

**Arthur D Little**

**Arthur D Little**

**Appendix D:  
Cost Model for  
Amtrak Retention  
Toilet Systems**

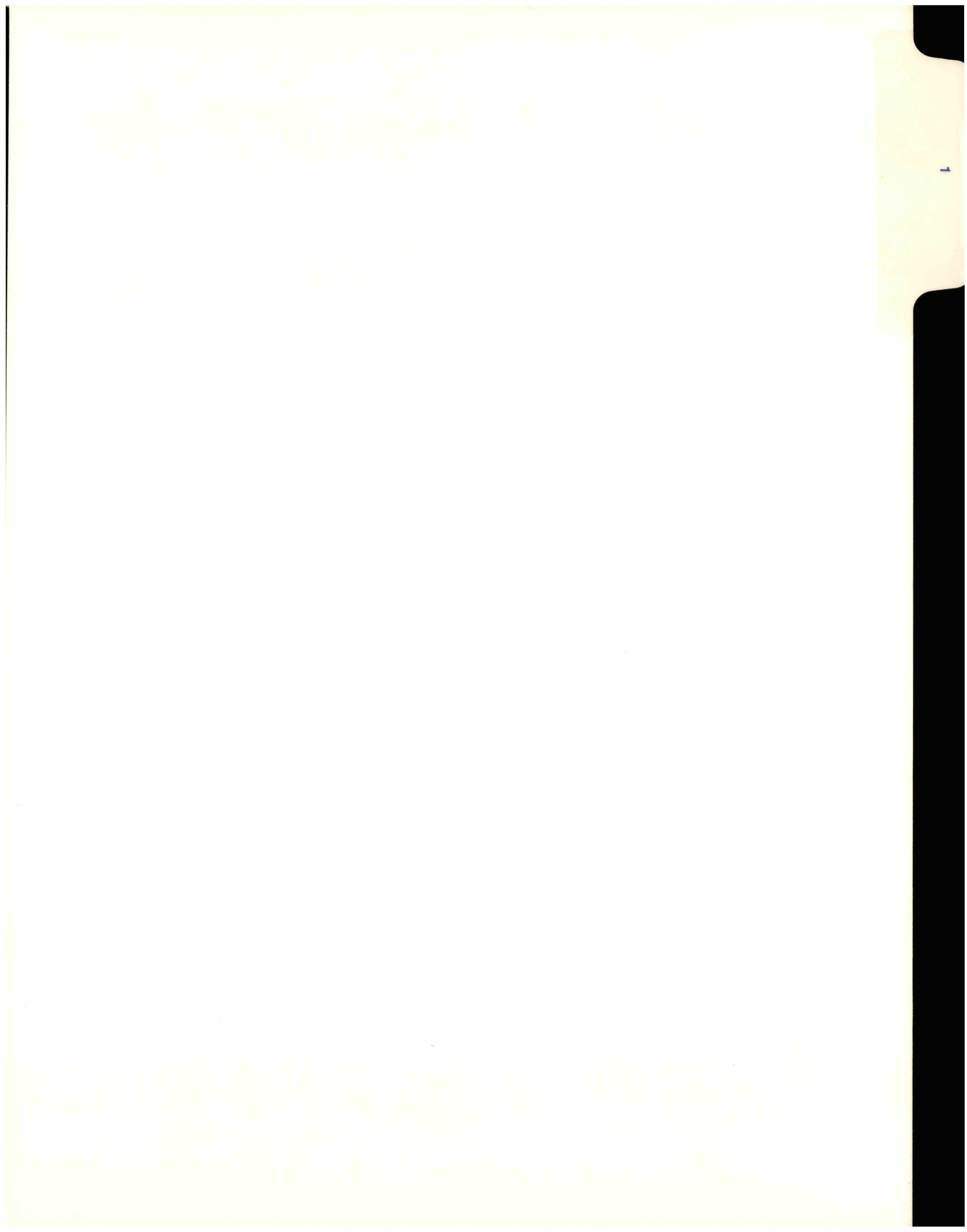
Costs by Car Type

**Draft Final Report  
to Federal Railroad  
Administration**

1990

Arthur D. Little, Inc.  
Acorn Park  
Cambridge, Massachusetts  
02140-2390

Reference 60719-71



Car Type: Coach-HEP-HLV

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 72

Number of Toilets: 4

Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$33,592		
- Equipment:	\$31,000		
- Installation:	\$2,592		
Maintenance Cost:	\$1,794		
- Labor:	\$864		
- Spare Parts:	\$930		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	32.33	64.66	96.98
Flush Fluid Generated:	34.93	69.85	104.78
Capacity Adjustment:	16.81	33.63	50.44
Total Capacity Required per Day:	84.07	168.14	252.21
Pumpout Labor Cost:	\$0.3	\$0.7	\$1.0
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$26.4	\$26.8	\$29.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$146	\$195	\$219
Maximum Continuous Hours of Service:	67.1	67.1	67.1
Total Operating Cost per Service Hour:	\$1.73	\$1.04	\$0.84
- Trip Related:	\$1.15	\$0.61	\$0.45
- Non-Trip Related:	\$0.59	\$0.44	\$0.39
Total per-Car Operating Cost per Year:	\$5,319	\$4,271	\$3,881
Total Fleet Operating Cost per Year:	\$111,698	\$89,693	\$81,507
Total Fleet Capital Cost:	\$705,432		

**Arthur D Little**



# Monogram

## Favorable

\$33,592		
\$31,000		
\$2,592		
\$886		
\$576		
\$310		
24	48	72
1	1	1
32.33	64.66	96.98
27.22	54.43	81.65
14.89	29.77	44.66
74.43	148.86	223.29
\$0.3	\$0.5	\$0.8
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.4	\$26.6	\$26.9
219	219	219
110	73	55
\$111	\$148	\$166
75.8	75.8	75.8
\$1.48	\$0.85	\$0.64
\$1.14	\$0.60	\$0.42
\$0.34	\$0.25	\$0.22
\$3,885	\$2,979	\$2,526
\$81,576	\$62,555	\$53,045
\$705,432		

## Unfavorable

\$33,592		
\$31,000		
\$2,592		
\$2,702		
\$1,152		
\$1,550		
24	48	72
1	1	1
32.33	64.66	96.98
45.36	90.72	136.08
19.42	38.84	58.27
97.11	194.22	291.33
\$0.5	\$0.9	\$1.4
\$2.1	\$2.1	\$4.2
\$24.0	\$24.0	\$24.0
\$26.6	\$27.0	\$29.6
292	292	292
146	97	73
\$193	\$257	\$289
58.1	58.1	58.1
\$1.93	\$1.20	\$0.98
\$1.16	\$0.62	\$0.47
\$0.77	\$0.58	\$0.51
\$6,772	\$5,588	\$5,149
\$142,205	\$117,344	\$108,133
\$705,432		

Car Type: Lounge-HEP-HLV

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 86

Number of Toilets: 2

Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	38.61	77.23	115.84
Flush Fluid Generated:	41.72	83.44	125.16
Capacity Adjustment:	20.08	40.17	60.25
Total Capacity Required per Day:	100.42	200.83	301.25
Pumpout Labor Cost:	\$0.4	\$0.8	\$1.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.5	\$14.9	\$17.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$174	\$233	\$262
Maximum Continuous Hours of Service:	56.2	56.2	56.2
Total Operating Cost per Service Hour:	\$1.06	\$0.66	\$0.56
- Trip Related:	\$0.66	\$0.37	\$0.30
- Non-Trip Related:	\$0.40	\$0.30	\$0.26
Total per-Car Operating Cost per Year:	\$3,241	\$2,717	\$2,588
Total Fleet Operating Cost per Year:	\$19,446	\$16,299	\$15,530
Total Fleet Capital Cost:	\$168,096		

Monogram

Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
24	48	72
1	1	1
38.61	77.23	115.84
32.51	65.02	97.52
17.78	35.56	53.34
88.90	177.81	266.71
\$0.3	\$0.7	\$1.0
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.4	\$14.8	\$17.2
219	219	219
110	73	55
\$132	\$177	\$199
63.4	63.4	63.4
\$0.86	\$0.51	\$0.43
\$0.65	\$0.36	\$0.29
\$0.21	\$0.16	\$0.14
\$2,260	\$1,801	\$1,687
\$13,560	\$10,808	\$10,122
\$168,096		

Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
24	48	72
1	1	1
38.61	77.23	115.84
54.18	108.36	162.54
23.20	46.40	69.60
115.99	231.99	347.98
\$0.5	\$1.1	\$1.6
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.6	\$15.2	\$17.8
292	292	292
146	97	73
\$230	\$307	\$345
48.6	48.6	48.6
\$1.21	\$0.78	\$0.67
\$0.68	\$0.38	\$0.31
\$0.54	\$0.40	\$0.36
\$4,244	\$3,661	\$3,523
\$25,464	\$21,966	\$21,136
\$168,096		

Car Type: Trans Dorm Coach

Toilet Type: Modified Vacuum

Manufacturer: I

Number of Passengers: 40

Number of Toilets: 4

Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$33,592		
- Equipment:	\$31,000		
- Installation:	\$2,592		
Maintenance Cost:	\$1,794		
- Labor:	\$864		
- Spare Parts:	\$930		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	19.40	38.81	58.21
Capacity Adjustment:	9.34	18.68	28.02
Total Capacity Required per Day:	46.71	93.41	140.12
Pumpout Labor Cost:	\$0.2	\$0.4	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$26.3	\$26.5	\$26.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$81	\$108	\$122
Maximum Continuous Hours of Service:	120.8	120.8	120.8
Total Operating Cost per Service Hour:	\$1.71	\$1.02	\$0.79
- Trip Related:	\$1.12	\$0.58	\$0.40
- Non-Trip Related:	\$0.59	\$0.44	\$0.39
Total per-Car Operating Cost per Year:	\$5,234	\$4,158	\$3,620
Total Fleet Operating Cost per Year:	\$188,432	\$149,691	\$130,321
Total Fleet Capital Cost:	\$1,209,312		

**Arthur D Little**

# Monogram

## Favorable

\$33,592		
\$31,000		
\$2,592		
\$886		
\$576		
\$310		
24	48	72
1	1	1
17.96	35.92	53.88
15.12	30.24	45.36
8.27	16.54	24.81
41.35	82.70	124.05
\$0.2	\$0.3	\$0.5
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.3	\$26.4	\$26.6
219	219	219
110	73	55
\$62	\$82	\$92
136.4	136.4	136.4
\$1.45	\$0.83	\$0.62
\$1.12	\$0.57	\$0.39
\$0.34	\$0.25	\$0.22
\$3,822	\$2,895	\$2,432
\$137,595	\$104,237	\$87,558
\$1,209,312		

## Unfavorable

\$33,592		
\$31,000		
\$2,592		
\$2,702		
\$1,152		
\$1,550		
24	48	72
1	1	1
17.96	35.92	53.88
25.20	50.40	75.60
10.79	21.58	32.37
53.95	107.90	161.85
\$0.3	\$0.5	\$0.8
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.4	\$26.6	\$26.9
292	292	292
146	97	73
\$107	\$143	\$161
104.5	104.5	104.5
\$1.90	\$1.16	\$0.92
\$1.13	\$0.58	\$0.40
\$0.77	\$0.58	\$0.51
\$6,657	\$5,434	\$4,823
\$239,635	\$195,634	\$173,634
\$1,209,312		

Car Type: **Sleeper Super**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **44**  
 Number of Toilets: **12**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$55,896		
- Equipment:	\$51,000		
- Installation:	\$4,896		
Maintenance Cost:	\$4,122		
- Labor:	\$2,592		
- Spare Parts:	\$1,530		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	19.76	39.51	59.27
Flush Fluid Generated:	21.34	42.69	64.03
Capacity Adjustment:	10.28	20.55	30.83
Total Capacity Required per Day:	51.38	102.75	154.13
Pumpout Labor Cost:	\$0.2	\$0.4	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$72.0	\$72.0	\$72.0
Total Pumpout/Cleaning Cost per Day:	\$74.3	\$74.5	\$74.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$89	\$119	\$134
Maximum Continuous Hours of Service:	109.8	109.8	109.8
Total Operating Cost per Service Hour:	\$4.47	\$2.59	\$1.96
- Trip Related:	\$3.13	\$1.58	\$1.07
- Non-Trip Related:	\$1.34	\$1.01	\$0.90
Total per-Car Operating Cost per Year:	\$13,705	\$10,588	\$9,030
Total Fleet Operating Cost per Year:	\$931,927	\$719,999	\$614,035
Total Fleet Capital Cost:	\$3,800,928		

# Monogram

## Favorable

\$55,896		
\$51,000		
\$4,896		
\$2,238		
\$1,728		
\$510		
24	48	72
1	1	1
19.76	39.51	59.27
16.63	33.26	49.90
9.10	18.19	27.29
45.49	90.97	136.46
\$0.2	\$0.3	\$0.5
\$2.1	\$2.1	\$2.1
\$72.0	\$72.0	\$72.0
\$74.3	\$74.4	\$74.6
219	219	219
110	73	55
\$68	\$90	\$102
124.0	124.0	124.0
\$3.97	\$2.22	\$1.63
\$3.12	\$1.58	\$1.06
\$0.85	\$0.64	\$0.57
\$10,438	\$7,762	\$6,424
\$709,777	\$527,809	\$436,825
\$3,800,928		

## Unfavorable

\$55,896		
\$51,000		
\$4,896		
\$6,006		
\$3,456		
\$2,550		
24	48	72
1	1	1
19.76	39.51	59.27
27.72	55.44	83.16
11.87	23.74	35.61
59.35	118.69	178.04
\$0.3	\$0.6	\$0.8
\$2.1	\$2.1	\$2.1
\$72.0	\$72.0	\$72.0
\$74.4	\$74.7	\$74.9
292	292	292
146	97	73
\$118	\$157	\$177
95.0	95.0	95.0
\$4.85	\$2.87	\$2.22
\$3.13	\$1.59	\$1.07
\$1.71	\$1.29	\$1.14
\$16,983	\$13,429	\$11,653
\$1,154,838	\$913,204	\$792,388
\$3,800,928		

Car Type: Bag Coach Super

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 78

Number of Toilets: 5

Total Tank Capacity (gals): 235.0

Scenario:

Expected

Capital Cost	\$36,380		
- Equipment:	\$33,500		
- Installation:	\$2,880		
Maintenance Cost:	\$2,085		
- Labor:	\$1,080		
- Spare Parts:	\$1,005		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	35.02	70.04	105.07
Flush Fluid Generated:	37.84	75.68	113.51
Capacity Adjustment:	18.21	36.43	54.64
Total Capacity Required per Day:	91.07	182.15	273.22
Pumpout Labor Cost:	\$0.4	\$0.8	\$1.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$30.0	\$30.0	\$30.0
Total Pumpout/Cleaning Cost per Day:	\$32.5	\$32.9	\$35.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$158	\$211	\$237
Maximum Continuous Hours of Service:	61.9	61.9	61.9
Total Operating Cost per Service Hour:	\$2.08	\$1.25	\$1.00
- Trip Related:	\$1.40	\$0.74	\$0.54
- Non-Trip Related:	\$0.68	\$0.51	\$0.45
Total per-Car Operating Cost per Year:	\$6,392	\$5,094	\$4,579
Total Fleet Operating Cost per Year:	\$306,833	\$244,525	\$219,810
Total Fleet Capital Cost:	\$1,746,240		

**Arthur D Little**



# Monogram

## Favorable

\$36,380		
\$33,500		
\$2,880		
\$1,055		
\$720		
\$335		
24	48	72
1	1	1
35.02	70.04	105.07
29.48	58.97	88.45
16.13	32.25	48.38
80.63	161.27	241.90
\$0.3	\$0.6	\$0.9
\$2.1	\$2.1	\$4.2
\$30.0	\$30.0	\$30.0
\$32.4	\$32.7	\$35.1
219	219	219
110	73	55
\$120	\$160	\$180
69.9	69.9	69.9
\$1.80	\$1.03	\$0.80
\$1.40	\$0.73	\$0.53
\$0.40	\$0.30	\$0.27
\$4,722	\$3,601	\$3,156
\$226,671	\$172,870	\$151,488
\$1,746,240		

## Unfavorable

\$36,380		
\$33,500		
\$2,880		
\$3,115		
\$1,440		
\$1,675		
24	48	72
1	1	1
35.02	70.04	105.07
49.14	98.28	147.42
21.04	42.08	63.12
105.20	210.41	315.61
\$0.5	\$1.0	\$1.5
\$2.1	\$2.1	\$4.2
\$30.0	\$30.0	\$30.0
\$32.6	\$33.1	\$35.7
292	292	292
146	97	73
\$209	\$279	\$313
53.6	53.6	53.6
\$2.31	\$1.42	\$1.15
\$1.42	\$0.75	\$0.56
\$0.89	\$0.67	\$0.59
\$8,082	\$6,614	\$6,033
\$387,947	\$317,452	\$289,562
\$1,746,240		

Car Type: Coach Super  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 75  
 Number of Toilets: 6  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$39,168		
- Equipment:	\$36,000		
- Installation:	\$3,168		
Maintenance Cost:	\$2,376		
- Labor:	\$1,296		
- Spare Parts:	\$1,080		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	33.68	67.35	101.03
Flush Fluid Generated:	36.38	72.77	109.15
Capacity Adjustment:	17.51	35.03	52.54
Total Capacity Required per Day:	87.57	175.14	262.72
Pumpout Labor Cost:	\$0.4	\$0.7	\$1.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$36.0	\$36.0	\$36.0
Total Pumpout/Cleaning Cost per Day:	\$38.5	\$38.8	\$41.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$152	\$203	\$228
Maximum Continuous Hours of Service:	64.4	64.4	64.4
Total Operating Cost per Service Hour:	\$2.43	\$1.44	\$1.14
- Trip Related:	\$1.65	\$0.86	\$0.62
- Non-Trip Related:	\$0.77	\$0.58	\$0.52
Total per-Car Operating Cost per Year:	\$7,442	\$5,886	\$5,242
Total Fleet Operating Cost per Year:	\$677,213	\$535,597	\$476,996
Total Fleet Capital Cost:	\$3,564,288		

Monogram

Favorable

\$39,168		
\$36,000		
\$3,168		
\$1,224		
\$864		
\$360		
24	48	72
1	1	1
33.68	67.35	101.03
28.35	56.70	85.05
15.51	31.01	46.52
77.53	155.06	232.59
\$0.3	\$0.6	\$0.9
\$2.1	\$2.1	\$2.1
\$36.0	\$36.0	\$36.0
\$38.4	\$38.7	\$39.0
219	219	219
110	73	55
\$115	\$154	\$173
72.7	72.7	72.7
\$2.11	\$1.20	\$0.90
\$1.64	\$0.85	\$0.58
\$0.47	\$0.35	\$0.31
\$5,542	\$4,201	\$3,530
\$504,363	\$382,258	\$321,205
\$3,564,288		

Unfavorable

\$39,168		
\$36,000		
\$3,168		
\$3,528		
\$1,728		
\$1,800		
24	48	72
1	1	1
33.68	67.35	101.03
47.25	94.50	141.75
20.23	40.46	60.69
101.16	202.31	303.47
\$0.5	\$0.9	\$1.4
\$2.1	\$2.1	\$4.2
\$36.0	\$36.0	\$36.0
\$38.6	\$39.0	\$41.6
292	292	292
146	97	73
\$201	\$268	\$301
55.8	55.8	55.8
\$2.67	\$1.63	\$1.31
\$1.66	\$0.87	\$0.64
\$1.01	\$0.76	\$0.67
\$9,360	\$7,596	\$6,867
\$851,800	\$691,253	\$624,930
\$3,564,288		

Car Type:

Horizon

Toilet Type:

Modified Vacuum

Manufacturer:

Number of Passengers: 82

Number of Toilets: 2

Total Tank Capacity (gals): 235.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$28,016

\$26,000

\$2,016

Maintenance Cost:

- Labor:

- Spare Parts:

\$1,212

\$432

\$780

Hours per Trip:

Trips per Day:

12

1

24

1

48

1

Waste Generation Data

Waste Generated:

18.41

36.82

73.64

Flush Fluid Generated:

19.89

39.78

79.56

Capacity Adjustment:

9.57

19.15

38.30

Total Capacity Required per Day:

47.87

95.75

191.49

Pumpout Labor Cost:

\$0.2

\$0.4

\$0.8

Connect/Disconnect Labor Cost:

\$2.1

\$2.1

\$2.1

Cleaning Labor Cost:

\$12.0

\$12.0

\$12.0

Total Pumpout/Cleaning Cost per Day:

\$14.3

\$14.5

\$14.9

Days Operated per Year:

255

255

255

Clean-out Cycles per Year:

255

128

85

Waste Disposal Cost per Year:

\$166

\$166

\$222

Maximum Continuous Hours of Service:

58.9

58.9

58.9

Total Operating Cost per Service Hour:

\$1.64

\$1.05

\$0.66

- Trip Related:

\$1.25

\$0.66

\$0.36

- Non-Trip Related:

\$0.40

\$0.40

\$0.30

Total per-Car Operating Cost per Year:

\$5,032

\$3,230

\$2,702

Total Fleet Operating Cost per Year:

\$518,267

\$332,735

\$278,347

Total Fleet Capital Cost:

\$2,885,648

**Arthur D Little**

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
12	24	48
1	1	1
18.41	36.82	73.64
15.50	31.00	61.99
8.48	16.95	33.91
42.38	84.77	169.54
\$0.2	\$0.3	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.4	\$14.7
219	219	219
219	110	73
\$126	\$126	\$168
66.5	66.5	66.5
\$1.44	\$0.86	\$0.51
\$1.24	\$0.65	\$0.35
\$0.21	\$0.21	\$0.16
\$3,796	\$2,252	\$1,791
\$390,996	\$231,969	\$184,459
\$2,885,648		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
12	24	48
1	1	1
18.41	36.82	73.64
25.83	51.66	103.32
11.06	22.12	44.24
55.30	110.60	221.20
\$0.3	\$0.5	\$1.0
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.6	\$15.1
292	292	292
292	146	97
\$220	\$220	\$293
51.0	51.0	51.0
\$1.79	\$1.21	\$0.78
\$1.26	\$0.67	\$0.38
\$0.54	\$0.54	\$0.40
\$6,288	\$4,230	\$3,642
\$647,687	\$435,651	\$375,102
\$2,885,648		

Car Type: Coach  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 48  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.78	21.55	43.10
Flush Fluid Generated:	11.64	23.28	46.57
Capacity Adjustment:	5.60	11.21	22.42
Total Capacity Required per Day:	28.02	56.05	112.09
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$97	\$97	\$130
Maximum Continuous Hours of Service:	100.6	100.6	100.6
Total Operating Cost per Service Hour:	\$1.61	\$1.02	\$0.63
- Trip Related:	\$1.22	\$0.63	\$0.34
- Non-Trip Related:	\$0.40	\$0.40	\$0.30
Total per-Car Operating Cost per Year:	\$4,942	\$3,140	\$2,582
Total Fleet Operating Cost per Year:	\$385,450	\$244,951	\$201,423
Total Fleet Capital Cost:	\$2,185,248		

Monogram

Favorable

Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
12	24	48
1	1	1
10.78	21.55	43.10
9.07	18.14	36.29
4.96	9.92	19.85
24.81	49.62	99.24
\$0.1	\$0.2	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.5
219	219	219
219	110	73
\$74	\$74	\$99
113.7	113.7	113.7
\$1.42	\$0.83	\$0.49
\$1.21	\$0.62	\$0.33
\$0.21	\$0.21	\$0.16
\$3,730	\$2,186	\$1,702
\$290,914	\$170,486	\$132,781
\$2,185,248		

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
12	24	48
1	1	1
10.78	21.55	43.10
15.12	30.24	60.48
6.47	12.95	25.90
32.37	64.74	129.48
\$0.2	\$0.3	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.4	\$14.7
292	292	292
292	146	97
\$129	\$129	\$171
87.1	87.1	87.1
\$1.76	\$1.17	\$0.74
\$1.22	\$0.64	\$0.34
\$0.54	\$0.54	\$0.40
\$6,166	\$4,107	\$3,479
\$480,940	\$320,369	\$271,336
\$2,185,248		

Car Type: Coach (HDCP)  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 44  
 Number of Toilets: 3  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$30,804		
- Equipment:	\$28,500		
- Installation:	\$2,304		
Maintenance Cost:	\$1,503		
- Labor:	\$648		
- Spare Parts:	\$855		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	9.88	19.76	39.51
Flush Fluid Generated:	10.67	21.34	42.69
Capacity Adjustment:	5.14	10.28	20.55
Total Capacity Required per Day:	25.69	51.38	102.75
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$18.0	\$18.0	\$18.0
Total Pumpout/Cleaning Cost per Day:	\$20.2	\$20.3	\$20.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$89	\$89	\$119
Maximum Continuous Hours of Service:	109.8	109.8	109.8
Total Operating Cost per Service Hour:	\$2.20	\$1.37	\$0.82
- Trip Related:	\$1.71	\$0.88	\$0.46
- Non-Trip Related:	\$0.49	\$0.49	\$0.37
Total per-Car Operating Cost per Year:	\$6,755	\$4,187	\$3,370
Total Fleet Operating Cost per Year:	\$141,857	\$87,933	\$70,775
Total Fleet Capital Cost:	\$646,884		

**Arthur D Little**



# Monogram

## Favorable

\$30,804		
\$28,500		
\$2,304		
\$717		
\$432		
\$285		
12	24	48
1	1	1
9.88	19.76	39.51
8.32	16.63	33.26
4.55	9.10	18.19
22.74	45.49	90.97
\$0.1	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.2	\$20.3	\$20.4
219	219	219
219	110	73
\$68	\$68	\$90
124.0	124.0	124.0
\$1.98	\$1.14	\$0.66
\$1.71	\$0.87	\$0.45
\$0.27	\$0.27	\$0.20
\$5,205	\$3,004	\$2,299
\$109,302	\$63,082	\$48,277
\$646,884		

## Unfavorable

\$30,804		
\$28,500		
\$2,304		
\$2,289		
\$864		
\$1,425		
12	24	48
1	1	1
9.88	19.76	39.51
13.86	27.72	55.44
5.93	11.87	23.74
29.67	59.35	118.69
\$0.1	\$0.3	\$0.6
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.2	\$20.4	\$20.7
292	292	292
292	146	97
\$118	\$118	\$157
95.0	95.0	95.0
\$2.37	\$1.54	\$0.95
\$1.72	\$0.88	\$0.46
\$0.65	\$0.65	\$0.49
\$8,317	\$5,382	\$4,456
\$174,647	\$113,020	\$93,586
\$646,884		

Car Type: Dome Coach  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 46  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.33	20.65	41.31
Flush Fluid Generated:	11.16	22.31	44.63
Capacity Adjustment:	5.37	10.74	21.48
Total Capacity Required per Day:	26.86	53.71	107.42
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$93	\$93	\$124
Maximum Continuous Hours of Service:	105.0	105.0	105.0
Total Operating Cost per Service Hour:	\$1.61	\$1.02	\$0.63
- Trip Related:	\$1.21	\$0.63	\$0.33
- Non-Trip Related:	\$0.40	\$0.40	\$0.30
Total per-Car Operating Cost per Year:	\$4,936	\$3,135	\$2,575
Total Fleet Operating Cost per Year:	\$59,236	\$37,621	\$30,903
Total Fleet Capital Cost:	\$336,192		

Monogram

Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
12	24	48
1	1	1
10.33	20.65	41.31
8.69	17.39	34.78
4.76	9.51	19.02
23.78	47.55	95.11
\$0.1	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.4
219	219	219
219	110	73
\$71	\$71	\$94
118.6	118.6	118.6
\$1.42	\$0.83	\$0.48
\$1.21	\$0.62	\$0.33
\$0.21	\$0.21	\$0.16
\$3,726	\$2,182	\$1,697
\$44,709	\$26,182	\$20,365
\$336,192		

Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
12	24	48
1	1	1
10.33	20.65	41.31
14.49	28.98	57.96
6.20	12.41	24.82
31.02	62.04	124.09
\$0.1	\$0.3	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.4	\$14.7
292	292	292
292	146	97
\$123	\$123	\$164
90.9	90.9	90.9
\$1.76	\$1.17	\$0.74
\$1.22	\$0.63	\$0.34
\$0.54	\$0.54	\$0.40
\$6,159	\$4,100	\$3,469
\$73,904	\$49,201	\$41,629
\$336,192		

Car Type: Amlounge II  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 49  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	11.00	22.00	44.00
Flush Fluid Generated:	11.88	23.77	47.54
Capacity Adjustment:	5.72	11.44	22.89
Total Capacity Required per Day:	28.61	57.21	114.43
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$99	\$99	\$133
Maximum Continuous Hours of Service:	98.6	98.6	98.6
Total Operating Cost per Service Hour:	\$1.61	\$1.03	\$0.63
- Trip Related:	\$1.22	\$0.63	\$0.34
- Non-Trip Related:	\$0.40	\$0.40	\$0.30
Total per-Car Operating Cost per Year:	\$4,944	\$3,143	\$2,586
Total Fleet Operating Cost per Year:	\$123,608	\$78,576	\$64,647
Total Fleet Capital Cost:	\$700,400		

**Arthur D Little**

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
12	24	48
1	1	1
11.00	22.00	44.00
9.26	18.52	37.04
5.07	10.13	20.26
25.33	50.65	101.31
\$0.1	\$0.2	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.5
219	219	219
219	110	73
\$75	\$75	\$101
111.3	111.3	111.3
\$1.42	\$0.83	\$0.49
\$1.21	\$0.62	\$0.33
\$0.21	\$0.21	\$0.16
\$3,732	\$2,188	\$1,705
\$93,290	\$54,692	\$42,623
\$700,400		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
12	24	48
1	1	1
11.00	22.00	44.00
15.44	30.87	61.74
6.61	13.22	26.44
33.04	66.09	132.18
\$0.2	\$0.3	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.4	\$14.7
292	292	292
292	146	97
\$131	\$131	\$175
85.3	85.3	85.3
\$1.76	\$1.17	\$0.75
\$1.23	\$0.64	\$0.34
\$0.54	\$0.54	\$0.40
\$6,169	\$4,111	\$3,483
\$154,237	\$102,772	\$87,087
\$700,400		

Car Type: **Sleeper 10-6**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **22**  
 Number of Toilets: **17**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$69,836		
- Equipment:	\$63,500		
- Installation:	\$6,336		
Maintenance Cost:	\$5,577		
- Labor:	\$3,672		
- Spare Parts:	\$1,905		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	4.94	9.88	19.76
Flush Fluid Generated:	5.34	10.67	21.34
Capacity Adjustment:	2.57	5.14	10.28
Total Capacity Required per Day:	12.84	25.69	51.38
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.2	\$104.2	\$104.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$45	\$45	\$60
Maximum Continuous Hours of Service:	219.6	219.6	219.6
Total Operating Cost per Service Hour:	\$10.51	\$6.18	\$3.55
- Trip Related:	\$8.69	\$4.36	\$2.19
- Non-Trip Related:	\$1.82	\$1.82	\$1.36
Total per-Car Operating Cost per Year:	\$32,233	\$18,934	\$14,521
Total Fleet Operating Cost per Year:	\$2,643,091	\$1,552,591	\$1,190,684
Total Fleet Capital Cost:	\$5,726,552		

Monogram

Favorable

Unfavorable

\$69,836		
\$63,500		
\$6,336		
\$3,083		
\$2,448		
\$635		
12	24	48
1	1	1
4.94	9.88	19.76
4.16	8.32	16.63
2.27	4.55	9.10
11.37	22.74	45.49
\$0.0	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.1	\$104.2	\$104.3
219	219	219
219	110	73
\$34	\$34	\$45
248.0	248.0	248.0
\$9.86	\$5.53	\$3.06
\$8.69	\$4.35	\$2.19
\$1.17	\$1.17	\$0.88
\$25,924	\$14,525	\$10,740
\$2,125,758	\$1,191,044	\$880,647
\$5,726,552		

\$69,836		
\$63,500		
\$6,336		
\$8,071		
\$4,896		
\$3,175		
12	24	48
1	1	1
4.94	9.88	19.76
6.93	13.86	27.72
2.97	5.93	11.87
14.84	29.67	59.35
\$0.1	\$0.1	\$0.3
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.2	\$104.2	\$104.4
292	292	292
292	146	97
\$59	\$59	\$79
190.1	190.1	190.1
\$11.00	\$6.66	\$3.92
\$8.70	\$4.36	\$2.19
\$2.30	\$2.30	\$1.73
\$38,547	\$23,349	\$18,309
\$3,160,883	\$1,914,598	\$1,501,333
\$5,726,552		

Car Type: Amcoach II  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 59  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	26.49	52.98	79.47
Flush Fluid Generated:	28.62	57.24	85.86
Capacity Adjustment:	13.78	27.56	41.33
Total Capacity Required per Day:	68.89	137.78	206.67
Pumpout Labor Cost:	\$0.3	\$0.6	\$0.9
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.7	\$15.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$120	\$160	\$180
Maximum Continuous Hours of Service:	81.9	81.9	81.9
Total Operating Cost per Service Hour:	\$1.03	\$0.64	\$0.51
- Trip Related:	\$0.64	\$0.34	\$0.25
- Non-Trip Related:	\$0.40	\$0.30	\$0.26
Total per-Car Operating Cost per Year:	\$3,170	\$2,621	\$2,347
Total Fleet Operating Cost per Year:	\$377,174	\$311,921	\$279,295
Total Fleet Capital Cost:	\$3,333,904		

**Arthur D Little**



# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
24	48	72
1	1	1
26.49	52.98	79.47
22.30	44.60	66.91
12.20	24.40	36.59
60.99	121.98	182.97
\$0.2	\$0.4	\$0.7
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.5	\$14.8
219	219	219
110	73	55
\$91	\$121	\$136
92.5	92.5	92.5
\$0.84	\$0.49	\$0.38
\$0.63	\$0.34	\$0.24
\$0.21	\$0.16	\$0.14
\$2,207	\$1,731	\$1,493
\$262,657	\$205,985	\$177,649
\$3,333,904		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
24	48	72
1	1	1
26.49	52.98	79.47
37.17	74.34	111.51
15.92	31.83	47.75
79.58	159.15	238.73
\$0.4	\$0.7	\$1.1
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.5	\$14.8	\$17.3
292	292	292
146	97	73
\$158	\$211	\$237
70.9	70.9	70.9
\$1.18	\$0.76	\$0.64
\$0.65	\$0.35	\$0.29
\$0.54	\$0.40	\$0.36
\$4,147	\$3,531	\$3,377
\$493,478	\$420,241	\$401,864
\$3,333,904		

Car Type: **Slumbercoach 24-8**

Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **40**

Number of Toilets: **32**

Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$111,656
- Equipment:	\$101,000
- Installation:	\$10,656

Maintenance Cost:	\$9,942
- Labor:	\$6,912
- Spare Parts:	\$3,030

Hours per Trip:	24	48	72
Trips per Day:	1	1	1

**Waste Generation Data**

<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	19.40	38.81	58.21
Capacity Adjustment:	9.34	18.68	28.02
Total Capacity Required per Day:	46.71	93.41	140.12

Pumpout Labor Cost:	\$0.2	\$0.4	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$192.0	\$192.0	\$192.0
Total Pumpout/Cleaning Cost per Day:	\$194.3	\$194.5	\$194.7

Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64

Waste Disposal Cost per Year:	\$81	\$108	\$122
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Maximum Continuous Hours of Service:	120.8	120.8	120.8
Total Operating Cost per Service Hour:	\$11.36	\$6.51	\$4.89
- Trip Related:	\$8.12	\$4.08	\$2.73
- Non-Trip Related:	\$3.24	\$2.43	\$2.16

Total per-Car Operating Cost per Year:	\$34,844	\$26,614	\$22,499
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Total Fleet Operating Cost per Year:	\$557,507	\$425,826	\$359,985
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Total Fleet Capital Cost:	\$1,786,496
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Monogram

Favorable

\$111,656		
\$101,000		
\$10,656		
\$5,618		
\$4,608		
\$1,010		
24	48	72
1	1	1
17.96	35.92	53.88
15.12	30.24	45.36
8.27	16.54	24.81
41.35	82.70	124.05
\$0.2	\$0.3	\$0.5
\$2.1	\$2.1	\$2.1
\$192.0	\$192.0	\$192.0
\$194.3	\$194.4	\$194.6
219	219	219
110	73	55
\$62	\$82	\$92
136.4	136.4	136.4
\$10.25	\$5.68	\$4.15
\$8.12	\$4.07	\$2.73
\$2.14	\$1.60	\$1.43
\$26,950	\$19,891	\$16,362
\$431,201	\$318,264	\$261,795
\$1,786,496		

Unfavorable

\$111,656		
\$101,000		
\$10,656		
\$14,266		
\$9,216		
\$5,050		
24	48	72
1	1	1
17.96	35.92	53.88
25.20	50.40	75.60
10.79	21.58	32.37
53.95	107.90	161.85
\$0.3	\$0.5	\$0.8
\$2.1	\$2.1	\$2.1
\$192.0	\$192.0	\$192.0
\$194.4	\$194.6	\$194.9
292	292	292
146	97	73
\$107	\$143	\$161
104.5	104.5	104.5
\$12.20	\$7.14	\$5.45
\$8.13	\$4.08	\$2.74
\$4.07	\$3.05	\$2.71
\$42,749	\$33,350	\$28,651
\$683,976	\$533,605	\$458,419
\$1,786,496		

Car Type: Viewliner-Sleeper  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 34  
 Number of Toilets: 17  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$69,836		
- Equipment:	\$63,500		
- Installation:	\$6,336		
Maintenance Cost:	\$5,577		
- Labor:	\$3,672		
- Spare Parts:	\$1,905		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.27	30.53	45.80
Flush Fluid Generated:	16.49	32.99	49.48
Capacity Adjustment:	7.94	15.88	23.82
Total Capacity Required per Day:	39.70	79.40	119.10
Pumpout Labor Cost:	\$0.2	\$0.3	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.3	\$104.4	\$104.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$69	\$92	\$103
Maximum Continuous Hours of Service:	142.1	142.1	142.1
Total Operating Cost per Service Hour:	\$6.19	\$3.56	\$2.69
- Trip Related:	\$4.37	\$2.20	\$1.48
- Non-Trip Related:	\$1.82	\$1.36	\$1.21
Total per-Car Operating Cost per Year:	\$18,966	\$14,563	\$12,361
Total Fleet Operating Cost per Year:	\$37,932	\$29,126	\$21,723
Total Fleet Capital Cost:	\$139,672		

**Arthur D Little**

# Monogram

## Favorable

\$69,836		
\$63,500		
\$6,336		
\$3,083		
\$2,448		
\$635		
24	48	72
1	1	1
15.27	30.53	45.80
12.85	25.70	38.56
7.03	14.06	21.09
35.15	70.30	105.44
\$0.1	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.2	\$104.4	\$104.5
219	219	219
110	73	55
\$52	\$70	\$79
160.5	160.5	160.5
\$5.54	\$3.07	\$2.25
\$4.36	\$2.19	\$1.47
\$1.17	\$0.88	\$0.78
\$14,548	\$10,771	\$8,882
\$29,097	\$21,542	\$17,764
\$139,672		

## Unfavorable

\$69,836		
\$63,500		
\$6,336		
\$8,071		
\$4,896		
\$3,175		
24	48	72
1	1	1
15.27	30.53	45.80
21.42	42.84	64.26
9.17	18.34	27.51
45.86	91.72	137.57
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.3	\$104.5	\$104.7
292	292	292
146	97	73
\$91	\$121	\$137
123.0	123.0	123.0
\$6.68	\$3.93	\$3.02
\$4.37	\$2.20	\$1.48
\$2.30	\$1.73	\$1.54
\$23,392	\$18,367	\$15,854
\$46,784	\$36,733	\$31,708
\$139,672		

