PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 8	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.9159	0.4860
2	0.0000	0.0000
3	10.2480	0.4270
4	440.6280	0.2920
5	0.7443	0.0620
6	0.0000	0.0000
7	0.1793	0.7470
8	5.1240	0.4270
SNOW WATER	0.000	

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**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_2BEN.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_2BEN.OUT


TIME:  12:53    DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Benches

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   9
          THICKNESS                  =      6.00   INCHES
          POROSITY                   =      0.5010 VOL/VOL
          FIELD CAPACITY             =      0.2840 VOL/VOL
          WILTING POINT              =      0.1350 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4977 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.190000006000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.04	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 3

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES

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POROSITY                      =      0.4370 VOL/VOL
FIELD CAPACITY                =      0.0620 VOL/VOL
WILTING POINT                 =      0.0240 VOL/VOL
INITIAL SOIL WATER CONTENT    =      0.0620 VOL/VOL
EFFECTIVE SAT. HYD. COND.     =  0.579999993000E-02 CM/SEC
SLOPE                         =      2.00   PERCENT
DRAINAGE LENGTH               =    100.0    FEET


                        LAYER  6
                        --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  35
THICKNESS                     =      0.10   INCHES
POROSITY                      =      0.0000 VOL/VOL
FIELD CAPACITY                =      0.0000 VOL/VOL
WILTING POINT                 =      0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT    =      0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND.     =  0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY           =      0.75   HOLES/ACRE
FML INSTALLATION DEFECTS      =      2.00   HOLES/ACRE
FML PLACEMENT QUALITY         =  3 - GOOD


                        LAYER  7
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          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  17
THICKNESS                     =      0.24   INCHES
POROSITY                      =      0.7500 VOL/VOL
FIELD CAPACITY                =      0.7470 VOL/VOL
WILTING POINT                 =      0.4000 VOL/VOL
INITIAL SOIL WATER CONTENT    =      0.7470 VOL/VOL
EFFECTIVE SAT. HYD. COND.     =  0.300000003000E-08 CM/SEC


                        LAYER  8
                        --------

              TYPE 3 - BARRIER SOIL LINER
              MATERIAL TEXTURE NUMBER  16
THICKNESS                     =     12.00   INCHES
POROSITY                      =      0.4270 VOL/VOL
FIELD CAPACITY                =      0.4180 VOL/VOL
WILTING POINT                 =      0.3670 VOL/VOL
INITIAL SOIL WATER CONTENT    =      0.4270 VOL/VOL
EFFECTIVE SAT. HYD. COND.     =  0.100000001000E-06 CM/SEC
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GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH AN EXCELLENT STAND OF GRASS, A SURFACE SLOPE OF 4.% AND A SLOPE LENGTH OF 300. FEET.

SCS RUNOFF CURVE NUMBER	=	73.40	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.986	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	3.006	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.810	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	158.566	INCHES
TOTAL INITIAL WATER	=	158.566	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	5.556	20167.187	14.39
EVAPOTRANSPIRATION	33.047	119961.164	85.59
PERC./LEAKAGE THROUGH LAYER 3	0.001390	5.046	0.00
AVG. HEAD ON TOP OF LAYER 2	2.4220		
DRAINAGE COLLECTED FROM LAYER 5	0.0014	5.023	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0006		
PERC./LEAKAGE THROUGH LAYER 8	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	0.006	20.882	0.01
SOIL WATER AT START OF YEAR	158.745	576245.125	
SOIL WATER AT END OF YEAR	158.751	576266.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.076	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	21.824	79221.367	37.80
EVAPOTRANSPIRATION	35.891	130282.805	62.17
PERC./LEAKAGE THROUGH LAYER 3	0.001405	5.099	0.00
AVG. HEAD ON TOP OF LAYER 2	2.4404		
DRAINAGE COLLECTED FROM LAYER 5	0.0015	5.446	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0006		
PERC./LEAKAGE THROUGH LAYER 8	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	0.014	50.238	0.02
SOIL WATER AT START OF YEAR	158.751	576266.000	
SOIL WATER AT END OF YEAR	158.765	576316.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.022	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	30.732	111558.016	45.42

EVAPOTRANSPIRATION	37.110	134711.078	54.85
PERC./LEAKAGE THROUGH LAYER 3	0.001832	6.650	0.00
AVG. HEAD ON TOP OF LAYER 2	3.2038		
DRAINAGE COLLECTED FROM LAYER 5	0.0017	6.138	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0007		
PERC./LEAKAGE THROUGH LAYER 8	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	-0.184	-669.381	-0.27
SOIL WATER AT START OF YEAR	158.765	576316.250	
SOIL WATER AT END OF YEAR	158.580	575646.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.124	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	13.364	48511.109	27.21
EVAPOTRANSPIRATION	35.592	129199.234	72.46
PERC./LEAKAGE THROUGH LAYER 3	0.001582	5.743	0.00
AVG. HEAD ON TOP OF LAYER 2	2.7656		
DRAINAGE COLLECTED FROM LAYER 5	0.0016	5.894	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0007		
PERC./LEAKAGE THROUGH LAYER 8	0.000003	0.009	0.00

AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	0.162	589.399	0.33
SOIL WATER AT START OF YEAR	158.580	575646.875	
SOIL WATER AT END OF YEAR	158.743	576236.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.035	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	9.767	35453.684	24.01
EVAPOTRANSPIRATION	30.970	112420.852	76.15
PERC./LEAKAGE THROUGH LAYER 3	0.001177	4.273	0.00
AVG. HEAD ON TOP OF LAYER 2	2.0359		
DRAINAGE COLLECTED FROM LAYER 5	0.0013	4.573	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0005		
PERC./LEAKAGE THROUGH LAYER 8	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	-0.068	-246.981	-0.17
SOIL WATER AT START OF YEAR	158.743	576236.250	
SOIL WATER AT END OF YEAR	158.675	575989.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.026	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	2.202	0.825	2.796	0.965	0.077	0.114
	1.356	1.801	1.095	0.230	1.003	3.784
STD. DEVIATIONS	2.127	0.685	4.178	0.954	0.150	0.254
	2.637	2.172	2.241	0.408	0.926	0.660
EVAPOTRANSPIRATION						
TOTALS	1.538	2.201	3.130	3.069	2.837	3.289
	5.353	4.859	3.943	2.003	1.270	1.030
STD. DEVIATIONS	0.168	0.120	0.422	1.551	0.434	1.660
	1.452	0.916	1.535	0.877	0.295	0.082
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0002	0.0002	0.0002	0.0001	0.0000	0.0000
	0.0001	0.0001	0.0001	0.0000	0.0002	0.0003
STD. DEVIATIONS	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001
	0.0001	0.0001	0.0001	0.0000	0.0001	0.0000
LATERAL DRAINAGE COLLECTED FROM LAYER 5						
TOTALS	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6						

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	5.1376	3.9509	3.4715	1.2760	0.6575	0.6665
	1.3689	2.0985	2.3093	0.6709	3.6198	5.6550
STD. DEVIATIONS	0.5200	0.5028	1.4719	1.1534	0.3565	1.0712
	1.3765	1.5843	1.6781	0.4095	2.3501	0.1955

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.0010	0.0010	0.0010	0.0008	0.0005	0.0004
	0.0003	0.0004	0.0004	0.0004	0.0005	0.0007
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001
	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002

DAILY AVERAGE HEAD ON TOP OF LAYER 8

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	16.249	(10.0689)	58982.27	32.012

EVAPOTRANSPIRATION	34.522	(2.4755)	125315.01	68.013
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00148	(0.00024)	5.362	0.00291
AVERAGE HEAD ON TOP OF LAYER 2	2.574	(0.437)		
LATERAL DRAINAGE COLLECTED FROM LAYER 5	0.00149	(0.00018)	5.415	0.00294
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000	(0.00000)	0.009	0.00000
AVERAGE HEAD ON TOP OF LAYER 6	0.001	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.00000	(0.00000)	0.009	0.00000
AVERAGE HEAD ON TOP OF LAYER 8	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.014	(0.1267)	-51.17	-0.028

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	3.976	14433.4365
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000009	0.03357
AVERAGE HEAD ON TOP OF LAYER 2	6.000	
DRAINAGE COLLECTED FROM LAYER 5	0.00001	0.02835
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 6	0.001	
MAXIMUM HEAD ON TOP OF LAYER 6	0.003	
LOCATION OF MAXIMUM HEAD IN LAYER 5 (DISTANCE FROM DRAIN)	0.0 FEET	

PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 8	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.9159	0.4860
2	0.0000	0.0000
3	10.2480	0.4270
4	139.2840	0.2920
5	0.7443	0.0620
6	0.0000	0.0000
7	0.1793	0.7470
8	5.1240	0.4270
SNOW WATER	0.000	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_2SS.D10
OUTPUT DATA FILE:            C:\temp\help3\CL-2SS.OUT


TIME:  12:54     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Side Slopes

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   9
          THICKNESS                  =      6.00   INCHES
          POROSITY                   =      0.5010 VOL/VOL
          FIELD CAPACITY             =      0.2840 VOL/VOL
          WILTING POINT              =      0.1350 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4954 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.190000006000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0783	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL

FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 7

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 25.% AND A SLOPE LENGTH OF 80. FEET.

