

Open Space and Conservation Design

Groundwater Protection Task Force
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Open Space: Protecting our "Green Infrastructure"

- Interconnected network of natural areas and open spaces that:
 - Conserves natural ecosystem functions
 - Sustains clean air and water
 - Provides other benefits to people and wildlife
- The ecological framework for social, environmental, and economic health

McHenry County's Core Green Infrastructure

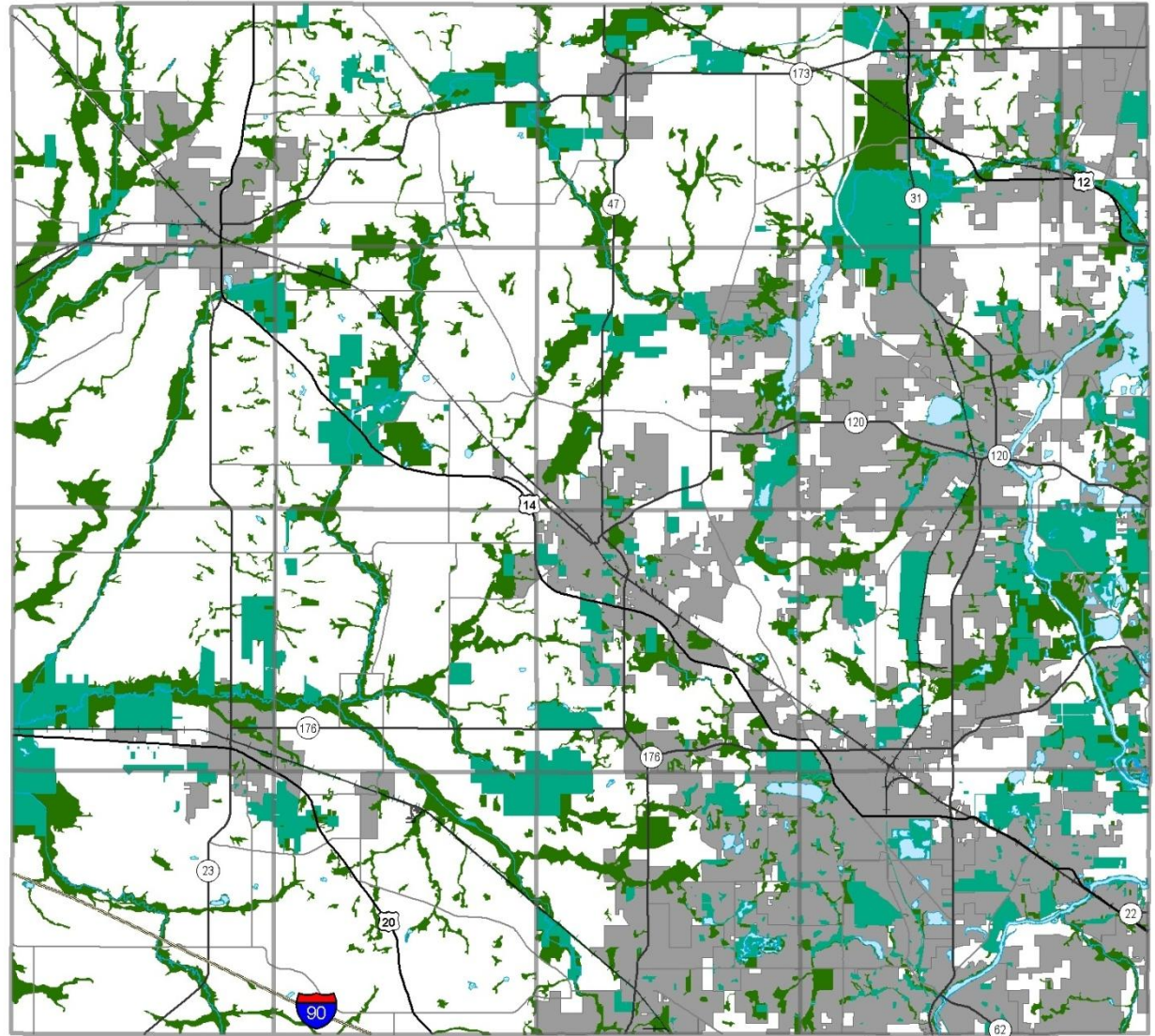
McHenry County Future Land Use

Open Space &
Environmentally
Sensitive Areas

- Open Space
- Environmentally Sensitive Area
- Incorporated Areas
- Water

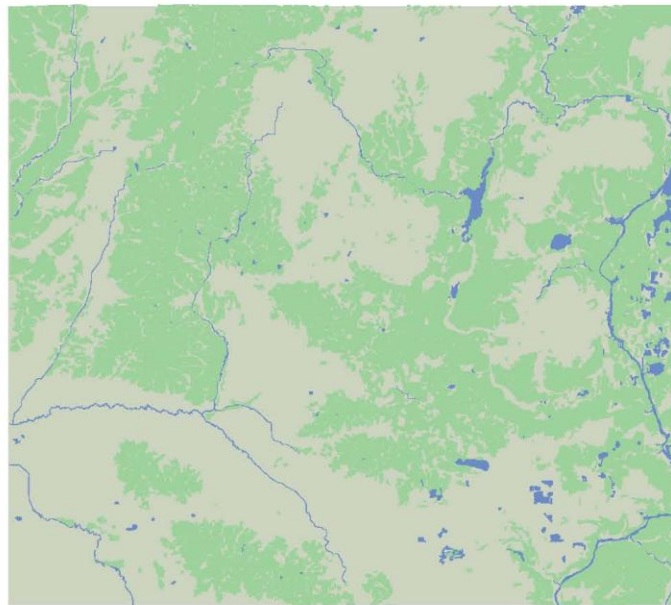


1 inch = 2.5 mile



Remnant Woodlands

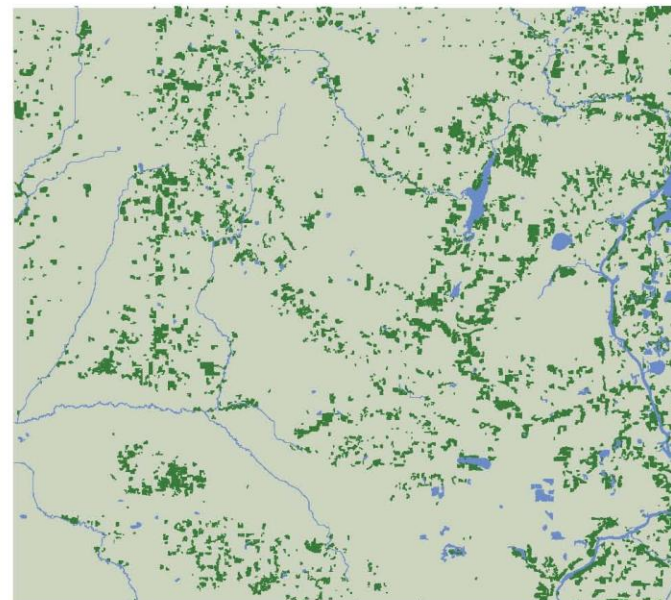
Figure 3.
Oak Woodlands in
McHenry County



1837



1872



1939



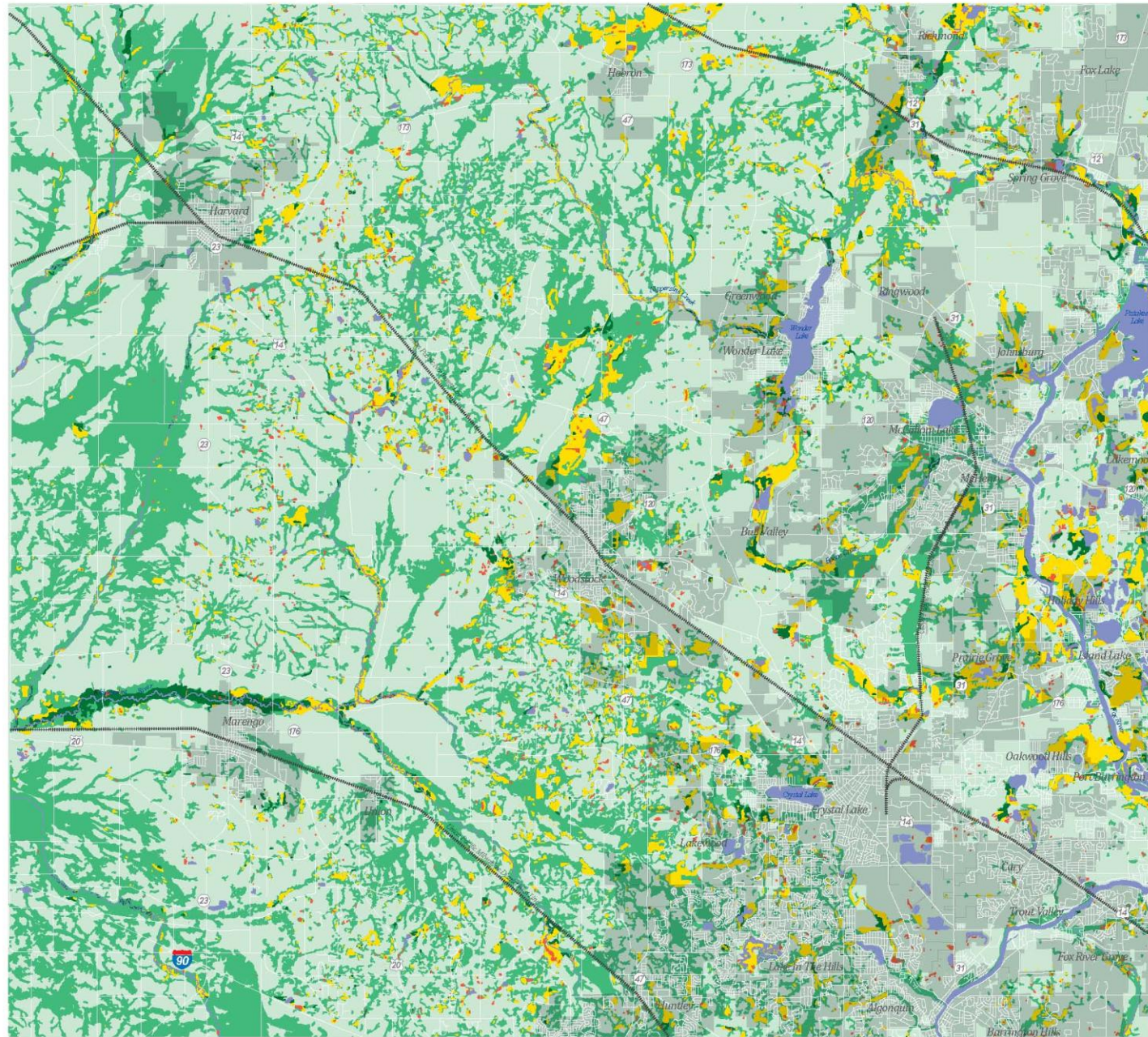
2005

Map Legend

- 1837 Oak Woodlands
- 1872 Oak Woodlands
- 1939 Oak Woodlands
- 2005 Oak Woodlands
- Water Features

