

# AGENDA

## RILEY COUNTY PLANNING BOARD

Monday, January 11, 2010  
7:30 p.m.

Commission Meeting Room  
Courthouse Plaza East

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### I. OPEN PUBLIC COMMENTS

### II. CONSENT AGENDA

1. Consider the minutes of the December 14, 2009 meeting.
2. Consider the Report of Fees for the month of December 2009.

### III. GENERAL AGENDA

1. Public Hearing at the request of the Board of County Commissioners of Riley County, Kansas for a **Special Use Authorization** to permit the construction and operation of seven (7) non-commercial wind and solar energy conversion systems.  
**ACTION NEEDED: Recommend approval/denial to the Board of County Commissioners**
2. Discussion with Joe Ryan – NexGen Energy Partners LLC – wind turbines to be located at Riley County High School and proposed regulation change.
3. Status report on new Zoning and Subdivision regulations.
4. Election of Officers.



# PLANNING & DEVELOPMENT

## STAFF REPORT

### Special Use Permit

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**PETITION:** (#09-17) Special Use Permit

**APPLICANT:** Board of Commissioners of Riley County  
110 Courthouse Plaza  
Manhattan, KS 66502

**PROPERTY OWNER:** same as above

**REPRESENTATIVE:** Rod Meredith  
6215 Tuttle Creek Blvd  
Manhattan, KS 66503

**TYPE OF REQUEST:** A Special Use Permit to allow for the construction and operation of seven (7) various types of non-commercial wind and solar energy conversion systems.

**SIZE OF TRACT:** The subject site is approximately 96.78 acres.

**LOCATION:** Generally located at the southwest corner of the intersection of Tuttle Creek Boulevard and Marlatt Avenue; Section 21, Township 9 South, Range 7 East; Wildcat Township.

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**BACKGROUND:** The subject site consists of three (3) tracts owned by the County to be used for the new County shops and facilities. In 1987, the easternmost portion of the site was rezoned from "G-1" (General Agricultural) to "D-3" (Heavy Industrial) (Petition #87-24), for the establishment of a stone cutting operation. In 1995, Board of Zoning Appeals approved a Conditional Use Authorization in the "G-1" (General Agricultural) zoning district (Petition # 95-39), for the area surrounding that portion of land zoned "D-3" (Heavy Industrial), to allow for publicly owned buildings & uses required for the operation of County. The development of these specific areas is presently on-going. In June 2006, a Special Use Permit (#06-14) was approved to allow for the construction and operation of a maintenance facility for the Riley County Parks Department and Emergency Management. Currently, a Special Use Permit is being requested to allow for the construction and operation of seven (7) various types of non-commercial wind and solar energy conversion systems (see attached description of the function of the utility).

**DESCRIPTION:**

Physical site characteristics: The subject site is currently developed with a mix of various structures and exterior storage areas, exhibiting little topographical variation. The western portion of the subject site consists primarily of open grassland, with only a small pocket of mature trees lining a small ravine at the northwest corner of the site.

General character of the area: The general character of the area is a mix of agricultural uses, open space; rural residential and public works shop buildings.

**SUITABILITY OF ZONING:**

Zoning History: (see Background)

Current zoning: The subject site is zoned "G-1" (General Agricultural) and "D-3" (Heavy Industrial). According to the site plan, the wind energy conversion structures will be located within the area zoned "G-1" (General Agricultural).

<b>SURROUNDING ZONING/LAND USE</b>		
	<b>ADJACENT ZONING</b>	<b>LAND USE</b>
<b>NORTH</b>	"C-4" (Highway Business) "G-1" (General Agricultural)	Open space and pasture
<b>SOUTH</b>	"A-5" (Single Family Residential)	residential
<b>EAST</b>	"G-1" (General Agricultural) w/conditional use "D-3" (Heavy Industrial)	Public facilities
<b>WEST</b>	"G-1" (General Agricultural)	residential

**POTENTIAL IMPACT:****Public facilities and services:**

Streets and bridges: The site has existing access to Tuttle Creek Boulevard (U.S. Hwy. 24), a two-lane, paved State highway.

Water and sewer: The construction and operation of the proposed structures will not utilize water or sewer.

Fire: Riley County Fire District #1 will serve the site. The primary responder is Keats Station #4, located at 3141 W. 69<sup>th</sup> Avenue and the secondary responder is Tattarrax Station #17, located at 2920 Marlatt Avenue.

Effect on public facilities and services: The wind turbines and solar systems being considered for the Riley County Public Works facilities will be constructed to help power the site and provide a model for other county operations throughout the State. Not only is this an opportunity for Riley County to save taxpayers money, the project will hopefully encourage schools, small towns and the agricultural industry to use wind, solar and geothermal renewable energy systems to power their operations.

**CONFORMANCE TO THE LAND USE PLAN:** According to the 2003 Manhattan Urban Area Plan, the subject site is located within the Northwest Planning Area. The projected land use for the subject property is a mix of public/semi-public, agricultural and rural residential uses. The proposed public/semi-public development of the area is consistent with the Comprehensive Plan.

Staff analysis: The request conforms to the goals and objectives of the Manhattan Urban Area Comprehensive Plan.

**COMMENTS AND CONCERNS:**

FORT RILEY: According to officials at Ft. Riley, the request is being reviewed to determine if the turbines at the Marlatt Road location will interfere with Fort Riley's radar.

**STAFF RECOMMENDATIONS:**

Staff tentatively recommends that the Planning Board forward a recommendation of approval to the Board of County Commissioners of a Special Use Permit to allow the construction and operation of seven (7) various types of non-commercial wind and solar energy conversion systems. Staff recommendation is contingent upon a report from Fort Riley officials stating that the request will not interfere with the installation's radar and is based on the following findings:

- The proposed zoning and existing uses of the subject property are compatible with those of surrounding properties;
- The subject site is located in an area that has existing industrial type uses;
- Surrounding development should not be negatively impacted by the request;
- It has been determined that the request meets the requirements of the Riley County Zoning Regulations and the Riley County Sanitary Code; and
- The request conforms to the 2003 Manhattan Urban Area Comprehensive Plan.

**POSSIBLE MOTION(S)**

**ACTION NEEDED:**

A. Move to approve the request for a Special Use Permit for the subject property for the following reasons:

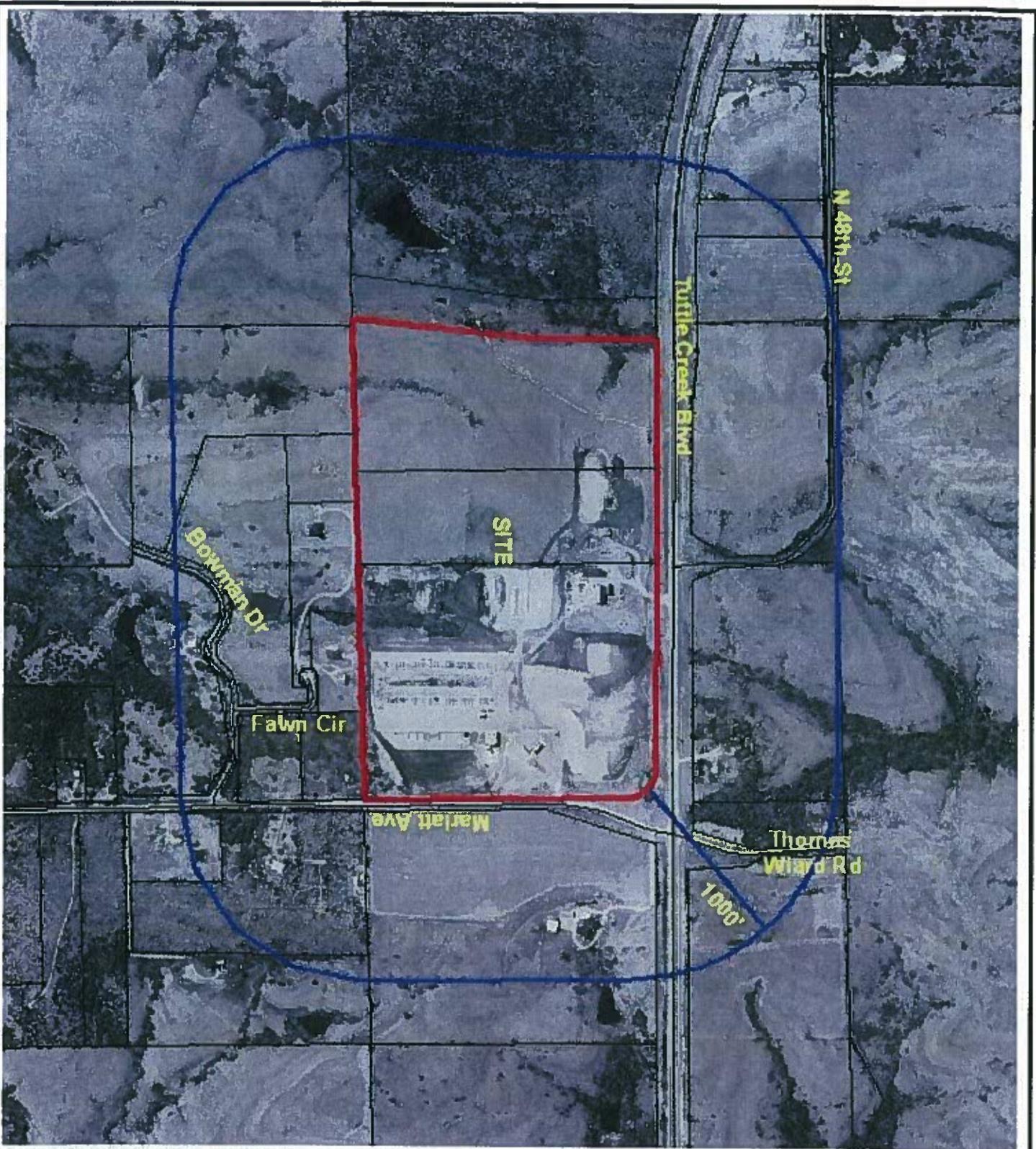
**Or**

B. Move to deny the request for a Special Use Permit for the subject property for the following reasons:

**ATTACHMENTS:**

- Vicinity/site map
- Surrounding zoning map
- Site map
- Description of the function of the utility