Car Type: **Amcafe**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **53**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.86	15.86	23.80
Flush Fluid Generated:	17.14	17.14	25.71
Capacity Adjustment:	8.25	8.25	12.38
Total Capacity Required per Day:	41.26	41.26	61.88
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.3	\$14.3	\$14.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$143	\$143	\$108
Maximum Continuous Hours of Service:	91.1	91.1	91.1
Total Operating Cost per Service Hour:	\$1.22	\$1.22	\$1.03
- Trip Related:	\$0.93	\$0.93	\$0.63
- Non-Trip Related:	\$0.30	\$0.30	\$0.40
Total per-Car Operating Cost per Year:	\$5,002	\$5,002	\$3,154
Total Fleet Operating Cost per Year:	\$225,076	\$225,076	\$141,914
Total Fleet Capital Cost:	\$1,260,720		

Monogram

Favorable

Unfavorable

\$28,016			\$28,016		
\$26,000			\$26,000		
\$2,016			\$2,016		
\$548			\$1,876		
\$288			\$576		
\$260			\$1,300		
8	16	24	8	16	24
2	1	1	2	1	1
15.86	15.86	23.80	15.86	15.86	23.80
13.36	13.36	20.03	22.26	22.26	33.39
7.31	7.31	10.96	9.53	9.53	14.30
36.53	36.53	54.79	47.66	47.66	71.48
\$0.1	\$0.1	\$0.2	\$0.2	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1	\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0	\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3	\$14.3	\$14.3	\$14.4
219	219	219	292	292	292
219	219	110	292	292	146
\$109	\$109	\$82	\$189	\$189	\$142
102.9	102.9	102.9	78.9	78.9	78.9
\$1.08	\$1.08	\$0.84	\$1.34	\$1.34	\$1.18
\$0.92	\$0.92	\$0.63	\$0.94	\$0.94	\$0.64
\$0.16	\$0.16	\$0.21	\$0.40	\$0.40	\$0.54
\$3,774	\$3,774	\$2,195	\$6,247	\$6,247	\$4,125
\$169,827	\$169,827	\$98,797	\$281,135	\$281,135	\$185,638
\$1,260,720			\$1,260,720		

Car Type: **Amcoach**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **84**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

**Scenario: Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	25.14	25.14	37.72
Flush Fluid Generated:	27.17	27.17	40.75
Capacity Adjustment:	13.08	13.08	19.62
Total Capacity Required per Day:	65.39	65.39	98.08
Pumpout Labor Cost:	\$0.3	\$0.3	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.4	\$14.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$227	\$227	\$170
Maximum Continuous Hours of Service:	57.5	57.5	57.5
Total Operating Cost per Service Hour:	\$1.25	\$1.25	\$1.06
- Trip Related:	\$0.95	\$0.95	\$0.66
- Non-Trip Related:	\$0.30	\$0.30	\$0.40
Total per-Car Operating Cost per Year:	\$5,111	\$5,111	\$3,236
Total Fleet Operating Cost per Year:	\$1,359,570	\$1,359,570	\$860,706
Total Fleet Capital Cost:	\$7,452,256		

**Arthur D Little**



# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
8	16	24
2	1	1
25.14	25.14	37.72
21.17	21.17	31.75
11.58	11.58	17.37
57.89	57.89	86.84
\$0.2	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.4
219	219	219
219	219	110
\$172	\$172	\$129
65.0	65.0	65.0
\$1.10	\$1.10	\$0.86
\$0.94	\$0.94	\$0.65
\$0.16	\$0.16	\$0.21
\$3,855	\$3,855	\$2,256
\$1,025,344	\$1,025,344	\$600,105
\$7,452,256		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
8	16	24
2	1	1
25.14	25.14	37.72
35.28	35.28	52.92
15.11	15.11	22.66
75.53	75.53	113.30
\$0.4	\$0.4	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.5	\$14.6
292	292	292
292	292	146
\$300	\$300	\$225
49.8	49.8	49.8
\$1.37	\$1.37	\$1.21
\$0.97	\$0.97	\$0.67
\$0.40	\$0.40	\$0.54
\$6,396	\$6,396	\$4,237
\$1,701,379	\$1,701,379	\$1,126,995
\$7,452,256		

Car Type: **Amclub**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **41**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	12.27	12.27	18.41
Flush Fluid Generated:	13.26	13.26	19.89
Capacity Adjustment:	6.38	6.38	9.57
Total Capacity Required per Day:	31.92	31.92	47.87
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$111	\$111	\$83
Maximum Continuous Hours of Service:	117.8	117.8	117.8
Total Operating Cost per Service Hour:	\$1.21	\$1.21	\$1.02
- Trip Related:	\$0.92	\$0.92	\$0.62
- Non-Trip Related:	\$0.30	\$0.30	\$0.40
Total per-Car Operating Cost per Year:	\$4,959	\$4,959	\$3,122
Total Fleet Operating Cost per Year:	\$119,024	\$119,024	\$74,925
Total Fleet Capital Cost:	\$672,384		

Monogram

Favorable

Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
8	16	24
2	1	1
12.27	12.27	18.41
10.33	10.33	15.50
5.65	5.65	8.48
28.26	28.26	42.38
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3
219	219	219
219	219	110
\$84	\$84	\$63
133.1	133.1	133.1
\$1.07	\$1.07	\$0.83
\$0.91	\$0.91	\$0.62
\$0.16	\$0.16	\$0.21
\$3,743	\$3,743	\$2,172
\$89,824	\$89,824	\$52,129
\$672,384		

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
8	16	24
2	1	1
12.27	12.27	18.41
17.22	17.22	25.83
7.37	7.37	11.06
36.87	36.87	55.30
\$0.2	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.4
292	292	292
292	292	146
\$146	\$146	\$110
102.0	102.0	102.0
\$1.32	\$1.32	\$1.16
\$0.92	\$0.92	\$0.63
\$0.40	\$0.40	\$0.54
\$6,190	\$6,190	\$4,082
\$148,557	\$148,557	\$97,971
\$672,384		

Car Type: Met-Srvc Dinette  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 23  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	4.65	5.58	6.51
Capacity Adjustment:	2.24	2.69	3.13
Total Capacity Required per Day:	11.19	13.43	15.67
Pumpout Labor Cost:	\$0.0	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.1	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$39	\$47	\$54
Maximum Continuous Hours of Service:	210.0	210.0	210.0
Total Operating Cost per Service Hour:	\$1.90	\$1.59	\$1.37
- Trip Related:	\$1.43	\$1.19	\$1.03
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,865	\$4,875	\$4,886
Total Fleet Operating Cost per Year:	\$63,249	\$63,381	\$63,513
Total Fleet Capital Cost:	\$364,208		

**Arthur D Little**

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
4.30	5.16	6.02
3.62	4.35	5.07
1.98	2.38	2.77
9.91	11.89	13.87
\$0.0	\$0.0	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.1	\$14.2
219	219	219
219	219	219
\$30	\$35	\$41
237.2	237.2	237.2
\$1.68	\$1.40	\$1.20
\$1.43	\$1.19	\$1.02
\$0.25	\$0.21	\$0.18
\$3,673	\$3,681	\$3,688
\$47,753	\$47,851	\$47,948
\$364,208		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
4.30	5.16	6.02
6.04	7.25	8.45
2.59	3.10	3.62
12.93	15.51	18.10
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
292	292	292
292	292	292
\$51	\$62	\$72
181.8	181.8	181.8
\$2.08	\$1.73	\$1.49
\$1.43	\$1.20	\$1.03
\$0.64	\$0.54	\$0.46
\$6,062	\$6,076	\$6,090
\$78,808	\$78,987	\$79,167
\$364,208		

Car Type: Met-Srvc Coach

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 60

Number of Toilets: 2

Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	12.13	14.55	16.98
Capacity Adjustment:	5.84	7.01	8.17
Total Capacity Required per Day:	29.19	35.03	40.87
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$101	\$122	\$142
Maximum Continuous Hours of Service:	80.5	80.5	80.5
Total Operating Cost per Service Hour:	\$1.94	\$1.62	\$1.40
- Trip Related:	\$1.46	\$1.23	\$1.06
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,947	\$4,973	\$5,000
Total Fleet Operating Cost per Year:	\$247,348	\$248,673	\$249,997
Total Fleet Capital Cost:	\$1,400,800		

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
11.23	13.47	15.72
9.45	11.34	13.23
5.17	6.20	7.24
25.84	31.01	36.18
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$77	\$92	\$108
90.9	90.9	90.9
\$1.70	\$1.43	\$1.23
\$1.45	\$1.22	\$1.05
\$0.25	\$0.21	\$0.18
\$3,734	\$3,753	\$3,773
\$186,678	\$187,655	\$188,632
\$1,400,800		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
11.23	13.47	15.72
15.75	18.90	22.05
6.74	8.09	9.44
33.72	40.46	47.21
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
292	292	292
292	292	292
\$134	\$161	\$187
69.7	69.7	69.7
\$2.11	\$1.77	\$1.53
\$1.47	\$1.24	\$1.07
\$0.64	\$0.54	\$0.46
\$6,173	\$6,209	\$6,245
\$308,655	\$310,454	\$312,253
\$1,400,800		

Car Type: **Met-Srvc Club**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **33**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	6.17	7.41	8.64
Flush Fluid Generated:	6.67	8.00	9.34
Capacity Adjustment:	3.21	3.85	4.50
Total Capacity Required per Day:	16.05	19.27	22.48
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$56	\$67	\$78
Maximum Continuous Hours of Service:	146.4	146.4	146.4
Total Operating Cost per Service Hour:	\$1.91	\$1.60	\$1.37
- Trip Related:	\$1.44	\$1.20	\$1.04
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,887	\$4,902	\$4,917
Total Fleet Operating Cost per Year:	\$63,536	\$63,725	\$63,915
Total Fleet Capital Cost:	\$364,208		

**Arthur D Little**



# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
6.17	7.41	8.64
5.20	6.24	7.28
2.84	3.41	3.98
14.21	17.06	19.90
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$42	\$51	\$59
165.3	165.3	165.3
\$1.68	\$1.41	\$1.21
\$1.43	\$1.20	\$1.03
\$0.25	\$0.21	\$0.18
\$3,690	\$3,700	\$3,711
\$47,965	\$48,105	\$48,244
\$364,208		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
6.17	7.41	8.64
8.66	10.40	12.13
3.71	4.45	5.19
18.55	22.25	25.96
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
292	292	292
292	292	292
\$74	\$88	\$103
126.7	126.7	126.7
\$2.09	\$1.74	\$1.50
\$1.44	\$1.21	\$1.04
\$0.64	\$0.54	\$0.46
\$6,092	\$6,112	\$6,132
\$79,198	\$79,455	\$79,712
\$364,208		

Car Type: **Amdinette**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **23**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	4.65	5.58	6.51
Capacity Adjustment:	2.24	2.69	3.13
Total Capacity Required per Day:	11.19	13.43	15.67
Pumpout Labor Cost:	\$0.0	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.1	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$39	\$47	\$54
Maximum Continuous Hours of Service:	210.0	210.0	210.0
Total Operating Cost per Service Hour:	\$1.90	\$1.59	\$1.37
- Trip Related:	\$1.43	\$1.19	\$1.03
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,865	\$4,875	\$4,886
Total Fleet Operating Cost per Year:	\$121,633	\$121,887	\$122,140
Total Fleet Capital Cost:	\$700,400		

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
4.30	5.16	6.02
3.62	4.35	5.07
1.98	2.38	2.77
9.91	11.89	13.87
\$0.0	\$0.0	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.1	\$14.2
219	219	219
219	219	219
\$30	\$35	\$41
237.2	237.2	237.2
\$1.68	\$1.40	\$1.20
\$1.43	\$1.19	\$1.02
\$0.25	\$0.21	\$0.18
\$3,673	\$3,681	\$3,688
\$91,833	\$92,021	\$92,208
\$700,400		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
4.30	5.16	6.02
6.04	7.25	8.45
2.59	3.10	3.62
12.93	15.51	18.10
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
292	292	292
292	292	292
\$51	\$62	\$72
181.8	181.8	181.8
\$2.08	\$1.73	\$1.49
\$1.43	\$1.20	\$1.03
\$0.64	\$0.54	\$0.46
\$6,062	\$6,076	\$6,090
\$151,554	\$151,899	\$152,244
\$700,400		

Car Type: **Amcoach**  
 Toilet Type: **Modified Vacuum**

Manufacturer:

Number of Passengers: **60**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **235.0**

Scenario: **Expected**

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	12.13	14.55	16.98
Capacity Adjustment:	5.84	7.01	8.17
Total Capacity Required per Day:	29.19	35.03	40.87
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$101	\$122	\$142
Maximum Continuous Hours of Service:	80.5	80.5	80.5
Total Operating Cost per Service Hour:	\$1.94	\$1.62	\$1.40
- Trip Related:	\$1.46	\$1.23	\$1.06
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,947	\$4,973	\$5,000
Total Fleet Operating Cost per Year:	\$153,356	\$154,177	\$154,998
Total Fleet Capital Cost:	\$868,496		

**Arthur D Little**

# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
11.23	13.47	15.72
9.45	11.34	13.23
5.17	6.20	7.24
25.84	31.01	36.18
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$77	\$92	\$108
90.9	90.9	90.9
\$1.70	\$1.43	\$1.23
\$1.45	\$1.22	\$1.05
\$0.25	\$0.21	\$0.18
\$3,734	\$3,753	\$3,773
\$115,741	\$116,346	\$116,952
\$868,496		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
11.23	13.47	15.72
15.75	18.90	22.05
6.74	8.09	9.44
33.72	40.46	47.21
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
292	292	292
292	292	292
\$134	\$161	\$187
69.7	69.7	69.7
\$2.11	\$1.77	\$1.53
\$1.47	\$1.24	\$1.07
\$0.64	\$0.54	\$0.46
\$6,173	\$6,209	\$6,245
\$191,366	\$192,481	\$193,597
\$868,496		

Car Type: Turbo Power Club

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 27

Number of Toilets: 1

Total Tank Capacity (gals): 235.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$25,228

\$23,500

\$1,728

Maintenance Cost:

- Labor:

- Spare Parts:

\$921

\$216

\$705

Hours per Trip:

Trips per Day:

2

5

12

1

7

2

Waste Generation Data

Waste Generated:

Flush Fluid Generated:

Capacity Adjustment:

Total Capacity Required per Day:

5.05

5.46

2.63

13.14

6.06

6.55

3.15

15.76

7.07

7.64

3.68

18.39

Pumpout Labor Cost:

Connect/Disconnect Labor Cost:

Cleaning Labor Cost:

Total Pumpout/Cleaning Cost per Day:

\$0.1

\$2.1

\$6.0

\$8.2

\$0.1

\$2.1

\$6.0

\$8.2

\$0.1

\$2.1

\$6.0

\$8.2

Days Operated per Year:

Clean-out Cycles per Year:

255

255

255

255

255

255

Waste Disposal Cost per Year:

\$46

\$55

\$64

Maximum Continuous Hours of Service:

Total Operating Cost per Service Hour:

- Trip Related:

- Non-Trip Related:

178.9

\$1.19

\$0.83

\$0.36

178.9

\$1.00

\$0.70

\$0.30

178.9

\$0.86

\$0.60

\$0.26

Total per-Car Operating Cost per Year:

Total Fleet Operating Cost per Year:

Total Fleet Capital Cost:

\$3,050

\$18,301

\$151,368

\$3,062

\$18,372

\$3,074

\$18,444

Monogram

Favorable

\$25,228		
\$23,500		
\$1,728		
\$379		
\$144		
\$235		
2	12	7
5	1	2
5.05	6.06	7.07
4.25	5.10	5.95
2.33	2.79	3.26
11.63	13.96	16.28
\$0.0	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.1	\$8.2	\$8.2
219	219	219
219	219	219
\$35	\$42	\$48
202.1	202.1	202.1
\$1.00	\$0.84	\$0.72
\$0.83	\$0.70	\$0.60
\$0.17	\$0.14	\$0.12
\$2,197	\$2,206	\$2,214
\$13,181	\$13,234	\$13,287
\$151,368		

Unfavorable

\$25,228		
\$23,500		
\$1,728		
\$1,463		
\$288		
\$1,175		
2	12	7
5	1	2
5.05	6.06	7.07
7.09	8.51	9.92
3.03	3.64	4.25
15.17	18.21	21.24
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
292	292	292
292	292	292
\$60	\$72	\$84
154.9	154.9	154.9
\$1.34	\$1.12	\$0.96
\$0.84	\$0.70	\$0.61
\$0.50	\$0.42	\$0.36
\$3,909	\$3,925	\$3,942
\$23,455	\$23,552	\$23,649
\$151,368		

Car Type: Turbo Coach  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 72  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$28,016		
- Equipment:	\$26,000		
- Installation:	\$2,016		
Maintenance Cost:	\$1,212		
- Labor:	\$432		
- Spare Parts:	\$780		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	13.47	16.16	18.86
Flush Fluid Generated:	14.55	17.46	20.37
Capacity Adjustment:	7.01	8.41	9.81
Total Capacity Required per Day:	35.03	42.03	49.04
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$122	\$146	\$170
Maximum Continuous Hours of Service:	67.1	67.1	67.1
Total Operating Cost per Service Hour:	\$1.95	\$1.63	\$1.41
- Trip Related:	\$1.47	\$1.24	\$1.07
- Non-Trip Related:	\$0.47	\$0.40	\$0.34
Total per-Car Operating Cost per Year:	\$4,973	\$5,005	\$5,037
Total Fleet Operating Cost per Year:	\$104,442	\$105,110	\$105,777
Total Fleet Capital Cost:	\$588,336		

**Arthur D Little**



# Monogram

## Favorable

\$28,016		
\$26,000		
\$2,016		
\$548		
\$288		
\$260		
2	12	7
5	1	2
13.47	16.16	18.86
11.34	13.61	15.88
6.20	7.44	8.68
31.01	37.22	43.42
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3
219	219	219
219	219	219
\$92	\$111	\$129
75.8	75.8	75.8
\$1.71	\$1.44	\$1.24
\$1.46	\$1.23	\$1.06
\$0.25	\$0.21	\$0.18
\$3,753	\$3,777	\$3,800
\$78,815	\$79,307	\$79,800
\$588,336		

## Unfavorable

\$28,016		
\$26,000		
\$2,016		
\$1,876		
\$576		
\$1,300		
2	12	7
5	1	2
13.47	16.16	18.86
18.90	22.68	26.46
8.09	9.71	11.33
40.46	48.56	56.65
\$0.2	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.4
292	292	292
292	292	292
\$161	\$193	\$225
58.1	58.1	58.1
\$2.13	\$1.78	\$1.54
\$1.48	\$1.25	\$1.08
\$0.64	\$0.54	\$0.46
\$6,209	\$6,252	\$6,295
\$130,391	\$131,297	\$132,204
\$588,336		

Car Type: Turbo Cafe  
 Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 52  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 235.0

Scenario: Expected

Capital Cost	\$25,228		
- Equipment:	\$23,500		
- Installation:	\$1,728		
Maintenance Cost:	\$921		
- Labor:	\$216		
- Spare Parts:	\$705		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
Waste Generated:	9.73	11.67	13.62
Flush Fluid Generated:	10.51	12.61	14.71
Capacity Adjustment:	5.06	6.07	7.08
Total Capacity Required per Day:	25.30	30.36	35.42
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.2	\$8.2	\$8.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$88	\$105	\$123
Maximum Continuous Hours of Service:	92.9	92.9	92.9
Total Operating Cost per Service Hour:	\$1.22	\$1.02	\$0.88
- Trip Related:	\$0.85	\$0.72	\$0.62
- Non-Trip Related:	\$0.36	\$0.30	\$0.26
Total per-Car Operating Cost per Year:	\$3,105	\$3,128	\$3,151
Total Fleet Operating Cost per Year:	\$9,316	\$9,385	\$9,454
Total Fleet Capital Cost:	\$75,684		

Monogram

Favorable

\$25,228		
\$23,500		
\$1,728		
\$379		
\$144		
\$235		
2	12	7
5	1	2
9.73	11.67	13.62
8.19	9.83	11.47
4.48	5.38	6.27
22.40	26.88	31.36
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
219	219	219
219	219	219
\$67	\$80	\$93
104.9	104.9	104.9
\$1.02	\$0.86	\$0.74
\$0.85	\$0.71	\$0.62
\$0.17	\$0.14	\$0.12
\$2,238	\$2,254	\$2,271
\$6,713	\$6,763	\$6,814
\$75,684		

Unfavorable

\$25,228		
\$23,500		
\$1,728		
\$1,463		
\$288		
\$1,175		
2	12	7
5	1	2
9.73	11.67	13.62
13.65	16.38	19.11
5.84	7.01	8.18
29.22	35.07	40.91
\$0.1	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.3	\$8.3
292	292	292
292	292	292
\$116	\$139	\$162
80.4	80.4	80.4
\$1.36	\$1.15	\$0.99
\$0.86	\$0.73	\$0.63
\$0.50	\$0.42	\$0.36
\$3,984	\$4,015	\$4,046
\$11,952	\$12,046	\$12,139
\$75,684		

Car Type: Turbo Power Coach

Toilet Type: Modified Vacuum

Manufacturer:

Number of Passengers: 40

Number of Toilets: 1

Total Tank Capacity (gals): 235.0

Scenario:

Expected

Capital Cost	\$25,228		
- Equipment:	\$23,500		
- Installation:	\$1,728		
Maintenance Cost:	\$921		
- Labor:	\$216		
- Spare Parts:	\$705		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	7.48	8.98	10.48
Flush Fluid Generated:	8.09	9.70	11.32
Capacity Adjustment:	3.89	4.67	5.45
Total Capacity Required per Day:	19.46	23.35	27.24
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.2	\$8.2	\$8.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$68	\$81	\$95
Maximum Continuous Hours of Service:	120.8	120.8	120.8
Total Operating Cost per Service Hour:	\$1.21	\$1.01	\$0.87
- Trip Related:	\$0.84	\$0.71	\$0.61
- Non-Trip Related:	\$0.36	\$0.30	\$0.26
Total per-Car Operating Cost per Year:	\$3,079	\$3,096	\$3,114
Total Fleet Operating Cost per Year:	\$43,104	\$43,351	\$43,598
Total Fleet Capital Cost:	\$353,192		

**Arthur D Little**

# Monogram

## Favorable

\$25,228		
\$23,500		
\$1,728		
\$379		
\$144		
\$235		
2	12	7
5	1	2
7.48	8.98	10.48
6.30	7.56	8.82
3.45	4.14	4.82
17.23	20.68	24.12
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
219	219	219
219	219	219
\$51	\$62	\$72
136.4	136.4	136.4
\$1.01	\$0.85	\$0.73
\$0.84	\$0.70	\$0.61
\$0.17	\$0.14	\$0.12
\$2,218	\$2,231	\$2,244
\$31,052	\$31,234	\$31,417
\$353,192		

## Unfavorable

\$25,228		
\$23,500		
\$1,728		
\$1,463		
\$288		
\$1,175		
2	12	7
5	1	2
7.48	8.98	10.48
10.50	12.60	14.70
4.50	5.40	6.29
22.48	26.98	31.47
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
292	292	292
292	292	292
\$89	\$107	\$125
104.5	104.5	104.5
\$1.35	\$1.13	\$0.98
\$0.85	\$0.72	\$0.62
\$0.50	\$0.42	\$0.36
\$3,948	\$3,972	\$3,996
\$55,274	\$55,610	\$55,945
\$353,192		



Car Type: Coach-HEP-HLV  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 72  
 Number of Toilets: 4  
 Total Tank Capacity (gals): 54.0

Scenario:	Expected		
Capital Cost	\$14,152		
- Equipment:	\$13,000		
- Installation:	\$1,152		
Maintenance Cost:	\$3,846		
- Labor:	\$3,456		
- Spare Parts:	\$390		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	32.33	64.66	96.98
Flush Fluid Generated:	10.00	10.00	10.00
Capacity Adjustment:	10.58	18.66	26.75
Total Capacity Required per Day:	52.91	93.32	133.73
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$8.4	\$16.8	\$25.2
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$32.5	\$40.9	\$49.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$119	\$140	\$150
Maximum Continuous Hours of Service:	24.5	27.8	29.1
Total Operating Cost per Service Hour:	\$2.65	\$1.83	\$1.55
- Trip Related:	\$1.39	\$0.89	\$0.72
- Non-Trip Related:	\$1.25	\$0.94	\$0.84
Total per-Car Operating Cost per Year:	\$8,117	\$7,469	\$7,145
Total Fleet Operating Cost per Year:	\$170,454	\$156,853	\$150,053
Total Fleet Capital Cost:	\$297,192		

**Arthur D Little**

# Monogram

## Favorable

\$14,152		
\$13,000		
\$1,152		
\$2,434		
\$2,304		
\$130		
24	48	72
1	1	1
32.33	64.66	96.98
10.00	10.00	10.00
10.58	18.66	26.75
52.91	93.32	133.73
\$0.1	\$0.1	\$0.1
\$8.4	\$16.8	\$25.2
\$24.0	\$24.0	\$24.0
\$32.5	\$40.9	\$49.3
219	219	219
110	73	55
\$102	\$120	\$129
24.5	27.8	29.1
\$2.32	\$1.58	\$1.33
\$1.39	\$0.89	\$0.72
\$0.93	\$0.69	\$0.62
\$6,095	\$5,540	\$5,262
\$127,989	\$116,332	\$110,503
\$297,192		

## Unfavorable

\$14,152		
\$13,000		
\$1,152		
\$5,258		
\$4,608		
\$650		
24	48	72
1	1	1
32.33	64.66	96.98
10.00	10.00	10.00
10.58	18.66	26.75
52.91	93.32	133.73
\$0.1	\$0.1	\$0.1
\$8.4	\$16.8	\$25.2
\$24.0	\$24.0	\$24.0
\$32.5	\$40.9	\$49.3
292	292	292
146	97	73
\$136	\$160	\$172
24.5	27.8	29.1
\$2.89	\$2.01	\$1.72
\$1.39	\$0.89	\$0.72
\$1.50	\$1.13	\$1.00
\$10,139	\$9,399	\$9,029
\$212,918	\$197,375	\$189,603
\$297,192		



Car Type: Lounge-HEP-HLV  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 86  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario: Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	38.61	77.23	115.84
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	10.90	20.56	30.21
Total Capacity Required per Day:	54.52	102.79	151.05
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$12.6	\$16.8	\$25.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$24.7	\$28.9	\$37.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$123	\$154	\$170
Maximum Continuous Hours of Service:	11.9	12.6	12.9
Total Operating Cost per Service Hour:	\$1.69	\$1.11	\$0.97
- Trip Related:	\$1.07	\$0.64	\$0.55
- Non-Trip Related:	\$0.63	\$0.47	\$0.42
Total per-Car Operating Cost per Year:	\$5,195	\$4,534	\$4,472
Total Fleet Operating Cost per Year:	\$31,168	\$27,205	\$26,833
Total Fleet Capital Cost:	\$42,456		

Monogram

Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
24	48	72
1	1	1
38.61	77.23	115.84
5.00	5.00	5.00
10.90	20.56	30.21
54.52	102.79	151.05
\$0.1	\$0.1	\$0.1
\$12.6	\$16.8	\$25.2
\$12.0	\$12.0	\$12.0
\$24.7	\$28.9	\$37.3
219	219	219
110	73	55
\$105	\$132	\$146
11.9	12.6	12.9
\$1.53	\$0.99	\$0.86
\$1.07	\$0.64	\$0.55
\$0.46	\$0.35	\$0.31
\$4,021	\$3,455	\$3,402
\$24,127	\$20,731	\$20,412
\$42,456		

Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
24	48	72
1	1	1
38.61	77.23	115.84
5.00	5.00	5.00
10.90	20.56	30.21
54.52	102.79	151.05
\$0.1	\$0.1	\$0.1
\$12.6	\$16.8	\$25.2
\$12.0	\$12.0	\$12.0
\$24.7	\$28.9	\$37.3
292	292	292
146	97	73
\$140	\$176	\$194
11.9	12.6	12.9
\$1.82	\$1.20	\$1.05
\$1.07	\$0.64	\$0.55
\$0.75	\$0.56	\$0.50
\$6,368	\$5,613	\$5,542
\$38,208	\$33,679	\$33,254
\$42,456		

Car Type: Trans Dorm Coach

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 40

Number of Toilets: 4

Total Tank Capacity (gals): 54.0

Scenario:

Expected

Capital Cost	\$14,152		
- Equipment:	\$13,000		
- Installation:	\$1,152		
Maintenance Cost:	\$3,846		
- Labor:	\$3,456		
- Spare Parts:	\$390		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	10.00	10.00	10.00
Capacity Adjustment:	6.99	11.48	15.97
Total Capacity Required per Day:	34.95	57.40	79.85
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$8.4	\$16.8	\$16.8
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$32.5	\$40.9	\$40.9
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$79	\$86	\$90
Maximum Continuous Hours of Service:	37.1	45.2	48.7
Total Operating Cost per Service Hour:	\$2.63	\$1.81	\$1.42
- Trip Related:	\$1.38	\$0.87	\$0.59
- Non-Trip Related:	\$1.25	\$0.94	\$0.84
Total per-Car Operating Cost per Year:	\$8,076	\$7,415	\$6,548
Total Fleet Operating Cost: per Year:	\$290,752	\$266,953	\$235,737
Total Fleet Capital Cost:	\$509,472		

**Arthur D Little**

# Monogram

## Favorable

\$14,152		
\$13,000		
\$1,152		
\$2,434		
\$2,304		
\$130		
24	48	72
1	1	1
17.96	35.92	53.88
10.00	10.00	10.00
6.99	11.48	15.97
34.95	57.40	79.85
\$0.1	\$0.1	\$0.1
\$8.4	\$16.8	\$16.8
\$24.0	\$24.0	\$24.0
\$32.5	\$40.9	\$40.9
219	219	219
110	73	55
\$67	\$74	\$77
37.1	45.2	48.7
\$2.31	\$1.57	\$1.21
\$1.38	\$0.87	\$0.59
\$0.93	\$0.69	\$0.62
\$6,060	\$5,493	\$4,750
\$218,164	\$197,764	\$171,008
\$509,472		

## Unfavorable

\$14,152		
\$13,000		
\$1,152		
\$5,258		
\$4,608		
\$650		
24	48	72
1	1	1
17.96	35.92	53.88
10.00	10.00	10.00
6.99	11.48	15.97
34.95	57.40	79.85
\$0.1	\$0.1	\$0.1
\$8.4	\$16.8	\$16.8
\$24.0	\$24.0	\$24.0
\$32.5	\$40.9	\$40.9
292	292	292
146	97	73
\$90	\$98	\$103
37.1	45.2	48.7
\$2.88	\$2.00	\$1.59
\$1.38	\$0.87	\$0.59
\$1.50	\$1.13	\$1.00
\$10,093	\$9,337	\$8,346
\$363,341	\$336,141	\$300,466
\$509,472		

Car Type: **Sleeper Super**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **44**  
 Number of Toilets: **12**  
 Total Tank Capacity (gals): **162.0**

Scenario: **Expected**

Capital Cost	\$42,456		
- Equipment:	\$39,000		
- Installation:	\$3,456		
Maintenance Cost:	\$11,538		
- Labor:	\$10,368		
- Spare Parts:	\$1,170		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	19.76	39.51	59.27
Flush Fluid Generated:	30.00	30.00	30.00
Capacity Adjustment:	12.44	17.38	22.32
Total Capacity Required per Day:	62.20	86.89	111.59
Pumpout Labor Cost:	\$0.3	\$0.3	\$0.3
Connect/Disconnect Labor Cost:	\$25.2	\$25.2	\$25.2
Cleaning Labor Cost:	\$72.0	\$72.0	\$72.0
Total Pumpout/Cleaning Cost per Day:	\$97.5	\$97.5	\$97.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$140	\$130	\$125
Maximum Continuous Hours of Service:	62.5	89.5	104.5
Total Operating Cost per Service Hour:	\$7.87	\$4.89	\$3.89
- Trip Related:	\$4.11	\$2.06	\$1.38
- Non-Trip Related:	\$3.76	\$2.82	\$2.51
Total per-Car Operating Cost per Year:	\$24,133	\$19,972	\$17,891
Total Fleet Operating Cost per Year:	\$1,641,076	\$1,358,095	\$1,216,605
Total Fleet Capital Cost:	\$2,887,008		

Monogram

Favorable

Unfavorable

\$42,456		
\$39,000		
\$3,456		
\$7,302		
\$6,912		
\$390		
24	48	72
1	1	1
19.76	39.51	59.27
30.00	30.00	30.00
12.44	17.38	22.32
62.20	86.89	111.59
\$0.3	\$0.3	\$0.3
\$25.2	\$25.2	\$25.2
\$72.0	\$72.0	\$72.0
\$97.5	\$97.5	\$97.5
219	219	219
110	73	55
\$120	\$112	\$108
62.5	89.5	104.5
\$6.89	\$4.15	\$3.23
\$4.11	\$2.06	\$1.38
\$2.78	\$2.08	\$1.85
\$18,098	\$14,531	\$12,748
\$1,230,672	\$988,117	\$866,840
\$2,887,008		

\$42,456		
\$39,000		
\$3,456		
\$15,774		
\$13,824		
\$1,950		
24	48	72
1	1	1
19.76	39.51	59.27
30.00	30.00	30.00
12.44	17.38	22.32
62.20	86.89	111.59
\$0.3	\$0.3	\$0.3
\$25.2	\$25.2	\$25.2
\$72.0	\$72.0	\$72.0
\$97.5	\$97.5	\$97.5
292	292	292
146	97	73
\$160	\$149	\$143
62.5	89.5	104.5
\$8.61	\$5.44	\$4.38
\$4.11	\$2.06	\$1.38
\$4.50	\$3.38	\$3.00
\$30,169	\$25,413	\$23,035
\$2,051,480	\$1,728,074	\$1,566,371
\$2,887,008		

Car Type: **Bag Coach Super**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **78**  
 Number of Toilets: **5**  
 Total Tank Capacity (gals): **67.5**

**Scenario: Expected**

Capital Cost	\$17,690		
- Equipment:	\$16,250		
- Installation:	\$1,440		
Maintenance Cost:	\$4,808		
- Labor:	\$4,320		
- Spare Parts:	\$488		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	35.02	70.04	105.07
Flush Fluid Generated:	12.50	12.50	12.50
Capacity Adjustment:	11.88	20.64	29.39
Total Capacity Required per Day:	59.40	103.18	146.96
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$10.5	\$21.0	\$31.5
Cleaning Labor Cost:	\$30.0	\$30.0	\$30.0
Total Pumpout/Cleaning Cost per Day:	\$40.6	\$51.1	\$61.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$134	\$155	\$165
Maximum Continuous Hours of Service:	27.3	31.4	33.1
Total Operating Cost per Service Hour:	\$3.30	\$2.28	\$1.94
- Trip Related:	\$1.74	\$1.10	\$0.89
- Non-Trip Related:	\$1.57	\$1.18	\$1.05
Total per-Car Operating Cost per Year:	\$10,131	\$9,316	\$8,909
Total Fleet Operating Cost per Year:	\$486,283	\$447,183	\$427,632
Total Fleet Capital Cost:	\$849,120		

**Arthur D Little**

# Monogram

## Favorable

\$17,690		
\$16,250		
\$1,440		
\$3,043		
\$2,880		
\$163		
24	48	72
1	1	1
35.02	70.04	105.07
12.50	12.50	12.50
11.88	20.64	29.39
59.40	103.18	146.96
\$0.1	\$0.1	\$0.1
\$10.5	\$21.0	\$31.5
\$30.0	\$30.0	\$30.0
\$40.6	\$51.1	\$61.6
219	219	219
110	73	55
\$114	\$133	\$142
27.3	31.4	33.1
\$2.89	\$1.97	\$1.66
\$1.74	\$1.10	\$0.89
\$1.16	\$0.87	\$0.77
\$7,605	\$6,907	\$6,558
\$365,060	\$331,545	\$314,788
\$849,120		

## Unfavorable

\$17,690		
\$16,250		
\$1,440		
\$6,573		
\$5,760		
\$813		
24	48	72
1	1	1
35.02	70.04	105.07
12.50	12.50	12.50
11.88	20.64	29.39
59.40	103.18	146.96
\$0.1	\$0.1	\$0.1
\$10.5	\$21.0	\$31.5
\$30.0	\$30.0	\$30.0
\$40.6	\$51.1	\$61.6
292	292	292
146	97	73
\$153	\$177	\$189
27.3	31.4	33.1
\$3.61	\$2.51	\$2.14
\$1.74	\$1.10	\$0.89
\$1.88	\$1.41	\$1.25
\$12,656	\$11,725	\$11,260
\$607,507	\$562,820	\$540,477
\$849,120		



Car Type:

Coach Super

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 75

Number of Toilets: 6

Total Tank Capacity (gals): 81.0

Scenario:

Expected

Capital Cost	\$21,228		
- Equipment:	\$19,500		
- Installation:	\$1,728		
Maintenance Cost:	\$5,769		
- Labor:	\$5,184		
- Spare Parts:	\$585		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	33.68	67.35	101.03
Flush Fluid Generated:	15.00	15.00	15.00
Capacity Adjustment:	12.17	20.59	29.01
Total Capacity Required per Day:	60.84	102.94	145.03
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.2
Connect/Disconnect Labor Cost:	\$12.6	\$25.2	\$25.2
Cleaning Labor Cost:	\$36.0	\$36.0	\$36.0
Total Pumpout/Cleaning Cost per Day:	\$48.8	\$61.4	\$61.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$137	\$154	\$163
Maximum Continuous Hours of Service:	32.0	37.8	40.2
Total Operating Cost per Service Hour:	\$3.96	\$2.73	\$2.14
- Trip Related:	\$2.08	\$1.32	\$0.89
- Non-Trip Related:	\$1.88	\$1.41	\$1.25
Total per-Car Operating Cost per Year:	\$12,134	\$11,148	\$9,851
Total Fleet Operating Cost per Year:	\$1,104,159	\$1,014,493	\$896,421
Total Fleet Capital Cost:	\$1,931,748		

Monogram

Favorable

\$21,228		
\$19,500		
\$1,728		
\$3,651		
\$3,456		
\$195		
24	48	72
1	1	1
33.68	67.35	101.03
15.00	15.00	15.00
12.17	20.59	29.01
60.84	102.94	145.03
\$0.2	\$0.2	\$0.2
\$12.6	\$25.2	\$25.2
\$36.0	\$36.0	\$36.0
\$48.8	\$61.4	\$61.4
219	219	219
110	73	55
\$117	\$132	\$140
32.0	37.8	40.2
\$3.47	\$2.36	\$1.81
\$2.08	\$1.32	\$0.89
\$1.39	\$1.04	\$0.93
\$9,106	\$8,262	\$7,150
\$828,681	\$751,824	\$650,619
\$1,931,748		

Unfavorable

\$21,228		
\$19,500		
\$1,728		
\$7,887		
\$6,912		
\$975		
24	48	72
1	1	1
33.68	67.35	101.03
15.00	15.00	15.00
12.17	20.59	29.01
60.84	102.94	145.03
\$0.2	\$0.2	\$0.2
\$12.6	\$25.2	\$25.2
\$36.0	\$36.0	\$36.0
\$48.8	\$61.4	\$61.4
292	292	292
146	97	73
\$156	\$176	\$186
32.0	37.8	40.2
\$4.33	\$3.00	\$2.39
\$2.08	\$1.32	\$0.89
\$2.25	\$1.69	\$1.50
\$15,161	\$14,035	\$12,552
\$1,379,637	\$1,277,161	\$1,142,222
\$1,931,748		

Car Type:

Horizon

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 82

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	18.41	36.82	73.64
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	5.85	10.45	19.66
Total Capacity Required per Day:	29.26	52.27	98.30
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$8.4	\$8.4	\$16.8
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$20.5	\$20.5	\$28.9
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$132	\$118	\$147
Maximum Continuous Hours of Service:	11.1	12.4	13.2
Total Operating Cost per Service Hour:	\$2.37	\$1.52	\$1.11
- Trip Related:	\$1.75	\$0.89	\$0.64
- Non-Trip Related:	\$0.63	\$0.63	\$0.47
Total per-Car Operating Cost per Year:	\$7,280	\$4,653	\$4,527
Total Fleet Operating Cost per Year:	\$749,794	\$479,261	\$466,322
Total Fleet Capital Cost:	\$728,828		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
12	24	48
1	1	1
18.41	36.82	73.64
5.00	5.00	5.00
5.85	10.45	19.66
29.26	52.27	98.30
\$0.1	\$0.1	\$0.1
\$8.4	\$8.4	\$16.8
\$12.0	\$12.0	\$12.0
\$20.5	\$20.5	\$28.9
219	219	219
219	110	73
\$113	\$101	\$126
11.1	12.4	13.2
\$2.21	\$1.35	\$0.98
\$1.75	\$0.89	\$0.64
\$0.46	\$0.46	\$0.35
\$5,808	\$3,557	\$3,449
\$598,258	\$366,372	\$355,282
\$728,828		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
12	24	48
1	1	1
18.41	36.82	73.64
5.00	5.00	5.00
5.85	10.45	19.66
29.26	52.27	98.30
\$0.1	\$0.1	\$0.1
\$8.4	\$8.4	\$16.8
\$12.0	\$12.0	\$12.0
\$20.5	\$20.5	\$28.9
292	292	292
292	146	97
\$150	\$134	\$168
11.1	12.4	13.2
\$2.50	\$1.64	\$1.20
\$1.75	\$0.89	\$0.64
\$0.75	\$0.75	\$0.56
\$8,751	\$5,749	\$5,605
\$901,330	\$592,149	\$577,362
\$728,828		

Car Type:

Coach

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 48

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$7,076

\$6,500

\$576

Maintenance Cost:

- Labor:

- Spare Parts:

\$1,923

\$1,728

\$195

Hours per Trip:

Trips per Day:

12

1

24

1

48

1

Waste Generation Data

Waste Generated:

Flush Fluid Generated:

Capacity Adjustment:

Total Capacity Required per Day:

10.78

21.55

43.10

5.00

5.00

5.00

3.94

6.64

12.03

19.72

33.19

60.13

Pumpout Labor Cost:

Connect/Disconnect Labor Cost:

Cleaning Labor Cost:

Total Pumpout/Cleaning Cost per Day:

\$0.1

\$0.1

\$0.1

\$4.2

\$8.4

\$12.6

\$12.0

\$12.0

\$12.0

\$16.3

\$20.5

\$24.7

Days Operated per Year:

Clean-out Cycles per Year:

255

255

255

128

255

85

Waste Disposal Cost per Year:

\$89

\$75

\$90

Maximum Continuous Hours of Service:

Total Operating Cost per Service Hour:

- Trip Related:

- Non-Trip Related:

16.4

19.5

21.6

\$2.01

\$1.50

\$1.01

\$1.38

\$0.88

\$0.54

\$0.63

\$0.63

\$0.47

Total per-Car Operating Cost per Year:

Total Fleet Operating Cost per Year:

Total Fleet Capital Cost:

\$6,164

\$4,610

\$4,112

\$480,757

\$359,589

\$320,774

\$551,928

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
12	24	48
1	1	1
10.78	21.55	43.10
5.00	5.00	5.00
3.94	6.64	12.03
19.72	33.19	60.13
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
219	219	219
219	110	73
\$76	\$64	\$77
16.4	19.5	21.6
\$1.85	\$1.34	\$0.88
\$1.38	\$0.88	\$0.54
\$0.46	\$0.46	\$0.35
\$4,852	\$3,520	\$3,094
\$378,437	\$274,579	\$241,309
\$551,928		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
12	24	48
1	1	1
10.78	21.55	43.10
5.00	5.00	5.00
3.94	6.64	12.03
19.72	33.19	60.13
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
292	292	292
292	146	97
\$101	\$85	\$103
16.4	19.5	21.6
\$2.13	\$1.63	\$1.10
\$1.38	\$0.88	\$0.54
\$0.75	\$0.75	\$0.56
\$7,475	\$5,700	\$5,131
\$583,077	\$444,599	\$400,239
\$551,928		

Car Type: Coach (HDCP)  
 Toilet Type: Self-Cont'd Recirc

Manufacturer: F

Number of Passengers: 44  
 Number of Toilets: 3  
 Total Tank Capacity (gals): 40.5

Scenario: Expected

Capital Cost	\$10,614		
- Equipment:	\$9,750		
- Installation:	\$864		
Maintenance Cost:	\$2,885		
- Labor:	\$2,592		
- Spare Parts:	\$293		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	9.88	19.76	39.51
Flush Fluid Generated:	7.50	7.50	7.50
Capacity Adjustment:	4.34	6.81	11.75
Total Capacity Required per Day:	21.72	34.07	58.77
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$6.3	\$6.3	\$12.6
Cleaning Labor Cost:	\$18.0	\$18.0	\$18.0
Total Pumpout/Cleaning Cost per Day:	\$24.4	\$24.4	\$30.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$98	\$77	\$88
Maximum Continuous Hours of Service:	22.4	28.5	33.1
Total Operating Cost per Service Hour:	\$3.00	\$1.98	\$1.37
- Trip Related:	\$2.06	\$1.04	\$0.66
- Non-Trip Related:	\$0.94	\$0.94	\$0.71
Total per-Car Operating Cost per Year:	\$9,210	\$6,075	\$5,585
Total Fleet Operating Cost per Year:	\$193,410	\$127,575	\$117,287
Total Fleet Capital Cost:	\$222,894		

**Arthur D Little**

# Monogram

## Favorable

\$10,614		
\$9,750		
\$864		
\$1,826		
\$1,728		
\$98		
12	24	48
1	1	1
9.88	19.76	39.51
7.50	7.50	7.50
4.34	6.81	11.75
21.72	34.07	58.77
\$0.1	\$0.1	\$0.1
\$6.3	\$6.3	\$12.6
\$18.0	\$18.0	\$18.0
\$24.4	\$24.4	\$30.7
219	219	219
219	110	73
\$84	\$66	\$76
22.4	28.5	33.1
\$2.76	\$1.74	\$1.18
\$2.06	\$1.04	\$0.66
\$0.69	\$0.69	\$0.52
\$7,247	\$4,560	\$4,140
\$152,194	\$95,765	\$86,946
\$222,894		

## Unfavorable

\$10,614		
\$9,750		
\$864		
\$3,944		
\$3,456		
\$488		
12	24	48
1	1	1
9.88	19.76	39.51
7.50	7.50	7.50
4.34	6.81	11.75
21.72	34.07	58.77
\$0.1	\$0.1	\$0.1
\$6.3	\$6.3	\$12.6
\$18.0	\$18.0	\$18.0
\$24.4	\$24.4	\$30.7
292	292	292
292	146	97
\$112	\$88	\$101
22.4	28.5	33.1
\$3.19	\$2.17	\$1.50
\$2.06	\$1.04	\$0.66
\$1.13	\$1.13	\$0.84
\$11,173	\$7,590	\$7,030
\$234,625	\$159,386	\$147,627
\$222,894		



Car Type: **Dome Coach**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **46**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **27.0**

Scenario: **Expected**

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.33	20.65	41.31
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	3.83	6.41	11.58
Total Capacity Required per Day:	19.16	32.07	57.89
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$12.6
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$20.5	\$24.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$86	\$72	\$87
Maximum Continuous Hours of Service:	16.9	20.2	22.4
Total Operating Cost per Service Hour:	\$2.01	\$1.50	\$1.01
- Trip Related:	\$1.38	\$0.88	\$0.53
- Non-Trip Related:	\$0.63	\$0.63	\$0.47
Total per-Car Operating Cost per Year:	\$6,161	\$4,608	\$4,109
Total Fleet Operating Cost per Year:	\$73,932	\$55,291	\$49,309
Total Fleet Capital Cost:	\$84,912		

Monogram

Favorable

Unfavorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
12	24	48
1	1	1
10.33	20.65	41.31
5.00	5.00	5.00
3.83	6.41	11.58
19.16	32.07	57.89
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
219	219	219
219	110	73
\$74	\$62	\$74
16.9	20.2	22.4
\$1.85	\$1.34	\$0.88
\$1.38	\$0.88	\$0.53
\$0.46	\$0.46	\$0.35
\$4,850	\$3,518	\$3,091
\$58,195	\$42,217	\$37,090
\$84,912		

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
12	24	48
1	1	1
10.33	20.65	41.31
5.00	5.00	5.00
3.83	6.41	11.58
19.16	32.07	57.89
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
292	292	292
292	146	97
\$98	\$82	\$99
16.9	20.2	22.4
\$2.13	\$1.63	\$1.10
\$1.38	\$0.88	\$0.53
\$0.75	\$0.75	\$0.56
\$7,472	\$5,697	\$5,127
\$89,670	\$68,365	\$61,529
\$84,912		

Car Type:

Amlounge II

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 49

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$7,076

\$6,500

\$576

Maintenance Cost:

- Labor:

- Spare Parts:

\$1,923

\$1,728

\$195

Hours per Trip:

Trips per Day:

12

1

24

1

48

1

Waste Generation Data

Waste Generated:

Flush Fluid Generated:

Capacity Adjustment:

Total Capacity Required per Day:

11.00

22.00

44.00

5.00

5.00

5.00

4.00

6.75

12.25

20.00

33.75

61.25

Pumpout Labor Cost:

Connect/Disconnect Labor Cost:

Cleaning Labor Cost:

Total Pumpout/Cleaning Cost per Day:

\$0.1

\$0.1

\$0.1

\$4.2

\$8.4

\$12.6

\$12.0

\$12.0

\$12.0

\$16.3

\$20.5

\$24.7

Days Operated per Year:

Clean-out Cycles per Year:

255

255

255

128

255

85

Waste Disposal Cost per Year:

\$90

\$76

\$92

Maximum Continuous Hours of Service:

Total Operating Cost per Service Hour:

- Trip Related:

- Non-Trip Related:

16.2

19.2

21.2

\$2.01

\$1.50

\$1.01

\$1.38

\$0.88

\$0.54

\$0.63

\$0.63

\$0.47

Total per-Car Operating Cost per Year:

Total Fleet Operating Cost per Year:

Total Fleet Capital Cost:

\$6,165

\$4,611

\$4,114

\$154,120

\$115,284

\$102,854

\$176,900

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
12	24	48
1	1	1
11.00	22.00	44.00
5.00	5.00	5.00
4.00	6.75	12.25
20.00	33.75	61.25
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
219	219	219
219	110	73
\$77	\$65	\$79
16.2	19.2	21.2
\$1.85	\$1.34	\$0.88
\$1.38	\$0.88	\$0.54
\$0.46	\$0.46	\$0.35
\$4,853	\$3,521	\$3,095
\$121,321	\$88,033	\$77,379
\$176,900		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
12	24	48
1	1	1
11.00	22.00	44.00
5.00	5.00	5.00
4.00	6.75	12.25
20.00	33.75	61.25
\$0.1	\$0.1	\$0.1
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.3	\$20.5	\$24.7
292	292	292
292	146	97
\$103	\$87	\$105
16.2	19.2	21.2
\$2.13	\$1.63	\$1.10
\$1.38	\$0.88	\$0.54
\$0.75	\$0.75	\$0.56
\$7,477	\$5,701	\$5,133
\$186,920	\$142,536	\$128,330
\$176,900		

Car Type: **Sleeper 10-6**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **22**  
 Number of Toilets: **17**  
 Total Tank Capacity (gals): **229.5**

Scenario: **Expected**

Capital Cost	\$60,146		
- Equipment:	\$55,250		
- Installation:	\$4,896		
Maintenance Cost:	\$16,346		
- Labor:	\$14,688		
- Spare Parts:	\$1,658		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	4.94	9.88	19.76
Flush Fluid Generated:	42.50	42.50	42.50
Capacity Adjustment:	11.86	13.09	15.56
Total Capacity Required per Day:	59.30	65.47	77.82
Pumpout Labor Cost:	\$0.4	\$0.4	\$0.4
Connect/Disconnect Labor Cost:	\$35.7	\$35.7	\$35.7
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$138.1	\$138.1	\$138.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$267	\$147	\$117
Maximum Continuous Hours of Service:	46.4	84.1	141.6
Total Operating Cost per Service Hour:	\$16.93	\$11.13	\$6.90
- Trip Related:	\$11.60	\$5.80	\$2.91
- Non-Trip Related:	\$5.33	\$5.33	\$4.00
Total per-Car Operating Cost per Year:	\$51,903	\$34,138	\$28,226
Total Fleet Operating Cost per Year:	\$4,256,054	\$2,799,331	\$2,314,515
Total Fleet Capital Cost:	\$4,931,972		

Monogram

Favorable

\$60,146		
\$55,250		
\$4,896		
\$10,345		
\$9,792		
\$553		
12	24	48
1	1	1
4.94	9.88	19.76
42.50	42.50	42.50
11.86	13.09	15.56
59.30	65.47	77.82
\$0.4	\$0.4	\$0.4
\$35.7	\$35.7	\$35.7
\$102.0	\$102.0	\$102.0
\$138.1	\$138.1	\$138.1
219	219	219
219	110	73
\$229	\$126	\$100
46.4	84.1	141.6
\$15.53	\$9.74	\$5.86
\$11.60	\$5.80	\$2.91
\$3.94	\$3.94	\$2.95
\$40,822	\$25,595	\$20,528
\$3,347,440	\$2,098,820	\$1,683,264
\$4,931,972		

Unfavorable

\$60,146		
\$55,250		
\$4,896		
\$22,347		
\$19,584		
\$2,763		
12	24	48
1	1	1
4.94	9.88	19.76
42.50	42.50	42.50
11.86	13.09	15.56
59.30	65.47	77.82
\$0.4	\$0.4	\$0.4
\$35.7	\$35.7	\$35.7
\$102.0	\$102.0	\$102.0
\$138.1	\$138.1	\$138.1
292	292	292
292	146	97
\$305	\$168	\$133
46.4	84.1	141.6
\$17.97	\$12.18	\$7.69
\$11.60	\$5.80	\$2.91
\$6.38	\$6.38	\$4.78
\$62,984	\$42,681	\$35,924
\$5,164,667	\$3,499,841	\$2,945,766
\$4,931,972		

Car Type: **Amcoach II**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **59**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **27.0**

Scenario:	Expected		
Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	26.49	52.98	79.47
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	7.87	14.50	21.12
Total Capacity Required per Day:	39.36	72.48	105.59
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$8.4	\$12.6	\$16.8
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$20.5	\$24.7	\$28.9
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$89	\$109	\$119
Maximum Continuous Hours of Service:	16.5	17.9	18.4
Total Operating Cost per Service Hour:	\$1.51	\$1.01	\$0.84
- Trip Related:	\$0.88	\$0.54	\$0.43
- Non-Trip Related:	\$0.63	\$0.47	\$0.42
Total per-Car Operating Cost per Year:	\$4,624	\$4,131	\$3,884
Total Fleet Operating Cost per Year:	\$550,255	\$491,589	\$462,255
Total Fleet Capital Cost:	\$842,044		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
24	48	72
1	1	1
26.49	52.98	79.47
5.00	5.00	5.00
7.87	14.50	21.12
39.36	72.48	105.59
\$0.1	\$0.1	\$0.1
\$8.4	\$12.6	\$16.8
\$12.0	\$12.0	\$12.0
\$20.5	\$24.7	\$28.9
219	219	219
110	73	55
\$76	\$93	\$102
16.5	17.9	18.4
\$1.34	\$0.89	\$0.74
\$0.88	\$0.54	\$0.43
\$0.46	\$0.35	\$0.31
\$3,532	\$3,110	\$2,898
\$420,324	\$370,039	\$344,896
\$842,044		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
24	48	72
1	1	1
26.49	52.98	79.47
5.00	5.00	5.00
7.87	14.50	21.12
39.36	72.48	105.59
\$0.1	\$0.1	\$0.1
\$8.4	\$12.6	\$16.8
\$12.0	\$12.0	\$12.0
\$20.5	\$24.7	\$28.9
292	292	292
146	97	73
\$101	\$124	\$136
16.5	17.9	18.4
\$1.63	\$1.10	\$0.93
\$0.88	\$0.54	\$0.43
\$0.75	\$0.56	\$0.50
\$5,716	\$5,152	\$4,871
\$680,186	\$613,139	\$579,615
\$842,044		



Car Type: Slumbercoach 24-8

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 40

Number of Toilets: 32

Total Tank Capacity (gals): 432.0

Scenario: Expected

Capital Cost	\$113,216		
- Equipment:	\$104,000		
- Installation:	\$9,216		
Maintenance Cost:	\$30,768		
- Labor:	\$27,648		
- Spare Parts:	\$3,120		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	80.00	80.00	80.00
Capacity Adjustment:	24.49	28.98	33.47
Total Capacity Required per Day:	122.45	144.90	167.35
Pumpout Labor Cost:	\$0.8	\$0.8	\$0.8
Connect/Disconnect Labor Cost:	\$67.2	\$67.2	\$67.2
Cleaning Labor Cost:	\$192.0	\$192.0	\$192.0
Total Pumpout/Cleaning Cost per Day:	\$260.0	\$260.0	\$260.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$275	\$217	\$188
Maximum Continuous Hours of Service:	84.7	143.1	185.9
Total Operating Cost per Service Hour:	\$20.96	\$13.00	\$10.34
- Trip Related:	\$10.92	\$5.47	\$3.65
- Non-Trip Related:	\$10.04	\$7.53	\$6.69
Total per-Car Operating Cost per Year:	\$64,258	\$53,129	\$47,564
Total Fleet Operating Cost per Year:	\$1,028,133	\$850,056	\$761,018
Total Fleet Capital Cost:	\$1,811,456		

Monogram

Favorable

\$113,216		
\$104,000		
\$9,216		
\$19,472		
\$18,432		
\$1,040		
24	48	72
1	1	1
17.96	35.92	53.88
80.00	80.00	80.00
24.49	28.98	33.47
122.45	144.90	167.35
\$0.8	\$0.8	\$0.8
\$67.2	\$67.2	\$67.2
\$192.0	\$192.0	\$192.0
\$260.0	\$260.0	\$260.0
219	219	219
110	73	55
\$236	\$186	\$161
84.7	143.1	185.9
\$18.33	\$11.03	\$8.59
\$10.92	\$5.47	\$3.65
\$7.41	\$5.56	\$4.94
\$48,178	\$38,638	\$33,868
\$770,848	\$618,211	\$541,892
\$1,811,456		

Unfavorable

\$113,216		
\$104,000		
\$9,216		
\$42,064		
\$36,864		
\$5,200		
24	48	72
1	1	1
17.96	35.92	53.88
80.00	80.00	80.00
24.49	28.98	33.47
122.45	144.90	167.35
\$0.8	\$0.8	\$0.8
\$67.2	\$67.2	\$67.2
\$192.0	\$192.0	\$192.0
\$260.0	\$260.0	\$260.0
292	292	292
146	97	73
\$315	\$248	\$215
84.7	143.1	185.9
\$22.93	\$14.47	\$11.66
\$10.92	\$5.47	\$3.65
\$12.00	\$9.00	\$8.00
\$80,339	\$67,619	\$61,259
\$1,285,418	\$1,081,902	\$980,144
\$1,811,456		

Car Type:  
Toilet Type:

Viewliner-Sleeper  
Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 34  
Number of Toilets: 17  
Total Tank Capacity (gals): 229.5

Scenario:

Expected

Capital Cost	\$60,146		
- Equipment:	\$55,250		
- Installation:	\$4,896		
Maintenance Cost:	\$16,346		
- Labor:	\$14,688		
- Spare Parts:	\$1,658		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.27	30.53	45.80
Flush Fluid Generated:	42.50	42.50	42.50
Capacity Adjustment:	14.44	18.26	22.07
Total Capacity Required per Day:	72.21	91.29	110.37
Pumpout Labor Cost:	\$0.4	\$0.4	\$0.4
Connect/Disconnect Labor Cost:	\$35.7	\$35.7	\$35.7
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$138.1	\$138.1	\$138.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$162	\$137	\$124
Maximum Continuous Hours of Service:	76.3	120.7	149.7
Total Operating Cost per Service Hour:	\$11.14	\$6.91	\$5.50
- Trip Related:	\$5.81	\$2.91	\$1.95
- Non-Trip Related:	\$5.33	\$4.00	\$3.55
Total per-Car Operating Cost per Year:	\$34,153	\$28,246	\$25,292
Total Fleet Operating Cost per Year:	\$68,307	\$56,492	\$50,585
Total Fleet Capital Cost:	\$120,292		

**Arthur D Little**

# Monogram

## Favorable

\$60,146		
\$55,250		
\$4,896		
\$10,345		
\$9,792		
\$553		
24	48	72
1	1	1
15.27	30.53	45.80
42.50	42.50	42.50
14.44	18.26	22.07
72.21	91.29	110.37
\$0.4	\$0.4	\$0.4
\$35.7	\$35.7	\$35.7
\$102.0	\$102.0	\$102.0
\$138.1	\$138.1	\$138.1
219	219	219
110	73	55
\$139	\$117	\$106
76.3	120.7	149.7
\$9.74	\$5.86	\$4.57
\$5.81	\$2.91	\$1.95
\$3.94	\$2.95	\$2.62
\$25,608	\$20,545	\$18,013
\$51,217	\$41,090	\$36,026
\$120,292		

## Unfavorable

\$60,146		
\$55,250		
\$4,896		
\$22,347		
\$19,584		
\$2,763		
24	48	72
1	1	1
15.27	30.53	45.80
42.50	42.50	42.50
14.44	18.26	22.07
72.21	91.29	110.37
\$0.4	\$0.4	\$0.4
\$35.7	\$35.7	\$35.7
\$102.0	\$102.0	\$102.0
\$138.1	\$138.1	\$138.1
292	292	292
146	97	73
\$186	\$156	\$142
76.3	120.7	149.7
\$12.19	\$7.69	\$6.20
\$5.81	\$2.91	\$1.95
\$6.38	\$4.78	\$4.25
\$42,698	\$35,947	\$32,571
\$85,397	\$71,894	\$65,143
\$120,292		

Car Type:

Amcafe

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 53

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost

\$7,076

- Equipment:

\$6,500

- Installation:

\$576

Maintenance Cost:

\$1,923

- Labor:

\$1,728

- Spare Parts:

\$195

Hours per Trip:

8

16

24

Trips per Day:

2

1

1

Waste Generation Data

Waste Generated:

15.86

15.86

23.80

Flush Fluid Generated:

5.00

5.00

5.00

Capacity Adjustment:

5.22

5.22

7.20

Total Capacity Required per Day:

26.08

26.08

36.00

Pumpout Labor Cost:

\$0.1

\$0.1

\$0.1

Connect/Disconnect Labor Cost:

\$4.2

\$4.2

\$8.4

Cleaning Labor Cost:

\$12.0

\$12.0

\$12.0

Total Pumpout/Cleaning Cost per Day:

\$16.3

\$16.3

\$20.5

Days Operated per Year:

255

255

255

Clean-out Cycles per Year:

255

255

128

Waste Disposal Cost per Year:

\$117

\$117

\$81

Maximum Continuous Hours of Service:

16.6

16.6

18.0

Total Operating Cost per Service Hour:

\$1.51

\$1.51

\$1.51

- Trip Related:

\$1.04

\$1.04

\$0.88

- Non-Trip Related:

\$0.47

\$0.47

\$0.63

Total per-Car Operating Cost per Year:

\$6,192

\$6,192

\$4,616

Total Fleet Operating Cost per Year:

\$278,647

\$278,647

\$207,739

Total Fleet Capital Cost:

\$318,420

Monogram

Favorable

Unfavorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
8	16	24
2	1	1
15.86	15.86	23.80
5.00	5.00	5.00
5.22	5.22	7.20
26.08	26.08	36.00
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
219	219	219
219	219	110
\$101	\$101	\$69
16.6	16.6	18.0
\$1.39	\$1.39	\$1.34
\$1.04	\$1.04	\$0.88
\$0.35	\$0.35	\$0.46
\$4,876	\$4,876	\$3,526
\$219,432	\$219,432	\$158,654
\$318,420		

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
8	16	24
2	1	1
15.86	15.86	23.80
5.00	5.00	5.00
5.22	5.22	7.20
26.08	26.08	36.00
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
292	292	292
292	292	146
\$134	\$134	\$92
16.6	16.6	18.0
\$1.61	\$1.61	\$1.63
\$1.04	\$1.04	\$0.88
\$0.56	\$0.56	\$0.75
\$7,508	\$7,508	\$5,707
\$337,862	\$337,862	\$256,824
\$318,420		

Car Type: Amcoach

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 84

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	25.14	25.14	37.72
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	7.54	7.54	10.68
Total Capacity Required per Day:	37.68	37.68	53.40
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$8.4	\$8.4	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$20.5	\$20.5	\$20.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$169	\$169	\$120
Maximum Continuous Hours of Service:	11.5	11.5	12.1
Total Operating Cost per Service Hour:	\$1.79	\$1.79	\$1.52
- Trip Related:	\$1.32	\$1.32	\$0.89
- Non-Trip Related:	\$0.47	\$0.47	\$0.63
Total per-Car Operating Cost per Year:	\$7,317	\$7,317	\$4,656
Total Fleet Operating Cost per Year:	\$1,946,432	\$1,946,432	\$1,238,374
Total Fleet Capital Cost:	\$1,882,216		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
8	16	24
2	1	1
25.14	25.14	37.72
5.00	5.00	5.00
7.54	7.54	10.68
37.68	37.68	53.40
\$0.1	\$0.1	\$0.1
\$8.4	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$20.5	\$20.5	\$20.5
219	219	219
219	219	110
\$145	\$145	\$103
11.5	11.5	12.1
\$1.67	\$1.67	\$1.35
\$1.32	\$1.32	\$0.89
\$0.35	\$0.35	\$0.46
\$5,841	\$5,841	\$3,559
\$1,552,648	\$1,553,648	\$946,741
\$1,882,216		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
8	16	24
2	1	1
25.14	25.14	37.72
5.00	5.00	5.00
7.54	7.54	10.68
37.68	37.68	53.40
\$0.1	\$0.1	\$0.1
\$8.4	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$20.5	\$20.5	\$20.5
292	292	292
292	292	146
\$194	\$194	\$137
11.5	11.5	12.1
\$1.88	\$1.88	\$1.64
\$1.32	\$1.32	\$0.89
\$0.56	\$0.56	\$0.75
\$8,794	\$8,794	\$5,752
\$2,339,216	\$2,339,216	\$1,530,006
\$1,882,216		



Car Type: Amclub  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 41  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario: Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	12.27	12.27	18.41
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	4.32	4.32	5.85
Total Capacity Required per Day:	21.59	21.59	29.26
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$20.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$97	\$97	\$66
Maximum Continuous Hours of Service:	20.0	20.0	22.1
Total Operating Cost per Service Hour:	\$1.51	\$1.51	\$1.50
- Trip Related:	\$1.04	\$1.04	\$0.87
- Non-Trip Related:	\$0.47	\$0.47	\$0.63
Total per-Car Operating Cost per Year:	\$6,172	\$6,172	\$4,601
Total Fleet Operating Cost per Year:	\$148,127	\$148,127	\$110,431
Total Fleet Capital Cost:	\$169,824		

Monogram

Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
8	16	24
2	1	1
12.27	12.27	18.41
5.00	5.00	5.00
4.32	4.32	5.85
21.59	21.59	29.26
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
219	219	219
219	219	110
\$83	\$83	\$56
20.0	20.0	22.1
\$1.39	\$1.39	\$1.34
\$1.04	\$1.04	\$0.87
\$0.35	\$0.35	\$0.46
\$4,859	\$4,859	\$3,513
\$116,615	\$116,615	\$84,304
\$169,824		

Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
8	16	24
2	1	1
12.27	12.27	18.41
5.00	5.00	5.00
4.32	4.32	5.85
21.59	21.59	29.26
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
292	292	292
292	292	146
\$111	\$111	\$75
20.0	20.0	22.1
\$1.60	\$1.60	\$1.62
\$1.04	\$1.04	\$0.87
\$0.56	\$0.56	\$0.75
\$7,485	\$7,485	\$5,690
\$179,639	\$179,639	\$136,557
\$169,824		

Car Type: Met-Srvc Dinette  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 23  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario: Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	2.33	2.54	2.76
Total Capacity Required per Day:	11.63	12.70	13.78
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$16.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$52	\$57	\$62
Maximum Continuous Hours of Service:	23.2	25.5	27.4
Total Operating Cost per Service Hour:	\$2.40	\$2.00	\$1.72
- Trip Related:	\$1.65	\$1.37	\$1.18
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,127	\$6,132	\$6,137
Total Fleet Operating Cost per Year:	\$79,653	\$79,716	\$79,779
Total Fleet Capital Cost:	\$91,988		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
2	12	7
5	1	2
4.30	5.16	6.02
5.00	5.00	5.00
2.33	2.54	2.76
11.63	12.70	13.78
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
219	219	219
219	219	219
\$45	\$49	\$53
23.2	25.5	27.4
\$2.20	\$1.84	\$1.57
\$1.65	\$1.37	\$1.18
\$0.56	\$0.46	\$0.40
\$4,821	\$4,825	\$4,829
\$62,667	\$62,721	\$62,775
\$91,988		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
2	12	7
5	1	2
4.30	5.16	6.02
5.00	5.00	5.00
2.33	2.54	2.76
11.63	12.70	13.78
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
292	292	292
292	292	292
\$60	\$65	\$71
23.2	25.5	27.4
\$2.55	\$2.12	\$1.82
\$1.65	\$1.37	\$1.18
\$0.90	\$0.75	\$0.64
\$7,434	\$7,439	\$7,445
\$96,639	\$96,711	\$96,783
\$91,988		

Car Type: Met-Srvc Coach  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 60  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario: Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	4.06	4.62	5.18
Total Capacity Required per Day:	20.28	23.09	25.89
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$16.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$91	\$104	\$116
Maximum Continuous Hours of Service:	13.3	14.0	14.6
Total Operating Cost per Service Hour:	\$2.41	\$2.02	\$1.73
- Trip Related:	\$1.66	\$1.39	\$1.19
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,166	\$6,179	\$6,191
Total Fleet Operating Cost per Year:	\$308,304	\$308,935	\$309,566
Total Fleet Capital Cost:	\$353,800		

Monogram

Favorable

Unfavorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
2	12	7
5	1	2
11.23	13.47	15.72
5.00	5.00	5.00
4.06	4.62	5.18
20.28	23.09	25.89
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
219	219	219
219	219	219
\$78	\$89	\$100
13.3	14.0	14.6
\$2.22	\$1.85	\$1.59
\$1.66	\$1.39	\$1.19
\$0.56	\$0.46	\$0.40
\$4,854	\$4,865	\$4,876
\$242,696	\$243,237	\$243,778
\$353,800		

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
2	12	7
5	1	2
11.23	13.47	15.72
5.00	5.00	5.00
4.06	4.62	5.18
20.28	23.09	25.89
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
292	292	292
292	292	292
\$104	\$119	\$133
13.3	14.0	14.6
\$2.56	\$2.14	\$1.84
\$1.66	\$1.39	\$1.19
\$0.90	\$0.75	\$0.64
\$7,478	\$7,493	\$7,507
\$373,911	\$374,633	\$375,354
\$353,800		

Toilet Type:

Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 33  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	6.17	7.41	8.64
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	2.79	3.10	3.41
Total Capacity Required per Day:	13.97	15.51	17.05
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$16.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$63	\$70	\$77
Maximum Continuous Hours of Service:	19.3	20.9	22.2
Total Operating Cost per Service Hour:	\$2.40	\$2.00	\$1.72
- Trip Related:	\$1.65	\$1.38	\$1.18
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,138	\$6,145	\$6,152
Total Fleet Operating Cost per Year:	\$79,790	\$79,880	\$79,970
Total Fleet Capital Cost:	\$91,988		

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
2	12	7
5	1	2
6.17	7.41	8.64
5.00	5.00	5.00
2.79	3.10	3.41
13.97	15.51	17.05
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
219	219	219
219	219	219
\$54	\$60	\$66
19.3	20.9	22.2
\$2.21	\$1.84	\$1.58
\$1.65	\$1.38	\$1.18
\$0.56	\$0.46	\$0.40
\$4,830	\$4,836	\$4,841
\$62,785	\$62,862	\$62,939
\$91,988		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
2	12	7
5	1	2
6.17	7.41	8.64
5.00	5.00	5.00
2.79	3.10	3.41
13.97	15.51	17.05
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
292	292	292
292	292	292
\$72	\$80	\$88
19.3	20.9	22.2
\$2.55	\$2.13	\$1.83
\$1.65	\$1.38	\$1.18
\$0.90	\$0.75	\$0.64
\$7,446	\$7,454	\$7,462
\$96,795	\$96,898	\$97,001
\$91,988		



Car Type: **Amdinette**  
 Toilet Type: **Self-Cont'd Recirc**

Manufacturer:

Number of Passengers: **23**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **27.0**

Scenario: **Expected**

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	2.33	2.54	2.76
Total Capacity Required per Day:	11.63	12.70	13.78
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$16.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$52	\$57	\$62
Maximum Continuous Hours of Service:	23.2	25.5	27.4
Total Operating Cost per Service Hour:	\$2.40	\$2.00	\$1.72
- Trip Related:	\$1.65	\$1.37	\$1.18
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,127	\$6,132	\$6,137
Total Fleet Operating Cost per Year:	\$153,179	\$153,300	\$153,421
Total Fleet Capital Cost:	\$176,900		

Monogram

Favorable

Unfavorable

\$7,076 \$6,500 \$576			\$7,076 \$6,500 \$576		
\$1,217 \$1,152 \$65			\$2,629 \$2,304 \$325		
2 5	12 1	7 2	2 5	12 1	7 2
4.30	5.16	6.02	4.30	5.16	6.02
5.00	5.00	5.00	5.00	5.00	5.00
2.33	2.54	2.76	2.33	2.54	2.76
11.63	12.70	13.78	11.63	12.70	13.78
\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2	\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0	\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3	\$16.3	\$16.3	\$16.3
219	219	219	292	292	292
219	219	219	292	292	292
\$45	\$49	\$53	\$60	\$65	\$71
23.2	25.5	27.4	23.2	25.5	27.4
\$2.20	\$1.84	\$1.57	\$2.55	\$2.12	\$1.82
\$1.65	\$1.37	\$1.18	\$1.65	\$1.37	\$1.18
\$0.56	\$0.46	\$0.40	\$0.90	\$0.75	\$0.64
\$4,821	\$4,825	\$4,829	\$7,434	\$7,439	\$7,445
\$120,514	\$120,618	\$120,722	\$185,844	\$185,982	\$186,120
\$176,900			\$176,900		

Car Type: Amcoach

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 60

Number of Toilets: 2

Total Tank Capacity (gals): 27.0

Scenario:

Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	4.06	4.62	5.18
Total Capacity Required per Day:	20.28	23.09	25.89
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$16.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$91	\$104	\$116
Maximum Continuous Hours of Service:	13.3	14.0	14.6
Total Operating Cost per Service Hour:	\$2.41	\$2.02	\$1.73
- Trip Related:	\$1.66	\$1.39	\$1.19
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,166	\$6,179	\$6,191
Total Fleet Operating Cost per Year:	\$191,148	\$191,540	\$191,931
Total Fleet Capital Cost:	\$219,356		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
2	12	7
5	1	2
11.23	13.47	15.72
5.00	5.00	5.00
4.06	4.62	5.18
20.28	23.09	25.89
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
219	219	219
219	219	219
\$78	\$89	\$100
13.3	14.0	14.6
\$2.22	\$1.85	\$1.59
\$1.66	\$1.39	\$1.19
\$0.56	\$0.46	\$0.40
\$4,854	\$4,865	\$4,876
\$150,472	\$150,807	\$151,142
\$219,356		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
2	12	7
5	1	2
11.23	13.47	15.72
5.00	5.00	5.00
4.06	4.62	5.18
20.28	23.09	25.89
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$16.3
292	292	292
292	292	292
\$104	\$119	\$133
13.3	14.0	14.6
\$2.56	\$2.14	\$1.84
\$1.66	\$1.39	\$1.19
\$0.90	\$0.75	\$0.64
\$7,478	\$7,493	\$7,507
\$231,825	\$232,272	\$232,719
\$219,356		

Car Type: Turbo Power Club

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 27

Number of Toilets: 1

Total Tank Capacity (gals): 13.5

Scenario: Expected

Capital Cost	\$3,538		
- Equipment:	\$3,250		
- Installation:	\$288		
Maintenance Cost:	\$962		
- Labor:	\$864		
- Spare Parts:	\$98		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	5.05	6.06	7.07
Flush Fluid Generated:	2.50	2.50	2.50
Capacity Adjustment:	1.89	2.14	2.39
Total Capacity Required per Day:	9.44	10.70	11.96
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.0
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.1	\$8.1	\$8.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$42	\$48	\$54
Maximum Continuous Hours of Service:	14.3	15.1	15.8
Total Operating Cost per Service Hour:	\$1.21	\$1.01	\$0.86
- Trip Related:	\$0.83	\$0.69	\$0.60
- Non-Trip Related:	\$0.38	\$0.31	\$0.27
Total per-Car Operating Cost per Year:	\$3,080	\$3,086	\$3,091
Total Fleet Operating Cost per Year:	\$18,479	\$18,513	\$18,547
Total Fleet Capital Cost:	\$21,228		

# Monogram

## Favorable

\$3,538		
\$3,250		
\$288		
\$609		
\$576		
\$33		
2	12	7
5	1	2
5.05	6.06	7.07
2.50	2.50	2.50
1.89	2.14	2.39
9.44	10.70	11.96
\$0.0	\$0.0	\$0.0
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.1	\$8.1	\$8.1
219	219	219
219	219	219
\$36	\$41	\$46
14.3	15.1	15.8
\$1.11	\$0.92	\$0.79
\$0.83	\$0.69	\$0.60
\$0.28	\$0.23	\$0.20
\$2,424	\$2,429	\$2,434
\$14,546	\$14,575	\$14,604
\$21,228		

## Unfavorable

\$3,538		
\$3,250		
\$288		
\$1,315		
\$1,152		
\$163		
2	12	7
5	1	2
5.05	6.06	7.07
2.50	2.50	2.50
1.89	2.14	2.39
9.44	10.70	11.96
\$0.0	\$0.0	\$0.0
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.1	\$8.1	\$8.1
292	292	292
292	292	292
\$49	\$55	\$61
14.3	15.1	15.8
\$1.28	\$1.07	\$0.92
\$0.83	\$0.69	\$0.60
\$0.45	\$0.38	\$0.32
\$3,736	\$3,742	\$3,748
\$22,413	\$22,452	\$22,491
\$21,228		

Car Type: Turbo Coach  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 72  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 27.0

Scenario: Expected

Capital Cost	\$7,076		
- Equipment:	\$6,500		
- Installation:	\$576		
Maintenance Cost:	\$1,923		
- Labor:	\$1,728		
- Spare Parts:	\$195		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	13.47	16.16	18.86
Flush Fluid Generated:	5.00	5.00	5.00
Capacity Adjustment:	4.62	5.29	5.96
Total Capacity Required per Day:	23.09	26.46	29.82
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.3	\$16.3	\$20.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$104	\$119	\$134
Maximum Continuous Hours of Service:	11.7	12.2	12.7
Total Operating Cost per Service Hour:	\$2.42	\$2.02	\$2.04
- Trip Related:	\$1.67	\$1.39	\$1.50
- Non-Trip Related:	\$0.75	\$0.63	\$0.54
Total per-Car Operating Cost per Year:	\$6,179	\$6,194	\$7,282
Total Fleet Operating Cost per Year:	\$129,753	\$130,071	\$152,924
Total Fleet Capital Cost:	\$148,596		

