

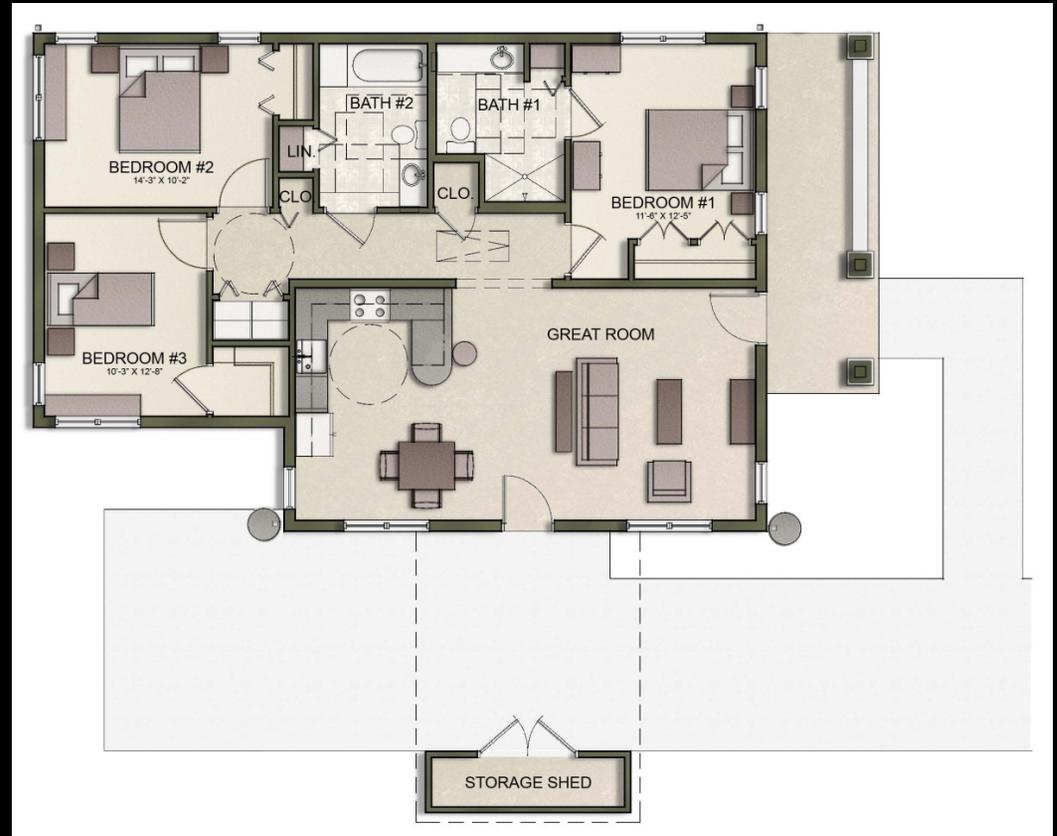
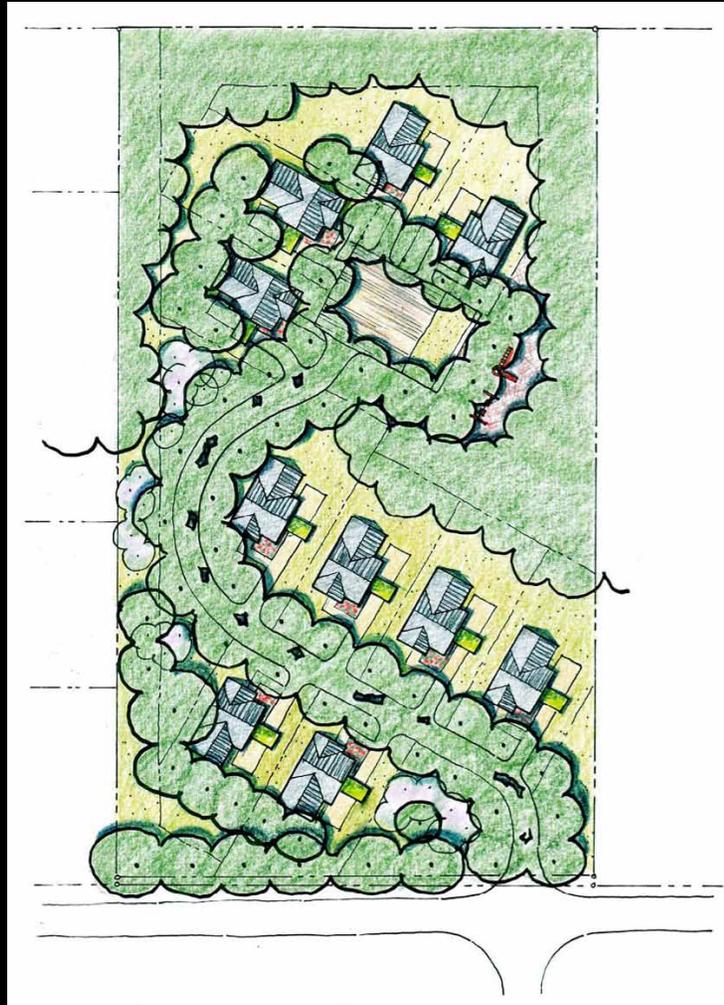