Prepared by: Bob Isaac, Planner  
January 5, 2010



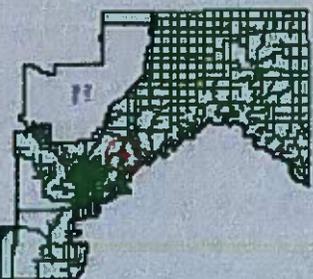
## VICINITY & SITE

Board of Commissioners  
of Riley County, Kansas

Petition #09-17

Special Use  
Seven Non-Commercial  
Wind/Solar Energy  
Conversion Systems

21-9-7





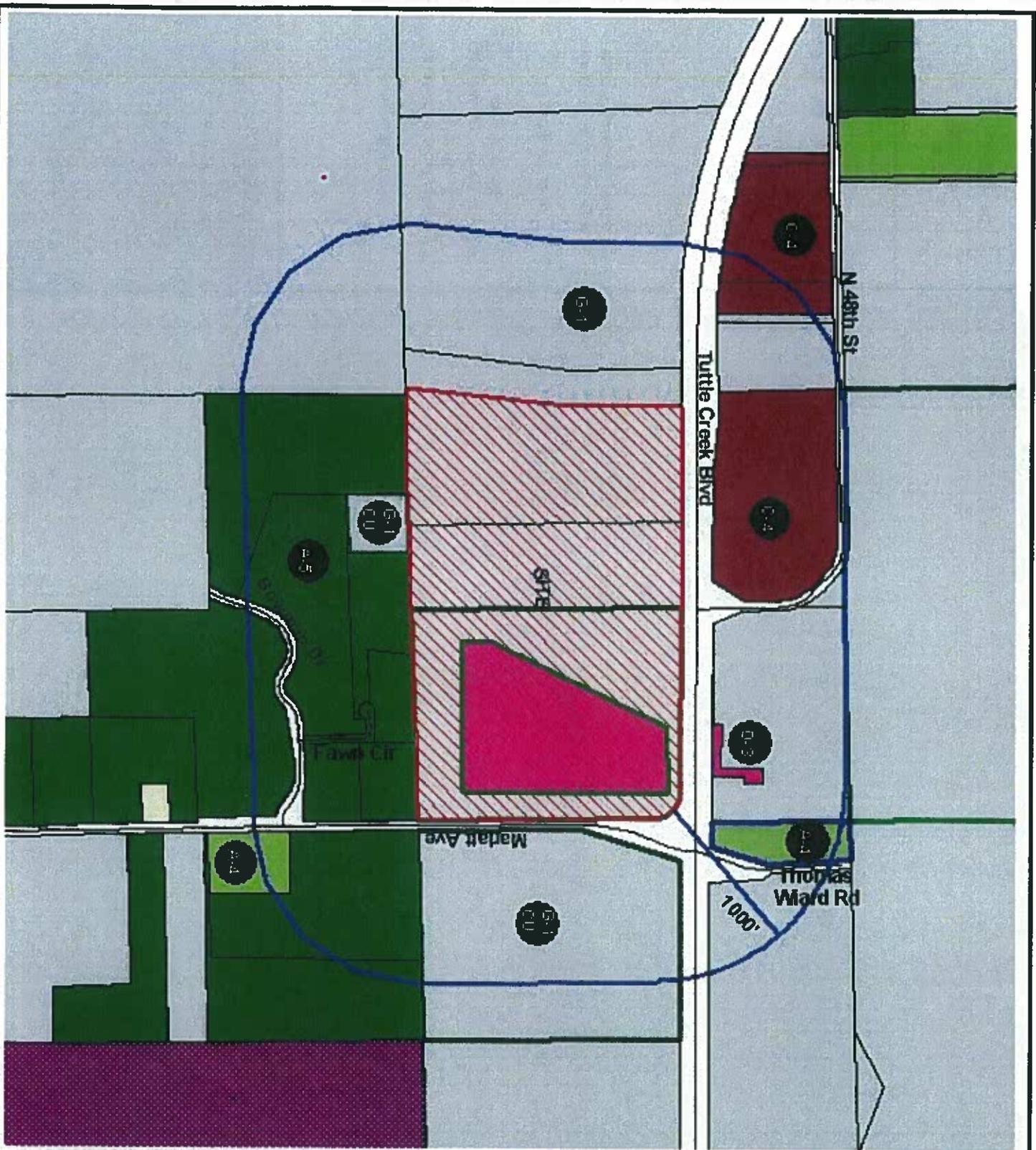
# SURROUNDING ZONING

Board of Commissioners  
of Riley County, Kansas

Petition #09-17

Special Use  
Seven Non-Commercial  
Wind/Solar Energy  
Conversion Systems

2-19-7



Distances

0-1/4	0-1/2	3/4	1	1 1/4	1 1/2	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100
0-1/4	0-1/2	3/4	1	1 1/4	1 1/2	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100

# SITE AND SURROUNDING AREA

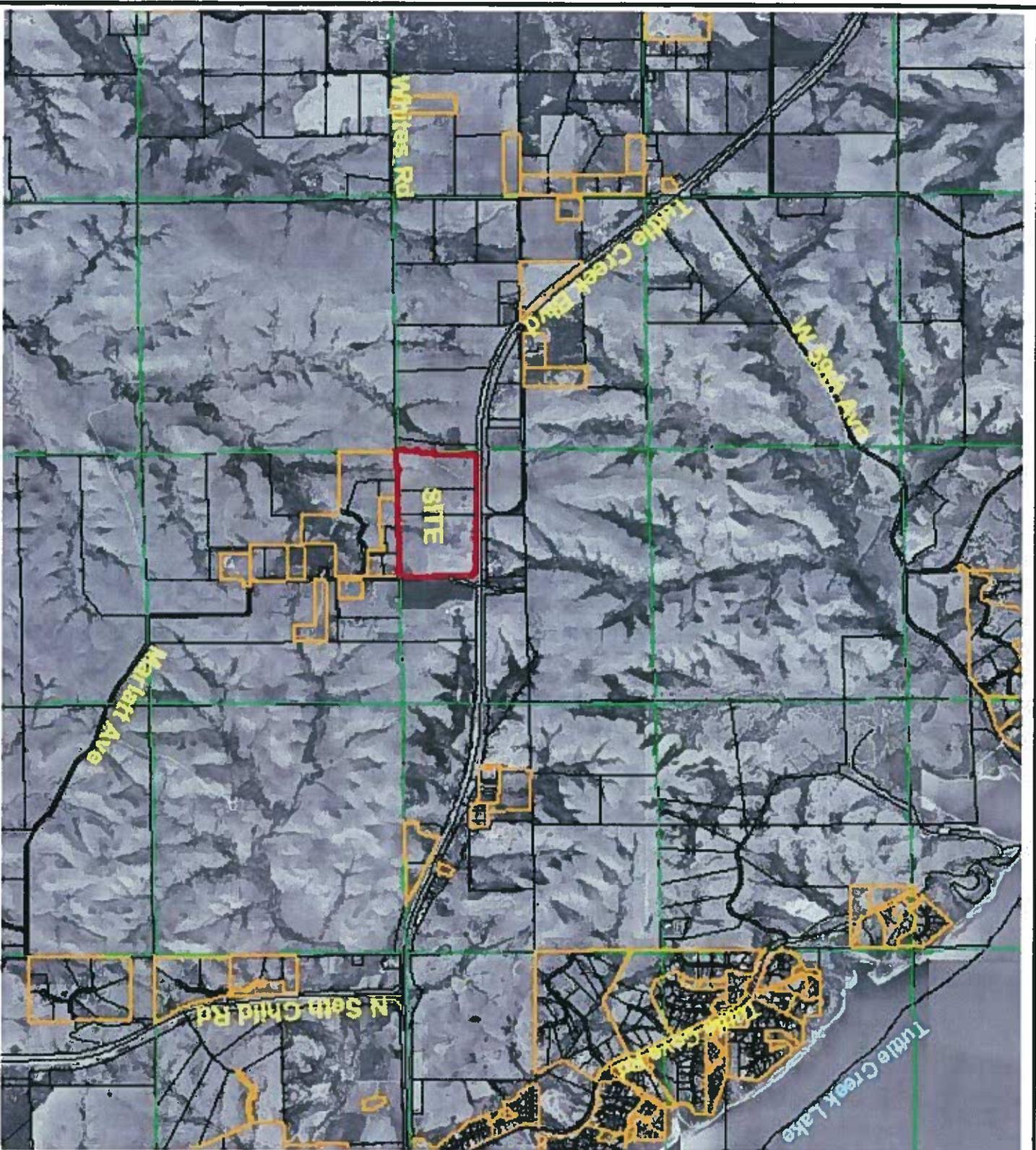


Board of Commissioners  
of Riley County, Kansas

Petition #09-17

Special Use  
Seven Non-Commercial  
Wind/Solar Energy  
Conversion Systems

2-1-9-7



Description of the  
Function of the Utility  
and the  
Extent of the Public Interest to be Served

March 12, 2009

On behalf of the Riley County Board of Commissioners, please consider our request to partner with us to install wind turbines and solar technologies at the Riley County Public Works facility located near Manhattan, KS.

