

Project Planning & Siting Issues for Wind Farms in Indiana



Indiana Wind Work Group 6th Meeting

September 17, 2007



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Agenda

1

Overview of Siting Requirements

2

On-Time & Within Budget

3

Critical Siting Issues

4

Managing the Siting Process



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1

What are Siting Issues?

IWWG Siting Committee's Issues List (April 2007)

- Wind resource availability
- Land Acquisition
- Permitting/Policy directives
 - Zoning
 - Environmental
 - FAA & Military Radar
 - Traffic & Building Permits
- Decommissioning standards & Requirements
- Transmission
- Small wind v. utility scale



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What are Siting Issues?

IWWG Siting Committee's list addresses some basic questions:

1. What kind of a project?
2. Can you build it here?
3. What do you need to know?
4. How do you plug it in?
5. How do you get rid of it when you are done?



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What are Siting Issues?

IWWG Siting Committee's List...

Question: Once you know you want to build it, what do you need to know to site your project?

- ✓ Wind resource availability
- ✓ Land Acquisition
- Permitting/Policy directives
 - Zoning
 - Environmental
 - FAA & Military Radar
 - Traffic & Building Permits
- ✓ Decommissioning standards & Requirements
- ✓ Transmission
- ✓ Small wind v. utility-scale



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Wind Project Siting Requirements

- NEPA/Federal regulatory compliance
- Local/State Permitting Zoning, Siting Restrictions, Ordinances
- Ecological
 - Wildlife, Avian Impacts, Bats, Endangered Species
 - Community Assessment/ Conservation
 - Wetlands Delineation, Permitting
- Cultural Resources Historic Properties, Archeology, Recreation, Aesthetics, Community Values



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Wind Project Siting Requirements

- NPDES, Erosion & Sediment Control, Floodplains
- Visual Impact Assessment: Viewshed, Photosimulation, Flicker
- Economic Impact
- Noise Mapping & Impact Assessment
- Traffic
- FAA
- Communications, Radar, & Microwave Impact Analysis



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Wind Project Siting Requirements

... some of these siting issues are unique to utility scale wind projects, but many are not

Unique challenges

- big wind projects
- new/developing siting requirements
- critical issues



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Wind Project Siting Requirements

... but before we start

Q: What are the biggest common challenges to developing a project?

1. Staying on Time
2. Staying within Budget
3. Oh yeah, that's right, those are related!



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Staying on Time & within Budget

Example Project Gantt Chart

ID	Task Name	2007	2008				2009				2010				2011		
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
1	Measure wind resource	[Gantt bar spanning all quarters from 2007 to 2011]															
2	Gain site control	[Gantt bar spanning Q4 2007 to Q3 2008]															
3	Critical Issues Analysis					[Gantt bar spanning Q3 2008 to Q4 2008]											
4	Env. Studies & Permitting					[Gantt bar spanning Q3 2008 to Q2 2009]											
5	Interconnection Agreements					[Gantt bar spanning Q3 2008 to Q3 2009]											
6	Power Purchase Agreement									[Gantt bar spanning Q1 2009 to Q3 2009]							
7	Financing													[Gantt bar spanning Q3 2009 to Q2 2010]			
8	Equipment Procurement									[Gantt bar spanning Q1 2010 to Q3 2010]							
9	Construction													[Gantt bar spanning Q3 2010 to Q3 2011]			
10	Operation																

2

Staying on Time & within Budget

- **Early project scoping**
- **Critical issues analyses (red flags, fatal flaws)**
- **Don't underestimate the time it will take to meet environmental requirements**
- **Remember that issues are interrelated**
- **Have a plan & use tools to manage critical issues**



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Critical Siting Issues

- What are the Critical Siting Issues?
- Understanding Siting Challenges
- Resolving Constraints & Optimizing Opportunities



3

Critical Siting Issues

Permitting: the changing landscape

- Current regulations
- Federal/State/Local/”Home Rule”
- Indiana
- What to expect
- New directions

ORDINANCE NO. _____

AN ORDINANCE AMENDING CHAPTER _____
OF ORDINANCE NO. _____
BEING THE UNIFIED ZONING ORDINANCE
OF TIPPECANOE COUNTY.

Be it ordained by the (County Commissioners of Tippecanoe County, Indiana; the Common Council of the City of Lafayette, Indiana; the Common Council of the City of West Lafayette, Indiana; the Town Council of the Town of Battle Ground, Indiana; the Town Council of the Town of Dayton, Indiana; and the Town Council of Clarks Hill, Indiana), that Ordinance No. _____, being the Unified Zoning Ordinance of Tippecanoe County is hereby amended as follows:

Section 1: Change **UZO Section 1-10-2 Words and Terms Defined** to add the following definitions:

Large Wind System. A **WECS** that has a nameplate capacity (manufacturer's rating) of more than 50 kilowatts per **wind tower**, or a **total height** of more than 100', or a **swept area** of more than 30'. Any **WECS** meeting one or more of these criteria shall be considered a **large wind system**.



