

Company Name

Project frank kowalski

Site Name

COMMENTS: sp8 and sp8a combined from one sample each on 5/23/2006 and a stream crossing under "other"

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AMD TREAT

AMD TREAT MAIN COST FORM

AMDTREAT

Costs

<u>Passive Treatment</u>	<u>A</u>	<u>S</u>	
Vertical Flow Pond	1	0	\$30,795
Anoxic Limestone Drain			\$0
Anaerobic Wetlands			\$0
Aerobic Wetlands			\$0
Manganese Removal Bed	1	0	\$22,223
Oxic Limestone Channel			\$0
Limestone Bed			\$0
BIO Reactor			\$0
Passive Subtotal:			\$53,018
<u>Active Treatment</u>			
Caustic Soda			\$0
Hydrated Lime			\$0
Pebble Quick Lime			\$0
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
Active Subtotal:			\$0
<u>Ancillary Cost</u>			
Ponds	1	0	\$5,000
Roads			\$0
Land Access			\$0
Ditching	1	0	\$4,983
Engineering Cost	1	0	\$7,300
Ancillary Subtotal:			\$17,283
Other Cost (Capital Cost)			\$10,000
Total Capital Cost:			\$80,301
<u>Annual Costs</u>			
Sampling	1	0	\$750
Labor	1	0	\$1,820
Maintenance	1	0	\$2,555
Pumping			\$0
Chemical Cost			\$0
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$510
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			\$5,635
Other Cost	1	0	

Water Quality

Calculated Acidity mg/L

Alkalinity mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity) mg/L

Design Flow gpm

Typical Flow gpm

Total Iron mg/L

Aluminum mg/L

Manganese mg/L

pH su

Ferric Iron mg/L

Ferrous Iron mg/L

Sulfate mg/L

Filtered Fe mg/L

Filtered Al mg/L

Filtered Mn mg/L

Specific Conductivity uS/cm

Total Dissolved Solids mg/L

Dissolved Oxygen mg/L

Typical Acid Loading tons/yr

**Total Annual Cost: per
1000 Gal of H2O Treated \$0.267**

VFP Name

AMDTREAT
VERTICAL FLOW POND (VFP)

AMDTREAT



Opening Screen
 Water Parameters

Influent Water Parameters that Affect VFP

Calculated Acidity

80.00 mg/L

Alkalinity

0.00 mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity)

80.00 mg/L

Design Flow

40.00 gpm

Typical Flow

40.00 gpm

Total Iron

0.73 mg/L

Aluminum

7.60 mg/L

Manganese

10.90 mg/L

SIZING METHODS Select One

1. Tons of Limestone Needed	274
2. Tons of Limestone Needed	562
3. Tons of Limestone Needed	1,062
4. Tons of Limestone Needed	837
5. Tons of Limestone Needed	1,684