**Arthur D Little**

# Monogram

## Favorable

\$7,076		
\$6,500		
\$576		
\$1,217		
\$1,152		
\$65		
2	12	7
5	1	2
13.47	16.16	18.86
5.00	5.00	5.00
4.62	5.29	5.96
23.09	26.46	29.82
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
219	219	219
219	219	219
\$89	\$102	\$115
11.7	12.2	12.7
\$2.22	\$1.86	\$1.90
\$1.67	\$1.39	\$1.50
\$0.56	\$0.46	\$0.40
\$4,865	\$4,878	\$5,810
\$102,160	\$102,432	\$122,020
\$148,596		

## Unfavorable

\$7,076		
\$6,500		
\$576		
\$2,629		
\$2,304		
\$325		
2	12	7
5	1	2
13.47	16.16	18.86
5.00	5.00	5.00
4.62	5.29	5.96
23.09	26.46	29.82
\$0.1	\$0.1	\$0.1
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.3	\$16.3	\$20.5
292	292	292
292	292	292
\$119	\$136	\$153
11.7	12.2	12.7
\$2.57	\$2.14	\$2.14
\$1.67	\$1.39	\$1.50
\$0.90	\$0.75	\$0.64
\$7,493	\$7,510	\$8,754
\$157,346	\$157,709	\$183,827
\$148,596		



Car Type: Turbo Cafe  
 Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 52  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 13.5

Scenario: Expected

Capital Cost	\$3,538		
- Equipment:	\$3,250		
- Installation:	\$288		
Maintenance Cost:	\$962		
- Labor:	\$864		
- Spare Parts:	\$98		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	9.73	11.67	13.62
Flush Fluid Generated:	2.50	2.50	2.50
Capacity Adjustment:	3.06	3.54	4.03
Total Capacity Required per Day:	15.29	17.72	20.15
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.0
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$10.2	\$10.2	\$10.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$69	\$80	\$91
Maximum Continuous Hours of Service:	8.8	9.1	9.4
Total Operating Cost per Service Hour:	\$1.43	\$1.19	\$1.02
- Trip Related:	\$1.05	\$0.88	\$0.76
- Non-Trip Related:	\$0.38	\$0.31	\$0.27
Total per-Car Operating Cost per Year:	\$3,643	\$3,654	\$3,665
Total Fleet Operating Cost per Year:	\$10,928	\$10,961	\$10,994
Total Fleet Capital Cost:	\$10,614		

Monogram

Favorable

\$3,538		
\$3,250		
\$288		
\$609		
\$576		
\$33		
2	12	7
5	1	2
9.73	11.67	13.62
2.50	2.50	2.50
3.06	3.54	4.03
15.29	17.72	20.15
\$0.0	\$0.0	\$0.0
\$4.2	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$10.2	\$10.2	\$10.2
219	219	219
219	219	219
\$59	\$68	\$78
8.8	9.1	9.4
\$1.33	\$1.11	\$0.95
\$1.05	\$0.88	\$0.76
\$0.28	\$0.23	\$0.20
\$2,907	\$2,916	\$2,925
\$8,720	\$8,748	\$8,776
\$10,614		

Unfavorable

\$3,538		
\$3,250		
\$288		
\$1,315		
\$1,152		
\$163		
2	12	7
5	1	2
9.73	11.67	13.62
2.50	2.50	2.50
3.06	3.54	4.03
15.29	17.72	20.15
\$0.0	\$0.0	\$0.0
\$4.2	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$10.2	\$10.2	\$10.2
292	292	292
292	292	292
\$79	\$91	\$104
8.8	9.1	9.4
\$1.50	\$1.25	\$1.08
\$1.05	\$0.88	\$0.76
\$0.45	\$0.38	\$0.32
\$4,379	\$4,391	\$4,404
\$13,136	\$13,174	\$13,211
\$10,614		

Car Type: Turbo Power Coach

Toilet Type: Self-Cont'd Recirc

Manufacturer:

Number of Passengers: 40

Number of Toilets: 1

Total Tank Capacity (gals): 13.5

Scenario:

Expected

Capital Cost	\$3,538		
- Equipment:	\$3,250		
- Installation:	\$288		
Maintenance Cost:	\$962		
- Labor:	\$864		
- Spare Parts:	\$98		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	7.48	8.98	10.48
Flush Fluid Generated:	2.50	2.50	2.50
Capacity Adjustment:	2.50	2.87	3.24
Total Capacity Required per Day:	12.48	14.35	16.22
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.0
Connect/Disconnect Labor Cost:	\$2.1	\$4.2	\$4.2
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.1	\$10.2	\$10.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$56	\$65	\$73
Maximum Continuous Hours of Service:	10.8	11.3	11.7
Total Operating Cost per Service Hour:	\$1.21	\$1.19	\$1.02
- Trip Related:	\$0.83	\$0.87	\$0.75
- Non-Trip Related:	\$0.38	\$0.31	\$0.27
Total per-Car Operating Cost per Year:	\$3,094	\$3,639	\$3,647
Total Fleet Operating Cost per Year:	\$43,310	\$50,939	\$51,057
Total Fleet Capital Cost:	\$49,532		

**Arthur D Little**

# Monogram

## Favorable

\$3,538		
\$3,250		
\$288		
\$609		
\$576		
\$33		
2	12	7
5	1	2
7.48	8.98	10.48
2.50	2.50	2.50
2.50	2.87	3.24
12.48	14.35	16.22
\$0.0	\$0.0	\$0.0
\$2.1	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$8.1	\$10.2	\$10.2
219	219	219
219	219	219
\$48	\$55	\$63
10.8	11.3	11.7
\$1.11	\$1.10	\$0.95
\$0.83	\$0.87	\$0.75
\$0.28	\$0.23	\$0.20
\$2,436	\$2,903	\$2,910
\$34,104	\$40,643	\$40,744
\$49,532		

## Unfavorable

\$3,538		
\$3,250		
\$288		
\$1,315		
\$1,152		
\$163		
2	12	7
5	1	2
7.48	8.98	10.48
2.50	2.50	2.50
2.50	2.87	3.24
12.48	14.35	16.22
\$0.0	\$0.0	\$0.0
\$2.1	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$8.1	\$10.2	\$10.2
292	292	292
292	292	292
\$64	\$74	\$83
10.8	11.3	11.7
\$1.28	\$1.25	\$1.07
\$0.83	\$0.87	\$0.75
\$0.45	\$0.38	\$0.32
\$3,751	\$4,374	\$4,384
\$52,516	\$61,235	\$61,370
\$49,532		



Car Type: Coach-HEP-HLV

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 72

Number of Toilets: 4

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$31,728		
- Equipment:	\$30,000		
- Installation:	\$1,728		
Maintenance Cost:	\$1,764		
- Labor:	\$864		
- Spare Parts:	\$900		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	32.33	64.66	96.98
Flush Fluid Generated:	95.36	190.71	286.07
Capacity Adjustment:	31.92	63.84	95.76
Total Capacity Required per Day:	159.61	319.21	478.82
Pumpout Labor Cost:	\$1.0	\$1.9	\$2.9
Connect/Disconnect Labor Cost:	\$2.1	\$4.2	\$4.2
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$27.1	\$30.1	\$31.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$277	\$370	\$416
Maximum Continuous Hours of Service:	45.1	45.1	45.1
Total Operating Cost per Service Hour:	\$1.79	\$1.15	\$0.91
- Trip Related:	\$1.22	\$0.72	\$0.52
- Non-Trip Related:	\$0.58	\$0.43	\$0.38
Total per-Car Operating Cost per Year:	\$5,497	\$4,698	\$4,164
Total Fleet Operating Cost per Year:	\$115,445	\$98,655	\$87,443
Total Fleet Capital Cost:	\$666,288		

**Arthur D Little**

## Favorable

\$31,728		
\$30,000		
\$1,728		
\$876		
\$576		
\$300		
24	48	72
1	1	1
32.33	64.66	96.98
74.30	148.61	222.91
26.66	53.32	79.97
133.29	266.58	399.87
\$0.7	\$1.5	\$2.2
\$2.1	\$2.1	\$4.2
\$24.0	\$24.0	\$24.0
\$26.8	\$27.6	\$30.4
219	219	219
110	73	55
\$198	\$265	\$298
54.0	54.0	54.0
\$1.53	\$0.90	\$0.72
\$1.19	\$0.65	\$0.50
\$0.33	\$0.25	\$0.22
\$4,014	\$3,154	\$2,840
\$84,290	\$66,243	\$59,634
\$666,288		

## Unfavorable

\$31,728		
\$30,000		
\$1,728		
\$2,652		
\$1,152		
\$1,500		
24	48	72
1	1	1
32.33	64.66	96.98
123.84	247.68	371.52
39.04	78.08	117.13
195.21	390.42	585.63
\$1.2	\$2.5	\$3.7
\$2.1	\$4.2	\$4.2
\$24.0	\$24.0	\$24.0
\$27.3	\$30.7	\$31.9
292	292	292
146	97	73
\$388	\$517	\$581
36.9	36.9	36.9
\$2.01	\$1.32	\$1.06
\$1.25	\$0.75	\$0.55
\$0.76	\$0.57	\$0.50
\$7,031	\$6,155	\$5,563
\$147,651	\$129,248	\$116,828
\$666,288		

Car Type: Lounge-HEP-HLV  
 Toilet Type: Gravity

Manufacturer:

Number of Passengers: 86  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	38.61	77.23	115.84
Flush Fluid Generated:	113.90	227.80	341.70
Capacity Adjustment:	38.13	76.26	114.38
Total Capacity Required per Day:	190.64	381.28	571.92
Pumpout Labor Cost:	\$1.1	\$2.3	\$3.4
Connect/Disconnect Labor Cost:	\$2.1	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$15.2	\$18.5	\$19.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$331	\$442	\$497
Maximum Continuous Hours of Service:	37.8	37.8	37.8
Total Operating Cost per Service Hour:	\$1.08	\$0.75	\$0.60
- Trip Related:	\$0.74	\$0.49	\$0.38
- Non-Trip Related:	\$0.34	\$0.25	\$0.22
Total per-Car Operating Cost per Year:	\$3,310	\$3,047	\$2,782
Total Fleet Operating Cost per Year:	\$19,860	\$18,284	\$16,691
Total Fleet Capital Cost:	\$126,912		



Microphor

Favorable

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
24	48	72
1	1	1
38.61	77.23	115.84
88.75	177.50	266.26
31.84	63.68	95.52
159.21	318.42	477.62
\$0.9	\$1.8	\$2.7
\$2.1	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$15.0	\$18.0	\$18.9
219	219	219
110	73	55
\$237	\$316	\$356
45.2	45.2	45.2
\$0.90	\$0.60	\$0.48
\$0.71	\$0.46	\$0.35
\$0.19	\$0.14	\$0.12
\$2,366	\$2,116	\$1,876
\$14,197	\$12,698	\$11,258
\$126,912		

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
24	48	72
1	1	1
38.61	77.23	115.84
147.92	295.84	443.76
46.63	93.27	139.90
233.17	466.34	699.50
\$1.5	\$3.0	\$4.4
\$2.1	\$4.2	\$6.3
\$12.0	\$12.0	\$12.0
\$15.6	\$19.2	\$22.7
292	292	292
146	97	73
\$463	\$617	\$694
30.9	30.9	30.9
\$1.23	\$0.87	\$0.75
\$0.78	\$0.53	\$0.45
\$0.45	\$0.34	\$0.30
\$4,314	\$4,058	\$3,930
\$25,881	\$24,348	\$23,582
\$126,912		

Car Type: Trans Dorm Coach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 40

Number of Toilets: 4

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$31,728		
- Equipment:	\$30,000		
- Installation:	\$1,728		
Maintenance Cost:	\$1,764		
- Labor:	\$864		
- Spare Parts:	\$900		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	52.98	105.95	158.93
Capacity Adjustment:	17.73	35.47	53.20
Total Capacity Required per Day:	88.67	177.34	266.01
Pumpout Labor Cost:	\$0.5	\$1.1	\$1.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$26.6	\$27.2	\$27.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$154	\$205	\$231
Maximum Continuous Hours of Service:	81.2	81.2	81.2
Total Operating Cost per Service Hour:	\$1.74	\$1.05	\$0.82
- Trip Related:	\$1.16	\$0.62	\$0.43
- Non-Trip Related:	\$0.58	\$0.43	\$0.38
Total per-Car Operating Cost per Year:	\$5,320	\$4,282	\$3,764
Total Fleet Operating Cost per Year:	\$191,520	\$154,170	\$135,494
Total Fleet Capital Cost:	\$1,142,208		

**Arthur D Little**

## Favorable

\$31,728		
\$30,000		
\$1,728		
\$876		
\$576		
\$300		
24	48	72
1	1	1
17.96	35.92	53.88
41.28	82.56	123.84
14.81	29.62	44.43
74.05	148.10	222.15
\$0.4	\$0.8	\$1.2
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.5	\$26.9	\$27.3
219	219	219
110	73	55
\$110	\$147	\$165
97.2	97.2	97.2
\$1.48	\$0.85	\$0.64
\$1.15	\$0.60	\$0.42
\$0.33	\$0.25	\$0.22
\$3,889	\$2,989	\$2,538
\$140,019	\$107,590	\$91,375
\$1,142,208		

## Unfavorable

\$31,728		
\$30,000		
\$1,728		
\$2,652		
\$1,152		
\$1,500		
24	48	72
1	1	1
17.96	35.92	53.88
68.80	137.60	206.40
21.69	43.38	65.07
108.45	216.90	325.35
\$0.7	\$1.4	\$2.1
\$2.1	\$2.1	\$4.2
\$24.0	\$24.0	\$24.0
\$26.8	\$27.5	\$30.3
292	292	292
146	97	73
\$215	\$287	\$323
66.4	66.4	66.4
\$1.93	\$1.20	\$0.99
\$1.18	\$0.63	\$0.48
\$0.76	\$0.57	\$0.50
\$6,778	\$5,613	\$5,184
\$244,022	\$202,084	\$186,634
\$1,142,208		

Car Type: **Sleeper Super**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **44**  
 Number of Toilets: **12**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$74,032		
- Equipment:	\$70,000		
- Installation:	\$4,032		
Maintenance Cost:	\$4,692		
- Labor:	\$2,592		
- Spare Parts:	\$2,100		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	19.76	39.51	59.27
Flush Fluid Generated:	58.27	116.55	174.82
Capacity Adjustment:	19.51	39.01	58.52
Total Capacity Required per Day:	97.54	195.07	292.61
Pumpout Labor Cost:	\$0.6	\$1.2	\$1.7
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$72.0	\$72.0	\$72.0
Total Pumpout/Cleaning Cost per Day:	\$74.7	\$75.3	\$75.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$169	\$226	\$254
Maximum Continuous Hours of Service:	73.8	73.8	73.8
Total Operating Cost per Service Hour:	\$4.70	\$2.77	\$2.13
- Trip Related:	\$3.17	\$1.62	\$1.11
- Non-Trip Related:	\$1.53	\$1.15	\$1.02
Total per-Car Operating Cost per Year:	\$14,402	\$11,328	\$9,791
Total Fleet Operating Cost per Year:	\$979,348	\$770,308	\$665,788
Total Fleet Capital Cost:	\$5,034,176		

# Microphor

## Favorable

\$74,032		
\$70,000		
\$4,032		
\$2,428		
\$1,728		
\$700		
24	48	72
1	1	1
19.76	39.51	59.27
45.41	90.82	136.22
16.29	32.58	48.87
81.46	162.91	244.36
\$0.5	\$0.9	\$1.4
\$2.1	\$2.1	\$2.1
\$72.0	\$72.0	\$72.0
\$74.6	\$75.0	\$75.5
219	219	219
110	73	55
\$121	\$162	\$182
88.4	88.4	88.4
\$4.08	\$2.30	\$1.71
\$3.15	\$1.61	\$1.09
\$0.92	\$0.69	\$0.62
\$10,713	\$8,065	\$6,742
\$728,482	\$548,443	\$458,423
\$5,034,176		

## Unfavorable

\$74,032		
\$70,000		
\$4,032		
\$6,956		
\$3,456		
\$3,500		
24	48	72
1	1	1
19.76	39.51	59.27
75.68	151.36	227.04
23.86	47.72	71.58
119.29	238.59	357.89
\$0.8	\$1.5	\$2.3
\$2.1	\$2.1	\$4.2
\$72.0	\$72.0	\$72.0
\$74.9	\$75.6	\$78.5
292	292	292
146	97	73
\$237	\$316	\$355
60.4	60.4	60.4
\$5.17	\$3.13	\$2.48
\$3.19	\$1.64	\$1.16
\$1.99	\$1.49	\$1.32
\$18,122	\$14,632	\$13,040
\$1,232,294	\$994,946	\$886,696
\$5,034,176		

Car Type: **Bag Coach Super**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **78**  
 Number of Toilets: **5**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$37,016		
- Equipment:	\$35,000		
- Installation:	\$2,016		
Maintenance Cost:	\$2,130		
- Labor:	\$1,080		
- Spare Parts:	\$1,050		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	35.02	70.04	105.07
Flush Fluid Generated:	103.30	206.61	309.91
Capacity Adjustment:	34.58	69.16	103.74
Total Capacity Required per Day:	172.91	345.81	518.72
Pumpout Labor Cost:	\$1.0	\$2.1	\$3.1
Connect/Disconnect Labor Cost:	\$2.1	\$4.2	\$4.2
Cleaning Labor Cost:	\$30.0	\$30.0	\$30.0
Total Pumpout/Cleaning Cost per Day:	\$33.1	\$36.3	\$37.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$300	\$401	\$451
Maximum Continuous Hours of Service:	41.6	41.6	41.6
Total Operating Cost per Service Hour:	\$2.17	\$1.37	\$1.08
- Trip Related:	\$1.48	\$0.85	\$0.62
- Non-Trip Related:	\$0.69	\$0.52	\$0.46
Total per-Car Operating Cost per Year:	\$6,663	\$5,619	\$4,963
Total Fleet Operating Cost per Year:	\$319,831	\$269,722	\$238,228
Total Fleet Capital Cost:	\$1,776,768		

**Arthur D Little**

# Microphor

## Favorable

\$37,016		
\$35,000		
\$2,016		
\$1,070		
\$720		
\$350		
24	48	72
1	1	1
35.02	70.04	105.07
80.50	160.99	241.49
28.88	57.76	86.64
144.40	288.80	433.19
\$0.8	\$1.6	\$2.4
\$2.1	\$2.1	\$4.2
\$30.0	\$30.0	\$30.0
\$32.9	\$33.7	\$36.6
219	219	219
110	73	55
\$215	\$287	\$323
49.9	49.9	49.9
\$1.86	\$1.09	\$0.86
\$1.45	\$0.78	\$0.59
\$0.41	\$0.31	\$0.27
\$4,888	\$3,818	\$3,397
\$234,630	\$183,242	\$163,067
\$1,776,768		

## Unfavorable

\$37,016		
\$35,000		
\$2,016		
\$3,190		
\$1,440		
\$1,750		
24	48	72
1	1	1
35.02	70.04	105.07
134.16	268.32	402.48
42.30	84.59	126.89
211.48	422.96	634.43
\$1.3	\$2.7	\$4.0
\$2.1	\$4.2	\$6.3
\$30.0	\$30.0	\$30.0
\$33.4	\$36.9	\$40.3
292	292	292
146	97	73
\$420	\$560	\$630
34.0	34.0	34.0
\$2.42	\$1.57	\$1.29
\$1.51	\$0.89	\$0.68
\$0.91	\$0.68	\$0.61
\$8,492	\$7,340	\$6,764
\$407,634	\$352,313	\$324,652
\$1,776,768		

Car Type: Coach Super  
Toilet Type: Gravity

Manufacturer:

Number of Passengers: 75  
Number of Toilets: 6  
Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$42,304		
- Equipment:	\$40,000		
- Installation:	\$2,304		
Maintenance Cost:	\$2,496		
- Labor:	\$1,296		
- Spare Parts:	\$1,200		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	33.68	67.35	101.03
Flush Fluid Generated:	99.33	198.66	297.99
Capacity Adjustment:	33.25	66.50	99.75
Total Capacity Required per Day:	166.26	332.51	498.77
Pumpout Labor Cost:	\$1.0	\$2.0	\$3.0
Connect/Disconnect Labor Cost:	\$2.1	\$4.2	\$4.2
Cleaning Labor Cost:	\$36.0	\$36.0	\$36.0
Total Pumpout/Cleaning Cost per Day:	\$39.1	\$42.2	\$43.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$289	\$385	\$433
Maximum Continuous Hours of Service:	43.3	43.3	43.3
Total Operating Cost per Service Hour:	\$2.54	\$1.58	\$1.24
- Trip Related:	\$1.72	\$0.97	\$0.69
- Non-Trip Related:	\$0.81	\$0.61	\$0.54
Total per-Car Operating Cost per Year:	\$7,779	\$6,474	\$5,687
Total Fleet Operating Cost per Year:	\$707,891	\$589,137	\$517,553
Total Fleet Capital Cost:	\$3,849,664		



Microphor

Favorable

Unfavorable

\$42,304		
\$40,000		
\$2,304		
\$1,264		
\$864		
\$400		
24	48	72
1	1	1
33.68	67.35	101.03
77.40	154.80	232.20
27.77	55.54	83.31
138.84	277.69	416.53
\$0.8	\$1.5	\$2.3
\$2.1	\$2.1	\$4.2
\$36.0	\$36.0	\$36.0
\$38.9	\$39.6	\$42.5
219	219	219
110	73	55
\$207	\$276	\$310
51.9	51.9	51.9
\$2.18	\$1.27	\$0.99
\$1.70	\$0.90	\$0.67
\$0.48	\$0.36	\$0.32
\$5,727	\$4,434	\$3,902
\$521,200	\$403,493	\$355,103
\$3,849,664		

\$42,304		
\$40,000		
\$2,304		
\$3,728		
\$1,728		
\$2,000		
24	48	72
1	1	1
33.68	67.35	101.03
129.00	258.00	387.00
40.67	81.34	122.01
203.34	406.69	610.03
\$1.3	\$2.6	\$3.9
\$2.1	\$4.2	\$6.3
\$36.0	\$36.0	\$36.0
\$39.4	\$42.8	\$46.2
292	292	292
146	97	73
\$404	\$538	\$606
35.4	35.4	35.4
\$2.82	\$1.80	\$1.47
\$1.76	\$1.01	\$0.76
\$1.06	\$0.80	\$0.71
\$9,883	\$8,430	\$7,704
\$899,326	\$767,154	\$701,068
\$3,849,664		

Car Type: Horizon  
Toilet Type: Gravity

Manufacturer:

Number of Passengers: 82  
Number of Toilets: 2  
Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	18.41	36.82	73.64
Flush Fluid Generated:	54.30	108.60	217.20
Capacity Adjustment:	18.18	36.35	72.71
Total Capacity Required per Day:	90.89	181.77	363.55
Pumpout Labor Cost:	\$0.5	\$1.1	\$2.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.6	\$15.2	\$18.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$316	\$316	\$421
Maximum Continuous Hours of Service:	39.6	39.6	39.6
Total Operating Cost per Service Hour:	\$1.66	\$1.07	\$0.74
- Trip Related:	\$1.32	\$0.74	\$0.49
- Non-Trip Related:	\$0.34	\$0.34	\$0.25
Total per-Car Operating Cost per Year:	\$5,089	\$3,288	\$3,018
Total Fleet Operating Cost per Year:	\$524,177	\$338,646	\$310,830
Total Fleet Capital Cost:	\$2,178,656		

**Arthur D Little**

# Microphor

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
12	24	48
1	1	1
18.41	36.82	73.64
42.31	84.62	169.25
15.18	30.36	60.72
75.90	151.80	303.60
\$0.4	\$0.8	\$1.7
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.5	\$14.9	\$17.9
219	219	219
219	110	73
\$226	\$226	\$301
47.4	47.4	47.4
\$1.48	\$0.89	\$0.60
\$1.30	\$0.71	\$0.46
\$0.19	\$0.19	\$0.14
\$3,895	\$2,351	\$2,096
\$401,147	\$242,120	\$215,844
\$2,178,656		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
12	24	48
1	1	1
18.41	36.82	73.64
70.52	141.04	282.08
22.23	44.46	88.93
111.16	222.32	444.65
\$0.7	\$1.4	\$2.8
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.8	\$15.5	\$19.0
292	292	292
292	146	97
\$441	\$441	\$589
32.4	32.4	32.4
\$1.81	\$1.22	\$0.86
\$1.36	\$0.77	\$0.52
\$0.45	\$0.45	\$0.34
\$6,341	\$4,282	\$4,016
\$653,078	\$441,042	\$413,643
\$2,178,656		

Car Type: Coach  
Toilet Type: Gravity

Manufacturer:

Number of Passengers: 48  
Number of Toilets: 2  
Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.78	21.55	43.10
Flush Fluid Generated:	31.79	63.57	127.14
Capacity Adjustment:	10.64	21.28	42.56
Total Capacity Required per Day:	53.20	106.40	212.81
Pumpout Labor Cost:	\$0.3	\$0.6	\$1.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.7	\$15.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$185	\$185	\$246
Maximum Continuous Hours of Service:	67.7	67.7	67.7
Total Operating Cost per Service Hour:	\$1.60	\$1.01	\$0.63
- Trip Related:	\$1.26	\$0.67	\$0.38
- Non-Trip Related:	\$0.34	\$0.34	\$0.25
Total per-Car Operating Cost per Year:	\$4,901	\$3,099	\$2,588
Total Fleet Operating Cost per Year:	\$382,249	\$241,750	\$201,834
Total Fleet Capital Cost:	\$1,649,856		

Microphor

Favorable

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
12	24	48
1	1	1
10.78	21.55	43.10
24.77	49.54	99.07
8.89	17.77	35.54
44.43	88.86	177.72
\$0.2	\$0.5	\$1.0
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.6	\$15.1
219	219	219
219	110	73
\$132	\$132	\$176
81.0	81.0	81.0
\$1.43	\$0.84	\$0.50
\$1.25	\$0.66	\$0.36
\$0.19	\$0.19	\$0.14
\$3,762	\$2,219	\$1,766
\$293,473	\$173,045	\$137,753
\$1,649,856		

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
12	24	48
1	1	1
10.78	21.55	43.10
41.28	82.56	165.12
13.01	26.03	52.06
65.07	130.14	260.28
\$0.4	\$0.8	\$1.7
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.9	\$15.8
292	292	292
292	146	97
\$258	\$258	\$345
55.3	55.3	55.3
\$1.73	\$1.15	\$0.74
\$1.28	\$0.70	\$0.40
\$0.45	\$0.45	\$0.34
\$6,072	\$4,014	\$3,454
\$473,627	\$313,056	\$269,385
\$1,649,856		

Car Type: Coach (HDCP)

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 44

Number of Toilets: 3

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$26,440		
- Equipment:	\$25,000		
- Installation:	\$1,440		
Maintenance Cost:	\$1,398		
- Labor:	\$648		
- Spare Parts:	\$750		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	9.88	19.76	39.51
Flush Fluid Generated:	29.14	58.27	116.55
Capacity Adjustment:	9.75	19.51	39.01
Total Capacity Required per Day:	48.77	97.54	195.07
Pumpout Labor Cost:	\$0.3	\$0.6	\$1.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$18.0	\$18.0	\$18.0
Total Pumpout/Cleaning Cost per Day:	\$20.4	\$20.7	\$21.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$169	\$169	\$226
Maximum Continuous Hours of Service:	73.8	73.8	73.8
Total Operating Cost per Service Hour:	\$2.21	\$1.37	\$0.84
- Trip Related:	\$1.75	\$0.92	\$0.50
- Non-Trip Related:	\$0.46	\$0.46	\$0.34
Total per-Car Operating Cost per Year:	\$6,777	\$4,210	\$3,435
Total Fleet Operating Cost per Year:	\$142,327	\$88,403	\$72,136
Total Fleet Capital Cost:	\$555,240		

**Arthur D Little**

## Microphor

## Favorable

\$26,440		
\$25,000		
\$1,440		
\$682		
\$432		
\$250		
12	24	48
1	1	1
9.88	19.76	39.51
22.70	45.41	90.82
8.15	16.29	32.58
40.73	81.46	162.91
\$0.2	\$0.5	\$0.9
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.3	\$20.6	\$21.0
219	219	219
219	110	73
\$121	\$121	\$162
88.4	88.4	88.4
\$2.00	\$1.16	\$0.68
\$1.74	\$0.90	\$0.48
\$0.26	\$0.26	\$0.19
\$5,255	\$3,054	\$2,377
\$110,353	\$64,133	\$49,924
\$555,240		

## Unfavorable

\$26,440		
\$25,000		
\$1,440		
\$2,114		
\$864		
\$1,250		
12	24	48
1	1	1
9.88	19.76	39.51
37.84	75.68	151.36
11.93	23.86	47.72
59.65	119.29	238.59
\$0.4	\$0.8	\$1.5
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.5	\$20.9	\$21.6
292	292	292
292	146	97
\$237	\$237	\$316
60.4	60.4	60.4
\$2.38	\$1.54	\$0.97
\$1.77	\$0.94	\$0.52
\$0.60	\$0.60	\$0.45
\$8,331	\$5,396	\$4,534
\$174,942	\$113,315	\$95,205
\$555,240		

Car Type: Dome Coach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 46

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.33	20.65	41.31
Flush Fluid Generated:	30.46	60.92	121.84
Capacity Adjustment:	10.20	20.39	40.79
Total Capacity Required per Day:	50.99	101.97	203.94
Pumpout Labor Cost:	\$0.3	\$0.6	\$1.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.7	\$15.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$177	\$177	\$236
Maximum Continuous Hours of Service:	70.6	70.6	70.6
Total Operating Cost per Service Hour:	\$1.59	\$1.01	\$0.63
- Trip Related:	\$1.26	\$0.67	\$0.38
- Non-Trip Related:	\$0.34	\$0.34	\$0.25
Total per-Car Operating Cost per Year:	\$4,890	\$3,088	\$2,573
Total Fleet Operating Cost per Year:	\$58,675	\$37,059	\$30,874
Total Fleet Capital Cost:	\$253,824		



Microphor

Favorable

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
12	24	48
1	1	1
10.33	20.65	41.31
23.74	47.47	94.94
8.52	17.03	34.06
42.58	85.16	170.32
\$0.2	\$0.5	\$0.9
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.6	\$15.0
219	219	219
219	110	73
\$127	\$127	\$169
84.5	84.5	84.5
\$1.43	\$0.84	\$0.50
\$1.24	\$0.66	\$0.36
\$0.19	\$0.19	\$0.14
\$3,755	\$2,211	\$1,756
\$45,056	\$26,529	\$21,068
\$253,824		

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
12	24	48
1	1	1
10.33	20.65	41.31
39.56	79.12	158.24
12.47	24.94	49.89
62.36	124.72	249.43
\$0.4	\$0.8	\$1.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.9	\$15.7
292	292	292
292	146	97
\$248	\$248	\$330
57.7	57.7	57.7
\$1.73	\$1.14	\$0.73
\$1.28	\$0.69	\$0.40
\$0.45	\$0.45	\$0.34
\$6,056	\$3,998	\$3,433
\$72,676	\$47,973	\$41,191
\$253,824		

Car Type: Amlounge II

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 49

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	11.00	22.00	44.00
Flush Fluid Generated:	32.45	64.90	129.79
Capacity Adjustment:	10.86	21.72	43.45
Total Capacity Required per Day:	54.31	108.62	217.24
Pumpout Labor Cost:	\$0.3	\$0.6	\$1.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.7	\$15.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$189	\$189	\$252
Maximum Continuous Hours of Service:	66.3	66.3	66.3
Total Operating Cost per Service Hour:	\$1.60	\$1.01	\$0.63
- Trip Related:	\$1.26	\$0.68	\$0.38
- Non-Trip Related:	\$0.34	\$0.34	\$0.25
Total per-Car Operating Cost per Year:	\$4,906	\$3,105	\$2,595
Total Fleet Operating Cost per Year:	\$122,654	\$77,622	\$64,875
Total Fleet Capital Cost:	\$528,800		

**Arthur D Little**

# Microphor

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
12	24	48
1	1	1
11.00	22.00	44.00
25.28	50.57	101.14
9.07	18.14	36.28
45.36	90.71	181.42
\$0.3	\$0.5	\$1.0
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.6	\$15.1
219	219	219
219	110	73
\$135	\$135	\$180
79.4	79.4	79.4
\$1.43	\$0.85	\$0.51
\$1.25	\$0.66	\$0.37
\$0.19	\$0.19	\$0.14
\$3,766	\$2,222	\$1,771
\$94,159	\$55,560	\$44,281
\$528,800		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
12	24	48
1	1	1
11.00	22.00	44.00
42.14	84.28	168.56
13.29	26.57	53.14
66.43	132.85	265.70
\$0.4	\$0.8	\$1.7
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.9	\$15.8
292	292	292
292	146	97
\$264	\$264	\$352
54.2	54.2	54.2
\$1.74	\$1.15	\$0.74
\$1.29	\$0.70	\$0.40
\$0.45	\$0.45	\$0.34
\$6,080	\$4,021	\$3,464
\$152,001	\$100,536	\$86,605
\$528,800		

Car Type: **Sleeper 10-6**

Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **22**

Number of Toilets: **17**

Total Tank Capacity (gals): **300.0**

Scenario:

**Expected**

Capital Cost	\$100,472		
- Equipment:	\$95,000		
- Installation:	\$5,472		
Maintenance Cost:	\$6,522		
- Labor:	\$3,672		
- Spare Parts:	\$2,850		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	4.94	9.88	19.76
Flush Fluid Generated:	14.57	29.14	58.27
Capacity Adjustment:	4.88	9.75	19.51
Total Capacity Required per Day:	24.38	48.77	97.54
Pumpout Labor Cost:	\$0.1	\$0.3	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.2	\$104.4	\$104.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$85	\$85	\$113
Maximum Continuous Hours of Service:	147.6	147.6	147.6
Total Operating Cost per Service Hour:	\$10.84	\$6.50	\$3.80
- Trip Related:	\$8.71	\$4.38	\$2.21
- Non-Trip Related:	\$2.13	\$2.13	\$1.60
Total per-Car Operating Cost per Year:	\$33,242	\$19,943	\$15,550
Total Fleet Operating Cost per Year:	\$2,725,803	\$1,635,304	\$1,275,137
Total Fleet Capital Cost:	\$8,238,704		

Microphor

Favorable

Unfavorable

\$100,472		
\$95,000		
\$5,472		
\$3,398		
\$2,448		
\$950		
12	24	48
1	1	1
4.94	9.88	19.76
11.35	22.70	45.41
4.07	8.15	16.29
20.36	40.73	81.46
\$0.1	\$0.2	\$0.5
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.2	\$104.3	\$104.6
219	219	219
219	110	73
\$61	\$61	\$81
176.8	176.8	176.8
\$10.00	\$5.66	\$3.17
\$8.71	\$4.37	\$2.20
\$1.29	\$1.29	\$0.97
\$26,281	\$14,882	\$11,111
\$2,155,076	\$1,220,362	\$911,128
\$8,238,704		

\$100,472		
\$95,000		
\$5,472		
\$9,646		
\$4,896		
\$4,750		
12	24	48
1	1	1
4.94	9.88	19.76
18.92	37.84	75.68
5.96	11.93	23.86
29.82	59.65	119.29
\$0.2	\$0.4	\$0.8
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.3	\$104.5	\$104.9
292	292	292
292	146	97
\$118	\$118	\$158
120.7	120.7	120.7
\$11.48	\$7.14	\$4.28
\$8.72	\$4.39	\$2.22
\$2.75	\$2.75	\$2.06
\$40,217	\$25,018	\$20,010
\$3,297,784	\$2,051,499	\$1,640,818
\$8,238,704		

Car Type: Amcoach II

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 59

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	26.49	52.98	79.47
Flush Fluid Generated:	78.14	156.28	234.42
Capacity Adjustment:	26.16	52.32	78.47
Total Capacity Required per Day:	130.79	261.58	392.36
Pumpout Labor Cost:	\$0.8	\$1.6	\$2.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.9	\$15.7	\$18.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$227	\$303	\$341
Maximum Continuous Hours of Service:	55.1	55.1	55.1
Total Operating Cost per Service Hour:	\$1.03	\$0.65	\$0.56
- Trip Related:	\$0.69	\$0.40	\$0.33
- Non-Trip Related:	\$0.34	\$0.25	\$0.22
Total per-Car Operating Cost per Year:	\$3,160	\$2,669	\$2,557
Total Fleet Operating Cost per Year:	\$376,079	\$317,602	\$304,326
Total Fleet Capital Cost:	\$2,517,088		

**Arthur D Little**

## Microphor

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
24	48	72
1	1	1
26.49	52.98	79.47
60.89	121.78	182.66
21.84	43.69	65.53
109.22	218.45	327.67
\$0.6	\$1.2	\$1.8
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.7	\$15.3	\$18.0
219	219	219
110	73	55
\$163	\$217	\$244
65.9	65.9	65.9
\$0.86	\$0.52	\$0.44
\$0.67	\$0.38	\$0.31
\$0.19	\$0.14	\$0.12
\$2,261	\$1,823	\$1,719
\$269,092	\$216,945	\$204,554
\$2,517,088		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
24	48	72
1	1	1
26.49	52.98	79.47
101.48	202.96	304.44
31.99	63.99	95.98
159.96	319.93	479.89
\$1.0	\$2.0	\$3.0
\$2.1	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$15.1	\$18.2	\$19.2
292	292	292
146	97	73
\$318	\$423	\$476
45.0	45.0	45.0
\$1.17	\$0.81	\$0.66
\$0.72	\$0.47	\$0.36
\$0.45	\$0.34	\$0.30
\$4,100	\$3,774	\$3,457
\$487,946	\$449,088	\$411,416
\$2,517,088		

Car Type: **Slumbercoach 24-8**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **40**  
 Number of Toilets: **32**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$179,792		
- Equipment:	\$170,000		
- Installation:	\$9,792		
Maintenance Cost:	\$12,012		
- Labor:	\$6,912		
- Spare Parts:	\$5,100		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	52.98	105.95	158.93
Capacity Adjustment:	17.73	35.47	53.20
Total Capacity Required per Day:	88.67	177.34	266.01
Pumpout Labor Cost:	\$0.5	\$1.1	\$1.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$192.0	\$192.0	\$192.0
Total Pumpout/Cleaning Cost per Day:	\$194.6	\$195.2	\$195.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$154	\$205	\$231
Maximum Continuous Hours of Service:	81.2	81.2	81.2
Total Operating Cost per Service Hour:	\$12.08	\$7.05	\$5.38
- Trip Related:	\$8.16	\$4.12	\$2.77
- Non-Trip Related:	\$3.92	\$2.94	\$2.61
Total per-Car Operating Cost per Year:	\$37,030	\$28,838	\$24,743
Total Fleet Operating Cost per Year:	\$592,480	\$461,416	\$395,884
Total Fleet Capital Cost:	\$2,876,672		



Microphor

Favorable

Unfavorable

\$179,792		
\$170,000		
\$9,792		
\$6,308		
\$4,608		
\$1,700		
24	48	72
1	1	1
17.96	35.92	53.88
41.28	82.56	123.84
14.81	29.62	44.43
74.05	148.10	222.15
\$0.4	\$0.8	\$1.2
\$2.1	\$2.1	\$2.1
\$192.0	\$192.0	\$192.0
\$194.5	\$194.9	\$195.3
219	219	219
110	73	55
\$110	\$147	\$165
97.2	97.2	97.2
\$10.55	\$5.90	\$4.36
\$8.15	\$4.10	\$2.75
\$2.40	\$1.80	\$1.60
\$27,717	\$20,685	\$17,168
\$443,479	\$330,954	\$274,691
\$2,876,672		