3

Critical Siting Issues

Visual Impact Assessment

Purpose

- Evaluate the visibility of the proposed project
- Compare landscape with and without the project
- Provide information to decision makers & public
 - understand potential visual impacts
 - make an informed judgment about aesthetic impacts



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3 Critical Siting Issues

Visual Impact Assessment

- No specific Federal rules, regulations, or policies govern evaluation of visual resources
- Uses standards & procedures from
 - National Forest Service
 - Bureau of Land Management
 - Federal Highway Administration
 - State agencies



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Slide 15

k3

develop slide from text

ktyrell, 9/13/2007

3 Critical Siting Issues

Visual Impact Assessment

- Quantitative (how much is seen, from what locations = visual impact)
- Qualitative (how it will be perceived = aesthetic impact)

Steps:

1. Define existing landscape
2. Conduct visibility analysis
3. Identify sensitive aesthetic resources
4. Select key receptors
5. Depict the appearance of the completed facility
6. Evaluate aesthetic effects of the visual change from project construction & operation
7. Identify opportunities for mitigation



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Slide 16

k2

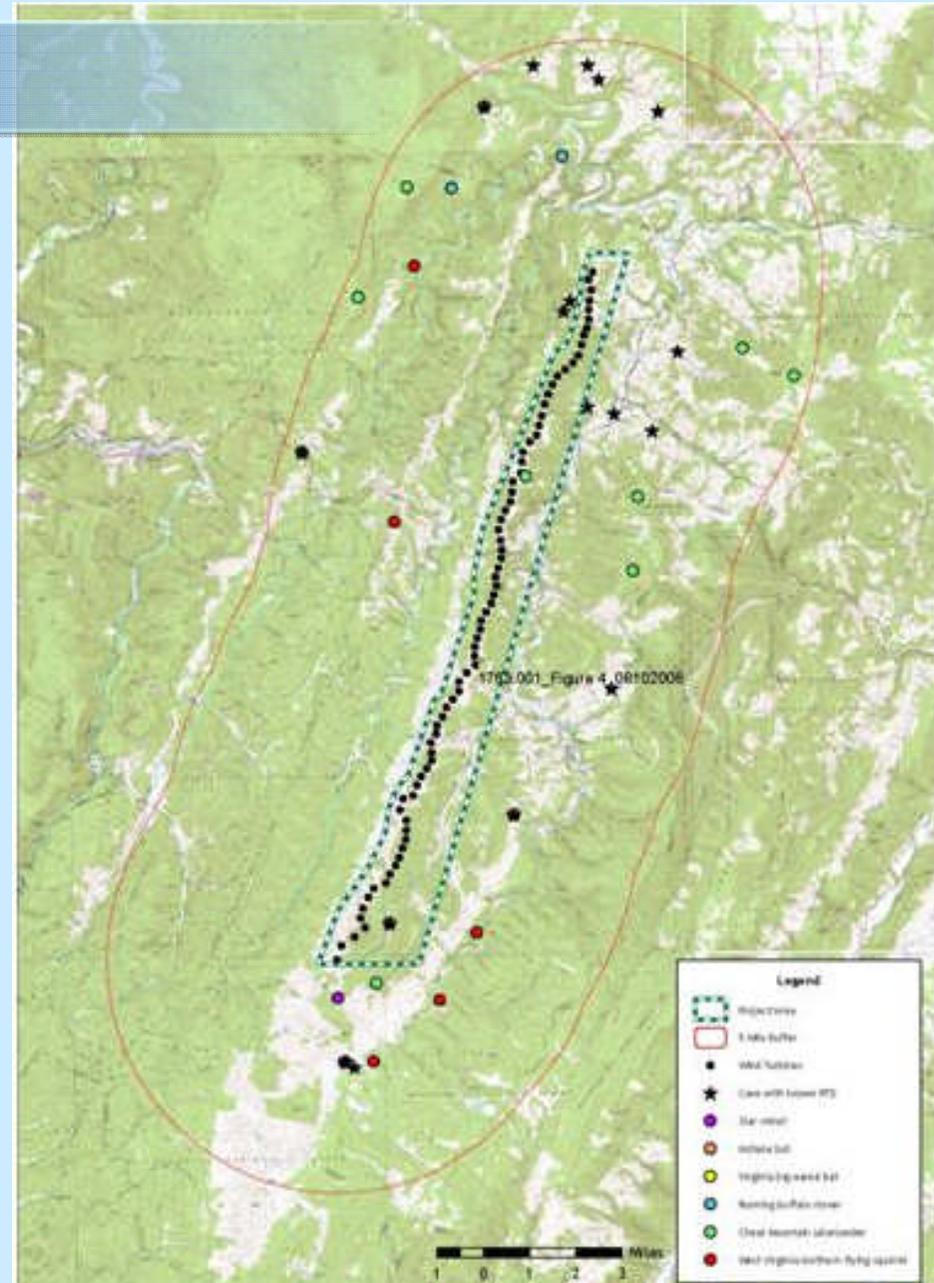
develop slide from text

ktyrell, 9/13/2007

3

Critical Siting Issues

Viewshed, example site layout with selected environmental features



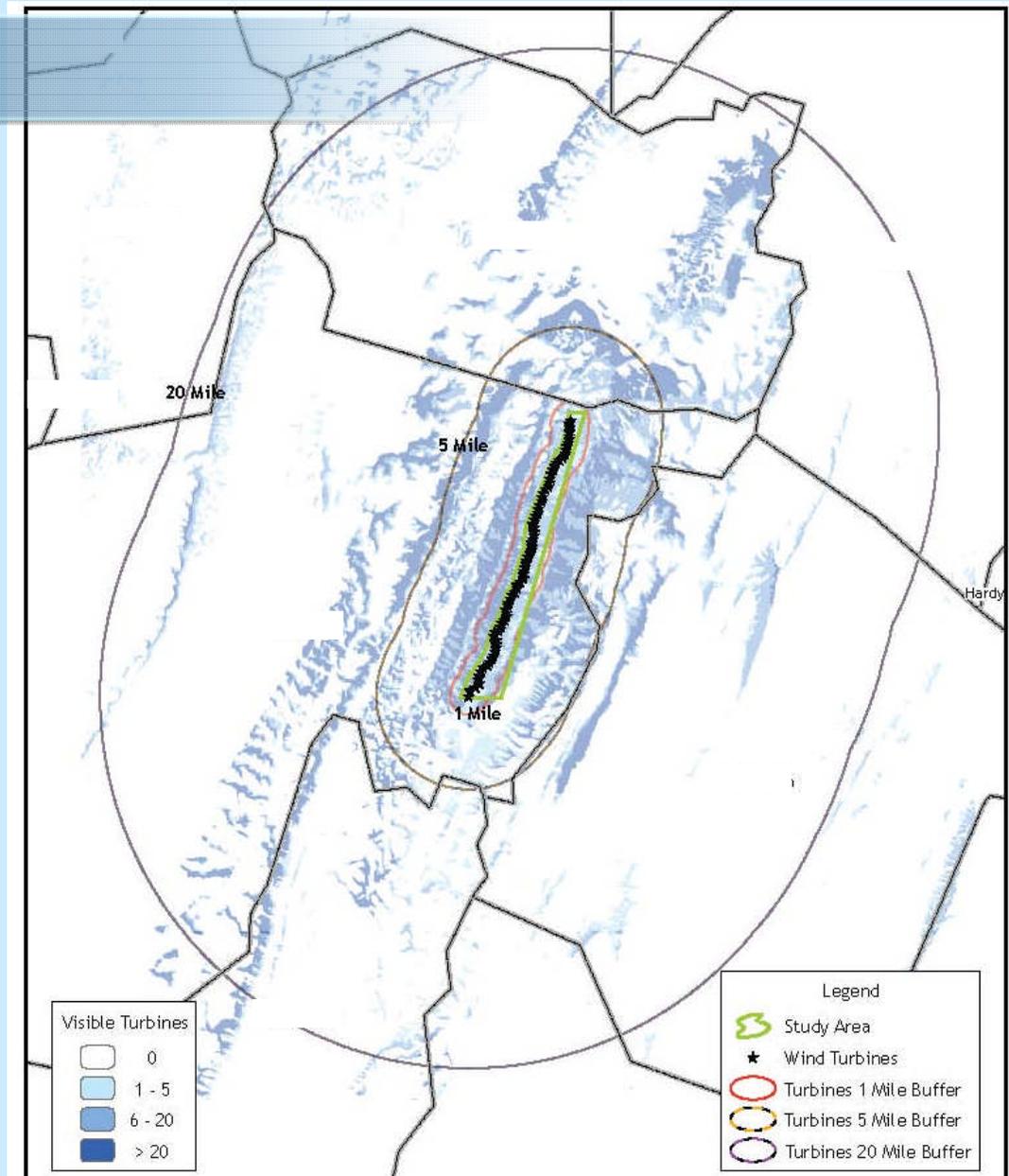
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3