VFP Based on Acidity Neutralization

VFP Based on Retention Time

VFP Based on Alkalinity Generation Rate

VFP Based on Tons Limestone Entered

VFP Based on Dimensions

6. Retention Time 16.00 hours

7. Alkalinity Generation Rate

8. Limestone Needed

9. Length at Top of Freeboard

10. Width at Top of Freeboard

11. % Void Space of L.S. Bed 43.00 %

12. System Life 20.00 years

13. Limestone Purity 85.00 %

14. Limestone Efficiency 60.00 %

15. Density of Loose Limestone 94.30 lbs/ft³

16. Limestone Unit Cost 22.00 \$/ton

17. L.S. Placement Unit Cost 0.00 \$/yd³

Run of Slope Rise of Slope

18. Slope of Pond Sides 2.0 : 1

19. Freeboard Depth 3.00 ft

20. Free Standing Water Depth 2.0 ft

21. Organic Matter Depth 1.0 ft

22. Organic Matter Unit Cost 20.00 \$/yd³

23. Organic Matter Spreading Unit Cost 4.50 \$/yd³

24. Limestone Depth 3.0 ft

25. Excavation Unit Cost 5.50 \$/yd³

Liner Cost

No Liner

Clay Liner

11. Clay Liner Unit Cost \$/yd³

12. Thickness of Clay Liner ft

Synthetic Liner

13. Synthetic Liner Unit Cost \$/yd²

29. Clearing and Grubbing?

30a. Land Multiplier ratio

30b. Clear/Grub Acres acres

31. Clear and Grub Unit Cost \$/acre

32. Nbr. of Valves 0 nbr

33. Unit Cost of Valves 3500.00 \$ ea.

34. Total Length of Effluent / Influent Pipe 20 ft

35. Pipe Install Rate 11.00 \$/hr

36. Labor Rate 35.00 \$/hr

37. Segment Len. of Trunk Pipe 20 ft/pipe seg.

38. Trunk Pipe Cost 15.00 \$/ft

39. Trunk Coupler Cost 6.60 \$/coupler

40. Spur Cost 7.00 \$/ft

41. Spur Coupler Cost 3.00 \$/spur

42. "T" Connector Cost 90.00 \$/T coupler

43. Segment Len. of Spur Pipe 20 ft/pipe seg.

44. Spur Pipe Spacing 10.0 ft

Custom Piping Costs

Length Diameter Unit Cost

45. Pipe #1 ft in in \$

46. Pipe #2 ft in in \$

47. Pipe #3 ft in in \$

VFP Sizing Summaries

48. Length at Top of Freeboard	122.12	ft
49. Width at Top of Freeboard	73.06	ft
50. Freeboard Volume	866	yd ³
51. Water Surface Area	6,724	ft ²
52. Total Water Volume	448	yd ³
53. Organic Matter Volume	189	yd ³
54. Limestone Surface Area	4,814	ft ²
55. Limestone Volume	442.14	yd ³
56. Excavation Volume	1,080.5	yd ³
57. Clear and Grub Area	0.0	acr.
58. Liner Area	0.0	ft ²
59. Theoretical Retention Time	16.00	hrs

VFP Cost Summaries

60. Organic Matter Cost	3,788	\$
61. Limestone Cost	12,383	\$
62. Limestone and Organic Matter Placement Cost	852	\$
63. Excavation Cost	5,943	\$
64. Liner Cost	0	\$
65. Clear and Grub Cost	0	\$
66. Valve Cost	0	\$
67. Pipe Cost	7,829	\$
68. Total Cost	30,795	\$

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AMDTREAT

AMD TREAT MANGANESE REMOVAL BED

MN Removal Bed Name

SIZING METHODS Select One			
Tons of Limestone Needed	844.31	<input checked="" type="radio"/> Based on Retention Time	1. Retention Time <input style="width: 50px; text-align: center;" type="text" value="1.00"/> days
Tons of Limestone Needed	200.00	<input type="radio"/> Based on Tons of Limestone	2. Limestone Needed <input style="width: 50px;" type="text"/> tons
Tons of Limestone Needed	806.32	<input type="radio"/> Based on Dimensions	3. Length at Top of Freeboard <input style="width: 50px;" type="text"/> ft
Tons of Limestone Needed	0.00	<input type="radio"/> Based on Kinetics	4. Width at Top of Freeboard <input style="width: 50px;" type="text"/> ft
			5. Rate Constant (k) <input style="width: 50px;" type="text"/> hr/ft

Opening Screen Water Parameters

Influent Water Parameters that Affect MN Removal Bed

Calculated Acidity mg/L

Alkalinity mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity) mg/L

Design Flow gpm

Typical Flow gpm

Total Iron mg/L

Aluminum mg/L

Manganese mg/L

6. Stone Diameter	<input style="width: 50px; text-align: center;" type="text" value="1.00"/>	inches
7. Effluent Mn Concentration	<input style="width: 50px; text-align: center;" type="text" value="5.00"/>	mg/l
8. % Void Space of Limestone Bed	<input style="width: 50px; text-align: center;" type="text" value="43.00"/>	%
9 Density of Loose Limestone	<input style="width: 50px; text-align: center;" type="text" value="94.30"/>	lbs/ft3
10. Limestone Unit Cost	<input style="width: 50px; text-align: center;" type="text" value="22.00"/>	\$/ton
11. Limestone Placement Unit Cost	<input style="width: 50px; text-align: center;" type="text" value="0.00"/>	\$/yd3
12. Freeboard Depth	<input style="width: 50px; text-align: center;" type="text" value="2.00"/>	ft
13. Limestone Depth	<input style="width: 50px; text-align: center;" type="text" value="1.00"/>	ft
14. Excavation Unit Cost	<input style="width: 50px; text-align: center;" type="text" value="5.50"/>	\$/yd3
15. Slope of Pond Sides	Run <input style="width: 30px; text-align: center;" type="text" value="2.0"/> : Rise <input style="width: 30px; text-align: center;" type="text" value="1"/>	