Various companies have inquired about our project and have shown interest in participating by providing equipment, funding and technical support for renewable energy technologies. These companies see our facilities as an outstanding opportunity to display their equipment for viewing by many people throughout the Midwest.

The wind turbines and solar systems being considered for the Riley County Public Works facilities will be constructed to help power the site and provide a model for other county operations throughout the state. This demonstration project will encourage schools, small towns, and the agricultural industry to use wind, solar, and geothermal renewable energy systems to power their operations.

The Kansas Energy Council's 2006 report cites projections that the State of Kansas will employ several thousand people as wind and solar projects enter full operation. As these projects move from development into construction and operations, the demand for skilled employees will increase. Our plan, with the help of our educational partners, will provide a quality training site to develop skilled technicians and provide a showcase for the general public.

If your company or agency is interested in becoming involved with this project, please contact the Riley County Commission at 785-537-6300 or Rod Meredith, Asst. Director of Public Works, at 785-539-2981 (rmeredith@rileycountyks.gov).

Respectfully,  
Riley County Board of Commissioners

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Alvan Johnson, Chair



## **Riley County Public Works Operations Complex:**

In July of 2008, Riley County relocated their public works operations to new energy efficient facilities located just outside of the city of Manhattan, Kansas. The new facilities replaced aging 55 year old structures that were located near the center of town. The project completed a multi-year master plan which involved the relocation of five departments and ten crews to a 96 acre site with improved highway access and ample storage space for materials and equipment.

A majority of the buildings at the new site are utilitarian pre-engineered metal buildings with the exception of the Operations and Training Center. The Operations and Training Center was designed as an agrarian structure with an added level of refinement to let visitors to the site know that this building should be their initial destination.

The facility utilizes many energy efficient systems and is designed with an open structure that allows natural light to filter into all of the interior spaces. The structure consists of open web trusses with structural insulated panels for the roof and a pre-cast concrete floor slab which creates secure storage vaults and a tornado shelter in the walk-out lower level. A geo-thermal heating and cooling system, central control system, highly efficient T-5 lighting, natural lighting, thermo-pane windows, and 8 – 10 inches of insulation in the walls and ceilings help to reduce energy costs.

### **How the project benefits the citizens of Riley County:**

Because of the efficient features used in the construction of the new Riley County Public Works Operations facilities, the county has the best of all worlds: increased safety, comfort and productivity for county employees and decreased energy consumption and costs, all while saving taxpayer dollars and helping the environment.

Making an investment in energy efficient lighting and using geothermal heat pumps has resulted in:

- A short payback period from the initial up front investment
- Lower electricity bills
- Reduction of greenhouse gas emissions
- Use of a 100% renewable energy source
- Reduction in the use of combustible fuels

In the basement of the new operations and training center is a state-of-the-art training room that is fully equipped for large meetings and training sessions. It has a kitchen that will accommodate the preparation and serving of full meals for up to 127 people. Having a training room on site reduces fuel costs and other travel expenses that would normally be incurred when attending sessions out of town.

This complex will provide a teaching lab for area schools and will encourage small towns, homeowners, and the agricultural industry to use wind, solar, and geothermal renewable energy systems to power their operations.

## **Special Features:**

Energy efficient T-5 and T-8 florescent light fixtures and compact fluorescents were used extensively throughout the Operations and Training center, fleet maintenance shop and crew buildings. The result of natural lighting from sky lights and large windows, coupled with T-5 and T-8 light fixtures reduce energy costs for lighting up to 75% (in comparison to conventional lighting).

By utilizing a geothermal system, no gas or electricity is needed to heat or cool the air throughout the operations and training center. Water is circulated in a closed loop piping system that is routed through 44 wells that are 250 feet deep. Heat pumps utilizing ground-circulated water reduce energy costs by 60% over a conventional HVAC system.

The heating and cooling system in the operations and training facility and the floor heat in the fleet maintenance shop facility are integrated into a central control system. This system provides automatic controls to regulate heating and cooling from one location. Utilizing the central control system will reduce energy costs up to 15%.

A modern heat pump type heating and cooling system is utilized for the office areas in the operations and training center, fleet maintenance shop facility and crew buildings. Heat pump systems typically save 15-20% in energy costs over conventional HVAC systems.

A radiant gas heat system was installed overhead in the fleet maintenance shop. Radiant gas heat is considered to be the most energy efficient heating system for large open facilities. An in-floor heating system was installed in the fleet shop and in the vehicle wash bay. This system utilizes piping in the concrete floor to store and emit heat for maintaining constant heat and provide quick recovery.

The ventilation system in the fleet maintenance shop consists of three exhaust fans with a heat recovery system. The recovery system improves

energy efficiency by providing heated makeup air when fans are engaged to reduce loads on other heating systems.

An automatic vehicle wash system was installed to reduce costs for washing vehicles and equipment. It was costing \$35 to \$45 per wash and took an hour per vehicle to use a regular car wash facility. It takes 5 minutes to wash a vehicle with this system and the cost is less than \$10 per wash.

### **Future Development:**

A concept to install three wind turbines of various sizes ranging from 50 KW to 750 KW along with several PV and thermal solar panel systems has been presented to Board of County Commissioners.

The use of photovoltaic solar panels is planned to power signage, yard lighting and some building operating systems. Thermal solar panels are being pursued to assist with heating domestic water and seasonally pre-heat in-floor heating systems. Waste oil heating systems will be utilized in two facilities for heating shop and storage areas utilizing 13,000 gallons of waste oil collected annually by the household hazardous waste collection facility.

The renewable energy systems at the Riley County Shop Facility are located in close proximity to the Manhattan Area Technical College and other educational institutions including Kansas State University and several local high schools. All of the systems at the shop complex will be made available for use in teaching renewable energy efficiency concepts.

There are two significant power transmission lines running adjacent to the property. Electricity produced from the wind turbines and solar panels will be utilized to assist with the power demands for the Riley County Shop Facilities. Any excess power will be returned to the grid for use by the power company.

The equipment installed at this facility will be showcased as a place for citizens to learn about a variety of renewable energy systems for use by home owners, the agricultural industry, or small communities. Several state and county officials have already toured this highly visible facility.

The Riley County Public Works Operations and Training Center includes the following energy efficient and renewable energy systems:

Energy efficient light fixtures

Natural lighting from large energy efficient windows and skylights

Extra insulation throughout all facilities

Geothermal heating and cooling

Centrally controlled heat pump HVAC systems

Radiant gas heat systems and radiant in-floor liquid heating systems

Heated makeup air ventilation systems

Other renewable energy systems being evaluated include:

Wind turbines of various sizes (50kw, 200kw, 750kw)

Solar thermal panel systems

Solar photovoltaic panel systems

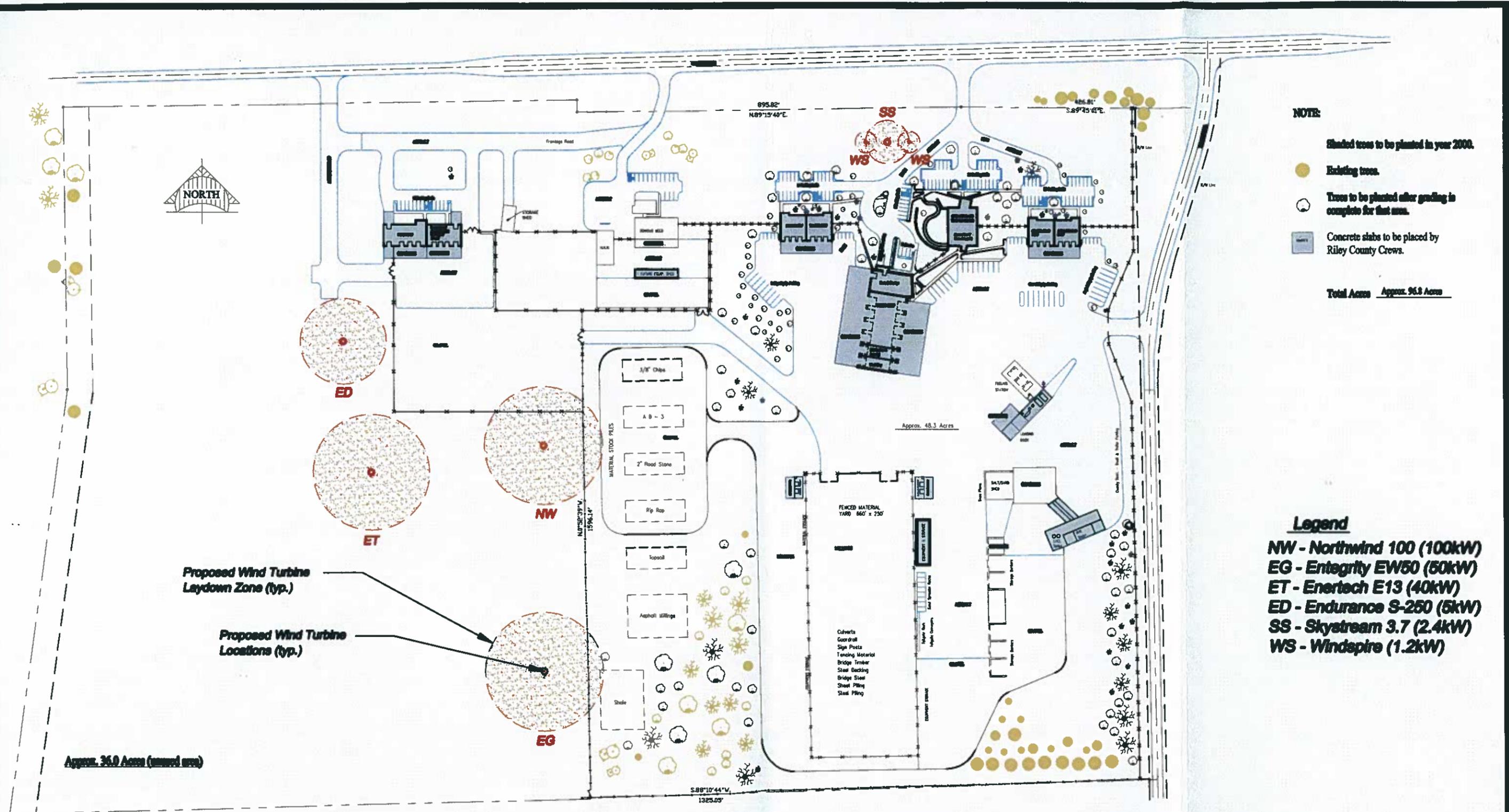
Waste oil furnace heating system

## **Summary:**

In 2007, Riley County received the Governor's Energy Efficiency Recognition Award from Kansas Governor Kathleen Sebelius for these facilities.

