

# APPENDIX S

## Remedy O&M Costing Detail

## **APPENDIX S**

### **30 YEAR NPV OPERATION AND MAINTENANCE COST ESTIMATES FOR REMEDY ALTERNATIVES**

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**Table S-1**  
**Alternative 2 - Limited Waste Removal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. Site Review Completed Every 5 Years (Wastes Remain Onsite)
3. Emergency Maintenance to Berm Due to Earthquake - Once Per 10 Years **\$250,000**
4. Well Abandonment Included in Remedy Capital Cost (Cost About \$30K for 1/2 of wells)

Components of O&M:

1. Maintain Vegetative Cover/Drainage (19 acres) (Includes Replacement Soil Due to Settlement)
2. Maintain Site Fencing
3. Maintain Site Roads
4. Site Security/Inspections
5. Groundwater, Soil Vapor, Ambient Air (Same Schedule), and Stormwater Monitoring (Annual)
6. No gas/leachate collection
7. Project Management (Including Public Relations)

**Fixed Annual Costs - Years 1-30**

<b>Category - Labor</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 2 maintenance personnel, 2 days per week, 8 hours per day each, 52 weeks	1,664	person-hours	\$50	\$83,200
2. 1 site security person - inspections 3 days per week, 4 hours per day, 52 weeks	624	person-hours	\$50	\$31,200

**Subtotal Labor** **\$114,400**

<b>Category - Equipment</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 3 Support Trucks - Gas + Maintenance	364	truck-days	\$85	\$30,940

**Subtotal Equipment** **\$30,940**

<b>Category - Materials</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Maintain Irrigation System/Turf (Not Including Soil Replacement Due to Settlement - See Variable Costs)	12	mth	\$7,500	\$90,000

**Subtotal Materials** **\$90,000**

**Subtotal Fixed Costs/Year** **\$235,340**

**Table S-1**  
**Alternative 2 - Limited Waste Removal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Costs**

**1.) Monitoring/Reporting (All But Stormwater On Same Schedule)**

Years 1-5: Quarterly; Years 6-10 - Semiannual; Years 11-30 - Annual

**a) Groundwater**

	Per Event
Field Labor Costs (Including Oversight)	\$12,000
Office Labor Costs (Report Prep)	\$20,000
Field Equipment	\$6,000
Analytical	\$26,100
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$64,100</b>

**b) Ambient Air - 6 Perimeter Samples  
 (Analytical + Field Labor - Reporting Added to  
 Groundwater)**

**\$3,300**

**c) Soil Gas Perimeter Monitoring - 16 samples  
 (Analytical + Field Labor - Reporting Added to  
 Groundwater)**

**\$7,800**

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**Subtotal Air + Groundwater Monitoring/Event**      **\$75,200**

**d) Stormwater (\$25K for event, \$5K for report)**      **\$30,000**      **Annual Cost**

**2.) Conduct 5 Year Site Reviews**      **\$50,000**      **per event**

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$80,000</b>
Years 11-30	<b>\$60,000</b>

**4.) Soil Replacement Due to Settlement**

Years 1-5 - Assume 1/2' over 1/2 of site	15,327	cy	\$20	<b>\$306,533</b>
Years 6-10 - Assume 1/2' over 1/4 of site	7,663	cy	\$20	<b>\$153,267</b>
Years 11-30 - Assume No Additional Settlement				

**Table S-1**  
**Alternative 2 - Limited Waste Removal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Present Worth Cost Calculation**

$$PW = FW/(1+i)^n$$

Source: Perry's 5th Ed. Table 25.36

PW Present Worth  
 FW Future Worth  
 i Discount rate as interest compounded  
 n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	235,340	737,333	972,673	926,356
2	235,340	737,333	972,673	882,243
3	235,340	737,333	972,673	840,232
4	235,340	737,333	972,673	800,221
5	235,340	787,333	1,022,673	801,291
6	235,340	413,667	649,007	484,299
7	235,340	413,667	649,007	461,237
8	235,340	413,667	649,007	439,273
9	235,340	413,667	649,007	418,355
10	235,340	713,667	949,007	582,608
11	235,340	165,200	400,540	234,187
12	235,340	165,200	400,540	223,036
13	235,340	165,200	400,540	212,415
14	235,340	165,200	400,540	202,300
15	235,340	215,200	450,540	216,717
16	235,340	165,200	400,540	183,492
17	235,340	165,200	400,540	174,754
18	235,340	165,200	400,540	166,433
19	235,340	165,200	400,540	158,507
20	235,340	465,200	700,540	264,026
21	235,340	165,200	400,540	143,771
22	235,340	165,200	400,540	136,925
23	235,340	165,200	400,540	130,404
24	235,340	165,200	400,540	124,195
25	235,340	215,200	450,540	133,046
26	235,340	165,200	400,540	112,648
27	235,340	165,200	400,540	107,284
28	235,340	165,200	400,540	102,175
29	235,340	165,200	400,540	97,310
30	235,340	465,200	700,540	162,089
<b>Total</b>	<b>7,060,200</b>	<b>10,109,000</b>	<b>17,169,200</b>	<b>9,921,829</b>