Net Zero Energy Communities

NIST Workshop on Net Zero Energy Housing

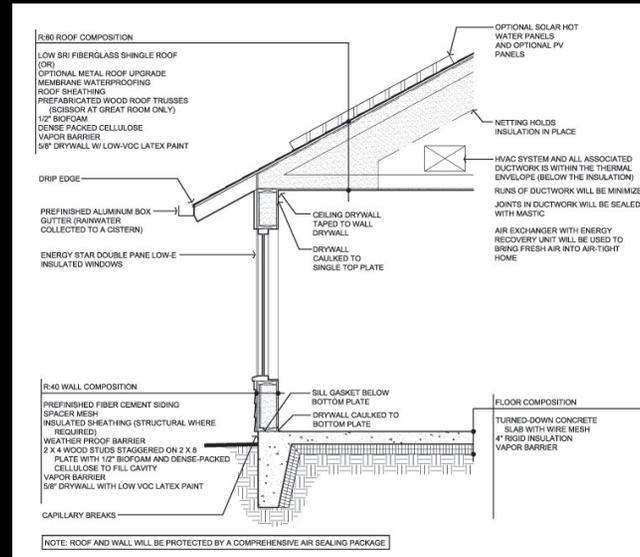
September 14, 2011

The Cottages at Greenwood — Howard County, MD



Net Zero Energy Communities

The Cottages at Greenwood – Howard County, MD



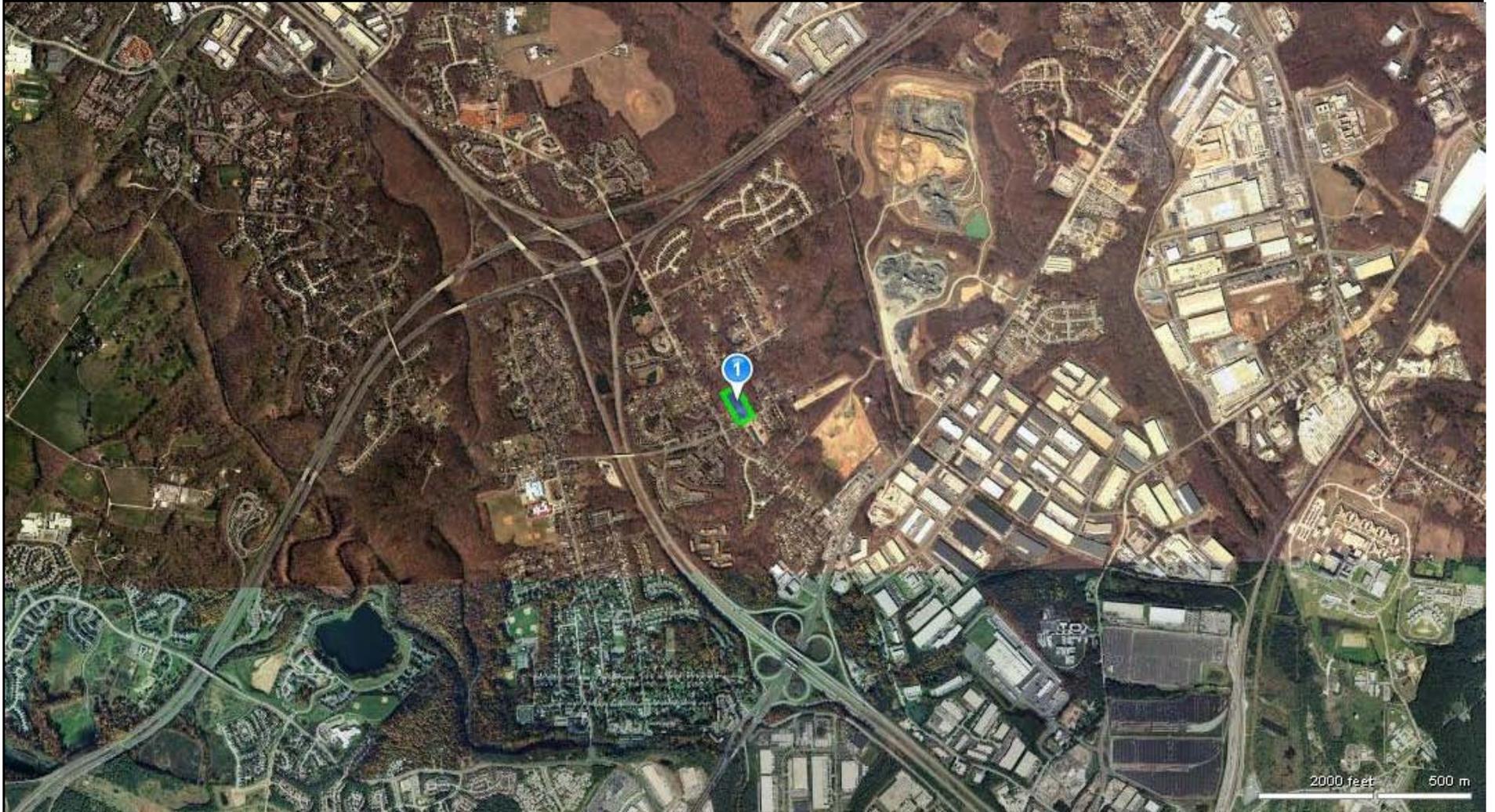
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The Cottages at Greenwood - Site and Context



