

Company Name American Development

Project BG156

Site Name Job 33



**AMD TREAT**

**Costs AMD TREAT MAIN COST FORM**

**AMDTREAT**

<u>Passive Treatment</u>	<u>A</u>	<u>S</u>	
Vertical Flow Pond			\$0
Anoxic Limestone Drain			\$0
Anaerobic Wetlands			\$0
Aerobic Wetlands			\$0
Manganese Removal Bed			\$0
Oxic Limestone Channel			\$0
Limestone Bed			\$0
BIO Reactor			\$0
Passive Subtotal:			<b>\$0</b>
<u>Active Treatment</u>			
Caustic Soda	1	0	\$8,387
Hydrated Lime			\$0
Pebble Quick Lime			\$0
Ammonia			\$0
Oxidants			\$0
Soda Ash			\$0
Active Subtotal:			<b>\$0</b>
<u>Ancillary Cost</u>			
Ponds	1	0	\$5,570
Roads			\$0
Land Access			\$0
Ditching			\$0
Engineering Cost	1	0	\$2,791
Ancillary Subtotal:			<b>\$8,361</b>
Other Cost (Capital Cost)			\$0
Total Capital Cost:			<b>\$16,748</b>
<u>Annual Costs</u>			
Sampling	2	0	\$1,226
Labor	1	0	\$10,920
Maintenance	1	0	\$252
Pumping			\$0
Chemical Cost	1	0	\$18,721
Oxidant Chem Cost			\$0
Sludge Removal	1	0	\$359
Other Cost (Annual Cost)			\$0
Land Access (Annual Cost)			\$0
Total Annual Cost:			<b>\$31,478</b>
Other Cost			

**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

**Total Annual Cost: per  
1000 Gal of H2O Treated \$2.393**



# AMD TREAT CAUSTIC SODA

AMDTREAT

**Opening Screen  
Water Parameters**

Caustic Soda Name

**Influent Water  
Parameters  
that Affect  
Caustic Soda**

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

1. Gallons of Caustic per Year  gal/yr

2. Gallons of Caustic per Month  gal/mo

3. Gallons of Caustic per Day  gal/day

4. Titration?

5. Caustic Titration Volume  gal caustic/gal  
water treated

6. Purity of Caustic Solution  purity of 20%  
caustic solution

7. Mixing Efficiency of  
Caustic Solution  %

8. Tank Cost  \$

9. Tank Volume  gal

10. Delivery Frequency  times/yr

11. Valve Unit Cost  \$

12. Number of Valves  nbr

13. Feeder Line Length  ft

14. Feeder Line Unit Cost  \$/ft

15. Installation of System  
Unit Cost  \$/hr

16. Installation Hours  hours

17. Automatic System?

18. PID pH Proportional Control  \$

19. pH Probe  \$

20. Chemical Metering Pump  \$

21. Water Wheel Dispenser

22. Dispenser Cost  \$

**Caustic Sub-Totals**

23. Number of Tanks Required  nbr

24. Tank Cost  \$

25. Automatic System or Wheel  
Dispenser Cost  \$

26. Cost of Valves  \$

27. Feeder Line Cost  \$

28. Labor Cost  \$

29. Total Capital Cost  \$

**Record Number 1 of 1**

# AMD TREAT PONDS



**AMDTREAT**

Pond Name Settling pond

**Pond Design Based On:**

Retention Time

1. Desired Retention Time  hours

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  75.000 ft

9. Pond Width at Top of Freeboard  75.000 ft

	Run	Rise
10. Slope Ratio of Pond Sides	<input type="text"/> 2.0	: <input type="text"/> 1
11. Freeboard Depth	<input type="text"/> 2.0	ft
12. Water Depth	<input type="text"/> 6.0	ft
13. Excavation Unit Cost	<input type="text"/> 2.50	\$/yd3
14. Total Length of Effluent / Inlet Pipe	<input type="text"/> 20.00	ft
15. Unit Cost of Pipe	<input type="text"/> 7.90	\$/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  1500.00 \$/acre

24. Number of Ponds for this Design  3 number

25. Cost of Baffles  0 \$

**Calculated Pond Dimensions per Pond**

26. Length at Top of Freeboard  75 ft

27. Width at Top of Freeboard  75 ft

28. Freeboard Volume  1,056 yd3

29. Water Volume  682 yd3

30. Estimated Annual Sludge  0 yd3/yr

31. Volume of Sludge per Removal  0 yd3/removal

32. Excavation Volume  0.42 acre ft

33. Excavation Volume  682 yd3

34. Clear and Grub Area  0.19 acres

35. Liner Area  0 yd2

36. Calculated Retention Time  46 hours

**Ponds Sub-Totals per Pond**

37. Excavation Cost  5,121 \$

38. Pipe Cost  158 \$

39. Liner Cost  0 \$

40. Clearing and Grubbing Cost  0 \$

41. Revegetation Cost  290 \$

42. Baffle Cost  0 \$

43. Estimated Cost  5,570 \$

**Opening Screen Water Parameters**

**Influent Water Parameters that Affect Ponds**

Calculated Acidity  0.00 mg/L

Alkalinity  0.00 mg/L

Calculate Net Acidity (Acid-Alkalinity)

