best practices in material use and construction.	Construction phases.
SM3 SM6	Work in collaboration with on-site businesses to develop, install, and monitor new materials.	Construction phases.
SM1	Reduce construction waste through on-site separation, reuse and recycling.	Construction phases.
SM1	Use high-quality construction techniques to produce durable buildings.	Construction phases.

Community life strategies

Strategies to support residents' use of healthy, sustainable materials and products in their homes integrate mechanisms to support a thriving community economy, effective programs to encourage sharing, reuse and recycling and education and resources to promote sustainable consumer behavior.

Goals	Promoting sustainable behaviors	Milestones
SM1 SM7	Establish a community hub in the neighborhood community sustainability centers that enables residents to check-out products like tools, lawnmowers, recreation equipment (skis, roller blades). Could be connected to non-material resource sharing such as babysitting or community classes (knitting, gardening, etc.).	By phases of occupancy.
SM1 SM7	Collaborate with car- and bicycle-sharing programs and organizations to establish car- and bicycle-sharing opportunities in the UMore Park community, with shared vehicle parking scattered conveniently throughout the community.	By appropriate phase of occupancy.
SM2 SM8	Establish and launch a local sustainable community brand that identifies products produced in UMore Park as well as locally-based services.	By phases of occupancy.
SM1 SM3 SM8	Create a residents' manual that outlines locally available sustainable goods and services.	By phases of occupancy.
SM2	Draw in vendors that provide locally made and sustainable products and services.	By phases of commercial/retail occupancy.
SM2	Work with product developers to encourage development of products and processes which loop products through use and reuse in the community's material streams to eliminate waste.	By phases of commercial/retail occupancy.
Goals	Education and engagement	Milestones
SM1 SM7 SM8	Establish a website that connects residents who are willing to share, loan, sell or exchange their property, such as cars, boats, fine china, rental property, etc. Explore broader community involvement.	By phases of occupancy.
SM2 SM8	Launch a "think local" campaign that informs people about local sustainable community-branded products and services, and that promotes other local and regional products.	By phases of occupancy.
SM8	Establish a sustainability concierge at the community sustainability center(s) that guides UMore Park residents on ways to live sustainably and orients visitors to the community.	By phases of occupancy.
SM7 SM8	Provide resources to support residents' use of sustainable, healthy products such as furnishings, efficient appliances, cleaning products, light bulbs, among others.	By phases of occupancy.
Goals	Collaborative opportunities	Milestones
SM2 SM3	Explore partnerships with existing local businesses to provide sustainable purchasing options.	By phases of commercial/retail occupancy.

Management plan strategies

Property management plans and policies can provide a framework through which residents, property owners and businesses have access to a mix of sustainable options for resource procurement, construction and remodeling.

Goals	On-site policies and property management	Milestones
SM3	Solicit environmentally responsible suppliers, cleaners, and maintenance businesses.	By phases of commercial/retail occupancy.
SM2	Make sustainable products, cleaning, and repair options available and the smart and easy choice.	By phases of occupancy.
SM6	Analyze the feasibility of requiring LEED Operations and Maintenance Certification or similar guidelines for buildings within the development.	By phases of occupancy.

HR plan and job creation

Job creation through use of local and sustainable materials in the community at UMore Park can include the following:

- Design and construction of UMore Park can provide jobs and training in sustainable construction techniques throughout the development of the community.
- Aggregate mining operations and ancillary businesses are anticipated to create from 80 to 120 jobs in sand and gravel mining and processing, along with pre-fabricated products.
- The location and development of an eco-industrial park and commitment to using community-produced materials can foster jobs in research and manufacturing.
- Promoting the use of local materials, products and services can create and support jobs in and nearby the community at UMore Park.

Synergies

- Sustainable Materials and Zero Carbon. High-quality construction and local procurement of materials can produce more durable buildings with reduced building heating and cooling demands and costs, and reduces materials transportation energy and costs.
- Sustainable Materials and Zero Waste. Effective designs can decrease waste by reducing materials needed and wastes produced during construction. The built environment can be designed for deconstruction and reuse.
- Sustainable Materials and Sustainable Transport. Buying locally reduces transportation emissions by minimizing the need for transportation.
- Sustainable Materials and Culture and Community. Sharing resources promotes interdependency among residents, producing a sense of community.
- Sustainable Materials and Equity and Local Economy. Fostering new business location and incubation in sustainable material development and manufacturing supports a thriving community and regional economy. In addition, efforts to encourage use of local products and services supports community retail and commercial businesses.

Strategic positioning

Community benefits

- Ensure high-quality goods are available to residents and the surrounding communities.
- Community demand and buying blocks within community for sustainable, local goods and products can reduce individual costs.
- Use of healthy, sustainable building products can improve indoor air quality and health.
- Resource sharing reduces household expenditures and promotes community cohesion.
- Residents are empowered consumers through awareness of product streams and material content.

Environmental benefits

- Sustainable material use reduces consumption and waste.
- Residents are encouraged to utilize natural resource material streams.

Marketing

- Educational art utilizing renewable or salvaged material highlights opportunities for new ways of using materials.

Wider community and municipal engagement

During community engagement process

- Demonstrate and educate residents and members of the surrounding communities on effective building materials and processes utilizing local and sustainable materials.

Post first occupancy

- Neighbors in the surrounding communities can participate in educational opportunities and in resource-sharing programs.
- Natural and local products will be available at UMore Park and open to all to purchase.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is one where all goods and materials used – for construction or consumer goods - are made from renewable or waste resources with low embodied energy and, wherever possible, sourced locally.

One Planet common international targets

Construction and refurbishment activities will be designed to minimize the impact of the materials used and the maintenance required. Project specific targets will be developed for these strategies.

One Planet Communities will:

- Make optimum use of all existing buildings and infrastructure and think creatively about designing out the need for some conventional built requirements – e.g. reducing paved areas and hard landscaping, avoiding suspended ceilings, etc.
- Measure (or at least have a strategy in place to assess) the embodied CO₂ of materials throughout the design and construction processes and use this as one of the decision making criteria from the outset; have strategies in place to minimize the embodied CO₂ of any construction and refurbishment work.
- Prioritize construction materials that are low impact, durable, local and reclaimed. Where possible high impact or polluting materials (for example PVC and aluminum) will be avoided. The key impact areas will be identified and plans developed to reduce the impact of these materials.
- Consider the lifecycle impact of buildings in design. This means design and materials choices that enable easy maintenance and longevity. Buildings will be designed with consideration for deconstruction so that on decommissioning the materials can be recovered and re-used or recycled.

Strategies to enable residents and workers to reduce consumption and choose low impact goods will be implemented. Options could include:

- Providing information on reducing the impact of goods through community information services e.g. welcome packs and a community intranet.
- Providing services that facilitate the sharing of goods, especially goods that are used infrequently but have a high-embodied energy for example power tools.
- Providing access to durable goods, electrical appliances and furniture, with low impact in manufacture.
- Attracting property management companies and other service providers to the community who will support the *One Planet* approach.

One Planet national and international context

The building industry consumes 40 percent of the world's raw resources. Increasing levels of international trade result in higher volumes of materials being transported greater distances, contributing to significant GHG emissions. The use of toxic materials in building contributes to poor indoor air quality and can impact human health. Using local materials can benefit local economies and support traditional and vernacular solutions.

A recent American Institute of Architects (AIA) poll of registered voters revealed that 90 percent of respondents said they would be willing to pay \$5,000 more for a house that would use less energy and protect the Earth.¹⁵

Renewable materials and energy-efficient products for kitchens and baths have risen in popularity, while economic concerns among homeowners has resulted in a decline in demand for high-end appliances and features (There is also a growing interest in eco-friendly features for kitchens such as bamboo and cork flooring, and concrete and bamboo countertops.). Water saving toilets and LED lighting options have become more popular in bathrooms, along with continued strong demand for radiant heated flooring. Conversely, there has been a drop-off among homeowners looking for high-end features including towel warming drawers, double-sink vanities and whirlpool baths.

5. LOCAL AND SUSTAINABLE FOOD

Mission statement

Promote consumer education and healthful diets high in local, seasonal and low-environmental impact foods while addressing local economic development and social interactions in the community at UMore Park.

Approach

The approach for the community at UMore Park emphasizes helping residents become aware of the impact their food choices have on their own health and on the environment. Residents can learn about the food they eat and how to make better choices. Access to sustainably-grown, local foods is integral to this part of the approach. Local and fair trade^a food could be available wherever possible. When local or fair trade products are not available, residents can access information and resources about alternative choices. An on-site farmers' market, grocery stores and markets carrying locally-grown products, research and demonstration gardens featuring local foods, and restaurants and cafes with an emphasis on local foods are key elements for the community. Local foods production could include orchards and year-round greenhouse facilities. Smaller community gardens in neighborhoods, patio gardening and edible landscaping could be incorporated as phases of the community are developed.

Partnerships with the school district, health care organizations, hospitals and care centers can emphasize nutrition education

and mechanisms to incorporate local foods into institutional settings. Community education could include gardening experiences, nutrition classes for all ages, partnerships with health and wellness organizations, citizen organizations and community nonprofits. Education and outreach efforts could engage residents first through the lens of health and healthy lifestyles in order to motivate people to eat and grow more local foods.

Goals

- LSF1 Educate residents and individuals that work in the community—through materials, classes and events—on environmental impacts of food production and on diet and nutrition, gardening and preparation of healthy meals that include local foods.
- LSF2 Encourage at-home gardening and food preparation by providing opportunities for residents to grow and harvest their own food on-site through individual and community gardens at multiple locations.
- LSF3 Maximize local food production on-site. Extend seasonal practices to make local foods available year round through greenhouses and related facilities. Connect local food production to on-site processing and sales resources to support economic development and job creation.
- LSF4 Create green-collar jobs, such as coordinators for

^a **Fair trade:** "Fair trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South. Fair trade organizations, backed by consumers, are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade." "What is Fair Trade?" Fair Trade Advocacy Office, http://www.fairtrade-advocacy.org/index.php?option=com_content&view=category&layout=blog&cid=69&Itemid=143 (2010).

See also the University of Minnesota Board of Regents policies:

Policy on Equity, Diversity, Equal Opportunity and Affirmative Action, University of Minnesota Board of Regents, http://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html (July 2009).

Policy on Purchasing, University of Minnesota Board of Regents, <http://www1.umn.edu/regents/policies/financial/Purchasing.pdf> (July 2008)

farmers' markets, edible landscapes, edible schoolyards, gardening parks as well as jobs in local foods restaurants, cafes, grocery stores, markets, vegetable stands, commercial processing, school and hospital kitchens, and in other small business start-ups.

- LSF5 Reduce food waste through education on composting and waste management.
- LSF6 Decrease vehicle miles travelled for food consumed by residents and businesses.
- LSF7 Strengthen food security for all people in and around the community at UMore Park.

Local context

- In 2007, there were 26,917,962 acres of total farmland in Minnesota. This is 52.9 percent of Minnesota's total land area. Cropland was 81.5 percent of this farmland, and pastureland was 5.5 percent.¹
- The average farm size in Minnesota in 2007 was 332 acres, with 40.4 percent of farms being between 1 to 99 acres, 41.6 percent being between 100 and 499 acres, and 18 percent being 500 acres or larger.²
- The market value of agricultural products sold in Minnesota in 2007 was the seventh highest of all states in the U.S. at \$13.2 billion.³
- In 2008, there were 543 organic agriculture certified operations in Minnesota, which encompassed 133,393 acres of croplands (6 percent of total cropland) and 20,742 acres of pasture and rangeland (1.4 percent of total pasture and rangeland).⁴
- In 2010, the top five agricultural commodities in Minnesota were corn, soybeans, hogs, dairy products, and cattle and calves. The percent of state total farm receipts for each were: corn 26.5 percent, soybeans 19.6 percent, hogs 15.2 percent, dairy products 9.6 percent, cattle and calves 8.0 percent.⁵
- In a ranking of states, Minnesota is the fourth largest exporter of feed grains and products, third largest exporter of soybeans and soybean products, and sixth largest exporter of wheat and wheat products.⁶
- Data from 1997 found that Minnesota livestock produce 0.254 million metric tons (MMt) of methane per year. This level of agricultural methane is equivalent to 1.4 MMt carbon equivalent emissions per year.⁷
- Dakota County has 1,065 farms with a total acreage of 246,026 acres. The median farm size is 52 acres while the average farm size is 231 acres. 46.2 percent of farmers in Dakota County list their primary occupation as farmers.⁸
- Total land used for vegetable production in Dakota County is 10,790 acres, according to the 2007 Census of Agriculture.⁹
- Compared with surrounding counties, Dakota County stands out as a leader in market value from crops, especially grains and oilseeds, vegetables, and nursery crops. Market value from sales in these categories are over \$115,000,000. Market sales from cattle and calves, as well as dairy products from cows, were \$61,000,000 in 2007.¹⁰
- According to the 2007 U.S. Census of Agriculture, Dakota County had 12 farms producing organic food.¹¹

- In 2007, the Minnesota Department of Agriculture conducted a survey of organic farmers in Minnesota. A majority of respondents reported that organic production was more profitable than conventional farming.¹²
- In 2007, in Dakota County the market value of products sold directly to individuals for human consumption was \$1,821,000, with 15.4 percent of farms participating. This represents the local production of sales for operations like farmers' markets, roadside vegetable stands and orchards.¹³
- Eight communities in Dakota County have established nine local farmers markets that provide opportunities for the sale of locally grown food. In addition, the County Parks and Open Space Department provides garden plots at the Spring Lake Regional Park.¹⁴
- Fifty-four percent of the UMore Park property is covered with Waukegan silt loam which is rich in organic matter from centuries of the growth of prairie plants. Waukegan silt loam yields, on average, four tons of grass-legume hay per acre. Prime agricultural soils are affected by the presence of the former WWII Gopher Ordnance Works remnants and by phased aggregate extraction over 40 years—through 2057.¹⁵
- A substantial portion of UMore Park is already used for agriculture. On average 600 to 900 acres of the site have supported agricultural research each year and acres have been rented to local farmers over the years. In total 70.7 percent of the land cover is classed as planted or cultivated vegetation.¹⁶
- Minnesota is home to more food coops than anywhere else in the U.S.¹⁷
- Currently 63 community supported agriculture (CSA) farms deliver produce to the Twin Cities metropolitan area and support food co-ops.¹⁸
- Minnesota is home to the second largest population of Hmong immigrants in the United States.¹⁹ This population is concentrated in the Twin Cities metropolitan area, with significant number of people involved in fruit and vegetable production and sales at metro-area farmers markets. Many currently rent or own land in Dakota County.

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens' quality of life by promoting active, healthy lifestyles and support economic development in the region and state. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to achieve sustainability across production, management and distribution of local, healthy foods:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district, new schools that could be established over time, and the regional community education network.
- Local units of government.
- State and federal agencies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Food, environmental, agriculture and health non-profit organizations.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on aspects of community development and sustainability.
- Regional and city programs focused on food and nutrition issues.
- Health and health insurance providers and national health associations and organizations with local chapters.
- Many local restaurants and chefs that emphasize local food in their establishments.
- National and multinational food companies based in the Twin Cities.
- National, family-owned and other local food retailers.
- Sustainable and local food networks, including CSA farms, farmers' markets and food co-ops.
- Multiple food shelf operations and local food distribution programs.

Site features

- With development proceeding in phases over 30 or more years, there are ample available acres for local food production, demonstration and food research.

- Seventy-seven acres of land at UMore Park are currently leased by members of the Hmong farming community for local food production.
- One local food enterprise currently leases acreage at UMore Park to grow and sell produce wholesale to local grocery chains.
- The property is located within 30 miles of St. Paul and Minneapolis Farmers' Markets (the St. Paul Growers Association stipulates that foods sold at the St. Paul Farmers Market must be cultivated within 50 miles of the market).
- Agricultural research on-site is coordinated by the College of Food, Agricultural and Natural Resource Sciences' Rosemount Research and Outreach Center.
- Several acres of the property are currently used for the University of Minnesota Master Gardener research and demonstration gardens.

Opportunities for innovation

Existing requirements

- Currently, City of Rosemount ordinances allow farm animals on property that is zoned as agricultural or owned by the University of Minnesota and used for agricultural or research purposes. Fowl, including chickens, are limited to three birds on residential property.

Site conditions

- Although ample areas exist within UMore Park for research and demonstration, commercial-scale local food production and community gardens, near-term road access may be a challenge for large equipment that may be needed to prepare soil as well as access for farming and gardeners. For smaller scale equipment, this would not be an issue.
- Providing access to irrigation water for the commercial-scale local food production and gardens may present a challenge to site locations.
- Management of produce, especially for processing and value-added opportunities will require special facilities.
- The lead time required to establish orchards and management systems for fruit production and distribution may be a factor in the UMore Park development timeline.
- Current levels of food literacy—and confusion about locally-grown food and organically grown foods—could inhibit early efforts toward local food production and related developments such as on-site farmers' markets, greenhouses and other facilities.

Research and knowledge creation

- A business model for on-site food production could be developed.
- Information on the type of local foods being produced in Dakota County including livestock for artisan cheese production and other local and specialty food items could be assessed in order to develop a strategy for local food production at UMore Park.
- A survey could be administered to area residents to determine

the level of food and nutrition literacy, current dietary behaviors, including consumption of fruits, vegetables and meat, percentage of local foods in the diet, and preferences of adults and for their children.

Baselines for key performance indicators

- Physical health statistics from Dakota County (2009) include:²⁰
 - ◆ Adult diabetes rate (6.1 percent)
 - ◆ Adult obesity rate (25.6 percent)
 - ◆ Low-income preschool obesity rate (12.6 percent)
- Total land used for vegetable production in Dakota County is 10,790, according to the 2007 Census of Agriculture, U.S. Department of Agriculture (USDA).²¹
- Independent School District 196 has participated in the Minnesota Farm to School program (which was created out of a U.S. Department of Agriculture-funded project nationally, 2000-2004) since 2008. The district has purchased apples, sweet corn, squash, pumpkins, cheese, wild rice and honey from local producers.²²
- Currently, 63 Community Supported Agriculture producers provide produce in the Twin Cities metropolitan area.²³
- The Food Alliance Midwest, a Minnesota cooperative, has worked with more than 40 Minnesota restaurants that are incorporating locally-grown food into menus.²⁴
- In 2011, more than 900 producers offered produce and products directly to consumers through the *Minnesota Grown* program of the Minnesota Department of Agriculture.²⁵

Key performance indicators

A priority focus on sustainable local foods supports multiple goals for the vital, sustainable community. University of Minnesota engaged research, education and outreach about local foods – with assistance from a range of partners – can support life-long learning for residents in areas of growing food and interactions with the managed environment, nutrition and healthy lifestyles, gardening as a social and physical activity, and business and economic development. Residents, from the youngest children to older adults can actively participate in gardening and food preparation. Larger research and demonstration acres and greenhouses for local foods could be a community gathering place, with a farmers’ market as the focal point. Neighborhood restaurants and grocery stores, schools and care centers can feature locally-grown produce, and entrepreneurs can create new business opportunities related to local food production, preparation and distribution. Food production, preparation and distribution could become part of job creation and economic development. Importantly, the focus on nutrition and healthful foods can prompt behavioral changes that result in decreasing the incidence of diet-related chronic diseases among residents.

Healthful foods and nutrition for community members, from production that has low impact on the environment

- Increase local food consumed as percent of diet.

- Reduce the average red meat intake while increasing the percentage of fruits and vegetables in the diet to meet U.S. Department of Agriculture/Department of Health and Human Services Dietary Guidelines for Americans.²⁶
- Subsequently reduce instances of heart disease, diabetes, obesity, and other diet-related chronic diseases in community residents.

Local food production

- Provide every household with access to a dedicated garden space and related education and resource opportunities to enable personal gardening experiences and food production.
- Increase participation in community gardening programs as neighborhoods develop.
- Increase amount of food consumed on-site that is produced on-site as a measure of reduced vehicle miles traveled, and social engagement.

Local foods and economic development

- Create jobs related to local food production, processing, retail sales, research and demonstration, and education activities at UMore Park.

Orient green space within neighborhoods and in close proximity to residences that includes gardens and food production areas

- Make best use of high-quality soils for use in on-site gardens and small commercial-scale crop and livestock operations.

Community education, partnerships and programming to support healthy lifestyles

- Increase gardening through partnerships with the school district, food and restaurant associations, the faith community and other non-profits.
- Support composting as part of the overall waste management plan, emphasizing the role of organic materials in soils lifecycles.
- Engage residents in cooking and nutrition activities that are anchored in appreciation for local, seasonal produce. Neighborhood community centers can be the focal point for classes and food-based events.

Monitoring plan

Ongoing monitoring via a variety of mechanisms can measure the success of the community in moving toward sustainable practices and behavior around local foods. Monitoring can include tracking community grocers, farmers’ markets and restaurant inventories of local foods, resident surveys related to diet and food spending, and tracking participation in community food programs.

Collaborate with grocers, farmers’ market managers and restaurateurs to analyze inventory records for:

- Performance adhering to procurement policy for local foods.
- Amount and types of meat sold.

- Amount of local foods sold.
- Food produced on-site from commercial operations (not produced in home gardens for home use).
- Sale of food produced on-site and through local production channels (including CSAs, farmers' markets, restaurants, schools).
- Challenges and successes.

Residents' survey

- Percentage of food budget spent on-site.
- Percentage of food budget spent off-site that is local and sustainable.
- Number of servings of red meat, fruits and vegetables and local foods per week.
- Hours spent per week in garden, and amount and type of produce for home consumption produced (each summer/fall).

Track policies, programs and activities around local and sustainable food in community

- Production from community gardens.
- Food production from on-site small commercial-scale crop and livestock operations.
- Percentage of resident families participating in CSAs, food cooperatives, community garden, composting and educational activities and programming.
- Percentage of residents attending cooking classes and food-related social events.
- The number of chicken and livestock permits issued.

Design strategies

Strategies for sustainable food integrate consumer choice, education and nutrition; community and social interactions; personal and community food production; and commercial food production and retail focused on local foods.

Goals	Design strategies	Milestones
LSF1	Incorporates life-long learning activities such as educational materials, website information, classes, school and community education programs, and special community events that celebrate sense of place and local Minnesota fresh produce.	Occupancy phases.
LSF2	Support active learning, personal rewards, social engagement, and improved nutrition for individuals and families with at-home gardening, food preparation.	Occupancy phases.
LSF3	Maximize local food production on-site. Establish acreage for research/demonstration and production of local foods. Develop business plan for potential conversion to commercial operation that includes greenhouses and high tunnels for extended season, on-site processing and sales.	Research and demonstration acreage to be established at earliest opportunity.
LSF4	Create green-collar jobs based on community, commercial and retail food-related opportunities.	Staged, with first jobs related to research/demonstration acreage, greenhouses.
LSF5	Reduce food waste through composting, waste management program. Provide education, information and appealing design for conveniently located closed-loop composting and fertilizer system on-site.	Occupancy phases.
LSF6	Decrease vehicle miles travelled for food. Develop consumer education/information materials, website information (including quick calculator) to encourage local engagement and patronage. Develop mutually beneficial arrangements among local food growers and commercial/retail purveyors.	Prior to first occupancy, based on establishment of research/demonstration acreage, greenhouses.
LSF7	Strengthen food security in and around the community. Ensure access to sufficient and nutritious foods for all community members, especially the very young and the very old. Special voucher programs could be used at community farmers' markets and in conjunction with local grocers and markets.	Occupancy phases.
LSF3 LSF4 LSF7	Establish CSA partnerships.	By occupancy phases.

LSF1 LSF2 LSF3 LSF4 LSF5 LSF6 LSF7	Foster edible landscaping – using food-producing plants in the constructed landscape, both residential and public landscapes – and a community harvest program as a way to contribute to community kitchens, and for events.	By occupancy phases and phased landscaping of public spaces.
LSF3 LSF4 LSF5 LSF6	Explore opportunity to use waste heat to heat greenhouse on-site: first stage for a nursery, potential to expand to winter production for the collective gardening group.	Design phases.

Construction strategies

Goals	Construction strategies	Milestones
LSF1 LSF2	Provide locally grown food (procured from growers within a 50 mile radius) to construction workers on-site via local lunch vendors.	Construction phases.
LSF2 LSF3	Collect and stockpile quality agricultural topsoil from excavation for use in gardens and yards.	Construction phases.
LSF1 LSF3	Address immediate need for sustainable irrigation strategy for community gardens, parks and other green space, and local foods research and demonstration acreage, as well as phased strategy as development proceeds.	Construction phases.

Community life strategies

Safe and healthful foods, along with wise food choices and smart eating habits, are essential to the quality of life for individuals, their families and overall community health. Food can be a focal point for fostering a sense of community, through the tending of vegetable gardens, the sharing of meals and through educational opportunities. The integration of nutrition education, gardening, cooking courses and retail food shopping options as formal and informal shared learning opportunities, for example, would address the interests of residents of all ages and foster community and a sense of place in the new community at UMore Park.

Goals	Promoting sustainable behaviors	Milestones
LSF1 LSF2 LSF3 LSF4 LSF5	Ensure that the central community sustainability center and neighborhood community sustainability centers offer a coordinated educational program on gardening, nutrition and cooking that includes use of kitchen facilities for all ages to: <ul style="list-style-type: none"> Educate on home meal preparation that incorporates local, seasonal produce -- and saves money for the consumer. Encourage healthy lifestyles and address diet-related chronic diseases. Serve as an incubator to influence and link the regional community. 	By occupancy phases.
LSF4 LSF6	Encourage cafés and restaurants on-site and in the local community to incorporate local foods, create partnerships with regional farmers, and label menus to include local and seasonal produce and other nutritional information.	Retail/commercial phases.

Goals	Education and engagement	Milestones
LSF1 LSF2 LSF5 LSF7	Encourage a healthy, school lunch program that incorporates local foods. Also, help to create a school garden program in conjunction with existing curriculum (in science, geography, economics, and others). The garden could be located on-site at the school(s) and help to ensure: <ul style="list-style-type: none"> • Healthful meals that are available to all students. • Experiential learning through growing, harvesting and preparing foods. • After-school opportunities for family participation. 	Coordinate with existing schools; implement in newly constructed schools.
LSF1 LSF2 LSF3 LSF4 LSF5 LSF6 LSF7	Ensure that the main community sustainability center and neighborhood community sustainability centers make information available on local education programs on health and environmental impacts of diet choices, portion size, food waste reduction, food preservation and canning, health and vegetarian cooking and composting. Information about CSA subscriptions, community garden plots and other resources will also be available.	By occupancy phases.
Goals	Community website and communications	Milestones
LSF1 LSF2	Feature lists and maps of local vegetarian option restaurants, organic food stores, other local and sustainable food outlets.	By occupancy phases.
LSF1 LSF2	Feature map of community gardens, edible landscapes and when different crops will be ripe for picking.	By occupancy phases.
LSF1 LSF2	Feature articles on food, nutrition, gardening, cooking, food-related special events, and healthy lifestyles – and a children and youth section – with a “community conversation” interface that allows everyone to share knowledge and questions.	By occupancy phases.
LSF1 LSF2	Carry web links to local food partners, food-based nonprofits, CSAs, local direct sales farmers and other food and health resources groups.	By occupancy phases.
Goals	Collaborative opportunities	Milestones
LSF4	Form a year-round farmers’ market on-site, providing sustainably produced foods and contributing to local job creation. Ideally, configured to expand upon acreage for research/demonstration of local foods.	To be established at earliest opportunity.
LSF1 LSF2	Develop educational partnerships on strategic issues; collaboration on research and educational grant opportunities related to healthy diets, food security, CSA strategies, sustainable food procurement policies, urban agriculture.	By occupancy phases.
LSF4	Stimulate economic development via training and certification programs for green-collar jobs. Create food-related jobs center; offer information/education programs for entrepreneurs via partnerships.	Launch prior to construction.
LSF1 LSF2 LSF3 LSF4 LSF5 LSF6 LSF7	Create an annual food/health focused celebratory event or festival featuring Minnesota-grown produce, local farm operations, and healthy lifestyle activities. Coordinate with other local food entities (wineries and apiaries, for example).	Launch prior to construction and in conjunction with research and demonstration acreage, farmers’ market.

