
Nine Springs E-Way

*Prepared for
Mayor Douglas W. Morrisette and
The Fitchburg Common Council*

by The Fitchburg Citizen's E-Way Advisory Committee

July 1, 1998

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E-Way Boundary Adjustments

The E-Way Committee has reviewed the E-Way boundary and has made several recommendations for expansion. For Fitchburg, the key recommendation is the addition of the McKeown property and the portion of the Wisconsin Alumni Research Foundation (WARF) property that lies north and west of the ridge line, a total of approximately 80 acres. Although this land could be acquired via many methods, the most intriguing method would be for the DNR to exchange land along Syene Road for the desired WARF parcel bordering the E-Way.

The Committee recommends that affected municipalities support the E-Way boundary adjustments as specified in the report. The Committee further recommends that the DNR and WARF consider a mutually beneficial land exchange.

Stormwater

Stormwater runoff has a major effect on the E-Way. Stormwater runoff is the precipitation that flows from streets, rooftops and lawns, carrying a variety of pollutants into Nine Springs Creek. In the past several years, Fitchburg has undertaken significant steps to reduce stormwater impacts on the E-Way. The engineering consulting firms of R. A. Smith & Associates and Mead & Hunt have completed studies that model stormwater facilities and practices in the Yahara-Monona watershed. Fitchburg has already implemented several major improvements recommended by these studies, and the remainder are budgeted to be constructed within the next five years.

One means of financing the considerable future stormwater management efforts necessary to protect the E-Way is a Stormwater Utility District (SUD). A SUD charges property owners based on the amount of runoff generated from their property. Under a SUD, homeowners typically pay less as the burden is distributed to businesses, multifamily dwellings and nonprofit entities, all of which generate proportionately more stormwater runoff and pollution.

The Committee recommends that local jurisdictions, including the City of Fitchburg, consider establishing stormwater utility districts to pay for stormwater management activities.

Realizing that stormwater management was an integral part of the Nine Springs Neighborhood, the City of Fitchburg retained Vierbicher Associates to develop a stormwater management plan. The plan uses the best available practices to reduce impacts on the E-Way. The Vierbicher Associates Stormwater Plan is based on extensive field observation and sampling, and should be the primary guide for planning future development in the Nine Springs Neighborhood. The E-Way Committee has reviewed and generally endorses the plan.

Erosion Control

Sediment from construction sites is a significant pollutant in the E-Way. Therefore, construction should be staged to require stormwater management measures to be in place before other onsite construction that may cause negative impacts.

Because erosion control is an important means to reduce impacts on the E-Way, the Committee recommends that continual monitoring and enforcement be emphasized during construction. Monitoring should begin before construction begins, and continue until permanent erosion control measures are in place.

Another means by which construction influences the E-Way is that surface and subsurface compaction by construction equipment limits infiltration, thereby increasing runoff volume and subsequent erosion. One very effective method to enhance on site infiltration and limit these effects is to use a technique called subsoiling. Subsoiling consists of chisel plowing the construction area before and after compaction.

The Committee recommends that all municipalities in the E-Way consider adopting ordinances that mandate the practice of subsoiling.

Infiltration

Stormwater facilities such as interconnected wet detention basins and buffer areas vegetated with prairie grasses can provide infiltration, ground water recharge, reduced flooding, pollution and sediment reduction. The maintenance of properly planned and engineered stormwater facilities such as these is important and must be incorporated into the long range plans of the City. The Vierbicher stormwater plan includes prairie grass channels to convey stormwater. This network of channels will help to infiltrate water over a wide area increasing the chance that the infiltrated water will be within the springs' recharge area.

The Vierbicher stormwater plan's recommendations will offer only limited protection to the E-Way's unique resources if subsequent developments revert to the old habit of viewing stormwater management as an issue of removing stormwater as efficiently as possible. Given the complexity of the spring and wetland systems, the surest way to protect them is to "keep the water on the land."

The Committee recommends that future designs emphasize infiltration, and that the amount of impervious surface be kept to a minimum. The crucial difference is not to view the water from paved areas as a nuisance to be piped away, but to conduct it to permeable soils in an unconcentrated manner for infiltration that may result in a net increase of groundwater recharge.

Protection of Dunn's Marsh & Greene Prairie

Similarly, the recommendations of other stormwater plans must be implemented to protect the E-Way. For example, the recommendations of the 1994 Dunn's Marsh Watershed Study by R.A. Smith that have not yet been implemented should be given top priority by Fitchburg, Madison and the UW Arboretum.

The Committee recommends that the Dunn's Marsh improvement projects, including installation of control structures at Dunn's Marsh and improving the hydraulic capacity of the Nine Springs Creek channel, be implemented as soon as possible to prevent the continued degradation of the Greene Prairie and Dunn's Marsh.

Protection of Wetlands & Springs

The Vierbicher stormwater plan also contains an extensive audit of wetland areas in the Nine Springs Watershed. Wetlands, like springs, have complex water flow systems not easily amenable to precise description or analysis. Wetlands are damaged if their water budgets are disrupted and are degraded through sediment runoff from eroded landscapes. Sensitive areas such as wetlands, spring recharge areas and locations with steep slopes should be recognized and any development plans and specific site designs should protect these areas.

The few remaining valuable sedge meadow wetlands have been identified and should be given the highest level of protection. Springs and wetlands, along with adjacent slopes and upland areas, must also be protected from the effects of urbanization.

Groundwater Resources

To help protect the County's groundwater resources, Fitchburg contributed to the development of the Dane County Groundwater Model. It can, therefore, request that the Wisconsin Geological and Natural History Survey (WGNHS) adapt the model to the Nine Springs area to study the springs under a variety of future scenarios. Although there are uncertainties in the model, the analysis will yield some useful predictions that can serve as valuable guides to further study of these complex systems. The Nine Springs Neighborhood Plan suggested a location of an additional well just east of the railroad tracks and just south of the extension of Cheryl Parkway. Careful study will be needed to ensure that the well does not affect the E-Way.

The Committee recommends that Fitchburg use the WGNHS groundwater model to identify recharge areas, as well as design and site future municipal wells so that impacts to the springs are minimal or nonexistent. The Committee also recommends that Fitchburg review and amend the existing well head

protection plan and ordinance for all municipal wells. The City should protect the recharge area of the springs with similar ordinances.

Public Education

Land use, stormwater management and careful stewardship of our groundwater resources are essential, but until a clear understanding of the problems and causal relationships of urbanization are disseminated, little progress will be made in guiding urban growth in harmony with our life-support system. Public education is the key to disseminating this information. Education strategies available to Fitchburg must first take into account the audience to be targeted. Audiences that a public education campaign should target include the general public, City officials, and prospective developers.

Perhaps the best opportunity to inform everyone about 'where to build' and 'where not to build' is better utilization of the E-Way itself as a teaching system. It is a model for how to protect water, wetland, and steep topography systems.

Good land stewardship depends upon individual understanding of and access to our present-day environmental knowledge. The Committee recommends that Fitchburg and other affected municipalities continue to expand their current environmental education programs through printed materials, cable television, local media and the Internet.

Intergovernmental Cooperation

The preservation, improvement and expansion of the E-Way enhances the quality of life of all the residents that live in the many jurisdictions that border the E-Way. Achieving this goal requires the cooperation of all the governmental entities that border the E-Way.

The Committee recommends that the Planning Department of each jurisdiction bordering the E-Way be notified of any other jurisdiction's consideration of development within or adjacent to the E-Way boundary.

The DNR is currently developing a new master plan for the Nine Springs complex. Because this property is within and adjacent to the E-Way, significant potential exists for minimizing negative impacts on the E-Way, as well as restoring prior degradation.

Because there are concerns about the fish hatchery operation, such as groundwater drawdown resulting in the potential desiccation of several springs, the Committee recommends that the DNR evaluate management alternatives to achieve sustainable use. These alternatives should determine the impact of groundwater drawdown and untreated effluent from the fish hatchery operation on the E-Way.

Conclusion

If Fitchburg will enact procedures, policies, and ordinances that give clear and specific guidance to development adjacent to, and impinging upon, the E-Way, it can become a model for how and what to build without destroying basic resources and values in the corridor.

The Committee recommends that Fitchburg revise the Nine Springs Neighborhood Plan to take into account the results of this study and the Vierbicher Associates Stormwater Plan.

These recommendations do not preclude development within the E-Way, so long as that development preserves and enhances groundwater quality and recharge and protects the fragile wetlands from erosion and pollution.

1

Introduction

"I know of no safe depository of the ultimate powers of the society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion."

- Thomas Jefferson, in a letter to William Charles Jarvis

This report of the Fitchburg E-Way Citizen's Advisory Committee, documenting months of expert testimony on how to minimize detrimental impacts to the Nine Springs corridor, will be successful only if its contents are well understood by all the stakeholders. Stakeholders include Fitchburg elected officials and staff, those who own property in or adjacent to the E-Way, officials from other units of government, and citizens at large.

The interest of the populace as a whole must enter into the process. But how are we to inform the discretion of the entire population? Before informed decisions can be expected in the field of land use, an awareness of the natural and cultural values that characterize the national and regional landscapes must be acquired. Only when diversity and sense of place are cherished can long-range growth strategies be developed that will protect and enhance the dynamic balance of the natural and cultural world.

The Citizen's E-Way Committee has spent the last year studying the Nine Springs E-Way, including land use, stormwater runoff, groundwater recharge and withdrawal, and public education. While this report cannot answer all of the questions related to the preservation of the E-Way, we hope that this report will be seen as a starting point.

2

The Committee

In May 1997, Fitchburg Mayor Douglas W. Morrisette formed the Fitchburg Citizen's E-Way Committee to help advise City officials and the Common Council on issues related to the Nine Springs E-Way. In addition to providing recommendations to the City of Fitchburg, the Committee is to provide recommendations to all municipalities bordering the Nine Springs E-Way.

Committee Members are listed below:

<u>Role</u>	<u>Name</u>	<u>Organization</u>
Co-Chair	Philip Lewis, MLA, FASLA	E-Way Founder, UW-Madison Professor (Emeritus, Jens Jensen Professor of Landscape Architecture)
Co-Chair	Douglas Yanggen, J.D.	UW Professor (retired), Developer
Member	Erhard Joeres, Ph.D., PE	Fitchburg Resident, UW Professor
Member	Kenneth Johnson, PE	DNR Lower Rock River Water Leader
Member	Kenneth LePine	Dane County (Parks Department)
Member	Gary Poulson	City of Madison Alderperson
Member	Karen Rueden	East Lacy Area Neighborhood Association
Member	Philip Winkel, PE	Fitchburg Alderperson, WI DOT (retired)
City Staff	Kevin Wunder, EIT	Fitchburg City Staff

The Town of Madison was also invited to participate in the Committee but declined to appoint a representative.

The Committee's Charge

Mayor Morrisette charged the Committee with the following tasks, directing the Committee to produce a report by April, 1998.

- Formulate recommendations to preserve and improve the environmental corridor within the City of Fitchburg and surrounding areas.

- ▶ Identify the issues which should be addressed in the siting of a municipal well in the Nine Springs area.
- ▶ Identify the points of public access into the E-Way, and address current and future limitations on public use which might be appropriate.
- ▶ Identify concerns related to stormwater management.
- ▶ Identify the minimum and desired level of any additional E-Way land acquisitions, and recommend how such land might be acquired considering the limited financial resources of all the area agencies and municipalities.
- ▶ Devise and recommend reasonable and cost effective techniques to mitigate land use impacts on the E-Way.
- ▶ Prepare and submit a written report of recommendations by April 30, 1998.

The Committee's Approach

Open Meetings

All Committee meetings were open to the public. Public attendance varied widely; initial meetings were well attended, but many subsequent meetings only had one or two members of the public present. The Committee thanks Hilda McVoy, a member of the public who attended almost every meeting. Ms. McVoy often provided the Committee with firsthand knowledge of the area, as well as maps and other information.

Study Phase

Initially, the Committee's focus was to study the E-Way, through a variety of written documents as well as presentations by experts and consultants. Presenters included consultants from R.A. Smith, Mead & Hunt, Vierbicher Associates, as well as Ken Potter from the UW Water Resources program.

Documents that the Committee reviewed included Nine Springs Neighborhood Plan (by The Discovery Group), Nine Springs Stormwater Management Plan (Draft, by Vierbicher Associates), Dunn's Marsh Watershed Study (by R.A. Smith and Associates), Inventory & Analysis of Stormwater Management Practices (by Mead & Hunt), and many other related documents, studies and manuals.

Analysis and Recommendation Phases

After reviewing all of the above studies, the Committee began to analyze and synthesize the study data. In groups or individually, Committee members wrote and presented the following chapters of this report. The Committee reviewed the chapters as each was presented, in written form, and finally as a draft of this document. The chapters of this report roughly correspond to the Committee's charges. The Committee also included chapters on public education and intergovernmental cooperation as these are integral to maintaining the viability of the E-Way.

3

The Nine Springs E-Way

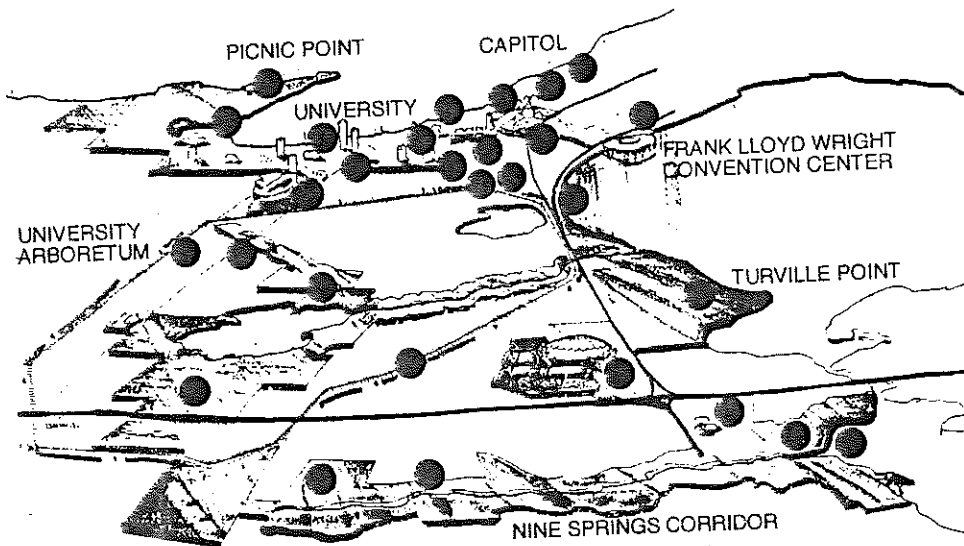
The E-Way Concept

In 1969, the National Endowment of the Arts provided a grant to the Environmental Awareness Center of the University of Wisconsin. The grant was to be used to show how a community might identify and capitalize on existing natural and manmade resources in the community development decision-making process.

The original "E-Way" concept resulting from this study proposed a 21-mile linear, continuous network of natural and manmade features that focus on educational, ecological, esthetic and environmental values. The proposed network included open space and transportation corridors connecting many of the urban area's prominent

educational and environmental features.

