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Weston & Sampson<sup>SM</sup>

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# Wind Turbine Relocation Study

Falmouth Board of Selectmen

October 15, 2018

# Wind Turbine Relocation Study

## Purpose

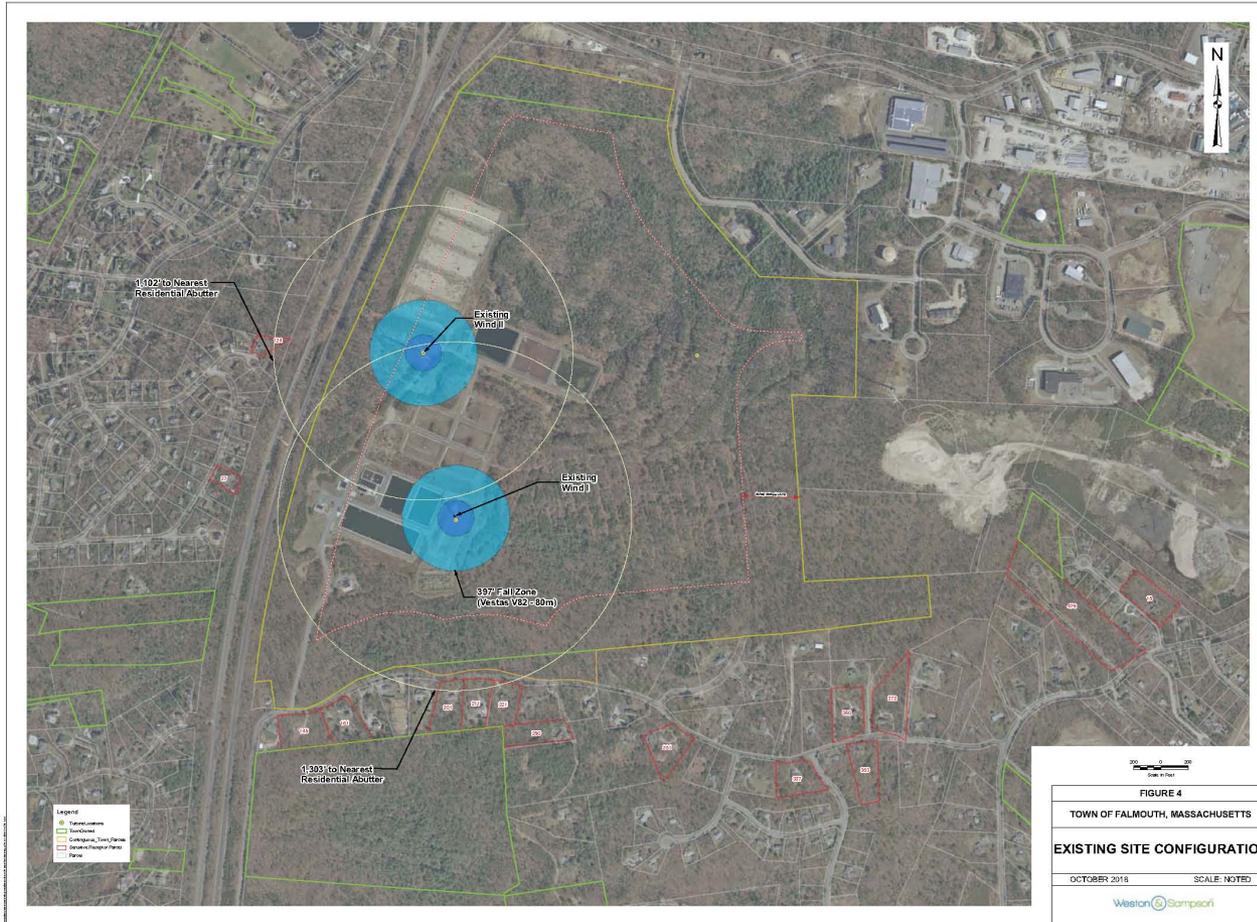
- Examine the feasibility of implementing an action (moving the turbine), so as to lessen the impact of the turbine