Management plan strategies

Key policies can encourage healthful and sustainable lifestyles, and also ensure fair and equitable opportunities for businesses and retail operations. They can also address access to local fresh fruits, vegetables and other foods products – for all community members.

Goals	On-site policies and property management	Milestones
LSF3 LSF4 LSF6 LSF7	In partnership, develop guidelines for grocery stores, markets, restaurants and neighborhood community kitchens that increase the availability of locally grown foods in the community.	By retail and occupancy phases.
LSF5	Incorporate composting and waste management into the overall sustainable waste management strategy for the community.	Design phase of waste management plan.
LSF2 LSF3 LSF6 LSF7	Manage access and harvest of edible landscaping in public spaces throughout the community.	By occupancy phases and landscaping phases.
LSF3 LSF4 LSF5 LSF6	Foster CSA partnerships between on-site local foods growers and on-site restaurants and grocery stores and between aspiring food producers for equipment sharing, with priority to on-site producers.	By retail phases and establishment of local foods acreages.
LSF2 LSF3 LSF5 LSF6	Create opportunities for residents to raise chickens, small livestock and keep bees in close proximity to residences.	By occupancy phases.
LSF2 LSF3 LSF4 LSF5 LSF6	Facilitate and manage community gardens for residents, other collective garden areas and research and demonstration acreage for local foods production.	By establishment of local foods acreages and gardens.
LSF2 SLF3 LSF4 LSF5 LSF6 LSF7	Manage and expand the farmers' market to provide an outlet for more farmers to sell their produce by promoting to residents in the broader region.	By phased establishment of local foods acreages and gardens.
LSF3 LSF4 LSF5	Sustainably manage food production infrastructure that includes water, equipment, facilities and other components to meet economic and resource conservation goals.	By phased establishment of local foods acreages and gardens.

HR plan and job creation

- Sustainability concierges at the community sustainability center(s) to support residents' efforts to live sustainably including providing recommendation for native plant landscaping and local food gardening and efficient energy and water use. In addition, concierges may serve as tour guides of the community sustainability center(s) and communities as well as provide information and outreach about UMore Park's sustainability achievements to the broader community.
- Establish a natural area management position responsible to manage restoration, land use and habitat work in the natural lands on the property. The natural area manager could establish monitoring teams, organize community outreach and education opportunities, hire and manage summer interns to work on landscaping and habitat projects, and serve as a naturalist resource for the community.
- Additional jobs or volunteer opportunities could be created to maintain care for community green spaces, gardens and edible landscaping.
- Coordinator(s) and related staff could support and manage on-site farmers' market(s).
- Numerous positions are imagined to staff farmers' markets, local food restaurants, cafes, grocery stores markets, vegetable stands, commercial processing, school and hospital kitchens, and in other small business start-ups.

Synergies

- Local and Sustainable Food, Land Use and Wildlife and Zero Carbon. Green spaces can function both for food production and habitat. Reductions in the number of miles food travels from farm to table and perennial edible landscaping such as fruit and nut trees along community paths, trails and gardens to sequester carbon could also help to reduce carbon emitted by the community.
- Local and Sustainable Food, Culture and Community and Equity and Local Economy. Monthly community gatherings that bring together people from diverse backgrounds to socialize and eat locally-grown food, especially foods that represent different ethnic backgrounds and heritages, can help build bridges between cultures and encourage entrepreneurship.
- Local and Sustainable Food, Health and Happiness and Sustainable Materials. Promoting the use of local, healthy foods and products contributes to healthy lifestyles of residents and a thriving regional economy.
- Local and Sustainable Food, Sustainable Water and Land Use and Wildlife. Ensuring efficient and effective exterior water use for irrigation of green spaces and residential and community gardens for local foods support complementary sustainable water and land use goals.

Strategic positioning

Community benefits

- Community members can enjoy the health benefits and flavors of fresh, local foods, both through personal and community gardens and in community-based cafes and restaurants, and extended season local food production.
- Community workshops and classes can inform residents on ways to improve their health including through healthy diets, portion sizes, nutrition, cooking options, healthy foods, and other techniques.
- Residents can enjoy the benefits of improved food security and safety through access to local foods through community gardens and local farmers, and the assurance of knowing how and where food was produced.
- Working together in gardens, attending events and activities at community sustainability center(s), and participating in intergenerational food services and exchanges promotes a sense of community cohesion.
- Community members can enjoy access to convenient and affordable food close to home.

- Edible landscaping and personal and community gardening ensures plenty of green and open space is allocated across the community for the enjoyment of community members.

Environmental benefits

- The availability of locally-grown foods helps to reduce food transportation miles and related greenhouse gas emissions.
- Natural food systems work in harmony with nature, encouraging and enhancing biodiversity.
- Increased green spaces for personal and community gardens can help to reduce the urban heat island effect, and the increased pervious surface can help to reduce stormwater runoff.
- Organic wastes can be composted and incorporated into community gardens as soil amendments.
- Perennial edible landscaping such as fruit and nut trees can help to sequester carbon in soils.
- Education and lifelong learning throughout the community can inform residents about the ecological impact of our food systems.

Marketing

- Locally-grown, healthy foods are sold at a farmers' market and in on-site shops and restaurants.
- Every home has access to a dedicated garden space for food production and personal gardening supported by community education opportunities on gardening, cooking and nutrition, among other topics.
- Promote the benefits of gardening, local food production on community-building through interaction with friends and neighbors, on health through active lifestyle promotion for families, and on the regional economy through support of local farmers and grocers.

Wider community and municipal engagement

- Offer access to residents and neighbors in the surrounding communities to utilize new community gardening space and participate in education and workshops.
- The new community can provide a unique selection of cafes, restaurants and grocery stores along with a farmers' market that offer a balanced menu with local foods option.
- Community kitchens and programs to support area residents in need with groceries or meals can help strengthen food security in the region.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is one where people are able to eat diets high in local, seasonal and organic produce, as well as healthy diets high in vegetable protein and lower in animal protein than is the norm in many countries with a high ecological footprint.

One Planet common international targets

One Planet Communities will develop strategies to enable and encourage residents to adopt a *One Planet* diet, through education and agreements with on-site retailers and caterers. On-site facilities, including retail and catering facilities, will strive to minimize packaging in line with zero waste targets, and encourage consumption of local foods which have a reduced ecological footprint. Food waste from all residents, tenants, businesses, restaurants and shops will be minimized. Food waste will be composted or provided as feed for area livestock.

Food growing will be integrated on-site where appropriate such as through space for urban farming including Community Supported Agriculture (CSA) operation, small livestock enterprises, commercial scale fruit and vegetable and other operations; community gardens; edible landscapes; allotments and window boxes. Strategies will be put in place to enable and encourage residents to take up food growing on-site. Food system assessments will be undertaken and links will be developed with local producers to establish regular supplies and to work with them to further reduce their impacts.

A significant proportion of food should be locally sourced from low environmental impact farming with reduced and recyclable packaging from a radius of 50 to 100 miles from the center of the site. Key Performance Indicators include local and fair trade food. Given the importance of food to eco-footprints, stretching targets are essential to achieving a *One Planet* footprint.

One Planet national and international context

Food production exerts a huge impact on the world's ecosystems as wilderness areas are converted into agricultural lands, and through the quantities of fossil fuels used to produce food and transport it to our tables, making food one of the largest single contributors to greenhouse gas (GHG) emissions.

North Americans eat an average of 248 pounds of meat per year, with meat accounting for 40 percent of the total diet. Nutritionists commonly recommend that only 25 percent of the diet be composed of protein, and some recommend a maximum of 10 percent come from meat.

To put the energy-using demand of meat production into easy-to-understand terms, Gidon Eshel, a geophysicist at the Bard Center, and Pamela A. Martin, an assistant professor of geophysics at the University of Chicago, calculated that if Americans were to reduce meat consumption by just 20 percent it would be as if we all switched from a standard sedan — a Camry, say — to the ultra-efficient Prius.

Similarly, a study last year by the National Institute of Livestock and Grassland Science in Japan estimated that 2.2 pounds of beef is responsible for the equivalent amount of carbon dioxide emitted by the average European car every 155 miles, and burns enough energy to light a 100-watt bulb for nearly 20 days.

According to the USDA, the average distance food has travelled from “farm to fork” in North America is 1,500 miles, with a rapidly increasing proportion of what Americans eat produced in other countries. The result is that over 20 percent of fossil fuels consumed in the U.S. are used to transport food. The United Nations estimates that when you take into account the methane released by rearing cattle, the planet's 1.5 billion cattle are “responsible for 18 percent of greenhouse gases, more than cars, planes and all other forms of transport put together,” and that this is projected to double by 2050.

6. SUSTAINABLE WATER

Mission statement

Conserve water in the community at UMore Park by taking advantage of natural hydrology, integrating water into public areas, and minimizing pollutants and the energy used to treat, cycle and recycle water, based on the recognition of the essential value of water to all human and ecological activity.

Approach

The approach for sustainable water use in the community at UMore Park emphasizes complementary methods and strategies to produce overall reductions in water use without compromising the various water needs within the community. A key focus for sustainable water strategies is maintaining and improving overall water quality throughout the community.

Importantly, the community at UMore Park should reinforce the value and significance of water, integrating landscape and built environment water features such as wetlands, lakes, ponds, public art and cascading walls for cooling towers, and by supporting monitoring and educational programs for sustainable water practices. A comprehensive water strategy for the community will evolve over time with each phase of development as innovations and best practices emerge.

Goals

- SW1 Minimize the use of interior water through a combination of low-flow appliances, monitoring and feedback to homeowners, and consumer education.
- SW2 Reduce landscape water use to a minimum, using a combination of natural and/or drought-tolerant vegetation, small irrigated areas and weather-based irrigation systems.

- SW3 Mimic natural hydrology by using a combination of low water use; extensive use of pervious surfaces such as green rooftops, narrow roads and porous pavements; rainwater collection for irrigation and possibly non-potable interior use; and wastewater reuse.
- SW4 Achieve near-zero export of pollutants by a combination of source reduction, particularly for road salt, water softener brine, food (garbage disposal) wastes, fertilizer, pesticides and unnecessary home chemicals; recycling of greywater or wastewater; and isolation of potential pollutants such as blackwater separation to isolate drug metabolites.
- SW5 Minimize the energy used for provision of water and treatment of wastewater through a combination of volume reduction (water conservation, use of rainwater and stormwater), wastewater/greywater reuse, and “natural” wastewater treatment (without mechanical aeration); and by extracting energy from wastewater.
- SW6 Design to achieve multiple uses of water, including reuse and development of recreational and natural water features such as ponds and wetlands.
- SW7 Model optimization of water, energy and waste disposal to achieve the lowest cost solution that meets goals 1 through 6 above. Implement and demonstrate effective emerging technologies and innovations for closed-loop water, energy and waste disposal systems in the community.
- SW8 Utilize an adaptive water system that provides feedback to all water users and community authorities, by collecting real-time water balance information. Provide feedback, with the goal of continuously improving behavior-based conservation.

SW9 Integrate innovative research, education and outreach programs into the UMore Park water and wastewater infrastructure.

Local context

- Minnesota, known as the “Land of 10,000 Lakes,” has 11,842 lakes larger than 10 acres. With so many lakes, and 962,700 acres of Lake Superior within its borders, Minnesota has an abundance of freshwater resources.¹
- Average rainfall is estimated at approximately 27 inches per year. For perspective, this amount of rain falling on a 1,000 square foot rooftop could, in theory, provide approximately 16,800 gallons per year, roughly half of the water needed for an average household size (2.6 people) using 35 gallons per person per day.²
- The state of Minnesota has nearly 600 municipal Wastewater Treatment Plants (WWTPs) permitted for discharge to surface waters.²
- Ninety-one percent of Dakota County residents use groundwater for their water supply, whether it comes from a municipal water source or their own private well. However, in much of the County this drinking water supply is susceptible to contamination from activities at the surface. A 2006 study showed that 21 percent of private wells exceeded water quality standards for either nitrates or pesticides.³
- Groundwater is recharged at rates that are much slower than the current rate of withdrawal in the County. Much of this water is not returned to the groundwater flow system but is discharged to surface water or evaporated. The net result of removing groundwater at rates greater than it is infiltrated to the ground is that water tables will decline and less groundwater will be available for both human and ecological receptors. The ecological systems most dependent on groundwater are surface water lakes, wetlands and streams.⁴
- Home water use in Rosemount is metered with a rate that increases with the volume of water used. There is also a stormwater utility fee that is based on the amount of runoff that the property generates.⁵The calculations are made based on how much of the surface area allows rain water to soak into the ground, compared with how much is impervious. The calculation also takes into account how quickly water can soak into the ground, and the slope of the land. Rates are set based on categories for specific land uses.⁶
- The Empire Wastewater Treatment Plant was built in 1979 but was recently doubled in size. Treated wastewater is discharged to the Mississippi River, and biosolids from the plant are processed and spread twice yearly on nearby farmers’ fields. The plant has a capacity of 24 million gallons per day and serves five communities and a population of 150,000. Planned capacity of the plant accommodates the projected needs of UMore Park, with the facility designed to accommodate 800 gallons of sanitary sewer flow per acre per day from the future development at UMore Park.⁷

- A University-owned well and water tower system currently services around 15 percent of the UMore Park property.⁸
- Many opportunities exist to involve University of Minnesota faculty and students in research, teaching, experiential learning and community outreach across all aspects of water management throughout phased development of the community at UMore Park and over time.

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota’s only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens’ quality of life by protecting and enhancing valuable regional water resources. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University’s goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to achieve sustainability in water resource management:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government, and water resources and watershed management authorities.
- State and federal agencies.
- Professional organizations, especially those focused on aspects of sustainable design for the environment and water resource management.
- Non-profit organizations especially focused on hydrology, stormwater management and related environment and water resource issues.

¹ Calculations based on Municipal Water Rates in Rosemount, Minnesota from the Metropolitan Council Environmental Services. <http://www.metrocouncil.org/environment/WaterSupply/WSPdata/Municipal%20Water%20Rates.pdf> (accessed January 9, 2012).

- Architecture, landscape architecture and planning firms with expertise in sustainable land use and water management strategies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Funders and grant-making organizations.
- Local businesses, industry and commercial operations.

Site features

- A major sewer collector line carrying black water to the Empire Sewage Treatment Plant is located on the western and northern boundaries of the UMore Park property. An adjacent return line carries treated water to the Mississippi River.
- Deeper aggregate deposit areas in the UMore Park mining area that extend below the water table can be restored as lakes, enhancing recreational opportunities and property values for shoreline residential areas.
- There are few natural water features on the UMore Park property. The Vermillion River is located approximately two miles south of the property and is included in the surface water watershed of UMore Park. Groundwater, however, flows northeast from the property toward the Mississippi River, not to the Vermillion River.

Opportunities for innovation

Existing requirements

- Modifications to current local and regional ordinances, codes and standards may be needed to foster innovations in reuse of rainwater or greywater, stormwater management and wastewater treatment in the UMore Park development.

Site conditions

- Groundwater aquifers are susceptible to surface environmental impacts such as road salt, which is common in Minnesota. Potential impacts to the aquifers can occur if stormwater management relies on infiltration.
- There are no natural water bodies on the property that would enhance aesthetics or provide recreational opportunities.
- In late 2010, the University of Minnesota launched a Remedial Investigation (RI) on the eastern 3,500 acres of UMore Park to collect important information regarding the environmental condition of the property resulting from historical uses, including as the Gopher Ordnance Works, a

federal smokeless gunpowder manufacturing facility during World War II, as well as activities following the University's acquisition of the property. The RI will include collection of soil and groundwater samples for laboratory analysis to assess any potential environmental impacts.

Research and Knowledge Creation

- Data regarding the water consumption performance of existing sustainable developments is needed to establish benchmarks, with special emphasis on external (landscape irrigation) water use data.
- The UMore Park Concept Master Plan (2008) includes a conceptual water budget for the community with a zero water balance. A detailed water balance study is needed to determine whether the goals identified in this action plan are feasible, and if not, to refine goals.
- Because the water system can be a major user of energy, a water cycle study could be coupled with an energy balance.

Baselines for key performance indicators

Interior water conservation

- Nearly all municipal water supplied in Rosemount goes to residential use (88 percent of the total in 2006). From 1999-2006, average residential water use was 90 gallons per capita per day (gpcd). Rosemount's Comprehensive Water System Plan uses a value of 95 gpcd for planning future residential water consumption.^b
- Rosemount summer water use averages 132 million gallons (MG) per month for the months of June, July and August, nearly three times higher than for the winter months of November through March. This produces an average interior water use estimate of 65 gpcd.^c

Exterior water use

- Exterior water use is estimated at 91 MG per summer month or 144 gpcd. External water use can be estimated as the difference between the total summer use minus the estimated interior use, yielding a value 91 MG per summer month, or 144 gpcd. Most of this water is probably used for landscape watering of single-family, detached homes. The estimated rate for residential landscape irrigation for Rosemount of five inches per summer falls into the upper end of the Minnesota Extension Service recommended range.^d

^b Baseline residential water use was obtained from the City of Rosemount's Comprehensive Water System Plan (2007) and Rosemount's online Water Quality Report. The rate of use will likely decrease because the State of Minnesota amended its water supply statute (Minnesota Statutes, section 103G.291) in 2008 to require cities to implement conservation rate structures. By 2009, Rosemount had implemented tiered water pricing for residential users, with prices increasing from \$0.90 per 1000 gallons for the first 10,000 gallons to \$1.90 for users using more than 60,000 gallons per month. It is unclear from available information whether the conservation pricing has had an effect on residential water use, so the 95 gpcd value is used in subsequent "baseline" calculations.

^c Because nearly all municipal water (88 percent) is used for residential purposes, interior water use can be estimated from the average monthly winter use, divided by the residential population (20,988 in 2009), yielding 65 gpcd. This is very close to the average value of 69 gpcd determined by Mayer et al. in a study of residential water use in 10 cities.

^d On an acreage basis, land use devoted to single-family, detached homes represents 89 percent of total residential land. Dividing total city-wide estimate for total external water use over the three summer months by the acreage of "single-family, detached residential homes" yields an overall watering rate of 4 inches per summer. Adjusting this value upward to account for impervious surface (estimated at 20 percent for this land use) yields a landscape irrigation rate of 5 inches per summer for pervious residential landscapes. For comparison, the University of Minnesota Extension Service recommends watering 1-1.5 inches per week, minus precipitation, the months of June-August. For the summer, this is a total water requirement of 13-19 inches. For the Twin Cities, average precipitation during these months is just over 12 inches, so the watering requirement for lawns would be 1-7 inches.

Mimic natural hydrology

- Runoff is closely related to percent impervious surface. Typical impervious surface percentages for various land uses are: single-family residential (35 percent), commercial (85 percent); industrial (75 percent) and parks (15 percent).⁹ Hydrologic modeling for the final UMore Park development could be done to determine a baseline based on conventional design features such as impervious, standard width roads, “hard” rooftops and others.

Near-zero discharge of nutrients and salts

- The Twin Cities Household Ecosystem Project estimated that households contribute the following volumes to sewage: 24 kilograms (kg) carbon, 19 kg nitrogen and 3.1 kg phosphorus.¹⁰ Pollutants also include salts, household chemicals and pharmaceuticals. Typical “salt pickup” for municipal wastewater is about 200-500 milligrams per liter (mg/L), which for 65 gpcd (interior water use, above) translates to 25 kg of salt added per capita per year.^c
- Another major water pollutant is de-icing or road salt. Based on studies done at the University’s St. Anthony Falls Laboratory, road salt use in the Twin Cities is about 260 pounds (120 kg) per person per year.¹¹
- Because solid waste sent to landfills is sometimes co-mingled with sewage sludge, waste reduction efforts often intersect. A landfill study by Beck shows that residential waste in the Twin Cities averages about 0.9 kg/capita-day.¹² About 26 percent of this is “organic” and could be composted. Estimates of current recycling rates in the Twin Cities are: recyclable paper (61 percent), plastic (9 percent), metal (15 percent) and glass (62 percent).¹³
- Finally, construction itself is a major polluting activity. Sediment yields from construction sites can be two-to-three orders of magnitude higher than from mature urban surfaces. Regarding runoff from construction sites, the U.S. Environmental Protection Agency (EPA) has determined that turbidity from construction activity can be reduced to as little as 13 Nephelometric Turbidity Units (NTUs).^f

Energy needed for water and wastewater treatment and delivery

- For an average household size in Rosemount of 2.8 people, energy costs for water and wastewater treatment and delivery total approximately \$31 per household per year.^g

Multiple water use

- Currently, there is no “intermediate” use of the treated wastewater, such as irrigating crops or urban landscapes, filling recreational lakes or wetland, or recharging aquifers.

Optimization of goals 1-6

- Because the activities involved in water treatment, wastewater treatment, stormwater management and solid waste disposal are managed by separate and distinct entities, this type of optimization has not been done.
- Small-scale demonstration of closed-loop water, energy and waste management systems exist in the U.S. The community at UMore Park could provide a model for large-scale community development.

Adaptive water system

- Currently, there is little feedback regarding water use for area residents. Billing does not include data for the same month in previous years, which would allow a resident to determine whether they are improving their conservation effort. A plan to allow residents to view data from previous years online is under development.

Integrate research and education into UMore Park water management

- University of Minnesota faculty, students and staff have initiated select pre-development research and education activities at UMore Park. Graduate students in the Department of Earth Sciences in the College of Science and Engineering are conducting unprecedented pre-development groundwater monitoring and modeling at UMore Park to contribute to baseline data on groundwater conditions, including temperature, elevation, flow and recharge, against which future potential changes can be evaluated.

Key performance indicators

Interior water use

- Reduce interior water use to 35 gpcd. Water use could be reduced to 40 gpcd solely through the use of low-flow appliances.¹⁴ Additionally, water conservation studies show that at least 10 percent can be readily achieved through behavioral change.

^c Some of these pollutants are removed by sewage treatment at the Empire Wastewater Treatment Plant. In 2010, average removal efficiencies are 99 percent for carbon, 94 percent for nitrogen and 94 percent for phosphorus. These very high nutrient removals are made possible because the plant has added special nutrient removal capacity. Nutrients “removed” from effluent become sewage sludge, which is applied to agricultural fields.

^f A turbidity meter, consisting of a light source that illuminates a water sample and a photoelectric cell that measures the intensity of light scattered at a 90° angle by the particles in the sample, measures turbidity in nephelometric turbidity units or NTUs. “What is Turbidity and Why is it Important?” U.S. Environmental Protection Agency, <http://water.epa.gov/type/rsl/monitoring/vms55.cfm> (September 2011).

^g Rosemount pumps groundwater for municipal use. After water is used, it is transported to the Empire Wastewater Treatment Plant, where it is treated by an “activated sludge” process that requires injection of massive quantities of air into the wastewater; the treated wastewater is then pumped to the Mississippi River. Per Metropolitan Council data, energy costs for the Empire Wastewater Treatment Plant are about \$5.60 per capita per year and pumping costs for water supply are about \$5.20 per capita per year, for a combined total of approximately \$11 per capita per year.

Exterior water use

- Minimize exterior water use for irrigation to reach or exceed Minnesota Extension Service recommended ranges of one to seven inches per summer.

Mimic natural hydrology

- Minimize the use of impervious surface across the built environment and utilize effective rainwater capture and stormwater management strategies to support a natural water cycle.

Near-zero discharge of nutrients and salts

- Strive to achieve benchmarks for pollutant discharge to the Mississippi River at (per household): 0.2 kg carbon (0.4 kg Biochemical Oxygen Demand), 1 kg nitrogen and 0.2 kg phosphorus.
- Employ strategies to reduce amount of waste exported to landfills to less than five percent through effective reuse, recycling, composting and waste-to-energy initiatives, among others.
- Meet the State of Minnesota's acute and chronic water quality standards for de-icing salt: 720 milligrams per liter (mg/L) for short-term exposure and 230 mg/L for long-term exposure. Continually reduce road salt use using an adaptive management strategy to achieve lower salt use every year, while maintaining safety.
- Reduce construction runoff and achieve a 13 NTU value for turbidity of any construction runoff produced.

Energy needed for water and wastewater treatment and delivery

- Reduce energy costs associated with water and wastewater infrastructure to less than the baseline estimate of \$31/household per year. Energy use should be incorporated into an optimization model to seek the minimal cost to meet other performance indicators.

Multiple water use

- One hundred percent of wastewater is reused, and some is reused multiple times.

Optimization of goals 1-6

- Conduct a cost-benefit analysis to identify the optimum standards for minimum cost.

Adaptive water system

- Incorporate water and energy use data from "smart meters" into an "app" for property owners so that they can receive continuous, tailored feedback regarding energy and water use. A step beyond this would be to develop a system that allows homeowners to compare their water and energy use with others in the community, with data sharing done on a voluntary basis. At the community level, a performance

standard could be monitoring of all aspects of the hydrologic cycling (runoff, groundwater, etc.), with annual "water balance" reporting to the community.

- For road salt, the minimal performance indicator could be chloride concentrations in runoff that are consistently below state water quality standards. Accomplishing this would probably require an ongoing adaptive management plan that includes ongoing measurement of chloride levels, an assessment of safety to ensure dry walking pavements and clear streets, and an ongoing evaluation of de-icing practices on both private and public property.

Monitoring plan

- Monitor interior water at each point of use (residential or commercial) together with site information such as number of occupants, income and more to allow ongoing analysis of water conservation.
- Monitor installation and functioning of evapotranspiration (ET)^h irrigation systems; monitor total external water use. Exterior water use can be estimated by subtracting interior water use (from winter months) from total summer (June, July, August) water use.
- Map connected impervious surfaces to determine whether goal of less than 10 percent impervious surface is being met.
- Establish a monitoring site at the sewer exit from the community at UMore Park to determine flows and pollutant loadings. Use this in conjunction with the Metropolitan Council's ongoing sewer monitoring to develop "per household" loadings.
- Monitoring could also be required for stormwater runoff. This should start before the construction phase and continue indefinitely to assess changes through construction and "maturation" of the UMore Park development. The protocol could be similar to that used by the Metropolitan Council for its stormwater/stream monitoring network.
- For solid waste, document weights of recycled and composted materials and the weight and composition of landfilled garbage. The latter could be done using periodic "container" studies of disposed garbage at individual households.
- Combine data already collected by Metropolitan Council (wastewater) and the City of Rosemount to derive a total estimate of energy used and energy costs for water and wastewater.
- Monitor flows to and from each wastewater reuse feature using gauging stations. A "reuse indicator" might be the sum of flows reused for various purposes, divided by the total wastewater flow.
- Because performance indicators might evolve over time and costs change, it may be advisable to repeat an optimization analysis every 5-10 years.
- In-home smart meters could provide monitoring and feedback to residents. This information could also be aggregated at the community level.

^h **Evapotranspiration** is defined by the U.S. Geological Survey as "[w]ater withdrawn from a land area by evaporation from water surfaces and moist soil and plant transpiration." Science in your Watershed: General Introduction and Hydrologic Definitions, U.S. Geological Survey, <http://water.usgs.gov/wsc/glossary.html> (February 2011).

- For road salt, ongoing monitoring of chloride levels in runoff as part of an ongoing stormwater monitoring program could be necessary to support an adaptive management system for road salt. This system could also require some innovative monitoring of safety metrics (such as percent dry pavement).
- Community-based water balance monitoring could include both direct measurements such as precipitation and wastewater flows, combined with hydrologic modeling.

Design strategies

Key strategies to achieve sustainable water resource management efforts incorporate natural and aesthetically-pleasing water features, public engagement and awareness of the significance of water and systems responsive to changing needs. The following tables explore these strategies and identify a potential timeline for when they might occur within the overall phasing plan for the future community.