Wetlands and Hydric Soils

Figure 12.
Hydric Soils & Wetlands

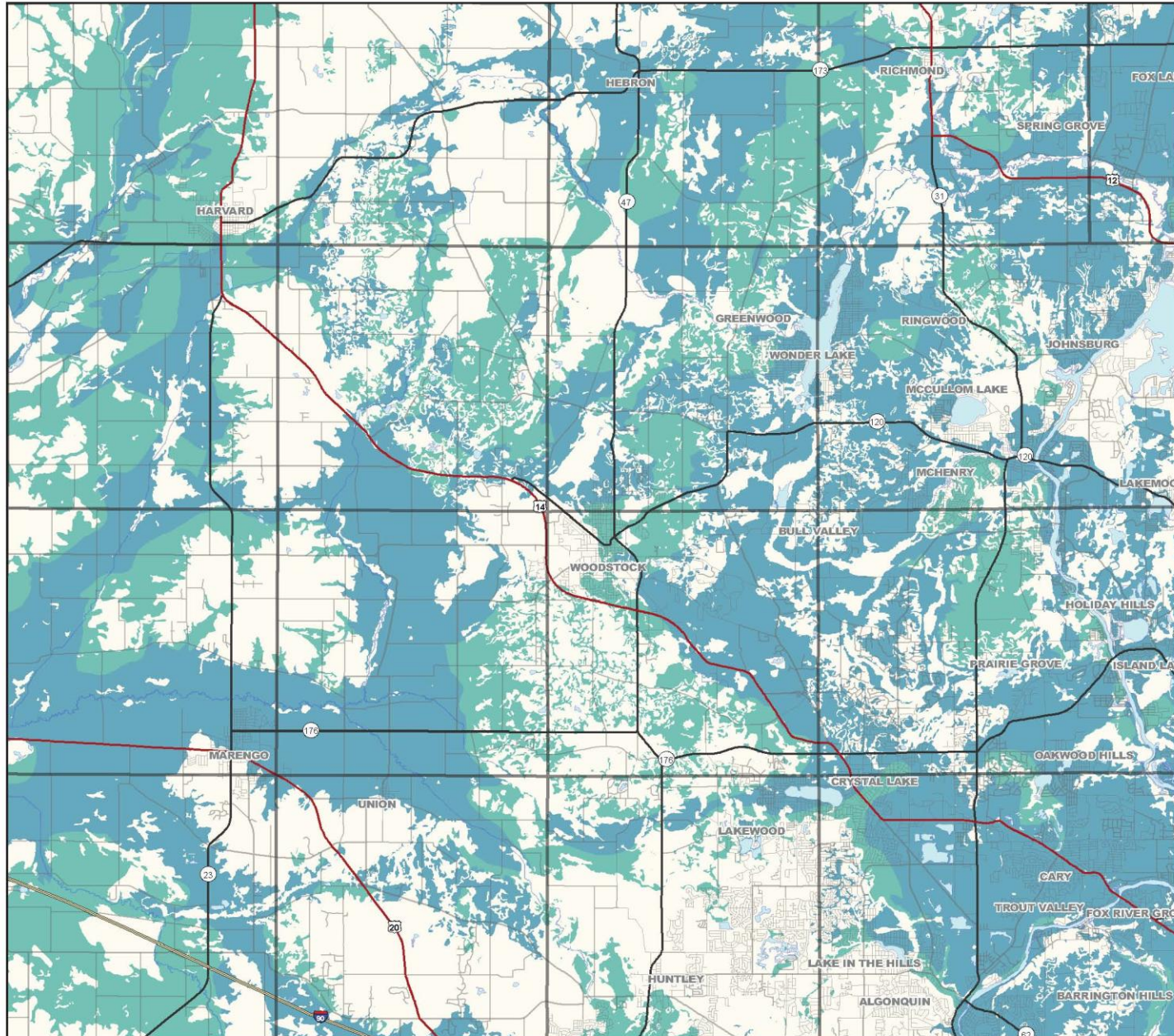


Map Legend

- Hydric Soils
- Freshwater Emergent Wetlands
- Freshwater Forested/Shrub Wetlands
- Freshwater Pond Wetland
- Riverine/Lake Wetland/
Other Water Features
- Other Wetland
- Railroads
- Unincorporated McHenry County
- Incorporated Municipality

Sensitive Aquifer Recharge Areas (SARA)

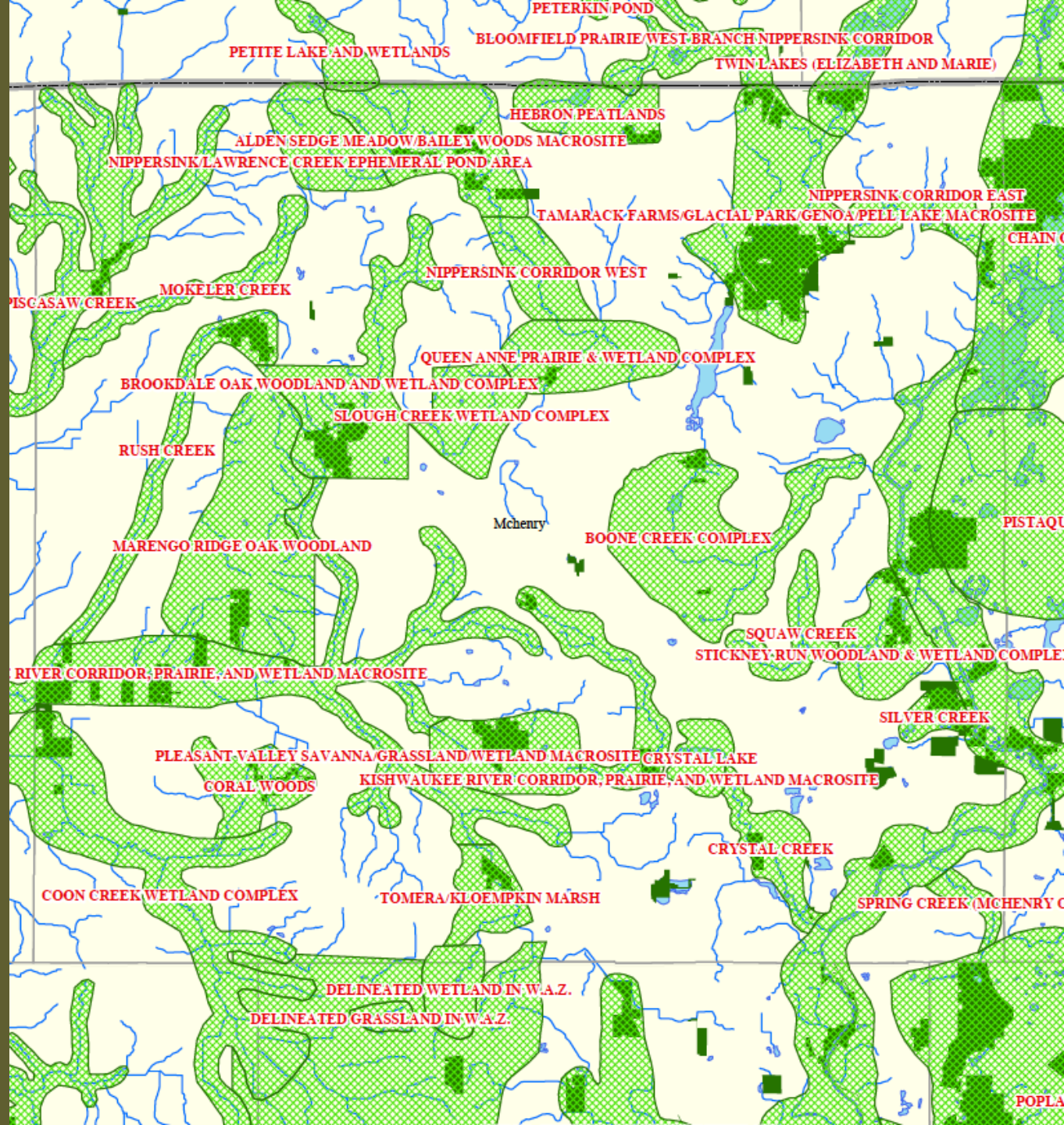
Figure 8.
McHenry County
Sensitive Aquifer
Recharge Areas



Map Legend

- High Aquifer Contamination Potential
- Moderately High Aquifer Contamination Potential

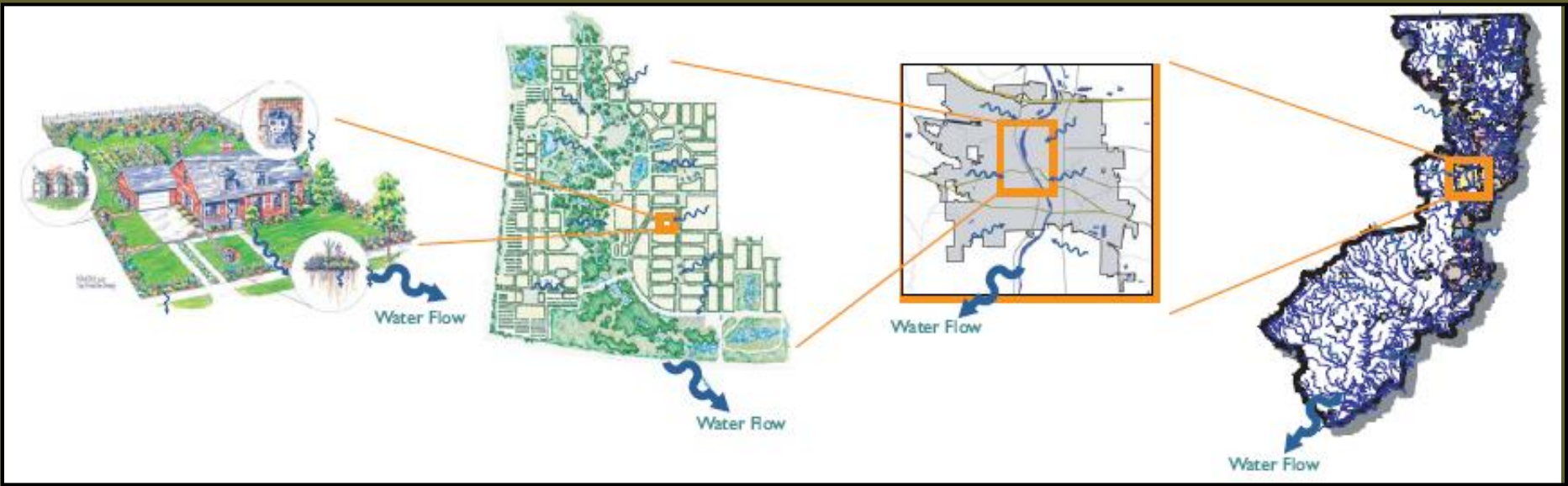
McHenry County "Resource Protection Areas"



Recommended Green Infrastructure Protection Strategies

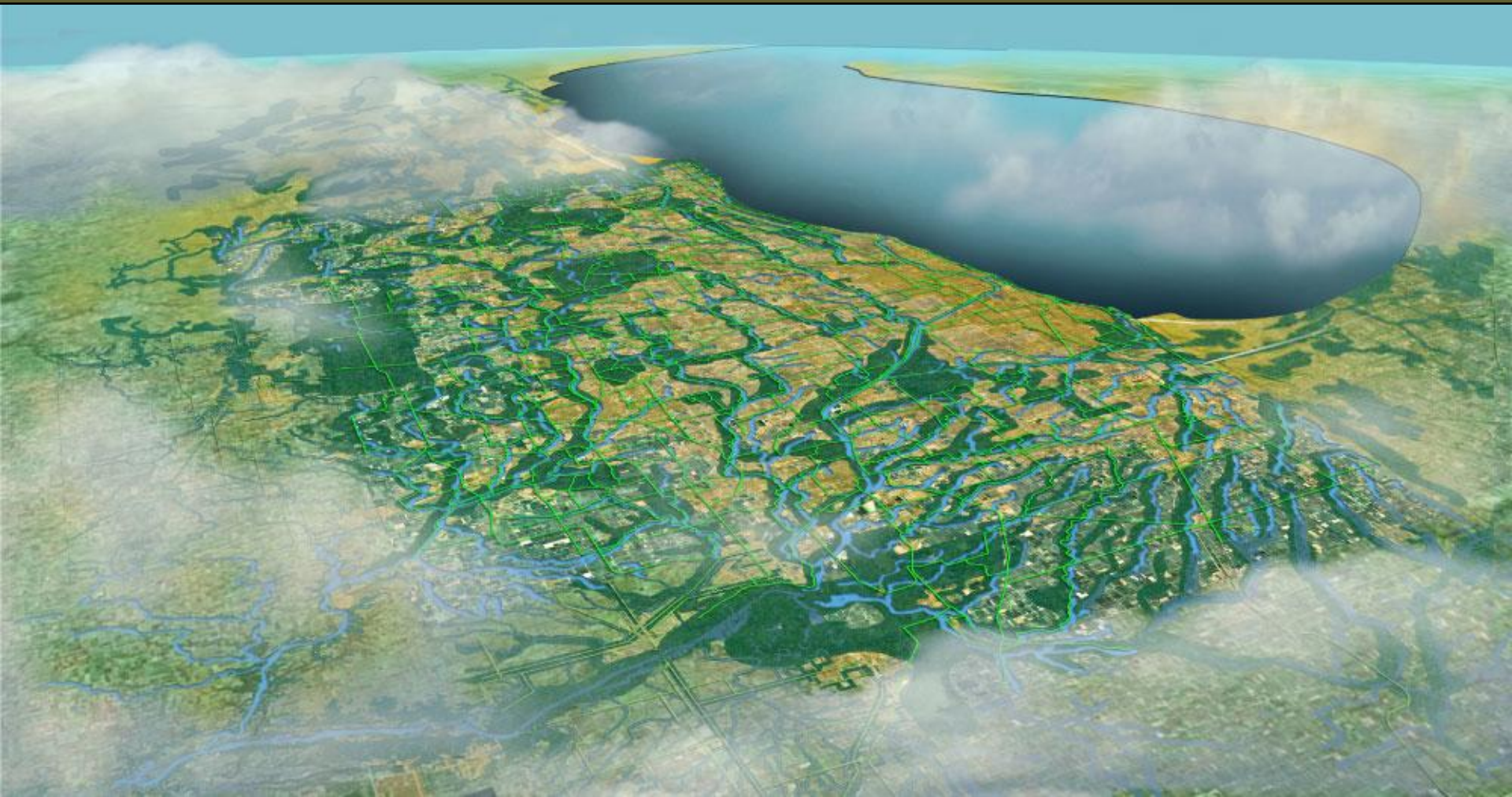
- Land acquisition
- Ecological restoration
- Greenway connections
- Private conservation easements
- Targeted land use planning and zoning
- Conservation development
- Retrofit developed areas
- Farmland preservation

