

Report

**Community  
Manure  
Management  
Feasibility Study**

**Dane County, WI**

February 2008

Report for  
**Dane County, Wisconsin**

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Community Manure Management  
Feasibility Study

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February 2008





# Dane County Manure Management Study

## Opinion of Costs

Alternative F-1

Fine Solids Separation with Polymer Addition

Opinion of Capital Costs	Initial Capital Cost
Raw Manure Short-Term Storage	\$20,000
Fine Solids Separation	\$228,000
Solids Conveyor	\$20,000
Solids Storage	\$53,000
Liquids Transfer Pumping Station	\$20,000
Liquids Storage	\$108,000
Building for Solids Separation (40x40)	\$160,000
Non-Potable Water System - Tank and Pumps	\$50,000
<b>Subtotal</b>	<b>\$659,000</b>
Piping and Mechanical	\$66,000
Electrical	\$66,000
HVAC	\$33,000
Site Work	\$33,000
<b>Subtotal</b>	<b>\$857,000</b>
Contractors General Conditions	\$69,000
Construction Costs	\$926,000
Contingencies & Technical Services	\$370,000
<b>Total Project Costs</b>	<b>\$1,296,000</b>
Decommissioning Reserve	\$130,000
<b>Total Opinion of Capital Cost</b>	<b>\$1,426,000</b>

Opinion of Annual O&M Costs	Year 2007	Year 2012	Year 2012 + 25%
Labor	\$42,000	\$47,000	\$51,700
Electricity	\$5,000	\$5,000	\$6,000
Natural Gas	\$5,000	\$6,000	\$6,000
Liquid Hauling Costs	\$67,000	\$76,000	\$91,200
Solids Disposal Revenue	(\$7,000)	(\$8,000)	(\$10,000)
GHG Emission Reduction Credits	(\$5,000)	(\$11,000)	(\$13,800)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$35,000	\$39,000	\$48,800.00
Maintenance and Supplies	\$10,000	\$11,000	\$12,700
<b>Total Annual O&amp;M Costs</b>	<b>\$152,000</b>	<b>\$165,000</b>	<b>\$193,000</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative F-2

Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost		
Raw Manure Short-Term Storage	\$20,000		
Fine Solids Separation	\$241,000		
Solids Conveyor	\$20,000		
Solids Storage	\$18,000		
Liquids Transfer Pumping Station	\$20,000		
Liquids Lagoon Modifications	\$27,000		
Building for Solids Separation (40 x 40)	\$160,000		
Non-Potable Water System - Tank and Pumps	\$50,000		
Irrigation Equipment and Piping	\$223,000		
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Subtotal	\$779,000		
Piping and Mechanical	\$78,000		
Electrical	\$78,000		
HVAC	\$39,000		
Site Work	\$39,000		
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Subtotal	\$1,013,000		
Contractors General Conditions	\$81,000		
Construction Costs	\$1,094,000		
Contingencies & Technical Services	\$438,000		
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Total Project Costs	\$1,532,000		
Decommissioning Reserve	\$153,000		
<b>Total Opinion of Capital Cost</b>	<b>\$1,685,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25<sup>o</sup></b>
Labor	\$42,000	\$47,000	\$51,700
Electricity	\$5,000	\$6,000	\$7,200
Natural Gas	\$5,000	\$6,000	\$6,000
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$28,000)	(\$31,000)	(\$38,800)
GHG Emission Reduction Credits	(\$11,000)	(\$23,000)	(\$28,800)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$25,000	\$25,000	\$31,300.00
Maintenance and Supplies	\$15,000	\$17,000	\$19,600
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<b>Total Annual O&amp;M Costs</b>	<b>\$53,000</b>	<b>\$47,000</b>	<b>\$48,000</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative F-3