Goals	Design strategies	Milestones
SW1	Develop interior design standards to meet or exceed 35 gpcd for residential water.	Design phase.
SW2	Develop landscape design to minimize external water use (irrigation) such as evapotranspiration (ET) irrigation systems which measure relevant meteorological conditions (wind, humidity, precipitation) and automatically adjust the irrigation rate to match plant water requirements in real time. The ET-based irrigation design standard would also apply to agricultural irrigation.	Design phase.
SW3	Utilize green infrastructure design methods such as green rooftops, porous pavements for low-traffic areas, minimization of impervious surfaces, narrower streets, rain harvesting, extensive tree canopies over impervious pavements to intercept rainfall and other strategies. Compute effective impervious surface.	Design phase.
SW4	Develop pollutant balances for key pollutants under different design scenarios to learn how to minimize generation of pollutants.	Design phase.
SW4	Design for waste minimization, source reduction and recycling, including reuse of some or all of the wastewater produced by UMore Park. <ul style="list-style-type: none"> • For wastewater, this could be accomplished through a combination of advanced wastewater treatment, land application of sludge and reuse of treated wastewater. • For solid waste (“garbage”), compost all organic wastes using within-development composting facilities, and to achieve greater than 90 percent recycling of recyclable paper, plastics, metal, and glass. • Use advanced road salting techniques such as computerized salt spreading, use of brine and others. 	Design phase.
SW5	Minimize energy use for water. Develop energy balance for water management in each design scenario, using various combinations of water use, wastewater treatment and wastewater reuse.	Design phase.
SW6	Incorporate design elements that would utilize recycled wastewater such as ponds, wetlands and other landscape features.	Design phase.
SW6	Increase profile of water such as through use in public art.	Design phase.
SW6	Water used in ground-source heating and cooling and/or energy use will be integrated through district energy systems that will employ both natural and renewable energies to heat and cool water. To the extent possible water used for heating and cooling will be visible and integrated into public art such as cascading walls for cooling towers, and/or man-made pond features.	Design phase.
SW7	Use formal optimization analysis to optimize design while meeting goals 1-6.	Design phase.

SW8	Develop an adaptive management plan for water (and energy) that provides feedback to the UMore Park community and various mechanisms to continuously improve water management.	Design phase.
SW9	Develop research, education and outreach plan. Start monitoring groundwater and surface water before construction.	Design phase.

Construction Strategies

Goals	Construction strategies	Milestones
SW1	Install low-flow plumbing.	Construction phases.
SW2	Install weather-based irrigation systems.	Construction phases.
SW3	Build community infrastructure to reduce the amount of impervious surface.	Construction phases.
SW4	Minimize runoff during construction phases using state-of-art erosion control to reduce pollution.	Construction phases.
SW6	Install landscape water features.	Construction phases.
SW9	Monitor stormwater runoff from construction sites.	Continued through construction phases.

Community life strategies

Engaging members of the community in water management efforts is fundamental to achieving the goals for sustainable water. The strategies below help to ensure continued awareness of the role citizens can play in maintaining healthy, renewable water resources.

Goals	Promoting sustainable behaviors	Milestones
SW1 SW2	Develop social network to allow residents to compare water savings.	By phases of occupancy.
SW4	Provide feedback to community via social network regarding total water use, energy and groundwater conditions.	By phases of occupancy.
SW6	Commission public art inspired by water and utilizing water in engineering as a visible part of the community.	By phases of occupancy.
SW8	Seek further reductions in water and energy use and waste production through social networks.	By phases of occupancy.
SW9	Study community social networks, analyze actual water and energy use and waste production.	By phases of occupancy.

Management plan strategies

Community policies and requirements can help to achieve sustainable water management practices for residential, retail and commercial operations.

Goals	On-site policies and property management strategies	Milestones
SW1	Ensure replacement plumbing fixtures in buildings to achieve the same or higher reductions in flow levels as initially designed.	By occupancy.
SW2	Promote drought-tolerant plants for use as landscaping throughout the community.	By occupancy.
SW3	Establish guides and standards for property owners to manage water naturally and effectively across their property including incorporating strategies for pervious surfaces and raingardens, rainwater capture and storage and greywater reuse, among others.	By occupancy.
SW4	Promote green cleaning supplies, compost for soil amendments and other techniques to minimize introduction of pollutants into the water systems.	By occupancy.
SW8	Sustain community-level adaptive management through website development and maintenance and community workshops.	Ongoing.

HR plan and job creation

A few jobs will be created within UMore Park to maintain water sustainability plans. Development and maintenance of social networks, establishing an adaptive management plan for de-icing, and other strategies could generate jobs.

Findings from research could create many jobs, as they find their way into the development of other sustainable communities. There are also potential licensing agreements from software developments such as optimization models that could create income for the University.

Synergies

- Sustainable Water, Zero Carbon and Zero Waste. Sustainable water strategies complement energy and waste reduction strategies through effective means for treatment and reuse of storm and wastewater, as well as composting of organic wastes to reduce landfill exports.
- Sustainable Water, Local and Sustainable Food and Land Use and Wildlife. Goals for sustainable water influence and are influenced by effective land use strategies with regard to water features, pervious surfaces and natural infiltration. Complementary strategies are required to ensure efficient and effective exterior water use for irrigation of green spaces and residential and community gardens for local foods.

Strategic positioning

Community benefits

- Consumers could benefit from lower costs for water, energy and waste management.
- Residents and community members could enjoy access to multifunctional community water features (landscape amenities).

- Water features and amenities across the community could increase the property values for residents.
- Shared water management could support and enhance development of a strong community and social fabric.

Environmental benefits

Potential environmental outcomes from achieving Sustainable Water goals could include:

- Improved condition of aquatic plants and animals (compared to conventional development).
- Near-zero output of pollutants.
- Minimal net water use (after accounting for wastewater reuse).
- Lower demand for landfill space.
- Creation of aquatic habitats.

Marketing

The UMore Park community could be a model for sustainable community development in the United States, especially producing innovative research, and creating educational and outreach materials.

An important part of a marketing strategy could be identification of aspects of UMore Park development that yield the greatest environmental, economic and social benefits.

Wider community and municipal engagement

Supported by research findings, UMore Park could quickly become a focus for urban sustainability in the Twin Cities region. The community could form the cornerstone of a broader effort to develop a translational research framework for urban sustainability.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is that we use water much more efficiently in buildings and in the products we buy; and manage water in such a way as to support healthy land-use, avoid local flooding and avoid pollution to watercourses.

One Planet common international targets

Best practice standards in water conservation, water efficiency, and recycling and surface water management will be adopted taking into account the local context. Where there is no country specific best practice the water strategy will need to consider local issues such as water availability and typical consumption levels to establish a target for the project. The key aspects are:

- All residents have access to safe potable water.
- The water strategy will look to reuse water where there is no adverse energy impact from doing so.
- Communities assess the carbon impacts of their water strategy.
- Communities implement a water reduction and re-use strategy to engage residents and tenants long term.
- In areas of flood risk, communities should have an acceptable 200 year flood risk strategy.
- Communities consider, and are designed to adapt to, climate change.
- In areas prone to flood risk, communities adopt a best practice approach to water drainage and storm water, ensuring that peak run off rates and annual run off volumes will be no greater than the previous conditions for the site. Examples of these systems include sustainable urban drainage systems, water sensitive urban design and best management practice.

It is acknowledged that the emerging concept of ‘embodied water’ (water used in the production of food and manufactured goods) is becoming more important and will be an increasingly important consideration of the Local and Sustainable Food and Sustainable Materials principles.

One Planet national and international context

WWF’s Living Planet Report concludes that Americans have the 6th highest water withdrawals in the world, behind only a handful of arid Central Asian countries. Provision of potable water requires a lot of energy and infrastructure, resulting in GHG emissions; and non-permeable built environments have a disruptive effect on how rain water is absorbed back into the earth and its water systems, which can contribute to flooding, water contamination, and which require significant infrastructural systems to accommodate.

7. LAND USE AND WILDLIFE

Mission statement

Enhance habitat for wildlife, recreation opportunities and the provision of key ecosystem services³ in the community at UMore Park through efficient land use practices, and thoughtful planning of green spaces that emphasizes connectivity, restoration and multifunctionality.

Approach

The approach for Land Use and Wildlife in the community at UMore Park requires careful consideration of both immediate and long-term goals to restore native habitats, preserve core natural areas for wildlife, improve outdoor recreation and enhance ecosystem services. The seven major goals related to land use and wildlife in the community at UMore Park emphasize the dual objectives of improving habitat for native plants and animals and improving the lives of residents and visitors through proper environmental stewardship and interaction with nature.

Goals

- LW1 Foster restoration activities to improve habitat for native and desirable species, increase biodiversity, enhance aesthetics and provide resident access to nature.
- LW2 Promote regional connectivity by establishing greenways and wildlife corridors to facilitate wildlife movement and regional recreation.
- LW3 Enhance beneficial ecosystem services through effective natural area design and planning to support water purification, carbon sequestration, air quality

improvement, pollination and biological pest control, among others.

- LW4 Increase functionality of green spaces and natural areas throughout the community to serve multiple purposes for added value to humans and wildlife.
- LW5 Employ adaptive management principles to monitor and respond to changes in social and ecological factors.
- LW6 Provide residents with both passive and active recreation opportunities through integrated green spaces, recreation trails, opportunities for wildlife viewing, as well as through athletic fields, parks and playgrounds, indoor green spaces, and areas for companion animals. Education and research should also be integrated with natural spaces and outdoor recreation areas.
- LW7 Emphasize sustainable and efficient land use principles, including preservation of open space, access to nature and multifunctionality in public spaces.

Local context

Land use

- Population growth and transportation continue to have the most significant impact on land use change in Dakota County.
- Dakota County is expected to add 164,106 people and 78,249 homes between 2000 and 2030. Since 2000, Dakota County has grown by 42,650 people, and added approximately 26,000 homes.¹
- Average density in Rosemount is 2.6 dwelling units per acre.²

³ **Ecosystem services:** "Ecosystem services are the processes by which the environment produces resources that we often take for granted such as clean water, timber, and habitat for fisheries, and pollination of native and agricultural plants." *Ecosystem Services*, Ecological Society of America, http://www.esa.org/education_diversity/pdfDocs/ecosystemservices.pdf (Summer 2000).

- UMore Park is generally located on a sandy topographic plateau in the Mississippi River groundwater watershed.
- The ground surface within UMore Park generally slopes from west to east. The predominant surface water drainage direction is to the southeast toward the Vermillion River tributaries.
- Surface water bodies in the vicinity of UMore Park include the Mississippi River, located approximately five miles to the northeast; the Vermillion River, located approximately two and one-half miles to the south, and the Minnesota River which is located approximately four and one-half miles to the northwest.

Wildlife and habitat

- There are six ecoregions in Minnesota, three of which converge in close proximity to UMore Park. These are the Western Corn Belt Plains, the North Central Hardwood Forests, and the Driftless Area. The Western Corn Belt Plains were once covered with tall-grass prairie but their average annual precipitation of 24.8 to 35 inches, which occurs mainly in the growing season, and their fertile, warm, moist soils have seen this landscape change to become one of the most productive areas for corn and soybeans in the world. Over 75 percent of this ecoregion is now used for cropland agriculture and much of the remainder is in forage for livestock. The North Central Hardwood Forests ecoregion to the north and east is transitional between the predominantly forested Northern Lakes and Forests to the north and the agricultural ecoregions to the south. Land cover in this ecoregion consists of a mosaic of forests, wetlands and lakes, cropland agriculture, pasture and dairy operations. The hilly uplands of the Driftless Area distinguish it from the surrounding ecoregions. Much of the area consists of a loess-capped plateau, deeply dissected by streams. Livestock and dairy farming are major land uses for this ecoregion, resulting in impacts to stream quality.³
- Dakota County is notable for its variety of rivers: the Mississippi River to the east and northeast, Minnesota River to the northwest, the scenic Cannon River to the south and trout-bearing Vermillion River through its center.⁴
- The Vermillion River Watershed is the largest watershed in the Minneapolis-St. Paul metropolitan area. The Vermillion River travels through areas of rapid urban growth, agricultural land and suburban residential land. Dakota and Scott Counties formed the Vermillion River Watershed Joint Powers Organization (VRWJPO) to implement the 2005 Watershed Plan. The plan leads the development and implementation of policies, programs and projects that protect and preserve water resources in the 335-square mile area that drains to the Vermillion River and its tributaries. It is one of the very few trout streams in the nation that runs through rapidly developing metropolitan counties.⁵
- Portions of the Vermillion River and its tributaries and lakes in the watershed are listed as “impaired” by the Minnesota Pollution Control Agency (MPCA) and the U.S. Environmental Protection Agency (EPA).⁶
- In 2002, the voters of Dakota County approved a levy to establish a Farmland and Natural Areas Program. To date, conservation easements on 3,517 acres of farmland and 2,456 acres of natural areas have been purchased, preserving these valuable assets for future generations. The county’s Parks and Open Space Department manages 5,900 acres of parkland and implements a natural area restoration program in each park. The county has established a stormwater improvement program and reserves funds annually to make improvements to the stormwater systems on county building sites.⁷
- Dakota County’s priorities for the next 10 years include 52 miles of regional greenways.⁸
- Minnesota manages the second oldest state park system in the country. Today, the Minnesota Department of Natural Resources State Park system includes 66 state parks and six recreation areas. In 2008, Minnesota State Parks hosted 8,375,506 visitors. Approximately 30 percent of Minnesotans visit a state park each year.⁹
- Vermillion Highlands: A Research, Recreation and Wildlife Management Area is a 2,822 acre property adjacent and to the south of UMore Park that is set aside by legislation for research, recreation and wildlife management in perpetuity.¹⁰
- Vermillion Highlands is managed to promote pheasant, turkey and deer populations, which are hunted seasonally throughout much of the property.¹¹
- The more than 11 miles of trails through Vermillion Highlands are enjoyed by hikers, horseback riders and cross-country skiers.¹²
- A new Dakota County Regional Park is near the southern boundary of the UMore Park property and adjacent to Vermillion Highlands. Significant opportunities exist to provide wildlife corridors connecting regional parks with nearby natural systems, including the Mississippi River floodplain and other creeks, wetlands and natural areas.¹³
- Of 17 animal species identified as Wildlife Indicator Species^b in the UMore Park Concept Master Plan, 10 are known to be present within 10 miles of the UMore Park property, three are not present within 10 miles, and the presence of the remaining four is unknown. The state lists six of the 17 species as either of special concern, endangered or threatened and all but one species have been identified by the Minnesota Department of Natural Resources as a species of greatest conservation need (SGCN) within the region.¹⁴
- The 17 indicator species selected for UMore Park are: Henslow’s sparrow, short-eared owl, loggerhead shrike, grasshopper sparrow, upland sandpiper, bobolink, dickcissel, field sparrow, eastern meadowlark, prairie vole, western harvest mouse, Franklin’s ground squirrel, American badger, plains pocket gopher, regal fritillary, pawnee skipper and gopher snake.¹⁵

^b **Wildlife Indicator Species:** An indicator species is any animal species that defines a trait or characteristic of the environment. The UMore Park Concept Master Plan identified wildlife species that should be used as indicators from a list of the species that normally live in large, natural prairies, savannas and wetlands in the region. “Environment,” UMore Park Concept Master Plan, University of Minnesota (December 2008).

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance regional habitat protection and connectivity through effective land use planning. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world. The University's Office for UMore Park Academic Initiatives is responsible for seamlessly integrating University research, teaching and learning, and outreach into planning and development in ways that add value to the property and enrich the community.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to promote effective land use planning including enhanced natural areas for recreation and wildlife movement:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Local area farmers.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Non-profit organizations especially focused on environmental and wildlife management issues.
- Citizens' clubs and education and advocacy groups.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on sustainable communities and landscapes.
- Wildlife rescue and rehabilitation organizations.
- Developers with conservation design experience.

Site features

- UMore Park is located in the Oak Savanna subsection of the Eastern Broadleaf Forest Province. Nearby subsections are the Rochester Plateau, the St. Paul Baldwin Plains and Moraines, and the Big Woods.
- The UMore Park property is relatively flat to rolling with no surface water assets on-site. The property does contain scattered wind breaks and low-lying vegetated areas.
- The UMore Park property contains fertile soils that can support growth of local, healthy foods and native planting and habitat restoration activities.
- UMore Park is adjacent to the Vermillion Highlands, a 2,822-acre research, recreation and wildlife management area and located in close proximity to additional regional conservation lands and parks, including Lebanon Hills Regional Park to the northwest, the Pine Bend Bluffs natural areas, Spring Lake Park Reserve, and Mississippi River corridor to the northeast.
- Development from the Twin Cities metropolitan area to the north has expanded to the northwestern edge of the UMore Park property.
- The property is accessible from major and minor arterial roads including: Highway 52, a four lane expressway running north-south providing access to St. Paul to the north and Rochester to the south; County Road (CR) 42 running east-west along the north border and CR 46 running east-west through the middle of the property. Beyond the existing roads, Dakota County completed a transportation study in 2010 that identified future alignment alternatives for roads within and surrounding UMore Park. The local units of government will need to be involved in future roadway plans as development proceeds.

Opportunities for innovation

Existing requirements

- Before development of the community at UMore Park can proceed, the comprehensive plans for the local units of government must be amended and the property rezoned for a mix of residential, commercial and industrial development.

Site conditions

- An Alternative Urban Area-wide Review (AUAR), a broad-based environmental assessment, was launched in early 2011 to assess any potential impacts of development of the community at UMore Park and to identify measures to mitigate those potential impacts. Led by the City of Rosemount, in conjunction with the University of Minnesota and Empire Township, the AUAR is anticipated to be completed by mid-2012.
- Large deer and raccoon populations in the region may increase the frequency of human-wildlife conflicts such as vehicle-animal collisions or damage resulting from wildlife feeding on food production areas, gardens and landscaped spaces.
- In late 2010, the University of Minnesota launched a Remedial Investigation (RI) on the eastern 3,500 acres of

UMore Park to collect important information regarding the environmental condition of the property resulting from historical uses, including as the Gopher Ordnance Works, a federal smokeless gunpowder manufacturing facility during World War II, as well as activities following the University's acquisition of the property. The RI includes collection of soil and groundwater samples for laboratory analysis to assess any potential environmental impacts.

- The UMore Park property contains one of the last and largest remaining high-quality aggregate deposits in Minnesota. The University executed a 40-year lease agreement in June 2011 for phased aggregate mining on 1,722 acres of the UMore Park property. This agreement followed the completion of an Environmental Impact Statement (EIS), which identified any potential impacts of mining and mitigation commitments to address those impacts, and authorization by the University Board of Regents to execute the lease, both in November 2010. Mining is limited to 160 acres at any given time. After mining is completed in an area, reclamation is intended to provide beneficial landscape features including a varied topography, wetlands and lakes. Goals for aggregate mining operations include minimizing the environmental impacts of this process while maximizing the benefits of a regionally-significant material. Additional information on sustainable practices with regard to the aggregate mining operations can be found in the appendices.
- The UMore Park property is not currently served by daily transit service.
- The communities that surround the UMore Park property are likely to remain auto-oriented and low density, placing continued demands on UMore Park's residents for personal auto use. These rural and low-density residential communities are not conducive to investments in mass transit facilities. And, as development in the region continues, increased traffic volumes may impact noise pollution and wildlife.

Research and knowledge creation

- Detailed habitat and species-specific information on the property and surrounding region is needed to identify migration patterns and support habitat restoration activities.
- Additional research and analysis on the impacts of changing climate on species of concern and the ability of natural areas on-site to adapt to changing conditions over time can help to identify best practices for adaptive management in the community.

Baselines for key performance indicators

Restoration

- Prairie, savanna and wet prairie were historically the dominant vegetation types on the UMore Park property. Regionally prairie, savanna and wet prairie are in decline. Less than one percent of the original acreage of these communities remains in Minnesota and less than 10 percent remains nationally.¹⁶
- Indicator species such as prairie birds, pocket gophers and badgers are typically abundant in large native prairies,

savannas and meadows. However, the populations of these species are currently unknown on the UMore Park property.¹⁷

- Areas in and around the UMore Park property were surveyed for habitats and species of greatest conservation need (SGCN). The surveys found that the majority of SGCN were in decline on the UMore Park property, whereas generalist species such as white-tailed deer and raccoons were increasing in abundance.¹⁸

Connectivity and wildlife

- The existing site contains minimal remnants of native habitats. There are excellent opportunities for establishing connectivity within the region, especially in relation to the Vermillion Highlands property.¹⁹

Enhancing ecosystem services

- On-site carbon capture and storage (sequestration) is currently influenced by agricultural management used on existing agricultural fields. Improvements in carbon sequestration rates should be evaluated relative to the baseline rate of sequestration typical of annual cropping systems.²⁰
- A 2009 Groundwater Assessment on the UMore Park property found elevated nitrate-nitrogen concentrations in five of the groundwater monitoring wells. Agricultural land use at and in the vicinity of UMore Park is the presumed primary source of nitrate plus nitrite in the groundwater.²¹

Multifunctionality and resilience

- Active management on the property is currently devoted to research and agricultural activities. Therefore the baseline for these goals should be measured relative to current land use which is largely for a single function without adaptive management.²²
- Land use in the surrounding region is also largely managed for a single function (residential development or agricultural production). As a result, land use in the region is not very resilient to changes in either climate or human preferences or demographics.

Recreation

- Currently, there are limited recreational opportunities on the UMore Park property. However, the University transferred 27.5 acres of the UMore Park property to the City of Rosemount as a credit of public park land toward future developments. The land is anticipated to be developed into joint-use baseball and softball fields by the City of Rosemount for children, youth and adult play. There are ample recreational opportunities in the surrounding region including athletic fields adjacent to the site and hiking and nature viewing opportunities, horseback riding and cross-country skiing as well as hunting at Vermillion Highlands. Hiking and nature viewing opportunities are also available at Lebanon Hills Regional Park.²³

Land use

- Average density in the city of Rosemount and surrounding region is 2.6 dwelling units per acre.
- Current land use on the UMore Park property includes agricultural plot research and row crop agriculture. Natural and semi-natural land cover on the property includes vacated farm fields with and without invasive trees and shrubs, second-growth woodlands and forests and several small depressional wetlands.²⁴
- Disturbed and second-growth plant communities are typically dominated by non-native invasive species such as smooth brome, Kentucky bluegrass, reed canary grass, sumac, prickly ash, boxelder, green ash and Siberian elm.²⁵
- Current habitats provide little vegetation cover for animal species. Nesting sites, foraging sites and breeding habitat for unique species are absent or rare at UMore Park.²⁶

Key performance indicators

Restoration

- Emphasize native diverse prairie, oak savanna and wetlands with restoration activities on-site. Success at meeting this goal could be based on whether or not these new habitats contain key indicator species (see list in local context), include a diversity of plant and animal species (target: 200 different native tree, shrub and herbaceous plant species). Aim to have less than five percent of on-site vegetation cover consisting of invasive plant species.

Connectivity and wildlife

- Aim to increase total terrestrial biodiversity at the site annually from pre-development to post-development and with active investment in ecological restoration and management.
- Support viable populations of species of conservation interest and promote connectivity with surrounding natural areas with wildlife corridors established on-site. Corridors could connect Vermillion Highlands to the south and open space to the north and northeast. Corridor design could also address connectivity to Lebanon Hills Regional Park and the Mississippi River Corridor.

Enhancing ecosystem services

- Improve groundwater quantity, rate and quality.
- Average less than one degree Fahrenheit air temperature difference between the new community's developed area and the surrounding rural areas to mitigate the urban heat island effect.
- Increase annual rates of carbon sequestration through effective land use and development activities on the property.
- Increase the abundance of beneficial insects including pollinator species and species with biological control benefits through green infrastructure, residential plantings and restoration activities.

Multifunctionality and resilience

- Design all green infrastructure, residential green spaces and park lands in the community should to support multiple functions, including recreation, food production, wildlife habitat and/or ecosystem service provision.
- Establish adaptive management as the guiding principle for management of natural lands in the community. Adaptive management requires integration of education, research and learning into management decision-making and allows for flexibility and adaptation to future changes.

Recreation

- Support increasing annual participation in active recreation activities for residents and visitors in the community. Residents report satisfaction with their level of access to nature including educational and recreational opportunities.

Land use

- Aim to increase average densities relative to typical suburban development in the region by 50 percent or more through development at UMore Park. Development also results in less impervious cover as a percentage of total acreage as compared to conventional suburban development.

Monitoring plan

A variety of monitoring activities to measure progress toward achieving the targets for success in effective land use and wildlife management could include:

- Establish test plots for continual monitoring of habitat restoration areas.
- Complete annual inventories of plants, birds and indicator species, especially along wildlife corridors to determine success at enhancing connectivity.
- Assess the presence of invasive species.
- Complete assessments of changes in ecosystem services (carbon sequestration, biodiversity, water quality and beneficial insects) prior to development, during development and repeated at five year increments post-development.
- Conduct annual assessments to determine if existing green spaces are meeting goals for multifunctionality.
- Monitor natural areas on-site for resilience and sensitivity to changes.
- Administer annual or periodic surveys of residents to gauge usage information and satisfaction with existing recreational opportunities as well as environmental education opportunities.
- Update spatial data on land use annually to confirm land use goals are met on a per acreage basis.

Design strategies

Strategies for sustainable management of the natural environment emphasize effective design of the built and natural environments, restoration and establishment of natural areas pre-development, and interaction with the landscape.

Goals	Design strategies	Milestones
LW1 LW3 LW4	Explore opportunities to establish forested areas on the property, both to invest in natural amenities on-site and to provide future resources for green infrastructure and building materials.	To be established at earliest opportunity.
LW1	Restore areas to diverse prairie and oak savanna.	To be established at earliest opportunity.
LW1	Restore potential wetland areas.	To be established at earliest opportunity.
LW2	Design wildlife corridors and begin re-establishing native vegetation before development begins.	Design phases.
LW2	Design regional wildlife corridors through the property to ensure that prairie, savanna and wetland species include the population sizes needed to survive into the future.	Design phases.
LW2 LW6	Emphasize both active and passive recreation, including athletic fields and parks, as well as hiking and cross-country skiing trails in community design.	Design phases.
LW3 LW7	Employ Low Impact Development (LID) ^c practices and design green spaces to improve water quality.	Design phases.
LW1	Survey for indicator species and plan habitat accordingly.	Design phases.
LW1 LW7	Use sustainable design best practices and green infrastructure to preserve natural spaces.	Design phases.
LW3	Promote carbon sequestration on-site through tree plantings, prairie restoration and local food production practices.	To be established at earliest opportunity.
LW1 LW7	Promote compact development and conservation design principles to preserve open space.	Design phases.
LW1	Evaluate research opportunities that can proceed along with development on-site.	Planning phases.
LW3 LW7	Promote habitat restoration and aesthetic landscape features in aggregate mining reclamation efforts.	Planning and design phases.
LW3 LW4	Incorporate green roofs and other opportunities to enhance green space and promote multi-functionality into the design-stage planning.	Design phases.
LW1 LW5	Establish funding mechanisms to provide annual investment in active management and restoration on the property including for annual burning, invasive species removal, plantings and habitat improvements.	Planning phases.

^c **Low Impact Development** (LID) is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. "Low Impact Development," U.S. Environmental Protection Agency, <http://water.epa.gov/polwaste/green/> (September 2011).

Construction strategies

Goals	Construction strategies	Milestones
LW1 LW3	Construct naturalized stormwater elements such as native swales, wet prairies, bio-filtration wetlands and ponds that also provide aesthetic value and habitat value.	Construction phases.
LW1 LW3	Minimize impact of earthmovers on-site. Reduce air, noise, and water pollution associated with construction activities.	Construction phases.
LW1 LW3	Ensure aggregate mining reclamation plans fit with the overarching goals and strategies across the property.	Construction phases.