Critical Siting Issues

Viewshed, Terrain only



3

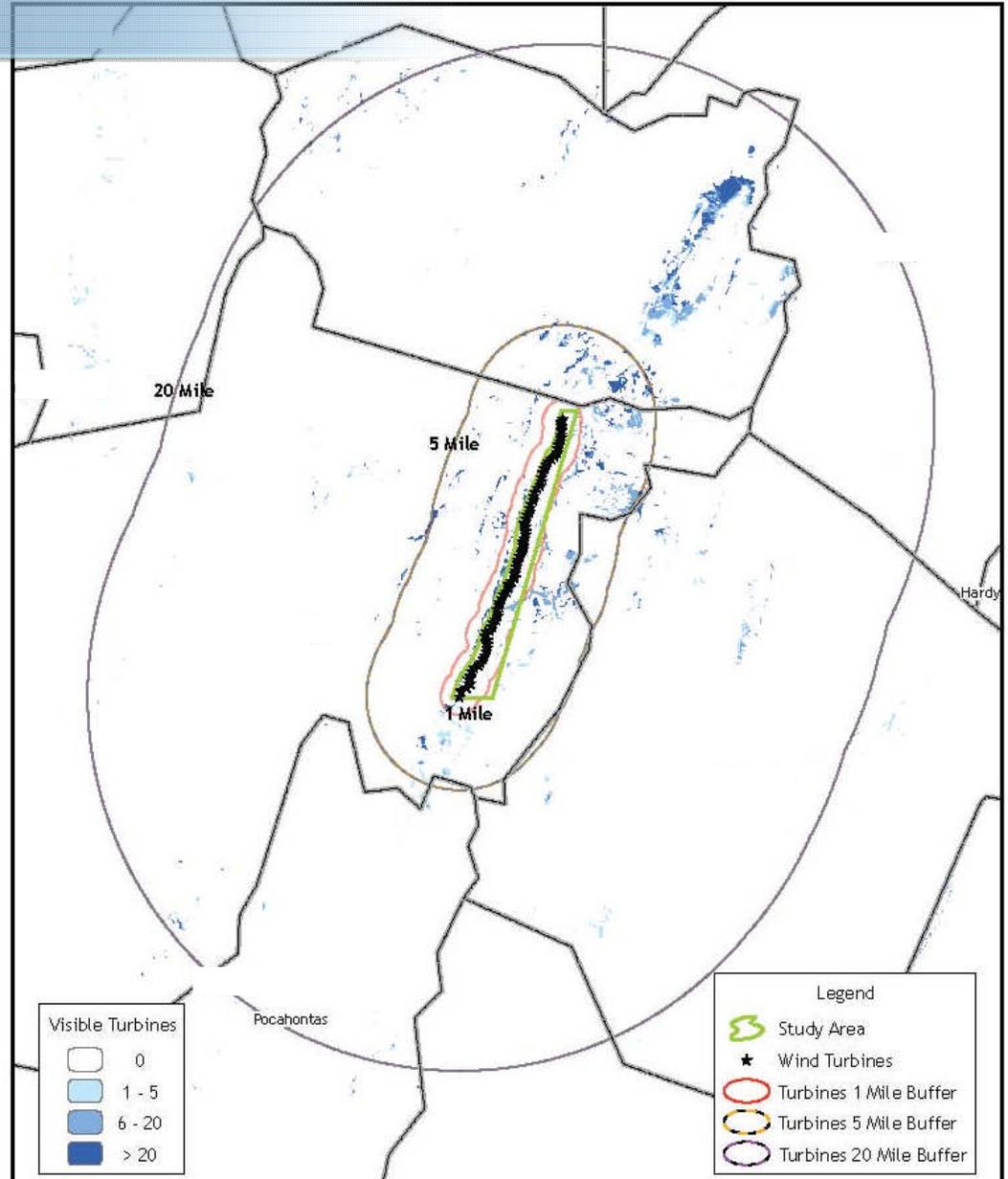
Critical Siting Issues

Viewshed, leaf-on



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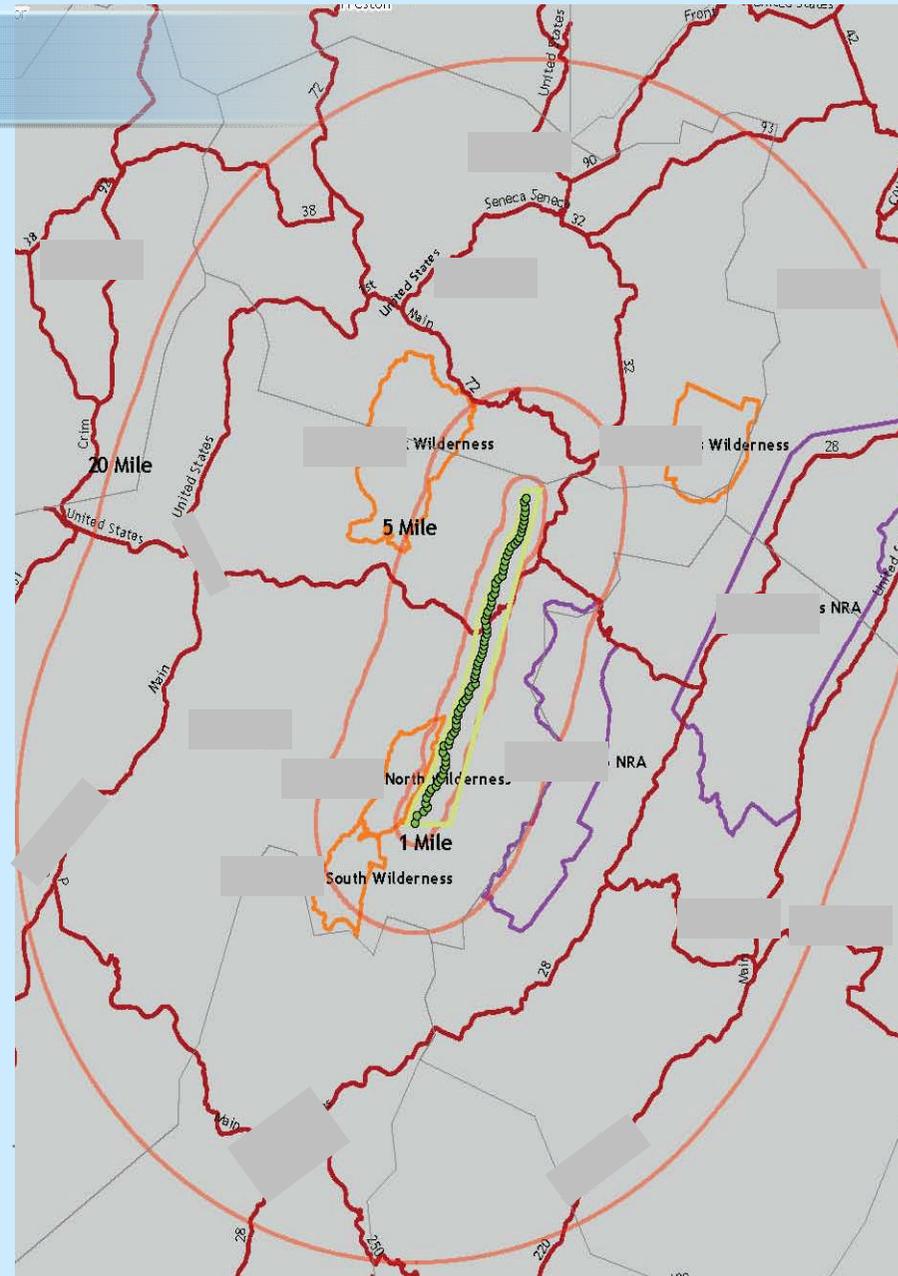
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3