SCS RUNOFF CURVE NUMBER	=	78.70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.973	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	3.006	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.810	INCHES

INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	158.748	INCHES
TOTAL INITIAL WATER	=	158.748	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	5.091	18480.512	13.19
EVAPOTRANSPIRATION	32.627	118434.578	84.50
PERC./LEAKAGE THROUGH LAYER 2	0.888274	3224.436	2.30
AVG. HEAD ON TOP OF LAYER 2	2.2878		
DRAINAGE COLLECTED FROM LAYER 4	0.8869	3219.552	2.30
PERC./LEAKAGE THROUGH LAYER 5	0.000028	0.100	0.00
AVG. HEAD ON TOP OF LAYER 5	0.3707		
PERC./LEAKAGE THROUGH LAYER 7	0.000028	0.100	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.005	19.497	0.01
SOIL WATER AT START OF YEAR	158.927	576903.937	
SOIL WATER AT END OF YEAR	158.932	576923.437	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.103	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	21.136	76722.102	36.61
EVAPOTRANSPIRATION	35.656	129429.891	61.76
PERC./LEAKAGE THROUGH LAYER 2	0.909491	3301.453	1.58

AVG. HEAD ON TOP OF LAYER 2	2.3582		
DRAINAGE COLLECTED FROM LAYER 4	0.9674	3511.800	1.68
PERC./LEAKAGE THROUGH LAYER 5	0.000030	0.109	0.00
AVG. HEAD ON TOP OF LAYER 5	0.4039		
PERC./LEAKAGE THROUGH LAYER 7	0.000030	0.109	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.029	-103.911	-0.05
SOIL WATER AT START OF YEAR	158.932	576923.437	
SOIL WATER AT END OF YEAR	158.903	576819.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.103	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	29.821	108250.344	44.07
EVAPOTRANSPIRATION	36.958	134157.375	54.62
PERC./LEAKAGE THROUGH LAYER 2	1.095636	3977.157	1.62
AVG. HEAD ON TOP OF LAYER 2	3.1462		
DRAINAGE COLLECTED FROM LAYER 4	1.0217	3708.627	1.51
PERC./LEAKAGE THROUGH LAYER 5	0.000032	0.115	0.00
AVG. HEAD ON TOP OF LAYER 5	0.4265		
PERC./LEAKAGE THROUGH LAYER 7	0.000032	0.115	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.141	-510.580	-0.21

SOIL WATER AT START OF YEAR	158.903	576819.500	
SOIL WATER AT END OF YEAR	158.763	576308.937	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.152	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	12.612	45781.691	25.68
EVAPOTRANSPIRATION	35.357	128347.562	71.98
PERC./LEAKAGE THROUGH LAYER 2	0.962556	3494.079	1.96
AVG. HEAD ON TOP OF LAYER 2	2.6776		
DRAINAGE COLLECTED FROM LAYER 4	0.9800	3557.233	2.00
PERC./LEAKAGE THROUGH LAYER 5	0.000031	0.111	0.00
AVG. HEAD ON TOP OF LAYER 5	0.4081		
PERC./LEAKAGE THROUGH LAYER 7	0.000031	0.111	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.171	619.032	0.35
SOIL WATER AT START OF YEAR	158.763	576308.937	
SOIL WATER AT END OF YEAR	158.933	576927.937	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.022	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	9.287	33713.312	22.84
EVAPOTRANSPIRATION	30.621	111153.766	75.29
PERC./LEAKAGE THROUGH LAYER 2	0.840705	3051.758	2.07
AVG. HEAD ON TOP OF LAYER 2	1.9205		
DRAINAGE COLLECTED FROM LAYER 4	0.8667	3145.976	2.13
PERC./LEAKAGE THROUGH LAYER 5	0.000027	0.098	0.00
AVG. HEAD ON TOP OF LAYER 5	0.3624		
PERC./LEAKAGE THROUGH LAYER 7	0.000027	0.098	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.105	-381.079	-0.26
SOIL WATER AT START OF YEAR	158.933	576927.937	
SOIL WATER AT END OF YEAR	158.828	576546.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.035	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49

	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	2.076	0.783	2.685	0.950	0.084	0.107
	1.323	1.762	1.059	0.221	0.935	3.605
STD. DEVIATIONS	2.137	0.645	4.093	0.935	0.144	0.239
	2.572	2.121	2.199	0.394	0.894	0.668
EVAPOTRANSPIRATION						
TOTALS	1.548	2.205	3.131	2.929	2.819	3.274
	5.330	4.812	3.946	1.934	1.277	1.039
STD. DEVIATIONS	0.169	0.120	0.425	1.622	0.417	1.662
	1.478	0.934	1.524	0.869	0.296	0.085
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.1276	0.1110	0.1156	0.0474	0.0296	0.0327
	0.0506	0.0690	0.0820	0.0461	0.0979	0.1299
STD. DEVIATIONS	0.0026	0.0037	0.0129	0.0364	0.0109	0.0360
	0.0409	0.0435	0.0500	0.0252	0.0502	0.0011
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	0.1081	0.1048	0.1168	0.1002	0.0727	0.0542
	0.0491	0.0586	0.0610	0.0633	0.0666	0.0891
STD. DEVIATIONS	0.0122	0.0080	0.0051	0.0149	0.0171	0.0081
	0.0158	0.0208	0.0183	0.0235	0.0220	0.0209
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	5.0370	3.7739	3.1906	1.2250	0.6455	0.6429
	1.3261	2.0509	2.2101	0.6044	3.4622	5.5682
STD. DEVIATIONS	0.5886	0.5139	1.6226	1.1527	0.3528	1.0427
	1.3463	1.5680	1.6682	0.4119	2.3403	0.2555

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.5305	0.5649	0.5733	0.5079	0.3567	0.2746
	0.2411	0.2875	0.3095	0.3107	0.3379	0.4372
STD. DEVIATIONS	0.0599	0.0376	0.0249	0.0756	0.0839	0.0409
	0.0777	0.1021	0.0928	0.1153	0.1114	0.1028

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	15.589	(9.9007)	56589.59	30.713
EVAPOTRANSPIRATION	34.244	(2.5662)	124304.64	67.465
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.93933	(0.09772)	3409.777	1.85061
AVERAGE HEAD ON TOP OF LAYER 2	2.478	(0.460)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.94453	(0.06540)	3428.638	1.86085
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00003	(0.00000)	0.107	0.00006
AVERAGE HEAD ON TOP OF LAYER 5	0.394	(0.027)		

PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00003	(0.00000)	0.107	0.00006
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.020	(0.1212)	-71.41	-0.039

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	3.933	14277.0410
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.004252	15.43442
AVERAGE HEAD ON TOP OF LAYER 2	6.000	
DRAINAGE COLLECTED FROM LAYER 4	0.00402	14.57967
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000000	0.00046
AVERAGE HEAD ON TOP OF LAYER 5	0.611	
MAXIMUM HEAD ON TOP OF LAYER 5	1.086	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	11.1 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000000	0.00046
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5010
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.9004	0.4834
2	10.2480	0.4270
3	139.2840	0.2920
4	0.9135	0.0761
5	0.0000	0.0000
6	0.1793	0.7470
7	5.1240	0.4270
SNOW WATER	0.000	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_2OP.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_2OP.OUT


TIME:  12:54     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Open Phase

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
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                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER  18
          THICKNESS                  =    477.00  INCHES
          POROSITY                   =      0.6710 VOL/VOL
          FIELD CAPACITY             =      0.2920 VOL/VOL
          WILTING POINT              =      0.0770 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.2955 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1410	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 5

TYPE 3 - BARRIER SOIL LINER

MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #18 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 10.% AND A SLOPE LENGTH OF 300. FEET.