Anaerobic Digestion; Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost		
Raw Transfer Pumping Station	\$20,000		
Anaerobic Digester and GenSet	\$400,000		
Fine Solids Separation	\$208,000		
Solids Conveyor	\$20,000		
Solids Storage	\$12,000		
Liquids Transfer Pumping Station	\$20,000		
Building for Solids Separation and AD Controls (60x60)	\$360,000		
Non-Potable Water System - Tank and Pumps	\$50,000		
Irrigation Equipment and Piping	\$223,000		
<b>Subtotal</b>	<b>\$1,313,000</b>		
Piping and Mechanical	\$131,000		
Electrical	\$131,000		
HVAC	\$66,000		
Site Work	\$66,000		
<b>Subtotal</b>	<b>\$1,707,000</b>		
Contractors General Conditions	\$137,000		
Construction Costs	\$1,844,000		
Contingencies & Technical Services	\$738,000		
<b>Total Project Costs</b>	<b>\$2,582,000</b>		
Decommissioning Reserve	\$258,000		
<b>Total Opinion of Capital Cost</b>	<b>\$2,840,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$83,000	\$94,000	\$103,400
Electricity	\$24,000	\$27,000	\$32,400
Natural Gas	\$0	\$0	\$0
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$38,000)	(\$44,000)	(\$55,000)
GHG Emission Reduction Credits	(\$12,000)	(\$24,000)	(\$30,000)
Energy Credit and RECs	(\$23,000)	(\$25,000)	(\$31,300)
Chemicals	\$25,000	\$25,000	\$31,300
Maintenance and Supplies	\$23,000	\$25,000	\$28,800
<b>Total Annual O&amp;M Costs</b>	<b>\$82,000</b>	<b>\$78,000</b>	<b>\$80,000</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative C-1 W

Fine Solids Separation with Polymer

Opinion of Capital Costs	Initial Capital Cost
<b>Individual Farm Costs</b>	
Farm 32	
Raw Manure Force Main	\$30,000
Raw Manure Pumping Station	\$27,000
Farm 4	
Raw Manure Force Main	\$210,000
Raw Manure Storage Tank (Six Months)	\$162,000
Raw Manure Pumping Station	\$27,000
Farm 150	
Raw Manure Force Main	\$105,000
Raw Manure Storage Tank (Short-Term)	\$27,000
Raw Manure Pumping Station	\$27,000
<b>Community Site Costs</b>	
Raw Manure Storage	\$203,000
Fine Solids Separation	\$937,000
Solids Conveyor	\$20,000
Solids Storage	\$531,000
Liquids Transfer Pumping Station	\$34,000
Liquids Storage	\$243,000
Liquids Return Pumping Station	\$47,000
Non-Potable Water System - Tank and Pumps	\$100,000
Building for Solids Separation, Maintenance, and Controls (60x40)	\$240,000
<b>Subtotal</b>	<b>\$2,970,000</b>
<b>Piping and Mechanical</b>	
Piping and Mechanical	\$297,000
Electrical	\$297,000
HVAC	\$149,000
Site Work	\$149,000
<b>Subtotal</b>	<b>\$3,862,000</b>
<b>Contractors General Conditions</b>	
Contractors General Conditions	\$309,000
Construction Costs	\$4,171,000
Contingencies & Technical Services	\$1,668,000
<b>Total Project Costs</b>	<b>\$5,839,000</b>
Decommissioning Reserve	\$584,000
<b>Total Opinion of Capital Cost</b>	<b>\$6,423,000</b>

<b>Opinion of Annual O&amp;M Costs</b>	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$17,000	\$19,000	\$22,800
Natural Gas	\$10,000	\$11,000	\$11,000
Liquid Hauling Costs	\$557,000	\$630,000	\$756,000
Solids Disposal Revenue	(\$67,000)	(\$81,000)	(\$101,300)
GHG Emission Reduction Credits	(\$53,000)	(\$107,000)	(\$133,800)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$349,000	\$395,000	\$493,800.00
Maintenance and Supplies	\$28,000	\$32,000	\$36,800
<b>Total Annual O&amp;M Costs</b>	<b>\$1,007,000</b>	<b>\$1,086,000</b>	<b>\$1,291,000</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative C-1 M