Liner Cost

<input checked="" type="radio"/> No Liner	
<input type="radio"/> Clay Liner	
16. Clay Liner Unit Cost	<input style="width: 50px; text-align: center;" type="text"/> \$/yd3
17. Thickness of Clay Liner	<input style="width: 50px; text-align: center;" type="text"/> ft
<input type="radio"/> Synthetic Liner	
18. Synthetic Liner Unit Cost	<input style="width: 50px; text-align: center;" type="text"/> \$/yd2
<input type="checkbox"/> 19. Clearing and Grubbing?	
<input type="radio"/> 20. Land Multiplier	<input style="width: 50px; text-align: center;" type="text"/> ratio
<input type="radio"/> 21. Clear/Grub Acres	<input style="width: 50px; text-align: center;" type="text"/> acres
22. Clear and Grub Unit Cost	<input style="width: 50px; text-align: center;" type="text"/> \$/acre

Manganese Removal Bed Sizing Summaries

23. Top Length at Freeboard	<input style="width: 50px; text-align: center;" type="text" value="200.24"/>	ft
23. Top Width at Freeboard	<input style="width: 50px; text-align: center;" type="text" value="104.12"/>	ft
25. Freeboard Volume	<input style="width: 50px; text-align: center;" type="text" value="1,455"/>	yd3
26. Limestone Surface Area	<input style="width: 50px; text-align: center;" type="text" value="18,478.3"/>	ft2
27. Limestone Volume	<input style="width: 50px; text-align: center;" type="text" value="663.2"/>	yd3
28. Tons of Limestone	<input style="width: 50px; text-align: center;" type="text" value="844"/>	tons
29. Excavation Volume	<input style="width: 50px; text-align: center;" type="text" value="663"/>	yd3
30. Clear and Grub Area	<input style="width: 50px; text-align: center;" type="text" value="0.0"/>	acres
31. Liner Area	<input style="width: 50px; text-align: center;" type="text" value="0"/>	ft2
32. Theoretical Retention Time	<input style="width: 50px; text-align: center;" type="text" value="1.00"/>	days

Manganese Removal Bed Sub-Totals

33. Limestone Cost	<input style="width: 50px; text-align: center;" type="text" value="18,575"/>	\$
34. Limestone Placement Cost	<input style="width: 50px; text-align: center;" type="text" value="0"/>	\$
35. Excavation Cost	<input style="width: 50px; text-align: center;" type="text" value="3,648"/>	\$
36. Liner Cost	<input style="width: 50px; text-align: center;" type="text" value="0"/>	\$
37. Clear and Grub Cost	<input style="width: 50px; text-align: center;" type="text" value="0"/>	\$

38. Total Cost \$

Record Number 1 of 1

Company Name

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AMD TREAT PONDS

AMDTREAT

Pond Name

Pond Design Based On:

Retention Time

1. Desired Retention Time hours

2. Include Sludge Removal?

3. Sludge Removal Frequency times/year

4. Titration?

5. Sludge Rate gal sludge/
gal H2O

6. Percent Solids %

7. Sludge Density lbs./gal

Pond Size

8. Pond Length at Top of Freeboard ft

9. Pond Width at Top of Freeboard ft

Run Rise

10. Slope Ratio of Pond Sides :

11. Freeboard Depth ft

12. Water Depth ft

13. Excavation Unit Cost \$/yd3

14. Total Length of Effluent
/ Influent Pipe ft

15. Unit Cost of Pipe \$/ft

Liner Cost

No Liner

Clay Liner

16. Clay Liner Unit Cost \$/yd3

17. Thickness of Clay Liner ft

Synthetic Liner

18. Synthetic Liner Unit Cost \$/yd2

19. Clearing and Grubbing?

20. Land Multiplier ratio

21. Clear/Grub Acres acres

22. Clear and Grub Unit Cost \$/acre

23. Revegetation Cost \$/acre

24. Cost of Baffles \$

Calculated Pond Dimensions per Pond

25. Length at Top of Freeboard ft

26. Width at Top of Freeboard ft

27. Freeboard Volume yd3

28. Water Volume yd3

29. Estimated Annual Sludge yd3/yr

30. Volume of Sludge
per Removal yd3/
removal

31. Excavation Volume acre ft

32. Excavation Volume yd3

33. Clear and Grub Area acres

34. Liner Area yd2

35. Calculated Retention Time hours

Ponds Sub-Totals per Pond

36. Excavation Cost \$

37. Pipe Cost \$

38. Liner Cost \$

39. Clearing and Grubbing Cost \$

40. Revegetation Cost \$

41. Baffle Cost \$

42. Estimated Cost \$

43. Accept Minimum Pond Cost?

The Recommended Minimum Construction
Cost of Building a Pond is \$ 5,000

44. Recommended Minimum Cost \$

45. Total Cost \$

Opening Screen
Water Parameters

Influent Water Parameters that Affect Ponds

Calculated Acidity

mg/L

Alkalinity

mg/L

Calculate Net
Acidity
(Acid-Alkalinity)

Enter Net Acidity
manually

Net Acidity
(Hot Acidity)

mg/L

Design Flow

gpm

Typical Flow

gpm

Total Iron

mg/L

Aluminum

mg/L

Manganese

mg/L

Record Number

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Project frank kowalski

Site Name

AMD TREAT DITCHING



AMDTREAT

Ditching Name

- 1. Ditch Length Rock ft
- 2. Ditch Length Grass ft
- 3. Bottom Width of Ditch ft
- 4. Ditch Depth ft
- 5. Geo Textile Unit Cost \$/yd2
- 6. Length of Geo Textile ft
- 7. Slope Ratio of Ditch Sides Run : Rise
- 8. Surveying?
- 9. Survey Rate acres/day
- 10. Survey Unit Cost \$/day
- 11. Clearing and Grubbing?
- 12. Clear and Grub Cost \$/acre

- 13. Ditch Depth of Rock ft
- 14. Cost of Ditch Surface Rock \$/yd3
- 15. Cost to Place Rock \$/yd3
- 16. Excavation Unit Cost \$/yd3
- 17. Length of Silt Fence ft
- 18. Unit Cost of Silt Fence \$/ft
- 19. Revegetation Unit Cost \$/acre

Ditching Sub-Totals

- 20. Excavation Cost \$
- 21. Survey Cost \$
- 22. Clear and Grub Cost \$
- 23. Aggregate Cost \$
- 24. Filter Fabric Cost \$
- 25. Silt Fence Cost \$
- 26. Revegetation Cost \$

Record Number 1 of 1

27. Total Cost \$

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AMDTREAT

**AMD TREAT
ENGINEERING COST**

1. Capital Cost *	<input type="text" value="73,001"/>	\$
<input checked="" type="radio"/> 2. Per Cent of Capital Cost	<input type="text" value="10.00"/>	%
<input type="radio"/> 3. Actual Engineering Cost	<input type="text"/>	\$
4. Total Engineering Cost <input type="text" value="7,300"/> \$		

*** Total Capital Cost minus Engineering and
Land Access Capital Cost**

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AMDTREAT

**AMD TREAT
OTHER COST**

Other Cost Name

A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Capital Cost Annual Cost
1. 2 36 in CMP stream crossing	10,000.00	1	10,000	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
2.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
3.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
4.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
5.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
6.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
7.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
8.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
9.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
10.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
11.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
12.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
13.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
14.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost
15.	0.00	0	0	<input checked="" type="radio"/> Capital Cost <input type="radio"/> Annual Cost

Record Number
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Curent Capital Cost \$
Current Annual Cost \$

Total Capital Cost \$
Total Annual Cost \$

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Site Name

AMD TREAT SAMPLING



Sampling Name

Estimate Sampling Cost

1. Unit Labor Cost \$/hr

2. Collection Time per Sample hours/sample

3. Travel Time hr

4. Sample Frequency samples/mo

5. Lab Cost Per Sample \$/sample

6. Number of Sample Points points

Enter Established Annual Sampling Cost

7. Actual Annual Sampling Cost \$

Sampling Sub-Totals

8. Yearly Sample Analysis Cost \$

9. Yearly Travel Cost \$

10. Yearly Collection Cost \$

11. Sampling Cost \$

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Company Name

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Site Name



AMDTREAT

AMD TREAT

LABOR

Labor Name

Estimate Labor Cost

1. Site Visits per Week

2. Site Labor Time per Visit hours

3. Travel Time per Visit hours

4. Unit Labor Cost \$/hour

Enter Established Annual Labor Cost

5. Actual Annual Labor Cost \$

6. Total Cost \$

Record Number 1 of 1

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AMDTREAT

AMD TREAT

MAINTANENCE

Estimate Maintenance Cost

- 1. Percent of Active Cost %
- 2. Percent of Passive Cost %
- 3. Percent of Ancillary Cost * %
- 4. Percent of Other Capital Cost %