Community life strategies

Access to and enjoyment of green space promotes healthy, active lifestyles and enhances quality of life of community residents. Initiatives to engage citizens in education and programs to protect and restore natural areas, active recreation opportunities, and monitoring activities can support community cohesion and ownership.

Goals	Promoting sustainable behaviors	Milestones
LW1 LW2 LW3 LW6	Educate residents about the purpose of conservation corridors and core natural habitats on-site. Create signage that explains the function and benefits associated with restoration activities. Recruit residents to participate actively in on-site habitat improvements and restoration including installation of blue-bird houses, prairie burning, and invasive species removal.	By occupancy phases.
Goals	Education and engagement	Milestones
LW6	Promote lifelong learning with nature through participatory activities and active environmental education programs targeted at all ages.	By occupancy phases.
Goals	Community website and communications	Milestones
LW1 LW2 LW6	Establish a community page with information about ongoing recreation, restoration and education activities in the community. Reach out to both UMore Park residents and neighboring communities. Include a land use map on the website with information on wildlife corridors, indicator species and multifunctional landscapes. Create an interactive website for residents to contribute information on bird sightings, non-native plant spotting and other natural history information.	By occupancy phases.
Goals	Collaborative opportunities	Milestones
LW1 LW2	Explore potential partnerships that could contribute to education, monitoring and restoration activities in the community.	By occupancy phases.

Management plan strategies

Key policies can encourage sustainable environmental management practices for residents and businesses in the community to promote multifunctional and healthy green spaces and resident engagement and recreation.

Goals	On-site policies and property management	Milestones
LW1 LW2 LW3	Encourage residents to use native plants in gardens and landscaping and prohibit planting of non-native highly invasive species.	By occupancy phases.
LW3 LW6	Encourage residents to donate a minimum number of hours annually to restoration and habitat management activities in the community.	By occupancy phases.
LW1 LW2 LW3	Limit street, residential, business and municipal lighting spillover glare at the edge of the property and use full-cutoff fixtures outside meeting Leadership in Energy and Environmental Design (LEED) standards.	Design through occupancy phases.

LW1 LW2 LW3	To enhance the effectiveness of wildlife corridors, limit overhead lighting in the community within 200 feet of corridors and prohibit lighting with low pole heights within this zone.	By occupancy phases.
LW1 LW4	Manage both public and private natural areas for multiple purposes. For example, green spaces can also serve the purpose of food production, carbon sequestration, wildlife habitat and improved water quality.	By occupancy phases.
LW1 LW5	Implement active control measures to reduce the spread of invasive species throughout the property.	By occupancy phases.

HR plan and job creation

With sufficient investment in restoration and land management activities in the community, opportunities for green jobs at UMore Park could include a natural area management position responsible to manage restoration, land use and habitat work in the natural lands on the property. The natural area manager could establish monitoring teams, organize community outreach and education opportunities, hire and manage summer interns to work on landscaping and habitat projects, and serve as a naturalist resource for the community.

Synergies

The land use and wildlife principle impacts or is impacted by nearly all other principles:

- Land Use and Wildlife, Zero Carbon and Sustainable Water. Habitat restoration and connectivity efforts will result in benefits to carbon storage and sustainable water.
- Land Use and Wildlife, Health and Happiness and Culture and Community. Additionally, community members' health, quality of life and sense of community will be enhanced through access to nature, improved recreational activities, and the benefits of living near open natural spaces.
- Land Use and Wildlife, Local and Sustainable Food, Sustainable Water and Zero Carbon. Emphasizing the goals of multifunctionality and ecosystem service provision can promote design of green spaces that function both for habitat and food production, create wetlands that treat stormwater and provide natural amenities, and establish diverse prairies as a biomass energy source that benefit habitat and also support carbon neutrality.

In addition to synergistic interactions across principles, there may also be tradeoffs where meeting one principle detracts from another. Balancing competing land uses at the site will be a key challenge at UMore Park where land is desired for residential and commercial development in addition to energy production, food production, recreation, and habitat protection. Additional tradeoffs may result from land management on-site. Food production and landscaping may require the application of nitrogen fertilizers that can impact water quality and habitat on- and off-site. Harvesting trees for building materials or for bioenergy production meets material and carbon goals, but may degrade habitat quality as compared to an undisturbed forest.

Strategic positioning

Community benefits

Direct benefits for community members to achieving Land Use and Wildlife goals could include:

- Access to nature including enhanced wildlife viewing opportunities.
- Improved recreational opportunities including hiking, bird-watching, cross-country skiing, and access to hunting.
- Environmental education opportunities on-site for all ages.
- Improved air and water quality.
- Improved climate regulation.
- Increased property values attributable to natural amenities and open space.
- Improved health and happiness related to easy access to nature.

Environmental benefits

- Habitat restoration and wildlife corridor connectivity could improve habitat for native species and provide better habitat for pollinators and beneficial insects.
- Strategies could enhance connectivity with nearby open space and key wildlife corridors such as the Mississippi River fly-way.
- Restoration activities and natural area multifunctionality could improve water quality on-site, reduce erosion, improve soil quality and reduce light, air and noise pollution.
- Carbon sequestration could be enhanced on-site due to restoration and land management.

Marketing

Below are examples of potential marketing, sales or communications opportunities.

- Recreational activities on-site are an important marketing amenity.
- Solid market research data indicates compact, walkable, mixed-use communities hold higher property values with more reliable, faster resale potential.
- Access to nature is highly valued by residents and contributes positively to overall quality of life.

Wider community and municipal engagement

During community engagement process

- Active web presence to highlight restoration activities on-site.

- Outreach materials in neighboring communities to solicit assistance with invasive species removal, habitat restoration and tree planting.
- Open house meetings to engage the broader community on land use and wildlife activities.
- Targeted meetings or outreach with key partners and stakeholders that can provide expertise or direct assistance with restoration, biodiversity surveys and land management.
- Participate in local celebrations and events such as picnics, art fairs, races and festivals.
- Attend regular meetings of local jurisdictional boards and commissions to share updates on aspects of community development and its potential benefits to the greater community.
- Host events promoting and celebrating milestones of the project.

Post first occupancy

As the community at UMore Park will be a model for sustainability, the following efforts can help to inform and engage with the broader community and region:

- Share information on project performance and best practices with local units of government.
- Participate in and host regional community events such as garage sales, festivals, theater and music events and art fairs.
- Create an active habitat and wildlife community group that involves residents in habitat management, restoration, and wildlife and plant surveys. The group could also be in charge of surveying residents for recreation preferences and evaluating progress with respect to the key performance indicators.
- Create opportunities for environmental education and outdoor recreation for residents and the surrounding community to highlight natural amenities at UMore Park.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is of communities that contribute to an overall increase in biodiversity and biological productivity, as well as support beautiful landscapes.

One Planet common international targets

To ensure a net positive contribution to local native biodiversity and natural habitats a management plan will be developed, resourced and financed alongside the property management plan. Such a plan will:

- Support collaboration between professional ecologists and project landscape architects with long term input from local conservation groups.
- Identify key species that are either protected or locally significant and monitor these to increase their presence.
- Include a comprehensive planting scheme with a selection process that benefits local wildlife, addresses local climate issues and avoids invasive species.
- Enhance the provision of key ecosystem services for the benefit of people living at, and outside of, the community such as: provision of food and timber, climate regulation, carbon sequestration, water quality, recreation, aesthetic value, and cultural and spiritual benefits.

Opportunities for education around land-use and ecosystems will be identified. At least one educational opportunity will be identified as a showcase to publicly report on actions taken to benefit biodiversity and enhance ecosystem services within the development. In addition, at least one educational opportunity must be identified to regenerate degraded local natural resource stocks (e.g. soils improvement, prairie restoration, reforestation) on-site.

Habitat loss due to residential development, especially development associated with metropolitan expansion, is one of the primary drivers of biodiversity loss worldwide. The developer will look for ways to showcase how they are minimizing habitat destruction and enhancing regional habitat connectivity by restoring or conserving valuable natural space on-site.

One Planet national and international context

The impact of human activities on Earth's ecosystems is extensive and growing.²⁷ Human-dominated land uses occupy approximately 50 percent of the vegetated land area globally. Greenhouse gas emissions have increased over 30 percent since the Industrial Revolution, about one-quarter of all bird species have been driven to extinction, and declines in the majority of ecosystem services have been documented worldwide.²⁸

In the United States, recent trends in household size and changing preferences have resulted in a dramatic increase in the area of low-density, exurban development.²⁹ The consequences of this development pattern have been associated with biodiversity loss, increased greenhouse gas emissions, declines in water and air quality, and reductions in other ecosystem services. The Land Use and Wildlife principle is designed to encourage development at UMore Park that minimizes the negative environmental impacts associated with suburban development and maximizes opportunities for enhancing ecosystem services and interacting with nature.

8. CULTURE AND COMMUNITY

Mission statement

Enhance, expand and enrich the cultural life of the community by actively engaging citizens, fostering a strong sense of place based on history and unique attributes of the landscape, utilizing regional resources and reflecting the increasing diversity of its residents.

Approach

Citizen involvement and input is critical to the approach for establishing a strong social fabric in the community at UMore Park. Throughout development and in the community over time, citizen engagement can help to shape the design of community programs, events and features at UMore Park that nurture a sense of place, and that support and encourage active engagement of residents, community groups and businesses in the area. The community at UMore Park is envisioned as a destination—a place where people can live, work and play.

Creation of a welcoming community at UMore Park includes thoughtful planning and design of the built environment and green spaces to meet the needs of a diverse body of residents and businesses. In addition, programs to support lifelong learning, recreation and the arts, cultural enrichment and sustainability initiatives can enhance the quality of life of the community's citizens by promoting active minds and bodies. Community events should draw participation of people from all walks of life, including from the surrounding area. Finally, UMore Park could be designed in such a way as to encourage active civic participation, community involvement, and volunteering.

Initiatives to foster a vibrant and thriving community at UMore Park are anticipated to evolve over time through sustained citizen input and recommendations for community features and

amenities that reflect community values and celebrate local and regional history and traditions.

Goals

- CC1 Acknowledge, appreciate and celebrate the history of the UMore Park property within the regional context.
- CC2 Create a sense of place that connects new residents with the land, the history and each other so that UMore Park becomes their community.
- CC3 Reflect community values—knowing others and being known, the ability to shape and guide the evolution of the community, access to local livelihood and enrichment, and safety and security.
- CC4 Foster integration with existing neighborhoods and communities to produce shared experiences and achieve common goals.
- CC5 Sustain a connection to the earth and environment through integration of green spaces and natural areas as well as personal and community gardening and food production.
- CC6 Encourage residents' participation in the life of the community by creating a community-driven governance structure, providing volunteer opportunities and supporting a system of institutions and organizations that rely on the active participation of their members.
- CC7 Celebrate and reflect diversity as the community seeks to embrace, learn from and provide opportunities for a resident-base that is diverse in every way—in age, gender, ethnicity, race, culture, income, housing, work and recreation opportunities and lifestyles.
- CC8 Emphasize the importance of the arts and culture to nurture the minds and hearts of area residents

by providing opportunities for them to experience, participate in and present a broad range of artistic, cultural and intellectual events and activities.

- CC9 Position community sustainability centers across neighborhoods to engage residents and visitors in the culture, history, and future—and the goals for social, economic and environmental sustainability—of the UMore Park community.
- CC10 Foster a relevant and appealing culture of sustainability that is maintained across generations of residents as new opportunities and new challenges arise.

Local context

- Dakota County is the third most populous county in Minnesota, with an estimated 2008 population of approximately 400,000.¹ Dakota County added 80,677 people during the 1990s. Accounting for about one out of every seven people added to the state's population in the 1990s, Dakota County grew by an average of nearly 3.0 percent per year between 1990 and 1995 and an average of approximately 2.2 percent per year between 1995 and 2000. The population of the small cities and townships in Dakota County grew by a little over 11 percent during the decade. Urban cities grew by a little over 30 percent.²
- In 2007 in Dakota County, more than 29,000 residents, or 7.3 percent, were foreign-born. The Minnesota figure was 12.4 percent.³ There were approximately 18,000 immigrants in Dakota County according to the 2000 Census, about five percent of the total population. The foreign-born population of more than 29,000 in 2007 represents a gain of 65 percent since 2000. During this time, the percent of foreign-born residents grew from 5.1 to 7.3 percent of the population.⁴ While the number of new arrivals has increased, there has also been a change in country of origin. With the largest decline in immigrants from European countries, the largest increase has been newcomers from African countries.⁵
- The surrounding area was originally inhabited by the Lower Band Mdewakanton of the Santee Sioux tribe. On August 5, 1851, Chief Little Crow, the leader of the New Ulm Indian uprising, signed a treaty at Pilot Knob, Mendota, turning the land over to the government.⁶
- In 1853, the first settlers to Rosemount, William and Walter Strathern and C. H. Carr came from Scotland by way of New York to stake their claim. They were followed soon after by many immigrants, most of whom were Irish Catholics. Because of the strong Irish sentiments, and the fact that there is a village in Ireland of the same name, Rosemount was chosen as the name of the village. The strong Irish tradition continues—Rosemount high school teams are the Irish; a shamrock is featured on the City of Rosemount flag; and Leprechaun Days, an event celebrating the community's Irish heritage, is held annually at the end of July.⁷
- The Rosemount and Empire Township areas were initially developed and cultivated by small family farmers, serving for many years as an important source of produce for the Twin Cities.⁸
- The modern history of the UMore Park property began during World War II. In 1942, the federal government acquired approximately 12,000 acres of farmland in Rosemount for the construction of the Gopher Ordnance Works, a smokeless gunpowder production facility. The project employed 20,000 workers and included construction of 856 new buildings on the property. Construction was never fully completed on one of the two smokeless powder manufacturing lines that were originally planned. However, one of the production lines was in operation for nine months, from January through October 1945. The University of Minnesota acquired approximately 8,000 acres of land in two parcels in 1947 and 1948 for research and education.⁹
- The Rosemount Research and Outreach Center, one of eight regional research and outreach centers under the University's College of Food, Agricultural and Natural Resource Sciences, is located on the UMore Park property.¹⁰
- United State (U.S.) Census data of the ancestry of residents of Empire Township found that of the 1,555 residents in 2000, 44.6 percent identified themselves as having a single ancestry, and 40.8 percent identified themselves as having multiple ancestry, the remaining 14.6 percent did not report their ancestry. Of those who reported, 36.3 percent identified themselves as German, 29 percent Norwegian, 16.1 percent Irish, 6.3 percent as English, 5.7 percent French, 5.6 percent Swedish and 4.6 percent Dutch.¹¹
- U.S. Census data of the ancestry of residents of Rosemount found that of the 14,615 residents in 2000, 40.1 percent identified themselves as having a single ancestry, and 45.7 percent identified themselves as having multiple ancestry, the remaining 14.2 percent did not report their ancestry. Of those who reported, 42.4 percent identified themselves as German, 16.8 percent Norwegian, 15.9 percent Irish, 8 percent English, 7.8 percent Swedish, 5.3 percent French, and 4.7 percent Polish. An estimated 8.5 percent of Rosemount residents speak a language other than English at home.¹²
- The Rosemount Community Center offers modern high quality facilities to area residents, including a banquet room, auditorium, gymnasium, meeting rooms, as well as the multi-purpose arena.¹³
- The community has a demonstrated commitment to nurturing arts and cultural programs and organizations. The Rosemount Area Arts Council, established in 2007, provides opportunities for residents to experience and participate in a variety of events and programs celebrating music, theater and the visual arts.¹⁴
- The Dakota County Library system opened its Robert Trail branch in 2009 in downtown Rosemount, just north of Robert Trail and 145th Street.¹⁵
- In 2008, Minnesota voters approved the Clean Water, Land and Legacy Amendment to the state constitution. This amendment created a new, permanent and dedicated revenue stream that provides funding for a variety of natural and cultural resource programs.
- Although the City of Rosemount is over 100 years old, more

than 50 percent of its current residents have been part of the community for fewer than 10 years. Despite the area's rapid growth, area residents continue to express a strong commitment to maintaining a "small town feel" as the community continues to grow.

- The Rosemount/Apple Valley/Eagan School District (ISD 196) is the fourth largest district in Minnesota, serving some 28,000 students. The district has garnered state and national recognition, and boasts a high level of family and community participation in academics and school activities.¹⁶

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can promote a strong social fabric through innovations in community design and features, programming and public engagement. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota seeks to establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to foster a vibrant and thriving community for residents, community groups and businesses:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Non-profit organizations, community organizations and societies with an emphasis on education, arts and culture, the environment, service and volunteerism and community engagement.
- Faith-based communities.
- Regional ethnic communities and organizations.

- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Funders and grant-making organizations.
- Local businesses, industry and commercial operations.

Site features

- Rosemount is located in close proximity to the Twin Cities, which have a well-deserved reputation as one of the nation's most robust regional cultural centers.
- Some remnants of the historical uses of the property, including the former Gopher Ordnance Works munitions facility, are present on the property.
- The UMore Park property is located near a major transportation corridor (U.S. Highway 52) that links two of the state's most important urban areas (the Twin Cities and Rochester).
- The UMore Park property is bordered on the south by the Vermillion Highlands, a 2,822-acre research, recreation, and wildlife management area jointly managed by the University of Minnesota and Minnesota Department of Natural Resources, in conjunction with Dakota County and Empire Township. The Vermillion Highlands offers abundant opportunities for outdoor recreation, including trails for horseback riding, hiking, and cross-country skiing; as well as opportunities for hunting and trapping. Dakota County is currently developing a regional park of nearly 500 acres in Empire Township adjacent to the western boundary of Vermillion Highlands. The UMore Park property is uniquely situated to become an important point of entry and pathway to these extensive natural areas.

Opportunities for innovation

Existing requirements

- The City of Rosemount has nearly doubled in size over the past decade. Development of the sustainable community at UMore Park can greatly increase the population over time. However, development of UMore Park can provide opportunities for creation of new community features, services and amenities.

Site conditions

- In late 2010, the University of Minnesota launched a Remedial Investigation (RI) on the eastern 3,500 acres of UMore Park to collect important information regarding the environmental condition of the property resulting from historical uses, including as the Gopher Ordnance Works, a federal smokeless gunpowder manufacturing facility during World War II, as well as activities following the University's acquisition of the property. The RI will include collection of soil and groundwater samples for laboratory analysis to assess any potential environmental impacts.
- The ethnic composition of Rosemount has been remarkably homogeneous, with a high proportion of residents having European American ancestry. These ethnic connections are reflected in many of the cultural events and institutions

that have been a traditional part of community life. As the population has increased over the past several years, the demographic diversity of the community has increased substantially and is anticipated to continue to increase as the community at UMore Park unfolds over time. The development of the UMore Park property provides opportunities to integrate new traditions into the cultural life of the community while maintaining longstanding local traditions.

Research and knowledge creation

- Additional information is needed to identify baseline information for the region around important demographic questions including residents' sense of community, current levels of community participation, knowledge of the history of the area, subjective well-being, literacy rates, access to cultural activities/services, volunteerism, charitable giving and civic participation.

Baselines for key performance indicators

Engagement and civic involvement

- Volunteerism rates in Minnesota were at 37.5 percent from 2007-2009, meaning over one third of Minnesotans volunteered at least once each year.¹⁷

Education and lifelong learning

- Literacy rates in Minnesota are nearly 96 percent.¹⁸
- High school graduate rates in Minnesota were at 86.2 percent in 2005-2006.¹⁹
- Dakota County has seen its residents' education increase, with 28 percent of adults 25 or older now having a four year degrees.
- School assessments in Dakota County have found that reading levels have gone down a little, while math scores have improved.
- Circulation of library materials in Dakota County increased 45.5 percent between 2001 and 2009.

Sense of well-being and safety

- Crime rates in Dakota County have stayed at the same level or decreased since 2007.²⁰
- The Happy Planet Index (HPI)^a or a similar index of individuals' sense of well-being and life satisfaction could be used to determine baseline levels of happiness and well-being in the surrounding area. The nation with the happiest population, according to the Happy Planet Index scored 68.2 out of 100 on their assessment. Also, the countries which scored highest on subjective well-being measures achieved scores of 8 out of 10.

Cultural diversity

The cultural diversity of Dakota County and the Twin Cities is changing, a pattern that will continue as UMore Park is developed in the years ahead. According to the U. S. Census Bureau and the American Community Survey, the Dakota County population in 2009 consisted of the following:

- White – 84.3 percent.
- Hispanic or Latino – 4.7 percent.
- Black – 2.2 percent.
- Asian – 2.8 percent.
- Other – 1.7 percent.
- Two or more – 1.7 percent.

Key performance indicators

Engagement and civic involvement

- Strive to exceed the rates of volunteering in Minnesota in the first 10 years of occupancy, with at least 50 percent of residents volunteering at least once each year. UMore Park could strive to increase the rates of volunteering among residents by one percentage point every year after the initial 10 years.
- Residents know more than 50 percent of their neighbors within a one block area well enough to call on for help.
- Aim to have 70 percent of respondents describe themselves as active participants in the community, including participation in neighborhood councils and/or other community associations.
- Ensure regular opportunities throughout planning and development and in the community over time to garner public input on community features, supporting community ownership and sustaining a strong sense of community among its members.

Education and lifelong learning

- Meet or exceed Minnesota literacy rates in the first 10 years, and increase one percentage point each subsequent decade.
- Strive to maintain a graduation rate of 87 percent in the first 10 years, and then aim for an improvement of one percentage point every five years.
- Foster numerous workshops, classes and general events that celebrate culture and educate the residents of UMore Park and the surrounding area about the cultural backgrounds of area residents.

Sense of well-being and safety

- Promote safety and security in the community so that all community members feel safe and able to be outside or allow children to play outside without danger.
- Strive to increase the sense of well-being and satisfaction of community members using the Happy Planet Index (HPI) or a similar index.

^a **Happy Planet Index (HPI)** is an innovative measure that shows the ecological efficiency with which human well-being is delivered around the world. It is the first ever index to combine environmental impact with well-being to measure the environmental efficiency with which country by country, people live long and happy lives. "About the Happy Planet Index," The New Economics Foundation, <http://www.happyplanetindex.org/learn/> (2009).

- Endeavor to provide jobs and a quality of life that enables the community to achieve a general retention rate 10 percent higher than that of communities of similar size in Dakota County.

Cultural diversity

- Ensure the governing bodies in UMore Park reflect the diversity of the community.
- Strive to be among the most diverse communities in Dakota County.

Monitoring plan

Monitoring performance toward achieving goals for a vibrant, engaged community at UMore Park will rely on annual surveys administered to members of the UMore Park community as well as tracking development of and participation in cultural programs and events in the community:

Examples of the information sought in an annual survey administered to residents, community groups and businesses at UMore Park follow, though the survey instrument would evolve over time with development of new neighborhoods, community features and amenities. Survey results could be synthesized and made available to community members.

A residents’ survey could:

- Explore community satisfaction and sense of well-being of residents through the Happy Planet Index or similar index.
- Seek to identify literacy rates, as well as rates of graduation and level of education of community residents.
- Evaluate residents’ involvement in community groups (frequency and duration), as well as charitable donations. The survey could also be used to create an inventory of the types and number of community organizations present in the community.
- Seek to identify residents’ demographics, as well as the demographic composition of community groups and community governing bodies.
- Explore resident retention rates, including opportunities for young adults to remain in the community following graduation.

In addition, community organizations and authorities could be urged to track community-wide programs, events, forums and festivities that occur each year, along with levels of participation at each. Community sustainability centers could track and monitor the number of visitors, distinguishing between residents and outside visitors. Visitors could provide additional information on the reason for their visit and their ideas and input for sustaining a vibrant, robust community.

Design strategies

The community at UMore Park is envisioned as a destination—a place where people can live, work and play. Strategies to promote a sense of place in the community infrastructure balance the old and the new, encouraging recognition of existing community features and characteristics while embracing a culture of sustainability and community connection.

Goals	Design strategies	Milestones
CC4 CC10	Explore creation of an annual Sustainability Conference to showcase and model best practices for sustainable community design and development at UMore Park. The event could encourage leading theoreticians, technologists, academics, and practitioners from around the world to present their ideas, and to participate in discussion around sustainable practices. Although initially directed toward a regional audience, the event could attract a wider national or international audience.	Planning phases and ongoing.
CC1 CC2 CC4	Design each phase of development to maintain continuity and physical connections with the existing surrounding community.	Planning phases.
CC1 CC2	Identify existing physical features that could be integrated into the new development.	Planning phases.
CC1 CC2 CC5	Develop ways to interpret the physical history of the site such as trails, interpretive kiosks, key structures and land use patterns.	Planning phases.
CC2 CC4 CC6 CC9	Design a primary community sustainability center as a hub for cultural, community and business activity and to orient visitors. Explore optimal location and number of additional community sustainability centers in each phase of development.	Planning phases.

CC2 CC3 CC5	Ensure that there is an adequate ratio of public to private spaces, and that there are ample amounts of green space that allows for community involvement, interaction and artistic expression.	Planning phases.
CC2 CC9 CC10	Locate community sustainability centers in accessible locations in neighborhoods within the community, allowing residents to connect and interact with other residents and visitors.	Design phases.
CC2 CC8	Promote integration of public art in places that attract residents to spend time and socialize, including large and eye-catching art.	Design phases.
CC1 CC2	Create historical record of the development project.	Planning phases.
CC2 CC6	Maintain digital and physical maps of UMore Park on the UMore Park website and at the community sustainability centers. Maps can include neighborhoods, parks and trails that are already developed, as well as future plans for development.	Planning phases.
CC3 CC7	Ensure child-friendly spaces where children of all ages can interact and play together.	Design phases.
CC3 CC5 CC7	Ensure that all community pathways are accessible for persons with reduced mobility.	Design phases.
CC2 CC3 CC5 CC7	Design multi-faith spaces around the community, both indoors and outdoors, that are welcoming and open for public use.	Design phases.
CC2 CC5	Integrate sports fields and places for exercise and group athletic activities into community designs.	Design phases.
CC1 CC2 CC5 CC8	For existing site and landscape features that are not feasible for reuse, explore how they can be captured in art and historical markers in the community.	Design phases.
CC1 CC2 CC6 CC8	In conjunction with residents and neighbors, explore names for neighborhoods, streets and buildings that reflect the culture, history and traditions of the area.	Design phases.
CC2 CC3 CC4 CC5 CC6	Create an area for a permanent farmers' market for UMore Park residents and the surrounding area.	Design phases.

Construction strategies

Goals	Construction strategies	Milestones
CC1 CC2	Preserve desirable existing site features and utilize existing materials and elements, if feasible, during construction.	Construction phases.
CC2 CC8	Incorporate signage in the construction phases to generate excitement and begin to establish the community identity and aesthetic.	Construction phases.
CC3 CC6	Ensure safety throughout construction phases that allows residents to still participate fully in community activities and recreation.	Construction phases.

Community life strategies

Establishing meaningful community events and programs; lifelong learning opportunities covering such topics as nutrition, the arts, recreation, and others; and regular communication and information sharing; can foster a sense of community among the members of the UMore Park community. In conjunction with advisory groups made up of members of the community, community-building activities can adapt to meet the changing needs of community members over time.