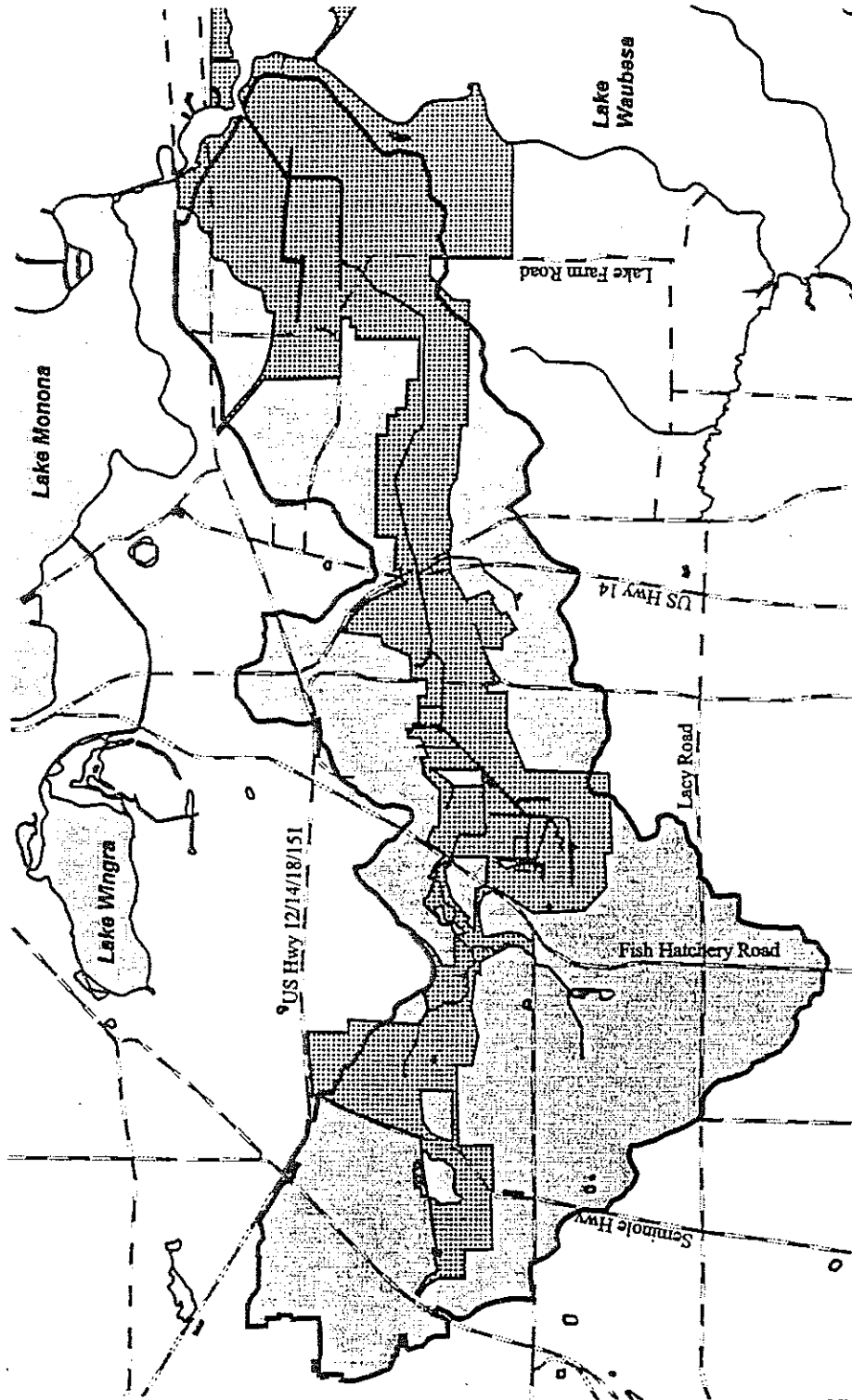
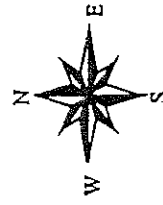
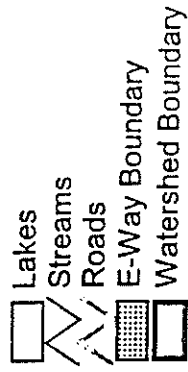
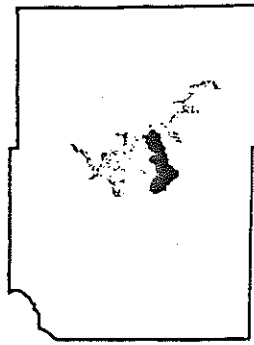
Landmarks such as the University/State Street Mall, the UW Arboretum, the Nevin Fish Hatchery, and the MMSD wastewater treatment plant were termed laboratories in the plan that were to be connected by the corridors.



Nine Springs Watershed

Watershed and E-Way Boundaries

Dane County, Wisconsin



4 Miles

2

0

2

Nine Springs E-Way

The E-Way concept was widely discussed and subsequently endorsed by Dane County and the City of Madison. The Dane County Board of Supervisors adopted a resolution requesting the Regional Planning Commission (RPC) to conduct an implementation study of the E-Way.

RPC staff, working with the E-Way Committee, composed of local governmental representatives, developed a specific proposal for acquisition and development of the section of the E-Way along Nine Springs Creek. In 1974, the Dane County Board of Supervisors directed the Dane County Park Commission to proceed with acquisition and development of the Nine Springs E-Way Corridor. This report is primarily concerned with the portion of the E-Way from Dunn's Marsh east along Nine Springs Creek.

Fitchburg was an early participant in the formation of the E-Way. In the mid-1970s, an E-way Committee was organized to help define the E-Way boundaries. The Committee's role was to define criteria for inclusion of property within the E-Way, delineate boundaries, and determine the availability of land within the boundaries. The Committee consisted of representatives from the Town of Fitchburg, Dane County, Cities of Madison and Monona, UW-Madison, and the State of Wisconsin. Town Chair Douglas Morrisette appointed Orrin Lokken to the E-Way Committee. After a short time, Mr. Lokken became committee chair, serving until the Committee's tasks were delegated to Dane County in the late 1970's. Orrin still serves on Fitchburg's Park Commission today, where his valuable perspective on the E-Way is often considered.

The Nine Springs E-Way Corridor

The Nine Springs E-Way Corridor extends from Dunn's Marsh near Seminole Highway east to Lake Farm Park on Lake Waubesa, a distance of seven miles. The corridor includes many points of interest such as Fitchburg's Dawley Park, parts of the University of Wisconsin Arboretum, the state's Nevin Fish Hatchery, the Madison Metropolitan Sewerage District Nine Springs Wastewater Treatment Plant and Dane County's Lake Farm Park. Natural features of the corridor include large areas of wetlands and sedge meadows, native forests, wild flowers, and many large springs which flow into Nine Springs Creek. These features provide a wide variety of habitat conditions for wildlife in the corridor.

A system of trails is being developed for year-round public use and enjoyment. The trail system provides the opportunity of hiking, nature study, photography and cross-country skiing and leads to scenic overlooks of the E-Way and surrounding areas. The corridor and trails provide an excellent outdoor classroom for a wide variety of nature studies, science projects and school field trips.

The gateway to the Nine Springs E-Way Corridor is Dane County's Lake Farm Park, a 328-acre recreational park on the northwest shore of Lake Waubesa. Facilities will eventually include shelter houses, Heritage Center, ball fields, play equipment, a boat launch, a wildlife pond, a 55-unit campground, cross-country ski trails, and nature trails

including the Native American Archaeological Trail and the Capital City Trail. The City of Fitchburg has made significant contributions to the E-Way system, through developer dedications as well as outright land purchases.

Capital City Trail

In 1997 the Dane County Parks Department received a grant from the Intermodal Surface Transportation and Enhancement Act (ISTEA) to construct a bicycle trail which would traverse the E-Way Corridor and eventually serve as the connector of the Glacial Drumlin and Military Ridge State Trails. This project has brought great attention to the E-Way as a very unique and valued resource. The trail should be completed by the spring of 1999. Originally the trail will be surfaced with gravel and will later be paved with asphalt. The trail will receive high public use due to the proximity to the Cities of Fitchburg and Madison, as well as other Dane County municipalities.

Points of Access

Access to the Capital City Trail and the E-Way will be necessary for the citizens of and visitors to Dane County. Through the cooperation of the various partners in the multi-jurisdictional project we have identified access points to the E-Way and the Capital City Trail. The access points include canoe access, boat access, hiking or pedestrian access points, biking access points and access with parking lots and facilities for users who would drive to get to the E-Way. These access points include many of the City of Fitchburg park and natural areas located along the E-Way corridor. A complete list of the access points and map are presented in Appendix A.

Recommended Uses

The E-Way Advisory Committee, in cooperation with Dane County Parks, developed a list of permitted and prohibited public uses within the E-Way. This list is not comprehensive, but includes all prohibited and permitted uses that are known to the Committee.

Permitted Uses at the Present

The following uses are permitted within the E-Way corridor.

Hiking	Running
Biking on Trail	Skiing
Snowshoeing	Picnicking
Canoeing	Fishing
Nature Study and Research	Dog walking (on leash)

Bird watching
In-Line Skating
Volunteer work

Lake Access (fishing, boating, etc.)
Heritage Center

The following uses are permitted only in designated areas.

Hunting and trapping (DNR-managed lands only)
Sporting activities, such as soccer, softball, playgrounds, tennis, basketball
(permitted only in active recreation areas adjoining the E-Way)
Camping (designated sites only)

Prohibited Uses at the Present Time

The following uses are currently prohibited within the E-Way. There are many other activities which are not listed which would be considered illegal or unauthorized use of the E-Way.

Hunting and Trapping in the land not managed by the DNR
Aero Modeling and Model Rocketry
Mountain Biking (all off-trail bicycling is prohibited)
ATV or snowmobile use
Horseback riding
Removing trees or natural vegetation without permits
Camping without proper authorization
Walking dogs off leash (outside of a designated area or DNR hunting ground.)

Future Public Use of the E-Way

As the E-Way's public usage increases and the demands on the resource intensify, a method will be needed to determine the appropriate and acceptable public uses of this corridor. There are numerous jurisdictions which should have a voice in the decision making process about public use of this area. These decisions will need a system and process to handle them.

The Committee recommends the establishment of an advisory committee to help decide the future public uses of the E-Way, as well as other policy decisions. This recommendation is explored more fully in Chapter 10, Intergovernmental Cooperation.

Acquisition of Additional Lands

E-Way Acquisition Boundary Adjustments

The E-Way Committee has reviewed the E-Way Boundary and have made some recommendations for expansion of the boundary. These recommendations are in

agreement with those made by Dane County Park Commission and staff. These additions are shown in the Map A1 in Appendix A. An E-Way boundary adjustment will require a resolution passed by the Dane County Board of Supervisors to officially adjust the boundary. E-Way boundaries are used to designate project boundaries for grant funding applications only, and should not be considered land use boundaries.

Recommendations

The Committee recommends the following E-Way boundary adjustments:

- 1) Addition to the acquisition boundary the McKeown property and that portion of the WARF property that lies north and west of the ridge line and slopes toward the E-Way.
- 2) Expansion of the boundary to acquire development rights on lands north of Meadowview Road to the present E-Way south boundary and west to Lake Farm Road. There are portions of this expansion where development rights have already been acquired, such as the Sinako purchase and sale of land to the Uphoff family for farming only.
- 3) Addition to the acquisition boundary approximately 40 acres of land owned by Lake Farm Associates Inc. along the west side of Lake Farm Road.
- 4) Addition to the acquisition boundary a wetland parcel south and east of the Wisconsin Education Association Council parcel and contiguous with land owned by the Madison Metropolitan Sewer District.

These lands could be acquired via numerous methods, including park land dedication by developers, fee simple purchase, or by designation of properties as sensitive areas, such that they would be unable to be developed. In the case of the McKeown/WARF properties, a unique acquisition opportunity is available, in which the DNR and WARF could agree to exchange properties. A combination of these efforts may be needed to protect all of the desired lands. Further discussion of a potential land exchange between DNR and WARF is included in Chapter 10, Intergovernmental Cooperation.

The Committee recommends that affected municipalities support these boundary adjustments.

Funding Acquisition

Funding Alternatives

The Committee has included a variety of funding alternatives to accomplish the preservation of the Nine Springs E-Way Corridor. These are offered as ideas, and the Committee recognizes that not all methods will work in all situations. However, a

combination of these methods could accomplish the goal of acquiring the desired E-Way land.

- Impact Fees on new development within Dane County
- Stewardship funds
- Surcharge on stormwater utility district fees (If utility districts are established)
- County Sales Tax
- General Tax Revenue (from property taxes)
- Establish a Park District with separate taxing authority
- User Fees charged to park users (trail stickers, etc.)
- Bond Issues for Park and Recreation Protection
- Recreational Tax (tax on recreational equipment)
- Private Funds: Trusts, Endowments, and Foundations
- Grants from state and federal agencies
- Non-Profit Conservation Organizations (Nature Conservancy, Ducks Unlimited)
- Land Dedications in Cooperation with Cities, Villages and Towns for parks, environmental corridor, and stormwater (such as Chicory Meadow Park in Fitchburg)
- Cooperative Purchases with Cities Villages and Towns (such as the Syene Spring purchase agreement between Fitchburg and Dane County)
- Purchase of Development Rights
- Transfer of Development Rights

Mitigating Land Use Impacts

Part of the Committee's task was to discuss and recommend ways to mitigate land use impacts on the E-Way. The Committee's recommendations include the following:

- Adopt good land use planning practices prior to development, with the goal of minimizing impacts on the E-Way.
- Consider requiring design standards that meet planning goals. For example, establish density standards, landscaping standards, or mandating certain architectural design features, such as style, materials, and color.
- Regulate development on slopes with fragile, erodible soils. Refer to Chapter 8, Spring Flow, for more information.
- Continuing to accept developer park land dedication to protect sensitive areas and, where possible, create, retain and expand contiguous greenways.
- All affected municipalities should adopt uniform stormwater management quantity and quality ordinances.
- Require erosion control and stormwater management prior to beginning construction.

5

The Nine Springs Neighborhood

Questions raised about the 1997 Proposed Nine Springs Neighborhood development eventually led to the establishment of the Fitchburg Citizen's E-Way Advisory Committee.

1995 Land Use Plan

In March, 1995, the City of Fitchburg adopted the revised General Land Use Plan as the City's long-range land use policy document. The General Land Use Plan includes a statement of community goals and policies, generalized land use and circulation plans, and a staging plan for future expansions of the urban service area. The plan has a general time frame of 10 to 20 years.

One of the key recommendations of the revised General Land Use Plan is to concentrate the City's resources in the development of the Nine Springs Neighborhood. The Nine Springs Neighborhood is identified as the next logical addition to the Central Urban Service Area.