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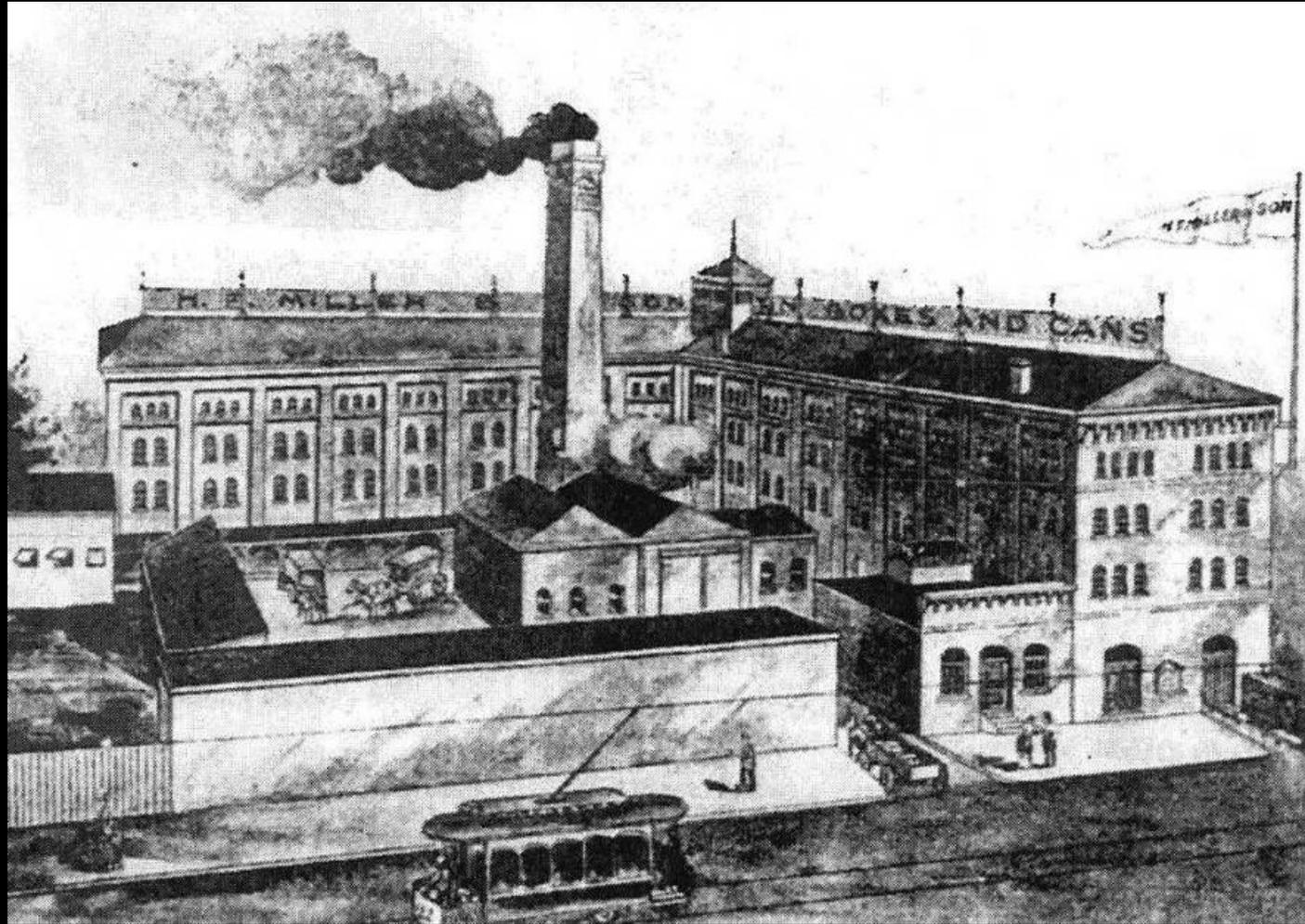
The Cottages at Greenwood - Site and Context