# Wind Turbine Relocation Study

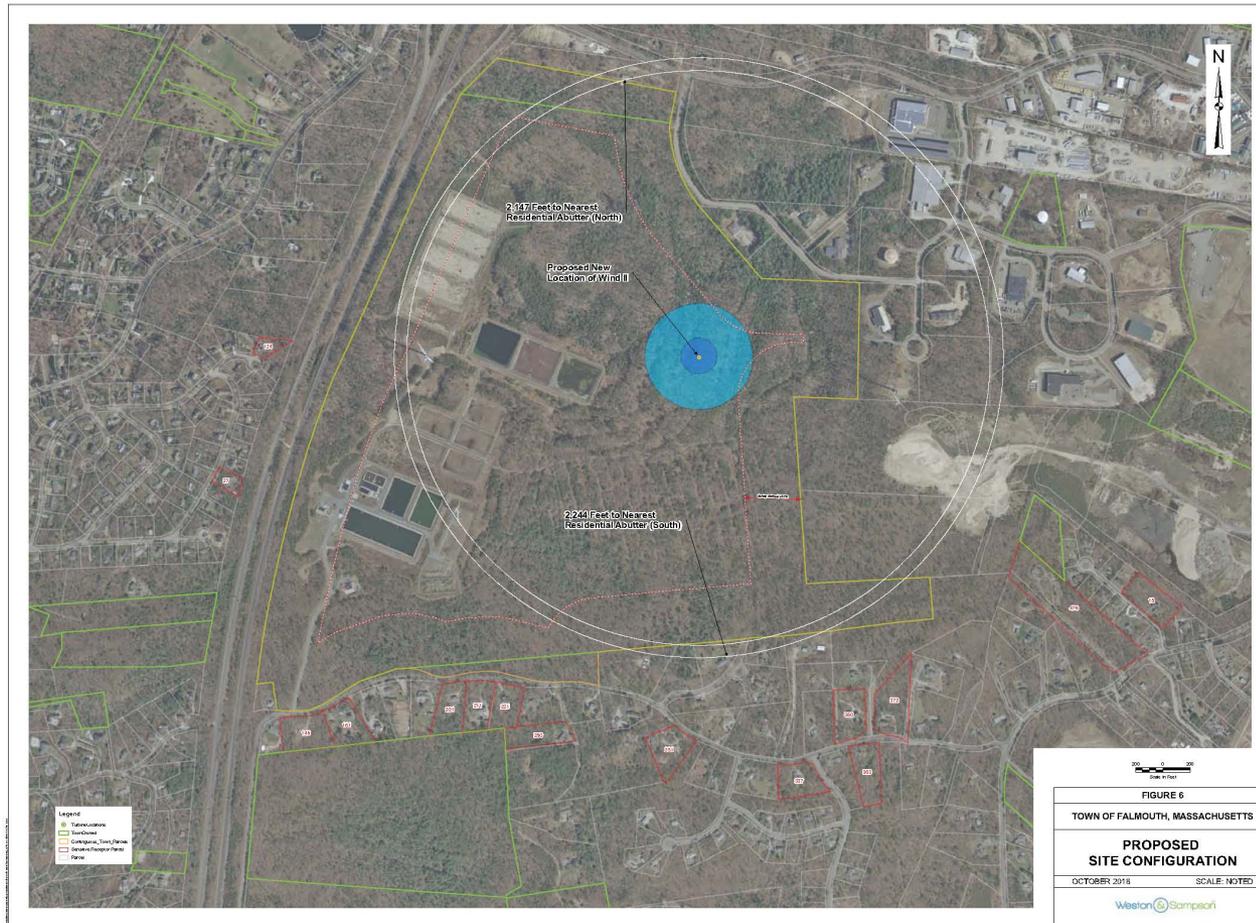
## Scope

- Evaluate alternate location for Wind II
- Estimate likely sound impacts
- Estimate likely shadow flicker impacts
- Estimate energy production
- Opinion of probable cost
- Alternate use of Wind I
- Economic analysis for relocation of Wind II