Map A-2 in Appendix A illustrates the platted lands in Dane County. The Nine Springs Neighborhood is clearly defined by a "hole" in the existing platted lands. The Nine Springs Neighborhood is located only about four miles from downtown Madison, and is planned to have a high enough housing density in an attempt to justify commuter rail on the existing Union Pacific Railroad tracks, as well as bus service.

The Nine Springs Neighborhood

As described in the General Land Use Plan, the Nine Springs Neighborhood consists of most of the land north of Lacy Road, west of U.S. Highway 14 and east of the Fitchburg Center, with the exception of approximately 160 acres in the Swan Creek watershed near the intersection of Lacy Road and U.S. Highway 14. The Nine Springs Neighborhood Planning Area in this report has been expanded to include all of the land north of Lacy Road and west of U.S. Highway 14, as shown on the Planning Area Map on page 19.

The Nine Springs Neighborhood, as outlined in the March 1997 draft, includes approximately 1,232 acres, of which approximately 427 acres are proposed environmental corridor, 290 acres are existing small tract development and street and railroad right-of-way, and 542 acres are potentially developable lands.

Urban Service Area Adjustment

The Nine Springs Neighborhood Plan is intended to provide guidance regarding the type of development, development densities, the circulation system, and other public facilities and services. It is further intended that after adoption of the Nine Springs Neighborhood Plan, the City of Fitchburg will petition the Dane County Regional Planning Commission for expansion of the Central Urban Service Area to allow the extension of sanitary sewer service into the planning area.

The plan will serve as a guide for both the City and private landowners and developers in fostering development of a well-designed and efficient neighborhood that serves the needs of residents and businesses and preserves the high quality of the natural environment.

A guiding principal in developing the plan has been to protect and preserve the unique environmental characteristics of the Nine Springs Creek E-Way Corridor and create a system of open spaces that will provide continuous links between residential neighborhoods and the E-Way.

The intent of the plan is to provide for compact urban development, a transit friendly urban design that will allow for the use of mass transit, a balanced urban community that provides for a combination of uses and a variety of residential types of housing. The park and open space system emphasizes linear connections and protection of important natural resources.

Land Use

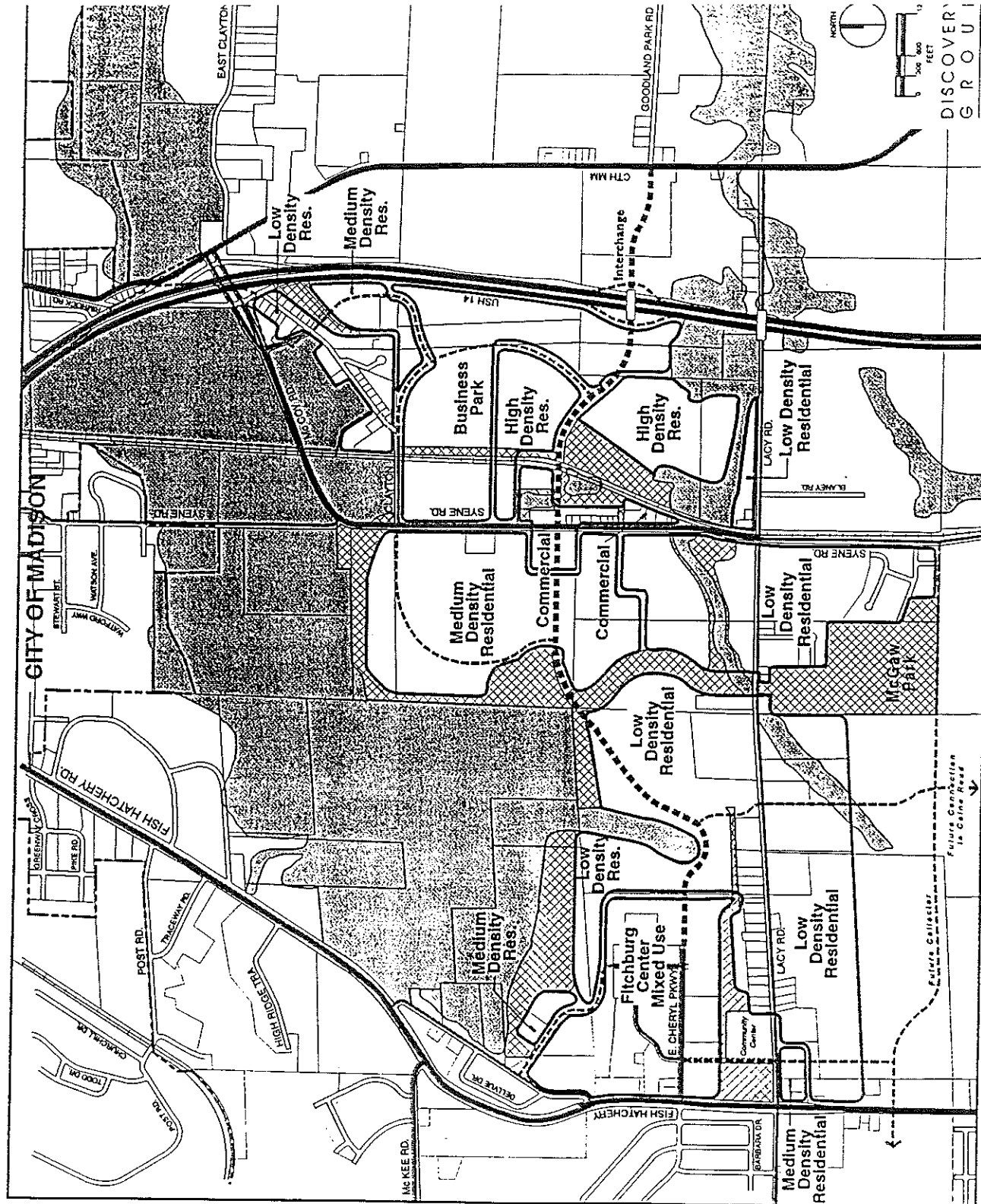
Of the 557.6 developable acres in the neighborhood, about 420.2 acres are proposed for residential purposes. The plan proposes a mixture of residential development to provide a mix of housing opportunities. To help achieve the density necessary for transit friendly development about 50% of the total area for housing is set aside for medium density residential uses at an average of 7 dwelling units per acre. These areas are expected to provide for a mix of housing from single family, generally on small lots, to multi-family condominium projects. The medium density areas will produce about 46% of the dwelling units in the neighborhood.

Multi-family housing is expected to produce just over 40% of the dwelling units in the plan. The multi-family areas are concentrated near Syene Road and the Union Pacific railroad tracks in order to be closest to transit routes. The high density residential areas are proposed to occur on about 90 acres of land.

NINE SPRINGS NEIGHBORHOOD PLAN (1997)

Land Use Plan

- EXISTING
ARTERIALS
- PROPOSED
ARTERIALS
- EXISTING
COLLECTOR
- PROPOSED
COLLECTOR
- PARK AND
OPEN SPACE
- ENVIRONMENTAL
CORRIDORS



Single family development, or low density residential, is expected to occur on just under 120 acres of land and will produce the remaining dwelling units, accounting for about 12 percent of the total.

Commercial and business park opportunities exist in strategic areas with commercial areas being centered in order to provide ease of access from the neighborhood population. The employment area is located between Syene Road and the Union Pacific railroad tracks to take advantage of the highway visibility.

The park and open space system is characterized by three main features: linear open space corridors; preservation of major wetland and environmental features; and park locations to serve the neighborhood population. McGaw Park will serve as the community park for the neighborhood, but an area park and several neighborhood parks are planned to serve the population.

The plan also indicates circulation patterns, sanitary sewer and water main infrastructure options, and institutional, or school site options. A storm water management plan, undertaken by Vierbicher and Associates emphasizes infiltration and natural prairie grass plantings to both treat and reduce the amount of storm water runoff to the streams.

Plan modifications are expected to occur as the planning process continues.

Public Participation

Significant public input opportunities were available before the Nine Springs Plan was presented to the City Council. Appendix C includes the Chronology of Events for the Plan, and details public participation opportunities.

Recommendation

The Committee recommends that Fitchburg revise the Nine Springs Neighborhood Plan to take into account the results of this report and the Vierbicher Associates Stormwater Plan.

5

Stormwater

Stormwater Runoff

Stormwater runoff is the rain and melting snow that flows from streets, rooftops and lawns. This flowing water carries sand, salt, soil, pesticides, fertilizers, leaves, grass clippings, oil, litter and other pollutants into nearby waterways. Stormwater may cause problems because of quantity (flooding), quality (pollutants), timing (faster runoff) and temperature. The majority of Fitchburg's Urban Service Area (USA) is in the Yahara-Monona watershed, so stormwater from this area flows into the Yahara-Monona system via Nine Springs Creek.

Pollutants in Stormwater

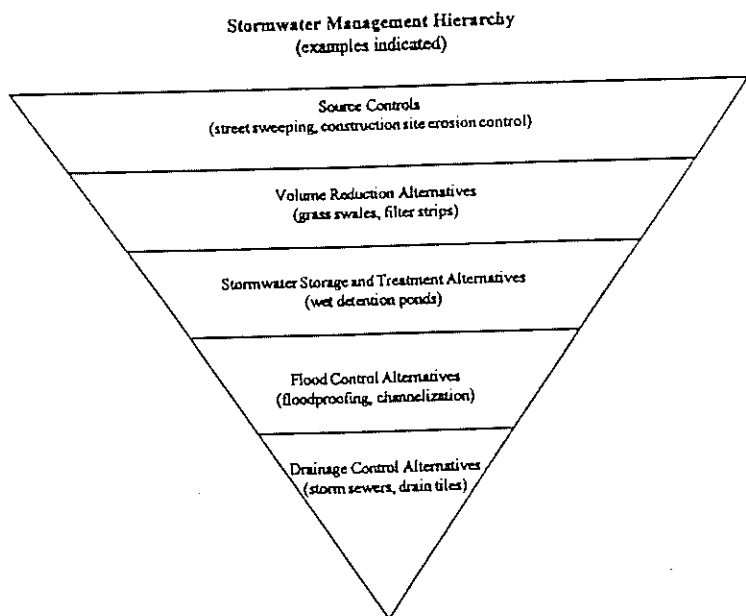
Stormwater runoff carries pollutants which can seriously harm the quality of local waters, including sediment, phosphorus and toxic chemicals. Sediment includes soil particles from construction site erosion, as well as sand applied to City streets. Phosphorus is a nutrient which can fuel rapid and excessive growth of algae and other aquatic plants. Yardwaste raked into the street for collection can be a major source of phosphorus, and excess fertilizer contributes both phosphorus and nitrogen to runoff. Other pollutants found in stormwater runoff include organic compounds such as motor oil, zinc from roof drains and tires, pesticides, heavy metals such as lead and copper, and bacteria from pet wastes.

Means to Reduce Pollutants in Stormwater

There are a variety of means available to improve the quality of runoff. Land use influences the amount of pollution by reducing the flow of runoff, instead encouraging water to soak into the ground. Erosion control practices and street sweeping can also play an important part in improving water quality, especially where construction is occurring.

Although land use and other non-structural means are extremely important in helping to improve stormwater quality, also necessary are structural facilities such as detention ponds or other treatment devices. The most effective type of stormwater management facility in Fitchburg is the wet-bottom detention pond. Ponds improve water quality by

reducing the velocity of incoming water, thereby allowing pollutants to settle out. As the ponds do their job of improving water quality, over time they fill with trapped sediment. Because the trapped sediments may contain heavy metals and other pollutants, cleaning the ponds can be an expensive project. Preventing and reducing pollution before it can be carried away by stormwater is essential for containing costs.



2 Stormwater Management Hierarchy
R. A. Smith and Associates

In the past several years, Fitchburg has undertaken significant steps to reduce stormwater impacts. In 1993, R. A. Smith & Associates, Inc. was retained by the cities of Madison and Fitchburg to conduct a comprehensive study of stormwater related concerns and provide alternative solutions and site specific recommendations for the protection of Dunn's Marsh and Nine Springs Creek. Fitchburg has implemented the recommendations of the study, per the terms of a cost share agreement with Madison, including installation of two wet-bottom detention ponds. These ponds treat water entering Dunn's Marsh and the Nine Springs Creek. Some of the other recommendations have been or are being accomplished, such as enforcement of construction site erosion control ordinances and conducting an information and education program on yardwaste

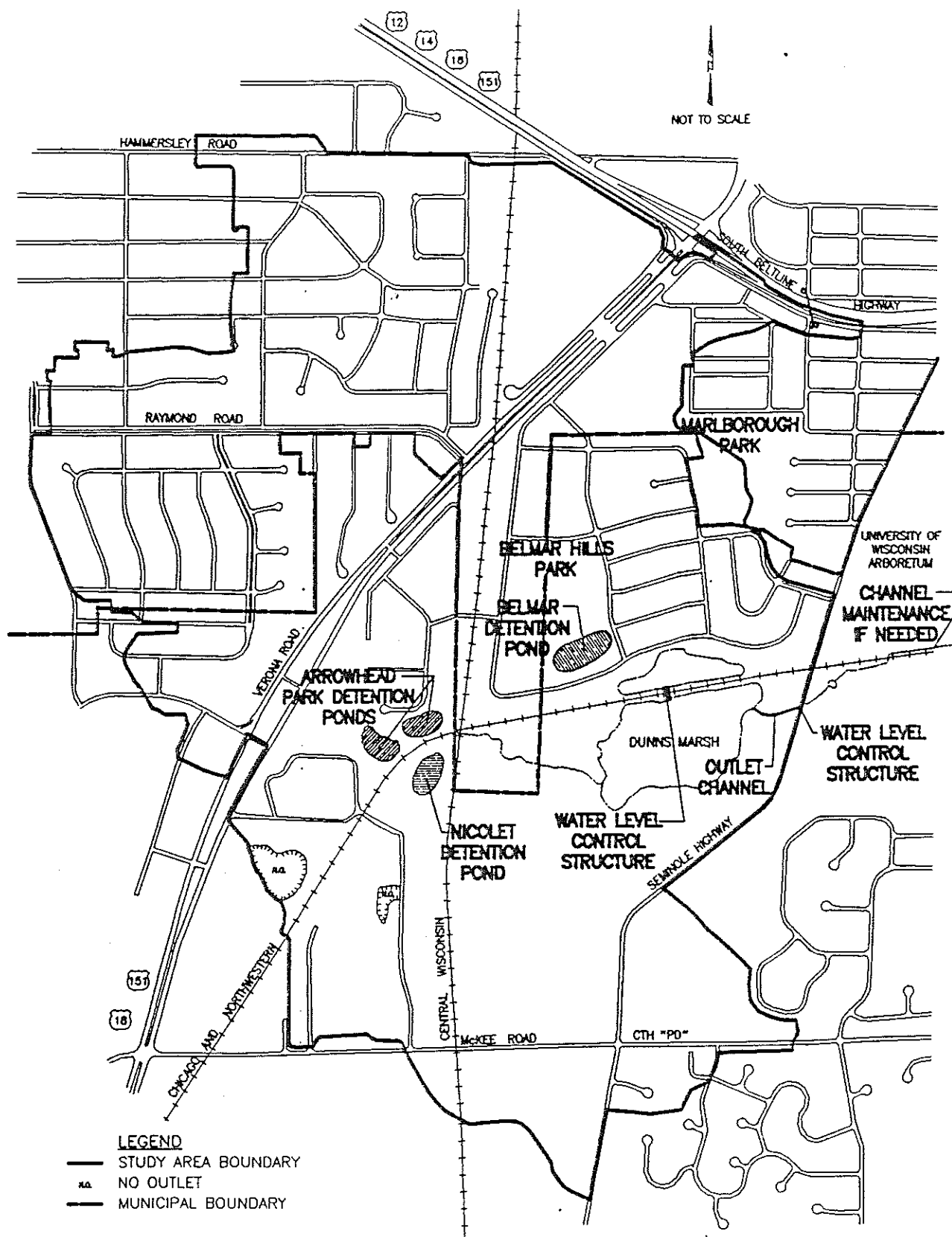
composting and disposal. These should be continued. See Map 3 on page 23.