Riley County's vision for this project was *"To help save taxpayer dollars by being a leader in the State of Kansas in implementing renewable energy efficient systems at county facilities."*

By incorporating renewable energy systems, using energy savings to pay for upgrades, reducing utility costs, and providing an educational tool for the community and the state, this vision will be met.



**NOTE:**

- Shaded trees to be planted in year 2000.
- Existing trees.
- Trees to be planted after grading is complete for that area.
- Concrete slabs to be placed by Riley County Crews.

Total Acres Approx. 96.8 Acres

**Legend**

- NW - Northwind 100 (100kW)
- EG - Entegriy EW50 (50kW)
- ET - Enertech E13 (40kW)
- ED - Endurance S-250 (5kW)
- SS - Skystream 3.7 (2.4kW)
- WS - Windspire (1.2kW)

Approx. 36.0 Acres (shaded area)

	Northwind 100	Entegriy EW50	Enertech E13	Skystream 3.7	Endurance S-250	Windspire
	NW	EG	ET	SS	ED	WS
rated power (kW)	100	50	4000	2.4	5	1.2
tower height (ft)	121	120	120	45	100	30
fence	no	yes	yes	no	no	no
tower type	monopole	lattice	lattice	tilt-up	monopole	monopole
rotor diameter (ft)	60	49.2	44	12	18	4

**PLAN VIEW**  
Not To Scale

Drafted by W.L.S.  
Assistant Director \_\_\_\_\_  
County Engineer \_\_\_\_\_  
Date 12-2-09

**Riley County Public Works**  
Project No. 12045.99  
Wind Turbine Location

Sheet  
1 of 1



## MEMO

<input type="checkbox"/>	PLEASE COMMENT
<input type="checkbox"/>	PLEASE REPLY
<input type="checkbox"/>	URGENT
<input checked="" type="checkbox"/>	FOR REVIEW

Riley County Planning Board

January 5, 2010

Dear Board members,

Since the time the Wind Energy Conversion Systems (WECS) regulations were adopted, there has been an increased state and national interest for renewable energy sources. Communities are strongly encouraged to formulate regulations that will make it more efficient for citizens to appropriately utilize renewable energy sources such as wind, solar and geothermal, while also protecting and maintaining community character. Recently, the Planning & Development Department has received several inquiries regarding private or non-commercial wind and solar energy systems. Unfortunately, it was noted that many of the proposals cannot meet the maximum height requirement of the non-commercial WECS, as defined in Section 22 of the Riley County Zoning Regulations.

Most recently, Joe Ryan, Regional Manager of NexGen Energy Partners, LLC, contacted this office with a similar inquiry. He stated that their company has been working with the Riley County school district to possibly install 2-100 kW wind turbines at the Jr/Sr High Campus north of Riley. These machines are just shy of 200' tall. He explained that they are installing a similar project at Southeast of Saline schools in Saline County and have successfully applied for a conditional use permit. He emphasized that this will be a nice project for the school district. It's a 1 to 1.2 million dollar project that will offset around 40% of the building's electrical usage. Mr. Ryan explained that, unfortunately, there is no option for the company to lower the height of the towers (under 150'). He explained that the machines are the smallest that are economically viable for the company to install and operate.

Thus, the solution was proposed to keep the maximum height requirement for a non-commercial WECS in place, but amend Section 20-Board of Zoning Appeals of the Riley County Zoning Regulations giving the Board of Zoning Appeals the authority to increase the maximum height of non-commercial WECS by no more than 33%. A sample of the Notice of Public Hearing outlining the proposed amendment is included for your review. Mr. Ryan wishes to present the reasons for the proposed amendment.

If you have any questions or need additional information, I can be reached at 537-6332 or emailed at [risaac@rileycountyks.gov](mailto:risaac@rileycountyks.gov) Thanks!

Bob Isaac  
Planning & Development  
110 Courthouse Plaza  
Manhattan, Kansas 66502



value; provided that the use of the structure is not changed nor its size increased.

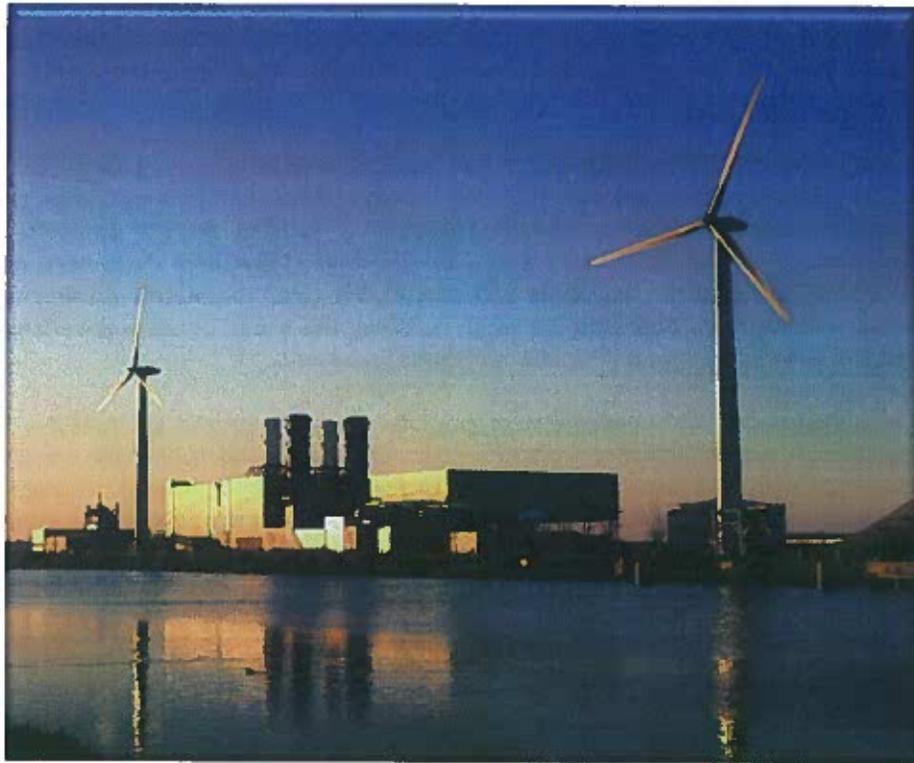
You are hereby notified that the Manhattan Urban Area Planning Board will hold a public hearing concerning the aforesaid amendment. Said hearing is to be held **Monday, June 2, 2010 at 7:00 PM** in the City Commission Meeting Room, City Hall, 11th & Poyntz, Manhattan, Kansas.

You are further notified that the Riley County Planning Board will also hold a public hearing concerning the aforesaid amendment. Said hearing is to be held **Monday, June 9, 2010 at 7:30 PM** in the Commission Meeting Room, 1<sup>st</sup> Floor, Courthouse Plaza East, 115 North 4<sup>th</sup> Street, Manhattan, Kansas.

Manhattan Urban Area Planning Board  
of Riley County, Kansas

Riley County Planning Board  
of Riley County, Kansas

**In order to comply with provisions of the Americans with Disabilities Act (ADA), Riley County will make reasonable efforts to accommodate the needs of persons with disabilities. Please contact the Division of Human Resources at (785) 565-6464 for assistance.**



**NexGen Energy Partners**  
Boulder, CO

**Statement of Qualifications**

1881 9<sup>th</sup> Street, Suite 120 • Boulder, CO 80302  
[www.nexgen-energypartners.com](http://www.nexgen-energypartners.com)  
303-440-6262



## **Company Description**

NexGen Energy Partners, LLC is a unique distributed renewable energy service company providing commercial and industrial customers with cutting-edge clean energy solutions. NexGen's in-house financial and technical experts work with communities, electric utilities, colleges and universities, schools, businesses and government agencies to implement customer-located renewable energy systems used to control long-term energy costs. NexGen's team has global experience with distributed wind, solar and biomass energy technologies, as well as deep expertise in project assessment, financial modeling, design and development, operation and maintenance, and sustainable business practices. NexGen's business approach is focused on the complete implementation of renewable energy systems at the customer's site. In exchange, NexGen's customers purchase the energy produced by the system at an attractive, stable and predictable rate. NexGen's turnkey approach empowers organizations to maintain focus on their mission while receiving the broad benefits of renewable energy without capital investment, and without technical, financial, nor operational risk.

NexGen works with customers who consume large amounts of electricity and are sensitive to the rising cost of energy. By combining substantial expertise from the financial services and renewable energy sectors, we work efficiently and effectively with our equipment and installation partners to provide a comprehensive, least-cost solution to our customers. NexGen is self-financed with immediate access to significant capital and can purchase equipment and implement projects in a very short time frame with minimal transactional costs. NexGen is proud to work with organizations that share our commitment to sustainable and affordable energy sources.