Goals	Promoting sustainable behaviors	Milestones
CC1 CC2 CC3 CC4 CC5 CC6 CC7 CC10	In conjunction with residents and community organizations, plan and implement one-time and annual community events and activities, to take place within the community and nearby, such as: <ul style="list-style-type: none"> • A festival that highlights the importance of the environment. • A cultural festival and parade. • An award program that recognizes sustainable practices and achievements of businesses, public leaders, and residents. • A festival that celebrates the local history of the area. • Monthly community dinners that bring together people from diverse populations to eat and socialize. 	By phases of occupancy.
CC4 CC7 CC8	Incorporate national flags of the communities represented in the community and surrounding area in community sustainability centers.	By phases of occupancy.
CC2 CC8	Incorporate arts into community activities and events.	By phases of occupancy.
CC4 CC5	Foster opportunities for Community Supported Agriculture and promote workshops on cooking and growing food.	By phases of occupancy.
CC2 CC4	Encourage establishment of sporting leagues, such as softball, basketball, and hockey, for residents but open to participants from outside the UMore Park community.	By phases of occupancy.
CC1 CC2 CC4 CC5 CC10	Develop a tour of the UMore Park property for residents and visitors, and focus especially on the historical legacy of the site and the goals for sustainability.	By phases of occupancy.
CC6	Explore creation of a babysitting co-op so parents have the chance to meet other adults and spend time with friends.	By phases of occupancy.
CC2 CC6 CC7	Ensure all festivities and activities are accessible to persons with limited mobility.	By phases of occupancy.
CC6	Create event coordinator positions to coordinate community and neighborhood events and activities, and also encourage resident engagement and participation.	By phases of occupancy.
CC2 CC5 CC6 CC8	Create green spaces and gardens in each neighborhood with native plants and flowers, allowing residents and visitors to stroll through and learn about local plants.	By phases of occupancy.
CC2 CC8	Create public spaces where local musicians can perform and people can listen or participate.	By phases of occupancy.
CC2 CC8	Create public spaces where art can be actively created and developed by residents and visitors.	By phases of occupancy.

Goals	Education and engagement	Milestones
CC2 CC4 CC5 CC6 CC7 CC8 CC9 CC10	Develop programs to educate residents and visitors. Utilize community sustainability center(s) to host classes and workshops, including topics on living sustainability, cultural heritage, cross-cultural communication and healthy living. Empower residents to teach their own community education programs and workshops. Bring in instructors and faculty from the University of Minnesota to lead workshops and trainings on a range of issues.	By phases of occupancy.
CC2 CC4 CC6 CC8	Partner with area organizations to bring music and art performances to the community.	By phases of occupancy.
CC1 CC4 CC5 CC10	Foster learning opportunities for local schools and organizations around aspects of environmental, economic and social sustainability in the community, as well as the historical legacy of the area.	By phases of occupancy.
CC4 CC10	Establish a sustainability concierge at the community sustainability center(s) that guides UMore Park residents on ways to live sustainably and orients visitors to the community.	By phases of occupancy.
Goals	Community website and communications	Milestones
CC2 CC3 CC6	Establish a website which provides a mechanism for community members to set up interest groups, as well as groups for separate populations/neighborhoods. These groups can be used to share news and host online discussions.	By first phase occupancy.
CC1 CC2 CC3 CC8	Capture photos and videos of community activities to post on new media sites to inform and excite residents about social opportunities in the community. Also include photos and videos highlighting the legacy of the UMore Park area.	By first phase occupancy.
CC2 CC6	Create an online calendar of activities taking place in the community at UMore Park that allows residents to add activities.	By phases of occupancy.
CC2 CC6 CC10	Establish a community blog that provides residents and visitors an opportunity to reflect on their lives as UMore Park residents and the advancements in community-building and sustainability.	By phases of occupancy. (Pilot Potential)
CC6	Post and maintain a list of all volunteer opportunities in the community that categorizes opportunities by the type of volunteer work.	By phases of occupancy.

Management plan strategies

Key policies can encourage a sense of community ownership, ensure fair and equitable community management, and promote access to nature and the arts – for all community members.

Goals	On-site policies and property management	Milestones
CC6	Create a residential tenants' guide outlining suggested community decision-making processes and participation mechanisms.	By first phase occupancy.
CC7	Strive to have mixed-income housing, both within smaller units like apartments, but also within neighborhoods in larger units.	By phases of occupancy.
CC2 CC6 CC10	Establish a community design committee, including design professionals (planners, architects, landscape architects); public officials; and citizens, to advise on flexible design guidelines for buildings and landscape features within the community.	Planning phases and ongoing.

CC6 CC8 CC10	Promote volunteer and leadership opportunities to encourage residents to actively participate in planning community activities, managing upkeep to landscape and property features, coordinating and teaching community education, and exploring additional strategies for sustainable living.	By phases of occupancy.
CC6 CC7 CC8	Seek funding to create a cultural endowment for the community at UMore Park. Dividends from the investment of principal could be used to provide a revenue stream for cultural events and programs in the community.	By phases of occupancy.

HR plan and job creation

Job creation to support community-building efforts and activities in the community at UMore Park could include the following types of positions:

- Event and activity coordinator positions to support neighborhood and community activities in the community. The coordinators could be advised by a group of volunteer residents to plan and implement larger community activities, such as annual festivities, parades and events as well as more ongoing, UMore Park-wide activities, such as sporting leagues, exercise activities, workshops and classes.
- Sustainability concierges at the community sustainability center(s) to support residents' efforts to live sustainably including providing recommendation for home maintenance, landscaping and gardening and energy-efficiency. In addition, concierges may serve as tour guides of the community sustainability centers and communities as well as provide information and outreach about UMore Park's sustainability achievements to the broader community.
- Positions to develop, maintain and promote social networking tools that inform residents and visitors regarding the community and its legacy.
- Positions on the governing and cultural boards, as well as positions designed to help UMore Park interact with local and statewide governing bodies and school systems.
- Individuals available as needed to lead more in-depth tours and activities for non-UMore Park residents, such as wildlife and habitat guides or historical legacy tours for local schools and outside organizations.
- Service positions for community sustainability centers including janitorial staff and customer service.
- A cultural liaison to establish, maintain and develop connections with existing cultural organizations, as well as educational institutions and funding organizations.
- Environmental educators to develop sustainability curriculum for use in area schools, day care centers and community education programs.

Synergies

- Culture and Community, Local and Sustainable Food and Equity and Local Economy. Monthly community gatherings that bring together people from diverse backgrounds to socialize and eat locally-grown food, especially foods that represent different ethnic backgrounds and heritages, can help build bridges between cultures and

encourage entrepreneurship.

- Culture and Community and Land Use and Wildlife. Volunteer opportunities and school field trips that focus on protecting the biodiversity and natural habitats of UMore Park create an informed body of residents who actively engage in enhancing their environment.
- Culture and Community, Health and Happiness and Equity and Local Economy. Exercise and physical activity groups and events encourage community members to form groups and get to know one another while staying fit and active. In addition, the community sustainability centers could also host health classes, business/entrepreneurship courses, local health clinics and local businesses.

Strategic positioning

Community benefits

- Residents can enjoy a strong social fabric characterized by availability of jobs, tight-knit and safe neighborhoods, volunteer and engagement opportunities and lifelong learning.
- Both residents and people from the surrounding community will have access to new cultural amenities and resources such as workshops, classes, physical activity and exercise opportunities, art displays and musical performances.
- Community members can lead active, healthy lifestyles through available theater, arts and recreation opportunities.
- Community members and visitors from all across the region, state, nation and world, will be able to contribute ideas and learn from others about living sustainably in an interactive and supportive environment.

Environmental benefits

- The community at UMore Park can provide a model of environmental, economic and social sustainability to the region, state, nation and world.
- Community members participate in and join a growing culture of sustainability that is carried on into future generations and into other communities.

Marketing

- Arts and culture strengths of the University of Minnesota and region can draw prospective residents to UMore Park.
- Initial residents can help to share the value and benefits of being a part of the community at UMore Park, including sense of connectedness, well-being and active minds and bodies.

Wider community and municipal engagement

During community engagement process

- Encourage residents from neighboring areas to continue to offer input and shape the vision for development of the vibrant, sustainable community at UMore Park.
- Promote transparency throughout planning and development activities.

Post first occupancy

- Partner with the surrounding area to produce local foods and an area farmers' market for residents.
- Invite area neighbors to participate in community groups, workshops, classes, exercise and physical activity groups, art creation, and musical and artistic performances.
- Explore ways to collaborate with surrounding communities around mutual goals and benefits.
- Invite local schools and students of all ages to visit UMore Park for field trips and learning excursions.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is one where a culture of sustainability, community and a sense of place have been nurtured. Endorsed communities build on local cultural heritage to foster social capital and connectedness.

One Planet common international targets

A site-specific plan to maintain and enhance or revive valuable aspects of local culture and community will be developed. Community involvement in the writing and delivery of the plan will be considered as central to the process.

One Planet centers will be provided (perhaps as part of a broader community center) to inform residents and visitors and to help create a new culture of sustainability.

Each *One Planet Community* will endeavor to develop a thriving sense of place and sense of community. In addition, two locally specific showcase projects will be identified and delivered that deepen the local sense of culture and community. The approach and scale of the showcase projects will be agreed on a project-by-project basis and be at a scale commensurate with that of the development.

One Planet national and international context

Local cultural heritage is being lost throughout the world due to globalization, resulting in a loss of local identity and wisdom. Learning from our past can help us live in the future in ways more appropriate to our local geography, climate and culture.

9. EQUITY AND LOCAL ECONOMY

Mission statement

Provide a diverse range of places to live, work and play in a manner that achieves social, environmental and economic equity in the community at UMore Park.

Approach

The approach to fostering a thriving economy in the community at UMore Park is centered on creating economic opportunities for the diverse community of individuals and families who live and work at UMore Park and also for those people who work in the community. A focus on creating neighborhoods of engaged and empowered citizens can help to create such opportunities.

The community at UMore Park strives to be diverse in every way: in age, gender, ethnicity, race, culture, income, housing, work and recreation opportunities and lifestyles. It is part of the City of Rosemount and Empire Township; a community with local jobs and services that meet the needs of its residents.

Goals

ELE1 Evolve as a robustly diverse community comprised of different ages, cultures and lifestyles that links to surrounding neighborhoods, places of commerce and

recreational opportunities in the City of Rosemount, Empire Township and the greater region and is accessible for people with reduced mobility.

- ELE2 Collectively act as a responsible steward of the land.
- ELE3 Feature a socio-economic mix, with both quality affordable and market-rate housing units available in an integrated setting.
- ELE4 Provide opportunities for all residents to actively participate in the governance and management of their neighborhoods.
- ELE5 Promote equal access to healthy living including healthy lifestyle and disease prevention information, services, facilities and other amenities.
- ELE6 Foster on-site green collar jobs.
- ELE7 Foster a thriving local commercial sector that sets the example for fair commerce practices and value commercial and retail operations as key community “members.”
- ELE8 Foster living wage^a employment opportunities and a range and diversity of local jobs to help ensure that residents can live and work in the community.
- ELE9 Improve upon the values of equity and fair trade^b over time through evaluation and monitoring.

^a **Living wage:** “An above market wage mandate set at upwards of \$15 an hour. Traditional living wages apply only to government employees or employees of companies that contract with governments. Recently, efforts have been made to expand the reach of these ordinances to all local businesses.” Glossary: Living Wage, Employment Policies Institute, http://epionline.org/lw_glossary_list.cfm?gid=1 (2011).

^b **Fair trade:** “Fair trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South. Fair trade organizations, backed by consumers, are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade.” “What is Fair Trade?” Fair Trade Advocacy Office, http://www.fairtrade-advocacy.org/index.php?option=com_content&view=category&layout=blog&id=69&Itemid=143 (2010).

See also the University of Minnesota Board of Regents policies:

Policy on Equity, Diversity, Equal Opportunity and Affirmative Action, University of Minnesota Board of Regents, http://www1.umn.edu/regents/policies/administrative/Equity_Diversity_EO_AA.html (July 2009).

Policy on Purchasing, University of Minnesota Board of Regents, <http://www1.umn.edu/regents/policies/financial/Purchasing.pdf> (July 2008)

Local Context

- In March of 2011, the unemployment rate in Minnesota was 7.3 percent which is more than double the 3.6 percent rate that occurred in 2006. The national rate was 9.8 percent.¹
- Minnesota's per capita personal income was \$41,859 for 2009 which ranks 15th in the United States (U.S.).²
- Minnesota's Median Household Income for 2009 was \$56,090, which is higher than the U.S. median of \$49,777.³
- Dakota County's median household income was \$69,545 in 2009. However, household income in actual dollars is not keeping pace with inflation.⁴
- Households in Dakota County earning less than \$25,000 increased from 23 percent in 2007 to 24.7 percent in 2009.⁵
- Dakota County's poverty rate remains below the state and national rates and is among the lowest of the Twin Cities metropolitan counties.⁶
- Food shelf use has increased in Dakota County. Food shelf visits in 2009 increased 24 percent over the previous year — the largest recorded increase in 28 years. More than 50 percent of adult food-shelf visitors are employed. From 2000 to 2009, food-shelf usage almost tripled — from more than 1 million visits a year to almost 3 million. More than 18 percent of households with children in the metro area struggled to purchase food in 2009.⁷
- The poverty rate in Minnesota in 2009 was 10.9 percent, 10.3 percent in urban regions and 12.4 percent in rural areas.⁸
- From 2008 through the second quarter of 2009, Dakota County lost 4,316 jobs.⁹
- The proportion of residents with an income below the poverty threshold increased from 5.3 percent in 2004¹⁰ to 6.1 percent in 2009 in Dakota County.
- For a family of two adults and two children, the poverty line was \$22,050 per year in 2009.¹¹ A recent study by the Economic Policy Institute suggests that for a household in the Minneapolis/St. Paul metropolitan area, approximately \$54,000 is needed per year to ensure a modest but reasonable lifestyle. This is more than 2.7 times the income amount defined by the poverty thresholds.¹²
- The Employment and Economic Assistance Department of Dakota County has experienced large increases in public assistance caseloads since 2000 (Between 2000 and 2005 they increased 69 percent which is similar to the statewide increase.). There are at least three important factors driving this increase. First, there are more people and families that are poor. Second, the rising costs of basic needs (housing, childcare and medical insurance) are simply not possible for lower income families to finance. Finally, the Dakota County economy does not provide an easy source of relief. Among the different types of public assistance, the caseload of households that receive Food Support has increased the most (99 percent), followed by health care assistance (64 percent), and Minnesota Family Investment Program (MFIP) or Diversionary Work Program (DWP) (28 percent).¹³
- There was a 30 percent increase in the cost for childcare in Dakota County between 2000 and 2005. In 2005, it cost an average of \$13,000 per year for tuition at a childcare center for an infant. Similarly, the cost for pre-school care increased 31 percent between 2000 and 2005 to an average of \$9,700 per year. The average cost in Dakota County for childcare is somewhat higher than the state average.¹⁴
- In 2009, 46.2 percent of all renters in Dakota County spent more than 30 percent of their household income on housing costs.¹⁵ This is an increase from 38 percent in 2000. Similarly, more than one-quarter (31.1 percent) of homeowners with a mortgage spend more than 30 percent of their household income on housing costs. This is an increase from 17 percent in 2000.¹⁶
- The Metropolitan Council estimated that there were 1,010 affordable housing units (14 percent of all units) within Rosemount in 2005. The Dakota County Community Development Agency (CDA) estimated that there were 298 affordable rental units within Rosemount in 2006, 44 of which are CDA-owned senior units and 32 CDA-owned family units. The Metropolitan Council determined Rosemount's share of the regional affordable housing need at 1,000 new affordable units between 2011 and 2020.¹⁷
- The estimated median household income in Rosemount in 2009 was \$80,414. Despite this high median income, 8.7 percent of households in Rosemount had an income of less than \$25,000.¹⁸

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens' quality of life and support economic development in the region and state. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts around equity and economic development opportunities in the region:

- Post-secondary educational institutions. Dakota County

Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.

- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Local area farmers.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Non-profit organizations, especially those focused on economic and community development.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on aspects of community development and sustainability.

Site features

UMore Park has a number of features that make it truly unique. It is the largest development site in the upper Midwest under common ownership. Its owner, the University of Minnesota, is among the top public research and universities in the country. The experience, knowledge and creative thinking of University faculty and students can be combined with other potential public and private sector partners to shape a community that can advance equity and local economy goals.

- Proximity to Minneapolis/St. Paul International Airport (MSP). The Minneapolis/St. Paul International Airport (MSP) is located approximately 18 miles northwest of the property. Convenient access to the airport expands local economic opportunities.
- Proximity to leading-edge medical services. The nearest hospital is located less than 10 miles from the UMore Park property, and within 30 minutes, people in the UMore Park area can access the medical services associated with the University of Minnesota. The proximity of renowned health care institutions provides economic opportunities and unsurpassed medical care.
- Strong local employment base. Dakota County and the southern Twin Cities metropolitan area provides a strong base of local jobs. Land availability provides future opportunities to expand local employment.
- Existing transportation system. The existing road network including U.S. Highway 52 provides convenient vehicular access to the property for the movement of people and goods.

Opportunities for innovation

Existing requirements

- Local zoning ordinances and standards may need to be revised to accommodate innovations in affordable housing and the production, distribution and sale of local goods.
- Lack of knowledge of the fair trade certification process and the costs associated with certification can impede the expansion of local fair trade products.

Site conditions

- The location of the UMore Park property poses challenges to various ethnic and minority populations. Cultural institutions and support networks for non-English speaking populations tend to be in the central city areas of Minneapolis and St. Paul rather than proximate to the UMore Park property.
- The lack of readily available public transportation is a significant site challenge. Existing transit service in the City of Rosemount is limited to express and connection routes with virtually no local service options available. Future plans call for potential bus rapid transit (BRT) service as well as possible light rail transit (LRT) service, however, the implementation of such plans will potentially be years if not decades away.

Research and knowledge creation

In order to formulate effective strategies to enhance equity and the local economy, more information is needed. Specific research and knowledge creation opportunities include:

- Research needs to be conducted to better understand factors contributing to or constraining the growth of minority populations and other under-represented groups⁶ in Dakota County and the UMore Park area.
- Since the UMore Park area is currently significantly underserved by transit, more information is needed to understand wage ranges of potential employers and their impact on the ability of people, in the short term, to travel extended distances for employment.
- More information is needed on the skills and availability of the local labor force and how it relates to employment desired by local communities. In cases where the existing supply of local labor does not align with future employment opportunities in the new community, steps necessary to ensure a beneficial jobs-workforce match will need to be determined.
- Identify any cultural amenities in place that can attract and support a varied workforce. If none exist, explore options needed to establish such support mechanisms.
- A better understanding is needed of the fiscal implications of various types of development and employment and the resulting impact on local, regional and state governmental budgets.
- A better understanding is needed regarding barriers

⁶ **Under-represented groups** are groups whose voices are often not included in planning or heard on issues. "Building a Blueprint for Change," Corporation for National and Community Service, <http://www.blueprintforchangeonline.net/pages/stakeholders/underrepresented.php> (2009).

to employment and education for under-represented populations.

- Research is needed to more fully understand the ways in which differing educational providers can best meet diverse needs for local education.

Baselines for key performance indicators

Local economy and jobs

The unemployment level is an important baseline for key performance indicators. The unemployment rate in Minnesota was 7.3 percent in March of 2011 while the national rate was 9.8 percent for the same time period.¹⁹

Income levels

The 2009 estimated median household income for residents in the local and regional communities are as follows²⁰:

- Rosemount \$84,700.
- Empire Township \$76,400.
- Dakota County \$73,000.

Cultural diversity

The cultural diversity of Dakota County and the Twin Cities is changing, a pattern that may continue as UMore Park is developed in the years ahead. According to the U. S. Census Bureau and the American Community Survey, the Dakota County population in 2009 consisted of the following:

- White – 84.3 percent.
- Hispanic or Latino – 4.7 percent.
- Black – 2.2 percent.
- Asian – 2.8 percent.
- Other – 1.7 percent.
- Two or more – 1.7 percent.

Key performance indicators

Given market demands for housing and development over 25 to 30 years, the community at UMore Park can strive to achieve the following performance targets, based on estimates for population, job creation, housing and commerce in the community identified in the UMore Park Concept Master Plan (2008) and the Alternative Urban Areawide Review process initiated in early 2011.

Local economy and jobs

- Create 1,500 new permanent, full-time equivalent jobs at or above living wage by 10 years after initial residential occupancy.
- Target a full build out jobs/housing balance of 1:1.

- Ten years after initial residential occupancy, the five year success rate of small businesses that have located in UMore Park will be at or exceed 50 percent.
- Ten years after initial residential occupancy, 10 percent of the small businesses in UMore Park will be minority owned.

Housing

- Five years after initial residential occupancy, 15 percent of the total supply of housing should be affordable to low-to-moderate income households (persons earning up to 120 percent of area median income).
- Maintain a variety of housing types and tenure to ensure inclusivity according to age, family size and mobility.
- Affordable rental units established should be maintained at affordable levels.

Fair trade

- At least 25 percent of all goods sold on-site could be from local or environmentally-friendly sources.

Citizenship and civic involvement

- Residents will know more than 50 percent of their neighbors within a one block area well enough to call on for help.
- Seventy percent of respondents will describe themselves as active participants in the community.
- Seventy percent of the residents will participate in neighborhood councils and/or other neighborhood associations.

Health care

- One hundred percent of residents will have access to amenities that promote health.
- Active open space facilities will be located within one-half mile walking distance of 90 percent of the residential dwelling units and businesses in the community.

Monitoring plan

UMore Park is committed to the benefits of ongoing monitoring to assess progress toward achieving performance targets and will undertake a suitable level during the development process. As UMore Park develops, surveys of UMore Park residents and community businesses should be employed annually to measure achievement toward goals of monitoring for diversity, employment status, community participation and connectedness, number of individuals employed by local businesses, access to health care and availability of local and fair trade goods, among others.

Design strategies

Key strategies to achieve equitable community features and support a strong economy integrate job creation and local business development, infrastructure designs to meet diverse needs, and initiatives to promote interaction and community connectedness, in order to generate economic development and enhance residents' quality of life. The following tables explore these strategies and identify a potential timeline for when they might occur within the overall phasing plan for the future community.

Goals	Design strategies	Milestones
ELE7	Use local businesses wherever possible for materials related to the design and development of UMore Park.	Construction phases throughout development and build-out.
ELE3	Incorporate live-work housing units into the plans for each phase of the development.	Design phase.
ELE1	Ensure that all community pathways are accessible for persons with reduced mobility.	By first phase occupancy.
ELE3	Include diversity of housing types intermingled throughout the site.	By first phase occupancy.
ELE1 ELE3	Design housing to be flexible to accommodate family changes over time.	By first phase occupancy.
ELE6	Provide opportunities for job creation through an eco-industrial park that will reduce waste and pollution helping to achieve sustainable development.	By first phase occupancy.
ELE1	Explore community design features to attract a body of residents that is diverse in age, gender, ethnicity, race and income. Features could include community gathering spaces and a commerce space for local and ethnic goods and foods, among others.	Design phase.
ELE6 ELE8	Contribute to regional economic development through unique community characteristics that are linked to University discovery, programming and lifelong learning.	By phases of occupancy.
ELE2	Locate schools, recreation, civic facilities, places of worship, retail, transit stops, commercial and mixed-use within walking distance of places of employment and residences.	By phases of occupancy.
ELE2	Allocate land for local foods research and demonstration, extended season facilities and plant nurseries on the property.	Design phase.
ELE1	Establish community gathering spaces.	By phases of occupancy.
ELE7	Create commercial nodes that include flexible work spaces and that have the ability to adapt to the continuing evolution of the work environment.	By phases of occupancy.
ELE1	Incorporate the needs of multicultural communities in planning for future development.	By phases of occupancy.
ELE6 ELE7 ELE8	Develop economic development strategies that include business retention and expansion, support for entrepreneurs and attracting new businesses and commercial entities to the community including R&D, high-tech, biosciences and others.	Planning phase.

Construction strategies

Goals	Construction strategies	Milestones
ELE2	Monitor and ensure compliance with rules and regulations to mitigate the impacts of construction.	All phases of construction.
ELE8	Develop construction guidelines that encourage local and under-represented hiring.	By first phase of construction.

Community life strategies

The diverse needs of the community's potential residents require innovative strategies to ensure satisfaction and support the success of the community and region. The strategies below encourage development of a strong social fabric in the community over time.

Goals	Promoting sustainable behaviors	Milestones
ELE1 ELE3	Create neighborhoods that provide quality housing that is attractive, well-designed and at a variety of price points.	By first phase occupancy.
ELE1 ELE3	Encourage home ownership and also the development of types of housing for persons not able to attain traditional home ownership or not desiring home ownership including rental, live/work housing, and cooperative ownership.	By first phase occupancy.
ELE1 ELE3	Explore opportunities for private capital investments in housing that meets the needs of low- and moderate-income individuals.	By first phase occupancy.
ELE3	Create and implement strategies and supports to prevent homelessness. Include the provision of emergency shelters and transitional housing in the event of need.	By phases of occupancy.
ELE1 ELE3	Establish local housing mechanisms to maintain affordability over time.	By phases of occupancy.
Goals	Education and engagement	Milestones
ELE4 ELE5	Establish a sustainability concierge to provide support for local residents and businesspersons.	By first phase occupancy.
ELE9	Establish and launch a local sustainable community brand that identifies products produced in UMore Park as well as locally-based services.	By phases of occupancy.
ELE9	Launch a "think local" campaign that informs people about local sustainable community-branded products and services, and that promotes other local and regional products.	By phases of occupancy.
ELE2 ELE4	Create a residents' manual that outlines available goods and services.	By phases of occupancy.
ELE4	Conduct annual surveys to determine resident living satisfaction and recognition rates of social, economic and environmental equity.	By first phase occupancy.
ELE1	Develop and implement strategies to ensure that programs are accessible to and inclusive of people from diverse cultural and ethnic backgrounds including health and human services, library services, transportation services, community facilities, and sports and recreation.	By first phase occupancy.
ELE1	Promote and market the sustainable community as a multicultural community locally, nationally and internationally.	By first phase occupancy.
ELE1 ELE8	Foster relationships with international businesses, entrepreneurs and students to build economic development opportunities.	By first phase occupancy.
Goals	Community website and communications	Milestones
ELE1 ELE4	Ensure that the community website reflects a commitment to multiculturalism and provides easy links to multicultural information.	By appropriate phase occupancy.
ELE1 ELE4	Translate key information into an identified number of community languages.	By first phase occupancy.
ELE1	Develop multilingual signage to reflect UMore Park's diversity.	By appropriate phase occupancy.
ELE7 ELE8	Feature information on local businesses and job opportunities to encourage local buying and local employment.	By appropriate phase occupancy.

Management plan strategies

Effective policies and requirements can promote equitable and collaborative practices for residential, retail and commercial operations, while encouraging local business development and expansion.

Goals	On-site policies and property management	Milestones
ELE1 ELE4 ELE7	Create a commercial tenants' guide with suggested human resources practices, fair trade/local products to make available for sale, and create a code of conduct to promote basic working and environmental standards among product and service providers.	By first phase retail/commercial occupancy.
ELE1 ELE4	Create a residential tenants' guide outlining suggested community decision-making processes and participation mechanisms.	By first phase occupancy.
ELE7	Address the hiring of maintenance and grounds staff for community associations with priority being given to residents within the community, neighboring community residents and members of under-represented groups.	By first phase occupancy.
ELE7	Develop a "fair and equitable" work goal statement that addresses a commitment to sustainable practices and employment opportunities for citizens living in the community.	By first phase retail/commercial occupancy.

HR plan and job creation

Specific job creation related to this principle of equity and the community and regional economy includes:

- A sustainability concierge position to support residents, businesses and the broader community with sustainability goals and resources.
- A property manager responsible for broad management of the property and community.
- Property maintenance staff to support regular upkeep, maintenance and grounds keeping across the community.
- Consultants to assist with the development of retail/tenant guides.
- Researchers to assess the on-going performance of the UMore Park community against goals.

Synergies

- Equity and Local Economy, Culture and Community and Local and Sustainable Food. Monthly community gatherings that bring together people from diverse backgrounds to socialize and eat locally-grown food, especially foods that represent different ethnic backgrounds and heritages, can help build bridges between cultures and encourage entrepreneurship.
- Equity and Local Economy, Culture and Community and Health and Happiness. Exercise and physical activity groups and events should be planned so that people can get to know others from different age groups, backgrounds and cultures while practicing active living.
- Equity and Local Economy, Culture and Community and Sustainable Materials. Encourage sourcing of materials manufactured or sourced within or nearby UMore Park to support local business growth.