In 1997, Mead and Hunt completed a study which modeled the efficiency of all existing Fitchburg stormwater facilities in the Yahara-Monona watershed. Some of these improvements have been implemented, and the remainder are budgeted to be constructed within the next five years. When completed, these improvements will ensure that at least 80% of all suspended solids will be removed before the runoff enters Nine Springs Creek.

NR 216 Requirements for Stormwater

The United States Environmental Protection Agency (EPA) published proposed rules on January 9, 1998 to expand EPA's current stormwater management program. The new proposed rules, referred to as the Phase II rules, would expand the EPA's stormwater management program by including all small municipalities located within defined urbanized areas. The Wisconsin stormwater program for larger cities (including Madison

Map 3
Dunn's Marsh Watershed
Recommended Improvements



and Milwaukee) started in 1994 and continues today for medium-sized cities and their suburbs through a designation process.

The DNR is responsible for enforcing stormwater rules within Wisconsin, and has promulgated NR 216 as a result. Under this administrative rule (NR 216), selected communities must obtain a permit to discharge storm water into lakes, rivers and groundwater aquifers. Under the Phase II rules, the states and EPA are to issue permits under the rule by May 31, 2002. The DNR is proceeding with permitting additional municipalities in the Madison area under its current authority without waiting for final promulgation of EPA's Phase II rules.

Under the designation process outlined in NR 216, Fitchburg will be required to obtain a storm water discharge permit within the next few years. The stormwater permitting application process runs for two years. The permit is effective for five years and is based on an individual municipality's storm water information obtained from their pre-application and application submittals. The permit conditions may require a comprehensive storm water management program containing non-structural and structural BMPs, a discharge monitoring program, and an on-going maintenance program.

The pre-application is due six months after official notification by the DNR of the need to obtain a permit. The pre-application includes the following:

- Legal authority - Description of any local ordinances that control stormwater discharge.
- Urban storm water planning area - A map showing urban boundaries including stormwater drainage basins, sewer service area and urban development areas.
- Fiscal resources - A description of financial resources available to the city to complete the application.

The application is due two years after DNR approval of the pre-application and includes:

- Adequate legal authority - A demonstration of legal authority to control stormwater discharge.
- Storm sewer system map - A detailed map showing location of large storm sewer pipes, major outfalls, storm sewer drainage area boundaries.
- Existing management programs - A description of any existing control practices or BMPs addressing stormwater pollution.
- Discharge Characterization - A description of stormwater runoff quantity and quality and its effect on receiving bodies of water.
- Proposed pollutant loadings, monitoring program and management program - A schedule of proposed monitoring, pollutant loadings and future management programs; and a fiscal analysis of projected capital, and operation and maintenance costs of the proposed monitoring and management program.

After the permit is issued and considered complete, it is the DNR's intention to issue the permit within twelve months.

Erosion Control Enforcement

Erosion control enforcement duties are divided among several City departments. The Public Works Department is responsible for erosion control enforcement for road construction, utility projects and plat improvements. Industrial and commercial construction projects, including multifamily dwellings, are monitored by the Zoning and Public Works Departments. Erosion control at residential single family and duplex construction is overseen by the Building Inspection Department.

Fitchburg has hired a Code Enforcement Officer under the supervision of the Building Inspection and Police Departments. The Code Enforcement Officer assists various departments with code enforcement issues, including erosion control. One of the main purposes for the creation of this position was to consolidate erosion control and code enforcement authority with a single individual who would be able to enforce a variety of regulations, including erosion control, tracking of mud, backing over curbs, and other such offenses. Under current DILHR code, only DILHR-certified inspectors can enforce erosion control regulations on single-family residential construction. The Code Enforcement Officer is DILHR certified, as are the City's Building Inspectors.

Compaction by Construction Machinery

Surface and subsurface compaction limits infiltration after development of agricultural lands. Surface and subsurface compaction change the existing hydrologic soil group resulting in an increase in runoff volumes due to reduction in infiltration that allows the slow release of the water into streams.

If we are to be successful in our attempts at conservation design, it is essential that we keep the water on the landscape rather than allow it to run off. The actual act of construction, operating extremely heavy earthmoving equipment repeatedly over the soil, works against this goal by compacting the soil and changing the runoff characteristic of permeable soil to less permeable. One low cost very effective method to combat this and enhance on site infiltration is to prepare the soil prior to subdivision construction.

This technique, called subsoiling, consists of chisel plowing the construction area perpendicular to the direction of flow to a depth of about 2 ½ feet. This activity enhances or reestablishes the soil profile structure to predevelopment conditions. The improvement of the soil profile structure by subsoiling allows for rapid infiltration and breaks up any formation of sheet and rill flow before it reaches scour velocities.

Many construction activities will result in some recompaction of the subsoil so it is recommended that this practice be conducted both prior to initial construction, to help curb run off during construction and prior to final landscaping of individual lots. This simple low cost method will help to preserve and enhance infiltration capacity of the existing soils. **The Committee recommends that all municipalities in the E-Way consider adopting ordinances that mandate the practice of subsoiling.**

Stormwater Planning for the Nine Springs Neighborhood

In the process of planning for the Nine Springs Neighborhood, the City of Fitchburg retained Vierbicher Associates, Inc. to develop a stormwater management plan. As stated in the document, the plan "...utilizes the best available methodology designs and management practices to encourage infiltration, reduce velocities and volume of stormwater runoff, reduce pollutant loading, and minimize impacts on wetlands, springs and other ecological and natural features." The E-Way Committee has reviewed the Vierbicher Associates stormwater plan and generally endorses it.

Stormwater Recommendations

This Committee recommends that the City of Fitchburg and all others who contribute stormwater runoff, give special attention to the following.

1. General plans and specific designs should emphasize infiltration.
 - a. Surface drainage to infiltrating surfaces is preferred; even to the extent of requiring house roof drains to discharge to grassy areas.
 - b. The amount of impervious surface should be kept as low as possible.
 - c. Utilize natural/existing natural drainage features when possible.
2. The on-site construction should be staged to require stormwater management measures to be in place and established to accomplish their purpose prior to other onsite construction that would cause negative impacts.
3. Erosion control is an important element of design and construction approvals. Continual monitoring and enforcement should be emphasized during the actual construction of sites and buildings.
4. Interconnected wet detention basins and buffer areas vegetated with prairie grasses can provide infiltration, ground water recharge, pollution and sediment reduction and reduced flooding. The maintenance of properly planned and engineered stormwater facilities such as detention/retention areas and stormwater swales and storm sewers is important and must be incorporated into the long range plans of the City.
5. Sensitive areas such as wetlands, spring recharge areas and locations with steep slopes should be recognized and any development plans and specific site designs should protect these areas.

6. The means to manage stormwater quality and quality recommendation the Vierbicher Report should be incorporated into ordinances or design standards. Existing mechanisms should be reviewed and modified as necessary. New tools should be developed where needed. Consideration should be given to the establishment of a stormwater utility district.
7. The Vierbicher report contains many specific recommendations which should be considered. Examples include the following:
 - ▶ “Open prairie grass conveyance channels are recommended in lieu of storm sewer pipes to attenuate the storm water flow and increase groundwater discharge by maximizing the portion of runoff that infiltrates into the soil, and improve water quality and enhance the aesthetic qualities of a development.”
 - ▶ “Designing and constructing several interconnected wet detention basins and prairie grass vegetation buffer areas will provide a multi-stage storm water treatment train system to mitigate further flooding, sediment, and pollutant discharges to the E-Way, wetlands, creeks, Yahara River, and lakes.”
 - ▶ “As discussed in this plan, we recommend that a storm water management plan and ordinance be implemented to require developers to contribute their fair share to reduce sedimentation, mitigate water quality degradation, and reduce increased water quantity discharges within the Nine Springs Neighborhood Watershed.”
 - ▶ “We recommend that constructed wetlands in conjunction with wet detention basins be implemented, if feasible, as a BMP (Best Management Practice) to control and pre-treat storm water runoff.”
 - ▶ “We recommend the design and construction of wetland marshes and native prairie grasses be considered at every potential site and everyone should be aware that final design may never achieve all objectives. However, combined wet-detention basins, constructed wetlands, and native prairie grasses are unique since they can truly be a multi-purpose BMP, by providing storm water management, pollutant removal, and landscaping/habitat improvement to the maximum extent practical.”
 - ▶ “We recommend that infiltration/dry retention basins be considered as a secondary, BMP with native prairie grass vegetation, wet detention basins, and constructed wetlands.”
 - ▶ “Individual site specific conditions should be thoroughly investigated prior to design and construction of the infiltration/dry detention basin BMP.”
 - ▶ “We recommend implementation of a creek restoration program to stabilize the severely eroded sections of Nine Springs Creek and Swan Creek. This restoration can include a 1. reforestation and 2. vegetative planting program, 3.

installation of riprap, gabions, and geotextile erosion control measures. Riprap and gabions should only be installed at the hard corners of the creek.”

- “We recommend that major drainage ways, wetlands, Nine Spring Creek, and Swan Creek be protected with conservancy area native prairie grassed buffer zone adjacent and along these sensitive areas to control erosion, filter out pollutants, and capture sediments.”
- “Wherever feasible and practical, we recommend storm water runoff be routed to storm water management facilities and water resource areas by unconnected systems rather than connected systems. Unconnected systems such as grassed swales, drainage ways, and channels can remove substantial amounts of particulates, sediments, and pollutants prior to discharge.”
- “Should connected storm water systems be necessary we recommend they discharge to a disconnected system.”
- “The City of Fitchburg should implement an ecological restoration and management plan for enhancing or restoring the degraded ecosystems, ideally on a watershed basis as recommended in Section V.”
- “The City of Fitchburg should establish stringent minimum setback requirements between construction activities and all significant creeks, E-Way, drainage ways, springs, groundwater recharge areas, and wetlands. It is recommended that the City establish 75 foot wide corridors along stream, drainage channels and wetlands, such corridors being composed of a 25 foot wide minimum strip of native plant vegetation. Greater width native vegetation corridors should be encouraged. Twenty-five foot wide minimum buffer strips should also be established adjacent to the high water mark of all storm water ponds.”
- “Reducing front building setbacks within proposed urban curb and gutter street section areas, thereby reducing the lengths of driveways and entry walks, reduces impervious area and corresponding storm water runoff volumes.”
- “Natural drainage utilizing swales and prairie grass vegetated filter strips has strong environmental advantages over traditional drainage approaches which utilize storm sewers and curb and gutter streets. These include reduced runoff volumes, reduced storm water pollutant loads, and greater recharge of groundwater.”
- “Cluster designs allow for natural drainage, thereby absorbing rainwater and reducing flooding impacts.”
- “Future service should be phased-in in an orderly fashion to promote contiguous development from a downstream to upstream fashion.”

- ▶ “Recommended non-service areas include wetlands, floodplains, state and county designated natural areas, critical groundwater recharge and spring areas, agricultural protection areas, and public open space.”
- ▶ “Detention should be designed to reduce water quality discharges and remove storm water pollutants through improved settling, filtering, and biological uptake. These functions are achieved in basins designed like natural wetlands and/or wet sedimentation/detention ponds.”
- ▶ “Targeting identified local open space acquisitions to E-Ways, creeks, drainage ways, wetlands and environmentally sensitive areas is an effective and popular option. These acquisitions should be coordinated with Nine Spring Neighborhood Plan, regional open space and greenway recommendations, this storm water plan, and with the plans of county and state storm water management agencies.”

Other Recommendations

The recommendations of R.A. Smith from the 1994 Dunn's Marsh Watershed Study that have not yet been implemented should be given top priority by the responsible entities, including Madison, Fitchburg, and the UW Arboretum. Map 3 on page 23 illustrates the location of these recommended facilities. These recommendations include:

1. Installation of outlet channel and control structure on Dunn's Marsh to control the water level. By installing this device, the water level can be allowed to fluctuate in a controlled manner. This will create an environment that favors native wetland vegetation, and is less hospitable to exotic monocultures such as cattails and reed canary grass. Given the increasing concern over the fate of the Greene Prairie, installation of this device is essential to help facilitate efforts to rid the prairie of invading exotics. Per the cost share agreement between Fitchburg and Madison, Madison is the lead agency on this project.
2. Improve the hydraulic capacity of the Nine Springs Creek channel in order to prevent the continued degradation of the Greene Prairie. An important and easily accomplished first step to increase the capacity of the channel would be to remove existing obstructions to drainage in the current stream. This should be done both in the Arboretum, and downstream as the channel passes through Knollwood Park in Madison. The Arboretum should monitor the changes resulting from the lowering of Dunn's Marsh and channel improvements, and if flooding problems continue, implement channel changes as recommended by R.A. Smith. The UW-Madison is the lead agency on this project.
3. Install a stormwater detention pond serving the Orchard Ridge & Nakoma areas. This area, roughly bordered by the Beltline, Gilbert Road, Raymond Road and Allied Drive, comprises only 27% of the Dunn's Marsh watershed, yet contributes

62% of the suspended solids and 57% of the phosphorus loading to Dunn's Marsh. A vacant lot in the Belmar subdivision is available, and a pond should be constructed to handle up to a two-year, one hour event as recommended by R.A. Smith. Per the cost share agreement between Fitchburg and Madison, Madison is the lead agency on this project.

4. Currently untreated stormwater enters into the north basin of portion of Dunn's Marsh, which is separated from the main basin by a utility berm and a railroad track. As a result, the north basin has been providing water quality treatment for the rest of the marsh. The R.A. Smith study recommended enhancing this effect by retrofitting the north basin to improve its treatment efficiency. These modifications should be completed as soon as possible. Per the cost share agreement between Fitchburg and Madison, Madison is the lead agency on this project.

Stormwater Utility District

Stormwater Utility Districts (SUDs) charge land owners based on the amount of runoff generated from their property. Stormwater utility charges are typically determined from parcel size and a rate factor, which is a coefficient that relates estimated amounts of runoff per parcel to parcel charges. The rate factor can be based on an actual measure of impervious area, a runoff coefficient based on land use, or a combination of the two.