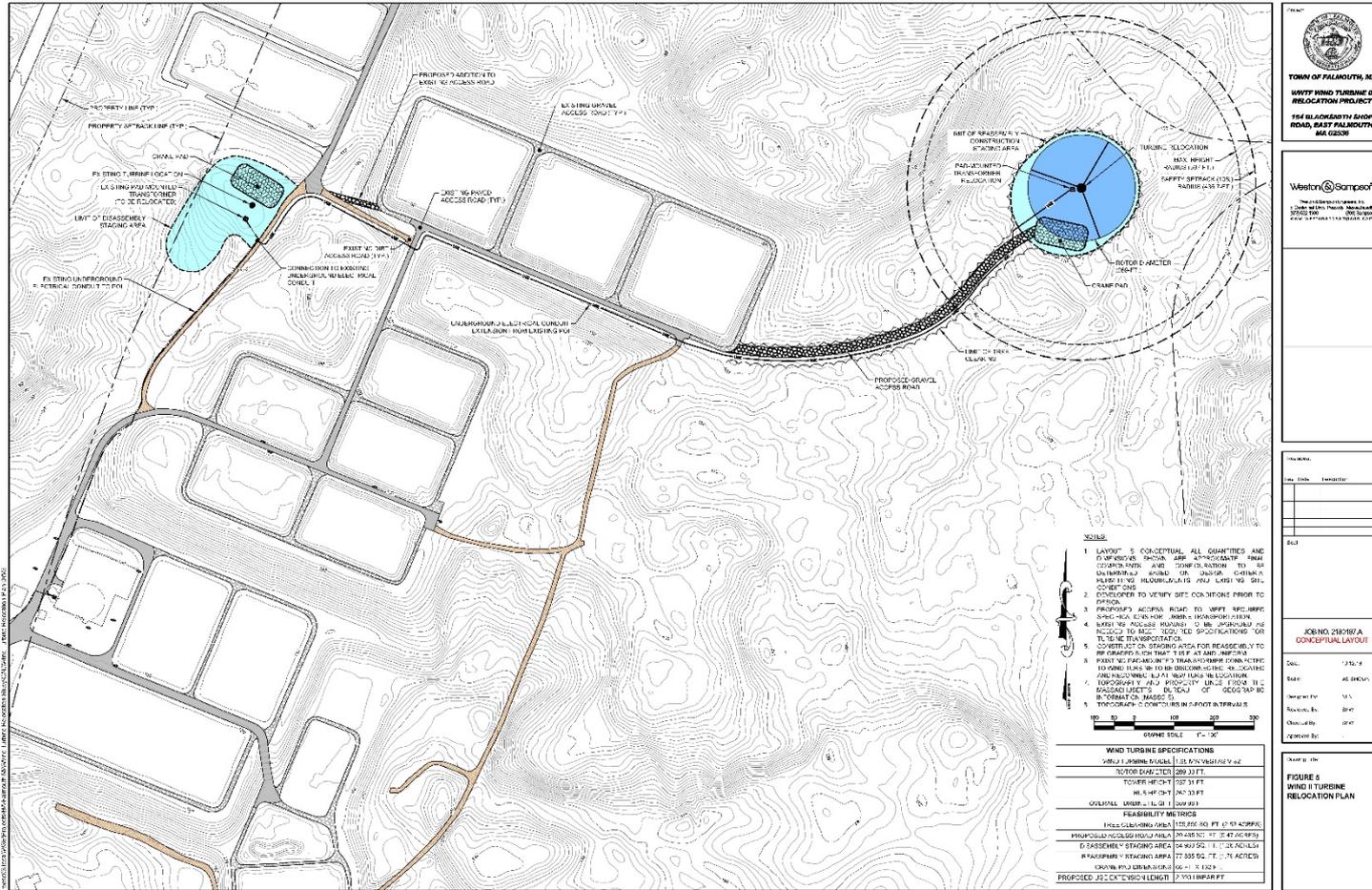
# Existing Site Configuration



# Proposed Site Configuration



# Proposed Site Configuration



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**TOWN OF PALAMOUTH, MA**  
**WPPF WIND TURBINE B**  
**RELOCATION PROJECT**  
**THE BLANDFORD AVENUE**  
**ROAD, PALAMOUTH, MA 02850**