Fine Solids Separation with Polymer

Opinion of Capital Costs	Initial Capital Cost
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Individual Farm Costs	
Farm 89	
Raw Manure Storage (Short-Term)	\$27,000
Farm 142	
Raw Manure Storage (Short-Term)	\$27,000
Farm 156	
Liquid Residual Storage (Six Months)	\$100,000
Farm 176	
Raw Manure Storage (Short-Term)	\$27,000
Farm 195	
Raw Manure Storage (Short-Term)	\$27,000
Community Site Costs	
Raw Manure Storage	\$162,000
Fine Solids Separation	\$963,000
Solids Conveyor	\$20,000
Solids Storage	\$396,000
Liquids Transfer Pumping Station	\$34,000
Liquids Storage	\$167,000
Non-Potable Water System - Tank and Pumps	\$100,000
Building for Solids Separation, Maintenance, and Controls (80x40)	<u>\$320,000</u>
Subtotal	\$2,370,000
Piping and Mechanical	
	\$237,000
Electrical	\$237,000
HVAC	\$119,000
Site Work	<u>\$119,000</u>
Subtotal	\$3,082,000
Contractors General Conditions	
	\$247,000
Construction Costs	\$3,329,000
Contingencies & Technical Services	<u>\$1,332,000</u>
Total Project Costs	<u>\$4,661,000</u>
Decommissioning Reserve	\$466,000
<b>Total Opinion of Capital Cost</b>	<b>\$5,127,000</b>

Opinion of Annual O&M Costs	Year 2007	Year 2012	Year 2012 + 25%
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$15,000	\$17,000	\$20,400
Natural Gas	\$10,000	\$11,000	\$11,000
Liquid Hauling Costs	\$558,000	\$631,000	\$757,200
Solids Disposal Revenue	(\$50,000)	(\$60,000)	(\$75,000)
GHG Emission Reduction Credits	(\$40,000)	(\$80,000)	(\$100,000)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$259,000	\$293,000	\$366,300.00
Maintenance and Supplies	\$28,000	\$32,000	\$36,800
<b>Total Annual O&amp;M Costs</b>	<b>\$946,000</b>	<b>\$1,031,000</b>	<b>\$1,222,000</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative C-2W

Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost		
<b>Individual Farm Costs</b>			
Farm 32			
Raw Manure Force Main	\$30,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
Farm 4			
Raw Manure Force Main	\$210,000		
Raw Manure Storage Tank (Six Months)	\$162,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
Farm 150			
Raw Manure Force Main	\$105,000		
Raw Manure Storage Tank (Short-Term)	\$27,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
<b>Community Site Costs</b>			
Raw Manure Storage	\$203,000		
Ferric Chloride Bulk Storage	\$20,000		
Fine Solids Separation	\$911,000		
Solids Conveyor	\$20,000		
Solids Storage	\$388,000		
Liquids Transfer Pumping Station	\$34,000		
Liquids Storage	\$167,000		
Liquids Return Pumping Station	\$47,000		
Non-Potable Water System - Tank, Pumps, and Filter	\$100,000		
Building for Solids Separation, Maintenance, and Controls (60x40)	\$240,000		
<b>Subtotal</b>	<b>\$3,891,000</b>		
Piping and Mechanical	\$389,000		
Electrical	\$389,000		
HVAC	\$195,000		
Site Work	\$195,000		
<b>Subtotal</b>	<b>\$5,059,000</b>		
Contractors General Conditions	\$405,000		
Construction Costs	\$5,464,000		
Contingencies & Technical Services	\$2,186,000		
<b>Total Project Costs</b>	<b>\$7,650,000</b>		
Decommissioning Reserve	\$765,000		
<b>Total Opinion of Capital Cost</b>	<b>\$8,415,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>			
	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$17,000	\$19,000	\$22,800
Natural Gas	\$10,000	\$11,000	\$11,000
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$283,000)	(\$312,000)	(\$390,000)
GHG Emission Reduction Credits	(\$113,000)	(\$226,000)	(\$282,500)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$250,000	\$283,000	\$353,800.00
Maintenance and Supplies	\$51,000	\$58,000	\$66,700
<b>Total Annual O&amp;M Costs</b>	<b>\$98,000</b>	<b>\$20,000</b>	<b>(\$13,000)</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative C-2 M

Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost
<b>Individual Farm Costs</b>	
Farm 89	
Raw Manure Storage (Short-Term)	\$27,000
Irrigation Equipment and Piping	\$303,000
Farm 142	
Raw Manure Storage (Short-Term)	\$27,000
Irrigation Equipment and Piping	\$303,000
Farm 156	
Liquid Residual Storage (Six Months)	\$74,000
Irrigation Equipment and Piping	\$303,000
Farm 176	
Raw Manure Storage (Short-Term)	\$27,000
Irrigation Equipment and Piping	\$303,000
Farm 195	
Raw Manure Storage (Short-Term)	\$27,000
Irrigation Equipment and Piping	\$303,000
<b>Community Site Costs</b>	
Raw Manure Storage	\$162,000
Ferric Chloride Bulk Storage	\$20,000
Fine Solids Separation	\$1,031,000
Solids Conveyor	\$20,000
Solids Storage	\$291,000
Liquids Transfer Pumping Station	\$34,000
Liquids Storage	\$124,000
Non-Potable Water System - Tank, Pumps, and Filter	\$100,000
Building for Solids Separation, Maintenance, and Controls (80x40)	\$320,000
Subtotal	<u>\$3,799,000</u>
Piping and Mechanical	\$380,000
Electrical	\$380,000
HVAC	\$190,000
Site Work	\$190,000
Subtotal	<u>\$4,939,000</u>
Contractors General Conditions	\$395,000
Construction Costs	\$5,334,000
Contingencies & Technical Services	\$2,134,000
Total Project Costs	<u><u>\$7,468,000</u></u>
Decommissioning Reserve	\$747,000
<b>Total Opinion of Capital Cost</b>	<b><u>\$8,215,000</u></b>

Opinion of Annual O&M Costs	Year 2007	Year 2012	Year 2012 + 25%
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$15,000	\$17,000	\$20,400
Natural Gas	\$10,000	\$11,000	\$11,000
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$459,000	\$519,000	\$622,800
Solids Disposal Revenue	(\$212,000)	(\$233,000)	(\$291,300)
GHG Emission Reduction Credits	(\$84,000)	(\$168,000)	(\$210,000)
Energy Credit and RECs	\$0	\$0	\$0
Chemicals	\$186,000	\$211,000	\$263,800.00
Maintenance and Supplies	\$60,000	\$68,000	\$78,200
<b>Total Annual O&amp;M Costs</b>	<b><u>\$600,000</u></b>	<b><u>\$612,000</u></b>	<b><u>\$701,000</u></b>

## Dane County Manure Management Study Opinion of Costs

Alternative C-3W

Anaerobic Digestion Followed by Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost		
<b>Individual Farm Costs</b>			
Farm 32			
Raw Manure Force Main	\$30,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
Farm 4			
Raw Manure Force Main	\$210,000		
Raw Manure Storage Tank (Six Months)	\$162,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
Farm 150			
Raw Manure Force Main	\$105,000		
Raw Manure Storage Tank (Short-Term)	\$27,000		
Raw Manure Pumping Station	\$27,000		
Irrigation Equipment and Piping	\$382,000		
<b>Community Site Costs</b>			
Raw Manure Storage	\$203,000		
Raw Transfer Station	\$34,000		
Anaerobic Digester and GenSet	\$1,717,000		
Ferric Chloride Bulk Storage	\$20,000		
Fine Solids Separation	\$644,000		
Solids Conveyor	\$20,000		
Solids Storage	\$264,000		
Liquids Transfer Pumping Station	\$34,000		
Liquids Storage	\$151,000		
Liquids Return Pumping Station	\$47,000		
Non-Potable Water System - Tank and Pumps	\$100,000		
Building for Solids Separation, Maintenance, and Controls (80x40)	\$320,000		
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Subtotal	\$5,315,000		
Piping and Mechanical	\$532,000		
Electrical	\$532,000		
HVAC	\$266,000		
Site Work	\$266,000		
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Subtotal	\$6,911,000		
Contractors General Conditions	\$553,000		
Construction Costs	\$7,464,000		
Contingencies & Technical Services	\$2,986,000		
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Total Project Costs	\$10,450,000		
Decommissioning Reserve	\$1,045,000		
<b>Total Opinion of Capital Cost</b>	<b>\$11,495,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>			
	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$103,000	\$113,000	\$135,600
Natural Gas	\$0	\$0	\$0
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$388,000)	(\$446,000)	(\$557,500)
GHG Emission Reduction Credits	(\$119,000)	(\$238,000)	(\$297,500)
Energy Credit and RECs	(\$231,000)	(\$248,000)	(\$310,000)
Chemicals	\$170,000	\$193,000	\$241,300
Maintenance and Supplies	\$79,000	\$89,000	\$102,400
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<b>Total Annual O&amp;M Costs</b>	<b>(\$220,000)</b>	<b>(\$350,000)</b>	<b>(\$480,000)</b>