SCS RUNOFF CURVE NUMBER	=	80.70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	6.617	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	14.762	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.694	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	147.968	INCHES
TOTAL INITIAL WATER	=	147.968	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	0.137	496.600	0.35
EVAPOTRANSPIRATION	33.975	123328.195	87.99
DRAINAGE COLLECTED FROM LAYER 2	4.4796	16260.787	11.60
PERC./LEAKAGE THROUGH LAYER 3	0.000193	0.700	0.00
AVG. HEAD ON TOP OF LAYER 3	1.8883		
PERC./LEAKAGE THROUGH LAYER 5	0.000193	0.700	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.019	67.907	0.05
SOIL WATER AT START OF YEAR	148.147	537774.000	
SOIL WATER AT END OF YEAR	148.166	537841.937	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.158	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	1.894	6876.229	3.28
EVAPOTRANSPIRATION	40.588	147334.172	70.31
DRAINAGE COLLECTED FROM LAYER 2	14.9633	54316.602	25.92
PERC./LEAKAGE THROUGH LAYER 3	0.000813	2.952	0.00
AVG. HEAD ON TOP OF LAYER 3	5.9821		
PERC./LEAKAGE THROUGH LAYER 5	0.000813	2.952	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0001		
CHANGE IN WATER STORAGE	0.284	1029.966	0.49
SOIL WATER AT START OF YEAR	148.166	537841.937	
SOIL WATER AT END OF YEAR	148.450	538871.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.031	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00

RUNOFF	3.066	11130.344	4.53
EVAPOTRANSPIRATION	40.278	146210.531	59.53
DRAINAGE COLLECTED FROM LAYER 2	20.7970	75493.125	30.74
PERC./LEAKAGE THROUGH LAYER 3	0.001274	4.626	0.00
AVG. HEAD ON TOP OF LAYER 3	8.3177		
PERC./LEAKAGE THROUGH LAYER 5	0.001274	4.626	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0001		
CHANGE IN WATER STORAGE	3.517	12767.258	5.20
SOIL WATER AT START OF YEAR	148.450	538871.875	
SOIL WATER AT END OF YEAR	151.967	551639.125	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.163	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	0.814	2955.515	1.66
EVAPOTRANSPIRATION	37.798	137206.875	76.95
DRAINAGE COLLECTED FROM LAYER 2	14.9714	54346.266	30.48
PERC./LEAKAGE THROUGH LAYER 3	0.000860	3.123	0.00
AVG. HEAD ON TOP OF LAYER 3	5.8686		
PERC./LEAKAGE THROUGH LAYER 5	0.000860	3.123	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0001		
CHANGE IN WATER STORAGE	-4.465	-16206.164	-9.09
SOIL WATER AT START OF YEAR	151.967	551639.125	

SOIL WATER AT END OF YEAR	147.502	535433.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.009	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	0.344	1250.323	0.85
EVAPOTRANSPIRATION	35.058	127261.242	86.20
DRAINAGE COLLECTED FROM LAYER 2	5.7305	20801.687	14.09
PERC./LEAKAGE THROUGH LAYER 3	0.000258	0.937	0.00
AVG. HEAD ON TOP OF LAYER 3	2.3935		
PERC./LEAKAGE THROUGH LAYER 5	0.000258	0.937	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.463	-1682.121	-1.14
SOIL WATER AT START OF YEAR	147.502	535433.000	
SOIL WATER AT END OF YEAR	147.039	533750.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.039	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	0.055	0.024	0.164	0.149	0.042	0.012
	0.140	0.134	0.375	0.021	0.052	0.084
STD. DEVIATIONS	0.111	0.054	0.234	0.234	0.068	0.028
	0.256	0.179	0.772	0.024	0.114	0.071
EVAPOTRANSPIRATION						
TOTALS	1.502	2.213	3.172	4.396	3.615	3.315
	5.218	5.379	4.265	2.283	1.210	0.971
STD. DEVIATIONS	0.145	0.111	0.411	1.507	0.923	1.881
	1.449	1.094	0.996	1.135	0.336	0.098
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.8615	1.1759	1.5599	1.4511	1.6780	1.3216
	0.9357	0.6727	0.6908	0.6062	0.6473	0.5877
STD. DEVIATIONS	0.4310	0.2573	0.6328	0.8463	1.1612	1.1787
	0.9605	0.5685	0.6639	0.6796	0.9414	0.7390
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0000	0.0000	0.0001	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	4.1816	6.2227	7.2950	6.9244	7.6480	6.4940
	4.4136	3.2736	3.4364	2.9189	3.0812	2.7908
STD. DEVIATIONS	2.0290	1.1607	2.6820	3.7471	5.1559	5.7814
	4.3698	2.7533	3.2622	3.2351	4.3346	3.4253

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	1.251	(1.2210)	4541.80	2.465
EVAPOTRANSPIRATION	37.539	(2.9886)	136268.20	73.958
LATERAL DRAINAGE COLLECTED FROM LAYER 2	12.18834	(6.90442)	44243.691	24.01266
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.00068	(0.00045)	2.467	0.00134
AVERAGE HEAD ON TOP OF LAYER 3	4.890	(2.699)		
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00068	(0.00045)	2.467	0.00134
AVERAGE HEAD ON TOP OF LAYER 5	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.222	(2.8439)	-804.63	-0.437

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	1.753	6362.4165
DRAINAGE COLLECTED FROM LAYER 2	0.09936	360.66934
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000008	0.02905
AVERAGE HEAD ON TOP OF LAYER 3	14.911	
MAXIMUM HEAD ON TOP OF LAYER 3	17.597	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	51.2 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000008	0.02905
AVERAGE HEAD ON TOP OF LAYER 5	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.3835

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0770

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	140.6990	0.2950
2	0.8573	0.0714

3	0.0000	0.0000
4	0.1793	0.7470
5	5.1240	0.4270
SNOW WATER	0.000	

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BEST COPY

H.E.L.P MODEL RESULTS
Alternative Liner System 2
With Interim Cover (2 Feet of Cover)

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:      c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:        C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:    C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:      c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:    C:\temp\help3\CL_2ICT.D10
OUTPUT DATA FILE:             C:\temp\help3\CL_2ICT.OUT


TIME:  12:58     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Int.Cv Top

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   0
          THICKNESS                  =     24.00   INCHES
          POROSITY                   =      0.4750 VOL/VOL
          FIELD CAPACITY             =      0.3780 VOL/VOL
          WILTING POINT              =      0.2650 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.2826 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.999999997000E-06 CM/SEC
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LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1509.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0620	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES

POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #15 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 4.% AND A SLOPE LENGTH OF 670. FEET.

SCS RUNOFF CURVE NUMBER	=	96.50	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	6.026	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.450	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	5.830	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	453.458	INCHES
TOTAL INITIAL WATER	=	453.458	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	

END OF GROWING SEASON (JULIAN DATE)	=	351
EVAPORATIVE ZONE DEPTH	=	22.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	26.802	97292.258	69.42
EVAPOTRANSPIRATION	11.795	42815.367	30.55
DRAINAGE COLLECTED FROM LAYER 3	0.0006	2.109	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.012	44.533	0.03
SOIL WATER AT START OF YEAR	453.637	1646701.750	
SOIL WATER AT END OF YEAR	453.649	1646746.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.066	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	44.505	161554.187	77.09
EVAPOTRANSPIRATION	12.941	46975.191	22.42
DRAINAGE COLLECTED FROM LAYER 3	0.0004	1.411	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.283	1029.024	0.49
SOIL WATER AT START OF YEAR	453.649	1646746.250	
SOIL WATER AT END OF YEAR	453.933	1647775.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.058	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	53.395	193824.203	78.92
EVAPOTRANSPIRATION	14.273	51811.957	21.10
DRAINAGE COLLECTED FROM LAYER 3	0.0004	1.580	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.009	-31.794	-0.01
SOIL WATER AT START OF YEAR	453.933	1647775.250	
SOIL WATER AT END OF YEAR	453.924	1647743.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-0.222	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	35.169	127662.773	71.60
EVAPOTRANSPIRATION	14.020	50894.266	28.54
DRAINAGE COLLECTED FROM LAYER 3	0.0004	1.533	0.00

PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.070	-253.019	-0.14
SOIL WATER AT START OF YEAR	453.924	1647743.500	
SOIL WATER AT END OF YEAR	453.854	1647490.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.047	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	28.961	105127.523	71.21
EVAPOTRANSPIRATION	11.837	42967.414	29.10
DRAINAGE COLLECTED FROM LAYER 3	0.0003	0.948	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.128	-463.831	-0.31
SOIL WATER AT START OF YEAR	453.854	1647490.500	
SOIL WATER AT END OF YEAR	453.726	1647026.620	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE 0.0000 0.043 0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	2.731	1.870	4.508	2.280	2.290	2.272
	5.134	4.841	3.809	1.997	2.036	3.998
STD. DEVIATIONS	1.738	0.882	4.857	1.452	0.428	1.370
	3.508	3.161	2.639	1.274	1.347	0.619
EVAPOTRANSPIRATION						
TOTALS	0.751	0.907	1.119	0.787	0.890	1.151
	2.252	1.863	1.136	0.664	0.728	0.726
STD. DEVIATIONS	0.105	0.103	0.481	0.487	0.243	0.589
	0.727	0.478	0.399	0.258	0.137	0.092
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
	0.0002	0.0003	0.0003	0.0002	0.0002	0.0001
STD. DEVIATIONS	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	37.766	(11.1149)	137092.19	74.405
EVAPOTRANSPIRATION	12.973	(1.1692)	47092.84	25.559
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.00042	(0.00011)	1.516	0.00082
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000	(0.00000)	0.009	0.00000
AVERAGE HEAD ON TOP OF LAYER 4	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000	(0.00000)	0.009	0.00000