Critical Siting Issues

Viewshed with sensitive aesthetic resources



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3

Critical Siting Issues

Photosimulation



3

Critical Siting Issues

Photosimulation



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Critical Siting Issues

Photosimulation



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3

Critical Siting Issues

Photosimulation



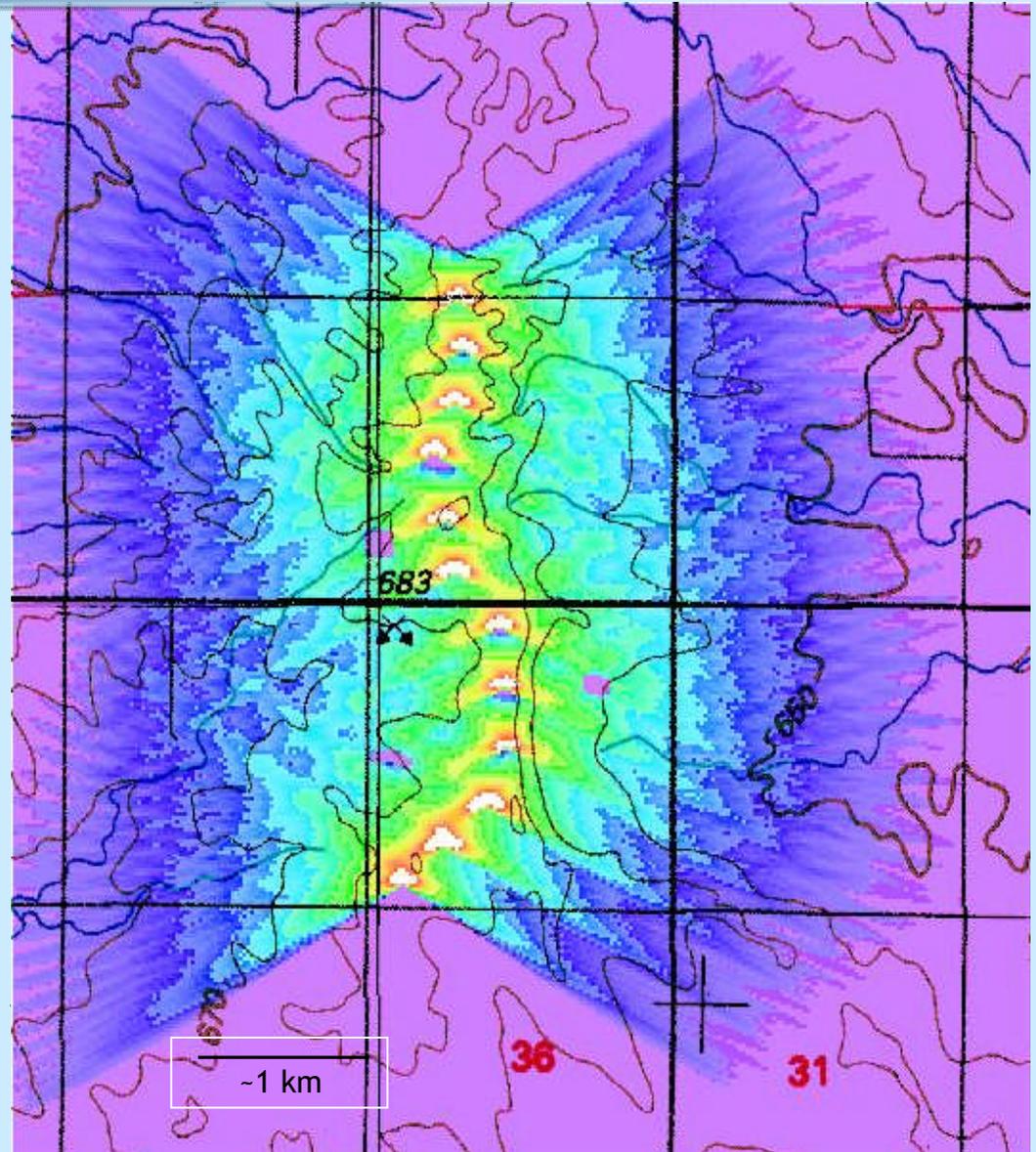
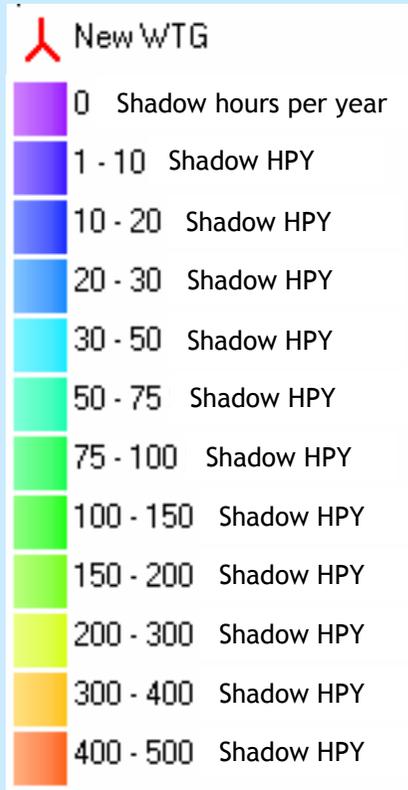
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3