## Dane County Manure Management Study Opinion of Costs

Alternative C-3 M

Anaerobic Digestion Followed by Fine Solids Separation with Ferric Chloride and Polymer Addition

Opinion of Capital Costs	Initial Capital Cost		
<b>Individual Farm Costs</b>			
Farm 89			
Raw Manure Storage (Short-Term)	\$27,000		
Irrigation Equipment and Piping	\$303,000		
Farm 142			
Raw Manure Storage (Short-Term)	\$27,000		
Irrigation Equipment and Piping	\$303,000		
Farm 156			
Liquid Residual Storage (Six Months)	\$62,000		
Irrigation Equipment and Piping	\$303,000		
Farm 176			
Raw Manure Storage (Short-Term)	\$27,000		
Irrigation Equipment and Piping	\$303,000		
Farm 195			
Raw Manure Storage (Short-Term)	\$27,000		
Irrigation Equipment and Piping	\$303,000		
<b>Community Site Costs</b>			
Raw Manure Storage	\$162,000		
Raw Transfer Station	\$34,000		
Anaerobic Digester and GenSet	\$1,735,000		
Ferric Chloride Bulk Storage	\$20,000		
Fine Solids Separation	\$644,000		
Solids Conveyor	\$20,000		
Solids Storage	\$199,000		
Liquids Transfer Pumping Station	\$34,000		
Liquids Storage	\$103,000		
Non-Potable Water System - Tank and Pumps	\$100,000		
Building for Solids Separation, Maintenance, and Controls (80x40)	\$320,000		
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Subtotal	\$5,056,000		
Piping and Mechanical	\$506,000		
Electrical	\$506,000		
HVAC	\$253,000		
Site Work	\$253,000		
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Subtotal	\$6,574,000		
Contractors General Conditions	\$526,000		
Construction Costs	\$7,100,000		
Contingencies & Technical Services	\$2,840,000		
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Total Project Costs	\$9,940,000		
Decommissioning Reserve	\$994,000		
<b>Total Opinion of Capital Cost</b>	<b>\$10,934,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$91,000	\$100,000	\$120,000
Natural Gas	\$0	\$0	\$0
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$396,000	\$448,000	\$537,600
Solids Disposal Revenue	(\$290,000)	(\$333,000)	(\$416,300)
GHG Emission Reduction Credits	(\$89,000)	(\$178,000)	(\$222,500)
Energy Credit and RECs	(\$172,000)	(\$185,000)	(\$231,300)
Chemicals	\$128,000	\$145,000	\$181,300
Maintenance and Supplies	\$74,000	\$84,000	\$96,600
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<b>Total Annual O&amp;M Costs</b>	<b>\$304,000</b>	<b>\$268,000</b>	<b>\$271,000</b>

## Dane County Manure Management Study Opinion of Costs

Alternative C-4W

Fine Solids Separation with Ferric Chloride and Polymer Addition Followed by a Solids Drier/Pelletizer

Opinion of Capital Costs	Initial Capital Cost
<b>Individual Farm Costs</b>	
Farm 32	
Raw Manure Force Main	\$30,000
Raw Manure Pumping Station	\$27,000
Irrigation Equipment and Piping	\$382,000
Farm 4	
Raw Manure Force Main	\$210,000
Raw Manure Storage Tank (Six Months)	\$162,000
Raw Manure Pumping Station	\$27,000
Irrigation Equipment and Piping	\$382,000
Farm 150	
Raw Manure Force Main	\$105,000
Raw Manure Storage Tank (Short-Term)	\$27,000
Raw Manure Pumping Station	\$27,000
Irrigation Equipment and Piping	\$382,000
<b>Community Site Costs</b>	
Raw Manure Storage	\$203,000
Ferric Chloride Bulk Storage	\$20,000
Fine Solids Separation	\$911,000
Solids Conveyor	\$20,000
Solids Storage	\$60,000
Liquids Transfer Pumping Station	\$34,000
Liquids Storage	\$167,000
Drier/Pelletizer	\$2,386,000
Finished Product Storage	\$138,000
Liquids Return Pumping Station	\$47,000
Non-Potable Water System - Tank and Pumps	\$100,000
Building for Solids Separation, Maintenance, and Controls (80x50)	\$400,000
 Subtotal	 \$6,247,000
 Piping and Mechanical	 \$625,000
Electrical	\$625,000
HVAC	\$312,000
Site Work	\$312,000
 Subtotal	 \$8,121,000
 Contractors General Conditions	 \$650,000
Construction Costs	\$8,771,000
Contingencies & Technical Services	\$3,508,000
Total Project Costs	\$12,279,000
 Decommissioning Reserve	 \$1,228,000
 <b>Total Opinion of Capital Cost</b>	 <b>\$13,507,000</b>