**Table S-2**  
**Alternative 3 - Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. Site Review Completed Every 5 Years (Wastes Remain Onsite)
3. Emergency Maintenance to Berm Due to Earthquake - Once Per 10 Years **\$125,000**
4. Well Abandonment Included in Remedy Capital Cost (Cost About \$30K for 1/2 of wells)

Components of O&M:

1. Maintain Turf/Drainage (38 acres) (Includes Replacement Soil Due to Settlement)
2. Maintain Site Fencing
3. Maintain Site Roads
4. Site Security/Inspections
5. Groundwater, Soil Vapor, Ambient Air (Same Schedule), and Stormwater Monitoring (Annual)
6. No gas/leachate collection
7. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

Category - Labor	Quantity	Units	Unit Cost	Total Cost
1. 2 maintenance personnel, 2 days per week, 8 hours per day each, 52 weeks	1,664	person-hours	\$50	\$83,200
2. 1 site security person - inspections 3 days per week, 4 hours per day, 52 weeks	624	person-hours	\$50	\$31,200
<b>Subtotal Labor</b>				<b>\$114,400</b>

Category - Equipment	Quantity	Units	Unit Cost	Total Cost
1. 3 Support Trucks - Gas + Maintenance, 52 weeks	364	truck-days	\$85	\$30,940
<b>Subtotal Equipment</b>				<b>\$30,940</b>

Category - Materials	Quantity	Units	Unit Cost	Total Cost
1. Maintain Irrigation System/Turf (Includes Soil Replacement Due to Settlement)	12	mth	\$10,000	\$120,000
<b>Subtotal Materials</b>				<b>\$120,000</b>

**Subtotal Fixed Costs/Year** **\$265,340**

**Table S-2**  
**Alternative 3 - Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Costs**

**1.) Monitoring/Reporting (All but Stormwater on Same Schedule)**

Years 1-5: Quarterly; Years 6-10 - Semiannual; Years 11-30 - Annual

**a) Groundwater**

	Per Event
Field Labor Costs (Including Oversight)	\$12,000
Office Labor Costs (Report Prep)	\$15,000
Field Equipment	\$6,000
Analytical	\$26,100
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$59,100</b>

**b) Ambient Air - 6 Perimeter Samples  
(Analytical + Field Labor - Reporting  
Added to Groundwater)**

**\$3,300**

**c) Soil Gas Perimeter Monitoring - 16  
samples (Analytical + Field Labor -  
Reporting Added to Groundwater)**

**\$7,800**

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**Subtotal Air + Groundwater  
Monitoring/Event** **\$70,200**

**d) Stormwater (\$25K for event, \$5K for  
report)** **\$30,000** Annual Cost

**2.) Conduct 5 Year Site Reviews** **\$50,000** per event

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$80,000</b>
Years 11-30	<b>\$60,000</b>

**4.) Soil Replacement Due to Settlement**

Years 1-5 - Assume 1/2' over 3/4 of site	22,990	cy	\$20	<b>\$459,800</b>
Years 6-10 - Assume 1/2' over 1/2 of site	15,327	cy	\$20	<b>\$306,533</b>
Years 11-30 - Assume No Additional Settlement				