In over half of existing SUDs nationwide, single family homes are charged the same amount, called a single family equivalent (SFE). Businesses and multifamily dwellings are charged a multiple of the SFE, based on the amount of impervious surface as compared to that of the average single family home. Impervious areas include parking lots, roofs, and other paved areas. Medium density residential areas usually have 35-45% impervious cover, while business and commercial areas usually have 95-100% impervious cover.

Financing Stormwater Pollution Reduction Efforts

In the past, efforts to clean up stormwater runoff have been paid for through general revenues. Although this approach helps to distribute the cost, it is not fair to property owners outside the Urban Service Area (USA) which do not contribute stormwater to the Yahara-Monona watershed. In addition, under the current system, farmers and owners of undeveloped land pay a disproportionate amount, since undeveloped land generally contributes less runoff. Conversely, businesses and multifamily dwellings usually pay less than their share, since large roofs and paved areas contribute a significant amount of runoff. An alternative to this approach is setting up a stormwater utility district.

Implementing a Stormwater Utility District

For Fitchburg, the most efficient way to implement a stormwater utility district would be to utilize the same boundaries as the Utility District. Billing for the SUD could then be included with quarterly water and sewer bills. The SUD approach is similar to the volume-based refuse collection program in that "the polluter pays".

Current activities which could be paid for through a stormwater utility district include street sweeping and locating storm sewer pipes for contractors. A SUD could reimburse the City for use of equipment and staff for these activities. By eliminating these costs from the general fund, significant funding would be available for other activities.

The substantial future costs of cleaning and maintenance of existing detention ponds could also be paid for through a SUD. While construction of stormwater management facilities for new developments are paid for by the contractor, any added facilities or retrofits in existing areas could also be paid for by the SUD. A stormwater utility district could also provide information and education to residents to help reduce herbicide, pesticide, and other toxic chemicals in runoff.

In the near future, the City will need to invest significant amounts to maintain stormwater facilities. Establishing a stormwater utility district will remove these expenses from the general fund, and create a more equitable means for property owners to pay for these expenses. SUD billing could be incorporated into Utility bills at a relatively small expense.

The Committee recommends that local jurisdictions, including the City of Fitchburg, consider establishing stormwater utility districts to pay for stormwater management activities.

6

Siting of Municipal Wells

Background

The 1997 Nine Springs Neighborhood Plan suggested a location of an additional municipal well just east of the railroad tracks and just south of the extension of East Cheryl Parkway. This committee has been charged with the task of identifying the issues that should be addressed in siting this well.

The siting and placement of a municipal well requires approval by the Department of Natural Resources. Their review of a potential well site will be done according to the standards in Wisconsin Administrative Code NR 811. Three specific sections of that code are particularly pertinent:

- NR 811.13 - Specific Requirements for Waterworks, Plans, Specifications and Engineering Reports
- NR 811.16 - Wells - General Requirements
- NR 811.22 - Special constructions requirements for sandstone wells

NR 811.16 includes specific siting requirements and requires that all new wells be protected by the creation of a well head protection plan. The goal of this plan is to protect the well from contamination and to preserve the recharge areas in a fashion that ensures the quality and quantity of the water supply. Although the present NR code only requires that the City develop a plan for new wells it is strongly recommended that the City also develop plans to protect their entire existing well system. These plans are generally developed by consultants familiar with municipal well systems and address a range of issues.

Pertinent issues for this report are as follows:

1. Identification of recharge areas. Generally recharge areas are identified by the consultants best technical judgment, including detailed calculations and modeling.

2. Identification of a zone of influence around the well. The zone of influence or cone of depression is of interest from three perspectives, as it identifies the areas where other wells might be affected, it identifies an area which may need protection under the well head protection ordinance and it identifies areas of sensitive resources and sources of potential environmental pollution.
3. Identification of groundwater patterns. This is important because a well placed in the flow of groundwater may affect downstream expressions or springs of that groundwater system such as the Nevin Springs.
4. Identification of contaminates within ½ mile of the site.
5. A proposed protection area.
6. A management plan for the proposed protected area. For example, gas stations would generally be prohibited in the protection area since they may threaten the integrity of the well. Communities generally adopt ordinances to implement the plan.
7. A proposed water conservation plan is very important since we expect that larger quantities of water used will correlate with larger impacts on surrounding resources.
8. A public education plan.

Specific DNR approvals will be required for:

1. Approval of the well site. This review generally takes about 90 days.
2. Construction details of the well itself.
3. Water main installation.
4. Water main crossings of navigable streams, and buried or trenched crossings are generally permitted under §30.20 of the Wisconsin statutes. The City should allow about 60 days to acquire this permit.
5. Water main crossings of wetlands. This is a permit required under the federal Clean Water Act administered by the US Army Corps of Engineers. The DNR must also approve the crossing under section 401 of the same act.

The Department's review and approval of the well will generally revolve around water quality issues of the well and whether or not the well impacts another municipal well. Current water law precludes the DNR from denying or restricting a public water supply well because of impacts to surface waters or other private wells. Nonetheless, we believe the City should ask and seek answers to the following questions:

1. What impact will the well have on private water supply systems?
2. What impact will the well have on Springs in the Nevin wetland?

The technology does exist to determine the proposed well's impact and much of the modeling effort has already been done. We believe the City should use this technology to determine impact on the surrounding resources as well as to determine well head protection areas for the well itself. In Dane County we are fortunate to have a comprehensive groundwater model to help us in this endeavor. Since Fitchburg has participated in the development of the model, analysis of well siting is a free service. The creators of the model believe that it could be easily modified to include the impact on the Nevin springs.

Other considerations:

1. Containment of cuttings - drilling the well will result in waste products or cuttings. These cuttings are carried to the surface with either drilling mud or air pressure. Either process should require on site containment that assures the cuttings will not migrate off site.
2. Handling of water during testing - Test pumping of a well can result in large quantities of water being discharged to unsuitable areas. In order to prevent unwarranted erosion and water damage to neighbors, the drilling contractor should prepare and receive approval from the City for discharge of test waters.

Recommendations

1. Use Dane County's model to predict impacts on surrounding wells and springs.
2. The City should design the well and site its location so that impacts to the springs are minimal or non-existent.
3. The City should use the groundwater model to identify the recharge areas for the new well and its existing wells.
4. The City should identify impacted private water supply systems (if any) and make appropriate arrangements to resolve impacts to those systems.
5. The City should use the model to identify the recharge areas of the Nevin springs.
6. The City should adopt a well head protection plan and ordinance for the new well and all its existing wells.
7. The City should protect the recharge area of the Nevin springs with plans and ordinances similar to well head protection ordinances.

8. The City should continue the current water conservation program, including public outreach.
9. Cuttings and drilling mud should be confined to the construction site.
10. Waters from test pumping should be confined to areas capable of handling that quantity of water without erosion or damage to other property owners.

7

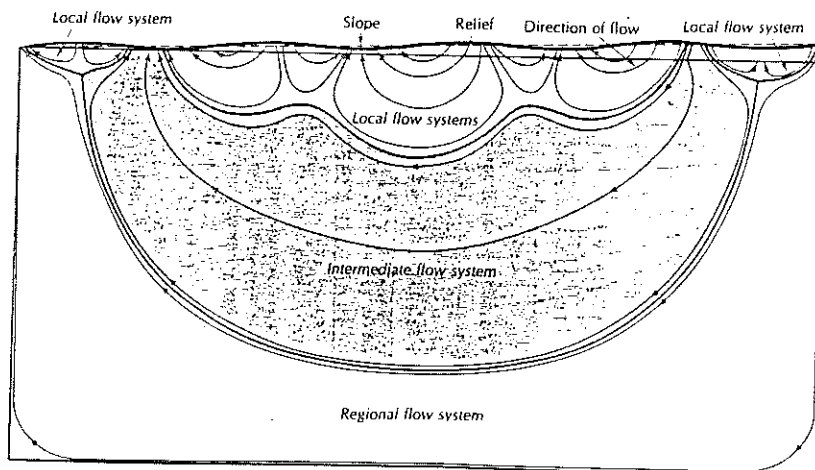
Spring Flow

Springs and Sources Areas

The locations of all the important springs are known. When the UW Water Resources Management students surveyed Nine Springs Creek, they found not nine, but fourteen springs. Given that there are clusters of smaller springs, there are probably more than fourteen. The locations of known springs are shown in Map 4 on page 38.

Springs are formed when groundwater discharges to the surface. Since the water discharging from springs has been filtered and acted upon by soil bacteria and has been subject to other chemical transformations as it moved through the ground (except for the presence of some dissolved constituents like nitrates), the waters of springs tend to be cleaner than surface waters. The areas where the spring water originates are called source areas. Here water seeps into the ground as groundwater recharge. If these areas are covered by impervious surfaces as part of development, the springs' source of water is cut off, effectively drying out the spring.

Elevation differences provide an energy gradient that allows water to move in a downsloping, lateral direction. Its motion is directly proportional to the ability of soil and rock to transmit water. This ability to transmit is called the hydraulic conductivity.



4 Diagram of Local, Intermediate and Regional Groundwater Flow Systems

Surface features of the landscape often do not correlate well with the hydraulic conductivity of the layers of material below the surface. It is therefore difficult to determine the source areas for springs. Water may have traveled from distant (higher elevation) source areas, or it may reach the springs rather quickly from nearby upland source areas. All source areas have the characteristic that they easily allow water to seep into the soil, termed a high infiltration capacity. The landscape is heterogeneous, therefore infiltration capacity tends to vary widely as shown by the results for infiltration testing carried out by Vierbicher Associates in the Nine Springs Neighborhood area.

The Vierbicher Associates stormwater plan includes prairie grass channels to convey stormwater. This network of channels will help to infiltrate water over a wider area than would an infiltration pond, increasing the chance that the infiltrated water will be within the springs' recharge area.

Because of the heterogeneity of the material below the surface, each spring probably has different source areas. These may be far removed, in close proximity, or both. Only by analysis of field measurements can reasonably reliable answers be obtained. The complexity of these natural systems provides a research challenge to determine specific sources areas.

The Dane County Groundwater Model

As mentioned in Chapter 6, Siting of Municipal Wells, the Wisconsin Geological and Natural History Survey (WGNHS) has developed a computer model that incorporates a representation of the geology of Dane County and allows the complex groundwater systems in the county to be analyzed. Data on soils, geologic formations and their hydraulic conductivities, ground elevations, water table elevations and water gradients are utilized by the model to predict groundwater flow.

Fitchburg helped to sponsor the development of this model. For a variety of water use scenarios, the model allows prediction of estimated groundwater flows, storage volumes and levels.

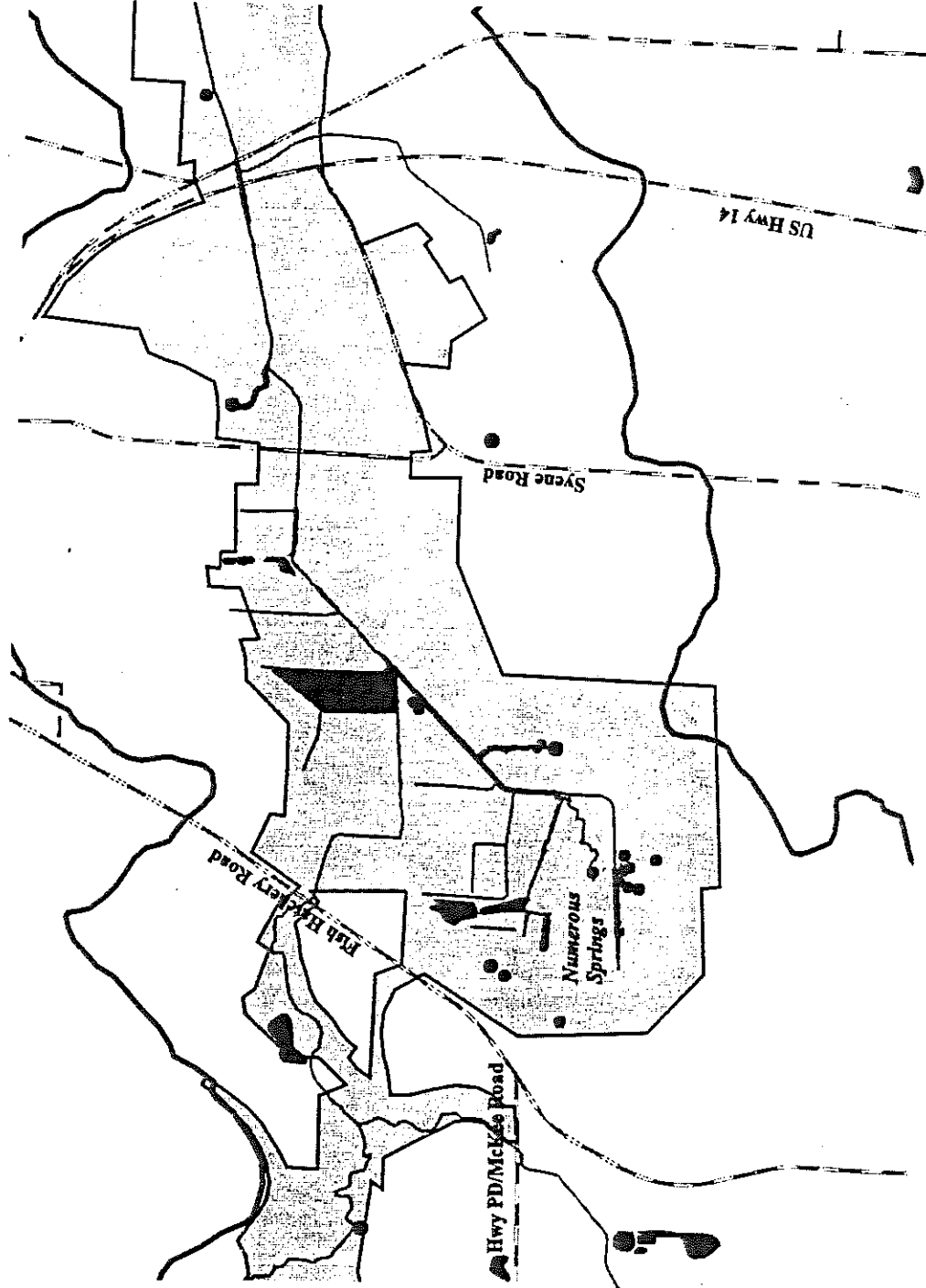
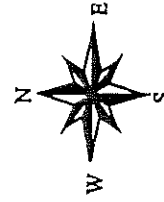
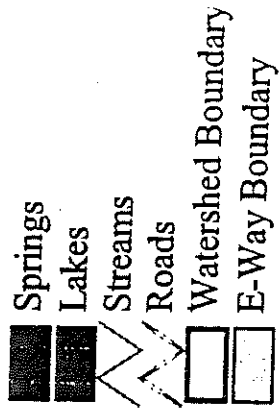
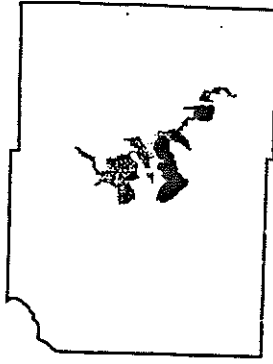
Initial use of the model has been to describe the effects on the county groundwater system for various well pumping scenarios. Both the effect of changing pumping rates of existing wells, and the potential impact of new wells can be studied. Results, however, are only applicable on a regional scale.