Net Zero Energy Communities



Miller's Court — Baltimore, MD



Net Zero Energy Communities

Miller's Court — Baltimore, MD



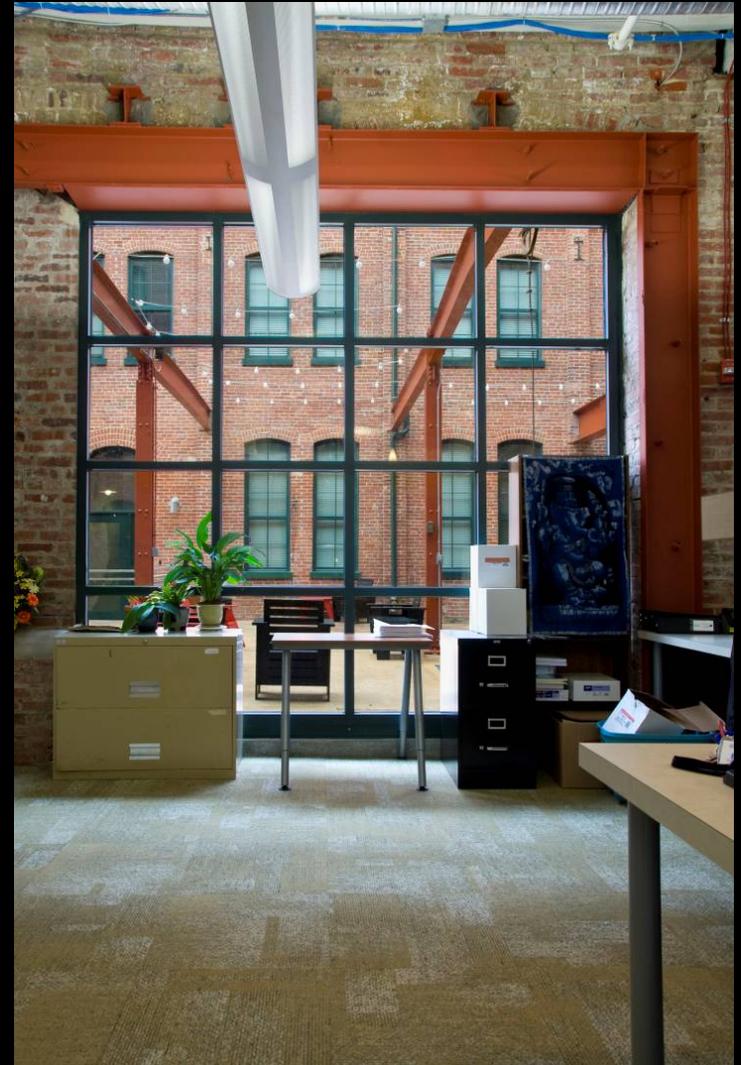
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Miller's Court — Baltimore, MD