Opinion of Annual O&M Costs	Year 2007	Year 2012	Year 2012 + 25%
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$39,000	\$41,000	\$49,200
Natural Gas	\$729,000	\$824,000	\$1,030,000
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$271,000)	(\$309,000)	(\$386,300)
GHG Emission Reduction Credits	(\$119,000)	(\$238,000)	(\$297,500)
Energy Credit and RECs	\$0		\$0
Chemicals	\$250,000	\$283,000	\$353,800
Maintenance and Supplies	\$90,000	\$102,000	\$117,300
<b>Total Annual O&amp;M Costs</b>	<b>\$884,000</b>	<b>\$890,000</b>	<b>\$1,072,000</b>

## Dane County Manure Management Study Opinion of Costs

Alternative C-4 M

Fine Solids Separation with Ferric Chloride and Polymer Addition Followed by a Solids Drier/Pelletizer

Opinion of Capital Costs	Initial Capital Cost			
<b>Individual Farm Costs</b>				
Farm 89				
Raw Manure Storage (Short-Term)	\$27,000			
Irrigation Equipment and Piping	\$303,000			
Farm 142				
Raw Manure Storage (Short-Term)	\$27,000			
Irrigation Equipment and Piping	\$303,000			
Farm 156				
Liquid Residual Storage (Six Months)	\$74,000			
Irrigation Equipment and Piping	\$303,000			
Farm 176				
Raw Manure Storage (Short-Term)	\$27,000			
Irrigation Equipment and Piping	\$303,000			
Farm 195				
Raw Manure Storage (Short-Term)	\$27,000			
Irrigation Equipment and Piping	\$303,000			
<b>Community Site Costs</b>				
Raw Manure Storage	\$162,000			
Ferric Chloride Bulk Storage	\$20,000			
Fine Solids Separation	\$1,031,000			
Solids Conveyor	\$20,000			
Solids Storage	\$50,000			
Liquids Transfer Pumping Station	\$34,000			
Liquids Storage	\$124,000			
Drier/Pelletizer	\$2,386,000			
Finished Product Storage	\$103,000			
Non-Potable Water System - Tank and Pumps	\$100,000			
Building for Solids Separation, Maintenance, and Controls (80x50)	\$400,000			
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Subtotal	\$6,127,000			
Piping and Mechanical	\$613,000			
Electrical	\$613,000			
HVAC	\$306,000			
Site Work	\$306,000			
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Subtotal	\$7,965,000			
Contractors General Conditions	\$637,000			
Construction Costs	\$8,602,000			
Contingencies & Technical Services	\$3,441,000			
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Total Project Costs	\$12,043,000			
Decommissioning Reserve	\$1,204,000			
<b>Total Opinion of Capital Cost</b>	<b>\$13,247,000</b>			
<b>Opinion of Annual O&amp;M Costs</b>				
	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>	
Labor	\$166,000	\$187,000	\$205,700	
Electricity	\$31,000	\$33,000	\$39,600	
Natural Gas	\$544,000	\$615,000	\$768,800	
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$459,000	\$519,000	\$622,800	
Solids Disposal Revenue	(\$202,000)	(\$231,000)	(\$288,800)	
GHG Emission Reduction Credits	(\$89,000)	(\$178,000)	(\$222,500)	
Energy Credit and RECs	\$0	\$0	\$0	
Chemicals	\$186,000	\$210,000	\$262,500	
Maintenance and Supplies	\$49,000	\$55,000	\$63,300	
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<b>Total Annual O&amp;M Costs</b>	<b>\$1,144,000</b>	<b>\$1,210,000</b>	<b>\$1,451,000</b>	