## **History**

NexGen Energy Partners, LLC was formed in 2007 to change the way American businesses and communities are powered. NexGen's mission is to supplement our customer's increasingly expensive energy with clean, affordable, fixed-cost renewable energy produced at the customer's location. NexGen allocated significant resources to designing and perfecting its unique business model and formulating its capital structure. Our team of financial and renewable energy experts was assembled to identify and procure high performance, reliable technologies and to ensure we bring the best energy solutions to our customers at an affordable price.

## **Team Information**

### **Ronald M. Abramson, Chairman and CEO**

Ronald Abramson brings considerable experience in the financial industry to bear in his work in the renewable energy sector. Prior to NexGen, Ronald spent over a decade as CEO of a specialized financial services company with 1,200 employees operating in 22 states, where he was responsible for managing total assets exceeding \$20 billion. Ronald has also served as President and CEO of Independence Biofuels, a cutting edge biofuels manufacturer committed to developing sustainable fuel solutions. Ronald's deep business experience is matched by his relentless enthusiasm and dedication to the renewable energy sector exemplified by his service on the Board of Advisors for the George Mason University Center for Climate Change.

### **John M. Brown, President**

John Brown is responsible for day-to-day operations of NexGen. John spent over ten years in the oil and gas sector working for companies including Chevron and BP, followed by four years at the National Renewable Energy Laboratory where he managed the State and Local Initiatives team. John's team provided technical, policy and business support to local, state and federal agencies including USDA and EPA. Most recently, John served as the

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[www.nexgen-energypartners.com](http://www.nexgen-energypartners.com)

303-440-6262



Managing Director of a distributed wind turbine manufacturing company, where he drove sales from less than \$1M to over \$14M per year in less than two years. John is recognized nationally as a leader in the distributed energy industry.

**Charles Newcomb, Chief Technology Officer**

Charles Newcomb oversees all technical decisions at NexGen. Charles is an internationally recognized engineering expert in distributed wind, solar and biomass energy systems. He spent over a decade at the Department of Energy's National Wind Technology Center, where he led a technical team in developing the USDA's \$25M renewable energy grant and loan program. Charles continued his work in the wind turbine manufacturing sector where he provided technical guidance and engineering support. He currently serves as Vice President of the Small Wind Certification Council's Board of Directors. He presents frequently on technical matters affecting the commercial-scale wind industry.

**Mark Boumansour, Vice President of Sales and Marketing**

Mark Boumansour oversees all sales efforts at NexGen. Most recently, Mark served as the Director of Sales at a leading manufacturer of distributed scale wind turbines, where he helped drive a 500% increase in company sales. Previously, Mark managed technical programs and accounts for Masco Corp., Emerson Electric, Precision Castparts Corp. and Phillips Plastics. Mark frequently speaks across the nation about the distributed solar and wind energy markets. Mark received his B.S. in Mechanical Engineering from Michigan State University.

**Ted Rose, Vice President of Business Development and Public Affairs**

Ted Rose oversees public affairs and renewable energy credit trading for NexGen. Prior to joining NexGen, Ted served as the Vice-President of Business Development for Renewable Choice Energy, the award-winning carbon offset and renewable energy credit provider. Ted was responsible for the first corporate sponsorship of a large-scale wind farm, Steelcase's Wege Wind Energy Farm in Panhandle, Texas. He has worked with Best Buy, Google, Citibank, and Whole Foods Markets on their renewable energy strategies. As a journalist, Ted wrote, edited and produced for The New York Times, Men's Journal, Slate, Salon, NBC News and others. He speaks at conferences and writes regularly about renewable energy and carbon markets. He is a graduate of Harvard College.

**Patrick Kelly, Vice President of Operations**

Patrick Kelly is responsible for the cost-effective development and operation of NexGen's fleet. Patrick has worked as the lead Project Manager on hundreds of cellular communication towers, critical back-up power platforms and wind turbine system projects throughout the United States. He has provided outstanding project management services to major corporations including Cricket Communications, Lucent, Sprint, AT&T and Qwest as well as served as President of his own communications consulting firm. Patrick is experienced in large tower construction and possesses the in-field and administrative skills that are crucial to understanding, implementing and completing projects in a timely and cost effective manner.

**Stephanie Savage, Senior Analyst**

Stephanie Savage leads the technical analysis team at NexGen. Stephanie spent three years at the National Renewable Energy Laboratory (NREL), providing programmatic and analytical support on renewable energy and energy efficiency technologies and policies to state and local governments, the Department of Energy, and the USDA. Following her work at NREL, Stephanie led economic and wind resource analysis for a wind turbine manufacturing and project development company. Stephanie received her M.S. in Mineral Economics from Colorado School of Mines.



### **Robyn Kullas, Project Manager and Environmental Specialist**

Robyn Kullas brings significant experience to NexGen's project management, environmental and regulatory compliance team. Prior to NexGen she worked at Veritas, a major international environmental consulting firm, performing environmental site assessments and NEPA screenings. She provided federal, state and local regulatory compliance assistance within the telecommunications, retail, and manufacturing industries throughout the United States. Robyn has also provided compliance support to state transportation and federal air force base facilities. Robyn received her M.A. in Energy and Environmental Analysis from Boston University and her undergraduate degree from University of Connecticut.

### **Lauren Cooper, Curricula Specialist**

Lauren Cooper oversees curricula development for NexGen's customers. Lauren worked at the Department of Energy's National Wind Technology Center where she performed power tests of small wind turbines. Lauren has worked closely with K-12 teachers and nearly 1,000 students to integrate engineering lessons that connect real-world experience with classroom curricula. Lauren has a B.S. in Mechanical Engineering from the Colorado School of Mines and M.S. in Building Systems from the University of Colorado. She is currently a PhD candidate at the University of Colorado.

### **Joe Ryan, Regional Manager**

Joe Ryan is the NexGen Regional Manager responsible for developing and supporting the Kansas market. Joe is a fifth generation Kansas rancher and lifelong resident of Saline County. Joe received his Bachelors Degree from Kansas State University in Animal Science and Industry and his Masters from Kansas State in Physical Education. Joe is currently a school board member of USD 306 Southeast of Saline and has formerly served on the board of directors for the Farmers Cooperative Association of Solomon and Talmadge. He has also served on the Saline County Extension Council and various church and civic boards and committees. Joe's family has farmed and ranched in Saline County since the 1870's and this has nurtured his sense of stewardship and conservation which led him to work in the renewable energy industry with NexGen.

### **Past Project Experience**

NexGen's team embodies extensive experience in developing distributed energy projects. Our years of hands-on experience, in all aspects of project development, ensure that there are few project challenges NexGen has not already addressed and overcome. Past projects include on-site systems installed at a variety of sites including K-12 schools, colleges, universities, water treatment facilities, municipal facilities, distribution facilities and manufacturing facilities in:

Alaska  
California  
Colorado  
Indiana  
Iowa  
Kansas  
Maine  
Massachusetts

Michigan  
Montana  
New Jersey  
Ohio  
Oregon  
Texas  
US Virgin Islands  
Canada



NexGen's core competencies include:

Project Feasibility  
Resource Analysis  
Financial Modeling  
Turbine Selection and Sourcing  
Utility Interconnection Agreements  
Curricula Planning and Development

System Design  
Site Acquisition/Zoning/Permitting  
Engineering and Construction Management  
Ongoing System Monitoring  
Operations and Maintenance Practices  
Green Power Marketing

### **Market Development Commitment**

NexGen's team has a long history and broad experience in the evolution of wind energy technology and project development. NexGen also has a sophisticated understanding of the optimum business model and the financial environment in which it is deployed. NexGen is uniquely positioned as a leader in the field of third-party owned, distributed renewable energy systems that offset retail rate power for customers at their facilities. The team's dedication to this approach stems from a belief in the tangible benefits that distributed energy generation offers to communities, schools, and local businesses including:

Energy Rate Stability  
Long Term Energy Savings  
Energy Security  
Risk Mitigation  
Cost Avoidance

Civic and Corporate Leadership  
Educational Value  
Environmental Sustainability  
Employee Morale  
Local Economic Development

### **Financial Capacity**

NexGen is a self-funded, privately held organization incorporated in the state of Maryland and headquartered in Boulder, Colorado - the heart of the nation's renewable energy economy. NexGen's founding partners understand the value and stability that comes with operating independently of the ebbs and flows of traditional commercial lending markets. NexGen is strategically structured and positioned to perform and execute large numbers of projects without the volatility and uncertainty inherent in working with traditional project finance and lending institutions.

NexGen welcomes questions regarding its financial structure and capacity. Ronald Abramson, NexGen's Chairman and CEO, is always available to answer inquiries about the impressive financial structure of NexGen.

### **Recent Publications and Presentations**

*Green Strategies & Financing Solutions for Your District*; Case Study, Dec. 1, 2009, OASBO 2009-2010 Workshop - Columbus, OH

*Financing Ohio's Renewable Energy*; Panelist, Oct. 14, 2009, Novogradac & Company LLP - Cleveland, OH

*Net Metering: A National Perspective*; Presentation/Panelist, Oct. 7, 2009, Kansas Wind and Renewable Energy Conference '09 - Topeka, KS



*AWEA Small and Community Wind Conference and Exhibition, Program Co-Chair, Nov. 3 - 5, 2009 - Detroit, MI*



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The City of Medford, Massachusetts owns a Northern Power Systems Northwind 100 wind turbine sited at McGlynn Elementary & Middle School.