Implementing Green Infrastructure at Varying Spatial Scales



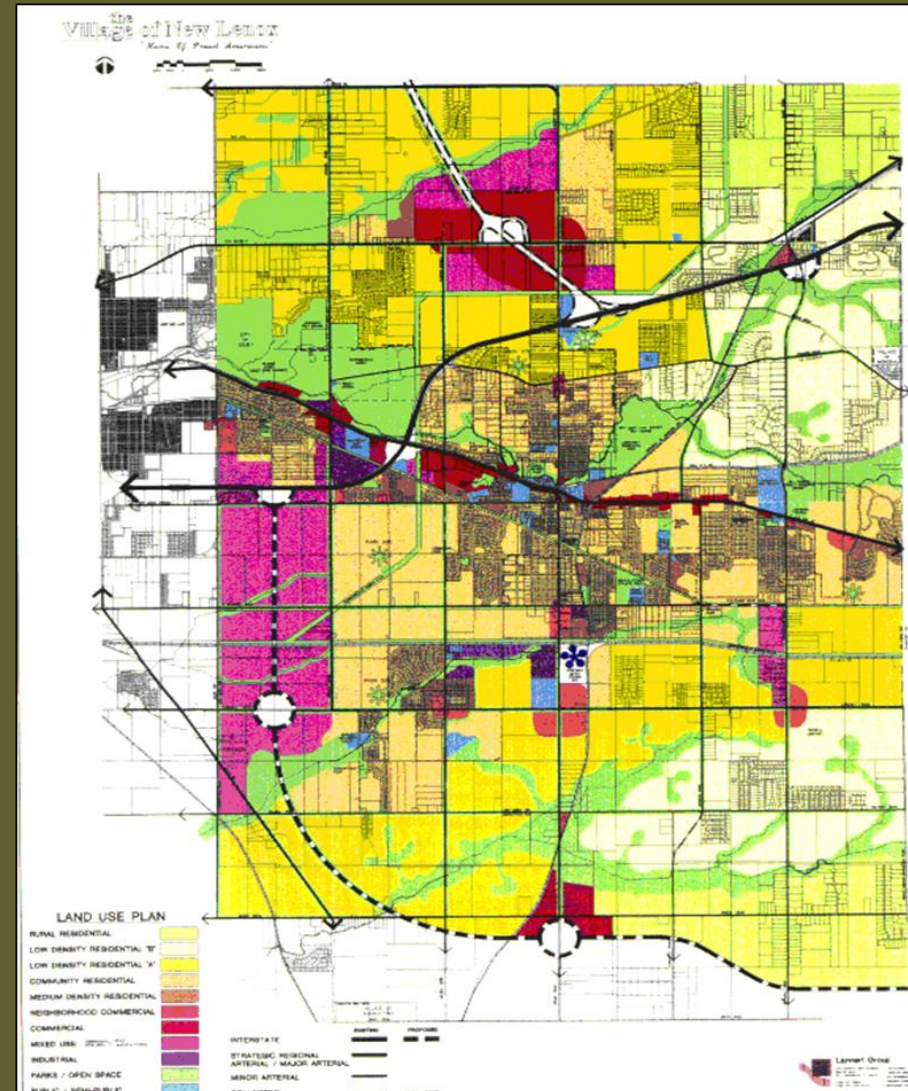
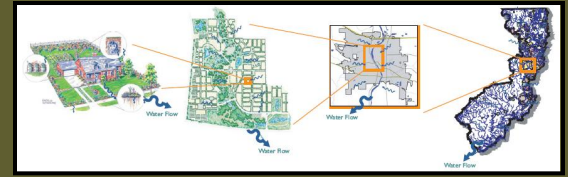
At the Regional Scale: CMAP GoTo 2040 Plan

Goal: Increase Conservation Open Space from
250,000 to 400,000 acres



At the community scale...

- Incorporate GI principles of biodiversity and sustainability into master plans and ordinances
- Identify interconnected greenways and wildlife corridors
- Plan walking trails and bike paths linking subdivisions and regional trails



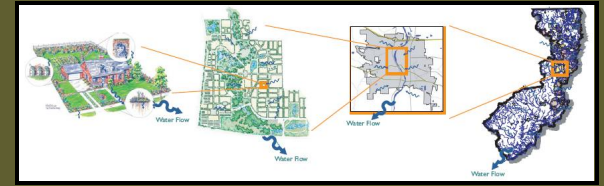
At the neighborhood scale...

- Incorporate “conservation design” into new developments
- Find creative ways to:
 - infiltrate runoff
 - protect natural areas
 - create greenway & trail connections



At the site/lot scale...

- Incorporate natural landscaping and stormwater best management practices in parks, school grounds, residences
 - Applicable to both new projects and retrofits
- Protect, restore, and manage natural areas

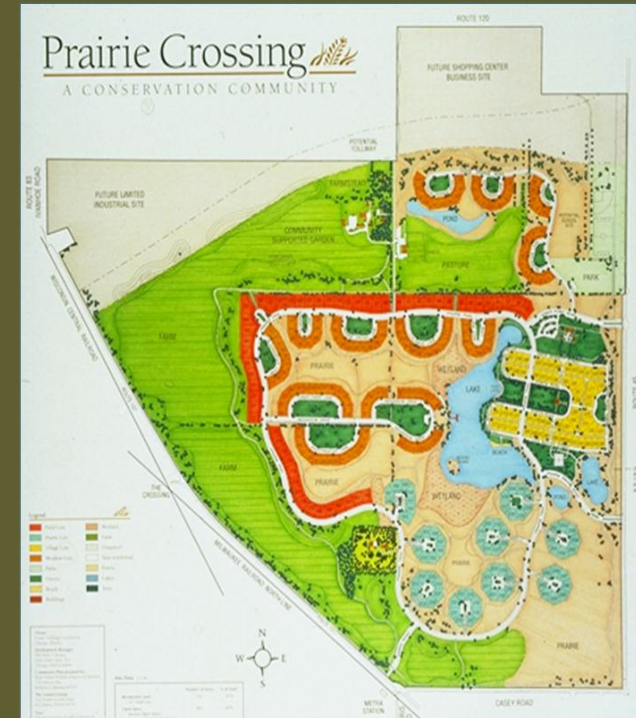


Ongoing Green Infrastructure Planning

- McHenry County Green Infrastructure Plan
 - Focus on open space, greenways, trails, and water trails
 - Sponsored by Chicago Wilderness
 - Conducted by McHenry County Planning & Development in cooperation with resource agencies and other local governments
- Woodstock Green Infrastructure Plan
- Crystal Lake Green Infrastructure Plan

Conservation Design: What is It?

- Varying definitions....
 - Low Impact Development (LID)
 - Conservation Design (CMAP, Chicago Wilderness, others)
 - Conservation/Open Space Design (Randall Arendt et al)



Conservation Design Themes

- Preserve Open Space and Minimize Land Disturbance
- Protect and Incorporate Natural Systems as Design Elements (e.g., wetlands, stream/wildlife corridors, woodlands)
- Utilize Neo-Traditional Street and Lot Layouts and Designs
- Decentralize and Micromanage Storm Water at its Source
 - *Treat water as a resource, not a waste product*

Conservation Design and BMPs are Receiving Increased Attention

- Federal NPDES and wetland permitting requirements
- Countywide stormwater agency requirements
- Community aesthetics
- Groundwater concerns
- Developer advantages

Federal Wetland Permitting Requirements

- Regional wetland permitting guidelines stress a BMP *treatment train* approach for sites adjacent to wetlands
- Runoff infiltration is a major emphasis



County Stormwater Agency Requirements

- McHenry County *encourages* a runoff reduction hierarchy -- detention alone is not sufficient
- Increasing focus on runoff *volume* and *infiltration*

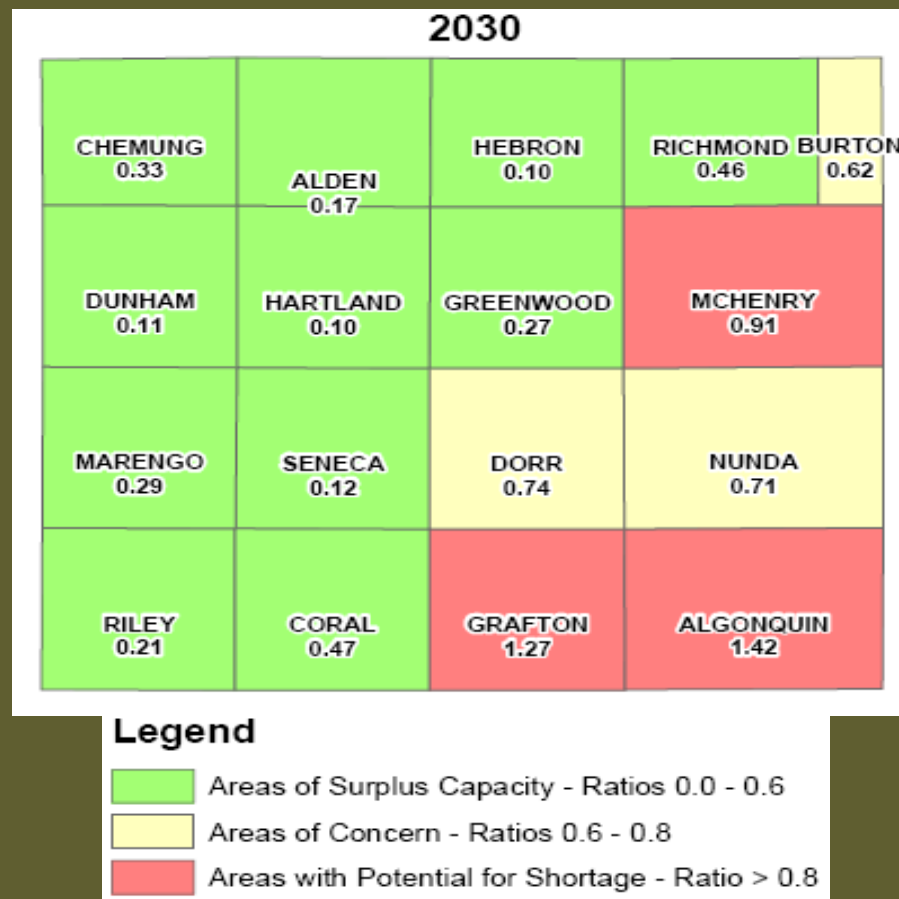
Community Aesthetic Concerns

- Some communities are tiring of “cookie cutter” developments
- Prefer the aesthetics of creative conservation designs
- E.g., the Aurora Countryside Vision Plan



Groundwater Protection Concerns

- Communities are realizing that conventional development may not protect groundwater recharge



Developer Advantages

- Reduces development costs for site work and stormwater management
 - NAHB has documented an estimated 34% savings in infrastructure costs
- Open space can provide a marketing advantage and allow for lot premiums
- Can reduce permitting hurdles – time and costs
- Some communities offer density bonuses
- Can reduce conflicts with local conservation and watershed groups



Conservation Design Procedures (Arendt)

- Work *with* the natural features of the site.
- Plan the development in a step-wise fashion:
 - Identify and preserve all natural areas.
 - Locate building areas to take advantage of open space and scenic views.
 - Design the street network to preserve natural areas and opportunities for future connectivity.
 - Establish lot lines and lot sizes in order to take maximum advantage of conservation subdivision concepts.
 - Prepare engineering plans to identify essential utilities and to integrate water management with open space.