**Table S-2**  
**Alternative 3 - Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**PW = FW/(1+i)<sup>n</sup>**

Source: Perry's 5th Ed. Table 25.36

- PW Present Worth
- FW Future Worth
- i Discount rate as interest compounded
  
- n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	265,340	870,600	1,135,940	1,081,848
2	265,340	870,600	1,135,940	1,030,331
3	265,340	870,600	1,135,940	981,268
4	265,340	870,600	1,135,940	934,541
5	265,340	920,600	1,185,940	929,215
6	265,340	556,933	822,273	613,593
7	265,340	556,933	822,273	584,374
8	265,340	556,933	822,273	556,547
9	265,340	556,933	822,273	530,045
10	265,340	731,933	997,273	612,239
11	265,340	160,200	425,540	248,804
12	265,340	160,200	425,540	236,957
13	265,340	160,200	425,540	225,673
14	265,340	160,200	425,540	214,927
15	265,340	210,200	475,540	228,743
16	265,340	160,200	425,540	194,945
17	265,340	160,200	425,540	185,662
18	265,340	160,200	425,540	176,821
19	265,340	160,200	425,540	168,401
20	265,340	335,200	600,540	226,337
21	265,340	160,200	425,540	152,744
22	265,340	160,200	425,540	145,471
23	265,340	160,200	425,540	138,544
24	265,340	160,200	425,540	131,946
25	265,340	210,200	475,540	140,428
26	265,340	160,200	425,540	119,679
27	265,340	160,200	425,540	113,980
28	265,340	160,200	425,540	108,553
29	265,340	160,200	425,540	103,383
30	265,340	160,200	425,540	98,460
<b>Total</b>	<b>7,960,200</b>	<b>10,841,667</b>	<b>18,801,867</b>	<b>11,214,458</b>



**Table S-3**  
**Alternative 3 - Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. Site Review Completed Every 5 Years (Wastes Remain Onsite)
3. Emergency Maintenance to Berm Due to Earthquake - Once Per 10 Years **\$250,000**
4. Well Abandonment Included in Remedy Capital Cost (Cost About \$30K for 1/2 of wells)

Components of O&M:

1. Maintain Vegetative Cover/Drainage/Liners (38 acres) (Includes Replacement Soil Due to Settlement)
2. Maintain Site Fencing
3. Maintain Gas and Leachate Collection and Treatment Systems
4. Maintain Site Roads
5. Site Security/Inspections
6. Groundwater, Soil Vapor, Ambient Air (Same Schedule), and Stormwater Monitoring (Annual)
7. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

<b>Category - Labor</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 3 maintenance personnel, 5 days per week, 8 hours per day each, 52 weeks	6,240	person-hours	\$50	\$312,000
2. 1 site security persons - inspections 3 days per week, 4 hours per day, 52 weeks	624	person-hours	\$50	\$31,200
<b>Subtotal Labor</b>				<b>\$343,200</b>

<b>Category - Equipment</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 4 Support Trucks - Gas + Maintenance; 52 weeks	936	truck-days	\$85	\$79,560
2. Replacement Equipment for Treatment System - Pumps, Vapor Units, Etc.	12	mth	\$5,000	\$60,000
<b>Subtotal Equipment</b>				<b>\$139,560</b>

<b>Category - Materials</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Maintain Vegetative Cover, Liners (Includes So Replacement Due to Settlement)	12	mth	\$15,000	\$180,000
2. Maintain Gas Collection System	1	ls	\$150,000	\$150,000
<b>Subtotal Materials</b>				<b>\$330,000</b>

<b>Category - Waste Disposal</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Spent Carbon & Leachate - Based on 1.5M gallons over 15 years	417	tons	\$100	\$41,700
<b>Subtotal Waste Disposal</b>				<b>\$41,700</b>
<b>Subtotal Fixed Costs/Year</b>				<b>\$854,460</b>

**Table S-3**  
**Alternative 3 - Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Costs**

**1.) Monitoring/Reporting (All but Stormwater on Same Schedule)**

Years 1-5: Quarterly; Years 6-10 - Semiannual; Years 11-30 - Annual

**a) Groundwater Monitoring**

	Per Event
Field Labor Costs (Including Oversight)	\$12,000
Office Labor Costs (Report Prep)	\$20,000
Field Equipment	\$6,000
Analytical	\$26,100
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$64,100</b>

**b) Ambient Air - 6 Perimeter Samples  
 (Analytical + Field Labor - Reporting Added to  
 Groundwater)** **\$3,300**

**c) Soil Gas Perimeter Monitoring - 16 samples  
 (Analytical + Field Labor - Reporting Added to  
 Groundwater)** **\$7,800**

**Subtotal Air + Groundwater Monitoring/Event** **\$75,200**

**d) Stormwater (\$25K for event, \$5K for report)** **\$30,000**      Annual Cost

**2.) Conduct 5 Year Site Reviews** **\$50,000**      per event

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$80,000</b>
Years 11-30	<b>\$60,000</b>