Specific localized results are approximate. Results are no better than the data available to run the model, and this data is perforce limited. We cannot know what is below the ground but for the few places where operational or test wells have been drilled. Since some of these wells are shallow and others deep, the information content each provides to the knowledge base varies. The WGNHS model then approximates the spatial gaps in information through informed interpolations of what is likely to exist between these

Nine Springs Watershed

Spring Locations

Dane County, Wisconsin



Nine Springs E-Way

sampled points. The spatial density of known information that serves as input limits the spacing of computational grid points which in turn is referred to as the resolution of the model.

The groundwater model could be fitted to study the spring system. Since Fitchburg was a sponsor of its development, it can request through the Dane County Regional Planning Commission that such a study be carried out. In order for model results to be accurate for individual springs, however, additional field data collection would be needed. A much finer resolution of input data will be required to make definitive prediction at a scale useful for analysis of the springs. Time and financial resources needed for such a characterization would need to be committed. In the absence of such careful refinement in model resolution, results will suffer in precision.

Current Research In Progress

University of Wisconsin Professors Ken Potter (Civil and Environmental Engineering) and Jean Bahr (Geology and Geophysics), under sponsorship of the Wisconsin Groundwater Research Fund, are currently gathering data on a cluster of springs southeast of the DNR Fish Hatchery with results expected in summer of 1998 and 1999. The research incorporates sampling wells for water levels and flows, as well as chemical analysis for constituents. It is hoped that through this work the source areas of these springs can be identified with some reasonable degree of confidence. It is not known if the source areas are nearby, or if the water has traveled a longer distance. Similar detailed analysis will be needed for all of the major springs in the valley for the WGNHS groundwater model to give accurate predictions about the impacts on the springs of source area development and/or the influence of possible future nearby wells.

Wetland Inventory

The Vierbicher Associates stormwater plan for the Nine Springs Neighborhood contains an extensive audit of wetland areas in the Nine Springs Watershed. This information extends the initial survey carried out by the UW Water Resources Management program students. Both inventories identify the remaining wetland that still exhibit historically varied wetland vegetation, as well as wetlands that have been degraded through poor land management practices, sediment runoff and alteration of their water budgets. The few remaining valuable sedge meadow wetlands have been identified and should be given the highest level of protection. The Vierbicher report gives an extensive, site specific inventory of plant communities found in the wetland areas. Wetlands, like springs, have complex water flow systems not easily amenable to precise description or analysis. All of them provide a unique laboratory for research to advance our understanding of these systems.

Immediate Recommendations

1. Provide a Margin of Safety

As the above discussion illustrates, we do not know if the source areas for the springs are nearby or far away, or if they contribute separately or in combination. We can also see that accurate determination is time consuming and expensive.

It is therefore proposed that as development proceeds we "hedge our bets" by providing a margin of safety for the springs and sensitive wetlands. Wetlands are damaged if their water budgets are disrupted. They are also degraded through sediment runoff from eroded landscapes. Therefore nearby slopes and upland areas adjacent to important springs and wetlands need to be protected from urbanization. This means that the only development that should be contemplated for these areas is to develop them as green spaces for various uses that allow them to act as buffers to constructed facilities such as houses, streets, parking lots, etc. They will continue to absorb water as source areas, they will attenuate impacts of urban stormwater discharge, and they will absorb the pollution flush from impervious areas.

It is furthermore not sufficient to select adjacent sloped lands to be protected from urbanization simply through a limiting slope characterization where, for example, lands of slope greater than ten percent would not be urbanized. In soil science and geomorphological studies various models have been developed to predict erosion from landscapes. One such model, the so-called universal soil loss equation, combines, in addition to slope, a variety of factors such as soil erodability, slope length, vegetation and cropping management, an erosion control factor, and rainfall characteristics to make soil loss rate predictions.

All of the sloped and upland areas adjacent to sensitive wetlands and springs will thus need to be evaluated individually for their potential erodability and sensitivity.

2. Modeling Studies

Fitchburg contributed to the development of the Dane County Groundwater Model. It can, therefore, request through the Dane County Regional Planning Commission that the Wisconsin Geological and Natural History Survey adapt the model to the Nine Springs area to study the behavior of the springs under a variety of future scenarios. Even though there are uncertainties in the model, the analysis will yield some useful predictions that can serve as valuable guides to further study of these complex systems.

3. Stormwater Management

The Vierbicher Report is based on extensive field observation and sampling. This report for stormwater management recommendations for greenways and the location and sizing of stormwater detention basins should be the primary guide for planning future development.

Long-Term Recommendations

1. Practice Conservation Design

The Vierbicher Report's recommendations will offer only limited protection to the E-way's unique resources if subsequent individual neighborhood project developments revert to the old habit of simply viewing stormwater management as an issue of removing stormwater from home sites as efficiently as possible.

Engineers have an effective "tool kit" to remove the water. What is needed, however, is a paradigm shift to a different objective. Given the complexity of the spring and wetland systems, the surest way to protect them is to practice a kind of development that has the objective to "keep the water on the land". The associated design approaches to accomplish this are collectively described as Conservation Design. It incorporates construction practices to preserve or reestablish healthy soil profiles, grass swales to augment curb-and-gutter design, roofs draining to flower beds, wood lots, french drains or tile fields under lawns, driveway designs to let water flow to adjacent pervious areas, parking lots with infiltration islands, etc.

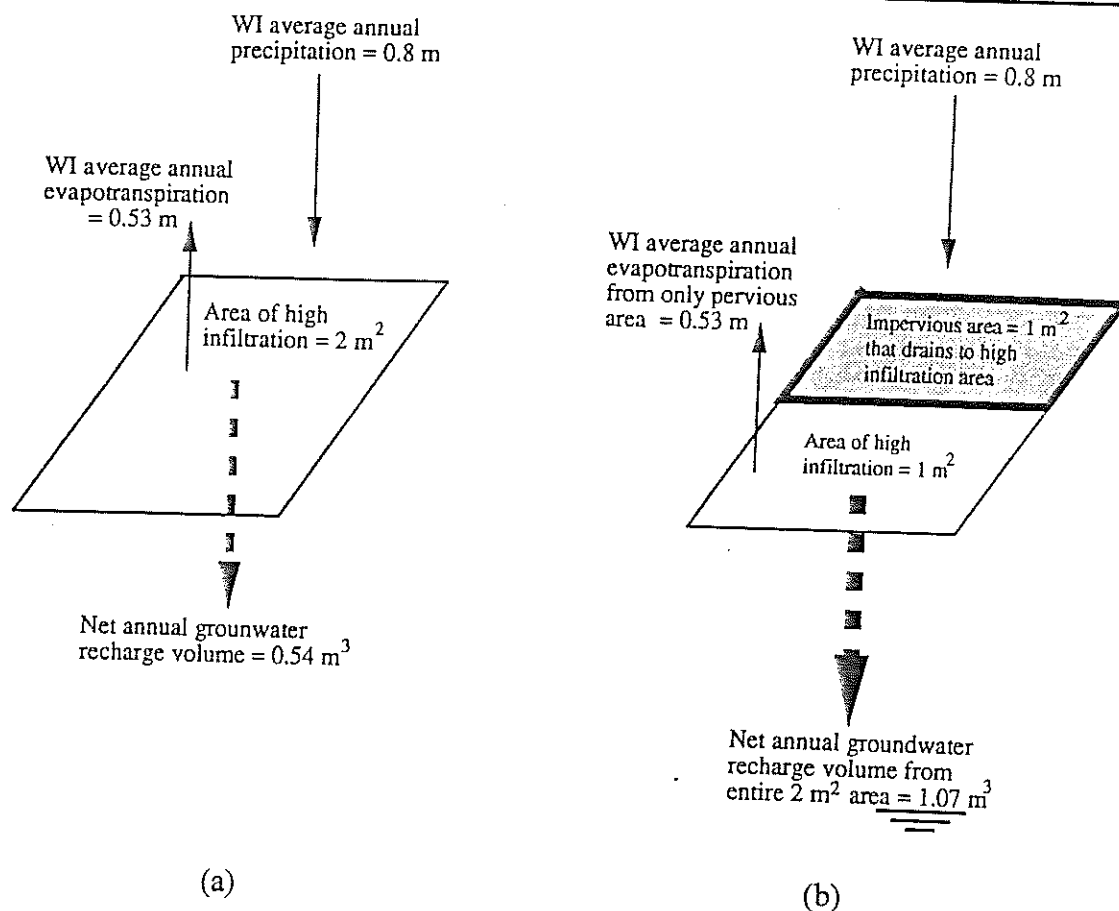
Examples and guidance are given in many application oriented references, such as the April 1997 report by the Northeastern Illinois Planning commission called: "Reducing Impacts of Urban Runoff: The Advantages of Alternative Site Design Approaches". This report gives examples of conservation design developments carried out in nearby communities in Illinois. Example locations are the Sears Industrial Park northwest of Chicago; Prairie Crossing, Grays Lake, Illinois; the Energy Center of Wisconsin at the UW Science Park in Madison; and the Promega development in Fitchburg. A number of design firms have begun to specialize in conservation design. Two such firms in our area are Ecological Design Concepts in Belleville and Conservation Design Forum in Naperville, IL.

2. Development and Infiltration

A simplified example will illustrate the advantages of conservation design in the following figures. Figure 4 shows how conservation design development can actually be used to increase water infiltration, a result that seems at first glance to be counterintuitive. In Figure 4(a) a parcel of land having high infiltration capacity is subjected to the average annual rainfall for Wisconsin of approximately 32 inches (0.8 meters). We assume that the infiltration capacity of the soil is large so that there will be zero surface runoff, meaning that all but the most extreme rainfalls infiltrate to groundwater. In Wisconsin's climate 2/3 of the annual precipitation is returned to the atmosphere as evapotranspiration, namely evaporation (from wetted plant and soil surfaces) and transpiration (through uptake by plant roots). The remaining 1/3 of the rainfall depth will result in a net volume of groundwater recharge from the area shown of 0.54 m^3 (i.e. 0.8 meters rain less 0.53 meters evapotranspiration multiplied by the area of 2 m^2).

Consider now Figure 4(b). Here half of the area (1 m^2) has been covered by an impervious surface such as a street or parking area. By design all rain to this 1 m^2 of impervious area drains to the remaining 1 m^2 of pervious, high infiltration soil. Rainfall events are short in duration so that evaporation from the covered area during the period of runoff is negligible, and, because there are no plants there, there will be no transpiration. So all of the rain volume falling on this covered area, namely 0.8 m depth $\times 1 \text{ m}^2$ area = 0.8 m^3 volume will drain to the remaining undeveloped, pervious area of 1 m^2 . The rainfall that falls directly on the undeveloped area behaves as before, namely $2/3$ of it will be lost to the atmosphere as evapotranspiration. Again we assume that infiltration capacity of the soil is sufficient to absorb both the direct rainfall plus water added from the impervious area. The net effect of this scenario is that now twice the water volume (1.07 m^3) will infiltrate to groundwater than did before development (0.54 m^3).

How can this possibly be true? The phenomenon results from the elimination of the evapotranspiration loss from the half of the area that has become impervious. Obviously this is an oversimplified example. One major assumption is that the infiltration capacity of the receiving soil is large enough that there will be no land runoff. We assume that runoff from the now impervious area is captured as sheet flow before it concentrates into rivulets and channels. This would be true of carefully designed roof drains, driveways and



4 Enhancing Infiltration through Design

parking lots that conduct water to adjacent lands. We also assume that the evapotranspiration from the paved area has been eliminated, and we also assume that the evapotranspiration of the pervious area remains at the 0.53 m level each year. The latter may not be true. The extra water draining to the pervious area might induce deeper roots and more plant growth there, having higher transpiration losses. Such a higher evapotranspiration loss will not be so large, however, as to offset the infiltration gain due to the captured runoff from the impervious area. The crucial difference is not to view the water from the paved area as a nuisance to be piped away, but rather to conduct it to highly permeable soils for infiltration which may result in a net increase of water to groundwater.

The Vierbicher Report has shown that in virtually all of the Nine Springs Neighborhood areas they tested the infiltration capacity of the soil is more than sufficient to capture the majority of the rainfall. To quantify what the "the majority of the rainfall" means, please note the following figures resulting from analysis of the long-term record of rainfall at the Dane County Regional Airport. This rainfall record is characteristic of Fitchburg as well. The pie chart in Figure 5 indicates if we are able to capture to infiltration all of the rainfall events up to the 2-year rainfall intensity, that we will actually have captured the majority of the rainfall volume. The 2-yr rainfall is the rainfall intensity that on average will be exceeded only every two years or less often. Which then raises a further question: is the infiltration capacity of the soil sufficient to absorb the 2-year rainfall?

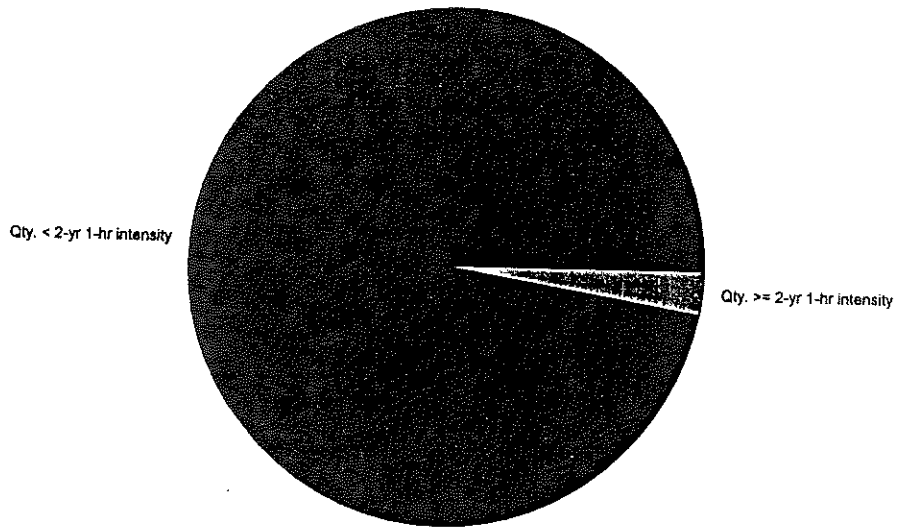
The plotted graph for the Dane County Regional Airport rain data in Figure 6 shows that the 2-year rainfall intensity for this area is a rain of 1.2 inches/hour. The figure also shows the information contained in the pie chart - namely that rains of intensities of 1.2 in/hr or less make up 95% of all rainfall. The infiltration rates found by Vierbicher and Associates at its various test sites in the Nine Springs Neighborhood are far in excess of this rainfall intensity. So the ground will not only be able to absorb the 2-year rainfall, it will also absorb additional water that is conducted to it from paved areas. Provided again, of course, that runoff from paved areas is spread as sheet flow over the adjacent infiltration land and is not allowed to concentrate into discharge streams. Even the latter, however if collected into grass swales rather than curb and gutter structures, will infiltrate with proper channel design.