\$179,792		
\$170,000		
\$9,792		
\$17,716		
\$9,216		
\$8,500		
24	48	72
1	1	1
17.96	35.92	53.88
68.80	137.60	206.40
21.69	43.38	65.07
108.45	216.90	325.35
\$0.7	\$1.4	\$2.1
\$2.1	\$2.1	\$4.2
\$192.0	\$192.0	\$192.0
\$194.8	\$195.5	\$198.3
292	292	292
146	97	73
\$215	\$287	\$323
66.4	66.4	66.4
\$13.23	\$7.93	\$6.19
\$8.18	\$4.13	\$2.82
\$5.06	\$3.79	\$3.37
\$46,370	\$37,029	\$32,512
\$741,926	\$592,471	\$520,196
\$2,876,672		

Car Type: **Viewliner-Sleeper**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **34**  
 Number of Toilets: **17**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$100,472		
- Equipment:	\$95,000		
- Installation:	\$5,472		
Maintenance Cost:	\$6,522		
- Labor:	\$3,672		
- Spare Parts:	\$2,850		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.27	30.53	45.80
Flush Fluid Generated:	45.03	90.06	135.09
Capacity Adjustment:	15.07	30.15	45.22
Total Capacity Required per Day:	75.37	150.74	226.11
Pumpout Labor Cost:	\$0.5	\$0.9	\$1.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.6	\$105.0	\$105.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$131	\$175	\$196
Maximum Continuous Hours of Service:	95.5	95.5	95.5
Total Operating Cost per Service Hour:	\$6.53	\$3.83	\$2.93
- Trip Related:	\$4.40	\$2.23	\$1.51
- Non-Trip Related:	\$2.13	\$1.60	\$1.42
Total per-Car Operating Cost per Year:	\$20,009	\$15,639	\$13,454
Total Fleet Operating Cost per Year:	\$40,018	\$31,278	\$26,908
Total Fleet Capital Cost:	\$200,944		

**Arthur D Little**

## Favorable

\$100,472		
\$95,000		
\$5,472		
\$3,398		
\$2,448		
\$950		
24	48	72
1	1	1
15.27	30.53	45.80
35.09	70.18	105.26
12.59	25.18	37.77
62.94	125.88	188.83
\$0.4	\$0.7	\$1.1
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.5	\$104.8	\$105.2
219	219	219
110	73	55
\$94	\$125	\$141
114.4	114.4	114.4
\$5.68	\$3.19	\$2.36
\$4.39	\$2.22	\$1.50
\$1.29	\$0.97	\$0.86
\$14,929	\$11,174	\$9,296
\$29,858	\$22,347	\$18,591
\$200,944		

## Unfavorable

\$100,472		
\$95,000		
\$5,472		
\$9,646		
\$4,896		
\$4,750		
24	48	72
1	1	1
15.27	30.53	45.80
58.48	116.96	175.44
18.44	36.87	55.31
92.18	184.36	276.55
\$0.6	\$1.2	\$1.8
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.7	\$105.3	\$105.9
292	292	292
146	97	73
\$183	\$244	\$275
78.1	78.1	78.1
\$7.17	\$4.31	\$3.36
\$4.41	\$2.25	\$1.52
\$2.75	\$2.06	\$1.84
\$25,113	\$20,136	\$17,648
\$50,226	\$40,273	\$35,296
\$200,944		

Car Type: **Amcafe**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **53**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.86	15.86	23.80
Flush Fluid Generated:	46.80	46.80	70.19
Capacity Adjustment:	15.67	15.67	23.50
Total Capacity Required per Day:	78.33	78.33	117.49
Pumpout Labor Cost:	\$0.5	\$0.5	\$0.7
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.6	\$14.6	\$14.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$272	\$272	\$204
Maximum Continuous Hours of Service:	61.3	61.3	61.3
Total Operating Cost per Service Hour:	\$1.23	\$1.23	\$1.02
- Trip Related:	\$0.98	\$0.98	\$0.68
- Non-Trip Related:	\$0.25	\$0.25	\$0.34
Total per-Car Operating Cost per Year:	\$5,026	\$5,026	\$3,127
Total Fleet Operating Cost per Year:	\$226,182	\$226,182	\$140,718
Total Fleet Capital Cost:	\$951,840		

Microphor

Favorable

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
8	16	24
2	1	1
15.86	15.86	23.80
36.46	36.46	54.70
13.08	13.08	19.62
65.41	65.41	98.12
\$0.4	\$0.4	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.5	\$14.6
219	219	219
219	219	110
\$195	\$195	\$146
73.4	73.4	73.4
\$1.10	\$1.10	\$0.85
\$0.96	\$0.96	\$0.67
\$0.14	\$0.14	\$0.19
\$3,851	\$3,851	\$2,238
\$173,276	\$173,276	\$100,708
\$951,840		

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
8	16	24
2	1	1
15.86	15.86	23.80
60.77	60.77	91.16
19.16	19.16	28.74
95.80	95.80	143.70
\$0.6	\$0.6	\$0.9
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.7	\$14.7	\$15.0
292	292	292
292	292	146
\$380	\$380	\$285
50.1	50.1	50.1
\$1.34	\$1.34	\$1.16
\$1.00	\$1.00	\$0.71
\$0.34	\$0.34	\$0.45
\$6,251	\$6,251	\$4,053
\$281,299	\$281,299	\$182,386
\$951,840		

Car Type: Amcoach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 84

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	25.14	25.14	37.72
Flush Fluid Generated:	74.17	74.17	111.25
Capacity Adjustment:	24.83	24.83	37.24
Total Capacity Required per Day:	124.14	124.14	186.21
Pumpout Labor Cost:	\$0.7	\$0.7	\$1.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.8	\$14.8	\$15.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$431	\$431	\$324
Maximum Continuous Hours of Service:	38.7	38.7	38.7
Total Operating Cost per Service Hour:	\$1.29	\$1.29	\$1.08
- Trip Related:	\$1.03	\$1.03	\$0.74
- Non-Trip Related:	\$0.25	\$0.25	\$0.34
Total per-Car Operating Cost per Year:	\$5,255	\$5,255	\$3,299
Total Fleet Operating Cost per Year:	\$1,397,936	\$1,397,936	\$877,511
Total Fleet Capital Cost:	\$5,626,432		

**Arthur D Little**

# Microphor

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
8	16	24
2	1	1
25.14	25.14	37.72
57.79	57.79	86.69
20.73	20.73	31.10
103.67	103.67	155.51
\$0.6	\$0.6	\$0.9
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.7	\$14.7	\$15.0
219	219	219
219	219	110
\$309	\$309	\$232
46.3	46.3	46.3
\$1.14	\$1.14	\$0.90
\$1.01	\$1.01	\$0.71
\$0.14	\$0.14	\$0.19
\$4,011	\$4,011	\$2,358
\$1,066,989	\$1,066,989	\$627,348
\$5,626,432		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
8	16	24
2	1	1
25.14	25.14	37.72
96.32	96.32	144.48
30.37	30.37	45.55
151.83	151.83	227.75
\$1.0	\$1.0	\$1.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$15.1	\$15.1	\$15.5
292	292	292
292	292	146
\$603	\$603	\$452
31.6	31.6	31.6
\$1.41	\$1.41	\$1.23
\$1.07	\$1.07	\$0.78
\$0.34	\$0.34	\$0.45
\$6,577	\$6,577	\$4,298
\$1,749,589	\$1,749,589	\$1,143,202
\$5,626,432		

Car Type: Amclub  
 Toilet Type: Gravity

Manufacturer:

Number of Passengers: 41  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	12.27	12.27	18.41
Flush Fluid Generated:	36.20	36.20	54.30
Capacity Adjustment:	12.12	12.12	18.18
Total Capacity Required per Day:	60.59	60.59	90.89
Pumpout Labor Cost:	\$0.4	\$0.4	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.5	\$14.5	\$14.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$211	\$211	\$158
Maximum Continuous Hours of Service:	79.2	79.2	79.2
Total Operating Cost per Service Hour:	\$1.21	\$1.21	\$1.00
- Trip Related:	\$0.96	\$0.96	\$0.66
- Non-Trip Related:	\$0.25	\$0.25	\$0.34
Total per-Car Operating Cost per Year:	\$4,938	\$4,938	\$3,061
Total Fleet Operating Cost per Year:	\$118,502	\$118,502	\$73,453
Total Fleet Capital Cost:	\$507,648		



Microphor

Favorable

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
8	16	24
2	1	1
12.27	12.27	18.41
28.21	28.21	42.31
10.12	10.12	15.18
50.60	50.60	75.90
\$0.3	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.4	\$14.5
219	219	219
219	219	110
\$151	\$151	\$113
94.9	94.9	94.9
\$1.08	\$1.08	\$0.83
\$0.94	\$0.94	\$0.65
\$0.14	\$0.14	\$0.19
\$3,788	\$3,788	\$2,191
\$90,921	\$90,921	\$52,592
\$507,648		

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
8	16	24
2	1	1
12.27	12.27	18.41
47.01	47.01	70.52
14.82	14.82	22.23
74.11	74.11	111.16
\$0.5	\$0.5	\$0.7
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.6	\$14.6	\$14.8
292	292	292
292	292	146
\$294	\$294	\$221
64.8	64.8	64.8
\$1.31	\$1.31	\$1.13
\$0.97	\$0.97	\$0.68
\$0.34	\$0.34	\$0.45
\$6,125	\$6,125	\$3,958
\$146,995	\$146,995	\$94,999
\$507,648		

Car Type: Met-Srvc Dinette  
 Toilet Type: Gravity

Manufacturer:

Number of Passengers: 23  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	12.69	15.23	17.77
Capacity Adjustment:	4.25	5.10	5.95
Total Capacity Required per Day:	21.24	25.49	29.74
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$74	\$89	\$103
Maximum Continuous Hours of Service:	141.2	141.2	141.2
Total Operating Cost per Service Hour:	\$1.86	\$1.55	\$1.34
- Trip Related:	\$1.45	\$1.22	\$1.05
- Non-Trip Related:	\$0.40	\$0.34	\$0.29
Total per-Car Operating Cost per Year:	\$4,741	\$4,762	\$4,783
Total Fleet Operating Cost per Year:	\$61,630	\$61,907	\$62,183
Total Fleet Capital Cost:	\$274,976		

**Arthur D Little**

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
4.30	5.16	6.02
9.89	11.87	13.85
3.55	4.26	4.97
17.74	21.29	24.84
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$53	\$63	\$74
169.1	169.1	169.1
\$1.67	\$1.39	\$1.20
\$1.44	\$1.21	\$1.04
\$0.22	\$0.19	\$0.16
\$3,650	\$3,665	\$3,680
\$47,455	\$47,649	\$47,843
\$274,976		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
4.30	5.16	6.02
16.48	19.78	23.08
5.20	6.24	7.28
25.98	31.18	36.38
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
292	292	292
292	292	292
\$103	\$124	\$144
115.5	115.5	115.5
\$2.00	\$1.68	\$1.44
\$1.46	\$1.23	\$1.06
\$0.54	\$0.45	\$0.39
\$5,845	\$5,875	\$5,905
\$75,979	\$76,372	\$76,766
\$274,976		

Car Type: Met-Srvc Coach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 60

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$21,152

\$20,000

\$1,152

Maintenance Cost:

- Labor:

- Spare Parts:

\$1,032

\$432

\$600

Hours per Trip:

Trips per Day:

2

5

12

1

7

2

Waste Generation Data

Waste Generated:

11.23

13.47

15.72

Flush Fluid Generated:

33.11

39.73

46.35

Capacity Adjustment:

11.08

13.30

15.52

Total Capacity Required per Day:

55.42

66.50

77.59

Pumpout Labor Cost:

\$0.3

\$0.4

\$0.5

Connect/Disconnect Labor Cost:

\$2.1

\$2.1

\$2.1

Cleaning Labor Cost:

\$12.0

\$12.0

\$12.0

Total Pumpout/Cleaning Cost per Day:

\$14.4

\$14.5

\$14.6

Days Operated per Year:

255

255

255

Clean-out Cycles per Year:

255

255

255

Waste Disposal Cost per Year:

\$193

\$231

\$270

Maximum Continuous Hours of Service:

54.1

54.1

54.1

Total Operating Cost per Service Hour:

\$1.92

\$1.62

\$1.40

- Trip Related:

\$1.52

\$1.28

\$1.12

- Non-Trip Related:

\$0.40

\$0.34

\$0.29

Total per-Car Operating Cost per Year:

\$4,912

\$4,967

\$5,023

Total Fleet Operating Cost per Year:

\$245,586

\$248,357

\$251,129

Total Fleet Capital Cost:

\$1,057,600

Microphor

Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
11.23	13.47	15.72
25.80	30.96	36.12
9.26	11.11	12.96
46.28	55.54	64.79
\$0.3	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.4	\$14.5
219	219	219
219	219	219
\$138	\$165	\$193
64.8	64.8	64.8
\$1.72	\$1.45	\$1.26
\$1.50	\$1.26	\$1.10
\$0.22	\$0.19	\$0.16
\$3,770	\$3,809	\$3,848
\$188,512	\$190,456	\$192,399
\$1,057,600		

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
11.23	13.47	15.72
43.00	51.60	60.20
13.56	16.27	18.98
67.78	81.34	94.89
\$0.4	\$0.5	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.6	\$14.7
292	292	292
292	292	292
\$269	\$323	\$377
44.3	44.3	44.3
\$2.08	\$1.76	\$1.53
\$1.55	\$1.31	\$1.14
\$0.54	\$0.45	\$0.39
\$6,088	\$6,167	\$6,246
\$304,397	\$308,344	\$312,291
\$1,057,600		

Car Type: Met-Srvc Club

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 33

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	6.17	7.41	8.64
Flush Fluid Generated:	18.21	21.85	25.49
Capacity Adjustment:	6.10	7.32	8.53
Total Capacity Required per Day:	30.48	36.58	42.67
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.3	\$14.3	\$14.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$106	\$127	\$148
Maximum Continuous Hours of Service:	98.4	98.4	98.4
Total Operating Cost per Service Hour:	\$1.87	\$1.57	\$1.36
- Trip Related:	\$1.47	\$1.23	\$1.07
- Non-Trip Related:	\$0.40	\$0.34	\$0.29
Total per-Car Operating Cost per Year:	\$4,787	\$4,817	\$4,848
Total Fleet Operating Cost per Year:	\$62,231	\$62,627	\$63,024
Total Fleet Capital Cost:	\$274,976		

**Arthur D Little**

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
6.17	7.41	8.64
14.19	17.03	19.87
5.09	6.11	7.13
25.45	30.55	35.64
\$0.1	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.3
219	219	219
219	219	219
\$76	\$91	\$106
117.9	117.9	117.9
\$1.68	\$1.41	\$1.22
\$1.46	\$1.22	\$1.06
\$0.22	\$0.19	\$0.16
\$3,683	\$3,704	\$3,726
\$47,876	\$48,154	\$48,432
\$274,976		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
6.17	7.41	8.64
23.65	28.38	33.11
7.46	8.95	10.44
37.28	44.74	52.19
\$0.2	\$0.3	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.4	\$14.4
292	292	292
292	292	292
\$148	\$178	\$207
80.5	80.5	80.5
\$2.02	\$1.70	\$1.47
\$1.48	\$1.25	\$1.08
\$0.54	\$0.45	\$0.39
\$5,910	\$5,954	\$5,997
\$76,834	\$77,398	\$77,963
\$274,976		

Car Type: **Amdinette**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **23**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	12.69	15.23	17.77
Capacity Adjustment:	4.25	5.10	5.95
Total Capacity Required per Day:	21.24	25.49	29.74
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$74	\$89	\$103
Maximum Continuous Hours of Service:	141.2	141.2	141.2
Total Operating Cost per Service Hour:	\$1.86	\$1.55	\$1.34
- Trip Related:	\$1.45	\$1.22	\$1.05
- Non-Trip Related:	\$0.40	\$0.34	\$0.29
Total per-Car Operating Cost per Year:	\$4,741	\$4,762	\$4,783
Total Fleet Operating Cost per Year:	\$118,520	\$119,051	\$119,582
Total Fleet Capital Cost:	\$528,800		



Microphor

Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
4.30	5.16	6.02
9.89	11.87	13.85
3.55	4.26	4.97
17.74	21.29	24.84
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$53	\$63	\$74
169.1	169.1	169.1
\$1.67	\$1.39	\$1.20
\$1.44	\$1.21	\$1.04
\$0.22	\$0.19	\$0.16
\$3,650	\$3,665	\$3,680
\$91,260	\$91,632	\$92,005
\$528,800		

Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
4.30	5.16	6.02
16.48	19.78	23.08
5.20	6.24	7.28
25.98	31.18	36.38
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
292	292	292
292	292	292
\$103	\$124	\$144
115.5	115.5	115.5
\$2.00	\$1.68	\$1.44
\$1.46	\$1.23	\$1.06
\$0.54	\$0.45	\$0.39
\$5,845	\$5,875	\$5,905
\$146,113	\$146,869	\$147,626
\$528,800		

Car Type: **Amcoach**  
 Toilet Type: **Gravity**

Manufacturer:

Number of Passengers: **60**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$21,152		
- Equipment:	\$20,000		
- Installation:	\$1,152		
Maintenance Cost:	\$1,032		
- Labor:	\$432		
- Spare Parts:	\$600		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	33.11	39.73	46.35
Capacity Adjustment:	11.08	13.30	15.52
Total Capacity Required per Day:	55.42	66.50	77.59
Pumpout Labor Cost:	\$0.3	\$0.4	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.5	\$14.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$193	\$231	\$270
Maximum Continuous Hours of Service:	54.1	54.1	54.1
Total Operating Cost per Service Hour:	\$1.92	\$1.62	\$1.40
- Trip Related:	\$1.52	\$1.28	\$1.12
- Non-Trip Related:	\$0.40	\$0.34	\$0.29
Total per-Car Operating Cost per Year:	\$4,912	\$4,967	\$5,023
Total Fleet Operating Cost per Year:	\$152,263	\$153,982	\$155,700
Total Fleet Capital Cost:	\$655,712		

**Arthur D Little**

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
11.23	13.47	15.72
25.80	30.96	36.12
9.26	11.11	12.96
46.28	55.54	64.79
\$0.3	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.4	\$14.5
219	219	219
219	219	219
\$138	\$165	\$193
64.8	64.8	64.8
\$1.72	\$1.45	\$1.26
\$1.50	\$1.26	\$1.10
\$0.22	\$0.19	\$0.16
\$3,770	\$3,809	\$3,848
\$116,878	\$118,083	\$119,288
\$655,712		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
11.23	13.47	15.72
43.00	51.60	60.20
13.56	16.27	18.98
67.78	81.34	94.89
\$0.4	\$0.5	\$0.6
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.5	\$14.6	\$14.7
292	292	292
292	292	292
\$269	\$323	\$377
44.3	44.3	44.3
\$2.08	\$1.76	\$1.53
\$1.55	\$1.31	\$1.14
\$0.54	\$0.45	\$0.39
\$6,088	\$6,167	\$6,246
\$188,726	\$191,173	\$193,621
\$655,712		

Car Type: Turbo Power Club

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 27

Number of Toilets: 1

Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$15,864		
- Equipment:	\$15,000		
- Installation:	\$864		
Maintenance Cost:	\$666		
- Labor:	\$216		
- Spare Parts:	\$450		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	5.05	6.06	7.07
Flush Fluid Generated:	14.90	17.88	20.86
Capacity Adjustment:	4.99	5.99	6.98
Total Capacity Required per Day:	24.94	29.93	34.91
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.2	\$8.3	\$8.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$87	\$104	\$121
Maximum Continuous Hours of Service:	120.3	120.3	120.3
Total Operating Cost per Service Hour:	\$1.12	\$0.94	\$0.81
- Trip Related:	\$0.86	\$0.72	\$0.63
- Non-Trip Related:	\$0.26	\$0.22	\$0.19
Total per-Car Operating Cost per Year:	\$2,860	\$2,885	\$2,910
Total Fleet Operating Cost per Year:	\$17,162	\$17,311	\$17,461
Total Fleet Capital Cost:	\$95,184		

Microphor

Favorable

Unfavorable

\$15,864		
\$15,000		
\$864		
\$294		
\$144		
\$150		
2	12	7
5	1	2
5.05	6.06	7.07
11.61	13.93	16.25
4.17	5.00	5.83
20.83	24.99	29.16
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.3
219	219	219
219	219	219
\$62	\$74	\$87
144.0	144.0	144.0
\$0.98	\$0.83	\$0.71
\$0.85	\$0.71	\$0.62
\$0.13	\$0.11	\$0.10
\$2,155	\$2,173	\$2,190
\$12,932	\$13,037	\$13,142
\$95,184		

\$15,864		
\$15,000		
\$864		
\$1,038		
\$288		
\$750		
2	12	7
5	1	2
5.05	6.06	7.07
19.35	23.22	27.09
6.10	7.32	8.54
30.50	36.60	42.70
\$0.2	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.3	\$8.3	\$8.4
292	292	292
292	292	292
\$121	\$145	\$170
98.4	98.4	98.4
\$1.23	\$1.03	\$0.89
\$0.87	\$0.74	\$0.64
\$0.36	\$0.30	\$0.25
\$3,581	\$3,616	\$3,652
\$21,485	\$21,698	\$21,911
\$95,184		

Car Type: Turbo Coach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 72

Number of Toilets: 2

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$21,152

\$20,000

\$1,152

Maintenance Cost:

- Labor:

- Spare Parts:

\$1,032

\$432

\$600

Hours per Trip:

Trips per Day:

2

5

12

1

7

2

Waste Generation Data

Waste Generated:

13.47

16.16

18.86

Flush Fluid Generated:

39.73

47.68

55.62

Capacity Adjustment:

13.30

15.96

18.62

Total Capacity Required per Day:

66.50

79.80

93.10

Pumpout Labor Cost:

\$0.4

\$0.5

\$0.6

Connect/Disconnect Labor Cost:

\$2.1

\$2.1

\$2.1

Cleaning Labor Cost:

\$12.0

\$12.0

\$12.0

Total Pumpout/Cleaning Cost per Day:

\$14.5

\$14.6

\$14.7

Days Operated per Year:

255

255

255

Clean-out Cycles per Year:

255

255

255

Waste Disposal Cost per Year:

\$231

\$277

\$324

Maximum Continuous Hours of Service:

45.1

45.1

45.1

Total Operating Cost per Service Hour:

\$1.94

\$1.64

\$1.43

- Trip Related:

\$1.54

\$1.31

\$1.14

- Non-Trip Related:

\$0.40

\$0.34

\$0.29

Total per-Car Operating Cost per Year:

\$4,967

\$5,034

\$5,100

Total Fleet Operating Cost per Year:

\$104,310

\$105,707

\$107,104

Total Fleet Capital Cost:

\$444,192

**Arthur D Little**

# Microphor

## Favorable

\$21,152		
\$20,000		
\$1,152		
\$488		
\$288		
\$200		
2	12	7
5	1	2
13.47	16.16	18.86
30.96	37.15	43.34
11.11	13.33	15.55
55.54	66.65	77.75
\$0.3	\$0.4	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.5	\$14.5
219	219	219
219	219	219
\$165	\$198	\$232
54.0	54.0	54.0
\$1.74	\$1.47	\$1.27
\$1.52	\$1.28	\$1.11
\$0.22	\$0.19	\$0.16
\$3,809	\$3,856	\$3,902
\$79,991	\$80,971	\$81,950
\$444,192		

## Unfavorable

\$21,152		
\$20,000		
\$1,152		
\$1,576		
\$576		
\$1,000		
2	12	7
5	1	2
13.47	16.16	18.86
51.60	61.92	72.24
16.27	19.52	22.77
81.34	97.61	113.87
\$0.5	\$0.6	\$0.7
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.6	\$14.7	\$14.8
292	292	292
292	292	292
\$323	\$388	\$452
36.9	36.9	36.9
\$2.11	\$1.79	\$1.55
\$1.57	\$1.34	\$1.17
\$0.54	\$0.45	\$0.39
\$6,167	\$6,262	\$6,356
\$129,504	\$131,494	\$133,483
\$444,192		

Car Type: Turbo Cafe  
 Toilet Type: Gravity

Manufacturer:

Number of Passengers: 52  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 300.0

Scenario: Expected

Capital Cost	\$15,864		
- Equipment:	\$15,000		
- Installation:	\$864		
Maintenance Cost:	\$666		
- Labor:	\$216		
- Spare Parts:	\$450		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	9.73	11.67	13.62
Flush Fluid Generated:	28.70	34.43	40.17
Capacity Adjustment:	9.61	11.53	13.45
Total Capacity Required per Day:	48.03	57.64	67.24
Pumpout Labor Cost:	\$0.3	\$0.3	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.4	\$8.4	\$8.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$167	\$200	\$234
Maximum Continuous Hours of Service:	62.5	62.5	62.5
Total Operating Cost per Service Hour:	\$1.16	\$0.99	\$0.86
- Trip Related:	\$0.90	\$0.77	\$0.67
- Non-Trip Related:	\$0.26	\$0.22	\$0.19
Total per-Car Operating Cost per Year:	\$2,976	\$3,024	\$3,072
Total Fleet Operating Cost per Year:	\$8,927	\$9,071	\$9,216
Total Fleet Capital Cost:	\$47,592		



Microphor

Favorable

\$15,864		
\$15,000		
\$864		
\$294		
\$144		
\$150		
2	12	7
5	1	2
9.73	11.67	13.62
22.36	26.83	31.30
8.02	9.63	11.23
40.11	48.13	56.15
\$0.2	\$0.3	\$0.3
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.3	\$8.4	\$8.4
219	219	219
219	219	219
\$119	\$143	\$167
74.8	74.8	74.8
\$1.02	\$0.86	\$0.75
\$0.89	\$0.75	\$0.66
\$0.13	\$0.11	\$0.10
\$2,236	\$2,270	\$2,304
\$6,709	\$6,810	\$6,911
\$47,592		

Unfavorable

\$15,864		
\$15,000		
\$864		
\$1,038		
\$288		
\$750		
2	12	7
5	1	2
9.73	11.67	13.62
37.27	44.72	52.17
11.75	14.10	16.45
58.74	70.49	82.24
\$0.4	\$0.4	\$0.5
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.5	\$8.5	\$8.6
292	292	292
292	292	292
\$233	\$280	\$327
51.1	51.1	51.1
\$1.28	\$1.09	\$0.95
\$0.93	\$0.79	\$0.70
\$0.36	\$0.30	\$0.25
\$3,745	\$3,814	\$3,882
\$11,236	\$11,441	\$11,646
\$47,592		

Car Type: Turbo Power Coach

Toilet Type: Gravity

Manufacturer:

Number of Passengers: 40

Number of Toilets: 1

Total Tank Capacity (gals): 300.0

Scenario:

Expected

Capital Cost

- Equipment:

- Installation:

\$15,864

\$15,000

\$864

Maintenance Cost:

- Labor:

- Spare Parts:

\$666

\$216

\$450

Hours per Trip:

Trips per Day:

2

5

12

1

7

2

Waste Generation Data

Waste Generated:

Flush Fluid Generated:

Capacity Adjustment:

Total Capacity Required per Day:

7.48

22.07

7.39

36.95

8.98

26.49

8.87

44.34

10.48

30.90

10.34

51.72

Pumpout Labor Cost:

Connect/Disconnect Labor Cost:

Cleaning Labor Cost:

Total Pumpout/Cleaning Cost per Day:

\$0.2

\$2.1

\$6.0

\$8.3

\$0.3

\$2.1

\$6.0

\$8.4

\$0.3

\$2.1

\$6.0

\$8.4

Days Operated per Year:

Clean-out Cycles per Year:

255

255

255

255

255

255

Waste Disposal Cost per Year:

\$128

\$154

\$180

Maximum Continuous Hours of Service:

Total Operating Cost per Service Hour:

- Trip Related:

- Non-Trip Related:

81.2

\$1.14

\$0.88

\$0.26

81.2

\$0.96

\$0.75

\$0.22

81.2

\$0.84

\$0.65

\$0.19

Total per-Car Operating Cost per Year:

Total Fleet Operating Cost per Year:

Total Fleet Capital Cost:

\$2,920

\$40,885

\$222,096

\$2,957

\$41,402

\$2,994

\$41,919

**Arthur D Little**

## Favorable

\$15,864		
\$15,000		
\$864		
\$294		
\$144		
\$150		
2	12	7
5	1	2
7.48	8.98	10.48
17.20	20.64	24.08
6.17	7.40	8.64
30.85	37.03	43.20
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.3	\$8.3	\$8.3
219	219	219
219	219	219
\$92	\$110	\$129
97.2	97.2	97.2
\$1.00	\$0.85	\$0.73
\$0.87	\$0.73	\$0.64
\$0.13	\$0.11	\$0.10
\$2,197	\$2,223	\$2,249
\$30,764	\$31,127	\$31,490
\$222,096		

## Unfavorable

\$15,864		
\$15,000		
\$864		
\$1,038		
\$288		
\$750		
2	12	7
5	1	2
7.48	8.98	10.48
28.67	34.40	40.13
9.04	10.85	12.65
45.19	54.23	63.26
\$0.3	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.4	\$8.4	\$8.5
292	292	292
292	292	292
\$179	\$215	\$251
66.4	66.4	66.4
\$1.26	\$1.06	\$0.92
\$0.90	\$0.77	\$0.67
\$0.36	\$0.30	\$0.25
\$3,666	\$3,719	\$3,772
\$51,329	\$52,066	\$52,803
\$222,096		



Car Type: Coach-HEP-HLV

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 72

Number of Toilets: 4

Total Tank Capacity (gals): 200.0

Scenario:	Expected		
Capital Cost	\$26,192		
- Equipment:	\$23,600		
- Installation:	\$2,592		
Maintenance Cost:	\$1,572		
- Labor:	\$864		
- Spare Parts:	\$708		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	32.33	64.66	96.98
Flush Fluid Generated:	26.06	52.11	78.17
Capacity Adjustment:	14.60	29.19	43.79
Total Capacity Required per Day:	72.98	145.96	218.94
Pumpout Labor Cost:	\$0.3	\$0.5	\$0.8
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$26.4	\$26.6	\$29.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$127	\$169	\$190
Maximum Continuous Hours of Service:	65.8	65.8	65.8
Total Operating Cost per Service Hour:	\$1.65	\$0.98	\$0.79
- Trip Related:	\$1.14	\$0.60	\$0.44
- Non-Trip Related:	\$0.51	\$0.38	\$0.34
Total per-Car Operating Cost per Year:	\$5,066	\$4,008	\$3,613
Total Fleet Operating Cost per Year:	\$106,394	\$84,174	\$75,881
Total Fleet Capital Cost:	\$550,032		

**Arthur D Little**

Favorable

\$26,192		
\$23,600		
\$2,592		
\$812		
\$576		
\$236		
24	48	72
1	1	1
32.33	64.66	96.98
20.30	40.61	60.91
13.16	26.32	39.47
65.79	131.58	197.37
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.3	\$26.5	\$26.7
219	219	219
110	73	55
\$98	\$131	\$147
73.0	73.0	73.0
\$1.44	\$0.82	\$0.61
\$1.13	\$0.59	\$0.41
\$0.31	\$0.23	\$0.21
\$3,790	\$2,878	\$2,421
\$79,593	\$60,429	\$50,847
\$550,032		

Unfavorable

\$26,192		
\$23,600		
\$2,592		
\$2,332		
\$1,152		
\$1,180		
24	48	72
1	1	1
32.33	64.66	96.98
33.84	67.68	101.52
16.54	33.08	49.63
82.71	165.42	248.13
\$0.3	\$0.7	\$1.0
\$2.1	\$2.1	\$4.2
\$24.0	\$24.0	\$24.0
\$26.4	\$26.8	\$29.2
292	292	292
146	97	73
\$164	\$219	\$246
58.0	58.0	58.0
\$1.81	\$1.10	\$0.90
\$1.15	\$0.60	\$0.45
\$0.67	\$0.50	\$0.44
\$6,356	\$5,157	\$4,711
\$133,481	\$108,302	\$98,932
\$550,032		

Car Type: Lounge-HEP-HLV

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 86

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	38.61	77.23	115.84
Flush Fluid Generated:	31.12	62.25	93.37
Capacity Adjustment:	17.43	34.87	52.30
Total Capacity Required per Day:	87.17	174.34	261.52
Pumpout Labor Cost:	\$0.3	\$0.6	\$0.9
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.4	\$14.7	\$17.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$151	\$202	\$227
Maximum Continuous Hours of Service:	55.1	55.1	55.1
Total Operating Cost per Service Hour:	\$0.96	\$0.59	\$0.50
- Trip Related:	\$0.65	\$0.36	\$0.29
- Non-Trip Related:	\$0.32	\$0.24	\$0.21
Total per-Car Operating Cost per Year:	\$2,958	\$2,422	\$2,288
Total Fleet Operating Cost per Year:	\$17,751	\$14,531	\$13,726
Total Fleet Capital Cost:	\$118,896		

Evac

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
24	48	72
1	1	1
38.61	77.23	115.84
24.25	48.50	72.76
15.72	31.43	47.15
78.58	157.17	235.75
\$0.2	\$0.5	\$0.7
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.3	\$14.6	\$16.9
219	219	219
110	73	55
\$117	\$156	\$176
61.1	61.1	61.1
\$0.82	\$0.48	\$0.40
\$0.64	\$0.35	\$0.28
\$0.18	\$0.13	\$0.12
\$2,154	\$1,687	\$1,568
\$12,921	\$10,120	\$9,410
\$118,896		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
24	48	72
1	1	1
38.61	77.23	115.84
40.42	80.84	121.26
19.76	39.52	59.28
98.79	197.59	296.38
\$0.4	\$0.8	\$1.2
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.5	\$14.9	\$17.4
292	292	292
146	97	73
\$196	\$262	\$294
48.6	48.6	48.6
\$1.08	\$0.68	\$0.58
\$0.66	\$0.37	\$0.30
\$0.42	\$0.31	\$0.28
\$3,780	\$3,179	\$3,031
\$22,679	\$19,072	\$18,188
\$118,896		



Car Type: Trans Dorm Coach

Toilet Type: Ultimate

Manufacturer: M

Number of Passengers: 40

Number of Toilets: 4

Total Tank Capacity (gals): 200.0

Scenario:

Expected

Capital Cost	\$26,192		
- Equipment:	\$23,600		
- Installation:	\$2,592		
Maintenance Cost:	\$1,572		
- Labor:	\$864		
- Spare Parts:	\$708		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	14.48	28.95	43.43
Capacity Adjustment:	8.11	16.22	24.33
Total Capacity Required per Day:	40.55	81.09	121.64
Pumpout Labor Cost:	\$0.1	\$0.3	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$26.2	\$26.4	\$26.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$70	\$94	\$106
Maximum Continuous Hours of Service:	118.4	118.4	118.4
Total Operating Cost per Service Hour:	\$1.63	\$0.96	\$0.73
- Trip Related:	\$1.12	\$0.57	\$0.39
- Non-Trip Related:	\$0.51	\$0.38	\$0.34
Total per-Car Operating Cost per Year:	\$4,995	\$3,913	\$3,373
Total Fleet Operating Cost per Year:	\$179,828	\$140,884	\$121,411
Total Fleet Capital Cost:	\$942,912		

**Arthur D Little**

Favorable

\$26,192		
\$23,600		
\$2,592		
\$812		
\$576		
\$236		
24	48	72
1	1	1
17.96	35.92	53.88
11.28	22.56	33.84
7.31	14.62	21.93
36.55	73.10	109.65
\$0.1	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.2	\$26.3	\$26.4
219	219	219
110	73	55
\$54	\$73	\$82
131.3	131.3	131.3
\$1.42	\$0.80	\$0.59
\$1.11	\$0.57	\$0.39
\$0.31	\$0.23	\$0.21
\$3,737	\$2,806	\$2,341
\$134,522	\$101,028	\$84,281
\$942,912		

Unfavorable

\$26,192		
\$23,600		
\$2,592		
\$2,332		
\$1,152		
\$1,180		
24	48	72
1	1	1
17.96	35.92	53.88
18.80	37.60	56.40
9.19	18.38	27.57
45.95	91.90	137.85
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$2.1
\$24.0	\$24.0	\$24.0
\$26.3	\$26.5	\$26.7
292	292	292
146	97	73
\$91	\$122	\$137
104.5	104.5	104.5
\$1.79	\$1.08	\$0.84
\$1.12	\$0.58	\$0.40
\$0.67	\$0.50	\$0.44
\$6,261	\$5,031	\$4,415
\$225,406	\$181,103	\$158,952
\$942,912		

Car Type: **Sleeper Super**  
 Toilet Type: **Ultimate**

Manufacturer:

Number of Passengers: **44**  
 Number of Toilets: **12**  
 Total Tank Capacity (gals): **200.0**

Scenario: **Expected**

Capital Cost	\$51,696		
- Equipment:	\$46,800		
- Installation:	\$4,896		
Maintenance Cost:	\$3,996		
- Labor:	\$2,592		
- Spare Parts:	\$1,404		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	19.76	39.51	59.27
Flush Fluid Generated:	15.92	31.85	47.77
Capacity Adjustment:	8.92	17.84	26.76
Total Capacity Required per Day:	44.60	89.20	133.80
Pumpout Labor Cost:	\$0.2	\$0.3	\$0.5
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$72.0	\$72.0	\$72.0
Total Pumpout/Cleaning Cost per Day:	\$74.3	\$74.4	\$74.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$77	\$103	\$116
Maximum Continuous Hours of Service:	107.6	107.6	107.6
Total Operating Cost per Service Hour:	\$4.42	\$2.55	\$1.93
- Trip Related:	\$3.12	\$1.58	\$1.06
- Non-Trip Related:	\$1.30	\$0.98	\$0.87
Total per-Car Operating Cost per Year:	\$13,560	\$10,437	\$8,876
Total Fleet Operating Cost per Year:	\$922,087	\$709,736	\$603,560
Total Fleet Capital Cost:	\$3,515,328		

Evac

Favorable

Unfavorable

\$51,696		
\$46,800		
\$4,896		
\$2,196		
\$1,728		
\$468		
24	48	72
1	1	1
19.76	39.51	59.27
12.41	24.82	37.22
8.04	16.08	24.12
40.21	80.41	120.62
\$0.1	\$0.2	\$0.4
\$2.1	\$2.1	\$2.1
\$72.0	\$72.0	\$72.0
\$74.2	\$74.3	\$74.5
219	219	219
110	73	55
\$60	\$80	\$90
119.4	119.4	119.4
\$3.95	\$2.20	\$1.61
\$3.12	\$1.57	\$1.06
\$0.84	\$0.63	\$0.56
\$10,383	\$7,703	\$6,363
\$706,072	\$523,821	\$432,695
\$3,515,328		

\$51,696		
\$46,800		
\$4,896		
\$5,796		
\$3,456		
\$2,340		
24	48	72
1	1	1
19.76	39.51	59.27
20.68	41.36	62.04
10.11	20.22	30.33
50.55	101.09	151.64
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$2.1
\$72.0	\$72.0	\$72.0
\$74.3	\$74.5	\$74.7
292	292	292
146	97	73
\$100	\$134	\$151
95.0	95.0	95.0
\$4.78	\$2.82	\$2.17
\$3.12	\$1.58	\$1.07
\$1.65	\$1.24	\$1.10
\$16,745	\$13,182	\$11,401
\$1,138,671	\$896,408	\$775,277
\$3,515,328		

Car Type: **Bag Coach Super**  
 Toilet Type: **Ultimate**

Manufacturer: **F**

Number of Passengers: **78**  
 Number of Toilets: **5**  
 Total Tank Capacity (gals): **200.0**

Scenario: **Expected**

Capital Cost	\$29,380		
- Equipment:	\$26,500		
- Installation:	\$2,880		
Maintenance Cost:	\$1,875		
- Labor:	\$1,080		
- Spare Parts:	\$795		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	35.02	70.04	105.07
Flush Fluid Generated:	28.23	56.46	84.68
Capacity Adjustment:	15.81	31.63	47.44
Total Capacity Required per Day:	79.06	158.13	237.19
Pumpout Labor Cost:	\$0.3	\$0.6	\$0.8
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$30.0	\$30.0	\$30.0
Total Pumpout/Cleaning Cost per Day:	\$32.4	\$32.7	\$35.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$137	\$183	\$206
Maximum Continuous Hours of Service:	60.7	60.7	60.7
Total Operating Cost per Service Hour:	\$2.01	\$1.18	\$0.94
- Trip Related:	\$1.39	\$0.73	\$0.53
- Non-Trip Related:	\$0.61	\$0.46	\$0.41
Total per-Car Operating Cost per Year:	\$6,149	\$4,840	\$4,320
Total Fleet Operating Cost per Year:	\$295,162	\$232,324	\$207,344
Total Fleet Capital Cost:	\$1,410,240		