**4.) Soil Replacement Due to Settlement**

Years 1-5 - Assume 1/2' over 3/4 of site	22,990	cy	\$20	<b>\$459,800</b>
Years 6-10 - Assume 1/2' over 1/2 of site	15,327	cy	\$20	<b>\$306,533</b>
Years 11-30 - Assume No Additional Settlement				

**Table S-3**  
**Alternative 3 - Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

$PW = FW/(1+i)^n$

Source: Perry's 5th Ed. Table 25.36

PW Present Worth  
 FW Future Worth  
 i Discount rate as interest compounded

n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	854,460	890,600	1,745,060	1,661,962
2	854,460	890,600	1,745,060	1,582,821
3	854,460	890,600	1,745,060	1,507,448
4	854,460	890,600	1,745,060	1,435,665
5	854,460	940,600	1,795,060	1,406,476
6	854,460	566,933	1,421,393	1,060,666
7	854,460	566,933	1,421,393	1,010,158
8	854,460	566,933	1,421,393	962,055
9	854,460	566,933	1,421,393	916,243
10	854,460	866,933	1,721,393	1,056,786
11	854,460	165,200	1,019,660	596,174
12	854,460	165,200	1,019,660	567,785
13	854,460	165,200	1,019,660	540,747
14	854,460	165,200	1,019,660	514,998
15	854,460	215,200	1,069,660	514,525
16	854,460	165,200	1,019,660	467,118
17	854,460	165,200	1,019,660	444,874
18	854,460	165,200	1,019,660	423,690
19	854,460	165,200	1,019,660	403,514
20	854,460	465,200	1,319,660	497,366
21	854,460	165,200	1,019,660	365,999
22	854,460	165,200	1,019,660	348,571
23	854,460	165,200	1,019,660	331,972
24	854,460	165,200	1,019,660	316,164
25	854,460	215,200	1,069,660	315,874
26	854,460	165,200	1,019,660	286,770
27	854,460	165,200	1,019,660	273,114
28	854,460	165,200	1,019,660	260,109
29	854,460	165,200	1,019,660	247,723
30	854,460	165,200	1,019,660	235,926
<b>Total</b>	<b>25,633,800</b>	<b>11,341,667</b>	<b>36,975,467</b>	<b>20,553,292</b>

**Table S-4**  
**Alternative 4 - Partial Source Removal with Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. Site Review Completed Every 5 Years (Wastes Remain Onsite)
3. Emergency Maintenance to Berm Due to Earthquake - Once Per 10 Years **\$125,000**
4. Well Abandonment Included in Remedy Capital Cost (Cost About \$30K for 1/2 of wells)

Components of O&M:

1. Maintain Vegetative Cover/Drainage/Liners (38 acres) (Includes Replacement Soil Due to Settlement)
2. Maintain Site Fencing
3. Maintain Site Roads
4. Site Security/Inspections
5. Groundwater, Soil Vapor, Ambient Air (Same Schedule), and Stormwater Monitoring (Annual)
6. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

Category - Labor	Quantity	Units	Unit Cost	Total Cost
1. 2 maintenance personnel, 2 days per week, 8 hours per day each, 52 weeks	1,664	person-hours	\$50	\$83,200
2. 1 site security person - inspections 3 days per week, 4 hours per day, 52 weeks	624	person-hours	\$50	\$31,200
<b>Subtotal Labor</b>				<b>\$114,400</b>

Category - Equipment	Quantity	Units	Unit Cost	Total Cost
1. 3 Support Trucks - Gas + Maintenance, 52 weeks	364	truck-days	\$85	\$30,940
<b>Subtotal Equipment</b>				<b>\$30,940</b>

Category - Materials	Quantity	Units	Unit Cost	Total Cost
1. Maintain Vegetative Cover, Liners (Include Soil Replacement Due to Settlement and Water)	12	ls	\$10,000	\$120,000
<b>Subtotal Materials</b>				<b>\$120,000</b>

Category - Waste Disposal	Quantity	Units	Unit Cost	Total Cost
<b>Subtotal Waste Disposal</b>				<b>\$0</b>
<b>Subtotal Fixed Costs/Year</b>				<b>\$265,340</b>

**Table S-4**  
**Alternative 4 - Partial Source Removal with Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Costs**

**1.) Monitoring/Reporting (All but Stormwater on Same Schedule)**

Years 1-5: Quarterly; Years 6-10 - Semiannual; Years 11-30 - Annual

**a) Groundwater Monitoring**

Based on Costs from Geosyntec:

	<b>Per Event</b>
<b>Field Labor Costs (Including Oversight)</b>	\$12,000
<b>Office Labor Costs (Report Prep)</b>	\$15,000
<b>Field Equipment</b>	\$6,000
<b>Analytical</b>	\$26,100
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$59,100</b>

**b) Ambient Air - 6 Perimeter Samples  
(Analytical + Field Labor - Reporting  
Added to Groundwater)**

**\$3,300**

**c) Soil Gas Perimeter Monitoring - 16  
samples (Analytical + Field Labor -  
Reporting Added to Groundwater)**

**\$7,800**

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**Subtotal Air + Groundwater  
Monitoring/Event**

**\$70,200**

**d) Stormwater (\$25K for event, \$5K for  
report)**

**\$30,000**

**Annual Cost**

**2.) Conduct 5 Year Site Reviews**

**\$50,000**

**per event**

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$80,000</b>
Years 11-30	<b>\$60,000</b>

**4.) Soil Replacement Due to Settlement**

Years 1-5 - Assume 1/2' over 3/4 of site	22,990	cy	\$20	<b>\$459,800</b>
Years 6-10 - Assume 1/2' over 1/2 of site	15,327	cy	\$20	<b>\$306,533</b>

**Table S-4**  
**Alternative 4 - Partial Source Removal with Protective (Monolithic) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**PW = FW/(1+i)<sup>n</sup>**

Source: Perry's 5th Ed. Table 25.36

PW Present Worth

FW Future Worth

i Discount rate as interest compounded

n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	265,340	870,600	1,135,940	1,081,848
2	265,340	870,600	1,135,940	1,030,331
3	265,340	870,600	1,135,940	981,268
4	265,340	870,600	1,135,940	934,541
5	265,340	920,600	1,185,940	929,215
6	265,340	556,933	822,273	613,593
7	265,340	556,933	822,273	584,374
8	265,340	556,933	822,273	556,547
9	265,340	556,933	822,273	530,045
10	265,340	731,933	997,273	612,239
11	265,340	160,200	425,540	248,804
12	265,340	160,200	425,540	236,957
13	265,340	160,200	425,540	225,673
14	265,340	160,200	425,540	214,927
15	265,340	210,200	475,540	228,743
16	265,340	160,200	425,540	194,945
17	265,340	160,200	425,540	185,662
18	265,340	160,200	425,540	176,821
19	265,340	160,200	425,540	168,401
20	265,340	335,200	600,540	226,337
21	265,340	160,200	425,540	152,744
22	265,340	160,200	425,540	145,471
23	265,340	160,200	425,540	138,544
24	265,340	160,200	425,540	131,946
25	265,340	210,200	475,540	140,428
26	265,340	160,200	425,540	119,679
27	265,340	160,200	425,540	113,980
28	265,340	160,200	425,540	108,553
29	265,340	160,200	425,540	103,383
30	265,340	160,200	425,540	98,460
<b>Total</b>	<b>7,960,200</b>	<b>10,841,667</b>	<b>18,801,867</b>	<b>11,214,458</b>

**Table S-5**  
**Alternative 4 - Partial Source Removal with Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. Site Review Completed Every 5 Years (Wastes Remain Onsite)
3. Emergency Maintenance to Berm Due to Earthquake - Once Per 10 Years **\$250,000**
4. Well Abandonment Included in Remedy Capital Cost (Cost About \$30K for 1/2 of wells)

Components of O&M:

1. Maintain Vegetative Cover/Drainage/Liners (38 acres) (Includes Replacement Soil Due to Settlement)
2. Maintain Site Fencing
3. Maintain Gas and Leachate Collection and Treatment Systems
4. Maintain Site Roads
5. Site Security/Inspections
6. Groundwater, Soil Vapor, Ambient Air (Same Schedule), and Stormwater Monitoring (Annual)
7. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

<b>Category - Labor</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 3 maintenance personnel, 5 days per week, 8 hours per day each, 52 weeks	6,240	person-hours	\$50	\$312,000
2. 1 site security person - inspections 3 days per week, 4 hours per day, 52 weeks	624	person-hours	\$50	\$31,200
<b>Subtotal Labor</b>				<b>\$343,200</b>