Strategic positioning

Community benefits

- Residents can enjoy meaningful employment.
- Residents can experience an inclusive sense of community.
- Residents can have full access to all community services and amenities regardless of age, ethnicity or mobility.
- Economic benefits can cascade to the local and regional economy.

Environmental benefits

- Reduced use of fossil fuels and generation of greenhouse gasses for the transportation of food, goods and services.
- Improved air quality.
- Reduced need to commute to jobs outside of the UMore Park property.

Marketing

Potential marketing, sales or engagement opportunities include:

- Measures to ensure diverse community membership (mixed housing types and costs, accessibility, life-cycle housing and on-site job creation).
- The availability of sustainable goods to purchase on-site (local and fair trade).
- Use of local materials for manufacturing and construction.
- Market "locally-made" and "locally-grown" to emphasize the local nature of goods and food.
- Community governance structure.

Wider community and municipal engagement

Institute a wide range of community participation strategies during the planning, design and occupancy stages of the community at UMore Park. UMore Park can emphasize

an approach that encourages people from all sectors of the community to express their needs and expectations and to be actively involved in shaping the future of the community. Participation strategies include :

- Develop processes and procedures for regular and structured community consultation.
- Ensure open and transparent meetings and communications so that the interests of all are shared.
- Produce written materials and information sessions that explain the community structure and services available to UMore Park residents and employees.
- Create open and friendly environments in all public buildings and gathering spaces through appropriate design of spaces, reductions to access barriers, use of appropriate signage and images that foster pride in the community.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is one where thriving, diverse and resilient local economies support fair employment, inclusive communities and international fair trade.

One Planet common international targets

One Planet Communities adopt strategies for the key themes below and aspire to global best practice in both the construction and operational phases:

- Employment, in particular promoting jobs in the green economy.
- Equity and inclusiveness-physically and socially.
- Participation of residents, business owners and those who work and provide services in the community.
- Ownership and affordability.
- Certified fair-trade goods.

One Planet Communities aim to improve the welfare of selected disadvantaged groups. Two priority groups within the local context will be identified and through discussion with them or their representatives, actions taken to improve their welfare. Candidate groups may include students from the local school district and local minority farmers. The approach and level of support will be determined on a project by project basis but should be provided at a scale commensurate with that of the development.

One Planet national and international context

Despite the nation's wealth, some Americans still live in relative poverty, while many in the developing world cannot meet their basic needs from what they produce or sell.

10. HEALTH AND HAPPINESS

Mission statement

Provide the means for all residents in the community at UMore Park to live safe, happy, healthy lives marked by active minds and bodies, community engagement and social connectedness.

Approach

The approach to enhancing community members' well-being and health integrates education, engagement, design of the built and natural environments, and community services and amenities that meet current needs and are adaptable to meet future needs of community members. With resident input and participation, the community at UMore Park can include well-designed institutional infrastructure and community features that promote optimal human and ecological health, and social and recreational activities which foster connections between community members.

Health and wellness will be a hallmark of the community through collaborative research, education and outreach with a variety of stakeholders. Community members can receive support, education and resources to promote understanding of the value of prevention and healthy lifestyles to the family and the community as a whole.

Goals

- HH1 Promote a strong sense of community and community connectedness through interpersonal contact and socialization opportunities that appeal to broad human interests and produce shared experiences and creative expressions.
- HH2 Promote the health of all residents through access to healthy lifestyle and disease prevention education, initiatives and services.

- HH3 Support the physical and emotional health and wellness of residents by emphasizing active lifestyles, healthy diets and nutrition in community design, access to local, healthy foods, and year-round indoor and outdoor recreational opportunities across mobility levels.
- HH4 Foster a sense of purpose and well-being among residents by promoting civic engagement and participation in initiatives within the community and in the surrounding area.
- HH5 Promote safety for all residents throughout the community utilizing best practices for the built environment as well as community services and neighborhood programs.
- HH6 Accommodate the ever-evolving needs of residents given the uncertainties of health, unforeseen circumstances and changes that occur with aging.
- HH7 Strive to attract businesses and foster job creation within the community and nearby areas to minimize the need for residents to commute long distances to and from work.
- HH8 Foster equity among residents while celebrating and encouraging a resident base that is diverse in every way—in age, gender, ethnicity, race, culture, income, housing, work and recreation opportunities and lifestyles.
- HH9 Facilitate practical conveniences and services to meet residents' needs in proximity to their homes, encouraging healthy modes of transport.

Local context

- The Gallup-Healthways Well-Being Index obtains completed interviews from 1,000 United States (U.S.) adults

nationally, seven days a week, excluding only major holidays. Based on their response, individuals and communities receive an overall well-being composite score and a score in each of six sub-indices including life evaluation, emotional health, physical health, healthy behavior, work environment and basic access. This index has ranked Minnesota residents overall well-being to be the fourth highest of all U.S. states. Minnesota's 2nd Congressional District, which is the district in and around UMore Park, ranks as the twelfth best overall well-being of all congressional districts in the U.S. The one area where residents score poorly, however, is that they are ranked 202nd for healthy behavior.¹

- According to a recent study by the Minnesota Department of Health, private health insurance premiums in Minnesota have continued to increase at a rate that far exceeds the rates at which inflation and income are increasing. The study notes that in 2004, premiums for private Minnesota health coverage were \$3,076 per person.²
- Nine percent of Minnesota residents did not have health insurance in 2009. The rate for those with lower income (family income at or below 200 percent of federal poverty guidelines) was 17 percent, while for those with higher income (family income above 200 percent of federal poverty guidelines) the rate was six percent.³
- It is estimated by the Minnesota Department of Health that there were 17,000 uninsured/underinsured residents in Dakota County in 2003.⁴
- The latest Scorecard Pollution Report Card rankings found that in 2002 Dakota County was amongst the highest 20 percent of U.S. counties for air and water releases of toxic chemicals by factories, power plants, and other industrial companies.⁵
- In 1999, Dakota County ranked among the highest 10 percent of all counties in the U.S. in terms of volatile organic compound emissions. Based on the U.S. Environmental Protection Agency's (EPA) most current data, Dakota County ranked among the highest 10 percent of all counties in the U.S. in terms of an average individual's added cancer risk from hazardous air pollutants.⁶
- There are more than 18 miles of cross-country ski trails and 20 miles of snowshoeing trails in Dakota County Parks. Trails are also available for ski skating, winter hiking and dog sledding.⁷
- Vermillion Highlands: A Research, Recreation and Wildlife Management Area is a 2,822 acre property adjacent and to the south of UMore Park that is set aside by legislation for research, recreation and wildlife management in perpetuity.⁸
- Vermillion Highlands is managed to promote pheasant, turkey and deer populations, which are hunted seasonally throughout much of the property.⁹
- More than 11 miles of trails through Vermillion Highlands are enjoyed by hikers, horseback riders and cross-country skiers.¹⁰

Assets

Regional and other expertise and interest

As the owner of the UMore Park property and Minnesota's only land grant university, the University of Minnesota can support unique partnership and collaborative opportunities in the future community to enhance citizens' quality of life and support health and wellness in the community at UMore Park. The breadth of University of Minnesota disciplinary and interdisciplinary academic units and centers, coordinate campuses in Crookston, Duluth, Morris and Rochester, as well as statewide research and outreach centers can participate in publicly-engaged research, teaching and outreach activities at UMore Park as they advance the University's goal to be among the top research institutions in the world.

As the keeper of the vision for development of a sustainable community on the UMore Park property, the University of Minnesota will establish a collaborative relationship with developer(s) to advance the vision for UMore Park.

However, success is ensured by the involvement of diverse organizations as priorities and strategies evolve throughout phases of development and based on the needs and interests of residents. Therefore, it is anticipated that the following organizations could have expertise and interest in collaborative efforts to foster active and healthy lifestyles in the community at UMore Park:

- Post-secondary educational institutions. Dakota County Technical College (DCTC), given its proximity on the northern edge of the UMore Park property, along with other institutions in the Minnesota State Colleges and Universities (MnSCU) system are anticipated to be strong partners, though partnerships and collaborations with other post-secondary educational institutions locally, regionally, nationally and internationally can be fostered.
- Existing elementary and secondary schools in the area school district as well as new schools that could be established over time.
- Local units of government.
- State and federal agencies.
- Chambers of commerce and other organizations that support and promote business opportunities.
- Economic and community development associations, agencies and special interest groups.
- Funders and grant-making organizations.
- Health, food and environmental non-profit organizations.
- Health and health insurance providers and national health associations and organizations with local chapters.
- Local businesses, industry and commercial operations.
- Professional organizations, especially those focused on aspects of health, community development and sustainability.
- Local area farmers.
- Sustainable and local food networks, including CSA farms, farmers' markets and food co-ops.
- National and multinational food companies based in the Twin Cities.
- National, family-owned and other local food retailers.

Site features

- The scale and size of the property and planned development can support a network of paths and green space for outdoor recreation activities including walking, biking, skiing and others. These features can promote physical activity and foster psychological well-being through active and contemplative engagement with nature and through connection with other community members.
- Proximity to leading-edge medical services. The nearest hospital is located less than 10 miles from the UMore Park property, and within 30 minutes, people in the UMore Park area can access the medical services associated with the University of Minnesota. The proximity of renowned health care institutions provides economic opportunities and unsurpassed medical care.
- Strong local employment base. Dakota County and the southern Twin Cities metropolitan area provides a strong base of local jobs. Land availability provides future opportunities to expand local employment.
- Existing transportation system. The existing road network including U.S. Highway 52 provides convenient vehicular access to the property for the movement of people and goods, and access from the property to the arts and cultural amenities of the Twin Cities.

Opportunities for innovation

Site conditions

- Given the size of the UMore Park property, development is anticipated to occur over at least 25 to 30 years. Efforts to promote health and happiness of residents in the community will evolve over time as new members join the community, as new neighborhoods unfold and as funding opportunities are explored.
- The northern border of the UMore Park property is separated from existing Rosemount development by a well-travelled east-west county road. The new community can explore unique mechanisms and initiatives to link and integrate the new neighborhoods at UMore Park with the existing neighborhoods and community amenities.

Research and knowledge creation

Research and evaluation is needed to identify baseline information on the health and wellness indicators for members of the communities surrounding UMore Park. A study could include information on general health statistics as well as the number of neighbors known by residents of Rosemount and Dakota County; amount of time spent exercising; use of public services; amount of time spent in commuting to and from work; work time and work-life balance; participation in arts, culture and educational activities; and nutrition and consumption of local foods.

Baselines for key performance indicators

Citizenship, social integration and civic involvement

The data below are from 2008-2010 and accessed from VolunteeringInAmerica.gov¹¹:

- Minnesota has 1.5 million volunteers providing 173.2 million hours of service.
- An estimated 37.5 percent of residents volunteer - ranking them 3rd among the 50 states and Washington, DC.
- Minnesotans contribute approximately 42.3 hours of service per resident, ranking them 8th among the 50 states and Washington, DC.¹²

Health

- The following health statistics highlight physical health characteristics of Dakota County residents in 2009:
 - ◆ Adult diabetes rate (6.1 percent).
 - ◆ Adult obesity rate (25.6 percent).
 - ◆ Low-income preschool obesity rate (12.6 percent).
- Additionally, in 2007 there were 5.4 hospital admissions for mental health treatments per 1000 Dakota County residents.¹²

Sense of well-being and safety

- The Happy Planet Index (HPI)^a or a similar index of individuals' sense of well-being and life satisfaction could be used to determine baseline levels of happiness and well-being in the surrounding area. The nation with the happiest population, according to the Happy Planet Index scored 68.2 out of 100 on their assessment. Also, the countries which scored highest on subjective well-being measures achieved scores of 8 out of 10.
- In 2007, crime rates in the City of Rosemount were as follows¹³:
 - ◆ 0 murders per 100,000 people.
 - ◆ 18.7 robberies per 100,000.
 - ◆ 28 assaults per 100,000.
 - ◆ 336.6 burglaries per 100,000.
 - ◆ 1523.9 thefts per 100,000.

Key performance indicators

Citizenship, social integration and civic involvement

- Support strong community cohesion such that residents know more than 50 percent of their neighbors within a one block area well enough to call on for help.
- Encourage increased community involvement opportunities allowing 70 percent of residents to describe themselves as active participants in the community.
- Provide early significant community leadership roles ensuring that at least 70 percent of the residents participate in neighborhood councils and/or other neighborhood associations.

^a **Happy Planet Index (HPI)** is an innovative measure that shows the ecological efficiency with which human well-being is delivered around the world. It is the first ever index to combine environmental impact with well-being to measure the environmental efficiency with which country by country, people live long and happy lives. "About the Happy Planet Index," The New Economics Foundation, <http://www.happyplanetindex.org/learn/> (2009).

Health

- Reduce instances of heart disease, diabetes, obesity, mental health issues and other health indicators in community residents.
- Increase active participation among community members in health and wellness initiatives including exercise and fitness programs, nutrition and wellness education, and disease prevention activities.

Sense of well-being and safety

- Strive to increase the sense of well-being and satisfaction of community members using the Happy Planet Index (HPI) or a similar index.
- Ensure crime rates in the community are below regional levels.
- Promote safety and security in the community so that all community members feel safe and able to be outside or allow children to play outside without danger.
- Endeavor to provide jobs and a quality of life that enables it to achieve a general retention rate 10 percent higher than that of communities of similar size in Dakota County.

Education and lifelong learning

- Meet or exceed Minnesota literacy rates in the first 10 years, and increase one percentage point each subsequent decade.
- Strive to maintain a graduation rate of 87 percent in the first 10 years, and then aim for an improvement of one percentage point every five years.

- Foster numerous workshops, classes and general events on a variety of health and wellness topics to promote and maintain active and healthy minds and bodies of residents.

Cultural diversity

- The governing bodies in UMore Park should reflect the diversity of the community.
- Strive to be among the most diverse communities in Dakota County.

Monitoring plan

To understand the progress of the community in moving towards a sustainable level, a program of monitoring of residents' levels of health and happiness could be undertaken. Items related to health and happiness can be included in an annual survey that measures community members satisfaction with their community and overall sense of well-being along with progress toward sustainability goals in other areas.

In addition, community members' participation and utilization of community services and programs can be monitored and tracked to identify rates of civic engagement, crime, demand for medical service for preventable disease, usage of recreational and exercise facilities, among other indicators.

Design strategies

Strategies for community health and well-being integrate best practices for the built and natural environments that promote active living, social connection and accessibility and flexibility to allow community members to better manage their health.

Goals	Design strategies	Milestones
HH1 HH3 HH6 HH9	Survey local community members to identify what types of facilities and services are desired on-site.	Planning phases.
HH1 HH5 HH7 HH9	Explore designs for neighborhood community sustainability center(s) to facilitate community gatherings and that address the needs of specific neighborhoods. Explore inclusion of shared office space to facilitate co-working among residents.	Planning phases.
HH1 HH2 HH5 HH9	Design an initial community sustainability center, exploring high value amenities to include such as a kitchen, sitting area/library, theater, playroom for children, outdoor play area, outdoor sitting area and nearby community garden area.	Design phases.
HH1 HH4 HH8 HH9	Explore designs for community sustainability centers that encourage social interaction with other residents and groups that use the center. Design any meeting rooms, play areas, cafés or libraries to promote interaction among diverse community members.	Planning phases.
HH3 HH6 HH9	Design a wellness center that includes a gym and a resource center with health related information as well as space for a visiting health care provider and other health educators, support groups and health-related meetings. Explore opportunities for including on-site childcare.	Design phases.

HH1 HH2 HH4 HH6	Design neighborhood centers and town squares to accommodate a wide range of events, storage space for seasonal/event equipment and the needs of cultural and interest groups on-site.	Design phases.
HH5 HH6 HH8	Incorporate designs for residential units accessible for persons with limited mobility in the community to meet the needs of new residents and the evolving needs of community members over time.	Design phases.
HH3 HH6 HH8	Ensure that all community pathways are accessible for persons with reduced mobility.	Design phases.
HH1 HH3 HH9	Explore land use patterns that optimize building density in order to promote socialization between neighbors and outdoor recreation for community members.	Design phases.
HH3 HH9	Ensure that the majority of residential units have view of green space, and access to green space for personal or community gardening.	Design phases.
HH2 HH3	Incorporate the use of natural “daylighting” as much as feasible to reduce occurrence of seasonal affective or related disorders.	Design phases.
HH2 HH3	Follow best practices to ensure superior noise insulation between units, including consulting an acoustic engineer to review unit plans.	Design phases.
HH3	Maintain healthy indoor air quality by incorporating operable windows in most locations and adequate ventilation.	Design phases.
HH6	Housing designs should strive for flexibility, in order to accommodate changes that occur in residents’ lives.	Design phases.
HH5	Design each phase of development to maintain continuity and physical connections with the existing surrounding community. Connect the biking and walking paths with neighboring communities.	Design phases.
HH1 HH2 HH3 HH4 HH9	Explore the possibility of forming a community-supported health care clinic to be located on-site.	Planning phases.
HH1 HH2 HH4 HH7 HH9	Create gathering places for teenagers, modeled on other successful locations. Explore partnerships with area companies and organizations to form a youth employment program.	Planning phases.

Construction strategies

Goals	Construction strategies	Milestones
HH3 HH6	Monitor and ensure compliance with rules and regulations to promote worker safety during the construction phase.	Construction phases.
HH3 HH6	Ensure construction areas are safe, orderly and clean.	Construction phases.
HH3 HH6	Establish a schedule for regular visits to the site by a safety officer in order to assess working conditions and worker health and well-being.	Construction phases.
HH3 HH6	Provide locally grown food (procured from growers within a 50 mile radius) to construction workers on-site via local lunch vendors.	Construction phases.
HH3 HH6	Host meetings with members of the surrounding community to inform them of the construction process, timeline and mechanisms for questions.	Construction phases.

Community life strategies

An individual's health can contribute significantly to satisfaction across many areas of life. Striving to include the amenities that can promote healthy lifestyles among community members, the community at UMore Park can provide spaces to encourage resident active participation in community health initiatives, cultural events, and lifelong learning. Programs to encourage recreation, purchase and use of healthy products, nutrition and diets rich in local produce, and disease prevention techniques can augment the benefits of a well-designed built environment, enhancing quality of life of community members.

Goals	Promoting sustainable behaviors	Milestones
HH1 HH2 HH6 HH9	Ensure that the Community Sustainability Center(s) and block-scale gathering places are well maintained and welcoming to all residents.	By phases of occupancy.
HH2 HH3 HH9	Establish the infrastructure for fitness in design plans by detailing routes for walking, biking, cross-country skiing and other recreation.	By phases of occupancy.
HH2 HH3	Collaborate with car- and bicycle-sharing programs and organizations to establish car- and bicycle-sharing opportunities in the UMore Park community, with shared vehicle parking scattered conveniently throughout the community.	By phases of occupancy.
HH3	Ensure that the Wellness Center is maintained, staffed and well-advertised throughout the community.	By phases of occupancy.
HH2 HH3	Ensure that walking/biking paths and trails, and other outdoor recreational spaces, are well maintained in all seasons.	By phases of occupancy.
Goals	Education and engagement	Milestones
HH4	Provide resources to support residents' use of sustainable, healthy products such as furnishings, efficient appliances, cleaning products, light bulbs, among others.	By phases of occupancy.
HH3	Ensure that the community sustainability center(s) and Wellness Center provides information to residents on the benefits of regular exercise. Ensure that sports/exercise areas are well-maintained and well-advertised, and provide information/examples of ways to fit exercise into residents' daily or weekly routines.	By phases of occupancy.
HH3	Ensure that the community sustainability center(s) make information available on local education programs on health and environmental impacts of diet choices, portion size, food waste reduction, food preservation and canning, health and vegetarian cooking and composting. Information about CSA subscriptions, community garden plots and other resources will also be available.	By phases of occupancy.

HH1 HH4	Establish methods for recognizing community volunteers and publicizing their efforts throughout the community, such as a “volunteer recognition day/week/month” and/or “Volunteer of the Year” awards.	By phases of occupancy.
Goals	Community website and communications	Milestones
HH1 HH2 HH3 HH4 HH5 HH6	Design and launch a UMore Park community website to help residents establish and maintain community connections; learn about and contribute ideas for community events and activities, and leadership and volunteer opportunities; and access health and wellness resources information on nutrition, disease prevention, exercise and recreation, arts and culture.	By phases of occupancy.
HH1 HH4 HH9	Include an energy use page on the community website providing recommendations and resources for increased energy efficiency, including a forum for community member discussion around energy best practices, and that allows residents to track and monitor their own energy use against similar size buildings in the community.	By phases of occupancy.
Goals	Collaborative opportunities	Milestones
HH2 HH3 HH5 HH7	Explore collaborative relationships around community health promotion and maintenance, health and wellness research and evaluation, as well as location on-site of health-related local businesses and non-profits.	By phases of occupancy.

Management plan strategies

Key policies can encourage healthful and sustainable lifestyles, and also promote member participation and input in community issues.

Goals	On-site policies and property management	Milestones
HH5	Promote use of local, green products in businesses and retailers in the UMore Park community.	By first phase retail/commercial occupancy.
HH5	Promote use of natural, green products for grounds keeping and in public areas of the community.	By first occupancy
HH1 HH2 HH4	Establish committees of residents to advise on community issues such as health and wellness, design and maintenance of the community, arts and cultural opportunities, and lifelong learning resources and programs for the community.	By phases of occupancy.
HH1 HH4 HH5	Establish opportunities for community members to participate in community authorities and associations responsible for property management decisions.	By phases of occupancy.
HH3 HH4	Explore necessary administrative positions to support property and community management activities.	By phases of occupancy.

HR plan and job creation

Job creation supporting overall health and wellness of community members at UMore Park could include:

- The sustainability concierge position(s) to support and assist residents, retailers and businesses to achieve high performance targets for sustainability in their lifestyles and operations.
- Community activities coordinator(s) to manage community programs, events and festivals as well as intergenerational and intramural recreational activities, such as sporting events and field trips.
- Wellness coordinator(s) to help direct community members to information, resources and facilities for health and wellness including healthy foods and nutrition, disease prevention, and exercise and recreation. In addition, wellness coordinator(s) could support community-care for residents in need including delivering groceries and prescriptions, facilitating in-home care and arranging transportation to physician appointments.
- A property manager, advised by community associations and authorities, to support day-to-day property management and operations.
- Researchers to participate in ongoing health programs and assessments of residents’ health and wellness.

Synergies

Exploring the intersections between community members' health, happiness and quality of life and other sustainability principles, several cross-cutting benefits and opportunities emerge:

- Health and Happiness, Culture and Community and Equity and Local Economy. Exercise and physical activity groups and events could be planned so that people can get to know others from different age groups, backgrounds and cultures while practicing active living. In addition, the community sustainability centers could host health classes, business/entrepreneurship courses, local health clinics and local businesses. Celebrating diversity by striving to include all members of the community, regardless of background, and ensuring individuals feel like a part of the community can support a sense of community connectedness and cohesion.
- Health and Happiness and Culture and Community. Community member participation and involvement in the UMore Park community supports residents' satisfaction and sense of ownership of the community. In addition, establishing and maintaining connections with the existing communities in Rosemount and Dakota County helps to leverage existing amenities and wellness services while establishing a unique community identity.
- Health and Happiness and Equity and Local Economy. Fostering job creation and location of businesses at UMore Park support economic development in the region while meeting the employment needs of residents and ensuring that community members can find the products and services they need in close proximity to their homes.
- Health and Happiness, Sustainable Materials and Local and Sustainable Food. Promoting the use of local, healthy foods and products contributes to healthy lifestyles of residents and a thriving regional economy.

Strategic positioning

Community benefits

- Community members can enjoy healthy and active lifestyles through the ample amenities and resources available throughout the community including recreational opportunities and facilities and nutrition and wellness information and classes.
- Community associations, events and lifelong learning activities provide residents with ample opportunities for interaction and connection with others.
- Community members can enjoy an improved sense of ownership and contribution to the community through participation in community development and management, which can also promote overall well-being and satisfaction.
- The community infrastructure, built and natural environments are designed to promote and emphasize resident safety, ensuring community members feel safe and secure in their homes and outdoors and feel comfortable allowing their children to play outdoors.
- Residents can enjoy access to information and resources to promote health and wellness, and participate in regional health initiatives and long-term research opportunities.

Environmental benefits

- Community education and programs can produce a culture of sustainability with community members contributing their ideas and supporting one another to maintain healthy, active lives, and reduce unnecessary consumption of resources.
- Community connectedness can reduce individual consumption levels through formal and informal sharing networks among residents.
- Promoting active lifestyles in the built environment and programs to emphasize walking and biking can foster reductions in greenhouse gas emissions due to decreased reliance on cars.

Marketing

UMore Park will be a proactively healthy community that promotes happiness and well-being in all endeavors.

- Convenient and inviting access to recreation, to nature and to healthy foods can enable residents to easily engage in healthy living all year round.
- The community at UMore Park will strive to provide all of the amenities to allow residents to “stay out of your car and stay in your neighborhood,” such as shops, cafes, services, public transport and gyms at your doorstep.
- Most importantly, UMore Park can be a community where neighbors know each other, garden together, hang out at the pub or in the park and take care of one another.

Wider community and municipal engagement

During community engagement process

- Continue public engagement efforts to emphasize the correlation between the sustainability goals for the community at UMore Park and the values of members of the surrounding communities and Minnesota—nature, health, human rights, civic participation, cooperation and diversity.
- Explore broader community health and wellness needs and desires that can be met through amenities at UMore Park.
- Emphasize the benefits of the community at UMore Park including accessibility and commitment to aging in place, as well as amenities for younger residents and families.
- Promote health and sustainability benefits to the surrounding community including increased local food options, recreational features, and proximity to jobs, products and services the community could offer.

Post first occupancy

- Ensure that the common areas and public features of the community that are designed to maximize health and happiness are available to the surrounding community.
- Encourage visitors and broader community members to visit and utilize the Community Sustainability Center(s) and Wellness Center(s), as well as trails and other recreational facilities, to participate in educational programs and initiatives to improve and enhance the overall health of and contribute to enhanced quality of life in the region.

In their own words...the BioRegional *One Planet Community* context and targets

One Planet Community vision

The *One Planet Community* vision is to create a future where it is easy, attractive and affordable for people to lead happy and healthy lives within a fair share of the earth's resources.

One Planet common international targets

A plan for promoting the health and happiness of residents will be produced, building on emerging findings from health promotion and happiness research. *One Planet Communities* are expected to adopt an exemplar approach during construction and long term community management, aspiring to global best practice.

One Planet Communities will complete two showcase initiatives to promote health and happiness in the community. Suitable projects will be identified using baseline data to benchmark the local context, identifying specific areas of need. The approach and level of support will be determined on a project by project basis but will be provided at a scale commensurate with that of the development.

Examples of showcase projects could include:

- Supporting people in preventing chronic illness and unhealthy lifestyle behaviors through promoting active travel and healthy diets.
- Facilitating inter-generational skills sharing or activities.
- Provide the tools and facilities to create an enterprising community that benefits the local economy.
- Annual assessments of residents' satisfaction levels will ask 'How many neighbors do you know?' as a measure of connectedness and social capital of the community.

One Planet national and international context

The U.S. is 150th in the global Happy Planet Index, out of a ranking of 178 countries. This index shows the ecological efficiency with which human well-being is delivered around the world. It is the first ever index to combine environmental impact with well-being to measure the environmental efficiency with which, country by country, people live long and happy lives.

There is a strong correlation between people's level of happiness, and the state of our environment and wider social relations. There are also linkages between how lifestyle choices and the environment we live impact human health and happiness. The long term health of the planet is fundamentally related to how we choose to live now - the sustainability of our lifestyles. Living unsustainably can not only lead to poor quality of life today, but may also jeopardize the quality of life of our descendants in the future.