**Arthur D Little**

Favorable

\$29,380		
\$26,500		
\$2,880		
\$985		
\$720		
\$265		
24	48	72
1	1	1
35.02	70.04	105.07
22.00	43.99	65.99
14.25	28.51	42.76
71.27	142.55	213.82
\$0.2	\$0.4	\$0.7
\$2.1	\$2.1	\$4.2
\$30.0	\$30.0	\$30.0
\$32.3	\$32.5	\$34.9
219	219	219
110	73	55
\$106	\$142	\$159
67.3	67.3	67.3
\$1.76	\$1.00	\$0.77
\$1.39	\$0.72	\$0.52
\$0.37	\$0.28	\$0.25
\$4,630	\$3,502	\$3,053
\$222,248	\$168,093	\$146,534
\$1,410,240		

Unfavorable

\$29,380		
\$26,500		
\$2,880		
\$2,765		
\$1,440		
\$1,325		
24	48	72
1	1	1
35.02	70.04	105.07
36.66	73.32	109.98
17.92	35.84	53.76
89.60	179.20	268.81
\$0.4	\$0.7	\$1.1
\$2.1	\$2.1	\$4.2
\$30.0	\$30.0	\$30.0
\$32.5	\$32.8	\$35.3
292	292	292
146	97	73
\$178	\$237	\$267
53.6	53.6	53.6
\$2.19	\$1.33	\$1.07
\$1.40	\$0.73	\$0.54
\$0.79	\$0.59	\$0.53
\$7,683	\$6,198	\$5,609
\$368,786	\$297,503	\$269,220
\$1,410,240		

Car Type: Coach Super

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 75

Number of Toilets: 6

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$32,568		
- Equipment:	\$29,400		
- Installation:	\$3,168		
Maintenance Cost:	\$2,178		
- Labor:	\$1,296		
- Spare Parts:	\$882		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	33.68	67.35	101.03
Flush Fluid Generated:	27.14	54.29	81.43
Capacity Adjustment:	15.20	30.41	45.61
Total Capacity Required per Day:	76.02	152.04	228.07
Pumpout Labor Cost:	\$0.3	\$0.5	\$0.8
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$4.2
Cleaning Labor Cost:	\$36.0	\$36.0	\$36.0
Total Pumpout/Cleaning Cost per Day:	\$38.4	\$38.6	\$41.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$132	\$176	\$198
Maximum Continuous Hours of Service:	63.1	63.1	63.1
Total Operating Cost per Service Hour:	\$2.35	\$1.38	\$1.09
- Trip Related:	\$1.64	\$0.85	\$0.61
- Non-Trip Related:	\$0.71	\$0.53	\$0.47
Total per-Car Operating Cost per Year:	\$7,212	\$5,645	\$4,996
Total Fleet Operating Cost per Year:	\$656,295	\$513,712	\$454,628
Total Fleet Capital Cost:	\$2,963,688		

Evac

Favorable

\$32,568		
\$29,400		
\$3,168		
\$1,158		
\$864		
\$294		
24	48	72
1	1	1
33.68	67.35	101.03
21.15	42.30	63.45
13.71	27.41	41.12
68.53	137.06	205.59
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$4.2
\$36.0	\$36.0	\$36.0
\$38.3	\$38.5	\$40.8
219	219	219
110	73	55
\$102	\$136	\$153
70.0	70.0	70.0
\$2.08	\$1.17	\$0.90
\$1.64	\$0.84	\$0.61
\$0.44	\$0.33	\$0.29
\$5,455	\$4,106	\$3,547
\$496,420	\$373,669	\$322,756
\$2,963,688		

Unfavorable

\$32,568		
\$29,400		
\$3,168		
\$3,198		
\$1,728		
\$1,470		
24	48	72
1	1	1
33.68	67.35	101.03
35.25	70.50	105.75
17.23	34.46	51.69
86.16	172.31	258.47
\$0.4	\$0.7	\$1.1
\$2.1	\$2.1	\$4.2
\$36.0	\$36.0	\$36.0
\$38.5	\$38.8	\$41.3
292	292	292
146	97	73
\$171	\$228	\$257
55.7	55.7	55.7
\$2.56	\$1.54	\$1.23
\$1.65	\$0.86	\$0.62
\$0.91	\$0.68	\$0.61
\$8,983	\$7,203	\$6,466
\$817,465	\$655,484	\$588,443
\$2,963,688		



Car Type: Horizon  
 Toilet Type: Ultimate

Manufacturer: I

Number of Passengers: 82  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	18.41	36.82	73.64
Flush Fluid Generated:	14.84	29.68	59.35
Capacity Adjustment:	8.31	16.62	33.25
Total Capacity Required per Day:	41.56	83.12	166.23
Pumpout Labor Cost:	\$0.1	\$0.3	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.4	\$14.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$144	\$144	\$193
Maximum Continuous Hours of Service:	57.7	57.7	57.7
Total Operating Cost per Service Hour:	\$1.55	\$0.96	\$0.59
- Trip Related:	\$1.23	\$0.65	\$0.35
- Non-Trip Related:	\$0.32	\$0.32	\$0.24
Total per-Car Operating Cost per Year:	\$4,751	\$2,950	\$2,410
Total Fleet Operating Cost per Year:	\$489,339	\$303,808	\$248,224
Total Fleet Capital Cost:	\$2,041,048		

**Arthur D Little**

Evac

**Favorable**

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
12	24	48
1	1	1
18.41	36.82	73.64
11.56	23.12	46.25
7.49	14.99	29.97
37.46	74.93	149.86
\$0.1	\$0.2	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.6
219	219	219
219	110	73
\$112	\$112	\$149
64.1	64.1	64.1
\$1.40	\$0.82	\$0.48
\$1.23	\$0.64	\$0.35
\$0.18	\$0.18	\$0.13
\$3,691	\$2,147	\$1,678
\$380,153	\$221,126	\$172,817
\$2,041,048		

**Unfavorable**

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
12	24	48
1	1	1
18.41	36.82	73.64
19.27	38.54	77.08
9.42	18.84	37.68
47.10	94.20	188.40
\$0.2	\$0.4	\$0.8
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.5	\$14.9
292	292	292
292	146	97
\$187	\$187	\$249
51.0	51.0	51.0
\$1.66	\$1.08	\$0.68
\$1.24	\$0.66	\$0.36
\$0.42	\$0.42	\$0.31
\$5,827	\$3,768	\$3,163
\$600,130	\$388,094	\$325,769
\$2,041,048		

Car Type: Coach

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 48

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario:

Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.78	21.55	43.10
Flush Fluid Generated:	8.69	17.37	34.74
Capacity Adjustment:	4.87	9.73	19.46
Total Capacity Required per Day:	24.33	48.65	97.31
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$85	\$85	\$113
Maximum Continuous Hours of Service:	98.7	98.7	98.7
Total Operating Cost per Service Hour:	\$1.52	\$0.94	\$0.56
- Trip Related:	\$1.21	\$0.62	\$0.33
- Non-Trip Related:	\$0.32	\$0.32	\$0.24
Total per-Car Operating Cost per Year:	\$4,675	\$2,874	\$2,309
Total Fleet Operating Cost per Year:	\$361,671	\$224,172	\$180,114
Total Fleet Capital Cost:	\$1,545,648		

Evac

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
12	24	48
1	1	1
10.78	21.55	43.10
6.77	13.54	27.07
4.39	8.77	17.54
21.93	43.86	87.72
\$0.1	\$0.1	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.4
219	219	219
219	110	73
\$65	\$65	\$87
109.4	109.4	109.4
\$1.38	\$0.80	\$0.46
\$1.21	\$0.62	\$0.32
\$0.18	\$0.18	\$0.13
\$3,634	\$2,090	\$1,602
\$283,455	\$163,027	\$124,968
\$1,545,648		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
12	24	48
1	1	1
10.78	21.55	43.10
11.28	22.56	45.12
5.51	11.03	22.06
27.57	55.14	110.28
\$0.1	\$0.2	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.6
292	292	292
292	146	97
\$109	\$109	\$146
87.1	87.1	87.1
\$1.63	\$1.05	\$0.65
\$1.22	\$0.63	\$0.33
\$0.42	\$0.42	\$0.31
\$5,726	\$3,667	\$3,028
\$446,599	\$286,028	\$236,207
\$1,545,648		

Car Type: Coach (HDCP)

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 44

Number of Toilets: 3

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$23,004		
- Equipment:	\$20,700		
- Installation:	\$2,304		
Maintenance Cost:	\$1,269		
- Labor:	\$648		
- Spare Parts:	\$621		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	9.88	19.76	39.51
Flush Fluid Generated:	7.96	15.92	31.85
Capacity Adjustment:	4.46	8.92	17.84
Total Capacity Required per Day:	22.30	44.60	89.20
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$18.0	\$18.0	\$18.0
Total Pumpout/Cleaning Cost per Day:	\$20.2	\$20.3	\$20.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$77	\$77	\$103
Maximum Continuous Hours of Service:	107.6	107.6	107.6
Total Operating Cost per Service Hour:	\$2.12	\$1.28	\$0.76
- Trip Related:	\$1.71	\$0.87	\$0.45
- Non-Trip Related:	\$0.41	\$0.41	\$0.31
Total per-Car Operating Cost per Year:	\$6,502	\$3,935	\$3,111
Total Fleet Operating Cost per Year:	\$136,550	\$82,627	\$65,337
Total Fleet Capital Cost:	\$483,084		

**Arthur D Little**

Favorable

\$23,004		
\$20,700		
\$2,304		
\$639		
\$432		
\$207		
12	24	48
1	1	1
9.88	19.76	39.51
6.20	12.41	24.82
4.02	8.04	16.08
20.10	40.21	80.41
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.2	\$20.2	\$20.3
219	219	219
219	110	73
\$60	\$60	\$80
119.4	119.4	119.4
\$1.95	\$1.11	\$0.63
\$1.70	\$0.87	\$0.45
\$0.24	\$0.24	\$0.18
\$5,114	\$2,913	\$2,204
\$107,402	\$61,182	\$46,289
\$483,084		

Unfavorable

\$23,004		
\$20,700		
\$2,304		
\$1,899		
\$864		
\$1,035		
12	24	48
1	1	1
9.88	19.76	39.51
10.34	20.68	41.36
5.05	10.11	20.22
25.27	50.55	101.09
\$0.1	\$0.2	\$0.4
\$2.1	\$2.1	\$2.1
\$18.0	\$18.0	\$18.0
\$20.2	\$20.3	\$20.5
292	292	292
292	146	97
\$100	\$100	\$134
95.0	95.0	95.0
\$2.25	\$1.42	\$0.86
\$1.71	\$0.87	\$0.46
\$0.54	\$0.54	\$0.41
\$7,899	\$4,964	\$4,029
\$165,874	\$104,247	\$84,619
\$483,084		

Car Type: Dome Coach

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 46

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.33	20.65	41.31
Flush Fluid Generated:	8.32	16.65	33.29
Capacity Adjustment:	4.66	9.33	18.65
Total Capacity Required per Day:	23.31	46.63	93.25
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$81	\$81	\$108
Maximum Continuous Hours of Service:	102.9	102.9	102.9
Total Operating Cost per Service Hour:	\$1.52	\$0.94	\$0.56
- Trip Related:	\$1.21	\$0.62	\$0.33
- Non-Trip Related:	\$0.32	\$0.32	\$0.24
Total per-Car Operating Cost per Year:	\$4,671	\$2,870	\$2,303
Total Fleet Operating Cost per Year:	\$56,050	\$34,435	\$27,639
Total Fleet Capital Cost:	\$237,792		

Evac

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
12	24	48
1	1	1
10.33	20.65	41.31
6.49	12.97	25.94
4.20	8.41	16.81
21.02	42.03	84.07
\$0.1	\$0.1	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.4
219	219	219
219	110	73
\$63	\$63	\$83
114.2	114.2	114.2
\$1.38	\$0.79	\$0.46
\$1.20	\$0.62	\$0.32
\$0.18	\$0.18	\$0.13
\$3,631	\$2,087	\$1,598
\$43,568	\$25,041	\$19,172
\$237,792		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
12	24	48
1	1	1
10.33	20.65	41.31
10.81	21.62	43.24
5.28	10.57	21.14
26.42	52.84	105.69
\$0.1	\$0.2	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.5
292	292	292
292	146	97
\$105	\$105	\$140
90.8	90.8	90.8
\$1.63	\$1.04	\$0.65
\$1.21	\$0.63	\$0.33
\$0.42	\$0.42	\$0.31
\$5,720	\$3,661	\$3,020
\$68,636	\$43,933	\$36,245
\$237,792		



Car Type: Amlounge II

Toilet Type: Ultimate

Manufacturer: F

Number of Passengers: 49

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	11.00	22.00	44.00
Flush Fluid Generated:	8.87	17.73	35.47
Capacity Adjustment:	4.97	9.93	19.87
Total Capacity Required per Day:	24.83	49.67	99.34
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.3	\$14.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$86	\$86	\$115
Maximum Continuous Hours of Service:	96.6	96.6	96.6
Total Operating Cost per Service Hour:	\$1.53	\$0.94	\$0.57
- Trip Related:	\$1.21	\$0.62	\$0.33
- Non-Trip Related:	\$0.32	\$0.32	\$0.24
Total per-Car Operating Cost per Year:	\$4,677	\$2,876	\$2,312
Total Fleet Operating Cost per Year:	\$116,937	\$71,906	\$57,803
Total Fleet Capital Cost:	\$495,400		

**Arthur D Little**

Evac

**Favorable**

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
12	24	48
1	1	1
11.00	22.00	44.00
6.91	13.82	27.64
4.48	8.95	17.91
22.39	44.77	89.55
\$0.1	\$0.1	\$0.3
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.4
219	219	219
219	110	73
\$67	\$67	\$89
107.2	107.2	107.2
\$1.38	\$0.80	\$0.46
\$1.21	\$0.62	\$0.32
\$0.18	\$0.18	\$0.13
\$3,636	\$2,092	\$1,604
\$90,893	\$52,294	\$40,109
\$495,400		

**Unfavorable**

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
12	24	48
1	1	1
11.00	22.00	44.00
11.52	23.03	46.06
5.63	11.26	22.52
28.14	56.29	112.58
\$0.1	\$0.2	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.6
292	292	292
292	146	97
\$112	\$112	\$149
85.3	85.3	85.3
\$1.63	\$1.05	\$0.65
\$1.22	\$0.63	\$0.34
\$0.42	\$0.42	\$0.31
\$5,729	\$3,670	\$3,032
\$143,215	\$91,750	\$75,806
\$495,400		

Car Type: **Sleeper 10-6**

Toilet Type: **Ultimate**

Manufacturer:

Number of Passengers: **22**

Number of Toilets: **17**

Total Tank Capacity (gals): **200.0**

Scenario:

**Expected**

Capital Cost	\$67,636		
- Equipment:	\$61,300		
- Installation:	\$6,336		
Maintenance Cost:	\$5,511		
- Labor:	\$3,672		
- Spare Parts:	\$1,839		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	4.94	9.88	19.76
Flush Fluid Generated:	3.98	7.96	15.92
Capacity Adjustment:	2.23	4.46	8.92
Total Capacity Required per Day:	11.15	22.30	44.60
Pumpout Labor Cost:	\$0.0	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.1	\$104.2	\$104.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$39	\$39	\$52
Maximum Continuous Hours of Service:	215.2	215.2	215.2
Total Operating Cost per Service Hour:	\$10.49	\$6.15	\$3.53
- Trip Related:	\$8.69	\$4.35	\$2.18
- Non-Trip Related:	\$1.80	\$1.80	\$1.35
Total per-Car Operating Cost per Year:	\$32,157	\$18,859	\$14,442
Total Fleet Operating Cost per Year:	\$2,636,912	\$1,546,413	\$1,184,250
Total Fleet Capital Cost:	\$5,546,152		

Evac

Favorable

Unfavorable

\$67,636		
\$61,300		
\$6,336		
\$3,061		
\$2,448		
\$613		
12	24	48
1	1	1
4.94	9.88	19.76
3.10	6.20	12.41
2.01	4.02	8.04
10.05	20.10	40.21
\$0.0	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.1	\$104.2	\$104.2
219	219	219
219	110	73
\$30	\$30	\$40
238.8	238.8	238.8
\$9.85	\$5.52	\$3.06
\$8.69	\$4.35	\$2.18
\$1.16	\$1.16	\$0.87
\$25,896	\$14,497	\$10,709
\$2,123,442	\$1,188,728	\$878,160
\$5,546,152		

\$67,636		
\$61,300		
\$6,336		
\$7,961		
\$4,896		
\$3,065		
12	24	48
1	1	1
4.94	9.88	19.76
5.17	10.34	20.68
2.53	5.05	10.11
12.64	25.27	50.55
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.2	\$104.2	\$104.3
292	292	292
292	146	97
\$50	\$50	\$67
189.9	189.9	189.9
\$10.97	\$6.63	\$3.89
\$8.69	\$4.36	\$2.19
\$2.27	\$2.27	\$1.70
\$38,423	\$23,225	\$18,180
\$3,150,725	\$1,904,440	\$1,490,796
\$5,546,152		

Car Type: Amcoach II

Toilet Type: Ultimate

Manufacturer: I

Number of Passengers: 59

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	26.49	52.98	79.47
Flush Fluid Generated:	21.35	42.70	64.06
Capacity Adjustment:	11.96	23.92	35.88
Total Capacity Required per Day:	59.80	119.61	179.41
Pumpout Labor Cost:	\$0.2	\$0.4	\$0.6
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.3	\$14.5	\$14.7
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$104	\$139	\$156
Maximum Continuous Hours of Service:	80.3	80.3	80.3
Total Operating Cost per Service Hour:	\$0.95	\$0.57	\$0.45
- Trip Related:	\$0.63	\$0.34	\$0.24
- Non-Trip Related:	\$0.32	\$0.24	\$0.21
Total per-Car Operating Cost per Year:	\$2,898	\$2,342	\$2,063
Total Fleet Operating Cost per Year:	\$344,916	\$278,669	\$245,546
Total Fleet Capital Cost:	\$2,358,104		

**Arthur D Little**

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
24	48	72
1	1	1
26.49	52.98	79.47
16.64	33.28	49.91
10.78	21.56	32.35
53.91	107.82	161.73
\$0.2	\$0.3	\$0.5
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.4	\$14.6
219	219	219
110	73	55
\$80	\$107	\$120
89.0	89.0	89.0
\$0.80	\$0.46	\$0.35
\$0.62	\$0.33	\$0.23
\$0.18	\$0.13	\$0.12
\$2,108	\$1,627	\$1,386
\$250,906	\$193,570	\$164,902
\$2,358,104		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
24	48	72
1	1	1
26.49	52.98	79.47
27.73	55.46	83.19
13.56	27.11	40.67
67.78	135.55	203.33
\$0.3	\$0.6	\$0.8
\$2.1	\$2.1	\$4.2
\$12.0	\$12.0	\$12.0
\$14.4	\$14.7	\$17.0
292	292	292
146	97	73
\$135	\$179	\$202
70.8	70.8	70.8
\$1.06	\$0.66	\$0.55
\$0.64	\$0.34	\$0.27
\$0.42	\$0.31	\$0.28
\$3,700	\$3,072	\$2,911
\$440,260	\$365,546	\$346,432
\$2,358,104		

Car Type: Slumbercoach 24-8

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 40

Number of Toilets: 32

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost  
- Equipment: \$115,456  
- Installation: \$104,800  
\$10,656

Maintenance Cost: \$10,056  
- Labor: \$6,912  
- Spare Parts: \$3,144

Hours per Trip:	24	48	72
Trips per Day:	1	1	1

Waste Generation Data

<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	14.48	28.95	43.43
Capacity Adjustment:	8.11	16.22	24.33
Total Capacity Required per Day:	40.55	81.09	121.64

Pumpout Labor Cost:	\$0.1	\$0.3	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$192.0	\$192.0	\$192.0
Total Pumpout/Cleaning Cost per Day:	\$194.2	\$194.4	\$194.5

Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64

Waste Disposal Cost per Year:	\$70	\$94	\$106
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Maximum Continuous Hours of Service:	118.4	118.4	118.4
Total Operating Cost per Service Hour:	\$11.40	\$6.53	\$4.91
- Trip Related:	\$8.12	\$4.07	\$2.72
- Non-Trip Related:	\$3.28	\$2.46	\$2.19

Total per-Car Operating Cost per Year:	\$34,941	\$26,705	\$22,588
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Total Fleet Operating Cost per Year:	\$559,059	\$427,287	\$361,401
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Total Fleet Capital Cost:	\$1,847,296		
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Evac

Favorable

Unfavorable

\$115,456		
\$104,800		
\$10,656		
\$5,656		
\$4,608		
\$1,048		
24	48	72
1	1	1
17.96	35.92	53.88
11.28	22.56	33.84
7.31	14.62	21.93
36.55	73.10	109.65
\$0.1	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$192.0	\$192.0	\$192.0
\$194.2	\$194.3	\$194.4
219	219	219
110	73	55
\$54	\$73	\$82
131.3	131.3	131.3
\$10.27	\$5.68	\$4.16
\$8.11	\$4.07	\$2.72
\$2.15	\$1.61	\$1.43
\$26,977	\$19,914	\$16,383
\$431,628	\$318,629	\$262,130
\$1,847,296		

\$115,456		
\$104,800		
\$10,656		
\$14,456		
\$9,216		
\$5,240		
24	48	72
1	1	1
17.96	35.92	53.88
18.80	37.60	56.40
9.19	18.38	27.57
45.95	91.90	137.85
\$0.2	\$0.4	\$0.6
\$2.1	\$2.1	\$2.1
\$192.0	\$192.0	\$192.0
\$194.3	\$194.5	\$194.7
292	292	292
146	97	73
\$91	\$122	\$137
104.5	104.5	104.5
\$12.25	\$7.17	\$5.48
\$8.12	\$4.08	\$2.73
\$4.13	\$3.09	\$2.75
\$42,913	\$33,507	\$28,803
\$686,613	\$536,106	\$460,853
\$1,847,296		



Car Type: **Viewliner-Sleeper**  
 Toilet Type: **Ultimate**

Manufacturer: **I**

Number of Passengers: **34**  
 Number of Toilets: **17**  
 Total Tank Capacity (gals): **200.0**

Scenario:	Expected		
Capital Cost	\$67,636		
- Equipment:	\$61,300		
- Installation:	\$6,336		
Maintenance Cost:	\$5,511		
- Labor:	\$3,672		
- Spare Parts:	\$1,839		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.27	30.53	45.80
Flush Fluid Generated:	12.30	24.61	36.91
Capacity Adjustment:	6.89	13.79	20.68
Total Capacity Required per Day:	34.46	68.93	103.39
Pumpout Labor Cost:	\$0.1	\$0.2	\$0.4
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$104.2	\$104.3	\$104.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$60	\$80	\$90
Maximum Continuous Hours of Service:	139.3	139.3	139.3
Total Operating Cost per Service Hour:	\$6.16	\$3.54	\$2.67
- Trip Related:	\$4.36	\$2.19	\$1.47
- Non-Trip Related:	\$1.80	\$1.35	\$1.20
Total per-Car Operating Cost per Year:	\$18,885	\$14,478	\$12,274
Total Fleet Operating Cost per Year:	\$37,771	\$28,955	\$24,548
Total Fleet Capital Cost:	\$135,272		

**Arthur D Little**

Evac

**Favorable**

\$67,636		
\$61,300		
\$6,336		
\$3,061		
\$2,448		
\$613		
24	48	72
1	1	1
15.27	30.53	45.80
9.59	19.18	28.76
6.21	12.43	18.64
31.07	62.14	93.20
\$0.1	\$0.2	\$0.3
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.2	\$104.3	\$104.4
219	219	219
110	73	55
\$46	\$62	\$69
154.5	154.5	154.5
\$5.52	\$3.06	\$2.24
\$4.36	\$2.19	\$1.47
\$1.16	\$0.87	\$0.78
\$14,517	\$10,736	\$8,846
\$29,033	\$21,472	\$17,691
\$135,272		

**Unfavorable**

\$67,636		
\$61,300		
\$6,336		
\$7,961		
\$4,896		
\$3,065		
24	48	72
1	1	1
15.27	30.53	45.80
15.98	31.96	47.94
7.81	15.62	23.43
39.06	78.12	117.17
\$0.2	\$0.3	\$0.5
\$2.1	\$2.1	\$2.1
\$102.0	\$102.0	\$102.0
\$104.3	\$104.4	\$104.6
292	292	292
146	97	73
\$78	\$103	\$116
122.9	122.9	122.9
\$6.64	\$3.90	\$2.99
\$4.37	\$2.20	\$1.47
\$2.27	\$1.70	\$1.51
\$23,260	\$18,228	\$15,712
\$46,521	\$36,456	\$31,423
\$135,272		

Car Type: **Amcafe**  
 Toilet Type: **Ultimate**

Manufacturer:

Number of Passengers: **53**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **200.0**

Scenario: **Expected**

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.86	15.86	23.80
Flush Fluid Generated:	12.79	12.79	19.18
Capacity Adjustment:	7.16	7.16	10.74
Total Capacity Required per Day:	35.81	35.81	53.72
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$124	\$124	\$93
Maximum Continuous Hours of Service:	89.3	89.3	89.3
Total Operating Cost per Service Hour:	\$1.16	\$1.16	\$0.94
- Trip Related:	\$0.92	\$0.92	\$0.63
- Non-Trip Related:	\$0.24	\$0.24	\$0.32
Total per-Car Operating Cost per Year:	\$4,726	\$4,726	\$2,885
Total Fleet Operating Cost per Year:	\$212,655	\$212,655	\$129,830
Total Fleet Capital Cost:	\$891,720		

Evac

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
8	16	24
2	1	1
15.86	15.86	23.80
9.96	9.96	14.95
6.46	6.46	9.69
32.29	32.29	48.43
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	110
\$96	\$96	\$72
99.1	99.1	99.1
\$1.05	\$1.05	\$0.80
\$0.91	\$0.91	\$0.62
\$0.13	\$0.13	\$0.18
\$3,672	\$3,672	\$2,098
\$165,235	\$165,235	\$94,430
\$891,720		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
8	16	24
2	1	1
15.86	15.86	23.80
16.61	16.61	24.91
8.12	8.12	12.18
40.59	40.59	60.88
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
292	292	292
292	292	146
\$161	\$161	\$121
78.8	78.8	78.8
\$1.24	\$1.24	\$1.05
\$0.93	\$0.93	\$0.63
\$0.31	\$0.31	\$0.42
\$5,793	\$5,793	\$3,682
\$260,680	\$260,680	\$165,684
\$891,720		

Car Type: **Amcoach**  
 Toilet Type: **Ultimate**

Manufacturer:

Number of Passengers: **84**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **200.0**

Scenario: **Expected**

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	25.14	25.14	37.72
Flush Fluid Generated:	20.27	20.27	30.40
Capacity Adjustment:	11.35	11.35	17.03
Total Capacity Required per Day:	56.76	56.76	85.14
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.3	\$14.3	\$14.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$197	\$197	\$148
Maximum Continuous Hours of Service:	56.4	56.4	56.4
Total Operating Cost per Service Hour:	\$1.18	\$1.18	\$0.96
- Trip Related:	\$0.94	\$0.94	\$0.65
- Non-Trip Related:	\$0.24	\$0.24	\$0.32
Total per-Car Operating Cost per Year:	\$4,818	\$4,818	\$2,954
Total Fleet Operating Cost per Year:	\$1,281,474	\$1,291,474	\$785,775
Total Fleet Capital Cost:	\$5,271,056		

**Arthur D Little**

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
8	16	24
2	1	1
25.14	25.14	37.72
15.79	15.79	23.69
10.23	10.23	15.35
51.17	51.17	76.76
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.3	\$14.3	\$14.3
219	219	219
219	219	110
\$152	\$152	\$114
62.5	62.5	62.5
\$1.07	\$1.07	\$0.82
\$0.93	\$0.93	\$0.64
\$0.13	\$0.13	\$0.18
\$3,741	\$3,741	\$2,150
\$995,077	\$995,077	\$571,951
\$5,271,056		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
8	16	24
2	1	1
25.14	25.14	37.72
26.32	26.32	39.48
12.87	12.87	19.30
64.33	64.33	96.50
\$0.3	\$0.3	\$0.4
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.4	\$14.4	\$14.5
292	292	292
292	292	146
\$255	\$255	\$192
49.7	49.7	49.7
\$1.27	\$1.27	\$1.08
\$0.95	\$0.95	\$0.66
\$0.31	\$0.31	\$0.42
\$5,916	\$5,916	\$3,774
\$1,573,529	\$1,573,529	\$1,003,842
\$5,271,056		

Car Type: Amclub  
Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 41  
Number of Toilets: 2  
Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	12.27	12.27	18.41
Flush Fluid Generated:	9.89	9.89	14.84
Capacity Adjustment:	5.54	5.54	8.31
Total Capacity Required per Day:	27.71	27.71	41.56
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$96	\$96	\$72
Maximum Continuous Hours of Service:	115.5	115.5	115.5
Total Operating Cost per Service Hour:	\$1.15	\$1.15	\$0.93
- Trip Related:	\$0.91	\$0.91	\$0.62
- Non-Trip Related:	\$0.24	\$0.24	\$0.32
Total per-Car Operating Cost per Year:	\$4,690	\$4,690	\$2,858
Total Fleet Operating Cost per Year:	\$112,562	\$112,562	\$68,602
Total Fleet Capital Cost:	\$475,584		

Evac

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
8	16	24
2	1	1
12.27	12.27	18.41
7.71	7.71	11.56
5.00	5.00	7.49
24.98	24.98	37.46
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	110
\$74	\$74	\$56
128.1	128.1	128.1
\$1.04	\$1.04	\$0.79
\$0.91	\$0.91	\$0.61
\$0.13	\$0.13	\$0.18
\$3,645	\$3,645	\$2,078
\$87,484	\$87,484	\$49,882
\$475,584		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
8	16	24
2	1	1
12.27	12.27	18.41
12.85	12.85	19.27
6.28	6.28	9.42
31.40	31.40	47.10
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3
292	292	292
292	292	146
\$125	\$125	\$94
101.9	101.9	101.9
\$1.23	\$1.23	\$1.04
\$0.92	\$0.92	\$0.62
\$0.31	\$0.31	\$0.42
\$5,745	\$5,745	\$3,646
\$137,890	\$137,890	\$87,510
\$475,584		



Car Type: Met-Srvc Dinette

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 23

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	3.47	4.16	4.86
Capacity Adjustment:	1.94	2.33	2.72
Total Capacity Required per Day:	9.71	11.66	13.60
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.0
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.1	\$14.1	\$14.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$34	\$41	\$47
Maximum Continuous Hours of Service:	205.9	205.9	205.9
Total Operating Cost per Service Hour:	\$1.80	\$1.51	\$1.29
- Trip Related:	\$1.43	\$1.19	\$1.02
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,611	\$4,620	\$4,628
Total Fleet Operating Cost per Year:	\$59,945	\$60,056	\$60,167
Total Fleet Capital Cost:	\$257,608		

**Arthur D Little**

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
4.30	5.16	6.02
2.70	3.24	3.78
1.75	2.10	2.45
8.76	10.51	12.26
\$0.0	\$0.0	\$0.0
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.1	\$14.1
219	219	219
219	219	219
\$26	\$31	\$37
228.4	228.4	228.4
\$1.64	\$1.37	\$1.17
\$1.42	\$1.19	\$1.02
\$0.21	\$0.18	\$0.15
\$3,586	\$3,592	\$3,599
\$46,617	\$46,700	\$46,783
\$257,608		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
4.30	5.16	6.02
4.50	5.41	6.31
2.20	2.64	3.08
11.01	13.21	15.41
\$0.0	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.2	\$14.2
292	292	292
292	292	292
\$44	\$52	\$61
181.7	181.7	181.7
\$1.93	\$1.61	\$1.39
\$1.43	\$1.19	\$1.03
\$0.50	\$0.42	\$0.36
\$5,640	\$5,651	\$5,663
\$73,321	\$73,469	\$73,617
\$257,608		

Car Type: **Met-Srvc Coach**

Toilet Type: **Ultimate**

Manufacturer:

Number of Passengers: 60

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario:

Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	9.05	10.86	12.67
Capacity Adjustment:	5.07	6.08	7.10
Total Capacity Required per Day:	25.34	30.41	35.48
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$88	\$106	\$123
Maximum Continuous Hours of Service:	78.9	78.9	78.9
Total Operating Cost per Service Hour:	\$1.83	\$1.53	\$1.32
- Trip Related:	\$1.45	\$1.22	\$1.05
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,680	\$4,702	\$4,724
Total Fleet Operating Cost per Year:	\$233,986	\$235,098	\$236,209
Total Fleet Capital Cost:	\$990,800		

Evac

Favorable

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
11.23	13.47	15.72
7.05	8.46	9.87
4.57	5.48	6.40
22.84	27.41	31.98
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$68	\$82	\$95
87.6	87.6	87.6
\$1.66	\$1.39	\$1.20
\$1.45	\$1.21	\$1.05
\$0.21	\$0.18	\$0.15
\$3,637	\$3,654	\$3,671
\$181,869	\$182,704	\$183,538
\$990,800		

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
11.23	13.47	15.72
11.75	14.10	16.45
5.74	6.89	8.04
28.72	34.46	40.21
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3
292	292	292
292	292	292
\$114	\$137	\$160
69.6	69.6	69.6
\$1.96	\$1.64	\$1.42
\$1.46	\$1.23	\$1.06
\$0.50	\$0.42	\$0.36
\$5,732	\$5,761	\$5,791
\$286,578	\$288,061	\$289,545
\$990,800		

Car Type: Met-Srvc Club  
Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 33  
Number of Toilets: 2  
Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	6.17	7.41	8.64
Flush Fluid Generated:	4.98	5.97	6.97
Capacity Adjustment:	2.79	3.34	3.90
Total Capacity Required per Day:	13.94	16.72	19.51
Pumpout Labor Cost:	\$0.0	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.1	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$48	\$58	\$68
Maximum Continuous Hours of Service:	143.5	143.5	143.5
Total Operating Cost per Service Hour:	\$1.81	\$1.51	\$1.30
- Trip Related:	\$1.43	\$1.20	\$1.03
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,630	\$4,642	\$4,654
Total Fleet Operating Cost per Year:	\$60,186	\$60,345	\$60,504
Total Fleet Capital Cost:	\$257,608		

**Arthur D Little**

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
6.17	7.41	8.64
3.88	4.65	5.43
2.51	3.02	3.52
12.56	15.08	17.59
\$0.0	\$0.0	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.1	\$14.2
219	219	219
219	219	219
\$37	\$45	\$52
159.2	159.2	159.2
\$1.64	\$1.37	\$1.18
\$1.43	\$1.20	\$1.03
\$0.21	\$0.18	\$0.15
\$3,600	\$3,609	\$3,618
\$46,798	\$46,917	\$47,036
\$257,608		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
6.17	7.41	8.64
6.46	7.76	9.05
3.16	3.79	4.42
15.80	18.95	22.11
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
292	292	292
292	292	292
\$63	\$75	\$88
126.6	126.6	126.6
\$1.94	\$1.62	\$1.39
\$1.44	\$1.20	\$1.04
\$0.50	\$0.42	\$0.36
\$5,665	\$5,681	\$5,697
\$73,642	\$73,855	\$74,067
\$257,608		

Car Type: Amdinette

Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 23

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	3.47	4.16	4.86
Capacity Adjustment:	1.94	2.33	2.72
Total Capacity Required per Day:	9.71	11.66	13.60
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.0
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.1	\$14.1	\$14.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$34	\$41	\$47
Maximum Continuous Hours of Service:	205.9	205.9	205.9
Total Operating Cost per Service Hour:	\$1.80	\$1.51	\$1.29
- Trip Related:	\$1.43	\$1.19	\$1.02
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,611	\$4,620	\$4,628
Total Fleet Operating Cost per Year:	\$115,279	\$115,492	\$115,705
Total Fleet Capital Cost:	\$495,400		

Evac

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
4.30	5.16	6.02
2.70	3.24	3.78
1.75	2.10	2.45
8.76	10.51	12.26
\$0.0	\$0.0	\$0.0
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.1	\$14.1
219	219	219
219	219	219
\$26	\$31	\$37
228.4	228.4	228.4
\$1.64	\$1.37	\$1.17
\$1.42	\$1.19	\$1.02
\$0.21	\$0.18	\$0.15
\$3,586	\$3,592	\$3,599
\$89,647	\$89,807	\$89,967
\$495,400		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
4.30	5.16	6.02
4.50	5.41	6.31
2.20	2.64	3.08
11.01	13.21	15.41
\$0.0	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.1	\$14.2	\$14.2
292	292	292
292	292	292
\$44	\$52	\$61
181.7	181.7	181.7
\$1.93	\$1.61	\$1.39
\$1.43	\$1.19	\$1.03
\$0.50	\$0.42	\$0.36
\$5,640	\$5,651	\$5,663
\$141,002	\$141,286	\$141,570
\$495,400		



Car Type: Amcoach

Toilet Type: Ultimate

Manufacturer: I

Number of Passengers: 60

Number of Toilets: 2

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	11.23	13.47	15.72
Flush Fluid Generated:	9.05	10.86	12.67
Capacity Adjustment:	5.07	6.08	7.10
Total Capacity Required per Day:	25.34	30.41	35.48
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$88	\$106	\$123
Maximum Continuous Hours of Service:	78.9	78.9	78.9
Total Operating Cost per Service Hour:	\$1.83	\$1.53	\$1.32
- Trip Related:	\$1.45	\$1.22	\$1.05
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,680	\$4,702	\$4,724
Total Fleet Operating Cost per Year:	\$145,071	\$145,761	\$146,450
Total Fleet Capital Cost:	\$614,296		

**Arthur D Little**

Evac

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
11.23	13.47	15.72
7.05	8.46	9.87
4.57	5.48	6.40
22.84	27.41	31.98
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$68	\$82	\$95
87.6	87.6	87.6
\$1.66	\$1.39	\$1.20
\$1.45	\$1.21	\$1.05
\$0.21	\$0.18	\$0.15
\$3,637	\$3,654	\$3,671
\$112,759	\$113,276	\$113,794
\$614,296		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
11.23	13.47	15.72
11.75	14.10	16.45
5.74	6.89	8.04
28.72	34.46	40.21
\$0.1	\$0.1	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.3
292	292	292
292	292	292
\$114	\$137	\$160
69.6	69.6	69.6
\$1.96	\$1.64	\$1.42
\$1.46	\$1.23	\$1.06
\$0.50	\$0.42	\$0.36
\$5,732	\$5,761	\$5,791
\$177,678	\$178,598	\$179,518
\$614,296		

Car Type: Turbo Power Club  
 Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 27  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$16,628		
- Equipment:	\$14,900		
- Installation:	\$1,728		
Maintenance Cost:	\$663		
- Labor:	\$216		
- Spare Parts:	\$447		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	5.05	6.06	7.07
Flush Fluid Generated:	4.07	4.89	5.70
Capacity Adjustment:	2.28	2.74	3.19
Total Capacity Required per Day:	11.40	13.68	15.96
Pumpout Labor Cost:	\$0.0	\$0.0	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.1	\$8.1	\$8.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$40	\$48	\$55
Maximum Continuous Hours of Service:	175.4	175.4	175.4
Total Operating Cost per Service Hour:	\$1.09	\$0.91	\$0.78
- Trip Related:	\$0.83	\$0.69	\$0.60
- Non-Trip Related:	\$0.26	\$0.22	\$0.19
Total per-Car Operating Cost per Year:	\$2,783	\$2,793	\$2,803
Total Fleet Operating Cost per Year:	\$16,695	\$16,755	\$16,816
Total Fleet Capital Cost:	\$99,768		