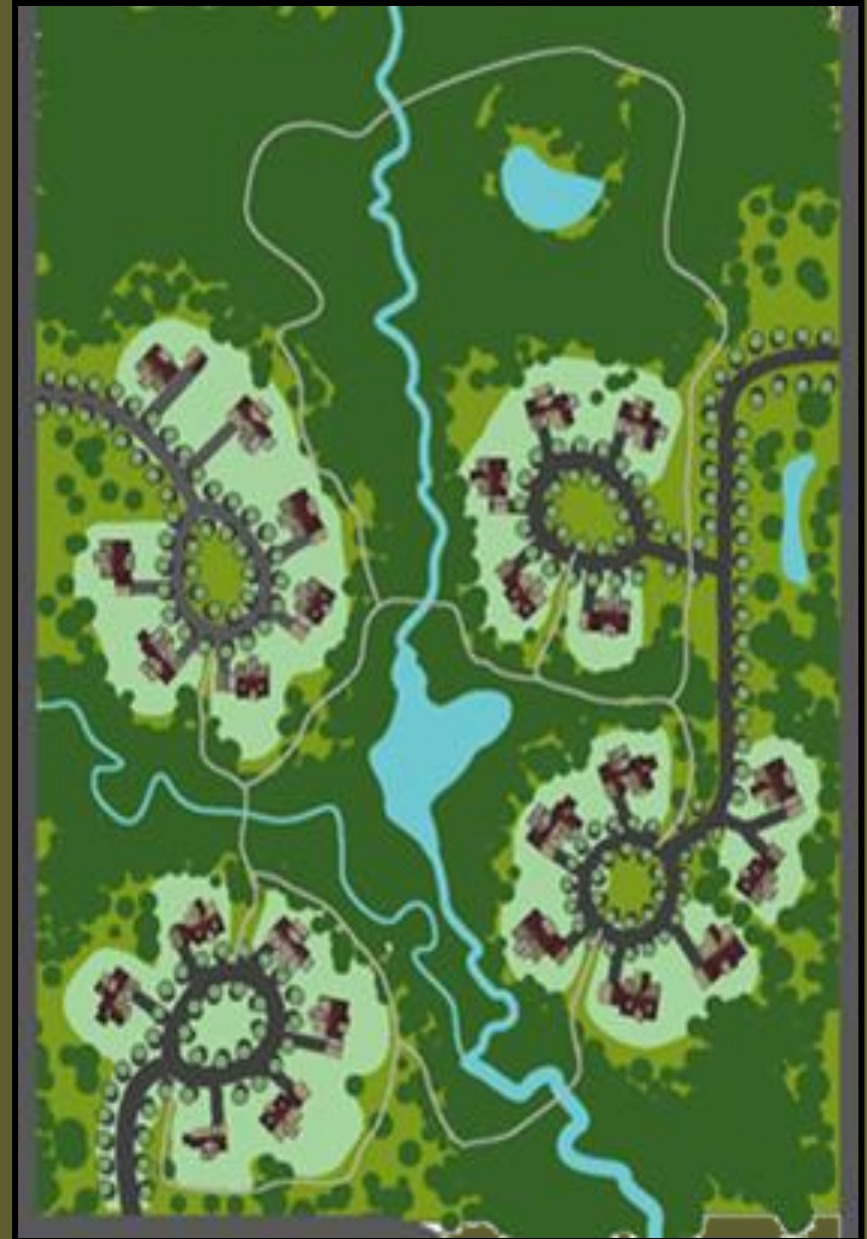
Protect Natural Areas

Not Just Wetlands and Floodplains

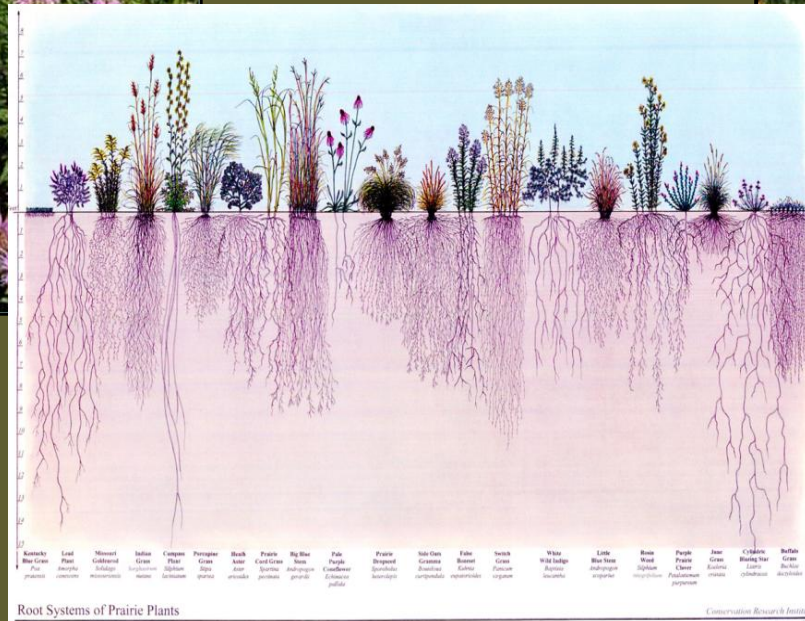


Cluster Residential Areas

- Protects natural areas
- Reduces mass grading
- Reduces impervious surfaces and runoff



Use Natural Landscaping in Common Areas

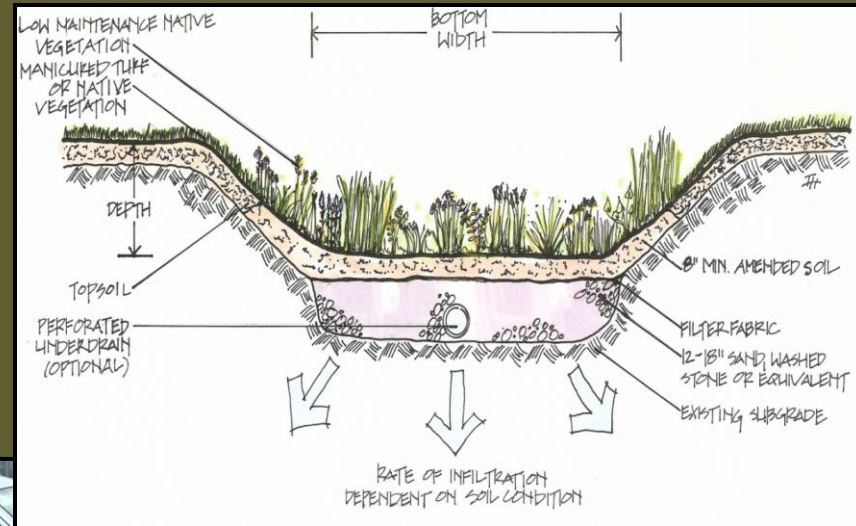


Reduce Impervious Areas (e.g., street widths)

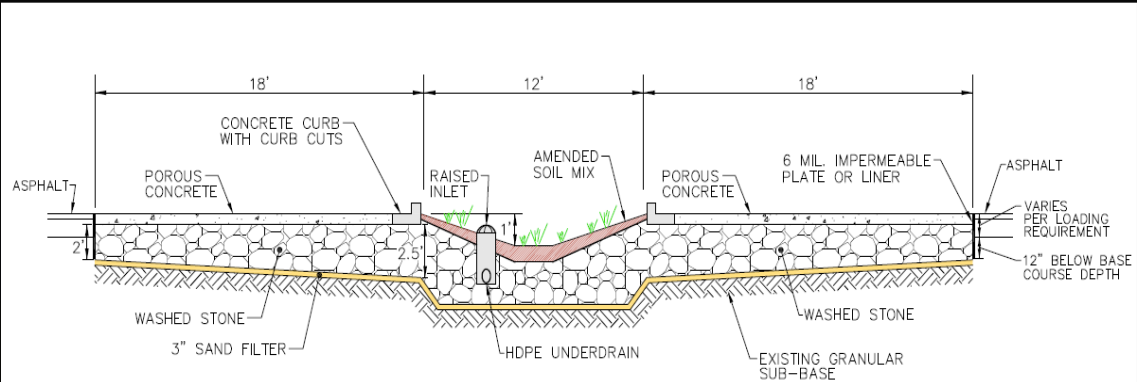
- Typical wide suburban streets contribute substantial runoff
- Questions re. safety issues (Institute of Traffic Engineers)



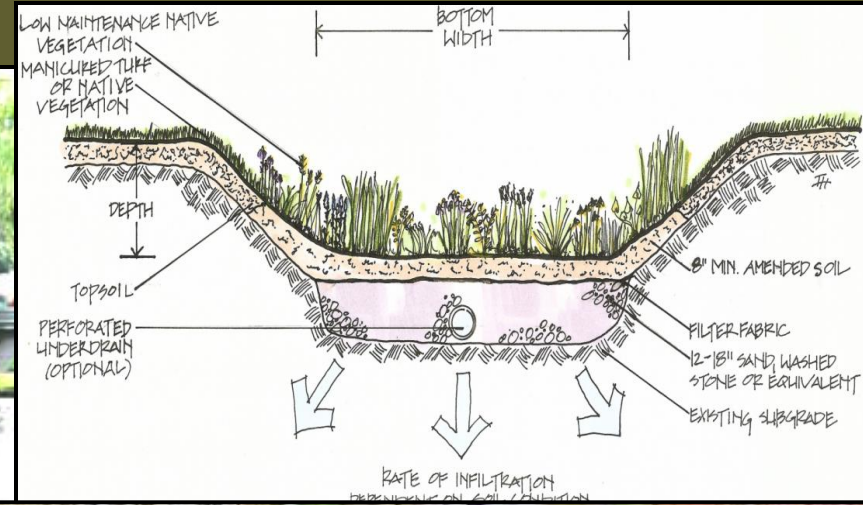
Use BMPs to Treat Precipitation and Runoff at its Source



Permeable Paving



Retrofitting “Green Streets” – Bio-swales and Infiltration Planters



Rain Garden Retrofits: Burnsville, MN

- In a neighborhood where rain gardens were retrofitted, stormwater volumes were reduced by almost 90 percent



Detention Basin Design: Emulate Natural Lakes and Wetlands

- Naturalized basins are more effective at removing stormwater pollutants
- Can reduce nuisance goose populations
- They also can enhance site aesthetics



Last but not least:
*Restoration and Management of
Natural Areas*

- Preservation of natural areas, by itself, does not ensure their long-term viability.
- Regulatory agencies commonly require enhancement and long-term management.
- The Corps of Engineers is now recommending “third party” management

Basic Elements of Restoration and Management

- Remove invasive brush and weeds
- Plant native grasses and wildflowers
- Perform regular controlled burns
- Monitor for performance criteria



Institutional Arrangements for Natural Area Management

- Identify Homeowners Association responsibilities (typically with backup Special Service Area option)
- Specify management requirements and funding in covenants
- Third party approaches:
 - Donation to park or conservation district
 - Conservation easement with land trust

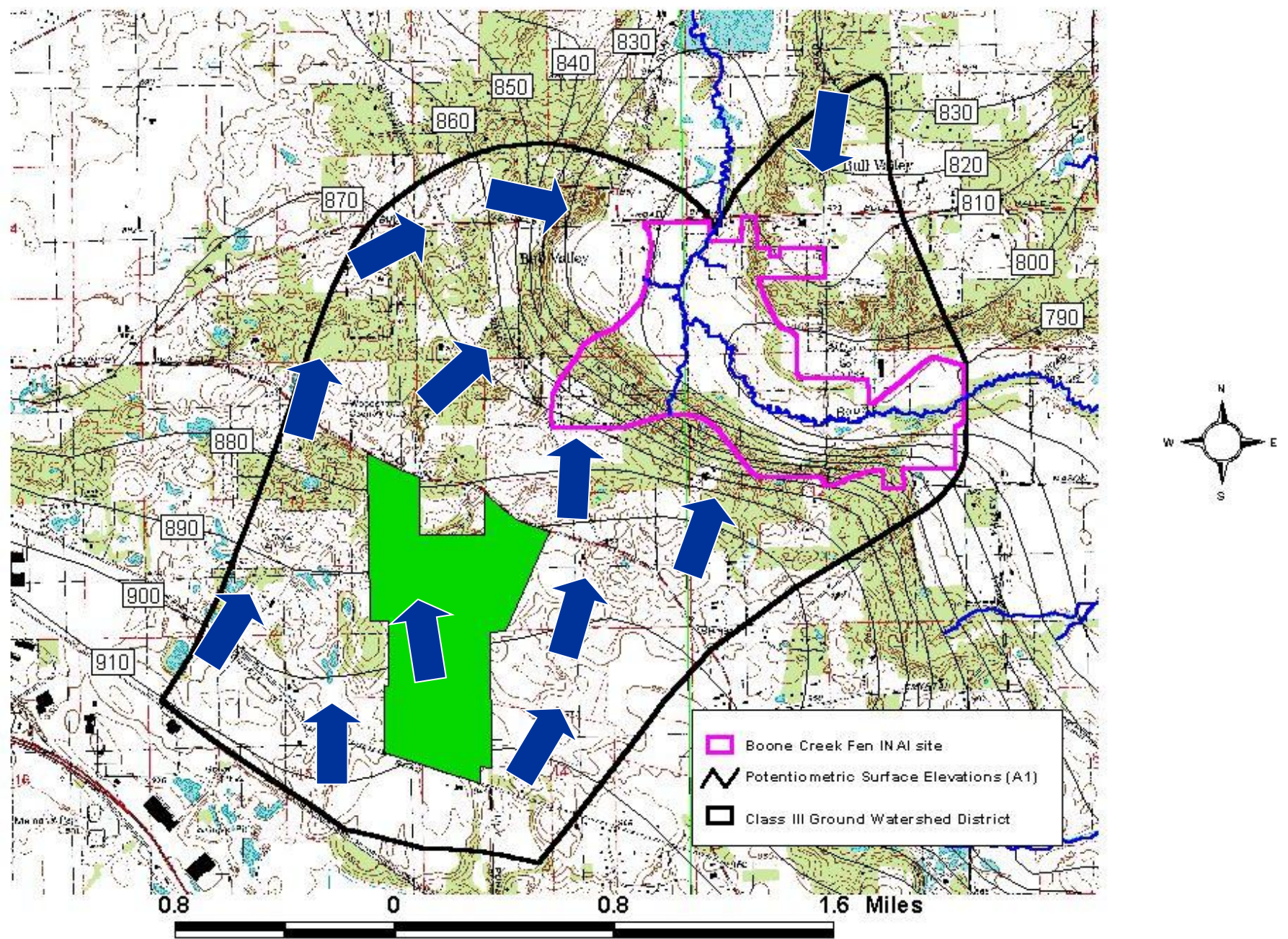
Some Conservation Design Examples

Sanctuary Of Bull Valley

- Originally proposed as conventional subdivision
- Groundwater concerns led to conservation design
- Open space, natural landscaping, and natural drainage throughout



Exhibit 1. Boone Creek Fen Illinois Natural Area and Class III Ground Watershed.