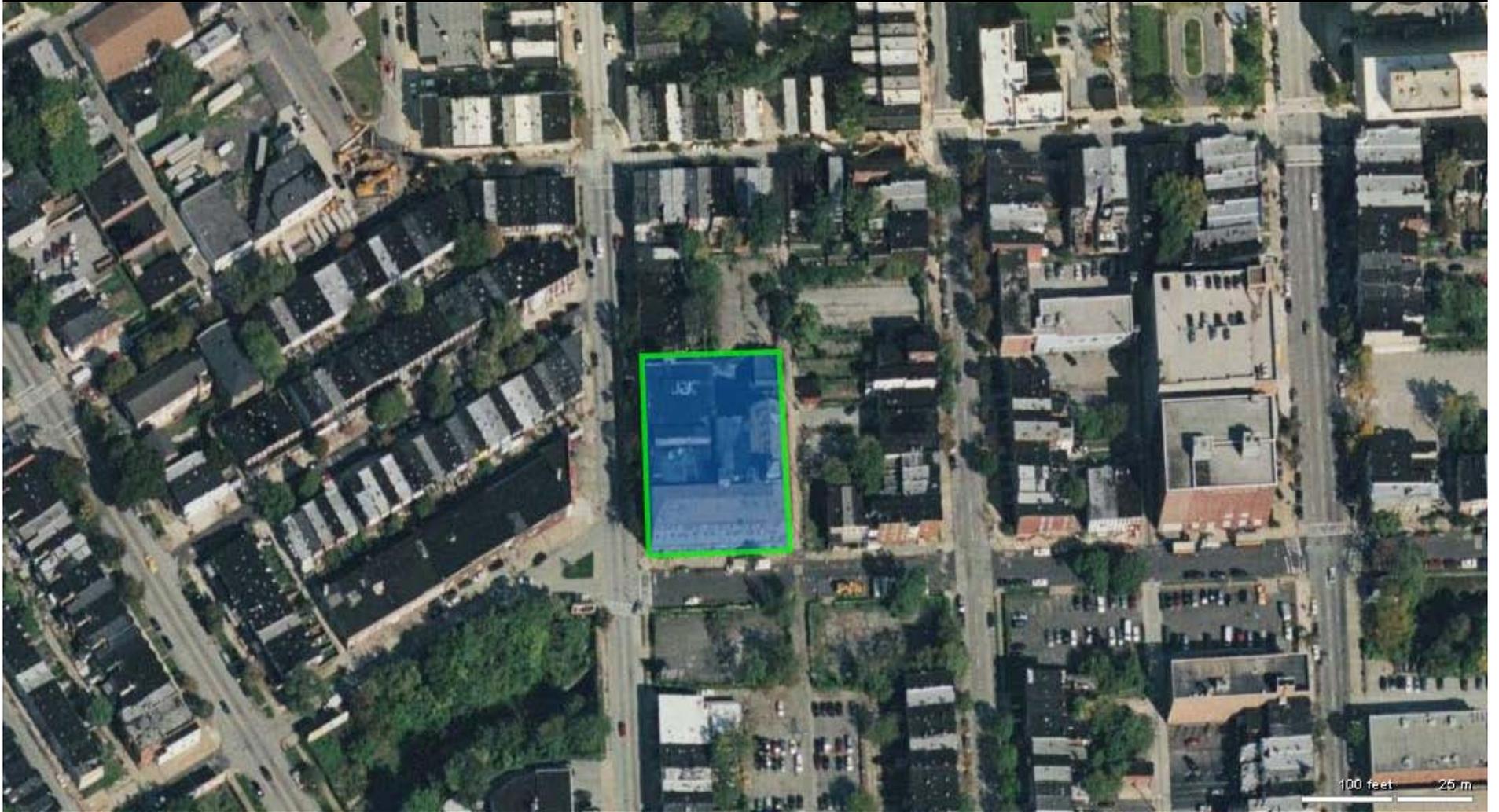
Net Zero Energy Communities

Miller's Court — Baltimore, MD



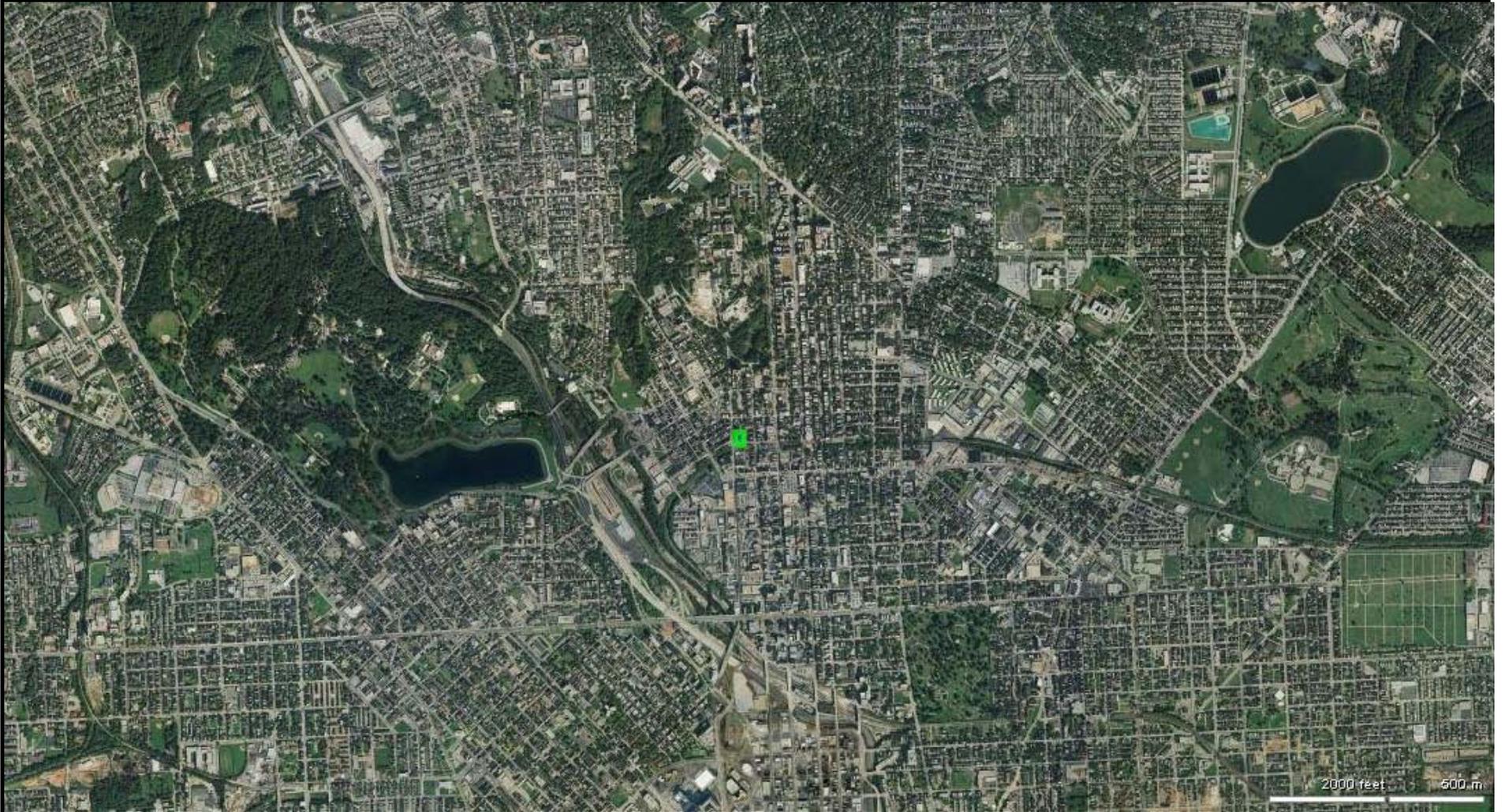
Net Zero Energy Communities

Miller's Court - Site and Context



Net Zero Energy Communities

Miller's Court - Site and Context



Net Zero Energy Communities

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Miller's Court – *BIG MATH*

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

* Denotes the base alternative for the ECB study.

		* Alt-1 Baseline Building Perform			Alt-2 Proposed Building Perform		
		Energy 10 ⁶ Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10 ⁶ Btu/yr	Proposed / Base %	Peak kBtu/h
Lighting - Conditioned	Electricity	530.6	9	199	435.4	82	167
Space Heating	Electricity	74.3	1	44	60.5	81	25
	Gas	1,356.9	22	3,064	834.7	62	1,327
Space Cooling	Electricity	590.7	10	881	347.1	59	382
Pumps	Electricity	40.6	1	11	411.7	1,015	47
Heat Rejection	Electricity	70.2	1	97	46.6	66	53
Fans - Conditioned	Electricity	2,104.1	34	376	518.4	25	166
Receptacles - Conditioned	Electricity	404.0	7	97	404.0	100	97
Stand-alone Base Utilities	Electricity	607.4	10	139	607.4	100	139
	Gas	414.6	7	63	414.6	100	63
Total Building Consumption		6,193.3			4,080.4		