Critical Siting Issues

Shadow Flicker



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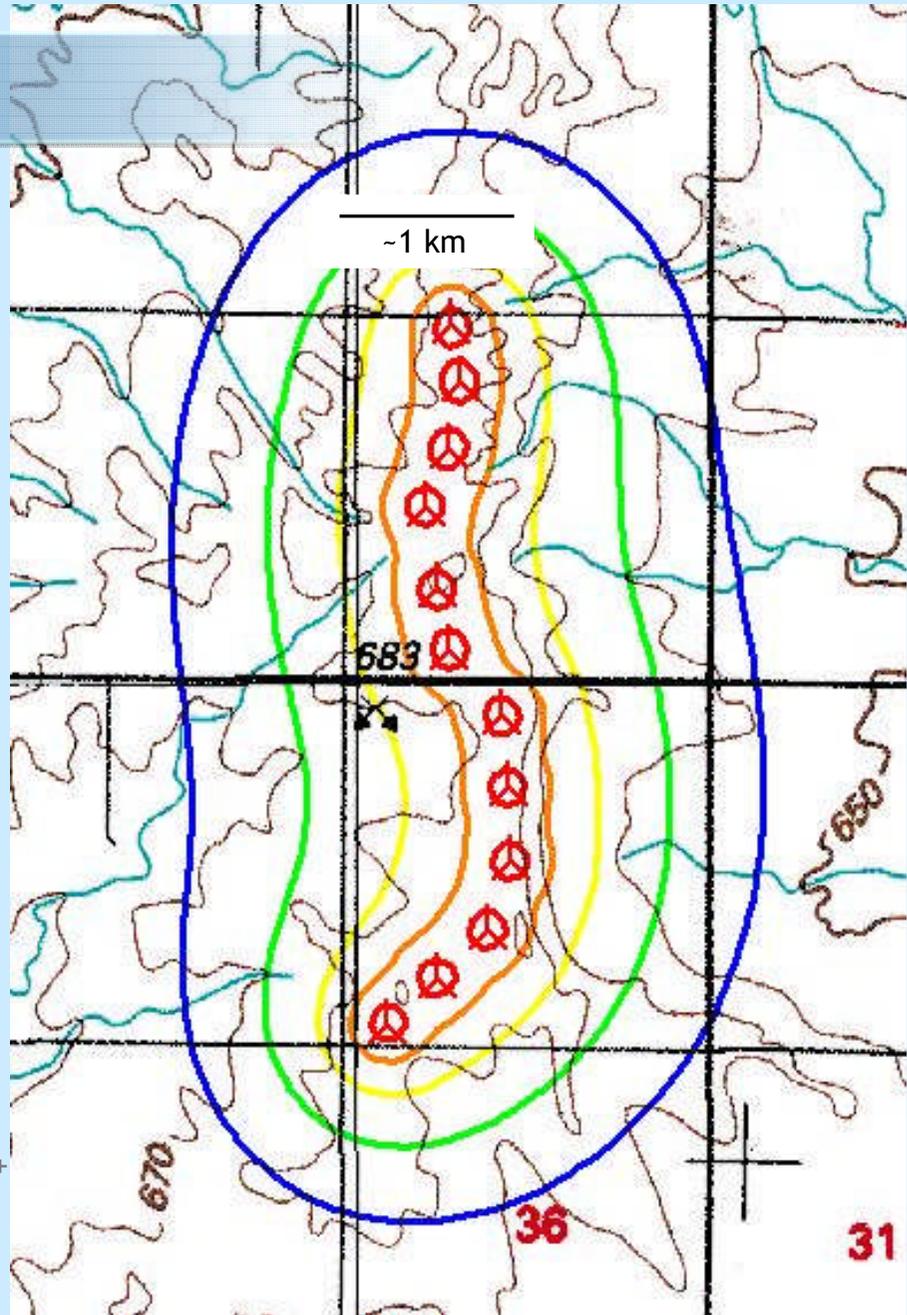
~1 km