Conservation Design Plan: Deed Restricted Open Space Throughout



Restored Savannas and Prairies



Economic Benefits of Conservation Development

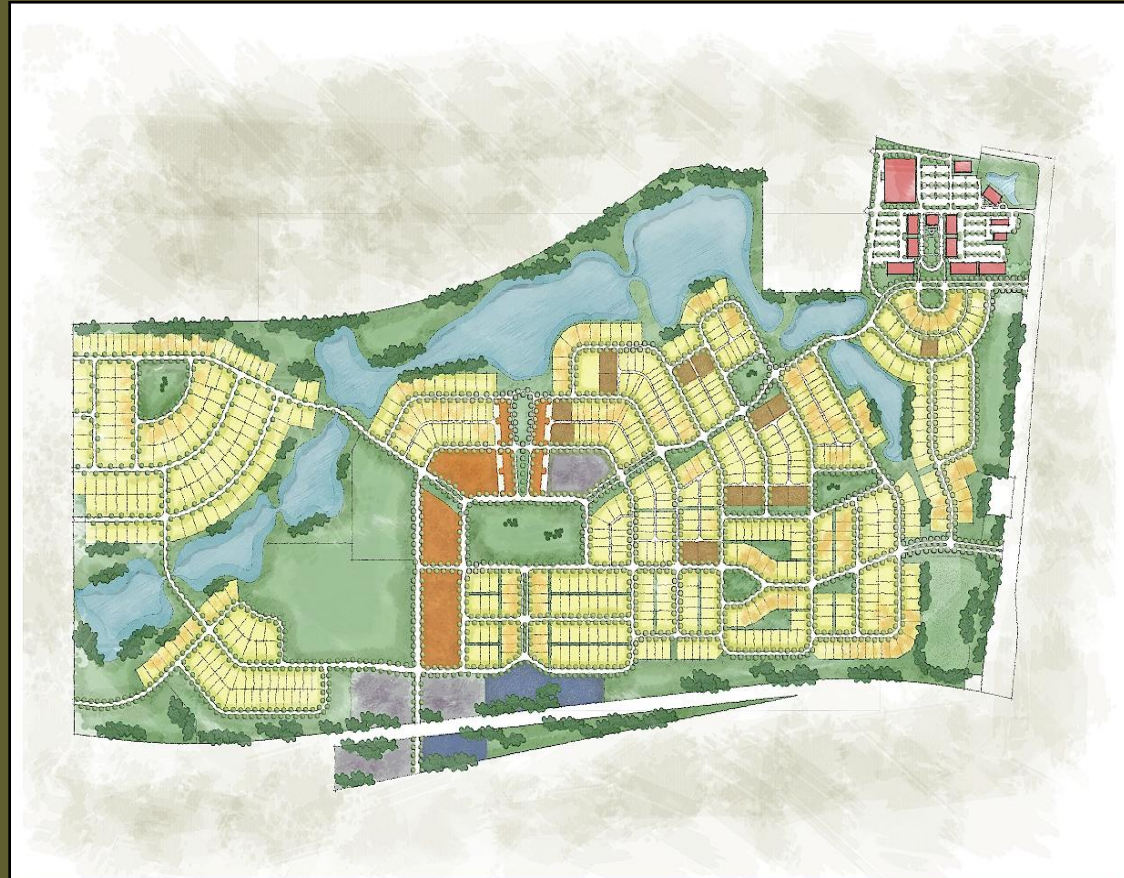
The Sanctuary of Bull Valley

- All lots back up to deed restricted open space, allowing for lot premiums.
- Saved over \$1.1 million in infrastructure cost on Phase 1 alone:
 - No mass grading, curb & gutter (Phase 1)
 - Smaller street width
 - Eliminate and minimize storm sewer
- Natural landscape maintenance: \$600/ac vs. \$2,500 to \$5,000/ac. for conventional landscaping
- Less infrastructure for City to maintain

Settlers Ridge in Sugar Grove



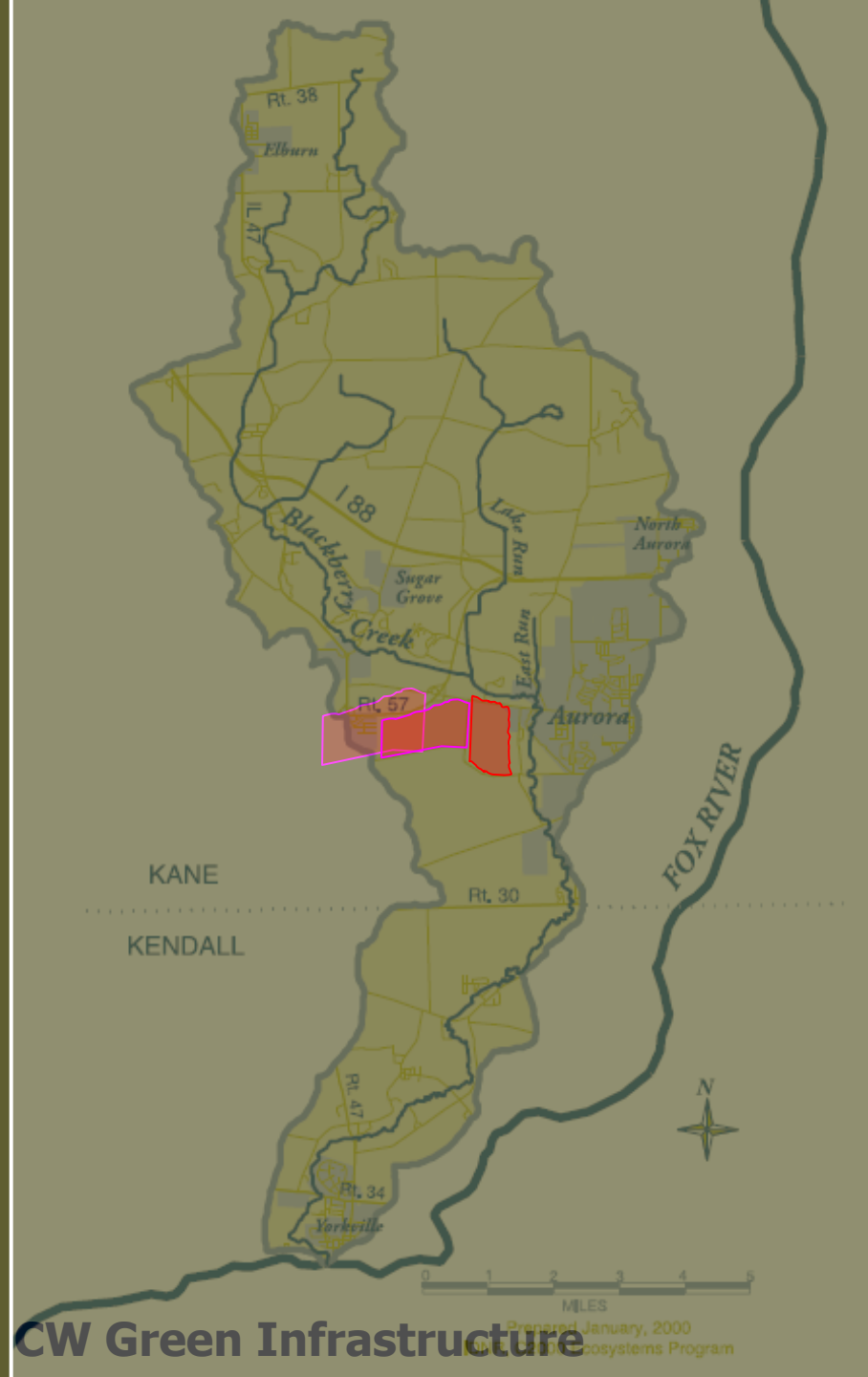
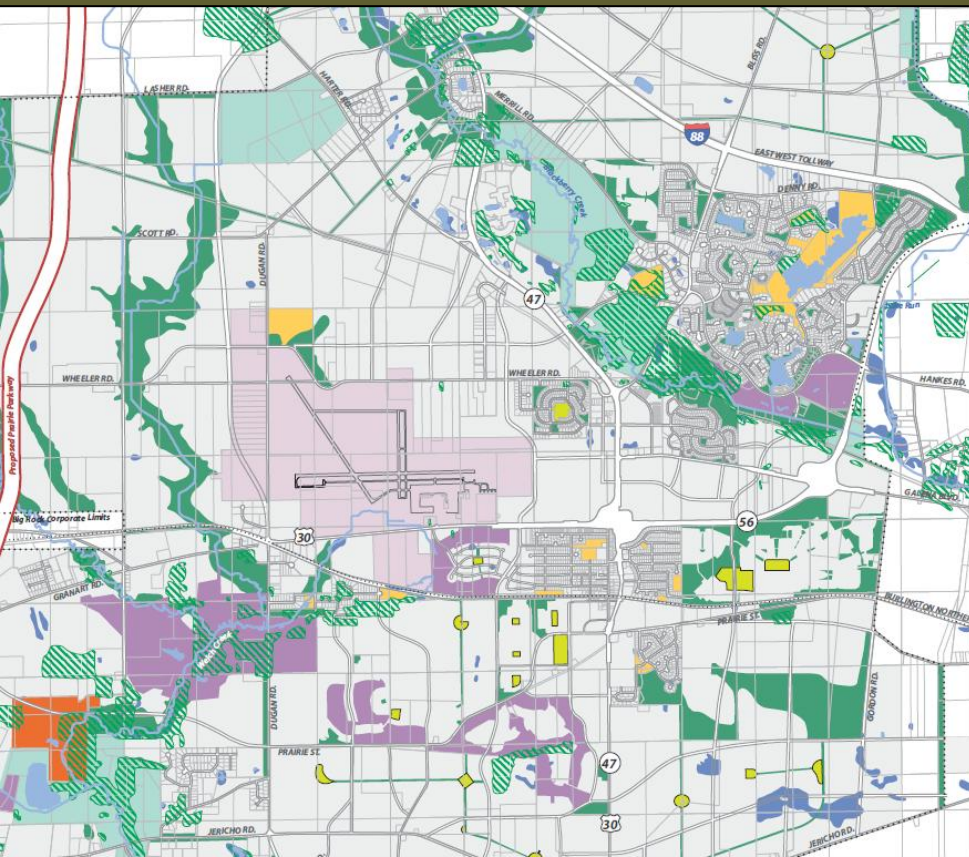
- Over 200 acres of open space
- Natural landscaping throughout
- Enhancement of farmed wetlands
- Innovative stormwater BMPs (where allowed)