<b>Category - Equipment</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 4 Support Trucks - Gas + Maintenance, 52 weeks	936	truck-days	\$85	\$79,560
2. Replacement Equipment for Treatment System - Pumps, Vapor Units, Etc.	12	mth	\$5,000	\$60,000
<b>Subtotal Equipment</b>				<b>\$139,560</b>

<b>Category - Materials</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Maintain Vegetative Cover, Liners (Includes Soil Replacement Due to Settlement and Water)	12	ls	\$15,000	\$180,000
2. Maintain Gas Collection Systems	1	ls	\$150,000	\$150,000
<b>Subtotal Materials</b>				<b>\$330,000</b>

<b>Category - Waste Disposal</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Spent Carbon & Leachate - based on 1M gallons over 15 years	417	tons	\$100	\$41,700
<b>Subtotal Waste Disposal</b>				<b>\$41,700</b>
<b>Subtotal Fixed Costs/Year</b>				<b>\$854,460</b>

**Table S-5**  
**Alternative 4 - Partial Source Removal with Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Costs**

**1.) Monitoring/Reporting (All but Stormwater on Same Schedule)**

Years 1-5: Quarterly; Years 6-10 - Semiannual; Years 11-30 - Annual

**a) Groundwater Monitoring**

Based on Costs from Geosyntec:

	<b>Per Event</b>
Field Labor Costs (Including Oversight)	\$12,000
Office Labor Costs (Report Prep)	\$20,000
Field Equipment	\$6,000
Analytical	\$26,100
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$64,100</b>

**b) Ambient Air - 6 Perimeter Samples  
(Analytical + Field Labor - Reporting Added  
to Groundwater)**

**\$3,300**

**c) Soil Gas Perimeter Monitoring - 16  
samples (Analytical + Field Labor -  
Reporting Added to Groundwater)**

**\$7,800**

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**Subtotal Air + Groundwater  
Monitoring/Event** **\$75,200**

**d) Stormwater (\$25K for event, \$5K for  
report)** **\$30,000** **Annual Cost**

**2.) Conduct 5 Year Site Reviews** **\$50,000** **per event**

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$80,000</b>
Years 11-30	<b>\$60,000</b>

**4.) Soil Replacement Due to Settlement**

Years 1-5 - Assume 1/2' over 3/4 of site	22,990	cy	\$20	<b>\$459,800</b>
Years 6-10 - Assume 1/2' over 1/2 of site	15,327	cy	\$20	<b>\$306,533</b>



**Table S-5**  
**Alternative 4 - Partial Source Removal with Protective (Multilayer) Cap**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

$PW = FW/(1+i)^n$

Source: Perry's 5th Ed. Table 25.36

- PW Present Worth
- FW Future Worth
- i Discount rate as interest compounded
- n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	854,460	890,600	1,745,060	1,661,962
2	854,460	890,600	1,745,060	1,582,821
3	854,460	890,600	1,745,060	1,507,448
4	854,460	890,600	1,745,060	1,435,665
5	854,460	940,600	1,795,060	1,406,476
6	854,460	566,933	1,421,393	1,060,666
7	854,460	566,933	1,421,393	1,010,158
8	854,460	566,933	1,421,393	962,055
9	854,460	566,933	1,421,393	916,243
10	854,460	866,933	1,721,393	1,056,786
11	854,460	165,200	1,019,660	596,174
12	854,460	165,200	1,019,660	567,785
13	854,460	165,200	1,019,660	540,747
14	854,460	165,200	1,019,660	514,998
15	854,460	215,200	1,069,660	514,525
16	854,460	165,200	1,019,660	467,118
17	854,460	165,200	1,019,660	444,874
18	854,460	165,200	1,019,660	423,690
19	854,460	165,200	1,019,660	403,514
20	854,460	465,200	1,319,660	497,366
21	854,460	165,200	1,019,660	365,999
22	854,460	165,200	1,019,660	348,571
23	854,460	165,200	1,019,660	331,972
24	854,460	165,200	1,019,660	316,164
25	854,460	215,200	1,069,660	315,874
26	854,460	165,200	1,019,660	286,770
27	854,460	165,200	1,019,660	273,114
28	854,460	165,200	1,019,660	260,109
29	854,460	165,200	1,019,660	247,723
30	854,460	165,200	1,019,660	235,926
<b>Total</b>	<b>25,633,800</b>	<b>11,341,667</b>	<b>36,975,467</b>	<b>20,553,292</b>