3

Critical Siting Issues

Noise

-  New WTG
-  35 dB(A)
-  40 dB(A)
-  45 dB(A)
-  50 dB(A)
-  55 dB(A)



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Critical Siting Issues

Cultural Resources

- **Historic Properties (viewshed)**
- **Archeology**
- **Recreation**
- **Cultural/Community Value**



3 Critical Siting Issues

Avian & Wildlife Issues

- Bats
- Birds
- Threatened & Endangered Species
- Other Concerns: Habitat Fragmentation, Displacement
- Pre and Post-Construction Surveys



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Critical Siting Issues

Bats

- Endangered Species
- Non-listed Bats



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Critical Siting Issues

Birds

- **Migratory Bird Treaty Act**
- **Bald & Golden Eagle Protection Act**



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3

Critical Siting Issues

Other Environmental Impacts

- Wetlands
- Streams
- Natural Areas
- Wild & Scenic Rivers



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3

Critical Siting Issues

Other Environmental Impacts

- NPDES, Erosion & Sediment Control, Floodplains
- Traffic
- Economics



4 Managing the Siting Process

Bringing it all Together

- Visualize Your Project: GIS
- Watch Your Schedule: Gantt Charts

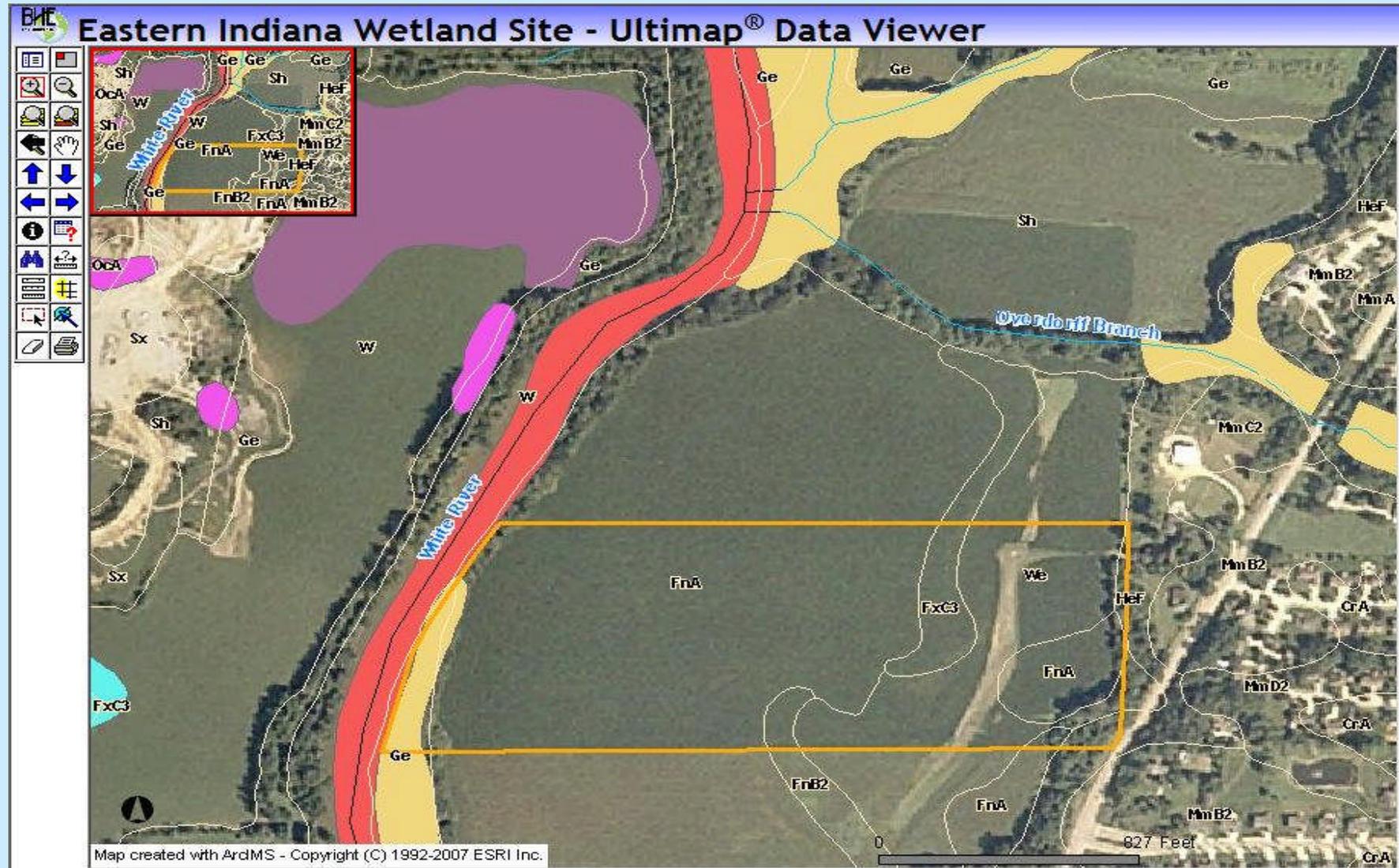


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4 Managing the Siting Process