APPENDICES

A. Key opportunities for community sustainability at UMore Park

Identified below are several important elements or issues related to planning and development of the community at UMore Park that are threaded through the entire UMore Park *Sustainability Action Plan* document. These elements are anticipated to unfold over time as the community at UMore Park develops including establishment of proposed community sustainability center(s), creation of a sustainability concierge position and role in the community, anticipated governance and community authorities, and aggregate mining activities.

Community sustainability centers

To promote sustainability and encourage community cohesion in the community at UMore Park, a primary community sustainability center could be developed to promote and foster programs and initiatives across the entire community. The primary community sustainability center can serve as a resource hub for sustainable lifestyle programs as well as a meeting place and exhibition center, complete with exhibits and resources for visitors who are interested in sustainable living in the community.

Key features and objectives of the primary community sustainability center could be:

- To provide an educational tool for sustainability for a variety of individuals (architects, city planners, residents, individuals interested in sustainability, among others).
- To allow residents and/or potential purchasers to see and understand elements of the development that may not be visible upon first glance.
- To provide additional marketing and sales resources for potential purchasers/tenants, including specific information and demonstration of sustainable features.

- To reinforce sustainable lifestyles of residents.
- To showcase and provide an informal/formal training environment for both residents and visitors.
- To ideally house it within a community building or public facility in the busiest area at the project.
- To locate alongside other community facilities in a place that many residents pass through on a regular basis due to shared services fostering stronger social connections and ties within the community.
- To include a variety of design and programmatic features to meet the needs of the broader community such as children's play areas, a cafe, a community kitchen, gathering spaces, studio and co-working space, health care facilities, and others.

Community sustainability center functions can be provided synergistically with a range of other facilities, such as a school being used out-of hours as a community and sports center; space offered within primary health care facilities; a business center serving the community; or community café or restaurant. In addition, smaller community sustainability centers could be located throughout the community in walking distance of neighborhoods and clusters of homes specifically emphasizing amenities and services that best meet the needs of the nearby community members.

The sustainability concierge

Given the significance of lifestyle and behavior choices on achieving sustainability goals for the community, a community sustainability concierge role is envisioned to support residents in sustainable living initiatives, promote and enhance residents' quality of life and foster community interaction. The sustainability concierge can facilitate resources and services for all

members of the community—including residents; commercial, retail and other business and nonprofit organizations; and others—to make the adoption of sustainable behaviors as convenient and as effortless as possible.

Responsibilities of the sustainability concierge could include:

- Greeting residents, guests and clients that visit the community sustainability center and responding to questions regarding the neighborhood and property.
- Maintaining an appropriate rapport with all property management bodies and associations.
- Being informed regarding area events, amenities, services and products.
- Supporting residents in organizing community-wide events and activities, including tours, committee meetings, educational opportunities and programs.
- Working with the residents to encourage participation and provide information on sustainable initiatives, such as recycling, composting, car-sharing or others.
- Assisting residents in using energy-efficient appliances and other technologies and for maximum efficiency.
- Managing community communications efforts including a website, calendars of events, newsletters and additional collaterals on sustainable lifestyles and the performance of the development.
- Welcoming new residents and introducing them to sustainable living.
- Promoting public transit and community transportation initiatives.
- Fostering ongoing participation from residents in the surrounding communities.
- Supporting ongoing monitoring of the performance of the development and reporting community performance including on recycling rates, resident satisfaction, and other resident and commercial/retail surveys.

The role of the sustainability concierge for the community at UMore Park will evolve over time, as each new phase of development brings additional residents and businesses into the community.

UMore Park community governance

The University of Minnesota envisions a community at the University's 5,000-acre UMore Park property in Dakota County that is integrated into the surrounding communities. Existing governance structures and a variety of legal tools can be employed to support the long-term vision of a truly sustainable community. Making effective use of these structures and tools is very important to the success of the project. It is envisioned that the existing governing bodies and a variety of newly created entities could play a role in governing this sustainable community.

The following briefly describes the entities that could share responsibility for governing the community at UMore Park.

University-related entities

- *University of Minnesota Board of Regents*

The plans for UMore Park are founded upon the University Board of Regents guiding principles. The board has been actively engaged in setting the new direction for the UMore Park property. The board established the UMore Development Limited Liability Company (LLC) to manage the real estate and business development activities of UMore Park and created a Legacy Fund for net proceeds generated by activities on the property to support special academic activities at the University of Minnesota not adequately funded by state, federal or tuition resources. The Board of Regents has retained responsibility for making final decisions regarding the development of the land.

- *UMore Development Limited Liability Company (LLC)*

UMore Development LLC provides oversight and management for planning and development of the UMore Park property. Nine individuals serve on the LLC's Board of Governors. The board brings private sector and University experience in planning, finance, real estate and law to the planning and development process and helps to ensure that the University's academic mission—research, teaching and public engagement—remains core to the project.

- *Office for UMore Park Academic Initiatives*

The Office for UMore Park Academic Initiatives is responsible for the integration of research, education and outreach into all phases of planning and development of UMore Park. UMore Park planning and development is made distinctive through the University's academic strengths that reach across the breadth of the institution. Supported by the UMore Park Academic Mission Advisory Board, the dual goals of the new office are to: (1) create new academic opportunities for faculty, students and staff that enhance research, learning and outreach; and (2) ensure that the new knowledge and innovation from academic efforts benefit planning, development, community engagement and economic vitality in the region.

Local Units of Government

- *City of Rosemount*

Portions of UMore Park that lie within the municipal boundaries of Rosemount will be under its jurisdiction. Rosemount ordinances are anticipated to be applied, in addition to deed covenants and policies established by the University to advance sustainable community design and practices. UMore Park residents in Rosemount will vote in local elections and participate in local activities.

- *Empire Township*

Portions of UMore Park that lie within the boundaries of Empire Township will be under its jurisdiction. Empire Township ordinances are anticipated to be applied, in addition to deed covenants and policies established by the University to advance sustainable design and practices. UMore Park residents in Empire Township will vote in local elections and participate in township activities.

Community Authorities

In master planned communities and other neighborhoods and developments today, there typically are a variety of community associations which support the life of the community. As the development of neighborhoods, commercial and retail business districts at UMore Park unfolds over time, it is anticipated that one or more of the following entities could be established.

- *Master Property Owners Association*

A Master Property Owners Association (MPOA) is commonly found in new developments. In general, an MPOA is governed by a Board of Directors elected by the property owners within the community. The MPOA operates in accordance with adopted by-laws and may be responsible for the maintenance of certain amenities and common areas as well as ensuring member compliance with any applicable covenants. MPOA operations are typically funded through assessments.

Often two divisions may exist under the Master Property Owners Association to support commercial property owners and homeowners:

- ◆ *Commercial Property Owners Association*

Many communities have a structure that includes a Commercial Property Owners Association (POA). In general, a POA includes a Board of Directors and voting members comprised of all commercial property owners within the boundaries of the POA. The POA operates in accordance with adopted by-laws and generally is responsible for certain maintenance of amenities and common areas specific to the POA and ensures compliance with any covenants, conditions or restrictions that are specific to the commercial zone. POA members are typically assessed a monthly fee.

- ◆ *Homeowners Association*

Additionally, Homeowners Associations (HOAs) may be established on a neighborhood or district scale. The HOA includes a Board of Directors and voting members. All residents of a particular neighborhood are members of their respective HOA. The HOA operates in accordance with adopted by-laws. Generally, the HOA seeks to maintain a high-quality of life for its members through maintenance of amenities and common areas specific to the HOA, development and support of community programming and organizations, and ensures member compliance with any covenants, conditions or restrictions. HOA members are typically assessed a monthly fee.

- *Land Trusts including Community Land Trust and Habitat Preservation Trust*

Additionally, land trusts can be established to acquire and manage land on behalf of a community's residents to serve a variety of needs. Community Land Trusts (CLTs) are

often established to acquire or maintain land for residential development while preserving affordability and preventing foreclosures for any housing located upon its land. A Habitat Preservation Trust (HPT) is a non-profit entity established for the purpose of monitoring, maintaining and supervising the habitat and wetlands areas located on a property that are not within park lands owned by the local units of government. A HPT coordinates its activities with governmental agencies as appropriate and prepares any required monitoring reports.

- *Community Food Association (CFA)*

The Community Food Association (CFA) is envisioned to be a non-profit entity established for the specific purpose of monitoring, maintaining and supervising the established or preserved local food production areas and common community gardens. The CFA will be responsible for managing any leases for local food production; will oversee any community-based agricultural facilities such as common storage buildings and farmer's markets; manage harvesting of edible landscaping across the community; and support education and programming around nutrition and food issues. The CFA may be funded by an assessment on all properties.

- *Additional community authorities*

Over time, other community-based organizations can be established to support the services and needs of the community. Potentially, these could include a community-based energy utility association to manage district-scale heating, cooling and electricity generation and distribution; and a transit authority to oversee transit services including car-sharing and bicycle-sharing.

Aggregate mining and sustainability

In June 2011, the University of Minnesota and Dakota Aggregates, LLC, (DA) executed a 40-year lease agreement for phased aggregate mining on 1,722 acres on the western edge of the University's 5,000-acre UMore Park property in Dakota County. This agreement followed the completion of an Environmental Impact Statement (EIS) and authorization by the University Board of Regents to execute the lease, both in November 2010. Following local jurisdictional approval, mining preparation is anticipated to begin in late spring 2012, with phased aggregate mining anticipated to follow.

Dakota Aggregates, LLC, is a company made up of two local companies, Cemstone Products Company (www.cemstone.com) and Ames Construction (www.amesconstruction.com). Dakota Aggregates' operations at UMore Park are proposed to include not only the mining operation, but also ancillary facilities and businesses that will provide a variety of products for both contractors and homeowners. These products could include aggregates, asphalt, ready-mix concrete, concrete masonry units, brick and decorative stone, as well as contractor supply items.

A focus and emphasis on sustainability and environmental stewardship is planned as Dakota Aggregates moves forward with this project. By implementing a Sustainable Purchasing Plan (SPP), DA can promote the procurement of environmentally-friendly products. The SPP places emphasis on reducing a product's carbon footprint through not only reducing emissions from transportation by buying locally, but also through the purchase of products that are biodegradable and/or manufactured in an environmentally-responsible manner. Dakota Aggregates' focus on the environment also includes the implementation of an Environmental Management System (EMS). The EMS allows DA to continually monitor and improve their environmental performance. Environmental stewardship is also evident in Dakota Aggregates' approach to mining and operating the ancillary facilities.

The focus on sustainability for the mining operation starts at the planning phase, and includes seeking proactive solutions for the successful reclamation of the sand and gravel mining areas. Through programs such as the Wildlife Habitat Council's *Wildlife at Work* or Pheasants Forever's habitat restoration plans, mined areas can be restored to ecologically thriving habitats that will last for generations after mining has ceased. Sustainability for the mining operations also means an emphasis on efficiency. Through the use of the EMS, DA can track its efficiency, and continually make improvements to help the entire operation run more efficiently, and thus minimize fuel usage and emissions. The mining operation will also be using a series of ponds to recycle water used in the washing of aggregates and to capture and use any precipitation that falls on the site. The pond system also prevents any runoff or turbid water from leaving the site. The aggregates mined here will also be used to support the production of sustainable products at the ancillary facilities, especially at the ready-mix concrete and asphalt plants.

The asphalt industry has made strides in the last decade towards being more sustainable. According to the National Asphalt Pavement Association, the more significant accomplishment of the sustainable initiative lies in recycling. About 60 percent of recycled asphalt is used in new asphalt mixes, with the remaining 40 percent being used in various other ways, including being crushed for use as road base.¹ Recycled asphalt will be a large part of the Dakota Aggregates plan, as incorporation of a recycling yard is planned not only to recycle used asphalt, but used concrete as well. The asphalt plant will also be using the aggregates to produce more environmentally-friendly products such as warm-mix asphalt and porous asphalt. Warm-mix asphalt

is laid at temperatures as much as 100 degrees Fahrenheit lower than traditional asphalt mixes. By using warm-mix asphalt, energy consumption used in the manufacturing process can be reduced 20 percent as compared to traditional hot-mix asphalt. Porous asphalt, when placed over a gravel bed, can be used to help control stormwater runoff by naturally filtering the water as it passes through.

Like asphalt, the ready-mix concrete industry has also made large strides in recent years based on recycling. Used concrete is crushed, and then used in a multitude of ways, including as fill or as a road base. The crushed concrete may also be used in the production of new concrete, and was recently approved for use as part of the Twin Cities' Central Corridor light rail project. The ready-mix facility at UMore Park will not only recycle concrete, but water as well. A closed-loop water recycling system is proposed for the ready-mix plant area of the site. This system will reuse treated wastewater from concrete drum washing in the production of new concrete. Dakota Aggregates also shows its commitment to the environment through the use of Supplementary Cementitious Materials (SCMs). These SCMs are often byproducts of other industries' manufacturing processes, and if not used in concrete, would often end up in landfills. Because the production of cement is the leading cause of carbon dioxide emissions in the manufacture of concrete, the substitution of the SCMs into the mix not only saves them from being landfilled, but also helps to reduce the use of the cement, and thus, helps to reduce concrete's carbon footprint as well. The ready-mix plant will also utilize the extracted aggregate to support the production of sustainable concrete technologies such as pervious concrete and insulated concrete forms (ICF) buildings and homes. The pervious concrete is a porous mix, that when used in conjunction with a drainable base, is recognized as an U.S. Environmental Protection Agency Best Management Practice for controlling and treating stormwater runoff. ICF homes and buildings are much more energy efficient than traditional wood-frame construction. The high thermal mass of the concrete walls vastly improves the efficiency of the building or home's heating and cooling system.

Dakota Aggregates is committed to environmentally-responsible and sustainable practices for its' UMore Park operations. Through the use of recycling, energy and operational efficiency, and the production of environmentally-friendly products, Dakota Aggregates can confidently follow through on these commitments, and can also become an environmental leader in the area.

B. UMore Development Limited Liability Company

The UMore Development Limited Liability Company (LLC) was established by the University of Minnesota Board of Regents in October 2009 to provide oversight and management for planning and development of the UMore Park property. In December 2009, the Board of Regents appointed nine individuals to the Board of Governors, four University governors and five community governors, to direct the LLC. The University of Minnesota is the sole member of the company.

The Board of Governors brings private sector and University expertise in planning, finance, real estate and law to the planning and development process and ensures that the University's academic mission—research, teaching and public engagement—remains core to the project.

C. Office for UMore Park Academic Initiatives

The University of Minnesota Office for UMore Park Academic Initiatives is responsible for the integration of research, education and outreach into all phases of planning and development on the University's 5,000-acre UMore Park property in Dakota County. The University's vision for UMore Park is made distinctive through the academic strengths that reach across the breadth of the University.

The Office for UMore Park Academic Initiatives was established on July 1, 2010, as the complement to the UMore Development Limited Liability Company (LLC), which was established by the Board of Regents in October 2009. The two entities work closely and in concert to ensure that University research, teaching and learning, and all forms of outreach are seamlessly integrated into planning and development in ways that add value to the property and enrich the community.

D. University of Minnesota Board of Regents Policy on Sustainability and Energy Efficiency

“Sustainability is a continuous effort integrating environmental, social, and economic goals through design, planning, and operational organization to meet current needs without compromising the ability of future generations to meet their own needs. Sustainability requires the collective actions of the University of Minnesota (University) community and shall be guided by the balanced use of all resources, within budgetary constraints. The University is committed to incorporating sustainability into its teaching, research, and outreach and the operations that support them.”

--University of Minnesota Board of Regents Policy
July 9, 2004

To read the complete policy, visit http://www1.umn.edu/regents/policies/administrative/Sustain_Energy_Efficiency.pdf
References

REFERENCES

Executive Summary

¹ Creating the Vision: The Future of UMore Park, University of Minnesota.

Zero Carbon

- ¹ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ² U. S. Environmental Protection Agency. *CO₂ Emissions from Fossil Fuel Combustion*, U.S. Environmental Protection Agency. http://www.epa.gov/statelocalclimate/documents/pdf/CO2FFC_2009.pdf (accessed September 1, 2011).
- ³ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ⁴ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ⁵ Minnesota Department of Commerce and Minnesota Pollution Control Agency. *Annual Legislative Proposal Report on Greenhouse Gas Emission Reductions and Biennial Greenhouse Gas Emissions Reduction Report To The Minnesota Legislature*. January 2011. Minnesota Department of Commerce and Minnesota Pollution Control Agency. http://www.state.mn.us/mn/externalDocs/Commerce/Greenhouse_Gas_Emissions_Reduction_Report_2011_122910041040_GreenhouseGasEmissions2010.pdf (accessed September 1, 2011).
- ⁶ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ⁷ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ⁸ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ⁹ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ¹⁰ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ¹¹ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).

- ¹² U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ¹³ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ¹⁴ Minnesota Climate Change Advisory Group. *Minnesota Climate Change Advisory Group Final Report*. April 2008. Minnesota Climate Change Advisory Group. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16692.pdf> (accessed September 1, 2011).
- ¹⁵ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ¹⁶ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ¹⁷ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ¹⁸ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ¹⁹ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ²⁰ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ²¹ Center for Sustainable Building Research. *Sustainable Building 2030*. June 2010. University of Minnesota. <http://www.mn2030.umn.edu/> (accessed January 4, 2012).
- ²² Center for Sustainable Building Research. *The State of Minnesota Sustainable Building Guidelines*. November 2011. University of Minnesota. <http://www.msb.g.umn.edu/> (accessed January 4, 2012).

Zero Waste

- ¹ Dakota County. *County Solid Waste Master Plan*. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/Reports/SolidWasteRecycling/MasterPlan.htm> (accessed September 1, 2011).
- ² *Dakota County Ordinance 110.2.57*, Dakota County.
- ³ *Dakota County Ordinance 110.2.101*, Dakota County.
- ⁴ *Dakota County Ordinance 110.2.81*, Dakota County.
- ⁵ Minnesota Pollution Control Agency. *Metropolitan Landfill Contingency Action Trust (MLCAT) Account: FY2011 Annual Report on Use of the MLCAT Account*. November 2011. Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/view-document.html?gid=16421>
- ⁶ Dakota County Solid Waste and Recycling Master Plan, Dakota County, <http://www.co.dakota.mn.us/EnvironmentRoads/Reports/SolidWasteRecycling/MasterPlan.html> (accessed September 1, 2011).
- ⁷ Minnesota Pollution Control Agency, *Metropolitan Solid Waste Management Policy Plan 2010-2030*, April 28, 2011. Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/waste-management/solid-waste/integrated-solid-waste-management/metropolitan-solid-waste-management-policy-plan-2004-2023.html> (accessed September 1, 2011).

- ⁸ Dakota County. *County Solid Waste Master Plan 2004 - 2024*. 2004. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/Reports/SolidWasteRecycling/MasterPlan.htm>
- ⁹ Minnesota Pollution Control Agency. *2009 Solid Waste Policy Report*. February 2010. Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/view-document.html?gid=3911> (accessed January 4, 2012).
- ¹⁰ Solid Waste Management Coordinating Board. <http://www.swmcb.org/> (accessed January 4, 2012).
- ¹¹ Minnesota Pollution Control Agency. *Metropolitan Solid Waste Management Policy Plan 2010 – 2030*. March 2011. <http://archive.leg.state.mn.us/docs/2011/mandated/110436.pdf> (accessed January 4, 2012).
- ¹² Dakota County. *Protecting the Environment: Reuse, Recycling & Waste Reduction*. 2006. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/EnvirProtect/Recycling/default.htm>
- ¹³ Bull, Mike and Baker, Karen – Minnesota House of Representatives Research Department. *Minnesota Solid Waste History Major Milestones*. January 2002. Minnesota House of Representatives. <http://www.house.leg.state.mn.us/hrd/pubs/solwaste.pdf> (accessed September 1, 2011).
- ¹⁴ Minnesota Revenue. *Solid Waste Management Tax*. August 2010. Minnesota Revenue. <http://taxes.state.mn.us/special/waste/Documents/swmfs1.pdf> (accessed September 1, 2011).
- ¹⁵ Resource Recycling. *The ABC's of Waste Diversion*. 2010. Resource Recycling. <http://resource-recycling.com/node/1303> (accessed September 1, 2011).
- ¹⁶ Vee, Arlene – Minnesota Pollution Control Agency. Report on 2007 SCORE Programs. January 2009. Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/view-document.html?gid=12793> (accessed September 1, 2011).
- ¹⁷ Minnesota Office of the Legislative Auditor. *Waste Management in Minnesota*. <http://www.auditor.leg.state.mn.us/ped/pedrep/0201ch1.pdf> (accessed January 4, 2012).
- ¹⁸ UMore Park Strategic Plan, Sasaki Associates Inc., 2006. <http://www.umorepark.umn.edu/planning/concept/strategicplanning/>
- ¹⁹ <http://www.co.dakota.mn.us/EnvironmentRoads/EnvirProtect/Composting/default.htm>
- ²⁰ Report on 2007 SCORE programs, p5. Accessed on 27 May 2011 from <http://www.pca.state.mn.us/index.php/view-document.html?gid=12793>. Waste and recycling metrics are taken from the Reports on SCORE programs and are accessible here: <http://www.pca.state.mn.us/index.php/view-document.html?gid=15335> <http://www.pca.state.mn.us/index.php/view-document.html?gid=12793>
- ²¹ Solid Waste Management Coordinating Board. *Rethink Recycling*. 2010. <http://www.rethinkrecycling.com/media/fast-facts> (accessed January 4, 2012).
- ²² Solid Waste Management Coordinating Board. *Rethink Recycling*. 2010. <http://www.rethinkrecycling.com/media/fast-facts> (accessed January 4, 2012).

Sustainable Transport

- ¹ U. S. Energy Information Administration, Independent Statistics and Analysis. *Minnesota*. November 2009. U. S. Department of Energy. <http://www.eia.gov/state/state-energy-profiles.cfm?sid=MN> (accessed September 1, 2011).
- ² Center for Transportation Studies – University of Minnesota. *Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota*. June 2008. Center for Transportation Studies – University of Minnesota. <http://www.leg.state.mn.us/docs/2008/mandated/080588.pdf> (accessed September 1, 2011).
- ³ U. S. Environmental Protection Agency. *CO₂ Emissions from Fossil Fuel Combustion, U.S. Environmental Protection Agency*. http://www.epa.gov/statelocalclimate/documents/pdf/CO2FFC_2009.pdf (accessed September 1, 2011).
- ⁴ Center for Transportation Studies – University of Minnesota. *Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota*. June 2008. Center for Transportation Studies – University of Minnesota. <http://www.leg.state.mn.us/docs/2008/mandated/080588.pdf> (accessed September 1, 2011).
- ⁵ Randy Strait, Bill Dougherty, Maureen Mullen, Steve Roe, and Holly Lindquist. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1900-2025*. March 2008. Center for Climate Strategies. <http://www.mnclimatechange.us/ewebeditpro/items/O3F16231.pdf> (accessed September 1, 2011).
- ⁶ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ⁷ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).

- ⁸ Minnesota Department of Employment and Economic Development. *Regional Labor Market Information*. 2011. Minnesota Department of Employment and Economic Development. <http://www.positivelyminnesota.com/apps/lmi/rws/Results.aspx> (accessed September 1, 2011).
- ⁹ U. S. Census Bureau. *Data Profile*; "Dakota County, Minnesota Selected Economic Characteristics: 2005-2009". U. S. Census Bureau. http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=05000US27037&-qr_name=ACS_2009_5YR_G00_DP5YR3&-context=adp&-ds_name=&-tree_id=5309&-_lang=en&-redoLog=false&-format= (accessed September 1, 2011).
- ¹⁰ City of Rosemount, Minnesota. *2030 Comprehensive Land Use Plan*. May 2009. City of Rosemount, Minnesota. <http://ci.rosemount.mn.us/vertical/Sites/%7B9EB5E841-C29C-4154-8A28-AC41E049797A%7D/uploads/%7B64B1CA41-E170-424B-B63E-D617F6A3FE97%7D.PDF> (accessed September 1, 2011).
- ¹¹ Published by City in 2009, Found some employment information down to the school district level for 2009 in the American Community Survey, but not specific to Rosemount U. S. Census Bureau. *Data Profile: Rosemount-Apple Valley-Eagan School District*. 2009. U. S. Census Bureau. http://factfinder.census.gov/servlet/ADPTable?_bm=y&-context=adp&-qr_name=ACS_2009_1YR_G00_DP3&-ds_name=&-tree_id=309&-keyword=Rosemount&-redoLog=false&-geo_id=97000US2732390&-format=&-_lang=en (accessed September 1, 2011).
- ¹² Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, Design Workshop, 2009 www.umorepark.umn.edu/planning/concept/cmpbook/
- ¹³ U.S. Census Bureau. State and County QuickFacts: *Dakota County*. 2010. <http://quickfacts.census.gov/cgi-bin/qfd/extract-xls?27037> (accessed January 4, 2012).
- ¹⁴ Center for Transportation Studies. *Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota*. University of Minnesota. June 2008. <http://www.leg.state.mn.us/docs/2008/mandated/080588.pdf> (accessed January 9, 2012).
- ¹⁵ 2030 Comprehensive Land Use Plan. City of Rosemount. May 2009. <http://ci.rosemount.mn.us/vertical/Sites/%7B9EB5E841-C29C-4154-8A28-AC41E049797A%7D/uploads/%7B64B1CA41-E170-424B-B63E-D617F6A3FE97%7D.PDF> (accessed January 9, 2010)

Sustainable Materials

- ¹ Center for Sustainable Building Research. *The State of Minnesota Sustainable Building Guidelines*. November 2011. University of Minnesota. <http://www.msbg.umn.edu/> (accessed January 4, 2012).
- ² Center for Sustainable Building Research. *The State of Minnesota Sustainable Building Guidelines*. November 2011. University of Minnesota. <http://www.msbg.umn.edu/> (accessed January 4, 2012).
- ³ Dakota County. *Protecting the Environment; Dakota County Sustainable Buildings*. April 2010. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/EnvirProtect/Sustainability/SustainableBuildings.htm> (accessed September 1, 2011).
- ⁴ Minnesota Pollution Control Agency. *Minnesota Recycled Products Directory*. <http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/recycling/recycled-products-directory/minnesota-recycled-products-directory-home-data.html> (accessed September 1, 2011).
- ⁵ Minnesota Pollution Control Agency. *Minnesota Recycling Markets Directory*. May 2010. Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/recycling/minnesota-recycling-markets-directory/minnesota-recycling-markets-directory-home.html> (accessed September 1, 2011).
- ⁶ Minnesota Materials Exchange. *Minnesota Materials Exchange*. <http://www.mnexchange.org> (accessed September 1, 2011).
- ⁷ Eureka Recycling. *Twin Cities Free Market*. 1998. Eureka Recycling. <http://www.twincitiesfreemarket.org/> (accessed September 1, 2011).
- ⁸ UMore Park Strategic Plan, Sasaki Associates Inc., 2006. <http://www.umorepark.umn.edu/planning/concept/strategicplanning/> (accessed January 4, 2012).
- ⁹ Dakota County Office of Planning and Analysis. *2010 Dakota County Community Indicators Report*. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00003be8/mtmavkvkqykfilyzkgxhcqmkuuzwlo/2010CommunityIndicatorsReport.pdf> (accessed September 1, 2011).
- ¹⁰ Minnesota Sustainable Building 2030. Center for Sustainable Building Research. University of Minnesota. June 2011. <http://www.mn2030.umn.edu/> (accessed January 20, 2012).
- ¹¹ LEED Projects & Case Studies Directory. U.S. Green Building Council. 2001. <http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx> (accessed January 20, 2012).
- ¹² LEED Projects & Case Studies Directory. U.S. Green Building Council. 2001. <http://www.usgbc.org/LEED/Project/CertifiedProjectList.aspx> (accessed January 20, 2012).
- ¹³ Solid Waste Management Coordinating Board Report 2009
- ¹⁴ <https://ilbi.org/lbc/LBC%20Documents/LBC2-0.pdf>
- ¹⁵ American Institute of Architects, http://www.aia.org/release_021408_q4hdt