AVERAGE HEAD ON TOP OF LAYER 6	0.000 (	0.000)		
CHANGE IN WATER STORAGE	0.018 (	0.1582)	64.98	0.035

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.288	19196.2520
DRAINAGE COLLECTED FROM LAYER 3	0.00000	0.01367
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 4	0.001	
MAXIMUM HEAD ON TOP OF LAYER 4	0.002	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 6	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2984
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2650

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	6.8717	0.2863
2	440.6280	0.2920
3	0.7440	0.0620
4	0.0000	0.0000
5	0.1793	0.7470
6	5.1240	0.4270
SNOW WATER	0.000	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_2ICB.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_2ICB.OUT


TIME:  12:52     DATE:  5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Int.Cv Benches

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   0
          THICKNESS                  =     24.00   INCHES
          POROSITY                   =      0.4750 VOL/VOL
          FIELD CAPACITY             =      0.3780 VOL/VOL
          WILTING POINT              =      0.2650 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.2826 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.999999997000E-06 CM/SEC
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LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0620	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES

POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #15 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 4.% AND A SLOPE LENGTH OF 300. FEET.

SCS RUNOFF CURVE NUMBER	=	96.60	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	6.026	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.450	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	5.830	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	152.114	INCHES
TOTAL INITIAL WATER	=	152.114	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	

END OF GROWING SEASON (JULIAN DATE)	=	351
EVAPORATIVE ZONE DEPTH	=	22.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	26.818	97349.555	69.46
EVAPOTRANSPIRATION	11.781	42766.004	30.51
DRAINAGE COLLECTED FROM LAYER 3	0.0007	2.376	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0003		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.010	36.335	0.03
SOIL WATER AT START OF YEAR	152.293	552823.687	
SOIL WATER AT END OF YEAR	152.303	552860.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.062	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	44.573	161801.656	77.21
EVAPOTRANSPIRATION	12.866	46705.168	22.29
DRAINAGE COLLECTED FROM LAYER 3	0.0003	1.255	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.290	1051.789	0.50
SOIL WATER AT START OF YEAR	152.303	552860.062	
SOIL WATER AT END OF YEAR	152.593	553911.812	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.006	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	53.411	193881.250	78.94
EVAPOTRANSPIRATION	14.260	51765.602	21.08
DRAINAGE COLLECTED FROM LAYER 3	0.0006	2.258	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0003		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.012	-43.259	-0.02
SOIL WATER AT START OF YEAR	152.593	553911.812	
SOIL WATER AT END OF YEAR	152.581	553868.562	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.128	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	35.134	127535.531	71.53
EVAPOTRANSPIRATION	14.056	51024.168	28.62
DRAINAGE COLLECTED FROM LAYER 3	0.0005	1.723	0.00

PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.070	-255.844	-0.14
SOIL WATER AT START OF YEAR	152.581	553868.562	
SOIL WATER AT END OF YEAR	152.510	553612.750	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.023	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	28.994	105247.086	71.29
EVAPOTRANSPIRATION	11.804	42848.672	29.02
DRAINAGE COLLECTED FROM LAYER 3	0.0003	1.141	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.128	-464.883	-0.31
SOIL WATER AT START OF YEAR	152.510	553612.750	
SOIL WATER AT END OF YEAR	152.382	553147.812	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE 0.0000 0.079 0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	2.733	1.870	4.512	2.280	2.316	2.272
	5.117	4.846	3.809	1.995	2.036	3.999
STD. DEVIATIONS	1.738	0.882	4.858	1.452	0.423	1.369
	3.527	3.165	2.640	1.272	1.346	0.617
EVAPOTRANSPIRATION						
TOTALS	0.748	0.909	1.116	0.787	0.864	1.150
	2.270	1.859	1.134	0.667	0.726	0.725
STD. DEVIATIONS	0.104	0.102	0.480	0.488	0.236	0.588
	0.707	0.476	0.397	0.258	0.137	0.090
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
	0.0003	0.0003	0.0003	0.0003	0.0002	0.0001
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	37.786	(11.1225)	137163.02	74.443
EVAPOTRANSPIRATION	12.954	(1.1861)	47021.92	25.521
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.00048	(0.00016)	1.751	0.00095
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000	(0.00000)	0.009	0.00000
AVERAGE HEAD ON TOP OF LAYER 4	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000	(0.00000)	0.009	0.00000

AVERAGE HEAD ON TOP OF LAYER 6	0.000 (	0.000)		
CHANGE IN WATER STORAGE	0.018 (	0.1612)	64.83	0.035

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.288	19196.6426
DRAINAGE COLLECTED FROM LAYER 3	0.00000	0.01581
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 4	0.001	
MAXIMUM HEAD ON TOP OF LAYER 4	0.001	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 6	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2985
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2650

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	6.8717	0.2863
2	139.2840	0.2920
3	0.7440	0.0620
4	0.0000	0.0000
5	0.1793	0.7470
6	5.1240	0.4270
SNOW WATER	0.000	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_2ICS.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_2ICS.OUT


TIME:  12:53     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 Int.Cv Slopes

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   0
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.4750 VOL/VOL
          FIELD CAPACITY               =      0.3780 VOL/VOL
          WILTING POINT                =      0.2650 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2826 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.999999997000E-06 CM/SEC
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LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0620	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES

POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #15 WITH BARE GROUND CONDITIONS, A SURFACE SLOPE OF 25.% AND A SLOPE LENGTH OF 80. FEET.

SCS RUNOFF CURVE NUMBER	=	97.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	6.026	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.450	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	5.830	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	152.114	INCHES
TOTAL INITIAL WATER	=	152.114	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	

END OF GROWING SEASON (JULIAN DATE)	=	351
EVAPORATIVE ZONE DEPTH	=	22.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR BATON ROUGE LOUISIANA AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	27.057	98217.578	70.08
EVAPOTRANSPIRATION	11.542	41896.937	29.89
DRAINAGE COLLECTED FROM LAYER 3	0.0009	3.164	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.010	36.612	0.03
SOIL WATER AT START OF YEAR	152.293	552823.312	
SOIL WATER AT END OF YEAR	152.303	552859.937	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.043	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	44.746	162427.719	77.51
EVAPOTRANSPIRATION	12.697	46089.273	21.99
DRAINAGE COLLECTED FROM LAYER 3	0.0003	1.240	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	0.287	1041.653	0.50
SOIL WATER AT START OF YEAR	152.303	552859.937	
SOIL WATER AT END OF YEAR	152.590	553901.562	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.017	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	53.391	193808.250	78.91
EVAPOTRANSPIRATION	14.278	51828.590	21.10
DRAINAGE COLLECTED FROM LAYER 3	0.0007	2.435	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0003		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.009	-33.455	-0.01
SOIL WATER AT START OF YEAR	152.590	553901.562	
SOIL WATER AT END OF YEAR	152.581	553868.125	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.093	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	35.350	128319.914	71.97
EVAPOTRANSPIRATION	13.841	50241.879	28.18
DRAINAGE COLLECTED FROM LAYER 3	0.0005	1.648	0.00

PERC./LEAKAGE THROUGH LAYER 4	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
PERC./LEAKAGE THROUGH LAYER 6	0.000003	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.071	-257.893	-0.14
SOIL WATER AT START OF YEAR	152.581	553868.125	
SOIL WATER AT END OF YEAR	152.510	553610.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.053	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	29.102	105639.266	71.56
EVAPOTRANSPIRATION	11.695	42454.043	28.76
DRAINAGE COLLECTED FROM LAYER 3	0.0003	1.183	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
PERC./LEAKAGE THROUGH LAYER 6	0.000002	0.009	0.00
AVG. HEAD ON TOP OF LAYER 6	0.0000		
CHANGE IN WATER STORAGE	-0.127	-462.391	-0.31
SOIL WATER AT START OF YEAR	152.510	553610.250	
SOIL WATER AT END OF YEAR	152.382	553147.812	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE 0.0000 -0.005 0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49
	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	2.738	1.879	4.519	2.280	2.316	2.296
	5.161	4.872	3.816	2.008	2.041	4.003
STD. DEVIATIONS	1.737	0.882	4.859	1.452	0.410	1.380
	3.513	3.165	2.639	1.284	1.354	0.612
EVAPOTRANSPIRATION						
TOTALS	0.745	0.899	1.112	0.782	0.864	1.121
	2.231	1.832	1.128	0.653	0.721	0.722
STD. DEVIATIONS	0.106	0.104	0.484	0.482	0.227	0.578
	0.694	0.469	0.395	0.251	0.142	0.091
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000
STD. DEVIATIONS	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002
	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002
STD. DEVIATIONS	0.0003	0.0002	0.0001	0.0001	0.0001	0.0001
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000