Evac

Favorable

\$16,628		
\$14,900		
\$1,728		
\$293		
\$144		
\$149		
2	12	7
5	1	2
5.05	6.06	7.07
3.17	3.81	4.44
2.06	2.47	2.88
10.28	12.34	14.39
\$0.0	\$0.0	\$0.0
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.1	\$8.1	\$8.1
219	219	219
219	219	219
\$31	\$37	\$43
194.6	194.6	194.6
\$0.96	\$0.80	\$0.69
\$0.83	\$0.69	\$0.60
\$0.13	\$0.11	\$0.10
\$2,104	\$2,112	\$2,119
\$12,627	\$12,672	\$12,717
\$99,768		

Unfavorable

\$16,628		
\$14,900		
\$1,728		
\$1,033		
\$288		
\$745		
2	12	7
5	1	2
5.05	6.06	7.07
5.29	6.35	7.40
2.58	3.10	3.62
12.92	15.51	18.09
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
292	292	292
292	292	292
\$51	\$62	\$72
154.8	154.8	154.8
\$1.19	\$0.99	\$0.85
\$0.83	\$0.70	\$0.60
\$0.35	\$0.29	\$0.25
\$3,465	\$3,478	\$3,492
\$20,790	\$20,870	\$20,950
\$99,768		

Car Type: Turbo Coach  
 Toilet Type: Ultimate

Manufacturer: I

Number of Passengers: 72  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$19,816		
- Equipment:	\$17,800		
- Installation:	\$2,016		
Maintenance Cost:	\$966		
- Labor:	\$432		
- Spare Parts:	\$534		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	13.47	16.16	18.86
Flush Fluid Generated:	10.86	13.03	15.20
Capacity Adjustment:	6.08	7.30	8.51
Total Capacity Required per Day:	30.41	36.49	42.57
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.2
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$14.2	\$14.2	\$14.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$106	\$127	\$148
Maximum Continuous Hours of Service:	65.8	65.8	65.8
Total Operating Cost per Service Hour:	\$1.84	\$1.54	\$1.33
- Trip Related:	\$1.46	\$1.23	\$1.06
- Non-Trip Related:	\$0.38	\$0.32	\$0.27
Total per-Car Operating Cost per Year:	\$4,702	\$4,729	\$4,755
Total Fleet Operating Cost per Year:	\$98,741	\$99,301	\$99,862
Total Fleet Capital Cost:	\$416,136		

**Arthur D Little**

Evac

Favorable

\$19,816		
\$17,800		
\$2,016		
\$466		
\$288		
\$178		
2	12	7
5	1	2
13.47	16.16	18.86
8.46	10.15	11.84
5.48	6.58	7.68
27.41	32.90	38.38
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.2	\$14.2
219	219	219
219	219	219
\$82	\$98	\$114
73.0	73.0	73.0
\$1.67	\$1.40	\$1.20
\$1.46	\$1.22	\$1.05
\$0.21	\$0.18	\$0.15
\$3,654	\$3,674	\$3,694
\$76,736	\$77,156	\$77,577
\$416,136		

Unfavorable

\$19,816		
\$17,800		
\$2,016		
\$1,466		
\$576		
\$890		
2	12	7
5	1	2
13.47	16.16	18.86
14.10	16.92	19.74
6.89	8.27	9.65
34.46	41.36	48.25
\$0.1	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$12.0	\$12.0	\$12.0
\$14.2	\$14.3	\$14.3
292	292	292
292	292	292
\$137	\$164	\$192
58.0	58.0	58.0
\$1.97	\$1.65	\$1.43
\$1.47	\$1.24	\$1.07
\$0.50	\$0.42	\$0.36
\$5,761	\$5,797	\$5,832
\$120,986	\$121,734	\$122,481
\$416,136		

Car Type: Turbo Cafe  
 Toilet Type: Ultimate

Manufacturer:

Number of Passengers: 52  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$16,628		
- Equipment:	\$14,900		
- Installation:	\$1,728		
Maintenance Cost:	\$663		
- Labor:	\$216		
- Spare Parts:	\$447		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	9.73	11.67	13.62
Flush Fluid Generated:	7.84	9.41	10.98
Capacity Adjustment:	4.39	5.27	6.15
Total Capacity Required per Day:	21.96	26.35	30.75
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.2	\$8.2	\$8.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$76	\$92	\$107
Maximum Continuous Hours of Service:	91.1	91.1	91.1
Total Operating Cost per Service Hour:	\$1.11	\$0.93	\$0.80
- Trip Related:	\$0.85	\$0.71	\$0.62
- Non-Trip Related:	\$0.26	\$0.22	\$0.19
Total per-Car Operating Cost per Year:	\$2,829	\$2,848	\$2,867
Total Fleet Operating Cost per Year:	\$8,487	\$8,545	\$8,602
Total Fleet Capital Cost:	\$49,884		

Evac

Favorable

Unfavorable

\$16,628		
\$14,900		
\$1,728		
\$293		
\$144		
\$149		
2	12	7
5	1	2
9.73	11.67	13.62
6.11	7.33	8.55
3.96	4.75	5.54
19.80	23.76	27.72
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
219	219	219
219	219	219
\$59	\$71	\$83
101.0	101.0	101.0
\$0.98	\$0.82	\$0.71
\$0.84	\$0.71	\$0.61
\$0.13	\$0.11	\$0.10
\$2,139	\$2,154	\$2,168
\$6,418	\$6,461	\$6,505
\$49,884		

\$16,628		
\$14,900		
\$1,728		
\$1,033		
\$288		
\$745		
2	12	7
5	1	2
9.73	11.67	13.62
10.18	12.22	14.26
4.98	5.97	6.97
24.89	29.87	34.85
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
292	292	292
292	292	292
\$99	\$119	\$138
80.4	80.4	80.4
\$1.21	\$1.01	\$0.88
\$0.85	\$0.72	\$0.62
\$0.35	\$0.29	\$0.25
\$3,527	\$3,552	\$3,578
\$10,580	\$10,657	\$10,735
\$49,884		



Car Type: Turbo Power Coach

Toilet Type: Ultimate

Manufacturer: I

Number of Passengers: 40

Number of Toilets: 1

Total Tank Capacity (gals): 200.0

Scenario: Expected

Capital Cost	\$16,628		
- Equipment:	\$14,900		
- Installation:	\$1,728		
Maintenance Cost:	\$663		
- Labor:	\$216		
- Spare Parts:	\$447		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	7.48	8.98	10.48
Flush Fluid Generated:	6.03	7.24	8.44
Capacity Adjustment:	3.38	4.05	4.73
Total Capacity Required per Day:	16.89	20.27	23.65
Pumpout Labor Cost:	\$0.1	\$0.1	\$0.1
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.2	\$8.2	\$8.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$59	\$70	\$82
Maximum Continuous Hours of Service:	118.4	118.4	118.4
Total Operating Cost per Service Hour:	\$1.10	\$0.92	\$0.79
- Trip Related:	\$0.84	\$0.70	\$0.61
- Non-Trip Related:	\$0.26	\$0.22	\$0.19
Total per-Car Operating Cost per Year:	\$2,807	\$2,821	\$2,836
Total Fleet Operating Cost per Year:	\$39,293	\$39,501	\$39,708
Total Fleet Capital Cost:	\$232,792		

**Arthur D Little**

Evac

**Favorable**

\$16,628		
\$14,900		
\$1,728		
\$293		
\$144		
\$149		
2	12	7
5	1	2
7.48	8.98	10.48
4.70	5.64	6.58
3.05	3.66	4.26
15.23	18.28	21.32
\$0.0	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.1	\$8.2	\$8.2
219	219	219
219	219	219
\$45	\$54	\$64
131.3	131.3	131.3
\$0.97	\$0.81	\$0.70
\$0.84	\$0.70	\$0.60
\$0.13	\$0.11	\$0.10
\$2,123	\$2,134	\$2,145
\$29,716	\$29,872	\$30,027
\$232,792		

**Unfavorable**

\$16,628		
\$14,900		
\$1,728		
\$1,033		
\$288		
\$745		
2	12	7
5	1	2
7.48	8.98	10.48
7.83	9.40	10.97
3.83	4.60	5.36
19.15	22.98	26.80
\$0.1	\$0.1	\$0.1
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.2	\$8.2	\$8.2
292	292	292
292	292	292
\$76	\$91	\$106
104.5	104.5	104.5
\$1.20	\$1.00	\$0.87
\$0.84	\$0.71	\$0.61
\$0.35	\$0.29	\$0.25
\$3,497	\$3,517	\$3,537
\$48,959	\$49,236	\$49,513
\$232,792		



Car Type: Coach-HEP-HLV

Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 72

Number of Toilets: 4

Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$21,728		
- Equipment:	\$20,000		
- Installation:	\$1,728		
Maintenance Cost:	\$1,464		
- Labor:	\$864		
- Spare Parts:	\$600		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
Waste Generated:	32.33	64.66	96.98
Flush Fluid Generated:	145.89	291.79	437.68
Capacity Adjustment:	44.56	89.11	133.67
Total Capacity Required per Day:	222.78	445.56	668.34
Pumpout Labor Cost:	\$1.5	\$2.9	\$4.4
Connect/Disconnect Labor Cost:	\$12.6	\$21.0	\$29.4
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$38.1	\$47.9	\$57.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$387	\$516	\$581
Maximum Continuous Hours of Service:	10.8	10.8	10.8
Total Operating Cost per Service Hour:	\$2.19	\$1.48	\$1.25
- Trip Related:	\$1.71	\$1.12	\$0.93
- Non-Trip Related:	\$0.48	\$0.36	\$0.32
Total per-Car Operating Cost per Year:	\$6,713	\$6,061	\$5,735
Total Fleet Operating Cost per Year:	\$140,975	\$127,283	\$120,437
Total Fleet Capital Cost:	\$456,288		

**Arthur D Little**

Favorable

\$21,728		
\$20,000		
\$1,728		
\$776		
\$576		
\$200		
24	48	72
1	1	1
32.33	64.66	96.98
113.68	227.37	341.05
36.50	73.01	109.51
182.52	365.03	547.55
\$1.1	\$2.3	\$3.4
\$8.4	\$16.8	\$25.2
\$24.0	\$24.0	\$24.0
\$33.5	\$43.1	\$52.6
219	219	219
110	73	55
\$272	\$362	\$408
13.1	13.1	13.1
\$1.80	\$1.22	\$1.03
\$1.50	\$1.00	\$0.83
\$0.30	\$0.22	\$0.20
\$4,720	\$4,283	\$4,064
\$99,122	\$89,938	\$85,347
\$456,288		

Unfavorable

\$21,728		
\$20,000		
\$1,728		
\$2,152		
\$1,152		
\$1,000		
24	48	72
1	1	1
32.33	64.66	96.98
189.47	378.95	568.42
55.45	110.90	166.35
277.25	554.50	831.76
\$1.9	\$3.8	\$5.7
\$12.6	\$25.2	\$37.8
\$24.0	\$24.0	\$24.0
\$38.5	\$53.0	\$67.5
292	292	292
146	97	73
\$551	\$734	\$826
8.7	8.7	8.7
\$2.38	\$1.72	\$1.50
\$1.76	\$1.26	\$1.09
\$0.61	\$0.46	\$0.41
\$8,323	\$8,044	\$7,904
\$174,778	\$168,917	\$165,986
\$456,288		

Car Type: Lounge-HEP-HLV  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 86  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	38.61	77.23	115.84
Flush Fluid Generated:	174.26	348.53	522.79
Capacity Adjustment:	53.22	106.44	159.66
Total Capacity Required per Day:	266.10	532.19	798.29
Pumpout Labor Cost:	\$1.7	\$3.5	\$5.2
Connect/Disconnect Labor Cost:	\$12.6	\$25.2	\$33.6
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$26.3	\$40.7	\$50.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$462	\$616	\$693
Maximum Continuous Hours of Service:	9.0	9.0	9.0
Total Operating Cost per Service Hour:	\$1.53	\$1.21	\$1.04
- Trip Related:	\$1.25	\$1.00	\$0.86
- Non-Trip Related:	\$0.28	\$0.21	\$0.19
Total per-Car Operating Cost per Year:	\$4,680	\$4,933	\$4,792
Total Fleet Operating Cost per Year:	\$28,078	\$29,601	\$28,753
Total Fleet Capital Cost:	\$90,912		

# Railtech

## Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
24	48	72
1	1	1
38.61	77.23	115.84
135.79	271.58	407.37
43.60	87.20	130.80
218.00	436.01	654.01
\$1.4	\$2.7	\$4.1
\$12.6	\$21.0	\$29.4
\$12.0	\$12.0	\$12.0
\$26.0	\$35.7	\$45.5
219	219	219
110	73	55
\$325	\$433	\$487
11.0	11.0	11.0
\$1.37	\$0.99	\$0.86
\$1.21	\$0.87	\$0.76
\$0.16	\$0.12	\$0.11
\$3,595	\$3,468	\$3,405
\$21,570	\$20,809	\$20,428
\$90,912		

## Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
24	48	72
1	1	1
38.61	77.23	115.84
226.32	452.63	678.95
66.23	132.46	198.70
331.16	662.32	993.49
\$2.3	\$4.5	\$6.8
\$16.8	\$29.4	\$42.0
\$12.0	\$12.0	\$12.0
\$31.1	\$45.9	\$60.8
292	292	292
146	97	73
\$658	\$877	\$986
7.2	7.2	7.2
\$1.85	\$1.42	\$1.27
\$1.48	\$1.14	\$1.03
\$0.36	\$0.27	\$0.24
\$6,469	\$6,623	\$6,700
\$38,813	\$39,737	\$40,200
\$90,912		

Car Type: Trans Dorm Coach  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 40  
 Number of Toilets: 4  
 Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$21,728		
- Equipment:	\$20,000		
- Installation:	\$1,728		
Maintenance Cost:	\$1,464		
- Labor:	\$864		
- Spare Parts:	\$600		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	81.05	162.11	243.16
Capacity Adjustment:	24.75	49.51	74.26
Total Capacity Required per Day:	123.77	247.53	371.30
Pumpout Labor Cost:	\$0.8	\$1.6	\$2.4
Connect/Disconnect Labor Cost:	\$8.4	\$12.6	\$16.8
Cleaning Labor Cost:	\$24.0	\$24.0	\$24.0
Total Pumpout/Cleaning Cost per Day:	\$33.2	\$38.2	\$43.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$215	\$287	\$323
Maximum Continuous Hours of Service:	19.4	19.4	19.4
Total Operating Cost per Service Hour:	\$1.93	\$1.22	\$0.99
- Trip Related:	\$1.45	\$0.87	\$0.67
- Non-Trip Related:	\$0.48	\$0.36	\$0.32
Total per-Car Operating Cost per Year:	\$5,922	\$5,006	\$4,548
Total Fleet Operating Cost per Year:	\$213,180	\$180,211	\$163,727
Total Fleet Capital Cost:	\$782,208		

**Arthur D Little**



**Favorable**

\$21,728		
\$20,000		
\$1,728		
\$776		
\$576		
\$200		
24	48	72
1	1	1
17.96	35.92	53.88
63.16	126.32	189.47
20.28	40.56	60.84
101.40	202.79	304.19
\$0.6	\$1.3	\$1.9
\$8.4	\$12.6	\$16.8
\$24.0	\$24.0	\$24.0
\$33.0	\$37.9	\$42.7
219	219	219
110	73	55
\$151	\$201	\$227
23.7	23.7	23.7
\$1.73	\$1.07	\$0.85
\$1.43	\$0.85	\$0.65
\$0.30	\$0.22	\$0.20
\$4,544	\$3,741	\$3,340
\$163,583	\$134,688	\$120,241
\$782,208		

**Unfavorable**

\$21,728		
\$20,000		
\$1,728		
\$2,152		
\$1,152		
\$1,000		
24	48	72
1	1	1
17.96	35.92	53.88
105.26	210.53	315.79
30.81	61.61	92.42
154.03	308.06	462.09
\$1.1	\$2.1	\$3.2
\$8.4	\$16.8	\$21.0
\$24.0	\$24.0	\$24.0
\$33.5	\$42.9	\$48.2
292	292	292
146	97	73
\$306	\$408	\$459
15.6	15.6	15.6
\$2.10	\$1.44	\$1.17
\$1.48	\$0.98	\$0.76
\$0.61	\$0.46	\$0.41
\$7,342	\$6,736	\$6,126
\$264,309	\$242,492	\$220,546
\$782,208		

Car Type: **Sleeper Super**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **44**  
 Number of Toilets: **12**  
 Total Tank Capacity (gals): **300.0**

Scenario: **Expected**

Capital Cost	\$65,184		
- Equipment:	\$60,000		
- Installation:	\$5,184		
Maintenance Cost:	\$4,392		
- Labor:	\$2,592		
- Spare Parts:	\$1,800		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	19.76	39.51	59.27
Flush Fluid Generated:	89.16	178.32	267.47
Capacity Adjustment:	27.23	54.46	81.69
Total Capacity Required per Day:	136.14	272.28	408.43
Pumpout Labor Cost:	\$0.9	\$1.8	\$2.7
Connect/Disconnect Labor Cost:	\$12.6	\$12.6	\$25.2
Cleaning Labor Cost:	\$72.0	\$72.0	\$72.0
Total Pumpout/Cleaning Cost per Day:	\$85.5	\$86.4	\$99.9
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$237	\$315	\$355
Maximum Continuous Hours of Service:	52.9	52.9	52.9
Total Operating Cost per Service Hour:	\$5.07	\$2.95	\$2.42
- Trip Related:	\$3.64	\$1.88	\$1.46
- Non-Trip Related:	\$1.43	\$1.07	\$0.95
Total per-Car Operating Cost per Year:	\$15,550	\$12,064	\$11,126
Total Fleet Operating Cost per Year:	\$1,057,406	\$820,375	\$756,588
Total Fleet Capital Cost:	\$4,432,512		

**Railtech**

**Favorable**

\$65,184		
\$60,000		
\$5,184		
\$2,328		
\$1,728		
\$600		
24	48	72
1	1	1
19.76	39.51	59.27
69.47	138.95	208.42
22.31	44.61	66.92
111.54	223.07	334.61
\$0.7	\$1.4	\$2.1
\$12.6	\$12.6	\$25.2
\$72.0	\$72.0	\$72.0
\$85.3	\$86.0	\$99.3
219	219	219
110	73	55
\$166	\$221	\$249
64.6	64.6	64.6
\$4.50	\$2.52	\$2.03
\$3.62	\$1.85	\$1.44
\$0.89	\$0.66	\$0.59
\$11,834	\$8,827	\$8,013
\$804,703	\$600,216	\$544,881
\$4,432,512		

**Unfavorable**

\$65,184		
\$60,000		
\$5,184		
\$6,456		
\$3,456		
\$3,000		
24	48	72
1	1	1
19.76	39.51	59.27
115.79	231.58	347.37
33.89	67.77	101.66
169.43	338.86	508.30
\$1.2	\$2.3	\$3.5
\$12.6	\$25.2	\$25.2
\$72.0	\$72.0	\$72.0
\$85.8	\$99.5	\$100.7
292	292	292
146	97	73
\$336	\$449	\$505
42.5	42.5	42.5
\$5.51	\$3.55	\$2.72
\$3.67	\$2.17	\$1.49
\$1.84	\$1.38	\$1.23
\$19,313	\$16,591	\$14,310
\$1,313,289	\$1,128,172	\$973,067
\$4,432,512		

Car Type: Bag Coach Super

Toilet Type: WTS 8300

Manufacturer: I

Number of Passengers: 78

Number of Toilets: 5

Total Tank Capacity (gals): 150.0

Scenario: Expected

Capital Cost	\$29,304		
- Equipment:	\$27,000		
- Installation:	\$2,304		
Maintenance Cost:	\$1,890		
- Labor:	\$1,080		
- Spare Parts:	\$810		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	35.02	70.04	105.07
Flush Fluid Generated:	158.05	316.11	474.16
Capacity Adjustment:	48.27	96.54	144.81
Total Capacity Required per Day:	241.34	482.69	724.03
Pumpout Labor Cost:	\$1.6	\$3.2	\$4.7
Connect/Disconnect Labor Cost:	\$12.6	\$25.2	\$31.5
Cleaning Labor Cost:	\$30.0	\$30.0	\$30.0
Total Pumpout/Cleaning Cost per Day:	\$44.2	\$58.4	\$66.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$419	\$559	\$629
Maximum Continuous Hours of Service:	14.9	14.9	14.9
Total Operating Cost per Service Hour:	\$2.59	\$1.81	\$1.47
- Trip Related:	\$1.98	\$1.35	\$1.06
- Non-Trip Related:	\$0.62	\$0.46	\$0.41
Total per-Car Operating Cost per Year:	\$7,953	\$7,419	\$6,750
Total Fleet Operating Cost per Year:	\$381,762	\$356,136	\$324,007
Total Fleet Capital Cost:	\$1,406,592		

**Arthur D Little**

Favorable

\$29,304		
\$27,000		
\$2,304		
\$990		
\$720		
\$270		
24	48	72
1	1	1
35.02	70.04	105.07
123.16	246.32	369.47
39.54	79.09	118.63
197.72	395.45	593.17
\$1.2	\$2.5	\$3.7
\$12.6	\$18.9	\$25.2
\$30.0	\$30.0	\$30.0
\$43.8	\$51.4	\$58.9
219	219	219
110	73	55
\$294	\$393	\$442
18.2	18.2	18.2
\$2.32	\$1.46	\$1.18
\$1.94	\$1.18	\$0.93
\$0.38	\$0.28	\$0.25
\$6,084	\$5,132	\$4,656
\$292,032	\$246,341	\$223,496
\$1,406,592		

Unfavorable

\$29,304		
\$27,000		
\$2,304		
\$2,790		
\$1,440		
\$1,350		
24	48	72
1	1	1
35.02	70.04	105.07
205.26	410.53	615.79
60.07	120.14	180.21
300.36	600.71	901.07
\$2.1	\$4.1	\$6.2
\$18.9	\$31.5	\$44.1
\$30.0	\$30.0	\$30.0
\$51.0	\$65.6	\$80.3
292	292	292
146	97	73
\$596	\$795	\$895
12.0	12.0	12.0
\$3.09	\$2.13	\$1.82
\$2.29	\$1.54	\$1.28
\$0.80	\$0.60	\$0.53
\$10,825	\$9,971	\$9,543
\$519,623	\$478,597	\$458,084
\$1,406,592		

Car Type: Coach Super  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 75  
 Number of Toilets: 6  
 Total Tank Capacity (gals): 150.0

Scenario: Expected

Capital Cost	\$32,592		
- Equipment:	\$30,000		
- Installation:	\$2,592		
Maintenance Cost:	\$2,196		
- Labor:	\$1,296		
- Spare Parts:	\$900		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	33.68	67.35	101.03
Flush Fluid Generated:	151.97	303.95	455.92
Capacity Adjustment:	46.41	92.82	139.24
Total Capacity Required per Day:	232.06	464.12	696.18
Pumpout Labor Cost:	\$1.5	\$3.0	\$4.6
Connect/Disconnect Labor Cost:	\$12.6	\$25.2	\$31.5
Cleaning Labor Cost:	\$36.0	\$36.0	\$36.0
Total Pumpout/Cleaning Cost per Day:	\$50.1	\$64.2	\$72.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$403	\$538	\$605
Maximum Continuous Hours of Service:	15.5	15.5	15.5
Total Operating Cost per Service Hour:	\$2.94	\$2.01	\$1.61
- Trip Related:	\$2.22	\$1.47	\$1.13
- Non-Trip Related:	\$0.72	\$0.54	\$0.48
Total per-Car Operating Cost per Year:	\$9,002	\$8,205	\$7,404
Total Fleet Operating Cost per Year:	\$819,180	\$746,622	\$673,724
Total Fleet Capital Cost:	\$2,965,872		

# Railtech

## Favorable

\$32,592		
\$30,000		
\$2,592		
\$1,164		
\$864		
\$300		
24	48	72
1	1	1
33.68	67.35	101.03
118.42	236.84	355.26
38.02	76.05	114.07
190.12	380.24	570.36
\$1.2	\$2.4	\$3.6
\$12.6	\$18.9	\$25.2
\$36.0	\$36.0	\$36.0
\$49.8	\$57.3	\$64.8
219	219	219
110	73	55
\$283	\$378	\$425
18.9	18.9	18.9
\$2.62	\$1.63	\$1.30
\$2.18	\$1.30	\$1.01
\$0.44	\$0.33	\$0.30
\$6,898	\$5,722	\$5,134
\$627,763	\$520,711	\$467,185
\$2,965,872		

## Unfavorable

\$32,592		
\$30,000		
\$2,592		
\$3,228		
\$1,728		
\$1,500		
24	48	72
1	1	1
33.68	67.35	101.03
197.37	394.74	592.11
57.76	115.52	173.28
288.80	577.61	866.41
\$2.0	\$3.9	\$5.9
\$12.6	\$25.2	\$37.8
\$36.0	\$36.0	\$36.0
\$50.6	\$65.1	\$79.7
292	292	292
146	97	73
\$573	\$765	\$860
12.5	12.5	12.5
\$3.19	\$2.21	\$1.89
\$2.27	\$1.52	\$1.27
\$0.92	\$0.69	\$0.61
\$11,185	\$10,334	\$9,908
\$1,017,854	\$940,359	\$901,611
\$2,965,872		

Car Type: Horizon  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 82  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	18.41	36.82	73.64
Flush Fluid Generated:	83.08	166.16	332.32
Capacity Adjustment:	25.37	50.74	101.49
Total Capacity Required per Day:	126.86	253.72	507.44
Pumpout Labor Cost:	\$0.8	\$1.7	\$3.3
Connect/Disconnect Labor Cost:	\$8.4	\$12.6	\$25.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$21.2	\$26.3	\$40.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$441	\$441	\$588
Maximum Continuous Hours of Service:	9.5	9.5	9.5
Total Operating Cost per Service Hour:	\$2.19	\$1.52	\$1.20
- Trip Related:	\$1.91	\$1.24	\$0.99
- Non-Trip Related:	\$0.28	\$0.28	\$0.21
Total per-Car Operating Cost per Year:	\$6,717	\$4,648	\$4,891
Total Fleet Operating Cost per Year:	\$691,880	\$478,716	\$503,770
Total Fleet Capital Cost:	\$1,560,656		

**Arthur D Little**



Favorable

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
12	24	48
1	1	1
18.41	36.82	73.64
64.74	129.47	258.95
20.79	41.57	83.15
103.93	207.86	415.73
\$0.6	\$1.3	\$2.6
\$8.4	\$12.6	\$21.0
\$12.0	\$12.0	\$12.0
\$21.0	\$25.9	\$35.6
219	219	219
219	110	73
\$310	\$310	\$413
11.5	11.5	11.5
\$2.03	\$1.36	\$0.98
\$1.87	\$1.20	\$0.86
\$0.16	\$0.16	\$0.12
\$5,347	\$3,573	\$3,439
\$550,733	\$368,022	\$354,193
\$1,560,656		

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
12	24	48
1	1	1
18.41	36.82	73.64
107.89	215.79	431.58
31.58	63.15	126.30
157.88	315.76	631.52
\$1.1	\$2.2	\$4.3
\$8.4	\$16.8	\$29.4
\$12.0	\$12.0	\$12.0
\$21.5	\$31.0	\$45.7
292	292	292
292	146	97
\$627	\$627	\$836
7.6	7.6	7.6
\$2.33	\$1.83	\$1.40
\$1.97	\$1.47	\$1.13
\$0.36	\$0.36	\$0.27
\$8,175	\$6,423	\$6,562
\$842,007	\$661,551	\$675,848
\$1,560,656		

Car Type: Coach  
Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 48  
Number of Toilets: 2  
Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.78	21.55	43.10
Flush Fluid Generated:	48.63	97.26	194.53
Capacity Adjustment:	14.85	29.70	59.41
Total Capacity Required per Day:	74.26	148.52	297.04
Pumpout Labor Cost:	\$0.5	\$1.0	\$1.9
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$12.6
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.7	\$21.4	\$26.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$258	\$258	\$344
Maximum Continuous Hours of Service:	16.2	16.2	16.2
Total Operating Cost per Service Hour:	\$1.75	\$1.25	\$0.85
- Trip Related:	\$1.47	\$0.97	\$0.64
- Non-Trip Related:	\$0.28	\$0.28	\$0.21
Total per-Car Operating Cost per Year:	\$5,373	\$3,840	\$3,457
Total Fleet Operating Cost per Year:	\$419,124	\$299,550	\$269,632
Total Fleet Capital Cost:	\$1,181,856		

**Railtech**

**Favorable**

**Unfavorable**

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
12	24	48
1	1	1
10.78	21.55	43.10
37.89	75.79	151.58
12.17	24.34	48.67
60.84	121.68	243.35
\$0.4	\$0.8	\$1.5
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.6	\$21.2	\$26.1
219	219	219
219	110	73
\$181	\$181	\$242
19.7	19.7	19.7
\$1.61	\$1.11	\$0.74
\$1.45	\$0.95	\$0.61
\$0.16	\$0.16	\$0.12
\$4,240	\$2,926	\$2,576
\$330,719	\$228,227	\$200,932
\$1,181,856		

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
12	24	48
1	1	1
10.78	21.55	43.10
63.16	126.32	252.63
18.48	36.97	73.93
92.42	184.83	369.67
\$0.6	\$1.3	\$2.5
\$4.2	\$8.4	\$16.8
\$12.0	\$12.0	\$12.0
\$16.8	\$21.7	\$31.3
292	292	292
292	146	97
\$367	\$367	\$489
13.0	13.0	13.0
\$1.87	\$1.37	\$1.03
\$1.51	\$1.01	\$0.76
\$0.36	\$0.36	\$0.27
\$6,558	\$4,806	\$4,814
\$511,511	\$374,855	\$375,526
\$1,181,856		

Car Type: Coach (HDCP)

Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 44

Number of Toilets: 3

Total Tank Capacity (gals): 100.0

Scenario:

Expected

Capital Cost	\$18,440		
- Equipment:	\$17,000		
- Installation:	\$1,440		
Maintenance Cost:	\$1,158		
- Labor:	\$648		
- Spare Parts:	\$510		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	9.88	19.76	39.51
Flush Fluid Generated:	44.58	89.16	178.32
Capacity Adjustment:	13.61	27.23	54.46
Total Capacity Required per Day:	68.07	136.14	272.28
Pumpout Labor Cost:	\$0.4	\$0.9	\$1.8
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$12.6
Cleaning Labor Cost:	\$18.0	\$18.0	\$18.0
Total Pumpout/Cleaning Cost per Day:	\$22.6	\$27.3	\$32.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$237	\$237	\$315
Maximum Continuous Hours of Service:	17.6	17.6	17.6
Total Operating Cost per Service Hour:	\$2.34	\$1.59	\$1.04
- Trip Related:	\$1.96	\$1.21	\$0.75
- Non-Trip Related:	\$0.38	\$0.38	\$0.28
Total per-Car Operating Cost per Year:	\$7,181	\$4,881	\$4,231
Total Fleet Operating Cost per Year:	\$150,791	\$102,502	\$88,858
Total Fleet Capital Cost:	\$387,240		

**Arthur D Little**

Favorable

\$18,440		
\$17,000		
\$1,440		
\$602		
\$432		
\$170		
12	24	48
1	1	1
9.88	19.76	39.51
34.74	69.47	138.95
11.15	22.31	44.61
55.77	111.54	223.07
\$0.3	\$0.7	\$1.4
\$4.2	\$8.4	\$12.6
\$18.0	\$18.0	\$18.0
\$22.5	\$27.1	\$32.0
219	219	219
219	110	73
\$166	\$166	\$221
21.5	21.5	21.5
\$2.17	\$1.42	\$0.90
\$1.94	\$1.19	\$0.73
\$0.23	\$0.23	\$0.17
\$5,706	\$3,735	\$3,159
\$119,825	\$78,434	\$66,333
\$387,240		

Unfavorable

\$18,440		
\$17,000		
\$1,440		
\$1,714		
\$864		
\$850		
12	24	48
1	1	1
9.88	19.76	39.51
57.89	115.79	231.58
16.94	33.89	67.77
84.72	169.43	338.86
\$0.6	\$1.2	\$2.3
\$4.2	\$8.4	\$16.8
\$18.0	\$18.0	\$18.0
\$22.8	\$27.6	\$37.1
292	292	292
292	146	97
\$336	\$336	\$449
14.2	14.2	14.2
\$2.48	\$1.73	\$1.24
\$1.99	\$1.24	\$0.87
\$0.49	\$0.49	\$0.37
\$8,702	\$6,074	\$5,775
\$182,739	\$127,551	\$121,279
\$387,240		

Car Type: **Dome Coach**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **46**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **100.0**

Scenario:	Expected		
Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	10.33	20.65	41.31
Flush Fluid Generated:	46.61	93.21	186.42
Capacity Adjustment:	14.23	28.47	56.93
Total Capacity Required per Day:	71.17	142.33	284.66
Pumpout Labor Cost:	\$0.5	\$0.9	\$1.9
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$12.6
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.7	\$21.3	\$26.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$247	\$247	\$330
Maximum Continuous Hours of Service:	16.9	16.9	16.9
Total Operating Cost per Service Hour:	\$1.75	\$1.25	\$0.84
- Trip Related:	\$1.47	\$0.97	\$0.63
- Non-Trip Related:	\$0.28	\$0.28	\$0.21
Total per-Car Operating Cost per Year:	\$5,357	\$3,824	\$3,436
Total Fleet Operating Cost per Year:	\$64,290	\$45,894	\$41,227
Total Fleet Capital Cost:	\$181,824		

# Railtech

## Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
12	24	48
1	1	1
10.33	20.65	41.31
36.32	72.63	145.26
11.66	23.32	46.64
58.30	116.61	233.21
\$0.4	\$0.7	\$1.5
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.6	\$21.1	\$26.1
219	219	219
219	110	73
\$174	\$174	\$232
20.6	20.6	20.6
\$1.61	\$1.11	\$0.73
\$1.45	\$0.95	\$0.61
\$0.16	\$0.16	\$0.12
\$4,229	\$2,915	\$2,561
\$50,748	\$34,980	\$30,737
\$181,824		

## Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
12	24	48
1	1	1
10.33	20.65	41.31
60.53	121.05	242.11
17.71	35.43	70.85
88.57	177.13	354.27
\$0.6	\$1.2	\$2.4
\$4.2	\$8.4	\$16.8
\$12.0	\$12.0	\$12.0
\$16.8	\$21.6	\$31.2
292	292	292
292	146	97
\$352	\$352	\$469
13.5	13.5	13.5
\$1.86	\$1.36	\$1.02
\$1.50	\$1.00	\$0.75
\$0.36	\$0.36	\$0.27
\$6,535	\$4,783	\$4,784
\$78,418	\$57,394	\$57,406
\$181,824		

Car Type: Amlounge II

Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 49

Number of Toilets: 2

Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	11.00	22.00	44.00
Flush Fluid Generated:	49.64	99.29	198.58
Capacity Adjustment:	15.16	30.32	60.65
Total Capacity Required per Day:	75.81	151.61	303.23
Pumpout Labor Cost:	\$0.5	\$1.0	\$2.0
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$16.8
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.7	\$21.4	\$30.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$263	\$263	\$351
Maximum Continuous Hours of Service:	15.8	15.8	15.8
Total Operating Cost per Service Hour:	\$1.76	\$1.26	\$0.94
- Trip Related:	\$1.48	\$0.98	\$0.73
- Non-Trip Related:	\$0.28	\$0.28	\$0.21
Total per-Car Operating Cost per Year:	\$5,381	\$3,848	\$3,825
Total Fleet Operating Cost per Year:	\$134,534	\$96,209	\$95,628
Total Fleet Capital Cost:	\$378,800		

**Arthur D Little**



Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
12	24	48
1	1	1
11.00	22.00	44.00
38.68	77.37	154.74
12.42	24.84	49.68
62.11	124.21	248.42
\$0.4	\$0.8	\$1.5
\$4.2	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$16.6	\$21.2	\$26.1
219	219	219
219	110	73
\$185	\$185	\$247
19.3	19.3	19.3
\$1.62	\$1.12	\$0.74
\$1.45	\$0.95	\$0.62
\$0.16	\$0.16	\$0.12
\$4,245	\$2,931	\$2,583
\$106,137	\$73,287	\$64,585
\$378,800		

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
12	24	48
1	1	1
11.00	22.00	44.00
64.47	128.95	257.89
18.87	37.74	75.47
94.34	188.69	377.37
\$0.6	\$1.3	\$2.6
\$4.2	\$8.4	\$16.8
\$12.0	\$12.0	\$12.0
\$16.8	\$21.7	\$31.4
292	292	292
292	146	97
\$375	\$375	\$500
12.7	12.7	12.7
\$1.87	\$1.37	\$1.03
\$1.51	\$1.01	\$0.76
\$0.36	\$0.36	\$0.27
\$6,569	\$4,817	\$4,830
\$164,233	\$120,433	\$120,744
\$378,800		

Car Type: **Sleeper 10-6**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **22**  
 Number of Toilets: **17**  
 Total Tank Capacity (gals): **450.0**

Scenario: **Expected**

Capital Cost	\$94,488		
- Equipment:	\$87,000		
- Installation:	\$7,488		
Maintenance Cost:	\$6,282		
- Labor:	\$3,672		
- Spare Parts:	\$2,610		
Hours per Trip:	12	24	48
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	4.94	9.88	19.76
Flush Fluid Generated:	22.29	44.58	89.16
Capacity Adjustment:	6.81	13.61	27.23
Total Capacity Required per Day:	34.04	68.07	136.14
Pumpout Labor Cost:	\$0.2	\$0.4	\$0.9
Connect/Disconnect Labor Cost:	\$18.9	\$18.9	\$18.9
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$121.1	\$121.3	\$121.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	128	85
Waste Disposal Cost per Year:	\$118	\$118	\$158
Maximum Continuous Hours of Service:	158.7	158.7	158.7
Total Operating Cost per Service Hour:	\$12.18	\$7.14	\$4.11
- Trip Related:	\$10.13	\$5.09	\$2.58
- Non-Trip Related:	\$2.05	\$2.05	\$1.54
Total per-Car Operating Cost per Year:	\$37,347	\$21,902	\$16,812
Total Fleet Operating Cost per Year:	\$2,062,468	\$1,795,980	\$1,378,606
Total Fleet Capital Cost:	\$7,748,016		

**Railtech**

**Favorable**

**Unfavorable**

\$94,488		
\$87,000		
\$7,488		
\$3,318		
\$2,448		
\$870		
12	24	48
1	1	1
4.94	9.88	19.76
17.37	34.74	69.47
5.58	11.15	22.31
27.88	55.77	111.54
\$0.2	\$0.3	\$0.7
\$18.9	\$18.9	\$18.9
\$102.0	\$102.0	\$102.0
\$121.1	\$121.2	\$121.6
219	219	219
219	110	73
\$83	\$83	\$111
193.7	193.7	193.7
\$11.38	\$6.35	\$3.51
\$10.12	\$5.08	\$2.56
\$1.26	\$1.26	\$0.95
\$29,916	\$16,678	\$12,305
\$2,453,127	\$1,367,566	\$1,009,022
\$7,748,016		

\$94,488		
\$87,000		
\$7,488		
\$9,246		
\$4,896		
\$4,350		
12	24	48
1	1	1
4.94	9.88	19.76
28.95	57.89	115.79
8.47	16.94	33.89
42.36	84.72	169.43
\$0.3	\$0.6	\$1.2
\$18.9	\$18.9	\$18.9
\$102.0	\$102.0	\$102.0
\$121.2	\$121.5	\$122.1
292	292	292
292	146	97
\$168	\$168	\$224
127.5	127.5	127.5
\$12.79	\$7.75	\$4.57
\$10.15	\$5.11	\$2.59
\$2.64	\$2.64	\$1.98
\$44,802	\$27,150	\$21,351
\$3,673,726	\$2,226,311	\$1,750,748
\$7,748,016		