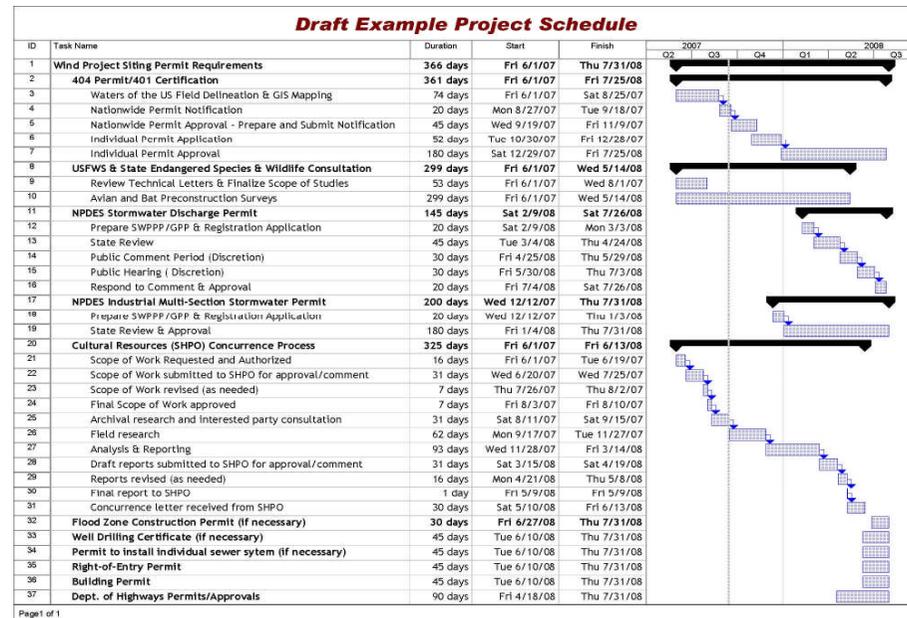
Visualize Your Project: GIS



4 Managing the Siting Process

Watch Your Schedule: Gantt Charts

ID	Task Name	Start	Finish	Duration	Sep 2005		Oct 2005			
					9/18	9/25	10/2	10/9	10/16	10/23
1	Task I Survey Services	9/16/2005	11/25/2005	51d	[Gantt bar]					
2	Task Ia Project Area Boundary	9/16/2005	11/25/2005	51d	[Gantt bar]					
3	Task Ib ALTA and Topo	9/16/2005	11/25/2005	51d	[Gantt bar]					
4	Task Ic Construction Staking	8/30/2005	8/30/2005	0d	[Gantt bar]					
5	Task Id As-Built Survey	8/30/2005	8/30/2005	0d	[Gantt bar]					
6	Task II Env Compliance, Surveys and Reporting	9/16/2005	11/8/2005	38d	[Gantt bar]					
7	Task IIa Agency Scoping	9/16/2005	9/23/2005	6d	[Gantt bar]					
8	Task IIb Wetland and Floodplain	9/26/2005	9/30/2005	5d	[Gantt bar]					
9	Task IIc NPDES/ECP	9/16/2005	9/23/2005	6d	[Gantt bar]					
10	Task IId Cultural and Historical Survey	9/26/2005	11/8/2005	32d	[Gantt bar]					
11	Task IId Comm/MW Impact Analysis	9/16/2005	10/31/2005	32d	[Gantt bar]					
12	Task IIe Noise Study	9/16/2005	11/2/2005	34d	[Gantt bar]					
13	Task IIg Visual Impact Analysis	9/16/2005	10/14/2005	21d	[Gantt bar]					
14	Task III OPSB Support	8/30/2005	2/3/2006	114d	[Gantt bar]					
15	Task IIIa OPSB Application (pertinent sections by BHE)	10/17/2005	11/11/2005	20d	[Gantt bar]					
16	OPSB Application Submitted (by others)	11/14/2005	11/14/2005	0d	[Gantt bar]					
17	Compliance Review (by OPSB)	11/14/2005	2/3/2006	60d	[Gantt bar]					
18	Task IIIb Response to OPSB Staff	1/2/2006	1/19/2006	14d	[Gantt bar]					
19	Task IIIc Attend OPSB Meetings	8/30/2005	8/30/2005	1d	[Gantt bar]					
20	Task IIId Defend Work Product	8/30/2005	8/30/2005	1d	[Gantt bar]					
21	Task IIId Participate in Public Meetings	8/30/2005	8/30/2005	1d	[Gantt bar]					
22	Task IIIf Post Application Participation	8/30/2005	8/30/2005	1d	[Gantt bar]					



Q&A

now...

Connect to the Grid (Next)



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