Energy Model

- 4,080,400,000 Btu/yr (34% below baseline)
- 270 metric tons CO₂/yr

Net Zero Energy Communities

Miller's Court – *BIG MATH*

Avoided Impact

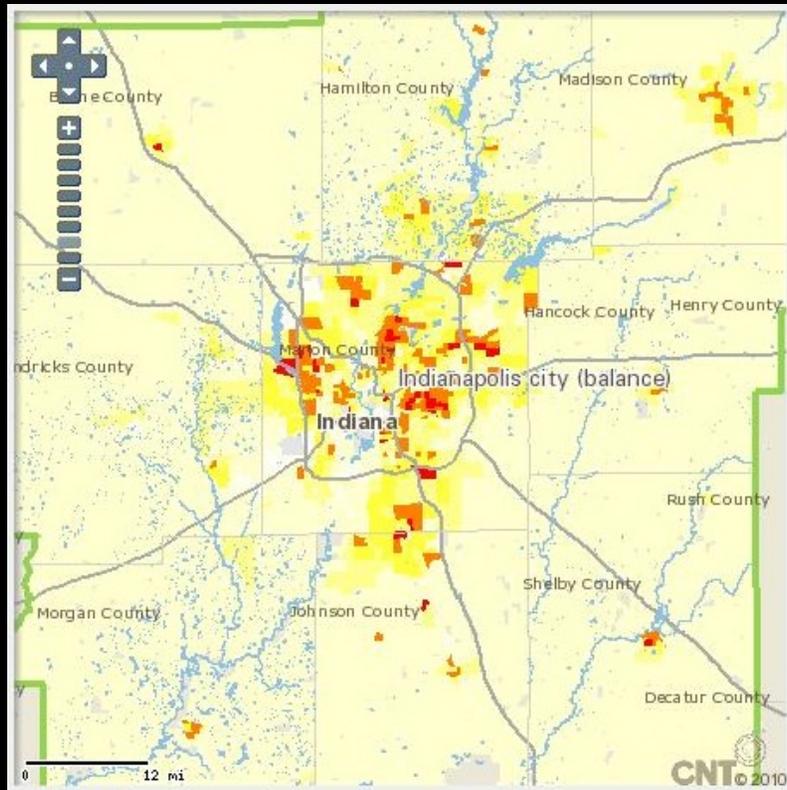
- Demolition = 900,000,000 BTU
- New Construction = 82,500,000,000 BTU
- Avoided Impact = 83,400,000,000 BTU
- 731,579 gal. gasoline = 6,504 metric tons CO₂
- *Does not* include allowance for embodied energy of existing building

Miller's Court – *BIG MATH*

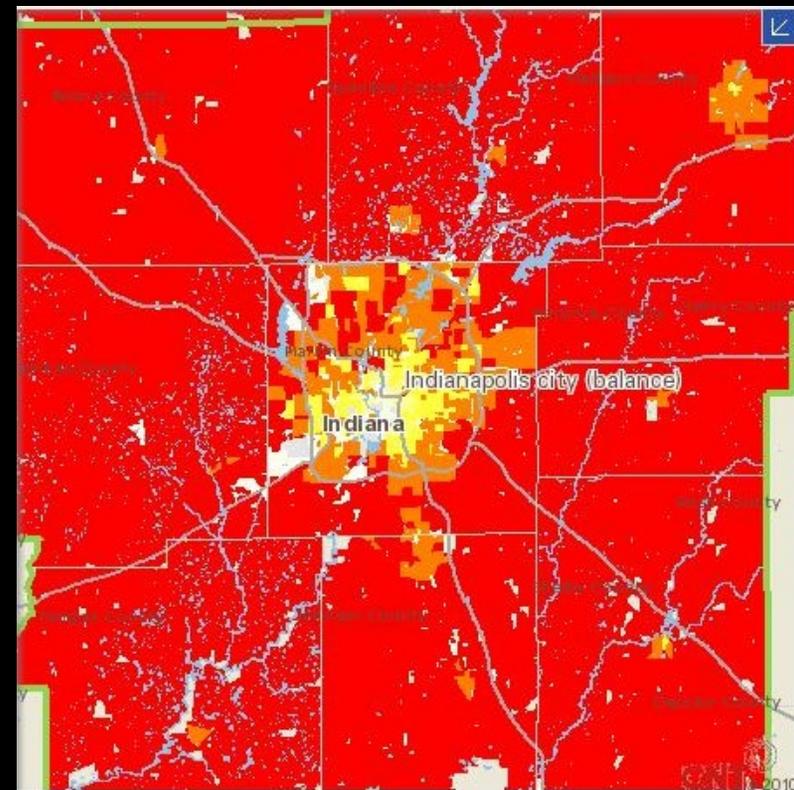
Direct Energy Payback

- 6,504 metric tons CO₂ / 270 metric tons CO₂ /yr
- 24 year direct payback
- Calculated VMT reduction due to density and location = 163 metric tons/year
- $270 - 163 = 107$ metric tons CO₂/yr net impact
- 60.8 year net payback