DAILY AVERAGE HEAD ON TOP OF LAYER 6

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	37.929	(11.0488)	137682.55	74.725
EVAPOTRANSPIRATION	12.811	(1.2329)	46502.14	25.238
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.00053	(0.00023)	1.934	0.00105
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000	(0.00000)	0.009	0.00000
AVERAGE HEAD ON TOP OF LAYER 4	0.000	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000	(0.00000)	0.009	0.00000

AVERAGE HEAD ON TOP OF LAYER 6	0.000 (	0.000)		
CHANGE IN WATER STORAGE	0.018	(0.1598)	64.91	0.035

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.287	19193.4395
DRAINAGE COLLECTED FROM LAYER 3	0.00001	0.02164
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 4	0.001	
MAXIMUM HEAD ON TOP OF LAYER 4	0.002	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 6	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2982
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.2650

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	6.8717	0.2863
2	139.2840	0.2920
3	0.7440	0.0620
4	0.0000	0.0000
5	0.1793	0.7470
6	5.1240	0.4270
SNOW WATER	0.000	

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BEST COPY

H.E.L.P MODEL RESULTS
Alternative Liner System 2
With Interim Cover (30-mil HDPE liner)

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                 DEVELOPED BY ENVIRONMENTAL LABORATORY                    **
**                   USAE WATERWAYS EXPERIMENT STATION                      **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:      c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:        C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:    C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:      c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:    C:\temp\help3\CL_230T.D10
OUTPUT DATA FILE:             C:\temp\help3\CL_230T.OUT


TIME:  12:53     DATE:  5/17/2005


******************************************************************************

     TITLE:  BFI Colonial Renewal/Modification - Option 2 30 mil Top

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   8
          THICKNESS                  =      0.10   INCHES
          POROSITY                   =      0.4630 VOL/VOL
          FIELD CAPACITY             =      0.2320 VOL/VOL
          WILTING POINT              =      0.1160 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4630 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.369999994000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.03	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	1509.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0622	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 7

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	98.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.046	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.046	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.012	INCHES

INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	446.724	INCHES
TOTAL INITIAL WATER	=	446.724	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	33.550	121788.242	86.90
EVAPOTRANSPIRATION	5.043	18306.287	13.06
PERC./LEAKAGE THROUGH LAYER 2	0.016460	59.749	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0226		
DRAINAGE COLLECTED FROM LAYER 4	0.0165	59.917	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0069		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	-0.222	0.00
SOIL WATER AT START OF YEAR	446.907	1622273.370	
SOIL WATER AT END OF YEAR	446.907	1622273.120	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.109	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	52.830	191771.141	91.51
EVAPOTRANSPIRATION	4.882	17721.834	8.46
PERC./LEAKAGE THROUGH LAYER 2	0.018429	66.896	0.03

AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0182	65.937	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0076		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	0.997	0.00
SOIL WATER AT START OF YEAR	446.907	1622273.120	
SOIL WATER AT END OF YEAR	446.907	1622274.120	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.043	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	62.229	225890.047	91.97
EVAPOTRANSPIRATION	5.448	19774.965	8.05
PERC./LEAKAGE THROUGH LAYER 2	0.018388	66.749	0.03
AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0179	64.984	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0075		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.034	-124.183	-0.05

SOIL WATER AT START OF YEAR	446.907	1622274.120	
SOIL WATER AT END OF YEAR	446.873	1622149.870	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.098	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	43.479	157829.797	88.52
EVAPOTRANSPIRATION	5.614	20378.719	11.43
PERC./LEAKAGE THROUGH LAYER 2	0.020065	72.836	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0275		
DRAINAGE COLLECTED FROM LAYER 4	0.0196	71.306	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0082		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.007	25.701	0.01
SOIL WATER AT START OF YEAR	446.873	1622149.870	
SOIL WATER AT END OF YEAR	446.880	1622175.620	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.078	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	36.200	131406.234	89.01
EVAPOTRANSPIRATION	4.460	16191.561	10.97
PERC./LEAKAGE THROUGH LAYER 2	0.016133	58.564	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0222		
DRAINAGE COLLECTED FROM LAYER 4	0.0173	62.808	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0072		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.008	-28.470	-0.02
SOIL WATER AT START OF YEAR	446.880	1622175.620	
SOIL WATER AT END OF YEAR	446.872	1622147.120	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.040	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49

	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	3.097	2.324	5.129	2.693	2.880	3.069
	6.618	5.982	4.512	2.431	2.448	4.475
STD. DEVIATIONS	1.793	0.865	5.250	1.641	0.470	1.736
	3.974	3.578	2.748	1.435	1.418	0.616
EVAPOTRANSPIRATION						
TOTALS	0.410	0.340	0.430	0.229	0.272	0.424
	0.760	0.724	0.417	0.272	0.336	0.475
STD. DEVIATIONS	0.146	0.149	0.226	0.139	0.057	0.214
	0.189	0.189	0.132	0.114	0.079	0.144
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0016	0.0012	0.0016	0.0009	0.0012	0.0014
	0.0025	0.0021	0.0013	0.0009	0.0012	0.0019
STD. DEVIATIONS	0.0006	0.0003	0.0006	0.0006	0.0003	0.0007
	0.0006	0.0005	0.0004	0.0004	0.0003	0.0006
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	0.0016	0.0014	0.0015	0.0014	0.0013	0.0013
	0.0016	0.0019	0.0017	0.0015	0.0013	0.0014
STD. DEVIATIONS	0.0003	0.0002	0.0002	0.0003	0.0003	0.0002
	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0260	0.0220	0.0263	0.0157	0.0203	0.0237
	0.0395	0.0340	0.0212	0.0148	0.0198	0.0310
STD. DEVIATIONS	0.0098	0.0046	0.0101	0.0095	0.0042	0.0120
	0.0100	0.0074	0.0061	0.0059	0.0044	0.0095

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0078	0.0074	0.0076	0.0071	0.0062	0.0064
	0.0079	0.0095	0.0088	0.0071	0.0066	0.0071
STD. DEVIATIONS	0.0016	0.0010	0.0008	0.0016	0.0016	0.0009
	0.0010	0.0012	0.0009	0.0009	0.0009	0.0010

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	45.658	(11.9039)	165737.09	89.952
EVAPOTRANSPIRATION	5.089	(0.4594)	18474.67	10.027
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.01789	(0.00161)	64.959	0.03526
AVERAGE HEAD ON TOP OF LAYER 2	0.025	(0.002)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.01790	(0.00116)	64.991	0.03527
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 5	0.007	(0.000)		

PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.007	(0.0161)	-25.24	-0.014

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.403	19612.4023
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000205	0.74520
AVERAGE HEAD ON TOP OF LAYER 2	0.100	
DRAINAGE COLLECTED FROM LAYER 4	0.00008	0.28110
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 5	0.012	
MAXIMUM HEAD ON TOP OF LAYER 5	0.024	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4630
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1160

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	0.0116	0.1160
2	0.0000	0.0000
3	440.6280	0.2920
4	0.7465	0.0622
5	0.0000	0.0000
6	0.1793	0.7470
7	5.1240	0.4270
SNOW WATER	0.000	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_230B.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_230B.OUT


TIME:  12:51     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 30 mil Benches

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
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                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   8
          THICKNESS                  =      0.10   INCHES
          POROSITY                   =      0.4630 VOL/VOL
          FIELD CAPACITY             =      0.2320 VOL/VOL
          WILTING POINT              =      0.1160 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4630 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.369999994000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.03	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0622	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 7

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	98.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.046	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.046	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.012	INCHES

INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	145.380	INCHES
TOTAL INITIAL WATER	=	145.380	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	33.550	121788.242	86.90
EVAPOTRANSPIRATION	5.043	18306.287	13.06
PERC./LEAKAGE THROUGH LAYER 2	0.016460	59.749	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0226		
DRAINAGE COLLECTED FROM LAYER 4	0.0165	59.917	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0069		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	-0.222	0.00
SOIL WATER AT START OF YEAR	145.563	528394.562	
SOIL WATER AT END OF YEAR	145.563	528394.312	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.109	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	52.830	191771.141	91.51
EVAPOTRANSPIRATION	4.882	17721.834	8.46
PERC./LEAKAGE THROUGH LAYER 2	0.018429	66.896	0.03

AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0182	65.937	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0076		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	0.942	0.00
SOIL WATER AT START OF YEAR	145.563	528394.312	
SOIL WATER AT END OF YEAR	145.563	528395.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.012	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	62.229	225890.047	91.97
EVAPOTRANSPIRATION	5.448	19774.965	8.05
PERC./LEAKAGE THROUGH LAYER 2	0.018388	66.749	0.03
AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0179	64.984	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0075		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.034	-124.183	-0.05

SOIL WATER AT START OF YEAR	145.563	528395.250	
SOIL WATER AT END OF YEAR	145.529	528271.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.098	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	43.479	157829.797	88.52
EVAPOTRANSPIRATION	5.614	20378.719	11.43
PERC./LEAKAGE THROUGH LAYER 2	0.020065	72.836	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0275		
DRAINAGE COLLECTED FROM LAYER 4	0.0196	71.306	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0082		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.007	25.811	0.01
SOIL WATER AT START OF YEAR	145.529	528271.062	
SOIL WATER AT END OF YEAR	145.536	528296.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.033	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	36.200	131406.234	89.01
EVAPOTRANSPIRATION	4.460	16191.561	10.97
PERC./LEAKAGE THROUGH LAYER 2	0.016133	58.564	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0222		
DRAINAGE COLLECTED FROM LAYER 4	0.0173	62.808	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0072		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.008	-28.526	-0.02
SOIL WATER AT START OF YEAR	145.536	528296.875	
SOIL WATER AT END OF YEAR	145.528	528268.375	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.016	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49

	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	3.097	2.324	5.129	2.693	2.880	3.069
	6.618	5.982	4.512	2.431	2.448	4.475
STD. DEVIATIONS	1.793	0.865	5.250	1.641	0.470	1.736
	3.974	3.578	2.748	1.435	1.418	0.616
EVAPOTRANSPIRATION						
TOTALS	0.410	0.340	0.430	0.229	0.272	0.424
	0.760	0.724	0.417	0.272	0.336	0.475
STD. DEVIATIONS	0.146	0.149	0.226	0.139	0.057	0.214
	0.189	0.189	0.132	0.114	0.079	0.144
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0016	0.0012	0.0016	0.0009	0.0012	0.0014
	0.0025	0.0021	0.0013	0.0009	0.0012	0.0019
STD. DEVIATIONS	0.0006	0.0003	0.0006	0.0006	0.0003	0.0007
	0.0006	0.0005	0.0004	0.0004	0.0003	0.0006
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	0.0016	0.0014	0.0015	0.0014	0.0013	0.0013
	0.0016	0.0019	0.0017	0.0015	0.0013	0.0014
STD. DEVIATIONS	0.0003	0.0002	0.0002	0.0003	0.0003	0.0002
	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0260	0.0220	0.0263	0.0157	0.0203	0.0237
	0.0395	0.0340	0.0212	0.0148	0.0198	0.0310
STD. DEVIATIONS	0.0098	0.0046	0.0101	0.0095	0.0042	0.0120
	0.0100	0.0074	0.0061	0.0059	0.0044	0.0095

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0078	0.0074	0.0076	0.0071	0.0062	0.0064
	0.0079	0.0095	0.0088	0.0071	0.0066	0.0071
STD. DEVIATIONS	0.0016	0.0010	0.0008	0.0016	0.0016	0.0009
	0.0010	0.0012	0.0009	0.0009	0.0009	0.0010

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	45.658	(11.9039)	165737.09	89.952
EVAPOTRANSPIRATION	5.089	(0.4594)	18474.67	10.027
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.01789	(0.00161)	64.959	0.03526
AVERAGE HEAD ON TOP OF LAYER 2	0.025	(0.002)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.01790	(0.00116)	64.991	0.03527
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 5	0.007	(0.000)		

PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.007	(0.0161)	-25.24	-0.014

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.403	19612.4023
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000205	0.74520
AVERAGE HEAD ON TOP OF LAYER 2	0.100	
DRAINAGE COLLECTED FROM LAYER 4	0.00008	0.28110
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 5	0.012	
MAXIMUM HEAD ON TOP OF LAYER 5	0.024	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4630

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1160

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	0.0116	0.1160
2	0.0000	0.0000
3	139.2840	0.2920
4	0.7465	0.0622
5	0.0000	0.0000
6	0.1793	0.7470
7	5.1240	0.4270
SNOW WATER	0.000	

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**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     c:\temp\help3\BFI_CL.D4
TEMPERATURE DATA FILE:       C:\temp\help3\BFI_CL.D7
SOLAR RADIATION DATA FILE:   C:\temp\help3\BFI_CL.D13
EVAPOTRANSPIRATION DATA:     c:\temp\help3\BFI_CL.D11
SOIL AND DESIGN DATA FILE:   C:\temp\help3\CL_230S.D10
OUTPUT DATA FILE:            C:\temp\help3\CL_230S.OUT


TIME:  12:51     DATE:   5/17/2005


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     TITLE:  BFI Colonial Renewal/Modification - Option 2 30 mil Slopes

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
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                   TYPE 1 - VERTICAL PERCOLATION LAYER
                       MATERIAL TEXTURE NUMBER   8
          THICKNESS                  =      0.10   INCHES
          POROSITY                   =      0.4630 VOL/VOL
          FIELD CAPACITY             =      0.2320 VOL/VOL
          WILTING POINT              =      0.1160 VOL/VOL
          INITIAL SOIL WATER CONTENT =      0.4630 VOL/VOL
          EFFECTIVE SAT. HYD. COND.  =  0.369999994000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.03	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	477.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 2

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.0620	VOL/VOL
WILTING POINT	=	0.0240	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0622	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.579999993000E-02	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.10	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.75	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.24	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7470	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

LAYER 7

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	98.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.046	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	0.046	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.012	INCHES

INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	145.380	INCHES
TOTAL INITIAL WATER	=	145.380	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
BATON ROUGE LOUISIANA

STATION LATITUDE	=	30.32	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	39	
END OF GROWING SEASON (JULIAN DATE)	=	351	
EVAPORATIVE ZONE DEPTH	=	0.1	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	72.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	73.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.58	4.97	4.59	5.59	4.82	3.11
7.07	5.05	4.42	2.63	3.95	4.99

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
50.80	53.60	60.50	68.40	74.80	80.30
82.10	81.40	77.90	68.20	58.70	53.10

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR BATON ROUGE LOUISIANA
AND STATION LATITUDE = 30.32 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.61	140154.344	100.00
RUNOFF	33.550	121788.242	86.90
EVAPOTRANSPIRATION	5.043	18306.287	13.06
PERC./LEAKAGE THROUGH LAYER 2	0.016460	59.749	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0226		
DRAINAGE COLLECTED FROM LAYER 4	0.0165	59.917	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0069		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	-0.222	0.00
SOIL WATER AT START OF YEAR	145.563	528394.562	
SOIL WATER AT END OF YEAR	145.563	528394.312	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.109	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	57.73	209559.891	100.00
RUNOFF	52.830	191771.141	91.51
EVAPOTRANSPIRATION	4.882	17721.834	8.46
PERC./LEAKAGE THROUGH LAYER 2	0.018429	66.896	0.03

AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0182	65.937	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0076		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.000	0.942	0.00
SOIL WATER AT START OF YEAR	145.563	528394.312	
SOIL WATER AT END OF YEAR	145.563	528395.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.012	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	67.66	245605.734	100.00
RUNOFF	62.229	225890.047	91.97
EVAPOTRANSPIRATION	5.448	19774.965	8.05
PERC./LEAKAGE THROUGH LAYER 2	0.018388	66.749	0.03
AVG. HEAD ON TOP OF LAYER 2	0.0252		
DRAINAGE COLLECTED FROM LAYER 4	0.0179	64.984	0.03
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0075		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.034	-124.183	-0.05