Enter Established Annual Maintenance Cost

5. Annual Maintenance Cost \$

Maintenance Sub-Totals

- 6 Total Maintenance Active Cost \$
- 7. Total Maintenance Passive Cost \$
- 8. Total Maintenance Ancillary Cost \$
- 9. Total Maintenance Other Capital Cost \$

10. Total Maintenance Cost \$

* Ancillary Cost does int include Cost for Land Access and Engineering Cost

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AMD TREAT

SLUDGE REMOVAL

Opening Screen Water Parameters

Influent Water Parameters that Affect Sludge Removal

Calculated Acidity mg/L
 Alkalinity mg/L

Calculate Net Acidity (Acid-Alkalinity)
 Enter Net Acidity manually

Net Acidity (Hot Acidity) mg/L

Design Flow gpm
 Typical Flow gpm

Total Iron mg/L
 Aluminum mg/L
 Manganese mg/L

Sludge Removal Name

1. Select One

Sludge Removal by \$ per Gallon Selection for Method of Removing Sludge
 2. Sludge Removal Unit Cost \$/gal

Sludge Removal by Vacuum Truck
 3. Vacuum Truck Unit Cost \$/hr
 4. Mobilization Cost \$
 5. Hours to be Used hr

Sludge Removal by Mechanical Excavation
 6. Mechanical Excavation Unit Rate \$/hr
 7. Mobilization Cost \$
 8. Hours to be Used hr

Sludge Removal by Lagoon Cleaner
 9. Lagoon Cleaning Unit Rate \$/hr
 10. Mobilization Cost \$
 11. Hours to be Used hr

Actual Sludge Removal Cost
 12. Actual Sludge Removal Cost \$

13. Off Site Disposal Cost \$

Concentrations from Main Water Quality Screen

14. Iron Concentration mg/L
 15. Manganese Concentration mg/L
 16. Aluminum Concentration mg/L

17. Total Miscellaneous Concentration mg/L
 18. Percent Solids %
 19. Sludge Density lbs/gal

20. Titration?

21. Gal. of Sludge per Gal of Water Treated

22. Estimated Sludge Volume yd³/yr

Cost for Sludge Removal Types

23. Removal by \$ per Gallon \$
 24. Removal by Vacuum Truck \$
 25. Removal by Mechanical Excavation \$
 26. Removal by Lagoon Cleaner \$
 27. Actual Sludge Removal Cost \$

Sludge Removal Sub-Totals

28. Currently Selected Removal Cost \$
 Plus Off Site Disposal Cost

Record Number 1 of 1

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AMD TREAT RECAPITIALIZATION COST

AMDTREAT

Calculation Period yrs Inflation Rate % Net Return Rate %

Recapitalization Name

A. Description of Item	B. Unit Cost Per Item	C. Quantity	D. Total Item Cost	E. Life Cycle	F. Number of Periods	G. Total PV
1. Vertical Flow Pond	30,795	1	30,795	7	10	123,080
2. Manganese removal bed	22,223	1	22,223	10	7	59,542
3. Pond	5,000	1	5,000	20	3	5,466
4. Stream Crossing	10,000	1	10,000	25	3	8,745
5.	0	0	0	0	0	0
6.	0	0	0	0	0	0
7.	0	0	0	0	0	0
8.	0	0	0	0	0	0
9.	0	0	0	0	0	0
10.	0	0	0	0	0	0
11.	0	0	0	0	0	0
12.	0	0	0	0	0	0
13.	0	0	0	0	0	0
14.	0	0	0	0	0	0
15.	0	0	0	0	0	0
16.	0	0	0	0	0	0
17.	0	0	0	0	0	0
18.	0	0	0	0	0	0
19.	0	0	0	0	0	0
20.	0	0	0	0	0	0

Total Capital Cost \$ PV Grand Total \$