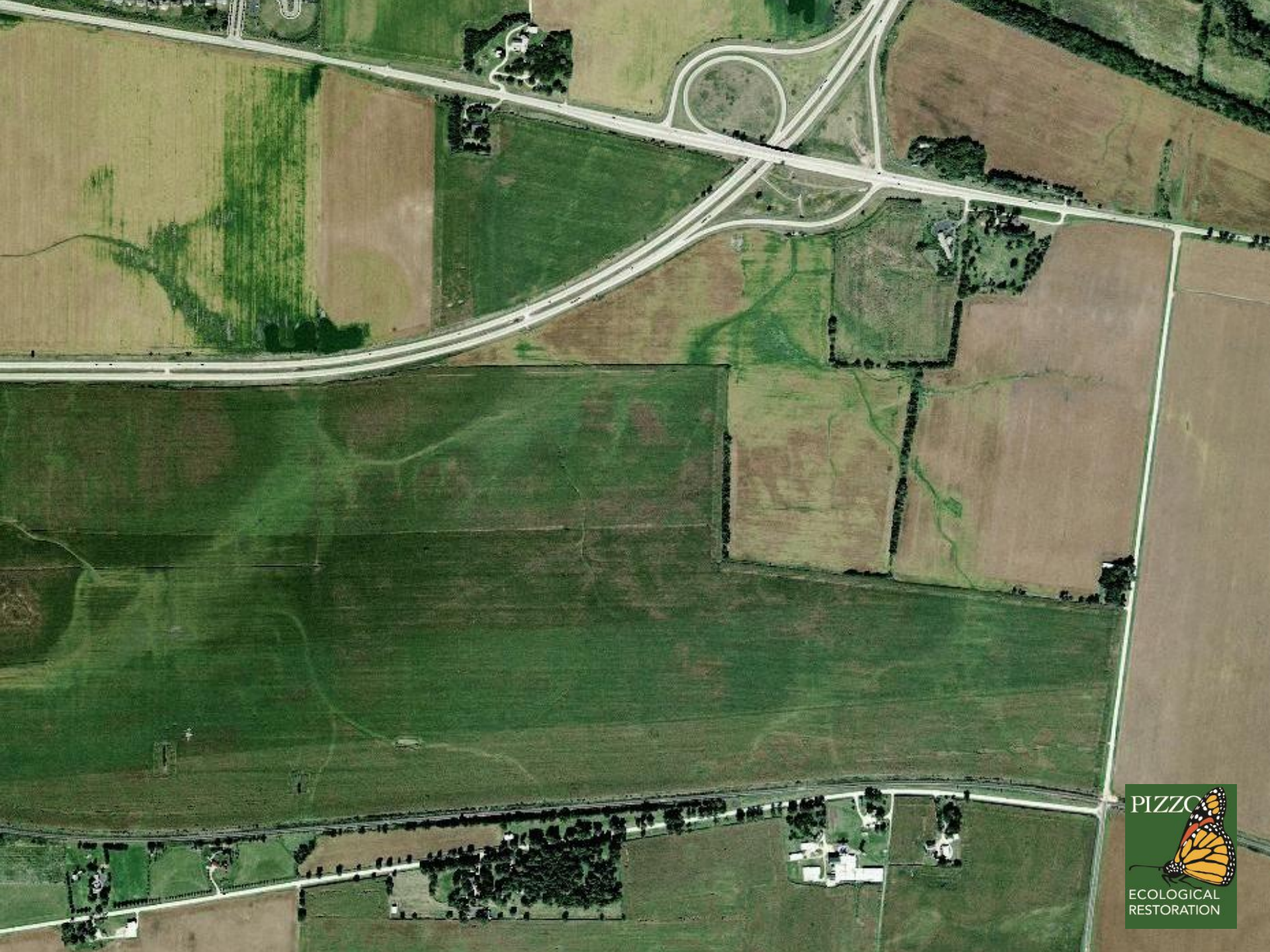


Settlers Ridge Illustrative Plan

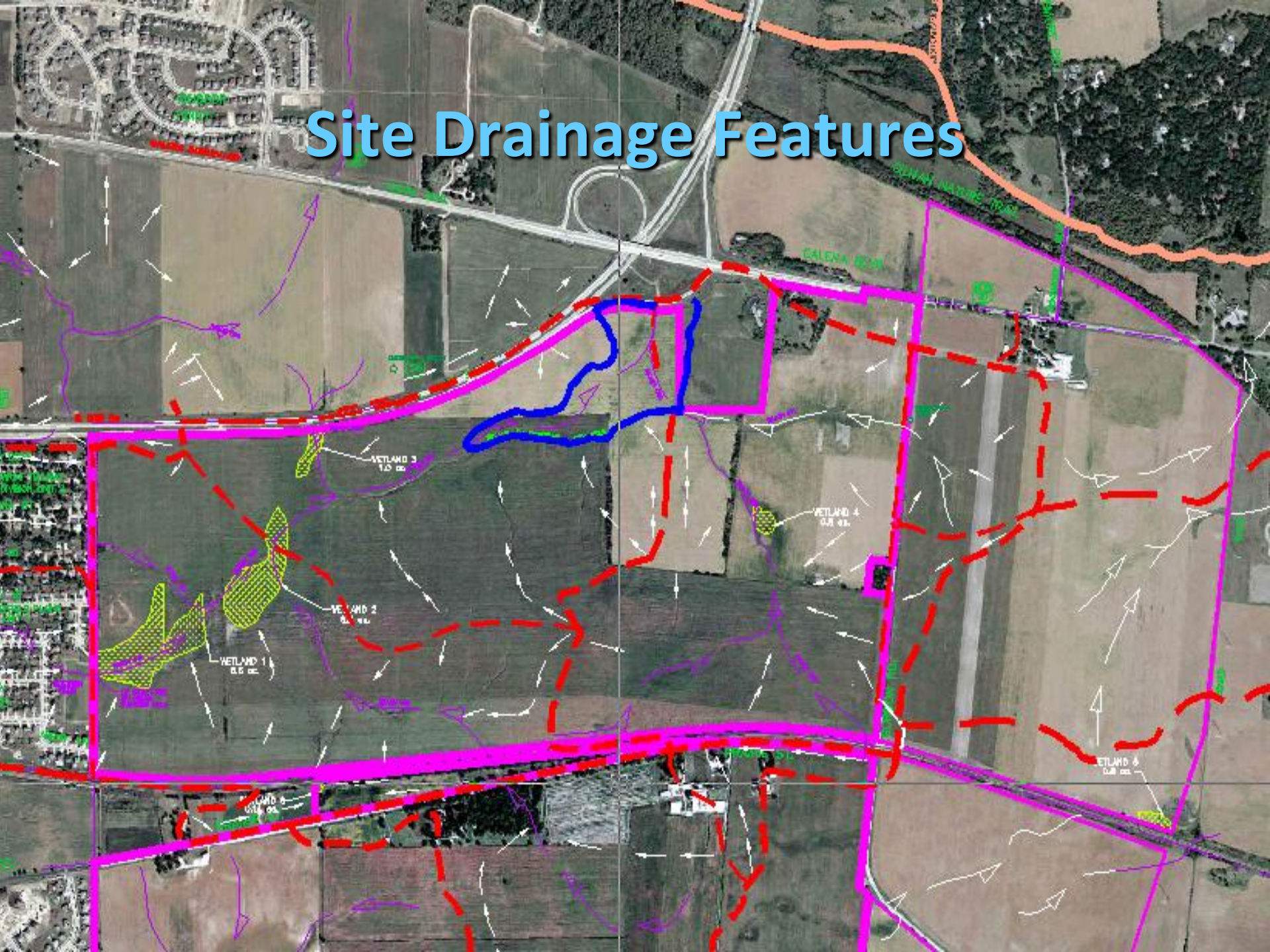
Sugar Grove, Illinois

Links to Sugar Grove Land Use Plan and Blackberry Creek Watershed Plan





Site Drainage Features





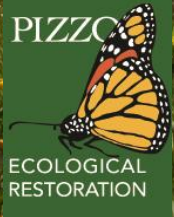


Settler's Ridge Spring 2006





Settler's Ridge July 5, 2007



Open Space Theme

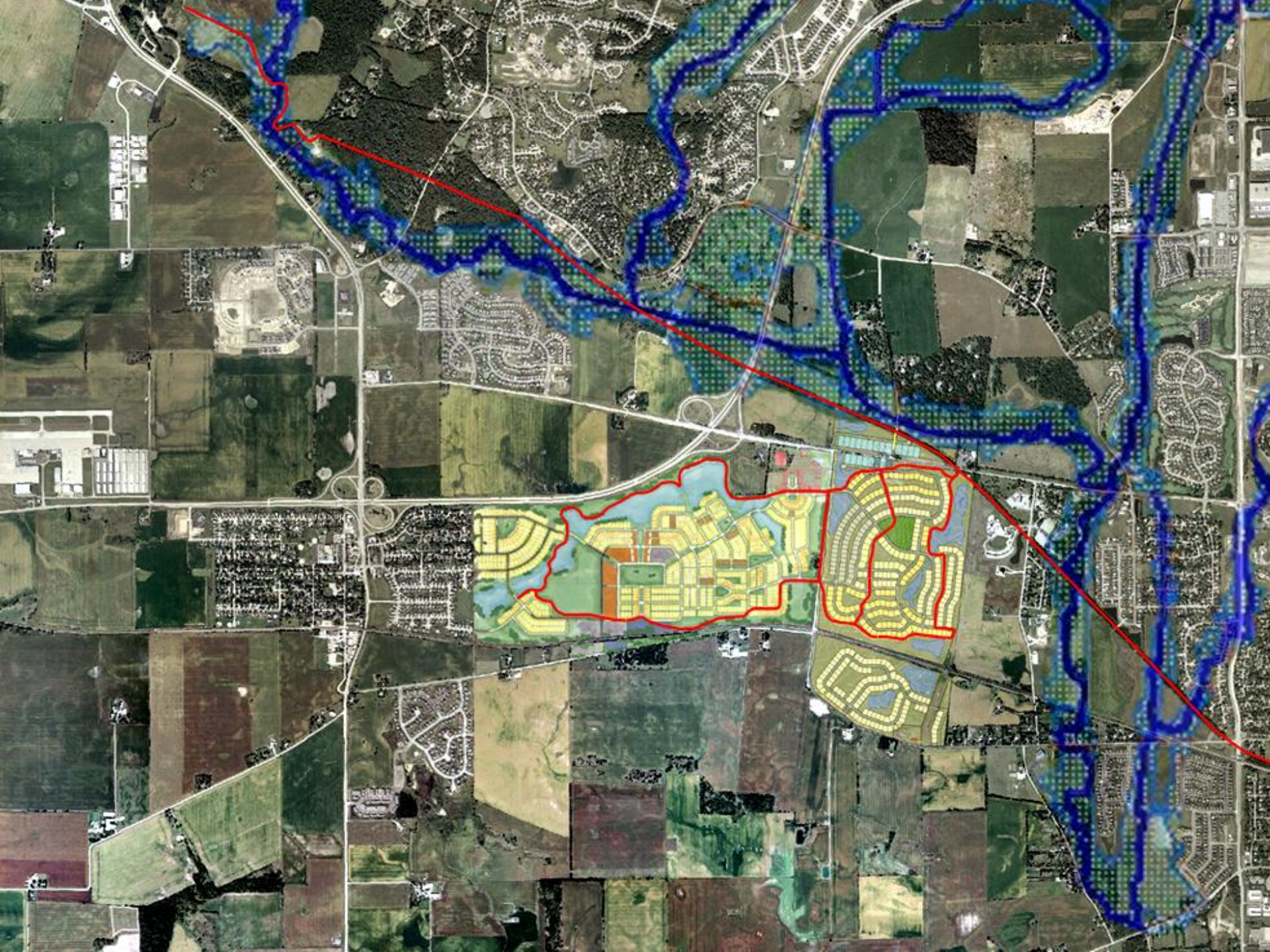


Neighborhood Pocket Parks



Integrated Trail and Sidewalk System