SOIL WATER AT START OF YEAR	145.563	528395.250	
SOIL WATER AT END OF YEAR	145.529	528271.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.098	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.12	178305.609	100.00
RUNOFF	43.479	157829.797	88.52
EVAPOTRANSPIRATION	5.614	20378.719	11.43
PERC./LEAKAGE THROUGH LAYER 2	0.020065	72.836	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0275		
DRAINAGE COLLECTED FROM LAYER 4	0.0196	71.306	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0082		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	0.007	25.811	0.01
SOIL WATER AT START OF YEAR	145.529	528271.062	
SOIL WATER AT END OF YEAR	145.536	528296.875	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.033	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	40.67	147632.109	100.00
RUNOFF	36.200	131406.234	89.01
EVAPOTRANSPIRATION	4.460	16191.561	10.97
PERC./LEAKAGE THROUGH LAYER 2	0.016133	58.564	0.04
AVG. HEAD ON TOP OF LAYER 2	0.0222		
DRAINAGE COLLECTED FROM LAYER 4	0.0173	62.808	0.04
PERC./LEAKAGE THROUGH LAYER 5	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0072		
PERC./LEAKAGE THROUGH LAYER 7	0.000003	0.011	0.00
AVG. HEAD ON TOP OF LAYER 7	0.0000		
CHANGE IN WATER STORAGE	-0.008	-28.526	-0.02
SOIL WATER AT START OF YEAR	145.536	528296.875	
SOIL WATER AT END OF YEAR	145.528	528268.375	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.016	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.49	2.68	5.55	2.92	3.15	3.49

	7.40	6.70	4.92	2.72	2.77	4.96
STD. DEVIATIONS	1.87	0.88	5.45	1.76	0.48	1.88
	4.14	3.58	2.85	1.55	1.47	0.60
RUNOFF						
TOTALS	3.097	2.324	5.129	2.693	2.880	3.069
	6.618	5.982	4.512	2.431	2.448	4.475
STD. DEVIATIONS	1.793	0.865	5.250	1.641	0.470	1.736
	3.974	3.578	2.748	1.435	1.418	0.616
EVAPOTRANSPIRATION						
TOTALS	0.410	0.340	0.430	0.229	0.272	0.424
	0.760	0.724	0.417	0.272	0.336	0.475
STD. DEVIATIONS	0.146	0.149	0.226	0.139	0.057	0.214
	0.189	0.189	0.132	0.114	0.079	0.144
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0016	0.0012	0.0016	0.0009	0.0012	0.0014
	0.0025	0.0021	0.0013	0.0009	0.0012	0.0019
STD. DEVIATIONS	0.0006	0.0003	0.0006	0.0006	0.0003	0.0007
	0.0006	0.0005	0.0004	0.0004	0.0003	0.0006
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	0.0016	0.0014	0.0015	0.0014	0.0013	0.0013
	0.0016	0.0019	0.0017	0.0015	0.0013	0.0014
STD. DEVIATIONS	0.0003	0.0002	0.0002	0.0003	0.0003	0.0002
	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0260	0.0220	0.0263	0.0157	0.0203	0.0237
	0.0395	0.0340	0.0212	0.0148	0.0198	0.0310
STD. DEVIATIONS	0.0098	0.0046	0.0101	0.0095	0.0042	0.0120
	0.0100	0.0074	0.0061	0.0059	0.0044	0.0095

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0078	0.0074	0.0076	0.0071	0.0062	0.0064
	0.0079	0.0095	0.0088	0.0071	0.0066	0.0071
STD. DEVIATIONS	0.0016	0.0010	0.0008	0.0016	0.0016	0.0009
	0.0010	0.0012	0.0009	0.0009	0.0009	0.0010

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	50.76	(12.107)	184251.5	100.00
RUNOFF	45.658	(11.9039)	165737.09	89.952
EVAPOTRANSPIRATION	5.089	(0.4594)	18474.67	10.027
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.01789	(0.00161)	64.959	0.03526
AVERAGE HEAD ON TOP OF LAYER 2	0.025	(0.002)		
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.01790	(0.00116)	64.991	0.03527
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 5	0.007	(0.000)		

PERCOLATION/LEAKAGE THROUGH LAYER 7	0.00000	(0.00000)	0.011	0.00001
AVERAGE HEAD ON TOP OF LAYER 7	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.007	(0.0161)	-25.24	-0.014

****

****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	5.41	19638.299
RUNOFF	5.403	19612.4023
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000205	0.74520
AVERAGE HEAD ON TOP OF LAYER 2	0.100	
DRAINAGE COLLECTED FROM LAYER 4	0.00008	0.28110
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 5	0.012	
MAXIMUM HEAD ON TOP OF LAYER 5	0.024	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.000000	0.00003
AVERAGE HEAD ON TOP OF LAYER 7	0.000	
SNOW WATER	1.61	5845.4434

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4630

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1160

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	0.0116	0.1160
2	0.0000	0.0000
3	139.2840	0.2920
4	0.7465	0.0622
5	0.0000	0.0000
6	0.1793	0.7470
7	5.1240	0.4270
SNOW WATER	0.000	

****
****

ATTACHMENT 8

LEACHATE PIPE STRENGTH AND CAPACITY ANALYSIS

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	4/13/2005
CHECKED	JAB	**DATE**	5/20/05
PAGE	1 of 4	**REV.**	

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION HDPE System Design for buried pipe

The following spreadsheet evaluates the buried situation for HDPE based upon Driscopipes "System Design" (Publication 2352-97 K 01)

1) Design by Wall Crushing

$$S_A = \frac{(SDR - 1)}{2} * P_T$$

S_A : Actual compressive stress [psi]
SDR : Standard Dimension Ratio
P_T : External Pressure [psi]
SF : Factor of Safety
P_S : Total "Static Load" Pressure [psi]
P_L : Total "Live Load" [psi]
P_I : Total effective external pressure due to negative internal operating pressure (vacuum) [psi]
P_{DE} : static load pressure of dry or slightly moist earth [psi]
P_{WE} : static load pressure of saturated soil under the maximum long term variable water table [psi]
P_B : Static pressure due to stationary surface structures [psi]
γ_{sat} : saturated soil unit weight [lbs/ft³]
H_{max} : maximum burial depth [ft]

$SF = 1500 / S_A$
$P_T = P_S + P_L + P_I$
$P_S = P_{DE} + P_{WE} + P_B$

SDR = 17

$P_{WE} = \gamma_{sat} * H_{max}$

γ_{sat} = 68 lbs/ft³
H_{max} = 98.4 ft

P_{WE} = 6,691.2 psf
P_{WE} = 46.47 psi

Note: If it is assumed that all of the soil is saturated, it will produce the worst case loading

P_{DE} = 0 psi
P_B = 0 psi

$P_S = P_{DE} + P_{WE} + P_B =$ 46.47 psi

P_L = 0 psi (If protective crossing are provided, the live load is zero)

P_I = 0 psi (assuming a full vacuum 1atm is worst case scenario) However, Since HDPE pipe is perforated, a vacuum situation would not occur.

then

$P_T = P_S + P_L + P_I =$ 46.47 psi = 6691 psf

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	4/13/2005
CHECKED	TAB	**DATE**	5/20/05
PAGE	2 of 4	**REV.**	

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION HDPE System Design for buried pipe

1) Design by Wall Crushing (cont'd)

$$S_A = \frac{(SDR - 1)}{2} * P_T$$

$S_A =$ 371.7 psi

Per page 37 of "System Design" the compressive yield strength of Driscopipe is 1,500 psi.

$SF = 1500 / S_A$

SF = 4.04 > 2 **Okay**

2) Design by Wall Buckling

$P_T =$ 46.47 psi (from above)

$S_A =$ 371.7 psi (from above)

E = 22,000 psi (from Chart 25 of "System Design")

$$P_C = \frac{2.32 * E}{(SDR)^3}$$

E : stress and time dependent tensile modulus of elasticity [psi] (Assumes 50 year service life at 120F)

P_C : hydrostatic critical-collapse differential pressure [psi]

$P_C =$ 10.39 psi

$E' = P_T / \varepsilon_s$

$\varepsilon_s =$ 0.015

E' = 3,000.0 psi

E' : Soil modulus calculated as ratio of the vertical soil pressure to vertical soil strain at a specified density [psi]

ε_s : vertical soil strain [in/in] (from chart 26, "system design")

$$P_{cb} = 0.8 * \sqrt{E' * P_C}$$

$P_{cb} =$ 141.2 psi

P_{cb} : critical buckling soil pressure at the top of the pipe [psi]

$SF = P_{cb} / P_T =$ 3.04 > 2 **Okay**

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CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	4/13/2005
CHECKED	TAO	**DATE**	5/20/05
PAGE	3 of 4	**REV.**	

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION HDPE System Design for buried pipe

3) Design by Ring Deflection

% Soil Strain = $P_T / E'_{min} * 100$

$E'_{min} = E' * SF$

SF = 2
E' = 3,000.0 psi

E'_{min} = 6,000.0 psi

P_T = 46.47 psi

% Soil Strain = 0.77% < **4.2%** **Okay**

Allowable Soil Strain = 4.2%

Chart 27 ("System Design")