## Wind for Schools Affiliate Programs

The U.S. Department of Energy's (DOE's) Wind for Schools program is designed to raise awareness about the benefits of wind energy while simultaneously developing a wind energy knowledge base in future leaders of our communities, states, and nation. To accommodate the many stakeholders who are interested in the program, a Wind for Schools affiliate program has been implemented. Individual K-12 schools or states that join the affiliate program will not receive financial support from DOE and the National Renewable Energy Laboratory (NREL), but they will receive access to technical assistance, program Web sites, and information. The program is designed to support schools that wish to implement wind-related educational curricula and install a Wind for Schools wind turbine system or states that intend to implement a statewide program.

In both cases, a key element of the program is to install small wind turbines at K-12 schools to be used in combination with age-appropriate, hands-on, wind-related curricula taught in science classes. The standard Wind for Schools system is further described in the Wind for Schools Project Power System Brief (available at [www.nrel.gov/docs/fy09osti/45685.pdf](http://www.nrel.gov/docs/fy09osti/45685.pdf)), but the system can include other turbines if appropriate. State-

based programs would support the implementation of a Wind Applications Center (WAC) at a local engineering university or college to lead efforts to implement Wind for Schools systems at multiple state K-12 schools.

The two affiliate programs are described in detail below.

### Individual K-12 Wind for Schools Affiliate Program

The K-12 Wind for Schools affiliate program is designed to support the implementation of an education program at a K-12 school with staff interested in incorporating wind energy into existing educational programs.

#### Program Support

Although the DOE's Wind for Schools program will not provide monetary support to an affiliate K-12 program, it will provide support in other areas. As a Wind for Schools K-12 affiliate, a school's staff will gain access to:

- Project implementation documents, including interconnection specifications and foundation information

- Hardware and software developed for the Wind for Schools system at costs equivalent to those paid by other Wind for Schools host schools
- Limited technical assistance during the implementation of the Wind for Schools system
- Program-sponsored teacher-training programs
- The Wind for Schools host schools' system database to support expanded educational opportunities
- The Wind for Schools environmental benefit sales process to allow the affiliate school to obtain outside funding to support the system implementation
- The National Energy Education Development (NEED) Project's curricula kits on a short-term loan basis to enable schools to complete the full NEED curricula model (as available).
- Install a Skystream (or equivalent) wind turbine at the school and utilize specific hardware (approved as appropriate for any state incentives)
- Install a compatible data logger and make the data from the wind turbine available on the Wind for Schools Web site so that other schools can access it for educational purposes
- Obtain all necessary funding to implement the project (the Wind for Schools program will offer some support in obtaining funds)
- Assume responsibility for all turbine maintenance and engage with all relevant organizations (such as the local utility or energy cooperative) that would support maintenance
- Conduct education and outreach to the local community
- Report on installation(s) and share data pertaining to system costs.

### Program Expectations

The Wind for Schools program team expects that a school or school system interested in joining the affiliate program would engage in the following tasks:

- Incorporate the NEED Project's wind curricula into science classes



Photo credit: Andy Swapp/Pix14994

A Skystream wind turbine at Milford Elementary School in Milford, Utah.

If a school is unable to install a Wind for Schools system due to a lack of available land, permitting, or wind resource, the school may become an affiliate if staff members are interested in implementing the NEED Project's wind curricula and using data from other Wind for Schools system installations.

### Expected Costs

An individual system, excluding staff time to cover the development costs, is approximately \$20,000 (this includes the turbine, tower, control package, and curricula). Operational funding for the system is not expected to be significant and would likely involve an annual inspection and the potential for minor service-related issues. The Wind for Schools program can assist in identifying funding sources but will not provide direct funding.

### Application Process

School staff members interested in becoming a Wind for Schools K-12 affiliate should contact Ian Baring-Gould at (303) 384-7021 or [ian.baring-gould@nrel.gov](mailto:ian.baring-gould@nrel.gov).

### Statewide Wind for Schools Auxiliary Program

The statewide auxiliary program is designed to mirror the current Wind for Schools activities in other states. This includes implementing a WAC at a state-based university, creating a state facilitator position (if needed), and funding related program elements. The program goals would reflect those of the existing Wind for Schools program, including:

- Educating future wind applications personnel at universities
- Installing Wind for Schools systems at approximately five host K-12 schools per year
- Engaging with communities to convey the benefits and discuss the issues related to an expanded wind energy application.

### Program Support

By agreeing to establish a state-based Wind for Schools auxiliary program, a state program will gain access to a broad array of support services, including:

- Project implementation documents, including interconnection specifications and foundation information
- National program-produced Wind for Schools publications
- Benefits of lessons learned by other states that have already implemented the program
- Hardware and software developed for the Wind for Schools system at costs equivalent to those charged to other Wind for Schools programs
- Limited technical assistance during the implementation of the Wind for Schools systems
- Program-sponsored meetings, training programs, and informational summits
- The Wind for Schools system database to support expanded educational opportunities
- The Wind for Schools environmental benefit sales process to allow the affiliate school to obtain outside funding to support the system implementation.

### Program Expectations

A comprehensive, state-based Wind for Schools auxiliary program will be expected to:

- Provide funding and operational support to install a Wind for Schools system at the WAC to facilitate training and educational opportunities for WAC students at a college or university
- Identify funding for a state facilitator to work with the WAC and K-12 host schools on project implementation and integrate the state participants into the national Wind for Schools program
- Obtain all funding necessary to implement the program (some support for this process will be available through the national program on a case-by-case basis)
- Perform or promote education and outreach to local communities
- Purchase wind assessment/measurement systems to support resource assessments at schools (these systems are typically provided to the WAC and also provide an educational opportunity for students at the university or associated community colleges)
- Implement NEED-based teacher-training program(s)
- Purchase NEED curriculum kits for loan to K-12 host schools (typically through the WAC)
- Report installations and share data on system costs
- Attend national Wind for Schools summits and other related meetings



Photo credit: Judi Segler/Pix16254

Installing a Wind for Schools system at the WAC facilitates training and educational opportunities for WAC students at a college or university.

- Provide partial funding or support for wind equipment at host schools
- Ensure that each host school activity meets the requirements as defined above for individual K-12 school programs.

### Expected Costs

A fully comprehensive Wind for Schools state program including WAC, state facilitator, and initial equipment funding is approximately \$175,000 per year for 3 years.

This assumes that a small amount of the state funding, such as \$8,000 to \$10,000 per host school, will be applied to wind turbine hardware. Typical funding would include:

Wind Application Center:	\$60,000 / year
State facilitator:	\$30,000 / year
Host school system funding:	\$50,000 / year (assumes ~five systems per year)
State-based project oversight	\$10,000 / year
Meteorological towers	\$25,000 (first year)
Wind for Schools teacher training	\$25,000 (second and third years)



Photo credit: NexGen Energy Partners, LLC/PX1674

Two 100-kW wind turbines, installed and operated by NexGen Energy Partners, provide on-site electricity generation for Upper Scioto Valley School in McGuffey, Ohio. Besides offsetting 20% of the school's energy bill, the turbines bring wind energy to life for students.

### Application Process

Any state organization interested in hosting a Wind for Schools K-12 affiliate activity should contact Ian Baring-Gould at (303) 384-7021 or [ian.baring-gould@nrel.gov](mailto:ian.baring-gould@nrel.gov).

### Wind for Schools Equivalent Wind Systems

The Wind for Schools program has identified Southwest Windpower's Skystream 3.7 wind turbine as the primary turbine to be implemented at host K-12 schools. This turbine system was selected based on the following attributes:

- Manageable size (the nameplate power capacity of 2.4 kW is small enough to avoid a net-metering conflict with the local utility or power cooperative and to allow installation using local resources)
- Primary AC power production (ensures simple interconnection with a school's electrical systems)
- Guyed lattice and monopole tower options at multiple heights to ease installation

- Integrated data acquisition with Web-based monitoring capabilities
- Manageable total system cost that includes significant turbine price discounts from the manufacturer
- Proven company track record with a commitment to expand support for school-based wind systems and a nationwide support infrastructure to allow long-term installation, warranty, and maintenance support.

Other turbine technologies and sizes would be applicable, but they should be selected for their ability to meet the basic requirements listed above and to provide performance data for other Wind for Schools partners.



[www.windpoweringamerica.gov](http://www.windpoweringamerica.gov)  
U.S. Department of Energy