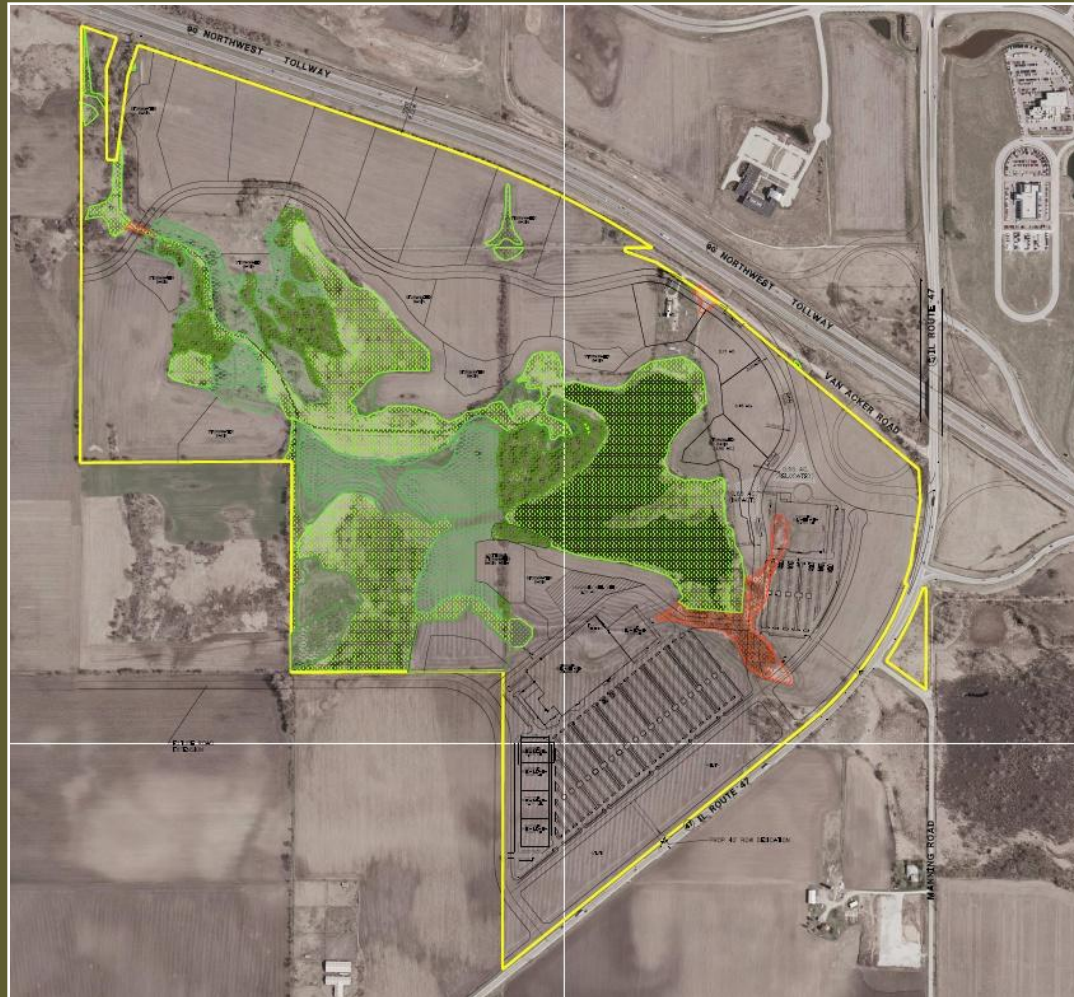




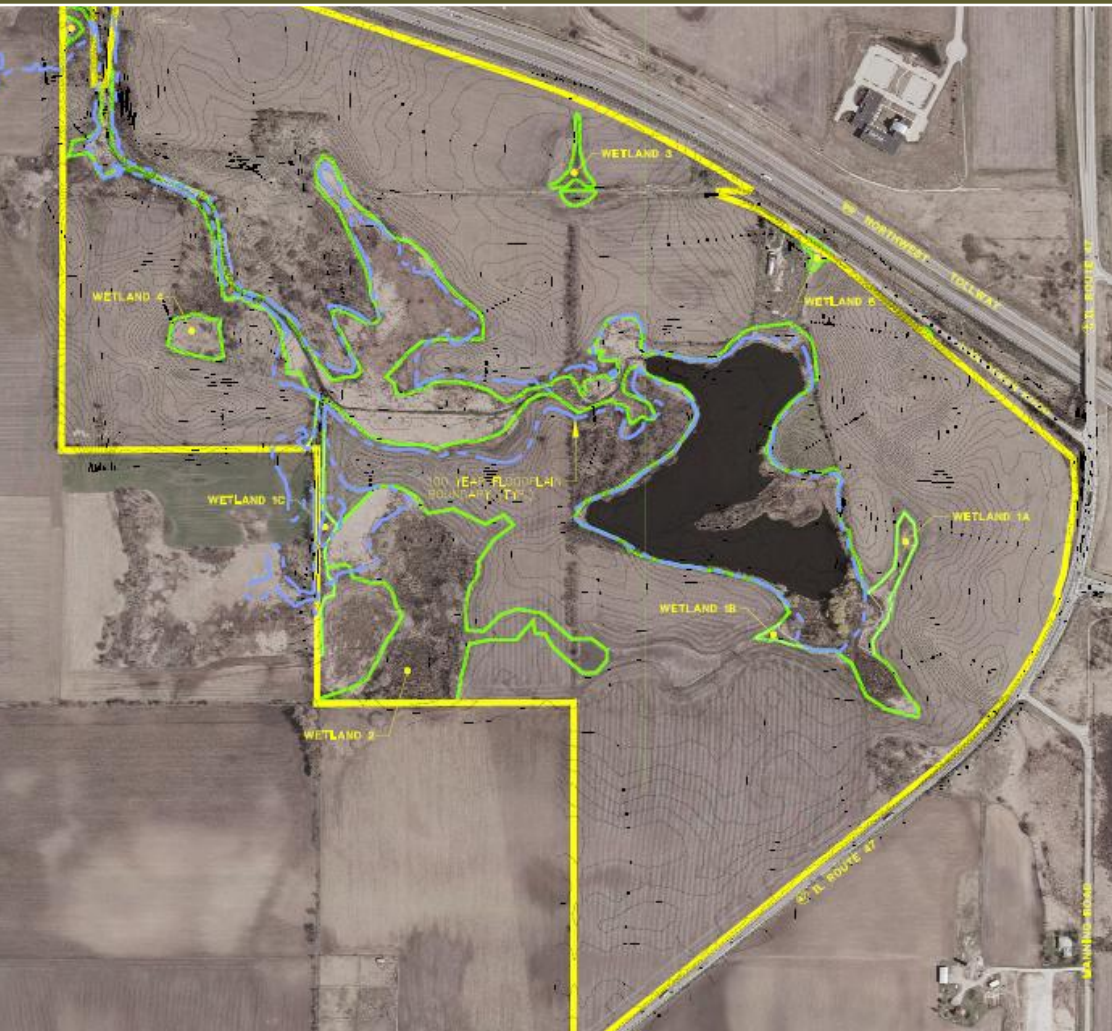
People and Nature Residing in Harmony



Commercial Development Example: I-90 and Rt. 47 -- Huntley

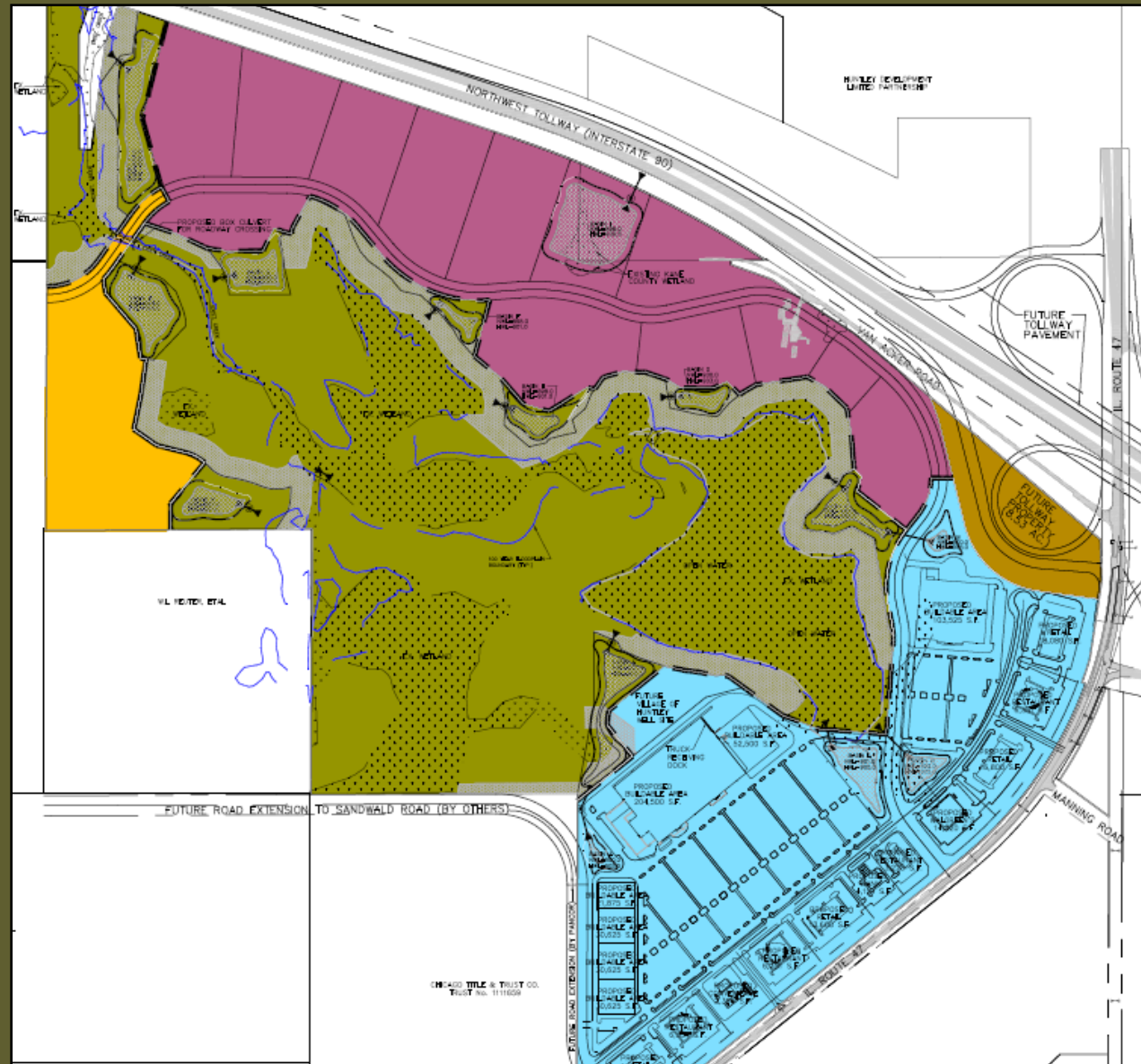


Site Constraints: High Quality Wetlands and Oak savannas



Open Space Theme:

170 acre
restoration
area to be
donated to
Village of
Huntley

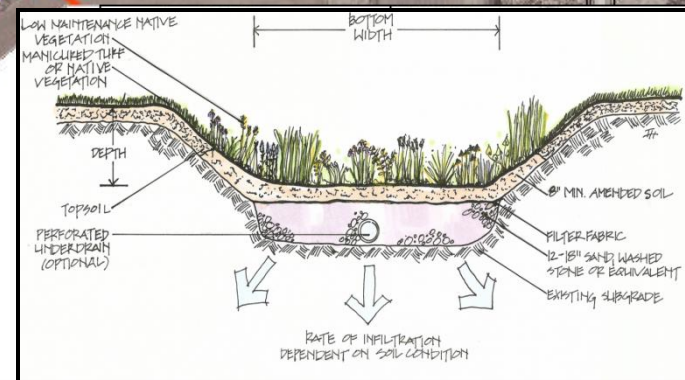
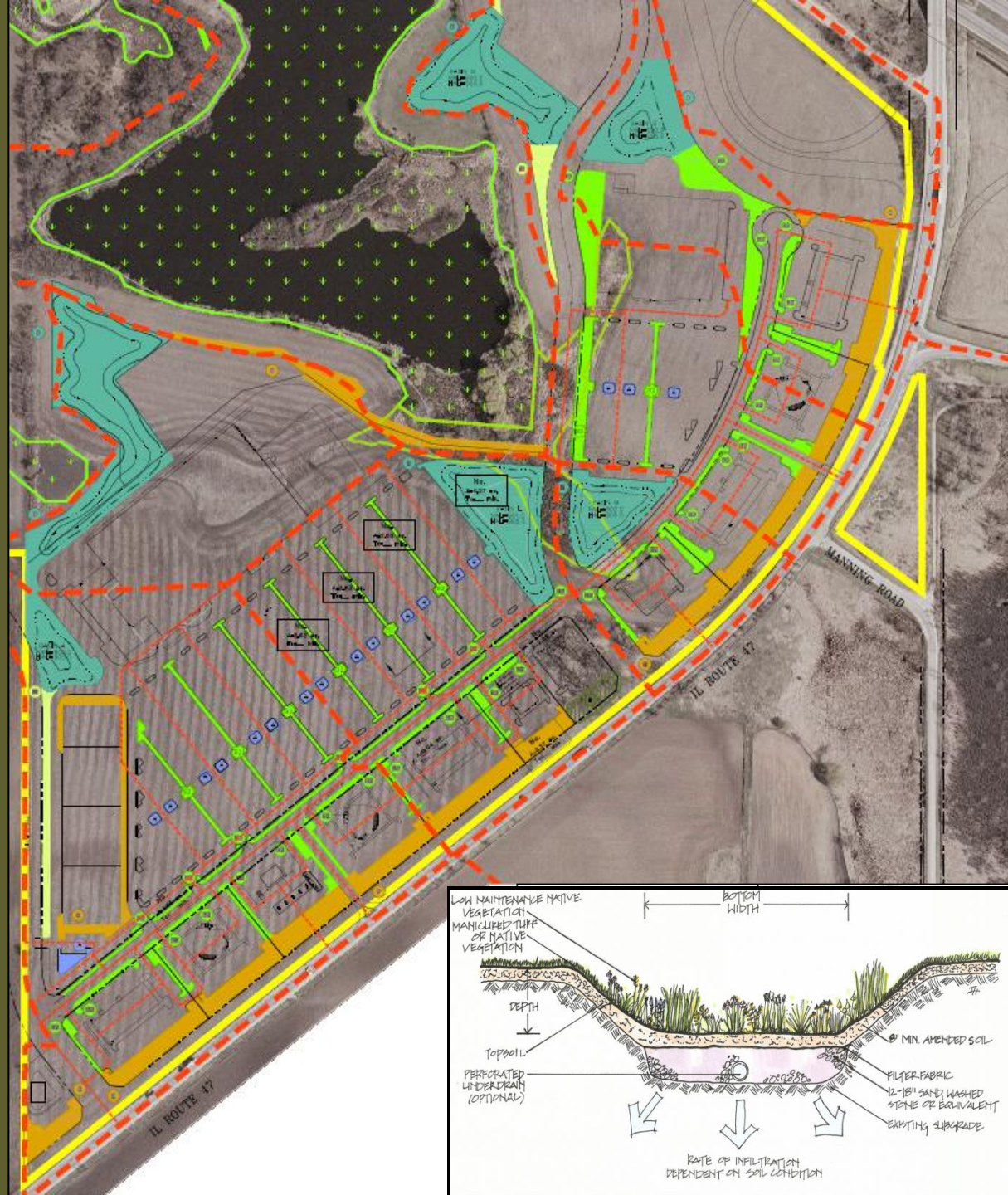