**Dane County Manure Management Study**  
**Opinion of Costs**  
 Alternative C-5W  
 Manure Incineration

Opinion of Capital Costs	Initial Capital Cost		
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Individual Farm Costs			
Farm 32			
Raw Manure Force Main	\$30,000		
Raw Manure Pumping Station	\$27,000		
Farm 4			
Raw Manure Force Main	\$210,000		
Raw Manure Pumping Station	\$27,000		
Farm 150			
Raw Manure Force Main	\$105,000		
Raw Manure Pumping Station	\$27,000		
Community Site Costs			
Raw Manure Storage	\$203,000		
Raw Transfer Station	\$34,000		
Drying and Natural Evaporation, Combustion/Close-Coupled Gasifier, and Turbine/Generator Set	\$4,249,000		
Ash Storage	\$10,000		
Building for Solids Separation, Maintenance, and Controls (80x40)	\$320,000		
Subtotal	\$5,242,000		
Piping and Mechanical	\$524,000		
Electrical	\$524,000		
HVAC	\$262,000		
Site Work	\$262,000		
Subtotal	\$6,814,000		
Contractors General Conditions	\$545,000		
Construction Costs	\$7,359,000		
Contingencies & Technical Services	\$2,944,000		
Total Project Costs	\$10,303,000		
Decommissioning Reserve	\$1,030,000		
<b>Total Opinion of Capital Cost</b>	<b>\$11,333,000</b>		
<b>Opinion of Annual O&amp;M Costs</b>	<b>Year 2007</b>	<b>Year 2012</b>	<b>Year 2012 + 25%</b>
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$21,000	\$23,000	\$27,600
Natural Gas	\$0	\$0	\$0
Liquid Hauling Costs (spray irrigation costs included elsewhere)	\$0	\$0	\$0
Solids Disposal Revenue	(\$28,000)	(\$32,000)	(\$40,000)
GHG Emission Reduction Credits	(\$119,000)	(\$238,000)	(\$297,500)
Energy Credit and RECs	(\$310,000)	(\$334,000)	(\$417,500)
Chemicals	\$0	\$0	\$0
Maintenance and Supplies	\$87,000	\$98,000	\$112,700
<b>Total Annual O&amp;M Costs</b>	<b>(\$183,000)</b>	<b>(\$296,000)</b>	<b>(\$409,000)</b>

# Dane County Manure Management Study

## Opinion of Costs

Alternative C-5 M  
Manure Incineration

Opinion of Capital Costs	Initial Capital Cost
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Individual Farm Costs	
None	
Community Site Costs	
Raw Manure Storage	\$162,000
Raw Transfer Station	\$34,000
Drying and Natural Evaporation, Combustion/Close-Coupled Gasifier, and Turbine/Generator Set	\$4,249,000
Ash Storage	\$8,000
Building for Solids Separation, Maintenance, and Controls (80x40)	<u>\$320,000</u>
Subtotal	\$4,773,000
Piping and Mechanical	\$477,000
Electrical	\$477,000
HVAC	\$239,000
Site Work	<u>\$239,000</u>
Subtotal	\$6,205,000
Contractors General Conditions	\$496,000
Construction Costs	\$6,701,000
Contingencies & Technical Services	<u>\$2,680,000</u>
Total Project Costs	<u><u>\$9,381,000</u></u>
Decommissioning Reserve	\$938,000
<b>Total Opinion of Capital Cost</b>	<b>\$10,319,000</b>

Opinion of Annual O&M Costs	Year 2007	Year 2012	Year 2012 + 25%
Labor	\$166,000	\$187,000	\$205,700
Electricity	\$19,000	\$21,000	\$25,200
Natural Gas	\$0	\$0	\$0
Liquid Hauling Costs (manure to cluster)	\$306,000	\$346,000	\$415,200
Solids Disposal Revenue	(\$21,000)	(\$24,000)	(\$30,000)
GHG Emission Reduction Credits	(\$89,000)	(\$178,000)	(\$222,500)
Energy Credit and RECs	(\$232,000)	(\$250,000)	(\$312,500)
Chemicals	\$0	\$0	\$0
Maintenance and Supplies	\$86,000	\$97,000	\$111,600
<b>Total Annual O&amp;M Costs</b>	<u><b>\$235,000</b></u>	<u><b>\$199,000</b></u>	<u><b>\$193,000</b></u>