Carbon Dioxide Generation – Indianapolis, IN



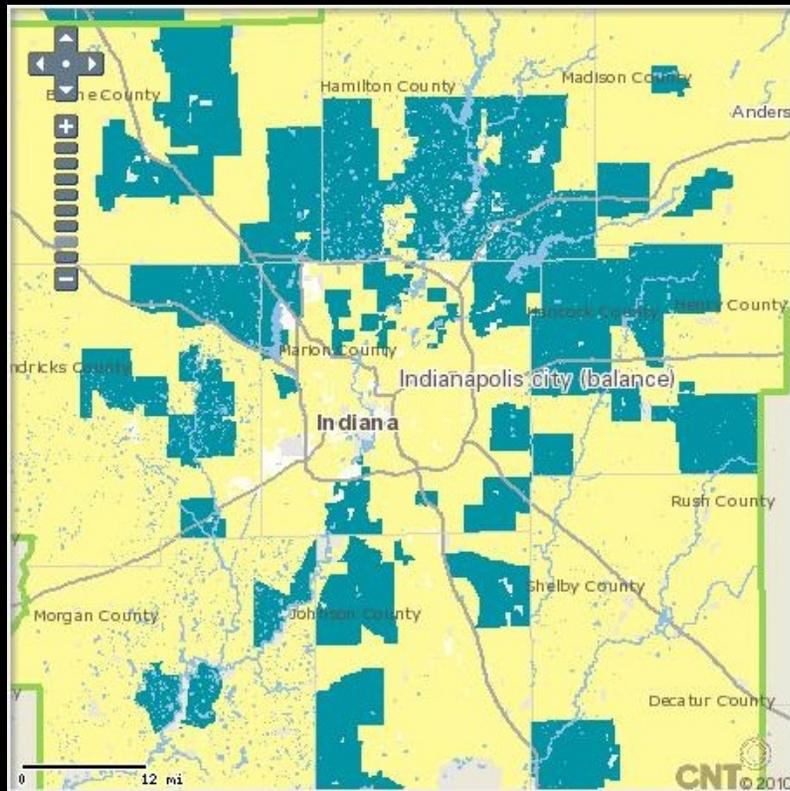
Transportation CO₂ Per Acre



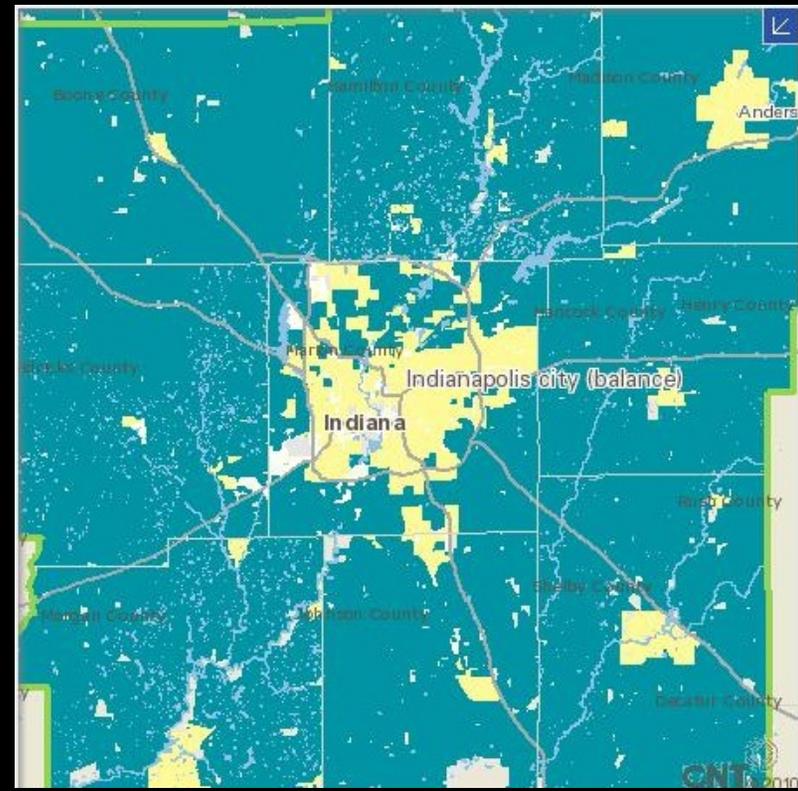
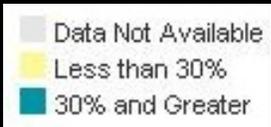
Transportation CO₂ Per Household

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Housing and Transportation Costs – Indianapolis, IN



Cost of Housing



Cost of Housing plus Transportation



Net Zero Energy Communities

Contact Information

Tom Liebel, FAIA, LEED Fellow

Principal

TomL@marks-thomas.com

Marks, Thomas Architects

1414 Key Highway, 2nd Floor

Baltimore, MD 21230

Phone: +1 410 400 7484

www.marks-thomas.com



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