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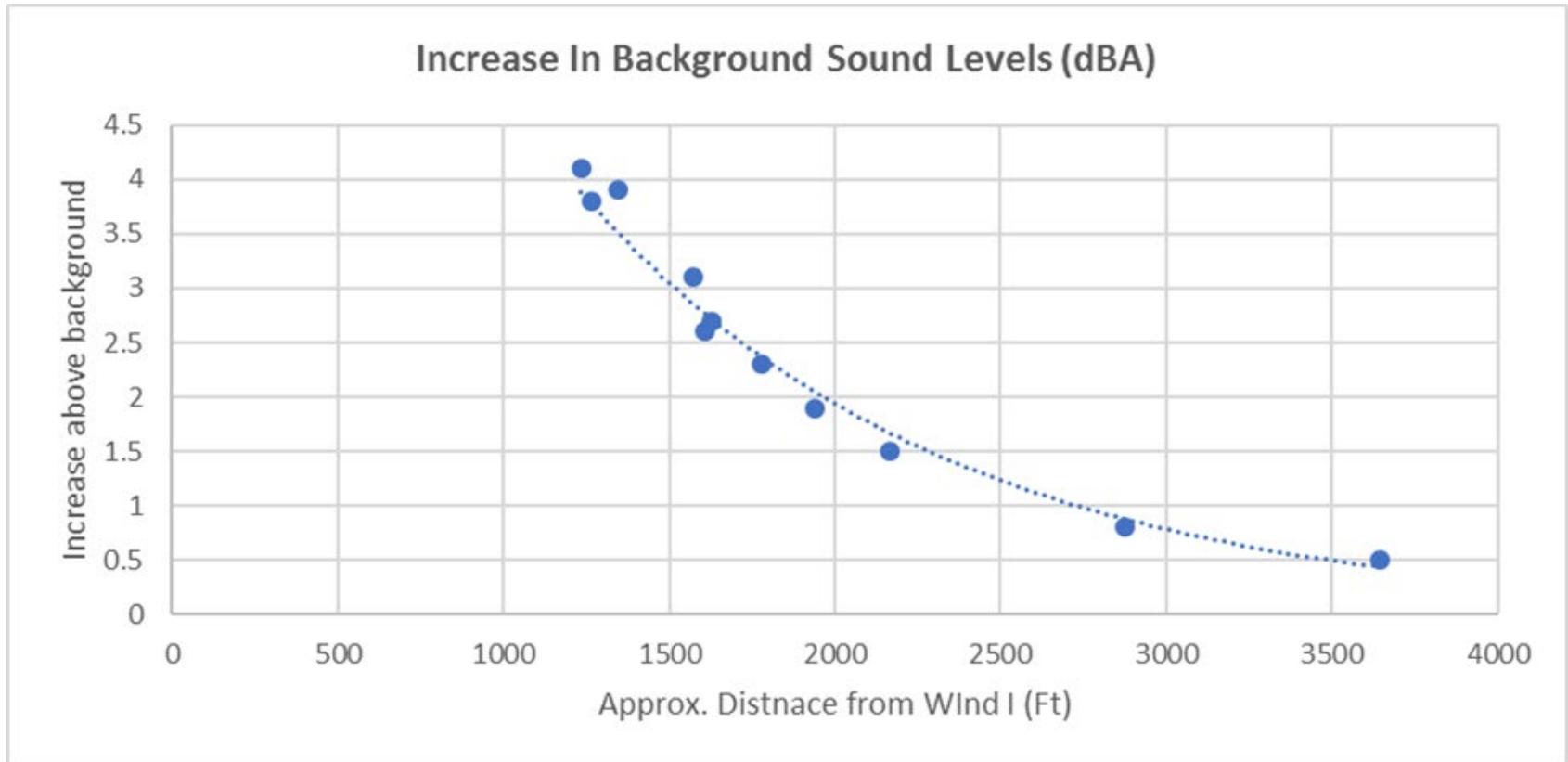
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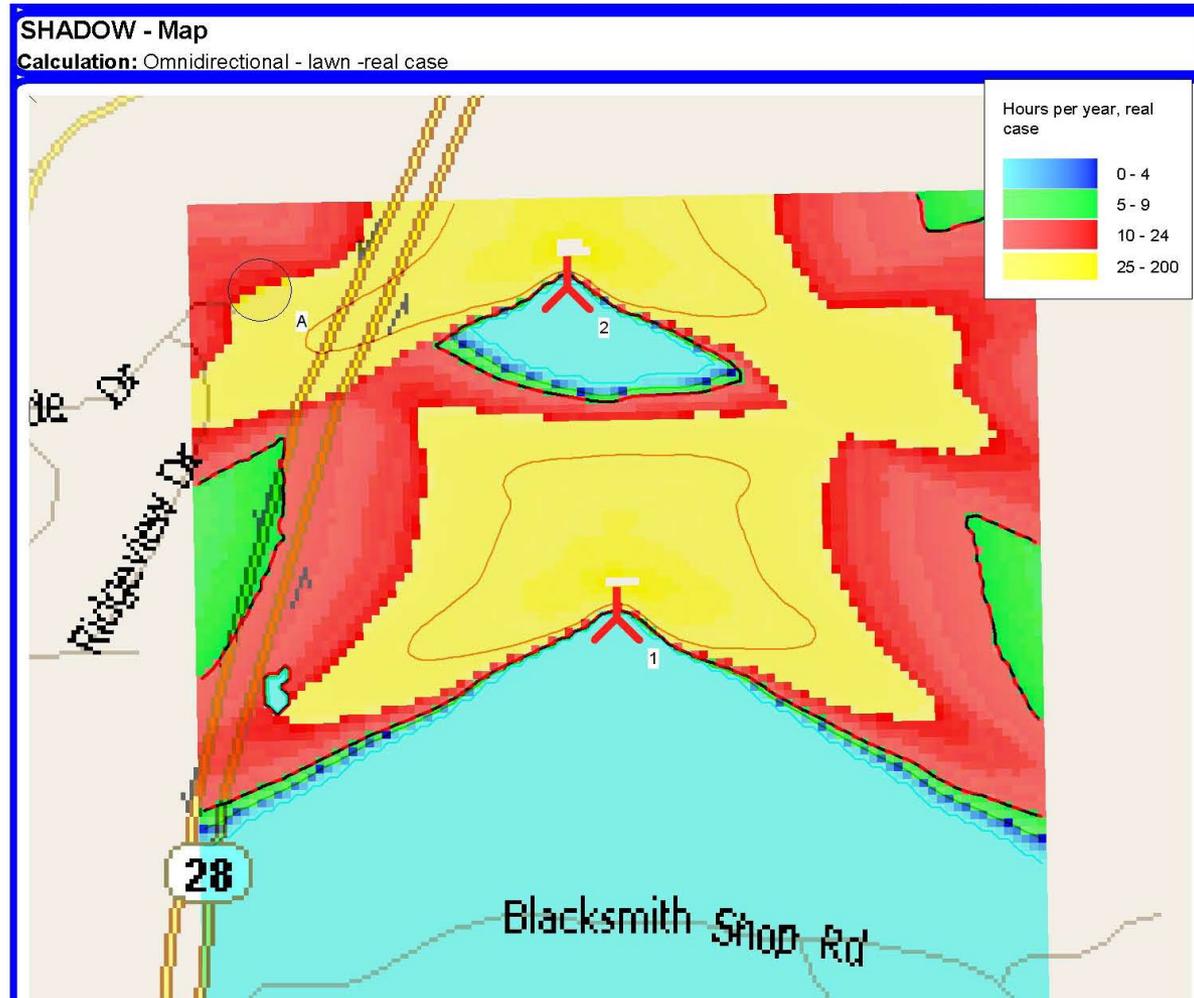
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**SEEN, ZONING & CONCEPTUAL LAYOUT**