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

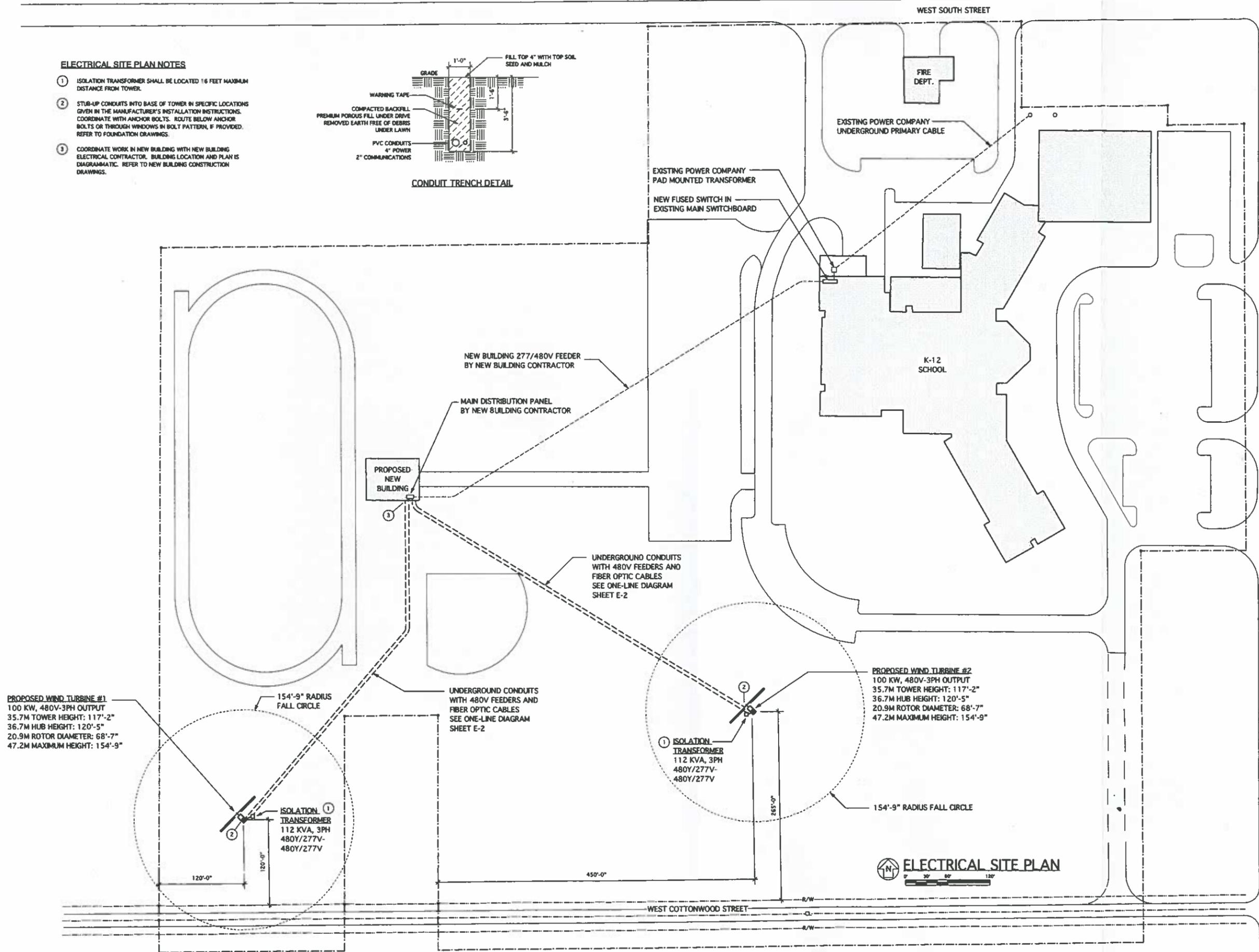
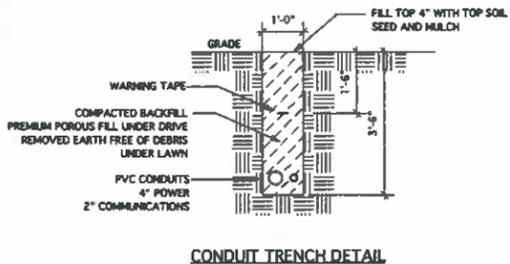
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1-877-EERE-INFO (1-877-337-3463)  
[www.eere.energy.gov/informationcenter](http://www.eere.energy.gov/informationcenter)

Prepared by the National Renewable Energy Laboratory (NREL)  
NREL is a national laboratory of the U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Operated by the Alliance for Sustainable Energy, LLC

DOE/GO-102009-2843 • December 2009

**ELECTRICAL SITE PLAN NOTES**

- 1 ISOLATION TRANSFORMER SHALL BE LOCATED 16 FEET MAXIMUM DISTANCE FROM TOWER.
- 2 STUB-UP CONDUITS INTO BASE OF TOWER IN SPECIFIC LOCATIONS GIVEN IN THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. COORDINATE WITH ANCHOR BOLTS. ROUTE BELOW ANCHOR BOLTS OR THROUGH WINDOWS IN BOLT PATTERN, IF PROVIDED. REFER TO FOUNDATION DRAWINGS.
- 3 COORDINATE WORK IN NEW BUILDING WITH NEW BUILDING ELECTRICAL CONTRACTOR. BUILDING LOCATION AND PLAN IS DIAGRAMMATIC. REFER TO NEW BUILDING CONSTRUCTION DRAWINGS.

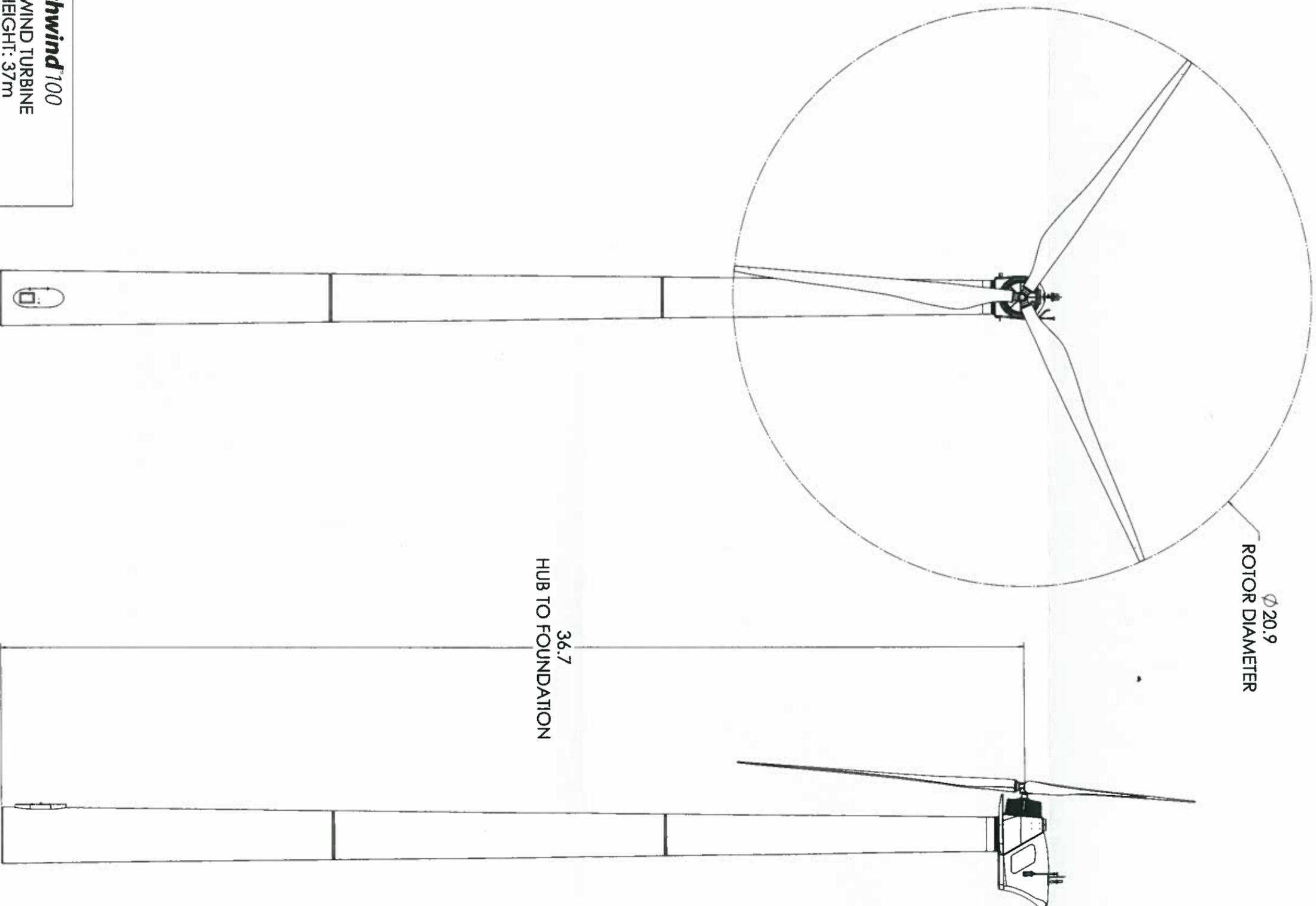


ISSUE	DESCRIPTION	DATE
P1 <td>REVIEW <td>03/30/09</td> </td>	REVIEW <td>03/30/09</td>	03/30/09
P2 <td>ADD P/L AND DIMENSIONS <td>04/07/09</td> </td>	ADD P/L AND DIMENSIONS <td>04/07/09</td>	04/07/09
C1 <td>FOR PERMITS <td>05/01/09</td> </td>	FOR PERMITS <td>05/01/09</td>	05/01/09

**WIND TURBINE INSTALLATION**  
**UPPER SCIOTO VALLEY SCHOOL DISTRICT**  
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**ENGINEERED PROCESS SYSTEMS**  
 P.O. BOX 471 • HURON, OHIO 44839  
 PHONE: (419) 433-7048 • FAX: (419) 433-6872