**Table S-6**  
**Alternative 5 -**  
**Source Removal with Offsite Disposal and Slurry Injection Technology**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. 5 Year Review Required (Groundwater Only)
- 3) No Emergency Earthquake Maintenance (No Cap)

Components of O&M:

1. Maintain vegetative cover/drainage (38 acres)
2. Maintain site fencing/roads
3. No Site Security
4. Conduct Groundwater Monitoring
5. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

<b>Category - Labor</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 1 maintenance personnel, 2 days per week, 4 hours per day each, 52 weeks	416	person-hours	\$50	\$20,800
<b>Subtotal Labor</b>				<b>\$20,800</b>

<b>Category - Equipment</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 1 Support Truck - Gas + Maintenance	104	truck-days	\$85	\$8,840
<b>Subtotal Equipment</b>				<b>\$8,840</b>

<b>Category - Materials</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Maintain Irrigation System/Turf (Includes Soil Replacement Due to Settlement and Water)	12	mth	\$10,000	\$120,000
<b>Subtotal Materials</b>				<b>\$120,000</b>

**Subtotal Fixed Costs** **\$149,640**

**Table S-6  
Alternative 5 -  
Source Removal with Offsite Disposal and Slurry Injection Technology  
30 Year NPV Operation and Maintenance Costs  
Ascon Landfill Site**

**Variable Annual Costs**

**1.) Monitoring/Reporting**

**a) Groundwater:**

**Years 1-5 Semiannual; Years 6-30 Annual**

	<b>Per Event</b>	
<b>Field Labor Costs (Including Oversight)</b>	<b>\$12,000</b>	
<b>Office Labor Costs (Report Prep)</b>	<b>\$20,000</b>	
<b>Field Equipment</b>	<b>\$6,000</b>	
<b>Analytical</b>	<b>\$26,100</b>	
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$64,100</b>	

**Years 1-5 Only**

**b) Ambient Air - 6 Perimeter Samples  
(Analytical + Field Labor - Reporting  
Added to Groundwater)**

**\$3,300      Semiannual**

**c) Soil Gas Perimeter Monitoring - 16  
samples (Analytical + Field Labor -  
Reporting Added to Groundwater)**

**\$7,800      Semiannual**

**d) Stormwater (\$25K for event, \$5K for  
report)**

**\$30,000      Annual**

**2.) Conduct 5 Year Site Reviews**

**\$50,000      per event**

**3.) Project Management/Public Relations**

<b>Years 1-5</b>	<b>\$100,000</b>
<b>Years 6-10</b>	<b>\$20,000</b>
<b>Years 11-30</b>	<b>\$20,000</b>

**Table S-6**  
**Alternative 5 -**  
**Source Removal with Offsite Disposal and Slurry Injection Technology**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

$PW = FW/(1+i)^n$

Source: Perry's 5th Ed. Table 25.36

PW Present Worth  
 FW Future Worth

i Discount rate as interest compounded  
 n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
1	149,640	280,400	430,040	409,562
2	149,640	280,400	430,040	390,059
3	149,640	280,400	430,040	371,485
4	149,640	280,400	430,040	353,795
5	149,640	330,400	480,040	376,124
6	149,640	84,100	233,740	174,420
7	149,640	84,100	233,740	166,115
8	149,640	84,100	233,740	158,204
9	149,640	84,100	233,740	150,671
10	149,640	134,100	283,740	174,192
11	149,640	84,100	233,740	136,663
12	149,640	84,100	233,740	130,155
13	149,640	84,100	233,740	123,957
14	149,640	84,100	233,740	118,055
15	149,640	134,100	283,740	136,484
16	149,640	84,100	233,740	107,079
17	149,640	84,100	233,740	101,980
18	149,640	84,100	233,740	97,124
19	149,640	84,100	233,740	92,499
20	149,640	134,100	283,740	106,939
21	149,640	84,100	233,740	83,899
22	149,640	84,100	233,740	79,904
23	149,640	84,100	233,740	76,099
24	149,640	84,100	233,740	72,475
25	149,640	134,100	283,740	83,789
26	149,640	84,100	233,740	65,737
27	149,640	84,100	233,740	62,607
28	149,640	84,100	233,740	59,626
29	149,640	84,100	233,740	56,786
30	149,640	84,100	233,740	54,082
<b>Total</b>	<b>4,489,200</b>	<b>3,754,500</b>	<b>8,243,700</b>	<b>4,570,565</b>

**Table S-7**  
**Alternative 6 - Source Removal with Offsite Disposal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