# Likely Sound Impacts



# Shadow Flicker Impacts



# Energy Production

## Modeling Input Variables

<b>Wind Turbine</b>	Vestas V-82	Units
<b>Turbine Size</b>	1,650	kW
<b>Capacity Factor</b>	24.3	%
<b>Tower Height</b>	80	meters
<b>Average Wind Speed</b>	6.4	m/s at 80 m
<b>Project Term</b>	20	years
<b>Annual Energy Production</b>	3,516,658	kWh

# Probable Cost

## Summary of Probable Cost

Description	AL - 1
Geotechnical, Design and Permitting	\$200,000
Civil Site Improvements	\$350,000
Structural Site Improvements	\$850,000
Electrical and Communications Installation	\$415,000
Rigging to Dismantle, Move and Erect Turbine	\$1,060,000
Balance of Plant	\$150,000
<b>TOTAL</b>	<b>\$3,025,000</b>

# Alternate Uses of Wind I

- Could be dismantled and used for parts
- Could be scraped for salvage value
- Could be sold to third party
- Could be moved and used elsewhere
- Tower could be used as cellular communications tower

# Economic Analysis

Modeling Input Variables		
Project Term	20	years
Annual Energy Production	3,516,658	kWh
Estimated Project Cost	\$3,025,000	
Financing Method	General obligation bond	
Bond Rate	4.0%	
Energy Inflation	3.5%	
General Inflation	2.0%	
Annual Energy Use	1,127,880	kWh/year
Value of Retail Off Set	\$0.1597	kWh
Value of Excess Power	\$0.1286	kWh
REC value Y1-Y10	\$0.0400	kWh
REC value Y11-Y20	\$0.0250	kWh
Coincidence factor	100.0%	
O&M (\$/kW)	\$42.50	
20-Y Energy Production	70,333,164	kWh

# Economic Analysis

Financial Results		
Unit Cost of Energy	\$0.10	kWh
Net Present Value	\$5,789,652	
Net Cash Flow	\$8,952,415	
Present Value Benefit	\$10,577,693	
Present Value Cost	\$4,788,041	
Benefit Cost Ratio	2.21	

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**thank you**

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