Car Type: Amcoach II

Toilet Type: WTS 8300

Manufacturer: I

Number of Passengers: 59

Number of Toilets: 2

Total Tank Capacity (gals): 100.0

Scenario:

Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	26.49	52.98	79.47
Flush Fluid Generated:	119.55	239.11	358.66
Capacity Adjustment:	36.51	73.02	109.53
Total Capacity Required per Day:	182.55	365.11	547.66
Pumpout Labor Cost:	\$1.2	\$2.4	\$3.6
Connect/Disconnect Labor Cost:	\$8.4	\$16.8	\$25.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$21.6	\$31.2	\$40.8
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$317	\$423	\$476
Maximum Continuous Hours of Service:	13.1	13.1	13.1
Total Operating Cost per Service Hour:	\$1.28	\$0.96	\$0.86
- Trip Related:	\$1.00	\$0.75	\$0.67
- Non-Trip Related:	\$0.28	\$0.21	\$0.19
Total per-Car Operating Cost per Year:	\$3,928	\$3,931	\$3,933
Total Fleet Operating Cost per Year:	\$467,432	\$467,828	\$468,027
Total Fleet Capital Cost:	\$1,803,088		

**Arthur D Little**

Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
24	48	72
1	1	1
26.49	52.98	79.47
93.16	186.32	279.47
29.91	59.82	89.74
149.56	299.12	448.68
\$0.9	\$1.9	\$2.8
\$8.4	\$12.6	\$21.0
\$12.0	\$12.0	\$12.0
\$21.3	\$26.5	\$35.8
219	219	219
110	73	55
\$223	\$297	\$334
16.0	16.0	16.0
\$1.14	\$0.76	\$0.69
\$0.97	\$0.64	\$0.58
\$0.16	\$0.12	\$0.11
\$2,987	\$2,657	\$2,722
\$355,398	\$316,157	\$323,900
\$1,803,088		

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
24	48	72
1	1	1
26.49	52.98	79.47
155.26	310.53	465.79
45.44	90.88	136.32
227.19	454.39	681.58
\$1.6	\$3.1	\$4.7
\$12.6	\$21.0	\$29.4
\$12.0	\$12.0	\$12.0
\$26.2	\$36.1	\$46.1
292	292	292
146	97	73
\$451	\$601	\$677
10.6	10.6	10.6
\$1.58	\$1.15	\$1.01
\$1.22	\$0.88	\$0.77
\$0.36	\$0.27	\$0.24
\$5,545	\$5,392	\$5,315
\$659,902	\$641,616	\$632,473
\$1,803,088		

Car Type: **Slumbercoach 24-8**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **40**  
 Number of Toilets: **32**  
 Total Tank Capacity (gals): **800.0**

Scenario: **Expected**

Capital Cost	\$173,824		
- Equipment:	\$160,000		
- Installation:	\$13,824		
Maintenance Cost:	\$11,712		
- Labor:	\$6,912		
- Spare Parts:	\$4,800		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	17.96	35.92	53.88
Flush Fluid Generated:	81.05	162.11	243.16
Capacity Adjustment:	24.75	49.51	74.26
Total Capacity Required per Day:	123.77	247.53	371.30
Pumpout Labor Cost:	\$0.8	\$1.6	\$2.4
Connect/Disconnect Labor Cost:	\$33.6	\$33.6	\$33.6
Cleaning Labor Cost:	\$192.0	\$192.0	\$192.0
Total Pumpout/Cleaning Cost per Day:	\$226.4	\$227.2	\$228.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$215	\$287	\$323
Maximum Continuous Hours of Service:	155.1	155.1	155.1
Total Operating Cost per Service Hour:	\$13.32	\$7.67	\$5.78
- Trip Related:	\$9.50	\$4.80	\$3.24
- Non-Trip Related:	\$3.82	\$2.86	\$2.55
Total per-Car Operating Cost per Year:	\$40,851	\$31,350	\$26,600
Total Fleet Operating Cost per Year:	\$653,616	\$501,606	\$425,601
Total Fleet Capital Cost:	\$2,781,184		

**Railtech**

**Favorable**

\$173,824		
\$160,000		
\$13,824		
\$6,208		
\$4,608		
\$1,600		
24	48	72
1	1	1
17.96	35.92	53.88
63.16	126.32	189.47
20.28	40.56	60.84
101.40	202.79	304.19
\$0.6	\$1.3	\$1.9
\$33.6	\$33.6	\$33.6
\$192.0	\$192.0	\$192.0
\$226.2	\$226.9	\$227.5
219	219	219
110	73	55
\$151	\$201	\$227
189.4	189.4	189.4
\$11.85	\$6.56	\$4.79
\$9.48	\$4.78	\$3.22
\$2.36	\$1.77	\$1.57
\$31,131	\$22,970	\$18,890
\$498,102	\$367,526	\$302,237
\$2,781,184		

**Unfavorable**

\$173,824		
\$160,000		
\$13,824		
\$17,216		
\$9,216		
\$8,000		
24	48	72
1	1	1
17.96	35.92	53.88
105.26	210.53	315.79
30.81	61.61	92.42
154.03	308.06	462.09
\$1.1	\$2.1	\$3.2
\$33.6	\$33.6	\$33.6
\$192.0	\$192.0	\$192.0
\$226.7	\$227.7	\$228.8
292	292	292
146	97	73
\$306	\$408	\$459
124.7	124.7	124.7
\$14.44	\$8.52	\$6.54
\$9.53	\$4.83	\$3.26
\$4.91	\$3.68	\$3.28
\$50,613	\$39,787	\$34,374
\$809,810	\$636,594	\$549,985
\$2,781,184		

Car Type: Viewliner-Sleeper

Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 34

Number of Toilets: 17

Total Tank Capacity (gals): 450.0

Scenario: Expected

Capital Cost	\$94,488		
- Equipment:	\$87,000		
- Installation:	\$7,488		
Maintenance Cost:	\$6,282		
- Labor:	\$3,672		
- Spare Parts:	\$2,610		
Hours per Trip:	24	48	72
Trips per Day:	1	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.27	30.53	45.80
Flush Fluid Generated:	68.89	137.79	206.68
Capacity Adjustment:	21.04	42.08	63.12
Total Capacity Required per Day:	105.20	210.40	315.60
Pumpout Labor Cost:	\$0.7	\$1.4	\$2.1
Connect/Disconnect Labor Cost:	\$18.9	\$18.9	\$18.9
Cleaning Labor Cost:	\$102.0	\$102.0	\$102.0
Total Pumpout/Cleaning Cost per Day:	\$121.6	\$122.3	\$123.0
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	128	85	64
Waste Disposal Cost per Year:	\$183	\$244	\$274
Maximum Continuous Hours of Service:	102.7	102.7	102.7
Total Operating Cost per Service Hour:	\$7.17	\$4.14	\$3.13
- Trip Related:	\$5.13	\$2.61	\$1.77
- Non-Trip Related:	\$2.05	\$1.54	\$1.37
Total per-Car Operating Cost per Year:	\$21,998	\$16,940	\$14,411
Total Fleet Operating Cost per Year:	\$43,996	\$33,879	\$28,821
Total Fleet Capital Cost:	\$188,976		

**Arthur D Little**



Favorable

\$94,488		
\$87,000		
\$7,488		
\$3,318		
\$2,448		
\$870		
24	48	72
1	1	1
15.27	30.53	45.80
53.68	107.37	161.05
17.24	34.48	51.71
86.19	172.38	258.56
\$0.5	\$1.1	\$1.6
\$18.9	\$18.9	\$18.9
\$102.0	\$102.0	\$102.0
\$121.4	\$122.0	\$122.5
219	219	219
110	73	55
\$128	\$171	\$193
125.3	125.3	125.3
\$6.37	\$3.54	\$2.59
\$5.11	\$2.59	\$1.75
\$1.26	\$0.95	\$0.84
\$16,744	\$12,393	\$10,218
\$33,487	\$24,786	\$20,436
\$188,976		

Unfavorable

\$94,488		
\$87,000		
\$7,488		
\$9,246		
\$4,896		
\$4,350		
24	48	72
1	1	1
15.27	30.53	45.80
89.47	178.95	268.42
26.18	52.37	78.55
130.92	261.85	392.77
\$0.9	\$1.8	\$2.7
\$18.9	\$18.9	\$18.9
\$102.0	\$102.0	\$102.0
\$121.8	\$122.7	\$123.6
292	292	292
146	97	73
\$260	\$347	\$390
82.5	82.5	82.5
\$7.79	\$4.61	\$3.55
\$5.15	\$2.63	\$1.79
\$2.64	\$1.98	\$1.76
\$27,288	\$21,534	\$18,658
\$54,576	\$43,069	\$37,315
\$188,976		

Car Type: **Amcafe**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **53**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **100.0**

Scenario: **Expected**

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	15.86	15.86	23.80
Flush Fluid Generated:	71.60	71.60	107.39
Capacity Adjustment:	21.87	21.87	32.80
Total Capacity Required per Day:	109.33	109.33	163.99
Pumpout Labor Cost:	\$0.7	\$0.7	\$1.1
Connect/Disconnect Labor Cost:	\$8.4	\$8.4	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$21.1	\$21.1	\$21.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$380	\$380	\$285
Maximum Continuous Hours of Service:	14.6	14.6	14.6
Total Operating Cost per Service Hour:	\$1.62	\$1.62	\$1.27
- Trip Related:	\$1.41	\$1.41	\$0.99
- Non-Trip Related:	\$0.21	\$0.21	\$0.28
Total per-Car Operating Cost per Year:	\$6,627	\$6,627	\$3,880
Total Fleet Operating Cost per Year:	\$298,216	\$298,216	\$174,610
Total Fleet Capital Cost:	\$681,840		

**Railtech**

**Favorable**

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
8	16	24
2	1	1
15.86	15.86	23.80
55.79	55.79	83.68
17.91	17.91	26.87
89.57	89.57	134.35
\$0.6	\$0.6	\$0.8
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.8	\$16.8	\$21.2
219	219	219
219	219	110
\$267	\$267	\$200
17.9	17.9	17.9
\$1.25	\$1.25	\$1.12
\$1.12	\$1.12	\$0.96
\$0.12	\$0.12	\$0.16
\$4,365	\$4,365	\$2,954
\$196,414	\$196,414	\$132,908
\$681,840		

**Unfavorable**

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
8	16	24
2	1	1
15.86	15.86	23.80
92.98	92.98	139.47
27.21	27.21	40.82
136.06	136.06	204.09
\$0.9	\$0.9	\$1.4
\$8.4	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$21.3	\$21.3	\$26.0
292	292	292
292	292	146
\$540	\$540	\$405
11.8	11.8	11.8
\$1.72	\$1.72	\$1.56
\$1.45	\$1.45	\$1.20
\$0.27	\$0.27	\$0.36
\$8,045	\$8,045	\$5,476
\$362,008	\$362,008	\$246,441
\$681,840		

Car Type: Amcoach

Toilet Type: WTS 8300

Manufacturer: I

Number of Passengers: 84

Number of Toilets: 2

Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	25.14	25.14	37.72
Flush Fluid Generated:	113.47	113.47	170.21
Capacity Adjustment:	34.65	34.65	51.98
Total Capacity Required per Day:	173.27	173.27	259.91
Pumpout Labor Cost:	\$1.1	\$1.1	\$1.7
Connect/Disconnect Labor Cost:	\$8.4	\$8.4	\$12.6
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$21.5	\$21.5	\$26.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$602	\$602	\$452
Maximum Continuous Hours of Service:	9.2	9.2	9.2
Total Operating Cost per Service Hour:	\$1.70	\$1.70	\$1.52
- Trip Related:	\$1.49	\$1.49	\$1.24
- Non-Trip Related:	\$0.21	\$0.21	\$0.28
Total per-Car Operating Cost per Year:	\$6,956	\$6,956	\$4,664
Total Fleet Operating Cost per Year:	\$1,250,352	\$1,850,352	\$1,240,533
Total Fleet Capital Cost:	\$4,030,432		

**Arthur D Little**

# Railtech

## Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
8	16	24
2	1	1
25.14	25.14	37.72
88.42	88.42	132.63
28.39	28.39	42.59
141.96	141.96	212.93
\$0.9	\$0.9	\$1.3
\$8.4	\$8.4	\$12.6
\$12.0	\$12.0	\$12.0
\$21.3	\$21.3	\$25.9
219	219	219
219	219	110
\$423	\$423	\$317
11.3	11.3	11.3
\$1.57	\$1.57	\$1.36
\$1.45	\$1.45	\$1.20
\$0.12	\$0.12	\$0.16
\$5,512	\$5,512	\$3,584
\$1,466,204	\$1,466,204	\$953,353
\$4,030,432		

## Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
8	16	24
2	1	1
25.14	25.14	37.72
147.37	147.37	221.05
43.13	43.13	64.69
215.64	215.64	323.46
\$1.5	\$1.5	\$2.2
\$12.6	\$12.6	\$16.8
\$12.0	\$12.0	\$12.0
\$26.1	\$26.1	\$31.0
292	292	292
292	292	146
\$856	\$856	\$642
7.4	7.4	7.4
\$2.09	\$2.09	\$1.84
\$1.81	\$1.81	\$1.48
\$0.27	\$0.27	\$0.36
\$9,746	\$9,746	\$6,446
\$2,592,401	\$2,592,401	\$1,714,583
\$4,030,432		

Car Type: Amclub  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 41  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	8	16	24
Trips per Day:	2	1	1
Waste Generation Data			
<u>Waste Generated:</u>	12.27	12.27	18.41
Flush Fluid Generated:	55.39	55.39	83.08
Capacity Adjustment:	16.91	16.91	25.37
Total Capacity Required per Day:	84.57	84.57	126.86
Pumpout Labor Cost:	\$0.6	\$0.6	\$0.8
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.8	\$16.8	\$21.2
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	128
Waste Disposal Cost per Year:	\$294	\$294	\$220
Maximum Continuous Hours of Service:	18.9	18.9	18.9
Total Operating Cost per Service Hour:	\$1.33	\$1.33	\$1.23
- Trip Related:	\$1.12	\$1.12	\$0.96
- Non-Trip Related:	\$0.21	\$0.21	\$0.28
Total per-Car Operating Cost per Year:	\$5,426	\$5,426	\$3,785
Total Fleet Operating Cost per Year:	\$130,236	\$130,236	\$90,831
Total Fleet Capital Cost:	\$363,648		

# Railtech

## Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
8	16	24
2	1	1
12.27	12.27	18.41
43.16	43.16	64.74
13.86	13.86	20.79
69.29	69.29	103.93
\$0.4	\$0.4	\$0.6
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.6	\$16.6	\$21.0
219	219	219
219	219	110
\$206	\$206	\$155
23.1	23.1	23.1
\$1.22	\$1.22	\$1.10
\$1.10	\$1.10	\$0.94
\$0.12	\$0.12	\$0.16
\$4,277	\$4,277	\$2,887
\$102,640	\$102,640	\$69,299
\$363,648		

## Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
8	16	24
2	1	1
12.27	12.27	18.41
71.93	71.93	107.89
21.05	21.05	31.58
105.25	105.25	157.88
\$0.7	\$0.7	\$1.1
\$8.4	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$21.1	\$21.1	\$21.5
292	292	292
292	292	146
\$418	\$418	\$313
15.2	15.2	15.2
\$1.68	\$1.68	\$1.35
\$1.41	\$1.41	\$0.98
\$0.27	\$0.27	\$0.36
\$7,861	\$7,861	\$4,725
\$188,660	\$188,660	\$113,410
\$363,648		

Car Type: Met-Srvc Dinette  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 23  
 Number of Toilets: 2  
 Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
<u>Waste Generated:</u>	4.30	5.16	6.02
Flush Fluid Generated:	19.42	23.30	27.19
Capacity Adjustment:	5.93	7.12	8.30
Total Capacity Required per Day:	29.65	35.58	41.51
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.4	\$16.4	\$16.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$103	\$124	\$144
Maximum Continuous Hours of Service:	33.7	33.7	33.7
Total Operating Cost per Service Hour:	\$2.01	\$1.69	\$1.46
- Trip Related:	\$1.68	\$1.41	\$1.22
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,144	\$5,174	\$5,205
Total Fleet Operating Cost per Year:	\$66,869	\$67,266	\$67,663
Total Fleet Capital Cost:	\$196,976		

**Arthur D Little**



Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
2	12	7
5	1	2
4.30	5.16	6.02
15.13	18.16	21.18
4.86	5.83	6.80
24.29	29.15	34.01
\$0.2	\$0.2	\$0.2
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.4	\$16.4	\$16.4
219	219	219
219	219	219
\$72	\$87	\$101
41.2	41.2	41.2
\$1.86	\$1.56	\$1.34
\$1.67	\$1.40	\$1.21
\$0.20	\$0.16	\$0.14
\$4,081	\$4,102	\$4,123
\$53,057	\$53,331	\$53,605
\$196,976		

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
4.30	5.16	6.02
25.22	30.26	35.31
7.38	8.86	10.33
36.90	44.28	51.66
\$0.3	\$0.3	\$0.4
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.5	\$16.5	\$16.6
292	292	292
292	292	292
\$147	\$176	\$205
27.1	27.1	27.1
\$2.13	\$1.79	\$1.54
\$1.70	\$1.43	\$1.23
\$0.44	\$0.36	\$0.31
\$6,227	\$6,271	\$6,315
\$80,946	\$81,518	\$82,091
\$196,976		

Car Type: Met-Srvc Coach  
Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 60  
Number of Toilets: 2  
Total Tank Capacity (gals): 100.0

Scenario: Expected

Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	2		7
Trips per Day:	5		2
Waste Generation Data			
Waste Generated:	11.23	13.47	15.72
Flush Fluid Generated:	50.66	60.79	70.92
Capacity Adjustment:	15.47	18.56	21.66
Total Capacity Required per Day:	77.35	92.82	108.30
Pumpout Labor Cost:	\$0.5	\$0.6	\$0.7
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.7	\$16.8	\$21.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$269	\$323	\$376
Maximum Continuous Hours of Service:	12.9	12.9	12.9
Total Operating Cost per Service Hour:	\$2.11	\$1.78	\$1.85
- Trip Related:	\$1.78	\$1.51	\$1.61
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,389	\$5,469	\$6,622
Total Fleet Operating Cost per Year:	\$269,466	\$273,448	\$331,085
Total Fleet Capital Cost:	\$757,600		

Railtech

Favorable

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
2	12	7
5	1	2
11.23	13.47	15.72
39.47	47.37	55.26
12.67	15.21	17.74
63.37	76.05	88.72
\$0.4	\$0.5	\$0.6
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.6	\$16.7	\$16.8
219	219	219
219	219	219
\$189	\$227	\$264
15.8	15.8	15.8
\$1.94	\$1.64	\$1.42
\$1.75	\$1.48	\$1.28
\$0.20	\$0.16	\$0.14
\$4,251	\$4,306	\$4,361
\$212,550	\$215,302	\$218,054
\$757,600		

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
11.23	13.47	15.72
65.79	78.95	92.11
19.25	23.10	26.96
96.27	115.52	134.78
\$0.7	\$0.8	\$0.9
\$4.2	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$16.9	\$21.2	\$21.3
292	292	292
292	292	292
\$382	\$459	\$535
10.4	10.4	10.4
\$2.25	\$2.26	\$1.97
\$1.82	\$1.90	\$1.65
\$0.44	\$0.36	\$0.31
\$6,581	\$7,922	\$8,037
\$329,040	\$396,104	\$401,848
\$757,600		

Car Type: Met-Srvc Club  
Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 33  
Number of Toilets: 2  
Total Tank Capacity (gals): 100.0

Scenario:	Expected		
Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	2	12	7
Trips per Day:	5	1	2
Waste Generation Data			
Waste Generated:	6.17	7.41	8.64
Flush Fluid Generated:	27.86	33.43	39.01
Capacity Adjustment:	8.51	10.21	11.91
Total Capacity Required per Day:	42.54	51.05	59.56
Pumpout Labor Cost:	\$0.3	\$0.3	\$0.4
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.5	\$16.5	\$16.6
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$148	\$177	\$207
Maximum Continuous Hours of Service:	23.5	23.5	23.5
Total Operating Cost per Service Hour:	\$2.04	\$1.71	\$1.48
- Trip Related:	\$1.71	\$1.44	\$1.24
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,210	\$5,254	\$5,298
Total Fleet Operating Cost per Year:	\$67,732	\$68,301	\$68,870
Total Fleet Capital Cost:	\$196,976		

**Arthur D Little**

**Favorable**

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
2	12	7
5	1	2
6.17	7.41	8.64
21.71	26.05	30.39
6.97	8.37	9.76
34.86	41.83	48.80
\$0.2	\$0.3	\$0.3
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.4	\$16.5	\$16.5
219	219	219
219	219	219
\$104	\$125	\$145
28.7	28.7	28.7
\$1.88	\$1.58	\$1.37
\$1.69	\$1.42	\$1.23
\$0.20	\$0.16	\$0.14
\$4,127	\$4,157	\$4,188
\$53,653	\$54,047	\$54,440
\$196,976		

**Unfavorable**

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
6.17	7.41	8.64
36.18	43.42	50.66
10.59	12.71	14.83
52.95	63.54	74.13
\$0.4	\$0.4	\$0.5
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.6	\$16.6	\$16.7
292	292	292
292	292	292
\$210	\$252	\$294
18.9	18.9	18.9
\$2.17	\$1.82	\$1.58
\$1.73	\$1.46	\$1.27
\$0.44	\$0.36	\$0.31
\$6,322	\$6,386	\$6,449
\$82,190	\$83,012	\$83,833
\$196,976		

Car Type: **Amdinette**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **23**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **100.0**

Scenario:	Expected		
Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	21.92	21.92	21.92
Trips per Day:	21.5	21.5	21.5
Waste Generation Data			
Waste Generated:	4.30	5.16	6.02
Flush Fluid Generated:	19.42	23.30	27.19
Capacity Adjustment:	5.93	7.12	8.30
Total Capacity Required per Day:	29.65	35.58	41.51
Pumpout Labor Cost:	\$0.2	\$0.2	\$0.3
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.4	\$16.4	\$16.5
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$103	\$124	\$144
Maximum Continuous Hours of Service:	33.7	33.7	33.7
Total Operating Cost per Service Hour:	\$2.01	\$1.69	\$1.46
- Trip Related:	\$1.68	\$1.41	\$1.22
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,144	\$5,174	\$5,205
Total Fleet Operating Cost per Year:	\$128,594	\$129,357	\$130,120
Total Fleet Capital Cost:	\$378,800		

**Railtech**

**Favorable**

**Unfavorable**

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
2	12	7
5	1	2
4.30	5.16	6.02
15.13	18.16	21.18
4.86	5.83	6.80
24.29	29.15	34.01
\$0.2	\$0.2	\$0.2
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.4	\$16.4	\$16.4
219	219	219
219	219	219
\$72	\$87	\$101
41.2	41.2	41.2
\$1.86	\$1.56	\$1.34
\$1.67	\$1.40	\$1.21
\$0.20	\$0.16	\$0.14
\$4,081	\$4,102	\$4,123
\$102,032	\$102,560	\$103,087
\$378,800		

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
4.30	5.16	6.02
25.22	30.26	35.31
7.38	8.86	10.33
36.90	44.28	51.66
\$0.3	\$0.3	\$0.4
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.5	\$16.5	\$16.6
292	292	292
292	292	292
\$147	\$176	\$205
27.1	27.1	27.1
\$2.13	\$1.79	\$1.54
\$1.70	\$1.43	\$1.23
\$0.44	\$0.36	\$0.31
\$6,227	\$6,271	\$6,315
\$155,665	\$156,766	\$157,867
\$378,800		

Car Type: **Amcoach**  
 Toilet Type: **WTS 8300**

Manufacturer:

Number of Passengers: **60**  
 Number of Toilets: **2**  
 Total Tank Capacity (gals): **100.0**

Scenario:	Expected		
Capital Cost	\$15,152		
- Equipment:	\$14,000		
- Installation:	\$1,152		
Maintenance Cost:	\$852		
- Labor:	\$432		
- Spare Parts:	\$420		
Hours per Trip:	218.2	218.12	218.7
Trips per Day:	215.6	215.0	217.2
Waste Generation Data			
Waste Generated:	11.23	13.47	15.72
Flush Fluid Generated:	50.66	60.79	70.92
Capacity Adjustment:	15.47	18.56	21.66
Total Capacity Required per Day:	77.35	92.82	108.30
Pumpout Labor Cost:	\$0.5	\$0.6	\$0.7
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.7	\$16.8	\$21.1
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$269	\$323	\$376
Maximum Continuous Hours of Service:	12.9	12.9	12.9
Total Operating Cost per Service Hour:	\$2.11	\$1.78	\$1.85
- Trip Related:	\$1.78	\$1.51	\$1.61
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,389	\$5,469	\$6,622
Total Fleet Operating Cost per Year:	\$167,069	\$169,538	\$205,273
Total Fleet Capital Cost:	\$469,712		



# Railtech

## Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		•
\$288		
\$140		
2	12	7
5	1	2
11.23	13.47	15.72
39.47	47.37	55.26
12.67	15.21	17.74
63.37	76.05	88.72
\$0.4	\$0.5	\$0.6
\$4.2	\$4.2	\$4.2
\$12.0	\$12.0	\$12.0
\$16.6	\$16.7	\$16.8
219	219	219
219	219	219
\$189	\$227	\$264
15.8	15.8	15.8
\$1.94	\$1.64	\$1.42
\$1.75	\$1.48	\$1.28
\$0.20	\$0.16	\$0.14
\$4,251	\$4,306	\$4,361
\$131,781	\$133,487	\$135,193
\$469,712		

## Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
11.23	13.47	15.72
65.79	78.95	92.11
19.25	23.10	26.96
96.27	115.52	134.78
\$0.7	\$0.8	\$0.9
\$4.2	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$16.9	\$21.2	\$21.3
292	292	292
292	292	292
\$382	\$459	\$535
10.4	10.4	10.4
\$2.25	\$2.26	\$1.97
\$1.82	\$1.90	\$1.65
\$0.44	\$0.36	\$0.31
\$6,581	\$7,922	\$8,037
\$204,005	\$245,585	\$249,146
\$469,712		

Car Type: Turbo Power Club  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 27  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 50.0

Scenario:	Expected	20'58	20'58
Capital Cost	\$7,576.08	10.3	10.3
- Equipment:	\$7,000		
- Installation:	\$576		
Maintenance Cost:	\$426		
- Labor:	\$216.22	522	522
- Spare Parts:	\$216.22	522	522
Hours per Trip:	2.28	2.28	2.28
Trips per Day:	2.55	2.55	2.55
Waste Generation Data	20.8	20.8	20.8
Waste Generated:	5.05	6.06	7.07
Flush Fluid Generated:	22.89	27.36	31.91
Capacity Adjustment:	6.96	8.35	9.75
Total Capacity Required per Day:	34.81	41.77	48.73
Pumpout Labor Cost:	\$0.2	\$0.3	\$0.3
Connect/Disconnect Labor Cost:	\$2.1	\$2.1	\$2.1
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$8.3	\$8.4	\$8.4
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$121	\$145	\$169
Maximum Continuous Hours of Service:	14.4	14.4	14.4
Total Operating Cost per Service Hour:	\$1.05	\$0.88	\$0.77
- Trip Related:	\$0.88	\$0.75	\$0.65
- Non-Trip Related:	\$0.17	\$0.14	\$0.12
Total per-Car Operating Cost per Year:	\$2,675	\$2,711	\$2,746
Total Fleet Operating Cost per Year:	\$16,048	\$16,264	\$16,479
Total Fleet Capital Cost:	\$45,456		

# Railtech

## Favorable

\$7,576		
\$7,000		
\$576		
\$214		
\$144		
\$70		
2	12	7
5	1	2
5.05	6.06	7.07
17.76	21.32	24.87
5.70	6.84	7.99
28.52	34.22	39.93
\$0.2	\$0.2	\$0.2
\$2.1	\$2.1	\$2.1
\$6.0	\$6.0	\$6.0
\$8.3	\$8.3	\$8.3
219	219	219
219	219	219
\$85	\$102	\$119
17.5	17.5	17.5
\$0.96	\$0.81	\$0.70
\$0.87	\$0.73	\$0.64
\$0.10	\$0.08	\$0.07
\$2,112	\$2,137	\$2,161
\$12,670	\$12,819	\$12,968
\$45,456		

## Unfavorable

\$7,576		
\$7,000		
\$576		
\$638		
\$288		
\$350		
2	12	7
5	1	2
5.05	6.06	7.07
29.61	35.53	41.45
8.66	10.40	12.13
43.32	51.98	60.65
\$0.3	\$0.4	\$0.4
\$2.1	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$8.4	\$10.6	\$10.6
292	292	292
292	292	292
\$172	\$206	\$241
11.5	11.5	11.5
\$1.12	\$1.12	\$0.97
\$0.90	\$0.94	\$0.82
\$0.22	\$0.18	\$0.16
\$3,262	\$3,927	\$3,978
\$19,570	\$23,559	\$23,870
\$45,456		

Car Type: Turbo Coach  
Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 72  
Number of Toilets: 2  
Total Tank Capacity (gals): 100.0

Scenario:	Expected	2014	2015
Capital Cost	\$15,152	\$15,152	\$15,152
- Equipment:	\$14,000	\$14,000	\$14,000
- Installation:	\$1,152	\$1,152	\$1,152
Maintenance Cost:	\$852	\$852	\$852
- Labor:	\$432	\$432	\$432
- Spare Parts:	\$420	\$420	\$420
Hours per Trip:	28.3	28.3	28.3
Trips per Day:	200	200	200
Waste Generation Data			
Waste Generated:	13.47	16.16	18.86
Flush Fluid Generated:	60.79	72.95	85.11
Capacity Adjustment:	18.56	22.28	25.99
Total Capacity Required per Day:	92.82	111.39	129.95
Pumpout Labor Cost:	\$0.6	\$0.7	\$0.9
Connect/Disconnect Labor Cost:	\$4.2	\$8.4	\$8.4
Cleaning Labor Cost:	\$12.0	\$12.0	\$12.0
Total Pumpout/Cleaning Cost per Day:	\$16.8	\$21.1	\$21.3
Days Operated per Year:	255	255	255
Clean-out Cycles per Year:	255	255	255
Waste Disposal Cost per Year:	\$323	\$387	\$452
Maximum Continuous Hours of Service:	10.8	10.8	10.8
Total Operating Cost per Service Hour:	\$2.14	\$2.16	\$1.88
- Trip Related:	\$1.81	\$1.89	\$1.64
- Non-Trip Related:	\$0.33	\$0.28	\$0.24
Total per-Car Operating Cost per Year:	\$5,469	\$6,638	\$6,733
Total Fleet Operating Cost per Year:	\$114,848	\$139,390	\$141,397
Total Fleet Capital Cost:	\$318,192		

Arthur D Little

Favorable

\$15,152		
\$14,000		
\$1,152		
\$428		
\$288		
\$140		
2	12	7
5	1	2
13.47	16.16	18.86
47.37	56.84	66.32
15.21	18.25	21.29
76.05	91.26	106.47
\$0.5	\$0.6	\$0.7
\$4.2	\$4.2	\$8.4
\$12.0	\$12.0	\$12.0
\$16.7	\$16.8	\$21.1
219	219	219
219	219	219
\$227	\$272	\$317
13.1	13.1	13.1
\$1.97	\$1.66	\$1.75
\$1.77	\$1.50	\$1.61
\$0.20	\$0.16	\$0.14
\$4,306	\$4,372	\$5,358
\$90,427	\$91,814	\$112,517
\$318,192		

Unfavorable

\$15,152		
\$14,000		
\$1,152		
\$1,276		
\$576		
\$700		
2	12	7
5	1	2
13.47	16.16	18.86
78.95	94.74	110.53
23.10	27.73	32.35
115.52	138.63	161.73
\$0.8	\$0.9	\$1.1
\$8.4	\$8.4	\$8.4
\$12.0	\$12.0	\$12.0
\$21.2	\$21.3	\$21.5
292	292	292
292	292	292
\$459	\$551	\$642
8.7	8.7	8.7
\$2.71	\$2.30	\$2.01
\$2.28	\$1.94	\$1.69
\$0.44	\$0.36	\$0.31
\$7,922	\$8,060	\$8,198
\$166,364	\$169,259	\$172,154
\$318,192		

Car Type: Turbo Cafe  
 Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 52  
 Number of Toilets: 1  
 Total Tank Capacity (gals): 50.0

Scenario:	Expected	2013	2014	2015
Capital Cost	\$7,576	\$7,576	\$7,576	\$7,576
- Equipment:	\$7,000	\$7,000	\$7,000	\$7,000
- Installation:	\$576	\$576	\$576	\$576
Maintenance Cost:	\$426	\$426	\$426	\$426
- Labor:	\$216.22	\$216.22	\$216.22	\$216.22
- Spare Parts:	\$210.22	\$210.22	\$210.22	\$210.22
Hours per Trip:	220.2	220.2	220.2	220.2
Trips per Day:	2.0	2.0	2.0	2.0
Waste Generation Data	24.5	24.5	24.5	24.5
<u>Waste Generated:</u>	9.73	11.67	13.62	15.57
Flush Fluid Generated:	43.90	52.68	61.46	70.24
Capacity Adjustment:	13.41	16.09	18.77	21.45
Total Capacity Required per Day:	67.04	80.45	93.86	107.26
Pumpout Labor Cost:	\$0.4	\$0.5	\$0.6	\$0.7
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$10.6	\$10.7	\$10.8	\$10.9
Days Operated per Year:	255	255	255	255
Clean-out Cycles per Year:	255	255	255	255
Waste Disposal Cost per Year:	\$233	\$280	\$326	\$373
Maximum Continuous Hours of Service:	7.5	7.5	7.5	7.5
Total Operating Cost per Service Hour:	\$1.32	\$1.12	\$0.98	\$0.86
- Trip Related:	\$1.16	\$0.99	\$0.86	\$0.74
- Non-Trip Related:	\$0.17	\$0.14	\$0.12	\$0.12
Total per-Car Operating Cost per Year:	\$3,377	\$3,446	\$3,515	\$3,584
Total Fleet Operating Cost per Year:	\$10,132	\$10,339	\$10,546	\$10,753
Total Fleet Capital Cost:	\$22,728			

**Railtech**

**Favorable**

\$7,576		
\$7,000		
\$576		
\$214		
\$144		
\$70		
2	12	7
5	1	2
9.73	11.67	13.62
34.21	41.05	47.89
10.98	13.18	15.38
54.92	65.91	76.89
\$0.3	\$0.4	\$0.5
\$4.2	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$10.5	\$10.6	\$10.7
219	219	219
219	219	219
\$164	\$196	\$229
9.1	9.1	9.1
\$1.23	\$1.04	\$0.91
\$1.13	\$0.96	\$0.84
\$0.10	\$0.08	\$0.07
\$2,686	\$2,734	\$2,782
\$8,059	\$8,202	\$8,345
\$22,728		

**Unfavorable**

\$7,576		
\$7,000		
\$576		
\$638		
\$288		
\$350		
2	12	7
5	1	2
9.73	11.67	13.62
57.02	68.42	79.82
16.69	20.02	23.36
83.43	100.12	116.81
\$0.6	\$0.7	\$0.8
\$4.2	\$6.3	\$6.3
\$6.0	\$6.0	\$6.0
\$10.8	\$13.0	\$13.1
292	292	292
292	292	292
\$331	\$398	\$464
6.0	6.0	6.0
\$1.41	\$1.38	\$1.21
\$1.19	\$1.20	\$1.05
\$0.22	\$0.18	\$0.16
\$4,114	\$4,827	\$4,927
\$12,343	\$14,481	\$14,780
\$22,728		

Car Type: Turbo Power Coach  
Toilet Type: WTS 8300

Manufacturer:

Number of Passengers: 40  
Number of Toilets: 1  
Total Tank Capacity (gals): 50.0

Scenario:	2011 Expected	2014	2015
	2008	2008	2008
	2015	2015	2008
Capital Cost	\$7,576		
- Equipment:	\$7,000	12	12
- Installation:	\$576		
	\$533	2580	\$350
Maintenance Cost:	\$426		
- Labor:	\$3216	322	322
- Spare Parts:	\$8210	322	322
Hours per Trip:	210.8 2	210.1 12	210.8 7
Trips per Day:	2.0 5	2.0 1	2.0 2
	245	245	245
Waste Generation Data	204	202	202
Waste Generated:	7.48	8.98	10.48
Flush Fluid Generated:	33.77	40.53	47.28
Capacity Adjustment:	10.31	12.38	14.44
Total Capacity Required per Day:	51.57	61.88	72.20
	13.00	25.28	41.25
Pumpout Labor Cost:	\$0.3	\$0.4	\$0.5
Connect/Disconnect Labor Cost:	\$4.2	\$4.2	\$4.2
Cleaning Labor Cost:	\$6.0	\$6.0	\$6.0
Total Pumpout/Cleaning Cost per Day:	\$10.5	\$10.6	\$10.7
Days Operated per Year:	251 255	255	255
Clean-out Cycles per Year:	251 255	255	255
	2450		
Waste Disposal Cost per Year:	\$179	\$215	\$251
	\$220		
Maximum Continuous Hours of Service:	9.7	9.7	9.7
Total Operating Cost per Service Hour:	\$1.29	\$1.09	\$0.95
- Trip Related:	\$1.12	\$0.95	\$0.83
- Non-Trip Related:	\$0.17	\$0.14	\$0.12
Total per-Car Operating Cost per Year:	\$3,298	\$3,351	\$3,404
Total Fleet Operating Cost per Year:	\$46,166	\$46,909	\$47,653
Total Fleet Capital Cost:	\$106,064		

**Arthur D Little**



Favorable

\$7,576		
\$7,000		
\$576		
\$214		
\$144		
\$70		
2	12	7
5	1	2
7.48	8.98	10.48
26.32	31.58	36.84
8.45	10.14	11.83
42.25	50.70	59.15
\$0.3	\$0.3	\$0.4
\$2.1	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$8.4	\$10.5	\$10.6
219	219	219
219	219	219
\$126	\$151	\$176
11.8	11.8	11.8
\$0.99	\$1.02	\$0.88
\$0.89	\$0.93	\$0.81
\$0.10	\$0.08	\$0.07
\$2,171	\$2,668	\$2,705
\$30,399	\$37,351	\$37,865
\$106,064		

Unfavorable

\$7,576		
\$7,000		
\$576		
\$638		
\$288		
\$350		
2	12	7
5	1	2
7.48	8.98	10.48
43.86	52.63	61.40
12.84	15.40	17.97
64.18	77.01	89.85
\$0.4	\$0.5	\$0.6
\$4.2	\$4.2	\$4.2
\$6.0	\$6.0	\$6.0
\$10.6	\$10.7	\$10.8
292	292	292
292	292	292
\$255	\$306	\$357
7.8	7.8	7.8
\$1.37	\$1.16	\$1.02
\$1.15	\$0.98	\$0.86
\$0.22	\$0.18	\$0.16
\$3,999	\$4,076	\$4,153
\$55,991	\$57,063	\$58,135
\$106,064		

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Appendix D: Cost Model for Amtrak Retention  
Toilet Systems, Costs by Car Type, Arthur D Little,  
1990 -23-Passenger Operations

**Arthur D Little**

Amsterdam  
Brussels  
Cambridge  
Caracas  
Copenhagen  
Hong Kong  
Houston  
London  
Los Angeles  
Madrid  
Mexico City  
Milan  
New York  
Paris  
Riyadh  
San Francisco  
São Paulo  
Singapore  
Taipei  
Tokyo  
Toronto  
Washington  
Wiesbaden