Local and Sustainable Food

- ¹ U. S. Department of Agriculture. *Data Sets*; “State Fact Sheets: Minnesota”. September 2011. Economic Research Service. <http://www.ers.usda.gov/statefacts/mn.htm#ORG> (accessed September 1, 2011).
- ² U. S. Department of Agriculture. *Data Sets*; “State Fact Sheets: Minnesota”. September 2011. Economic Research Service. <http://www.ers.usda.gov/statefacts/mn.htm#ORG> (accessed September 1, 2011).
- ³ Minnesota Agri-Growth Council. *Resources*; “Minnesota Food and Agriculture Facts”. March 2009. Minnesota Agri-Growth Council. <http://www.agrigrowth.org/resources.html> (accessed September 1, 2011).
- ⁴ U. S. Department of Agriculture. *Data Sets*; “State Fact Sheets: Minnesota”. September 2011. Economic Research Service. <http://www.ers.usda.gov/statefacts/mn.htm#ORG> (accessed September 1, 2011).
- ⁵ U. S. Department of Agriculture. *Data Sets*; “State Fact Sheets: Minnesota”. September 2011. Economic Research Service. <http://www.ers.usda.gov/statefacts/mn.htm#TCEC> (accessed September 1, 2011).
- ⁶ U. S. Department of Agriculture. *Data Sets*; “State Export Data”. June 2011. Economic Research Service. <http://www.ers.usda.gov/Data/StateExports/> (accessed September 1, 2011).
- ⁷ McIntosh, Gordon. *Minnesota Agriculture and the Reduction of Greenhouse Gases*. December 2000. Minnesotans for an Energy-Efficient Economy. <http://www.landstewardshipproject.org/mba/me3report.pdf> (accessed September 1, 2011).
- ⁸ Aitchison, Kate Boran – Community Growth Options. *The Future of Our Farmland, An Agricultural Inventory for Scott County, Minnesota*. February 2009. University of Minnesota. <http://conservancy.umn.edu/bitstream/50494/1/Boran,%20Kate.pdf>
- ⁹ U.S. Department of Agriculture. *The Census of Agriculture*; “2007 Census Publications”. December 2009. National Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp (accessed September 1, 2011).
- ¹⁰ U.S. Department of Agriculture. *The Census of Agriculture*; “2007 Census Publications”. December 2009. National Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp (accessed September 1, 2011).
- ¹¹ U.S. Department of Agriculture. *The Census of Agriculture*; “2007 Census Publications”. December 2009. National Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp (accessed September 1, 2011).
- ¹² Minnesota Department of Agriculture. *Overview: Experiences and Outlook of Minnesota Organic Farmers – 2007*. Minnesota Department of Agriculture. <http://www.mda.state.mn.us/news/publications/food/organicgrowing/2007orgsurvresults.pdf> (accessed January 5, 2012).
- ¹³ Aitchison, Kate Boran – Community Growth Options. *The Future of Our Farmland, An Agricultural Inventory for Scott County, Minnesota*. February 2009. University of Minnesota. <http://conservancy.umn.edu/bitstream/50494/1/Boran,%20Kate.pdf>
- ¹⁴ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ¹⁵ Concept Master Plan:For the University of Minnesota’s New Sustainable Community at UMore Park, DesignWorkshop, 2009
- ¹⁶ Concept Master Plan:For the University of Minnesota’s New Sustainable Community at UMore Park, DesignWorkshop, 2009
- ¹⁷ Minnesota Monthly. *The Co-op Advantage*. August 2008. Minnesota Monthly. <http://www.minnesotamonthly.com/media/Minnesota-Monthly/August-2008/Twin-Cities-Fresh-Taste-Festival/The-Co-Op-Advantage/> (accessed September 1, 2011).
- ¹⁸ CSA Farm Directory 2011, Land Stewardship Project, March 2011
- ¹⁹ Jaker, Jerry. *Hmong in Minnesota*. May 21, 2009. Minnesota Institute of Public Health. <http://www.miph.org/blog/hmong-minnesota> (accessed January 5, 2012).
- ²⁰ Public Health Department. *Community Health Profiles*. May 2011. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/77227AF7-CDB4-4C35-B7E0-6C3394A833EC/19174/CHAAPReferences2011.pdf> (accessed September 1, 2011).
- ²¹ U.S. Department of Agriculture. *The Census of Agriculture*; “2007 Census Publications”. December 2009. National Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp (accessed September 1, 2011).
- ²² National Farm to School Network. *Rosemount, Eagan and Apple Valley School District Farm to School*. <http://www.farmtoschool.org/state-programs.php?action=detail&id=49&pid=349> (accessed January 5, 2012).
- ²³ Land Stewardship Project. CSA Farm Directory, “2011 Edition of the Twin Cities, Minnesota & Western Wisconsin Region”. <http://www.landstewardshipproject.org/csa.html> (accessed January 5, 2012).
- ²⁴ Land Stewardship Project. *Food Alliance Midwest*. http://www.landstewardshipproject.org/programs_mwfa.html (accessed September 1, 2011).
- ²⁵ Minnesota Department of Agriculture. Minnesota Grown. <http://www3.mda.state.mn.us/mngrown/> (accessed January 5, 2012).
- ²⁶ U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans*. 2010. <http://www.health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf> (accessed January 5, 2012).

Sustainable Water

- ¹ Minnesota Department of Natural Resources. *Lakes, rivers, and wetlands facts*. 2008. Minnesota Department of Natural Resources. <http://www.dnr.state.mn.us/faq/mnfacts/water.html> (accessed September 1, 2011).
- ² Metropolitan Council. *Inventory of Major WWTPs and Potential Industrial Reuse Demands*. <http://www.metrocouncil.org/planning/environment/RTMWIWU/RWRTechMemo1Sect3.pdf> (accessed September 1, 2011).
- ³ Dakota County. *Protecting the Environment; "Water and Wells"*. 2006. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/EnvirProtect/Water/default.htm> (accessed September 1, 2011).
- ⁴ Barr Engineering. "Predictive Simulations to Assess Potential Effect of Mining Activities on Groundwater". Resource Document for Environmental Impact Statement. April 2010. http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/content/ssrd_content_214663.pdf (accessed January 20, 2012)
- ⁵ City of Rosemount, Minnesota. *Water and sewer utility billing*. 2011. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B56AB8850-1F12-4B6E-8EE2-B0FE74D9580D%7D (accessed September 1, 2011).
- ⁶ City of Rosemount, Minnesota. *Water and sewer utility billing*. 2011. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B56AB8850-1F12-4B6E-8EE2-B0FE74D9580D%7D (accessed September 1, 2011).
- ⁷ Metropolitan Council. *Empire Wastewater Treatment Plant*. 2011. Metropolitan Council. <http://www.metrocouncil.org/environment/wastewatertreatment/Empire.htm> (accessed September 1, 2011).
- ⁸ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, Design Workshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ⁹ Bauer, M., and B. Wilson. Estimation, mapping, and change analysis of impervious surface by LANDSAT remote sensing. 2005. Report to the Minnesota Pollution Control Agency.
- ¹⁰ Fissore, C., L. Baker, S. Hobbie, J. King, J. McFadden, K. Nelson, and I. Jakobsdottir (2010), Carbon, nitrogen, and phosphorus fluxes in household ecosystems in the Minneapolis–Saint Paul, Minnesota, urban region, *Ecological Applications*. 21(3): 619-639.
- ¹¹ Heinz, Stefan, Eric Novotny, Andrew Sander and Omid Mohseni. *Study of Environmental Effects of De-Icing Salt on Water Quality in the Twin Cities Metropolitan Area, Minnesota*. September 2008. University of Minnesota, St. Anthony Falls Laboratory. <http://www.lrrb.org/pdf/200842.pdf> (accessed January 5, 2012).
- ¹² Beck, Inc. *Municipal solid waste management and its impact on resource conservation and greenhouse gas emissions*. Report to the Minnesota Office of Environmental Assistance, St. Paul. 1999.
- ¹³ Baker, Larry. Can urban P conservation prevent the brown devolution? *Chemosphere* <http://dx.doi.org/10.1016/j.chemosphere.2011.03.026> (accessed January 3, 2012)
- ¹⁴ DeOreo, W.B., A. Dietman, T. Skeel, P.W. Mayer, D.M. Lewis, J. Smith, 2001 Retrofit realities. *J. Am. Water Works Association*, March 2001.

Land Use and Wildlife

- ¹ Dakota County. *Land Use and Growth*. December 2008(DRAFT). Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00002e4b/jyespfaciazckjyrwtpaetqebvdrnqh/landuseandgrowth.pdf> (accessed September 1, 2011).
- ² Dakota County. *Land Use and Growth*. December 2008(DRAFT). Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00002e4b/jyespfaciazckjyrwtpaetqebvdrnqh/landuseandgrowth.pdf> (accessed September 1, 2011).
- ³ U.S. Environmental Protection Agency. *Level III Ecoregions of the Continental United States*. March 2007. National Health and Environmental Effects Research Laboratory. <http://www.saveamericasforests.org/congress/ASAF/Parks/EPA-Ecoregion-Map.pdf> (accessed September 1, 2011).
- ⁴ Dakota County. *Protecting the Environment; "Water & Wells"*. 2006. Dakota County. <http://www.co.dakota.mn.us/EnvironmentRoads/EnvirProtect/Water/default.htm> (accessed September 1, 2011).
- ⁵ Vermillion River Watershed Organization. *Home Page*. 2011. Vermillion River Watershed. <http://www.vermillionriverwatershed.org/> (accessed September 1, 2011).
- ⁶ Vermillion River Watershed Organization. *Impaired Waters in the Watershed*. 2011. Vermillion River Watershed. http://www.vermillionriverwatershed.org/index.php?option=com_content&view=article&id=110&Itemid=119 (accessed September 1, 2011).
- ⁷ BioRegional. One Planet Action Plan: UMore Park Sustainability Workshop Brief. April 2011.

- ⁸ Ehret Miller, Debra and Slotterback, Brendon – Dakota County Office of Planning and Analysis. *Dakota County Energy Efficiency and Greenhouse Gas Emissions Reduction Report, Energy Committee Findings and Recommendations for Government Operations and Community Initiatives*. September 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/3B7F9497-E844-462D-B823-83B708E68094/14703/EnergyPolicy.pdf> (accessed September 1, 2011).
- ⁹ Minnesota Department of Natural Resources. *State Parks*. April 2009. Minnesota Department of Natural Resources. http://www.dnr.state.mn.us/faq/mnfacts/state_parks.html (accessed September 1, 2011).
- ¹⁰ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹¹ Minnesota Department of Natural Resources. *WMA detail report*; "Vermillion Highlands Recreation and WMA". 2011. Minnesota Department of Natural Resources. http://www.dnr.state.mn.us/wmas/detail_report.html?map=COMPASS_MAP_FILE&mode=itemquery&qqlayer=bdry_adwma2py3_query&qitem=uniqueid&qstring=WMA0184300 (accessed September 1, 2011).
- ¹² University of Minnesota. *Vermillion Highlands*; "Recreational Activities". June 2010. University of Minnesota. <http://www.vermillionhighlands.umn.edu/mgmt/activities/index.htm> (accessed September 1, 2011).
- ¹³ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁴ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁵ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁶ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁷ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁸ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ¹⁹ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ²⁰ Carbon Cycle and Greenhouse Gas Research. Rosemount Research and Outreach Center at UMore Park. October 2010. http://rroc.cfans.umn.edu/Research/SoilWaterClimate/John_Baker/index.htm (accessed January 20, 2012).
- ²¹ University of Minnesota. *Groundwater Assessment Report: Resource Document for Environmental Impact Statement*. June 2009. University of Minnesota. <http://purl.umn.edu/91611> (accessed September 1, 2011).
- ²² *Remedial Investigation of UMore Park East, Dakota County, MN*. University of Minnesota. April 2011. http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/content/ssrd_content_338009.pdf
- ²³ Cutts, Emily. *Rosemount buys UMore plot for \$1*. Minnesota Daily. February 2011. <http://www.mndaily.com/2011/02/14/rosemount-buys-umore-plot-1> (accessed January 5, 2012).
- ²⁴ Barr Engineering. *Groundwater Assessment Report Resource Document for Environmental Impact Statement*. June 2009. http://www.umorepark.umn.edu/prod/groups/ssrd/@pub/@ssrd/@umorepark/documents/article/ssrd_article_337984.pdf
- ²⁵ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ²⁶ Concept Master Plan: For the University of Minnesota's New Sustainable Community at UMore Park, DesignWorkshop, 2009. <http://www.umorepark.umn.edu/planning/concept>
- ²⁷ Tilman, D., Fargione, J., Wolff, B., D'Antonia, C., Dobson, A. Howarth, R. Schindler, D, Schlesinger, W., Simberloff, D., Swackhammer, D. 2001. Forecasting agriculturally driven global environmental change. *Science* 292:281-284.
- ²⁸ Millenium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being*. Island Press, Washington, D.C.
- ²⁹ Brown, D., K. Johnson, T. Loveland, and D. Theobald. 2005. *Rural Land Use Trends in the Conterminous United States, 1950-2000*. *Ecological Applications* 15:1851-1863.

Culture and Community

- ¹ Dakota County. *County Overview*. July 2008. Dakota County. <http://www.co.dakota.mn.us/About/Overview/default.htm> (accessed September 1, 2011).
- ² Dakota County. *2004-2005 Comprehensive Plan*; "Dakota County Community Corrections". 2005. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/0000051d/ystfhtyzadipcbtvydoptppejjffa/04CCFINAL20042005COMPPLAN.pdf> (accessed September 1, 2011).

- ³ Dakota County. *Dakota County Delivers 2008 Performance Profiles*; “Chapter 1: Safe, Healthy Citizens”. August 2009. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/DAC0038C-8284-427F-9AC6-688F776A14BC/11444/Chapter1.pdf> (accessed September 1, 2011).
- ⁴ Dakota County. *Dakota County Human Services Advisory Committee*; “Change and Stability: Update on Status of Immigrants in Dakota County”. October 2007. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/000017e7/fqmxwhknapctolrvxdmfbjbtqxjvveqi/1007HSACImmigrantRpt.pdf> (accessed September 1, 2011).
- ⁵ Dakota County. *Dakota County 2007 Annual Community Report*. Dakota County. http://www.co.dakota.mn.us/NR/rdonlyres/00001806/dtmecgrjvtraogztpcouezwcyrkziwcw/AnnCommunityReport_Final.pdf (accessed September 1, 2011).
- ⁶ City of Rosemount, Minnesota. *City history*. June 2008. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B3D03AC6E-9319-4D05-92E7-3743010D16DA%7D (accessed September 1, 2011).
- ⁷ City of Rosemount, Minnesota. *City history*. June 2008. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B3D03AC6E-9319-4D05-92E7-3743010D16DA%7D (accessed September 1, 2011).
- ⁸ City of Rosemount, Minnesota. *City history*. June 2008. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B3D03AC6E-9319-4D05-92E7-3743010D16DA%7D (accessed September 1, 2011).
- ⁹ City of Rosemount, Minnesota. *City history*. June 2008. City of Rosemount, Minnesota. http://ci.rosemount.mn.us/index.asp?Type=B_BASIC&SEC=%7B3D03AC6E-9319-4D05-92E7-3743010D16DA%7D (accessed September 1, 2011).
- ¹⁰ University of Minnesota. Rosemount Research and Outreach Center. <http://rroc.cfans.umn.edu/> (accessed January 5, 2012).
- ¹¹ U.S. Census Bureau. *American Factfinder*. Census 2000. U.S. Census Bureau. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF3_QTP13&prodType=table (accessed September 1, 2011).
- ¹² U.S. Census Bureau. *American Factfinder*. Census 2000. U.S. Census Bureau. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_00_SF3_QTP13&prodType=table (accessed September 1, 2011).
- ¹³ City of Rosemount, Minnesota. *Community Center/Ice Arena*. 2010. City of Rosemount, Minnesota. http://rosemount.govoffice.com/index.asp?Type=B_BASIC&SEC={B23AD2C6-6983-4EF9-9C88-114572585C92}&DE= (accessed September 1, 2011).
- ¹⁴ Rosemount Area Arts Council. <http://www.rosemountaac.org/about.html> (accessed January 5, 2012).
- ¹⁵ City of Rosemount, Minnesota. *Resident Guide*. City of Rosemount, Minnesota. <http://ci.rosemount.mn.us/vertical/Sites/%7B9EB5E841-C29C-4154-8A28-AC41E049797A%7D/uploads/%7BDEA6C9FC-0899-4B63-9811-6521E3B319E8%7D.PDF> (accessed September 1, 2011).
- ¹⁶ Rosemount-Apple Valley-Eagan Public Schools Independent School District 196. *District 196 at a Glance*. Independent School District 196. <http://www.district196.org/District/AboutUs/Index.cfm> (accessed September 1, 2011).
- ¹⁷ Corporation for National & Community Service. *Volunteering in America*; “Volunteering in Minnesota”. August 2011. Corporation for National & Community Service. <http://www.volunteeringinamerica.gov/MN> (accessed September 1, 2011).
- ¹⁸ National Assessment of Adult Literacy. *State and County Estimates of Low Literacy*. National Center for Education Statistics, Institute of Education Science. 2003. <http://nces.ed.gov/naal/estimates/StateEstimates.aspx>
- ¹⁹ Alliance for Excellent Education. *Understanding High School Graduation Rates in Minnesota*. July 2009. Alliance for Excellent Education. http://www.all4ed.org/files/Minnesota_wc.pdf (accessed September 1, 2011).
- ²⁰ Office of Planning and Analysis. *Crime Rates*. Dakota County. 2010. <http://www.co.dakota.mn.us/NR/rdonlyres/78F5D938-1BF9-4E7D-B9E1-EC55C388DCFF/19159/CrimeRates.pdf>

Equity and Local Economy

- ¹ Minnesota Department of Employment and Economic Development. *State and National Employment and Unemployment*. 2011. Minnesota Department of Employment and Economic Development. http://www.positivelyminnesota.com/Data_Publications/Data/Current_Economic_Highlights/State_National_Employment_Unemployment.aspx (accessed September 1, 2011).
- ² U.S. Energy Information Administration, Independent Statistics & Analysis. *Minnesota*. October 2009. U.S. Department of Energy. http://www.eia.gov/cfapps/state/state_energy_profiles.cfm?sid=MN accessed September 1, 2011
- ³ U. S. Census Bureau. *Income*; “State Median Income”. September 2011. U.S. Census Bureau. <http://www.census.gov/hhes/www/income/data/statemedian/index.html> (accessed September 1, 2011).

- ⁴ Dakota County. *Median Household Income*. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/78F5D938-1BF9-4E7D-B9E1-EC55C388DCFF/19151/MedianHouseholdIncome.pdf> (accessed September 1, 2011)
- ⁵ U. S. Census Bureau. *American Factfinder Comparison Profile*; “United States Selected Economic Characteristics 2009”. 2009 American Community Survey. http://www.factfinder.census.gov/servlet/MYPTTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2009_1YR_G00_CP3_1&-ds_name=ACS_2009_1YR_G00_&-_lang=en (accessed September 1, 2011).
- ⁶ Dakota County. *2011 Budget in Brief*; “Dakota County Government for the Fiscal Year Beginning January 1, 2011”. 2011. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00004525/knetvehafjdhccmxojmyhzoahdwsnori/2011BudgetBrief.pdf> (accessed September 1, 2011).
- ⁷ Hunger Solutions Minnesota. *Dakota County seeing the ‘new face of hunger’ Unemployed turn to food shelves they once supported*. May 2010. Hunger Solutions Minnesota. <http://www.hungersolutions.org/newsroom/dakota-county-seeing-new-face-hunger-unemployed-turn-food-shelves-they-once-supported> (accessed September 1, 2011).
- ⁸ U.S. Department of Agriculture. *Data Sets*; “State Fact Sheets: Minnesota”. Economic Research Service. September 2011. <http://www.ers.usda.gov/statefacts/mn.htm#PIE> (accessed September 1, 2011).
- ⁹ Dakota County Office of Planning and Analysis. *2010 Dakota County Community Indicators Report*. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00003be8/mtmavkvkqykfilyzkqgxcqmkuzwlo/2010CommunityIndicatorsReport.pdf> (accessed September 1, 2011).
- ¹⁰ Dakota County. *Dakota County Employment and Economic Assistance Caseload Increase Analysis*. May 2006. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000519/ibzkmqzmkyilpjftgytyocqfauykfmo/06PublicAssistCaseGrowthAnalysisFinalReportII.pdf> (accessed September 1, 2011).
- ¹¹ http://docs.google.com/viewer?a=v&q=cache:2hXpUXCJV4cJ:www.co.dakota.mn.us/NR/rdonlyres/78F5D938-1BF9-4E7D-B9E1-EC55C388DCFF/19015/Poverty3.pdf+Dakota+County+Poverty+Guidelines&hl=en&gl=us&pid=bl&srcid=ADGEEsSzScKVb3TQaAowbgiYj_H9XHfMfwEz1Uruty7H-qJyzkzEbi89sMijHPA9c5MxGPICbg_ppqklTekGmhOfSCLkajTpGFyfnwHcykjsR9uKORb6Xve5nJ5qam85ZndHTsF5Fg_Fm&sig=AHIEtbQtXvcmmj7npN01n1s0tHOJi1TsIQ (accessed September 1, 2011).
- ¹² Allegretto, Sylvia, A. *Basic family budgets: Working families’ incomes often fail to meet living expenses around the US*. August 2005. Economic Policy Institute. <http://www.epi.org/publications/entry/bp165/> (accessed September 1, 2011).
- ¹³ Dakota County. *Dakota County Employment and Economic Assistance Caseload Increase Analysis*. May 2006. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000519/ibzkmqzmkyilpjftgytyocqfauykfmo/06PublicAssistCaseGrowthAnalysisFinalReportII.pdf> (accessed September 1, 2011).
- ¹⁴ Dakota County. *Dakota County Employment and Economic Assistance Caseload Increase Analysis*. May 2006. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000519/ibzkmqzmkyilpjftgytyocqfauykfmo/06PublicAssistCaseGrowthAnalysisFinalReportII.pdf> (accessed September 1, 2011).
- ¹⁵ U. S. Census Bureau. *American Factfinder Comparison Profile*; “Dakota County, Minnesota Selected Housing Characteristics: 2009”. 2009 American Community Survey. http://www.factfinder.census.gov/servlet/MYPTTable?_bm=y&-geo_id=05000US27037&-qr_name=ACS_2009_1YR_G00_CP4_1&-ds_name=ACS_2009_1YR_G00_&-_lang=en&-redoLog=false (accessed September 1, 2011).
- ¹⁶ Dakota County. *Dakota County Employment and Economic Assistance Caseload Increase Analysis*. May 2006. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000519/ibzkmqzmkyilpjftgytyocqfauykfmo/06PublicAssistCaseGrowthAnalysisFinalReportII.pdf> (accessed September 1, 2011).
- ¹⁷ City of Rosemount. *2030 Comprehensive Land Use Plan*. May 2009. City of Rosemount, Minnesota. <http://ci.rosemount.mn.us/vertical/Sites/%7B9EB5E841-C29C-4154-8A28-AC41E049797A%7D/uploads/%7B64B1CA41-E170-424B-B63E-D617F6A3FE97%7D.PDF> (accessed September 1, 2011).
- ¹⁸ City-Data. *Rosemount, Minnesota (MN) income, earnings, and wages data*. 2009. City-Data. <http://www.city-data.com/income/income-Rosemount-Minnesota.html> (accessed September 1, 2011).
- ¹⁹ U.S. Department of Labor. Bureau of Labor Statistics. *News Release*. March 2011. http://www.bls.gov/news.release/archives/laus_04192011.pdf (accessed January 9, 2012).
- ²⁰ U.S. Census Bureau. *State & County QuickFacts*. 2010 Census. <http://quickfacts.census.gov/qfd/states/27/2755726.html> (accessed January 9, 2012).

Health and Happiness

- ¹ Gallup-Healthways Well-Being Index. *State of Well-Being 2009 City, State & Congressional District Well-Being Report Minnesota*. 2010. Gallup-Healthways Well-Being Index. http://www.well-beingindex.com/files/2010WBIRankings/MN_StateReport.pdf (accessed September 1, 2011).
- ² Dakota County. *Dakota County Employment and Economic Assistance Public Assistance Caseload Increase Analysis*. May 2006. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000519/ibzkmqzmkylpjjftgytyocqfauykfmo/06PublicAssistCaseGrowthAnalysisFinalReportII.pdf> (accessed September 1, 2011).
- ³ Minnesota Department of Health. *Minnesota Health Access Survey*. January 2011. Minnesota Department of Health and the University of Minnesota School of Public Health. <https://pqc.health.state.mn.us/mnha/PublicQuery.action> (accessed September 1, 2011).
- ⁴ Dakota County. *Improving Health Care Access for the Uninsured and Underinsured*; “A Report Presented to the Dakota County Board of Commissioners by the Human Services Advisory Committee”. November 2004. Dakota County. <http://www.co.dakota.mn.us/NR/rdonlyres/00000527/cxouqtkhnmxiiaqapmklherywnqxegvy/hsahealthcareaccess-rpt1104.pdf> (accessed September 1, 2011).
- ⁵ Scorecard. *Pollution Report Card Dakota County*. 2005. Scorecard. http://scorecard.goodguide.com/community/index.tcl?zip_code=55068&set_community_zipcode_cookie_p=t&x=7&y=2 (accessed September 1, 2011).
- ⁶ Scorecard. *Pollution Report Card Dakota County*. 2005. Scorecard. http://scorecard.goodguide.com/community/index.tcl?zip_code=55068&set_community_zipcode_cookie_p=t&x=7&y=2 (accessed September 1, 2011).
- ⁷ BioRegional. *One Planet Action Plan – UMore Park Workshop Brief*. April 2011
- ⁸ University of Minnesota. Vermillion Highlands. <http://www.vermillionhighlands.umn.edu/>
- ⁹ University of Minnesota. Vermillion Highlands. <http://www.vermillionhighlands.umn.edu/>
- ¹⁰ University of Minnesota. Vermillion Highlands. <http://www.vermillionhighlands.umn.edu/>
- ¹¹ Corporation for National and Community Service. *Volunteering in America: Minnesota*. <http://www.volunteeringinamerica.gov/MN> (accessed January 2, 2012).
- ¹² Dakota County. *Mental Health Hospital Admissions*. <http://www.co.dakota.mn.us/NR/rdonlyres/78F5D938-1BF9-4E7D-B9E1-EC55C388DCFF/19014/MentalHealthHospitalAdmissions2.pdf> (access permission required).
- ¹³ City of Rosemount, Minnesota. <http://ci.rosemount.mn.us/vertical/Sites/%7B9EB5E841-C29C-4154-8A28-AC41E049797A%7D/uploads/%7B6ECF54B8-ACC9-4849-BD5B-79A76719AD69%7D.PDF> (accessed September 1, 2011).

Appendices

- ¹ National Asphalt Pavement Association. “Black and Green – Sustainable Asphalt, Now and Tomorrow.” 2009.

For more information, contact:

UMore Development LLC
230 McNamara Alumni Center
200 Oak Street, S.E.
Minneapolis, MN 55455

Phone: (612) 624-6252

Fax: (612) 624-4843

Web: www.umorepark.umn.edu

UNIVERSITY OF MINNESOTA

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status or sexual orientation.

Zero Carbon Zero Waste Sustainable Transport Sustainable Materials Local &
Equity & Local Economy Health & Happiness Zero Carbon Zero Waste Sustain
Land Use & Wildlife Culture & Community Equity & Local Economy Health &
Local & Sustainable Food Sustainable Water Land Use & Wildlife Culture & Co
Sustainable Transport Sustainable Materials Local & Sustainable Food Sustainable