**DRAWING NUMBER**  
**E-1**



Ø 20.9  
ROTOR DIAMETER

36.7  
HUB TO FOUNDATION

**Northwind<sup>100</sup>**  
100kW WIND TURBINE  
HUB HEIGHT: 37m  
ROTOR DIAMETER: 21m

SCALE 1:50  
WHEN PRINTED ON ISO A0

ALL DIMENSIONS IN METERS  
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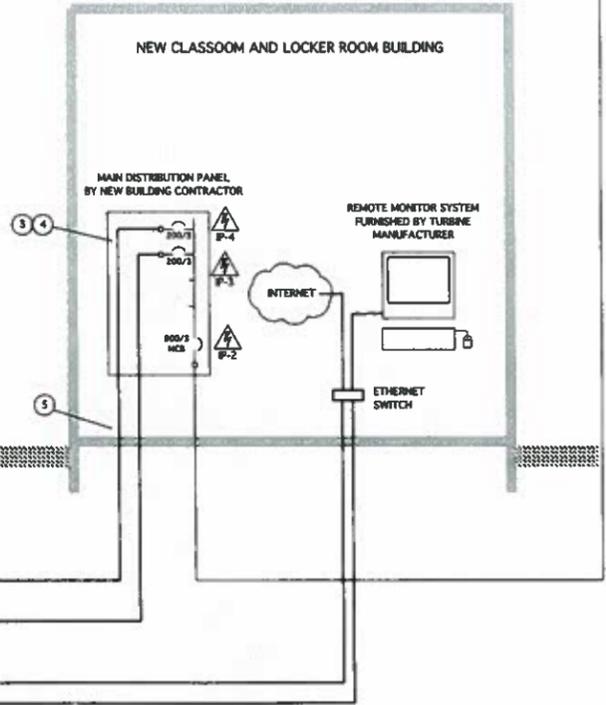
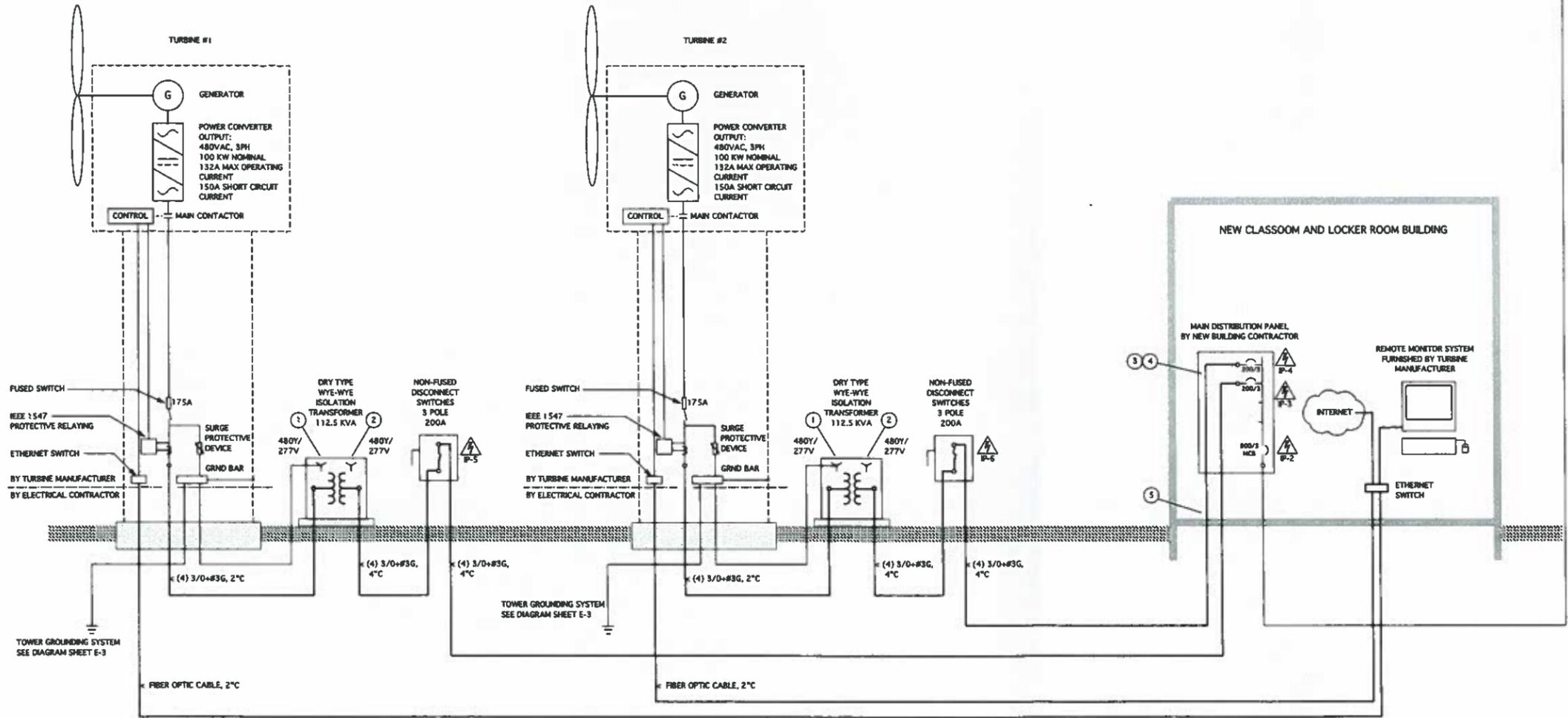
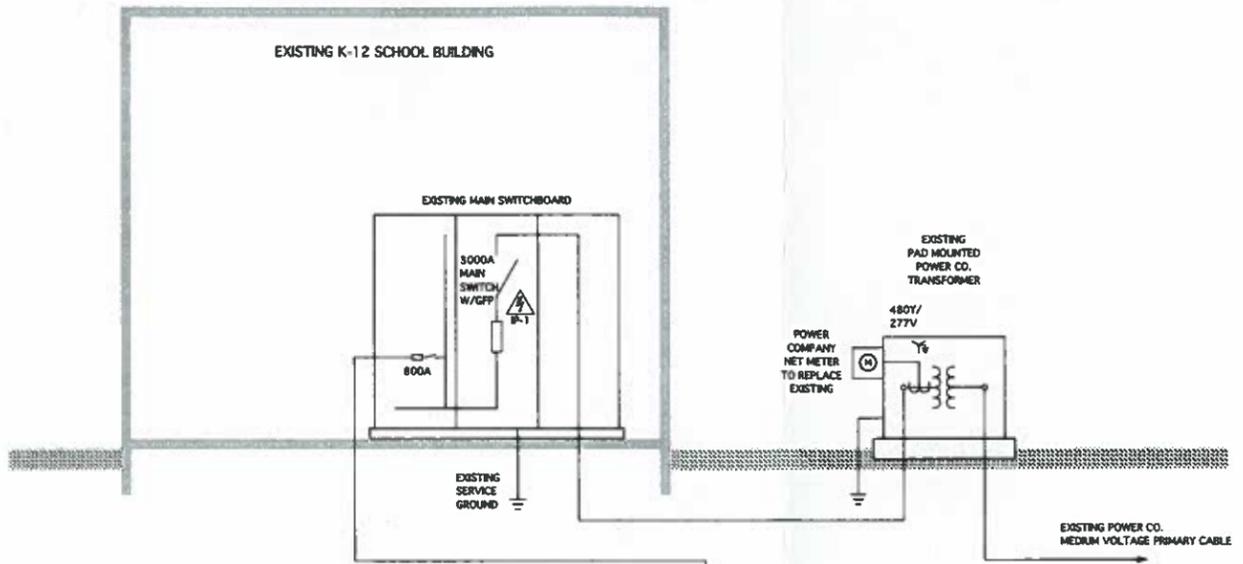


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MARK	LOCATION	DESCRIPTION	REFERENCE
IP-1	K-12 BUILDING SERVICE DISCONNECT SWITCH	UTILITY INTERCONNECTED POWER SOURCES ON PREMISES TWO 100 KW WIND TURBINES POINT OF CONNECTION: MAIN PANEL FOOTBALL FIELD BUILDING	NEC 705.10
IP-2	FOOTBALL FIELD BUILDING MAIN DISTRIBUTION PANEL	PANEL FED FROM MULTIPLE SOURCES: FEEDER FROM K-12 BUILDING MAIN SWITCHBOARD WIND TURBINE #1 UTILITY INTERACTIVE INVERTER WIND TURBINE #2 UTILITY INTERACTIVE INVERTER	NEC 705.12(O)(4)
IP-3	FOOTBALL FIELD BUILDING MAIN DISTRIBUTION PANEL TURBINE #1 CONNECTION CB	WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	NEC 705.12(D)(7)
IP-4	FOOTBALL FIELD BUILDING MAIN DISTRIBUTION PANEL TURBINE #2 CONNECTION CB	WARNING INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	NEC 705.12(O)(7)
IP-5	TURBINE DISCONNECT	WARNING INTERCONNECTED POWER SOURCES ALL CONTACTS MIGHT BE ENERGIZED	NEC 705.22
IP-6	TURBINE DISCONNECT	WARNING INTERCONNECTED POWER SOURCES ALL CONTACTS MIGHT BE ENERGIZED	NEC 705.22



**ONE-LINE DIAGRAM NOTES**

- 1 GROUND NEUTRAL OF TURBINE SIDE OF TRANSFORMER BY BONDING TO TOWER GROUNDING SYSTEM WITH #1/0 MIN. COPPER CONDUCTOR. SEE GROUNDING DIAGRAM.
- 2 DO NOT CONNECT NEUTRAL OF GRID SIDE OF TRANSFORMER TO GROUND AT TRANSFORMER. NEUTRAL TO BE GROUND AT UTILITY SERVICE ENTRANCE SWITCH ONLY.
- 3 CIRCUIT BREAKERS FOR TURBINE CONNECTION SHALL BE SUITABLE FOR BACKFEED. COORDINATE WITH ELECTRICAL CONTRACTOR FOR NEW BUILDING.
- 4 THE TURBINE CONNECTION CIRCUIT BREAKERS SHALL BE POSITIONED AT THE OPPOSITE END FROM THE MAIN SUPPLY FEEDER BREAKER PER NEC 705.12(D)(7). PERMANENT WARNING LABELS SHALL BE PROVIDED PER INFORMATION PLATE SCHEDULE. COORDINATE WITH ELECTRICAL CONTRACTOR FOR NEW BUILDING.
- 5 ROUTE CONDUCTORS OUTSIDE BUILDING UNTIL NEAR POINT OF CONNECTION TO CIRCUIT BREAKER PER NEC 240-21(C)(4)



DATE	DESCRIPTION
03/30/09	REVIEW
04/03/09	REVISED FOR PERMITS
05/01/09	FOR PERMITS

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