Enter Net Acidity manually

Net Acidity (Hot Acidity)  271.00 mg/L

Design Flow  50.00 gpm

Typical Flow  25.00 gpm

Total Iron  17.70 mg/L

Aluminum  6.34 mg/L

Manganese  3.40 mg/L

**Record Number**  
1 of 1

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**AMD TREAT**  
**ENGINEERING COST**



1. Capital Cost \*  \$

☛ 2. Per Cent of Capital Cost  %

☛ 3. Actual Engineering Cost  \$

4. Total Engineering Cost  \$

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

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## 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  \$

Record Number 1 of 2

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## 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  \$

Record Number 2 of 2

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## 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

### MAINTENANCE

**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 not include Cost for Land Access and Engineering Cost





# AMD TREAT CHEMICAL COST

AMDTREAT

Chemical Cost Name:

**Opening Screen Water Parameters**

**Influent Water Parameters that Affect Chemical Cost**

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

A. Hydrated Lime ?

1 Titration?

2. Hydrated Lime Titration Amount  lbs of hydrated lime / gal of H2O

3. Hydrated Lime Purity  %

4. Mixing Efficiency of Hydrated Lime  %

5. Hydrated Lime Unit Cost  \$/lb

B. Pebble Quick Lime ?

6. Titration?

7. Pebble Lime Titration Amount  lbs of Pebble Lime / gal of H2O

8. Pebble Lime Purity  %

9. Mixing Efficiency of Pebble Lime  %

Delivered in Bags

10. Pebble Lime Bag Unit Cost  \$/lb

Bulk Delivery

11. Pebble Lime Bulk Unit Cost  \$/lb

C. Caustic Soda ?

12. Titration?

13. Caustic Titration Amount  gal of caustic / gal H2O

14. Caustic Purity  purity of 20% caustic solution

15. Mixing Efficiency of Caustic  %

Non-Bulk Delivery

16. Caustic Non-Bulk Unit Cost  \$/gal

Bulk Delivery

17. Caustic Bulk Unit Cost  \$/gal

D. Limestone ?

18. Limestone Purity  %

19. Limestone Efficiency  %

20. Limestone Unit Cost  \$/ton

E. Anhydrous Ammonia ?

21. Titration?

22. Ammonia Titration Amount  lbs of ammonia / gal H2O

23. Ammonia Purity  %

24. Mixing Efficiency of Ammonia  %

Non-Bulk Delivery

25. Ammonia Non-Bulk Unit Cost  \$/lb

Bulk Delivery

26. Ammonia Bulk Unit Cost  \$/lb

F. Soda Ash ?

27. Titration?

28. Soda Ash Titration Amount  lbs of soda ash / gal of H2O

29. Soda Ash Purity  %

30. Mixing Efficiency of Soda Ash  %

31. Soda Ash Unit Cost  \$/lb

G. Known Chemical Cost ?

32. Known Annual Chemical Cost  \$

Chemical Cost Sub-Totals		Annual Amount of Chemicals Consumed	
33. Total Hydrated Lime Cost	<input type="text" value="0"/> \$	<input type="text" value="0"/> lbs	
34. Total Pebble Lime Cost	<input type="text" value="0"/> \$	<input type="text" value="0"/> lbs	
35. Total Caustic Soda Cost	<input type="text" value="18,721"/> \$	<input type="text" value="14,976"/> gals	
36. Total Limestone Cost	<input type="text" value="0"/> \$	<input type="text" value="0"/> tons	
37. Total Anhydrous Ammonia Cost	<input type="text" value="0"/> \$	<input type="text" value="0"/> lbs	
38. Total Soda Ash Cost	<input type="text" value="0"/> \$	<input type="text" value="0"/> lbs	
39. Total Known Chemical Cost	<input type="text" value="0"/> \$		

40. Selected Chemical: **CAUSTIC SODA**

Annual Chemical Cost  \$

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AMDTREAT

# AMD TREAT SLUDGE REMOVAL

Opening Screen  
Water Parameters

Sludge Removal Name

**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

Selection for Method of Removing Sludge

1. Select One

Sludge Removal by \$ per Gallon

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  \$

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  gal

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  \$

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### AMD TREAT RECAPITIALIZATION COST

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Calculation Period  yrs    Inflation Rate  %    Net Return Rate  %

Recapitalization Name

A	B	C	D	E	F	G
Description of Item	Unit Cost Per Item	Quantity	Total Item Cost	Life Cycle	Number of Periods	Total PV
1. replace all componants	13,957	1	13,957	25	3	12,206
2.	0	0	0	0	0	0
3.	0	0	0	0	0	0
4.	0	0	0	0	0	0
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  \$