One caveat is in order. In its presentation of the infiltration test results to the E-Way Advisory Committee, the Vierbicher representative attributed the high infiltration sites to be due to the presence of macropores. These macropores are largely attributable to the presence of worms in the soil that create passageways allowing easy passage of water. If in future development planned for the Nine Springs Neighborhood conservation design principles are applied, the effect of pesticides and herbicides use on worms will have to be investigated.

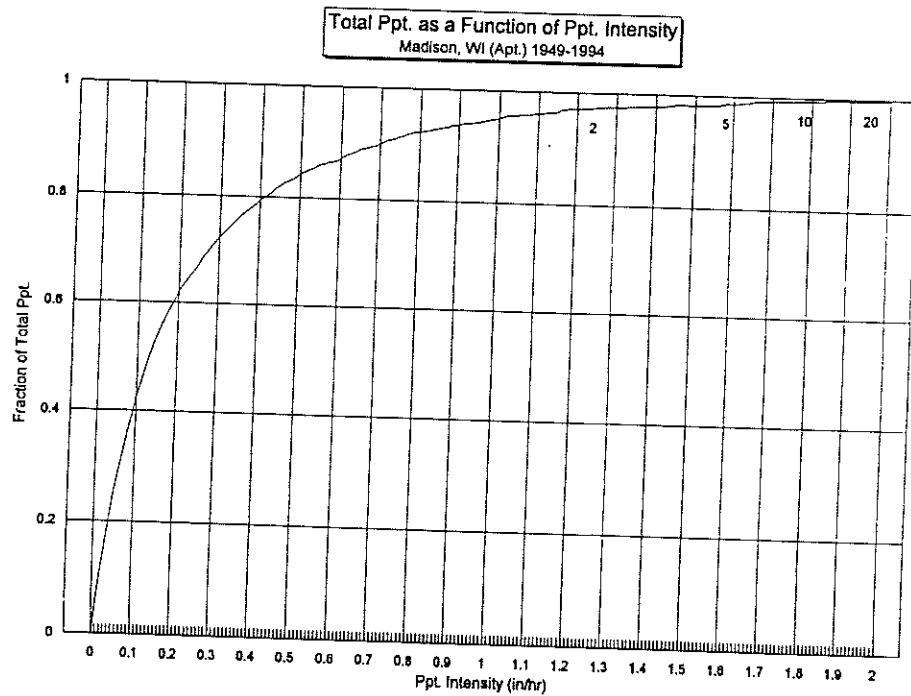
Conclusion

There is a lack of knowledge about the complex water systems of the wetlands and springs in the Nine Springs E-way. **Much additional study is needed to understand these systems. Any future development in the Nine Springs Neighborhood or on**

Fraction of Total Madison Precipitation Less (Greater) Than 2-Year Quantile
Madison Airport Data, 1949-1994



5 Fraction of Precipitation Less Than a Two-Year Storm



6 Total Precipitation as a Function of Precipitation Intensity

DNR-owned land in the Nine Springs Area should incorporate infiltration enhancement and erosion and runoff controls. This can best be accomplished by preserving sensitive upland and slope areas, such as those near Nursery Springs. These should not be built upon, as recommended elsewhere in this report.

These recommendations do not preclude development, so long as that development preserves and enhances groundwater quality and recharge and protects the fragile wetlands from erosion and pollution. **Conservation design strategies should be mandated in future subdivisions and neighborhoods to enhance groundwater infiltration and minimize pollutants in runoff.**

Finally, the Nevin Fish Hatchery uses a large amount of water for fish propagation - over 2.1 million gallons per day. This water flows through a channel into the Nine Springs Creek. **Because there have been concerns stated with groundwater drawdown and natural springs drying up, it is recommended that the DNR evaluate water management alternatives to achieve sustainable use and reduce the impacts of groundwater drawdown and untreated effluent on the E-Way.**

8

Public Education

As Thomas Jefferson stated, informing the discretion of the people in these matters is a task that requires a concerted interdisciplinary effort to assure the free flow of relevant information. It is a crucial task that requires innovative communication and education programs to portray the urgency of mastering regional growth and change and to emphasize the critical value of our alarmingly finite resources.

Similarly, until a clear understanding of the problems and causal relationships of urbanization are disseminated, little progress will be made in guiding urban growth in harmony with our life-support system.

The first step is identification of the patterns of the features we cherish. In the Wisconsin State Recreation and Open Space Plan, the rural and urban resource patterns sustaining a high-quality recreational and tourism experience were identified. These resource patterns are our first priority for saving, restoring, and enhancing. In protecting our inherently integrated water, wetland, and steep topography systems, some 220 additional resources held in high esteem by the public are included because of their relationship to this integrated system.

These patterns of great diversity are described as environmental corridors, or "E-Ways" (E for educational, environmental, esthetic, and ecological). The twenty-one mile rural, urban and suburban Dane County E-Way was the first to be so designated.

Almost thirty years and an investment of five million dollars and enormous public involvement later, this open space system contains four times the acreage of Central Park in New York City. It is nearing completion and is already serving as a worldwide model of public/private involvement, reported on in such planning journals as *Urbanistica* and the *American Society of Landscape Architecture Journal*, as well as popular press, magazines, radio and television coverage.

Is it totally protected? It is not. Most of the water, wetland, and steep topography within its identified boundaries have been protected, but we have yet to protect and develop wisely the adjacent buffers and land use practices that will deal with impacts such as excessive stormwater runoff, depleted water tables and contamination of air and water.

In order to address public education strategies for E-Way preservation, enhancement and restoration, we must first ask a series of questions:

- ▶ What do we cherish in our environment? Can we identify those physical features that we admire and desire to pass on to our children and future generations, particularly in Dane County and Fitchburg? We can talk about these physical values and we can write about them as we do, but can we describe, define, and visualize them so as to put in place the means to protect, restore and enhance them for the public?
- ▶ Where are these values located, how many acres of land are involved, and who owns them? We must first see the patterns made by life-sustaining features on the land (and water). Then we can pursue the difficult task of choosing the tools, educational, legal, financial, and organizational, available in our democratic society to carry out the analysis, design, and engineering to restore and enhance critical resources that comprise living space both for ourselves and our children's children.
- ▶ How can the City of Fitchburg best answer people's questions regarding planning and decision making, so that conflicts of interest are minimized and open communications are maximized? Emotion-laden exchange can be reduced by continuing information campaigns, public hearings, and dialogue with public officials.

Education Strategies

Education strategies available to Fitchburg must first take into account the audience to be targeted.

General Public

For the general public, these should include:

- ▶ Easy access to graphical information, including up-to-date brochures and maps available from City Hall on residential stewardship and other land use topics.
- ▶ Public forums and open meetings. Minutes and/or videotapes are available for review upon request as a matter of public record accessibility.
- ▶ Regular use of local newspapers for not only official and legal notices, but also informative articles on land use decisions, pending ordinances, opinion forums and prompt correction of misinformation of city policy or clarification of city actions. Unfortunately, there is no guarantee that newspapers or other media will publish information provided by the City.
- ▶ Fitchburg's continued acknowledgment and support of neighborhood associations, their newsletters, and provision for meeting space at City facilities .
- ▶ Continuing dialog with and accurate information dissemination to local grassroots organizations by City officials, both elected and appointed.
- ▶ Regular updates to the City's Internet web site with environmental information and meeting minutes and agendas.

- Availability of Fitchburg Area Cable Television (FACT) cable channel 6 & 12 equipment for resident use, and continuing FACT coverage of local meetings.
- E-Way field trips coordinated with DNR or the Dane County Parks Department. Field trips could also be provided as part of the recreation programs offered by the City.
- The City could sponsor a series of lectures at City facilities, including such topics as land use, reducing environmental impacts and conservation.
- The City should offer feedback opportunities for public opinion, including town meetings, surveys, opinion polls and when applicable, referendums. Previous surveys conducted by the City on topics such as postal service and solid waste issues have been met with response rates of up to 50%, indicating an interested and concerned populace.

City Officials

For City officials, especially those without science and engineering backgrounds, the goal is a more in-depth understanding of complex ecological concepts so that decision-making is better-informed. The tools to achieve better comprehension include:

- Workshops and seminars on basic topics of hydrology, native vegetation and up-to-date trends in sound urban planning. In the past few years, City staff have attended seminars in stormwater design for water quality, planning and financing stormwater programs, and new trends in urban planning. The City should continue to offer such educational opportunities to employees.
- Contracted studies should include audiovisual presentations as well as printed documents. For instance, upon completion of the Nine Springs Stormwater Plan, Vierbicher Associates should provide a brief presentation before the City Council.
- Elected and appointed City officials should be put on the mailing list for pertinent local publications, including the Arboretum newsletter, Wisconsin Wetlands Association newsletter, Dane County Parks newsletter, as well as DNR publications and UW outreach programs.

Developers

For prospective developers, a statement of Fitchburg's philosophy on balancing sound land use and human growth needs should include scientific rationalization to back up regulations and ordinances. A regularly updated resource database, which includes the materials and studies reviewed by the E-Way Citizen's Advisory Committee and references cited by the Vierbicher study, could be made available to developers, farmers and other landowners. Good land stewardship depends upon individual understanding of and access to our present-day environmental knowledge.

Learning Centers

Important learning centers that City officials should be familiar with in and near Fitchburg include: Dane County Heritage Center (under development), DNR Nevin State Fish Hatchery Information Center, the Aldo Leopold Education Center in Monona, UW-Extension outreach office in Madison, UW Arboretum, Olbrich Gardens, UW-Madison including the Institute of Environmental Studies, and the outdoor learning laboratory of the E-Way itself.

Fitchburg should consider the display capabilities of the new City Hall for historical and geographical information, natural history, and expression of local art, photography and writings so that it can be another of the "jewels on the necklace" of the E-Way.

Computers & Information Technology

The Internet provides a tremendous potential for public education. As part of the education strategy for the E-Way, Fitchburg and other public entities should include web pages devoted to the E-Way. Because the flow of information should be both ways, City officials should have Internet access to the World Wide Web and E-mail.

Computers may also be used for analyzing data. Geographic Information Systems (GIS) provide opportunities for Fitchburg, Dane County, the DNR and other jurisdictions to share data and information. The City should consider upgrading the current GIS system to make it available to all Department Heads.

Educational Goals

For each strategy and each audience, short and long term goals need to be formulated and evaluated. An inter-agency cooperative education effort would decrease costs by decreasing duplication of efforts. Identifying potential problems through the ongoing process of public feedback will also decrease incidence of conflict. Fitchburg needs to utilize its capability to create and maintain an information database which covers a broad knowledge base, welcomes public participation, and cooperates with the efforts of other organizations and municipalities. A well-defined environmental education program for Fitchburg citizens is an essential investment for survival in the ongoing process of balancing human growth and environmental preservation.

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Intergovernmental Cooperation

A multi-jurisdictional, natural asset like the E-Way requires that the many bordering governmental entities engage in a cooperative stewardship that includes ongoing communication on the activities and development that relate to and impact on the E-Way.

The preservation, improvement and expansion of the E-Way enhances the quality of life of all the residents that live in the many jurisdictions that border on the E-Way. Achieving this goal requires the cooperation of all the governmental entities that border on the E-Way.

- ▶ The Committee recommends that the Planning Department of each jurisdiction bordering the E-Way be notified of any other jurisdiction's consideration of development within or adjacent to the E-Way boundary.
- ▶ The Committee also recommends that the County establish an advisory committee initially consisting of representatives and appropriate staff of each governmental entity that borders the E-Way, including Dane County, as well as the Cities of Fitchburg, Madison, and Monona, Village of McFarland, the Towns of Blooming Grove, Dunn and Madison, State of Wisconsin agencies, including DNR and the UW Arboretum, and the Madison Metropolitan Sewerage District. This initial effort will ensure communications between the various agencies and governments. It will allow all jurisdictions to have an influence and communicate their concerns to the Dane County Park Commission.

At a minimum, the committee should meet annually to discuss the status of the E-Way, projected new acquisitions, acquisition strategies, the impact of development adjacent to the E-Way, current activities in the E-Way, and the environmental health of the E-Way. This concept could evolve over time to something more like a management district for the E-Way. This district could have regional and jurisdictional representation and could develop and recommend the general policy direction for the operation and public uses of the E-Way.

The DNR Nevin Master Plan

The Department of Natural Resources is currently developing a master plan for the 320-acre Nevin property. The property encompasses the South Central Region headquarters (which houses approximately 120 staff), the oldest state-run fish hatchery and part of the Capital City State Trail. The property also includes natural communities representing wetland and upland habitat, as well as fourteen natural springs on the property which feed into Nine Springs Creek and eventually the Yahara River system. Because this property is within and adjacent to the E-Way, significant potential exists for minimizing negative impacts on the E-Way, as well as restoring prior degradation.

The master plan is being developed by Department staff, with significant input from the public. It consists of determining how this property - for which there has never been a master plan - will be managed and developed into the 21st Century. The development of the master plan is guided by proposed Administrative Rule NR 44, which governs plan development and adoption, public participation, and land management and recreational use classifications.

The master planning committee was formed early in 1997, the first public open house was held on May 8, 1997, and the first meeting of local government representatives was held in September, 1997. The committee is now developing a draft project boundary and collecting information on the natural and cultural resource features on the property. The public will be invited to share their thoughts on draft plans and project boundaries during open houses expected to be held in late Summer, 1998 and in Spring, 1999. The final master plan is expected to go before the Natural Resources Board in July, 1999.

Alternatives discussed in the 1996 UW-Madison Water Resources Management Study included the restoration of stream meanders in Nine Springs Creek and separation of spring flow from stormwater flow. Since these alternatives primarily affect DNR-owned land, the Committee recommends that the DNR evaluate these alternatives for the Nevin Master Plan.

Potential Land Swap Between DNR and WARF

In Chapter 3, the Committee recommended expanding the E-Way boundary to include portions of the McKeown and WARF properties. One means to accomplish this acquisition would be for the DNR to exchange land along Syene Road for the desired parcel bordering the E-Way. Advantages of this proposal are many, as it would provide a ready means to acquire the property, while preserving a contiguous section of land in public ownership.

WARF would acquire the property along Lacy Road. This land could then be developed as specified in the Nine Springs Neighborhood Plan. Proximity to the proposed East Cheryl Drive extension and the existing Lacy road could help facilitate development.

Portions of the existing prairie grass on this parcel could be left intact as stormwater conveyance and green space.

Vision 2020

Vision 2020 is Dane County's land use and transportation plan for the next quarter century. The Plan's vision statement is as follows: "In the year 2020, Dane County will continue to offer a quality of life unmatched in the nation. That quality will be enhanced by thoughtfully planned and designed development, an integrated multimodal transportation network, vigorous business and job growth, and preservation of treasured natural resources."