Assumptions:

1. Only Landscape Maintenance
2. 5 Year Review Required (Groundwater Only)
- 3) No Earthquake Emergency Maintenance (No Cap)

Components of O&M:

1. Maintain vegetative cover/drainage (38 acres)
2. Maintain site fencing/roads
3. No Site Security
4. Conduct Groundwater Monitoring
5. Project Management/Public Relations

**Fixed Annual Costs - Years 1-30**

<b>Category - Labor</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 1 maintenance personnel, 2 days per week, 4 hours per day each, 52 weeks	416	person-hours	\$50	\$20,800
<b>Subtotal Labor</b>				<b>\$20,800</b>

<b>Category - Equipment</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. 1 Support Trucks - Gas + Maintenance	104	truck-days	\$85	\$8,840
<b>Subtotal Equipment</b>				<b>\$8,840</b>

<b>Category - Materials</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
1. Maintain Irrigation System/Turf (Includes Soil Replacement Due to Settlement and Water)	12	mth	\$10,000	\$120,000
<b>Subtotal Materials</b>				<b>\$120,000</b>

**Subtotal Fixed Costs** **\$149,640**

**Table S-7**  
**Alternative 6 - Source Removal with Offsite Disposal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**Variable Annual Costs**

**1.) Monitoring/Reporting**

**a) Groundwater**

Years 1-5 Semiannual; Years 6-30 Annual

	<b>Per Event</b>	
<b>Field Labor Costs (Including Oversight)</b>	\$12,000	
<b>Office Labor Costs (Report Prep)</b>	\$20,000	
<b>Field Equipment</b>	\$6,000	
<b>Analytical</b>	\$26,100	
<b>Subtotal Groundwater Monitoring/Event</b>	<b>\$64,100</b>	

Years 1-5 Only

**b) Ambient Air - 6 Perimeter Samples  
(Analytical + Field Labor - Reporting  
Added to Groundwater)**

**\$3,300      Semiannual**

**c) Soil Gas Perimeter Monitoring - 16  
samples (Analytical + Field Labor -  
Reporting Added to Groundwater)**

**\$7,800      Semiannual**

**d) Stormwater (\$25K for event, \$5K for  
report)**

**\$30,000      Annual**

**2.) Conduct 5 Year Site Reviews**

**\$50,000      per event**

**3.) Project Management/Public Relations**

Years 1-5	<b>\$100,000</b>
Years 6-10	<b>\$20,000</b>
Years 11-30	<b>\$20,000</b>

**Table S-7**  
**Alternative 6 - Source Removal with Offsite Disposal**  
**30 Year NPV Operation and Maintenance Costs**  
**Ascon Landfill Site**

**PW = FW/(1+i)<sup>n</sup>**

Source: Perry's 5th Ed. Table 25.36

PW Present Worth  
 FW Future Worth

i Discount rate as interest compounded  
 n Period in Years or Year of the Future Cashflow

Year	Fixed Costs (\$)	Variable Costs (\$)	Total Cost (FW) (\$)	PW(\$)
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4	149,640	280,400	430,040	353,795
5	149,640	330,400	480,040	376,124
6	149,640	84,100	233,740	174,420
7	149,640	84,100	233,740	166,115
8	149,640	84,100	233,740	158,204
9	149,640	84,100	233,740	150,671
10	149,640	134,100	283,740	174,192
11	149,640	84,100	233,740	136,663
12	149,640	84,100	233,740	130,155
13	149,640	84,100	233,740	123,957
14	149,640	84,100	233,740	118,055
15	149,640	134,100	283,740	136,484
16	149,640	84,100	233,740	107,079
17	149,640	84,100	233,740	101,980
18	149,640	84,100	233,740	97,124
19	149,640	84,100	233,740	92,499
20	149,640	134,100	283,740	106,939
21	149,640	84,100	233,740	83,899
22	149,640	84,100	233,740	79,904
23	149,640	84,100	233,740	76,099
24	149,640	84,100	233,740	72,475
25	149,640	134,100	283,740	83,789
26	149,640	84,100	233,740	65,737
27	149,640	84,100	233,740	62,607
28	149,640	84,100	233,740	59,626
29	149,640	84,100	233,740	56,786
30	149,640	84,100	233,740	54,082
<b>Total</b>	<b>4,489,200</b>	<b>3,754,500</b>	<b>8,243,700</b>	<b>4,570,565</b>