Long-term Open Space Arrangements

- Natural areas restoration
- Funding for stewardship to be provided through property owners association
- Back-up SSA
- Conservation easement to be provided to The Conservation Foundation
- Dedication as an Illinois Land and Water Reserve
- Opportunity for future trail connections



Conservation Design Approach: Stormwater “Treatment Train”



Implementing Conservation Design: Ordinance Approaches

- Allow by right
 - Will County Ordinance
- Require for sensitive sites
 - McHenry County, Algonquin, Woodstock, Crystal Lake
- Require for all development
 - Village of Homer Glen (residential)

McHenry County Conservation Design Ordinance

- GOAL: make the protection of the environment the standard for subdivision work instead of the exception



Purposes: Preserve the Integrity of the Land

- Preserve remnant wetlands, woodlands, savannas, and prairies
- Conserve scenic views, open space, and the County's rural character
- Preserve soil hydrology by minimizing mass grading and impervious surfaces



Protect Water Resources

- Preserve natural groundwater recharge functions
- Preserve streams, lakes, and wetlands
- Protect the quality of surface and groundwater
- Minimize stormwater runoff and associated flooding and erosion



Enhance Community Character and Connectivity

- Promote interconnected greenways and wildlife corridors
- Promote convenient walking trails and bike paths linking subdivisions and regional trails
- Optimize road connectivity between neighborhoods and businesses



Provide Greater Design Flexibility and Affordability

- Provide diverse lot sizes, building densities, and housing choices
- Create communities with a strong neighborhood identity
- Reduce infrastructure costs and the cost of public services required for new development
- Improve housing affordability



Ordinance Outline

- Applicability – Triggers
- Density Bonuses
- Conservation Design Procedures
- Conservation Design Standards
- Performance Standards for Residential Lots
- Wastewater Treatment and Disposal
- Open Space Requirements
- Open Space Ownership and Funding
- Open Space Management and Stewardship
- Tree Protection Standards
- Outdoor Lighting – “Dark Sky” Standards

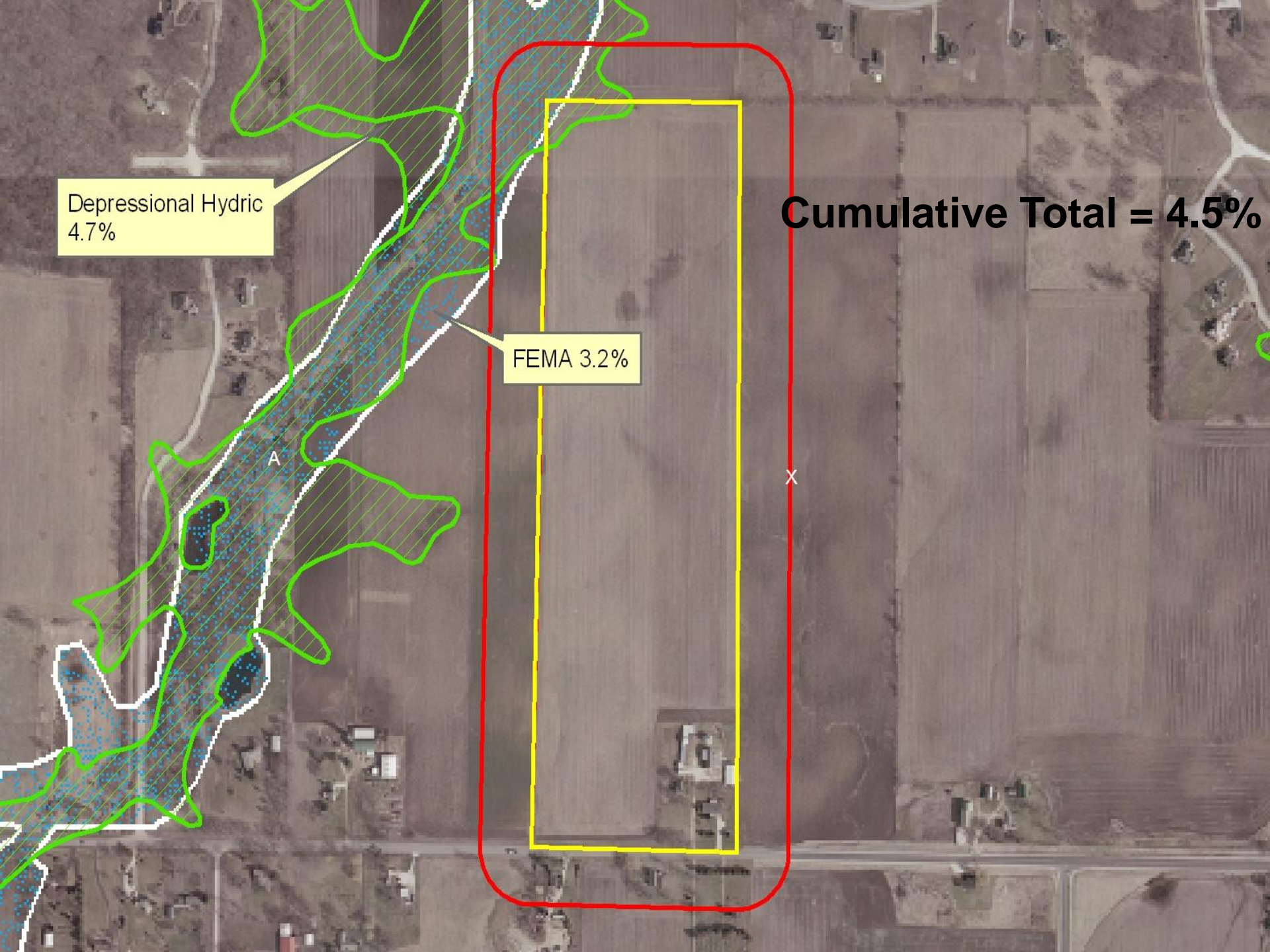
Applicability -- Triggers

- Conservation Development is allowed anywhere.
- Conservation Development is required when the site contains sensitive natural resources.
- Automatic triggers:
 - The site contains or abuts within 100 feet
 - ADID High Habitat Quality Streams, Rivers, and Lakes
 - Designated McHenry Natural Area Inventory Sites
- Cumulative triggers: 20% or more is “sensitive:”

Depressional Hydric
4.7%

FEMA 3.2%

Cumulative Total = 4.5%



Cumulative Total = 21.6%

fw K 430

w K 427

fw K 448

ADID Wetland 5.6%

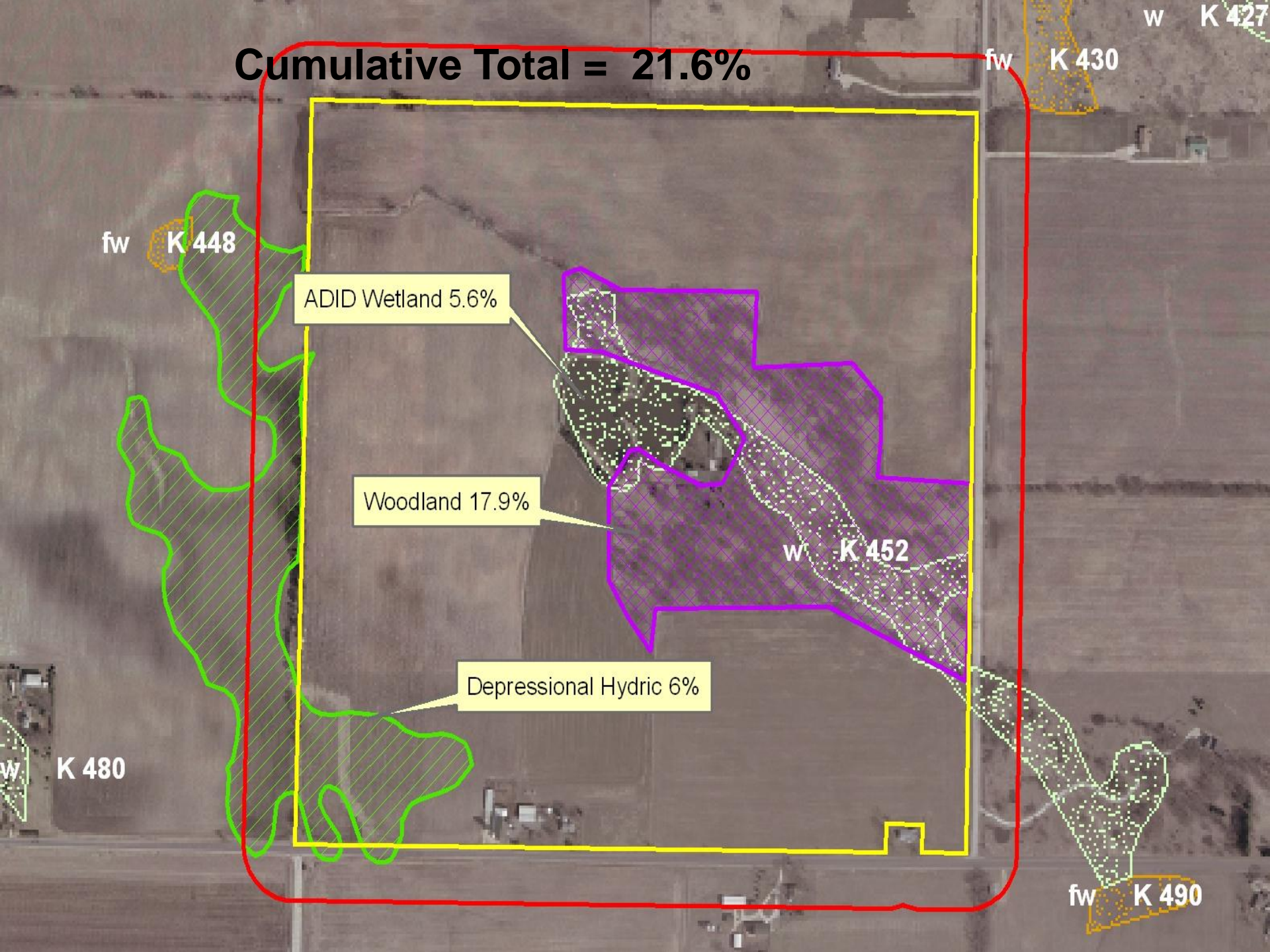
Woodland 17.9%

Depressional Hydric 6%

w K 452

w K 480

fw K 490



Open Space Requirements

- **Minimum open space percentages for residential development vary depending on underlying zoning**
 - **Ranges from 40% for R1 to 70% for E5**
- **Common open space is preferred**
- **Deed restricted open space also is allowed**



Open Space Ownership and Funding

- **Ownership Options**
 - Homeowners Association
 - Donation to public or private conservation organization
- **Permanent Legal Protection Mechanism Required**
- **Funding Options**
 - HOA dues and/or capital contributions
 - Endowment fund: e.g., percentage of sales or re-sales
 - Back-up SSA (at County discretion)





Resources:

Chicago Metropolitan Agency for Planning
(CMAP)

“Conservation Design Resource Manual”,
2003.

The Ecological Planning and Design
Directory

[http://www.nipc.org/environment/sustainable/.](http://www.nipc.org/environment/sustainable/)

Chicago Wilderness

“Conservation Development in Practice,” 2004

Low Impact Development (LID) Center,
www.lowimpactdevelopment.org.

Leadership in Energy and Environmental
Design (LEED)

[www.usgbc.org/DisplayPage.aspx?CategoryId=](http://www.usgbc.org/DisplayPage.aspx?CategoryId=19)
19

Sustainable Sites Initiative

<http://www.sustainablesites.org/>