Eleven goals were developed to expand upon this vision and provide basic guidance for the Plan. These can be summarized as follows:

- Promote **balanced communities** with a mix of different types of development.
- Promote **compact urban development**, redevelopment, and infill.
- Promote **visually distinct communities** and neighborhoods with a mix of uses.
- Provide a range of **affordable housing** throughout the county.
- Provide an **integrated all-mode transportation** system.
- Concentrate **employment and activity centers** along public transit corridors.
- Maintain **downtown Madison** as the region's major activity center.
- Provide **employment opportunities** and a diversified economic base.
- Protect **agricultural lands**, in part by limiting non-farm development in agricultural areas.
- Protect **environmental, cultural and historic resources**.
- Develop a **countywide system of open space corridors** to preserve environmental and scenic values, and recreational opportunities.

The Plan makes a variety of recommendations for urban areas, including the following:

- Locate new urban development where a full range of urban services can be efficiently provided while protecting environmental corridors.

- Encourage all urban communities to provide a full range of housing opportunities, including homes on smaller lots and a share of duplexes and apartments.
- Promote infill development and redevelopment, particularly in Madison's expanded Isthmus area, to maintain the vitality of its neighborhoods and downtown,
- Locate large-scale activity centers--like shopping malls and office parks--along transit routes.
- Design and build new neighborhoods with a mix of housing types, and integrate small-scale shops and services.
- Adopt neighborhood development plans for areas experiencing growth pressure before extending services. Require that development proposals comply with plans.

WARF

Another spectacular opportunity to demonstrate how and what to build adjacent to the E-way corridor is available and waiting. A major portion of the proposed Nine Springs Neighborhood is owned by one of the largest University of Wisconsin funding sources, the Wisconsin Alumni Research Foundation (WARF). In the past, numerous graduates have expressed an interest in substantial support for environmental research and demonstrations. The land that lies near rail lines that can provide future transit to the University and downtown Madison designated for development by the Nine-Springs Neighborhood plan offers an exceptional opportunity for funding interdisciplinary research investigations by University and state, county, and City of Fitchburg personnel.

This research, applied on the site to design and build a sustainable new community for the future could apply the bequest of the land to produce an example for development practices, income for the University, academic and esthetic acclaim for the participants and enormous benefits to the public both here and where this example is analyzed, studied, and improved upon. Such a 'Wisconsin Idea' endeavor would in itself be a 'show-me' educational facility with complete access to the twenty-one mile E-Way demonstration.

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Conclusion

In conclusion, perhaps the best opportunity to inform everyone more adequately about 'where to build' and 'where not to build' is better utilization of the E-Way itself as a teaching system. It is a model for how to protect water, wetland, and steep topography systems. If Fitchburg will enact procedures, policies, and ordinances that give clear and specific guidance to development adjacent to, and impinging upon, environmental corridors, it can become a model for how and what to build without destroying basic resources and values in the corridor. The Dane County E-Way necklace is not only a twenty-one mile corridor linking urban and rural patterns. A slightly expanded necklace links some forty educational facilities, including the State Historical Society, the Nevin Fish Hatchery, the Capitol, the Children's Museum, the UW-Madison Geology Museum, and so forth. Each of these learning 'jewels' on the E-Way necklace can inform young and old of the location and importance of the critical resource patterns in Fitchburg and Dane County.

11

Appendix A

E-Way Access Points

<u>Number</u>	<u>Map Symbol</u>	<u>Description</u>
1	A	Quarry Ridge Park - City of Fitchburg - Restrooms and Parking
2	C	Frontage Road Along the 18 - 151 Beltline
3	A	Arrowhead Park - City of Fitchburg Pathway
4	B	Freeport Trail - Capital City Trail Access
5	B	Overpass on Beltline Madison Freeport Trail
6	A	Pine Ridge Development - Public Access Easement
7	A	Dawley Park - City of Fitchburg Parking
8	A	Seminole Highway Bike Trail Access
9	A	Seminole Forest Development - Public Access Easement
10	C	UW Arboretum - Pedestrian Access
11	A	Chicory Meadows - City of Fitchburg - Restrooms and Street Parking
12	A	Highlands of Seminole - Street Access
13	C	Sprague Dawley Development - Pedestrian Access
14	A	Highlands of Seminole Development - Public Access Easement
15	B	Highlands of Seminole Development - Connector to Underpass
16	B	Knollwood Park - City of Madison Pathway
17	A	Highlands of Seminole Development - Public Access Easement
18	B	Hatchery Hills Development - Public Access Easement
19	B	Hatchery Hills Development - Public Access Easement
20	B	Nevin Fish Hatchery - Parking and Restrooms
21	C	Fitchburg Center Development or City of Fitchburg Park Access
22	C	Fitchburg Neighborhood Development - Public Access Easement
23	B	Jenni and Kyle Preserve - Dane County - Parking and Restrooms
24	B	Syene Road - Dane County - Parking
25	B	City of Madison - Parking

- | | | |
|----|---|--|
| 26 | C | Clayton Road - Parking |
| 27 | B | Baxter Park - City of Madison - Parking on Street |
| 28 | C | John Nolen Drive/Railroad Access |
| 29 | B | Highland Manor - City of Madison - Pathway |
| 30 | A | E-Way - Dane County - Parking and Restrooms |
| 31 | B | Nine Springs Creek - Dane County - Canoe Access |
| 32 | B | Madison Metropolitan Sewerage District Lagoons |
| 33 | B | Lake Farm Park - Dane County - Heritage Center, Parking,
Camping, Restrooms |
| 34 | C | Lake Farm Road - Town of Dunn - Trail Access |
| 35 | A | Lottas Park - City of Monona - Canoe Access |
| 36 | C | Rail Corridor Access - Village of McFarland McFarland Rail
Corridor |

Legend

- | | |
|---|--|
| A | Existing Access, Public Ownership |
| B | Future Access, Public Ownership |
| C | Future/Desired Access, Land Not Publicly Owned |

Legend

E-Way Access Points

- Bike-In Access _____
- Pedestrian Access _____
- Canoe Access _____

Additional Open Space

Letters and Numbers

- A - Existing Access, Public Ownership
- E - Future Access, Public Ownership
- C - Future Access, Land, Not Publicly Owned
- # - Each Number Corresponds to a Specific Site Location Listed on a Master Sheet.



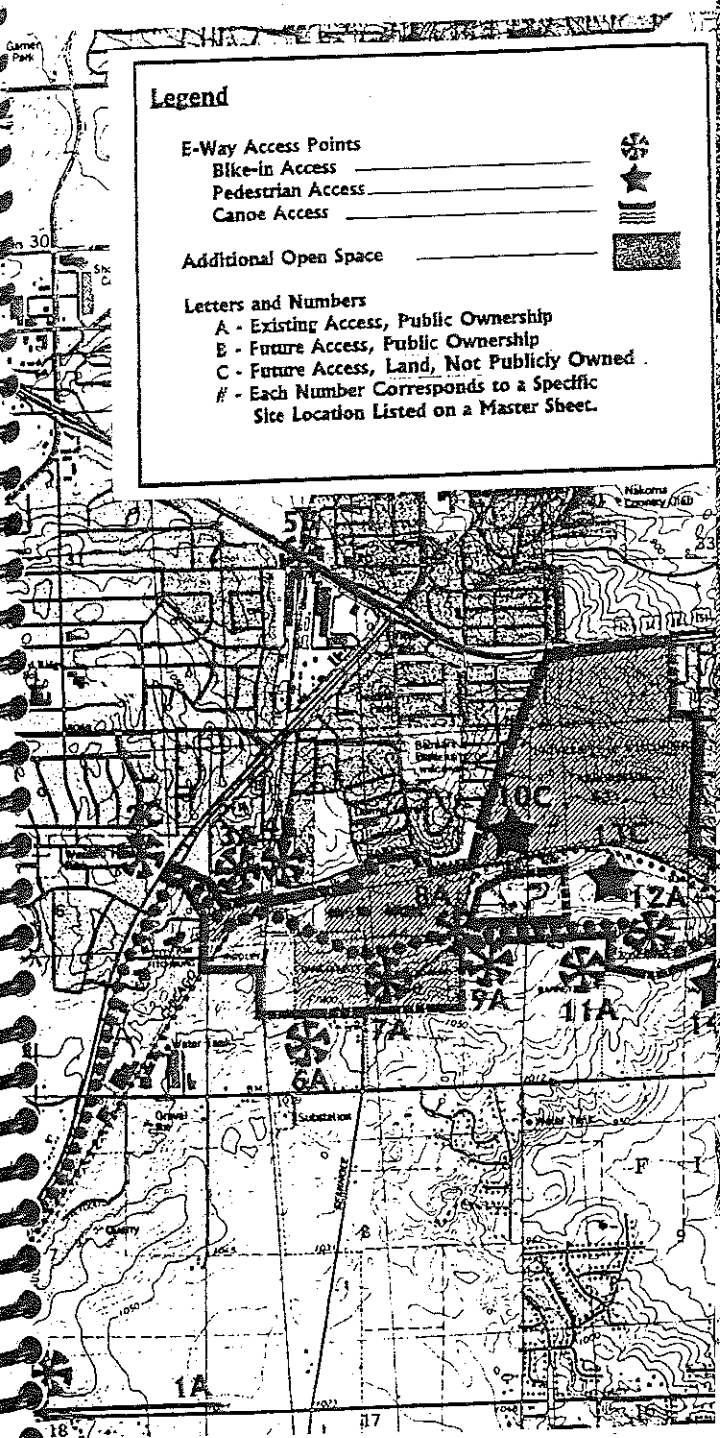
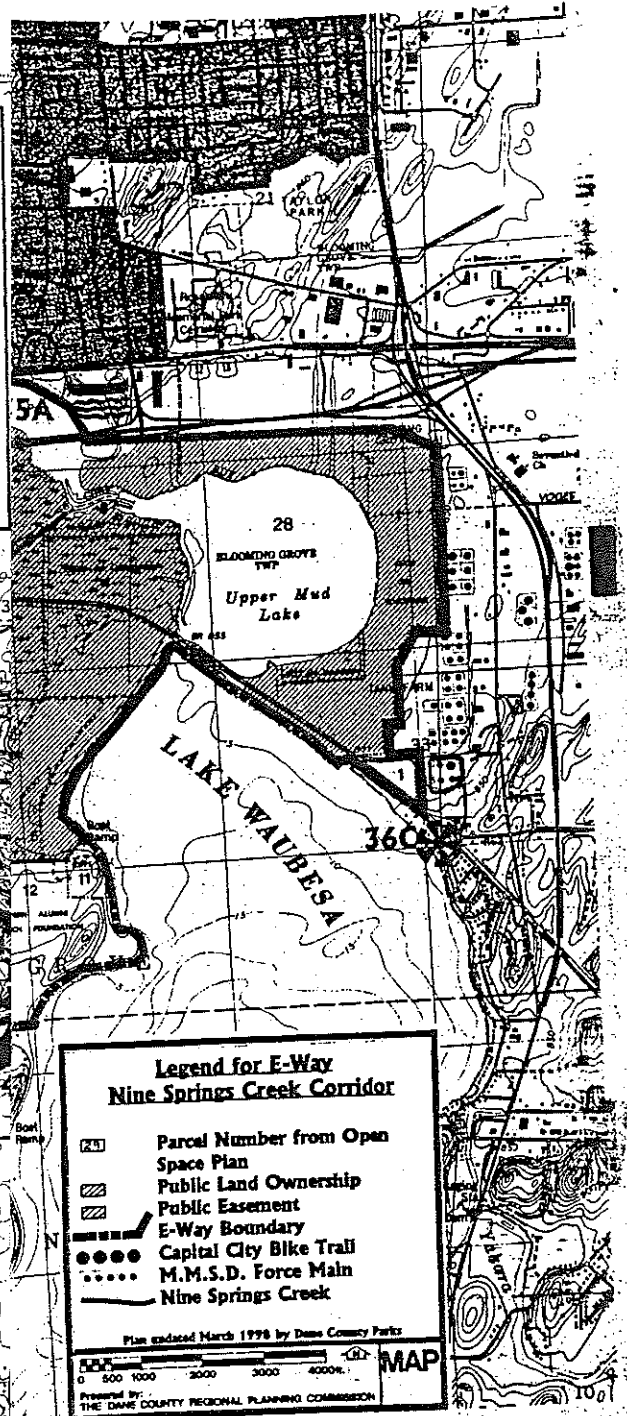
Legend for E-Way Nine Springs Creek Corridor

- Parcel Number from Open Space Plan
- Public Land Ownership
- Public Easement
- E-Way Boundary
- Capital City Bike Trail
- M.M.S.D. Force Main
- Nine Springs Creek

Plan updated March 1998 by Dane County Parks

0 500 1000 2000 3000 4000 ft
Presented by:
THE DANE COUNTY REGIONAL PLANNING COMMISSION

MAP



A close-up, vertical view of a metal spiral binding, showing the coiled wire and the way it secures the pages of a notebook.



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Appendix B

Chronology of Events for Nine Springs Plan

<u>Dates</u>	<u>Action</u>
Fall 1992	Dane County Regional Plan Commission selected as consultant for Update of General Land Use Plan for Fitchburg, Qualification proposal process utilized
Fall - Winter 1992	Preliminary background work on updating General Land Use Plan
Jan 1993-March 1995	Over 24 meetings and public hearings on General Land Use Plan, Major element of Plan is location of next phase of urban growth
March 30, 1993	Public participation meeting
March 1995	General Land Use Plan adopted, including Nine Springs Neighborhood as next phase of urban growth with land use and density
November 1995	Staff prepares Request for Qualifications for Nine Springs Plan
December 5, 1995	Plan Commission review of Request for Qualifications for proposed Nine Springs Plan
December 1995	Request for Qualifications mailed, notices published in newspapers
February 1996	Discovery Group selected as consultant for Nine Springs Plan
April 1996	Agreement finalized with consultant (Discovery Group)

April 1996	Request for citizens to serve on the Nine Springs Steering Committee
May 1996	Nine Springs Steering Committee formed
June 20, 1996	Nine Springs Steering Committee discusses work program and reviews and refines project methodology
Summer 1996	Consultant (Discovery Group) undertakes interviews and discussions with major landowners and interested parties in the area
July 30, 1996	Nine Springs Steering Committee holds public information session with over 66 people attending
August 27, 1996	Nine Springs Steering Committee meeting to discuss and review July 30 meeting, review plan, develop alternatives and offer suggestions
November 4, 1996	After four committee meetings and staff work sessions, Nine Springs Steering Committee reviews plan and finalizes recommendation to Plan Commission
December 3, 1996	Presentation and discussion of Nine Springs Plan to Plan Commission
December 1996	Plan sent to other governmental agencies for comment January 21, 1997 Plan Commission holds public hearing
February 18, 1997	Plan Commission discusses, adopts Nine Springs Plan and recommends Council approval
February 25, 1997	Council votes on resolution to adopt Nine Springs Plan, Plan Failed to be adopted
March 11, 1997	Council reconsiders action of 2/25/97 and sends Nine Springs Plan back to Plan Commission
April 1997	Establishment of E-Way Citizens Advisory Committee, Request for participants
August 1997	Vierbicher Associates begin stormwater study

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