SDR	Allowable Ring Deflection
32.5	8.1%
26.0	6.5%
21.0	5.2%
19.0	4.7%
17.0	4.2%
15.5	3.9%
13.5	3.4%
11.0	2.7%

Specify required soil Density assuming higher temperature

P_T = 46.47 psi
S_A = 371.7 psi

$$P_C = \frac{2.32 * E * K_{temp}}{(SDR)^3}$$

K_{temp} = 0.5

P_C = 5.19 psi

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CALCULATIONS AND SKETCHES

JOB NO.	018-005		
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CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION HDPE System Design for buried pipe

$$E' = \frac{(P_{cb})^2}{0.64(P_C)}$$

(Assume $P_{cb} = P_T$)

$E' =$ 649.5 psi

$E'_{min} =$ 1,948.5 psi (with 3.0 factor of safety)

$\varepsilon_s = P_T / E'_{min} * 100\% =$ 2.38% < **4.2% Okay**

Providence Engineering and Environmental Group LLC
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CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	5/17/2005
CHECKED	TAB	**DATE**	5/20/05
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CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill

DESCRIPTION Permit Renewal - Leachate Collection and Header Piping

Determine Flow of Collection Piping

$Q_{full} = (1.49 / n) * A * R^{2/3} * S^{1/2}$ [*Chezy-Manning Equation*]

where:

- Q : discharge [ft^3/sec]
- n: Manning Roughness Coefficient
- A: cross-sectional area of pipe [ft^2]
- R: hydraulic radius of pipe (area/wetted perimeter) [ft]
- S: slope of pipe [ft/ft]
- D: inside diameter [in]

Given

D =	8	inches =	0.667	feet
S =	0.01	ft/ft		
n =	0.009			

Then

n =	0.009		
A =	$\pi D^2 / 4$ =	0.349	ft^2
R =	$A / (\pi * D)$ =	0.167	ft
S =	0.01	ft/ft	

Q_{full} =	1.75	cfs =	151,215.7 cfd
v =	5.01	fps	

Required

Peak Daily Flow =	1,771.0	ft^3/day	(using a peak daily generation rate of
Total # Pipes =	1		360.7 ft3/day/acre for 4.91 acres for Phase III)
$Q_{daily/pipe}$ =	1771.00	cfd/pipe	area per pipe)

Conclusion

Q_{full} =	151,215.7	cfd	>	1,771.0	cfd	Therefore OKAY

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	5/17/2005
CHECKED	TAB	**DATE**	5/20/05
PAGE	2 of 3	**REV.**	1

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION Permit Renewal - Leachate Collection and Header Piping

Determine Flow of Header Piping

$Q = (1.49 / n) * A * R^{2/3} * S^{1/2}$ [*Chezy-Manning Equation*]

where:

Q : discharge [ft^3/sec]
n: Manning Roughness Coefficient
A: cross-sectional area of pipe [ft^2]
R: hydraulic radius of pipe (area/wetted perimeter) [ft]
S: slope of pipe [ft/ft]
D: inside diameter [in]

Given

D =	6	inches =	0.667	feet
S =	0.01	ft/ft		
n =	0.009			

Then

n =	0.009		
A =	$\pi D^2 / 4$ =	0.349	ft^2
R =	$A / (\pi * D)$ =	0.167	ft
S =	0.01	ft/ft	
Q =	1.75	cfs =	151,215.7 cfd
v =	5.01	fps	

Required

1) Calculate Volume of Leachate at Maximum Production, i.e., Last Year Operation:

Average Leachate Production for Closed Area = Σ leachate production per area / area

Area	Leachate Rate (ft3 /acre/day)	Acres	Leachate (ft^3/day)
4% Top Sloped Area	0.0284	64.5	1.8285183
Terraces	0.0283	22.5	0.6380468
Side Slopes	14.58	115.8	1689.0638
		202.9	1691.5304

Average Leachate Production Rate = 8.34 ft^3/acre/day

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	5/17/2005
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PAGE	1 of 3	**REV.**	1

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION Permit Renewal - Leachate Collection and Header Piping

Determine Flow of Collection Piping

$Q_{full} = (1.49 / n) * A * R^{2/3} * S^{1/2}$ [*Chezy-Manning Equation*]

where:
- Q : discharge [ft^3/sec]
- n: Manning Roughness Coefficient
- A: cross-sectional area of pipe [ft^2]
- R: hydraulic radius of pipe (area/wetted perimeter) [ft]
- S: slope of pipe [ft/ft]
- D: inside diameter [in]

Given

D =	8	inches =	0.667	feet
S =	0.01	ft/ft		
n =	0.009			

Then

n =	0.009		
A =	$\pi D^2 / 4$ =	0.349	ft^2
R =	$A / (\pi * D)$ =	0.167	ft
S =	0.01	ft/ft	
Q_{full} =	1.75	cfs =	151,215.7 cfd
v =	5.01	fps	

Required

Peak Daily Flow =	1,771.0	ft^3/day	(using a peak daily generation rate of
Total # Pipes =	1		360.7 ft3/day/acre for 4.91 acres for Phase III)
$Q_{daily/pipe}$ =	1771.00	cfd/pipe	area per pipe)

Conclusion

Q_{full} =	151,215.7	cfd	>	1,771.0	cfd	Therefore OKAY

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	5/17/2005
CHECKED	TAB	**DATE**	5/20/05
PAGE	2 of 3	**REV.**	1

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION Permit Renewal - Leachate Collection and Header Piping

Determine Flow of Header Piping

$Q = (1.49 / n) * A * R^{2/3} * S^{1/2}$ [*Chezy-Manning Equation*]

where:

Q : discharge [ft^3/sec]
n: Manning Roughness Coefficient
A: cross-sectional area of pipe [ft^2]
R: hydraulic radius of pipe (area/wetted perimeter) [ft]
S: slope of pipe [ft/ft]
D: inside diameter [in]

Given

D =	8	inches =	0.667	feet
S =	0.01	ft/ft		
n =	0.009			

Then

n =	0.009		
A =	$\pi D^2 / 4$ =	0.349	ft^2
R =	$A / (\pi * D)$ =	0.167	ft
S =	0.01	ft/ft	
Q =	1.75	cfs =	151,215.7 cfd
v =	5.01	fps	

Required

1) Calculate Volume of Leachate at Maximum Production, i.e., Last Year Operation:

Average Leachate Production for Closed Area = Σ leachate production per area / area

Area	Leachate Rate (ft3 /acre/day)	Acres	Leachate (ft^3/day)
4% Top Sloped Area	0.0284	64.5	1.8285183
Terraces	0.0283	22.5	0.6380468
Side Slopes	14.58	115.8	1689.0638
		202.9	1691.5304

Average Leachate Production Rate = 8.34 ft^3/acre/day

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BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	5/17/200
CHECKED	TAB	**DATE**	5/20/05
PAGE	3 of 3	**REV.**	1

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill
DESCRIPTION Permit Renewal - Leachate Collection and Header Piping

Determine Flow of Header Piping (cont'd)

Leachate Production for Areas with Interim Cover

Average Leachate Production for Interim Cover Area = Σ leachate production per area / area

Area	Leachate Rate (ft3 /acre/day)	Acres	Leachate (ft^3/day)
4% Top Sloped Area	0.2810	17.8	5.0018
Terraces	0.2810	6.2	1.7422
Side Slopes	0.28	32.0	8.992
		56.0	15.736

Average Leachate Production Rate = 0.28 ft^3/acre/day

Total Landfill Area =	202.9	acres
Current Landfill Area =	119.5	acres
Proposed Phase III Total Area =	76.0	acres
Open Active Area =	20.0	acres
Area with Interim Cover =	52.6	acres
Peak Leachate Production Final Cover Area =	62.4	gallons/acre/day
Peak Leachate Production Interim Cover Area =	2.1	gallons/acre/day
Peak Leachate Production Active Area =	2,698	gallons/acre/day

Maximum Leachate Production = Leachate Production (Active Area) + Leachate Production (Closed Area) + Leachate Production (Area with Interim Cover)

Leachate Production (Active Area) =	20 acre x 2698 gal/acre/day =	53,964	gallons/day
Leachate Production (Active Area) =	52.6 acre x 2.1 gal/acre/day =	111	gallons/day
Leachate Production (Closed Area) =	130.3 acre x 62.4 gal/acre/day =	8,125	gallons/day
	Maximum Leachate Production =	**62,200**	**gallons/day**
	=	**8,314.89**	**cubic feet/day**

2) Calculate the Volume of Leachate after the landfill closes

Total Area =	202.86	acres
Leachate Production Final Cover Area =	8.34	gallons/acre/day

Leachate Production (Closed Area - 202.9 acres) = 1,692 gallons/day
= 226.12 cubic feet/day

Conclusion

Q_{full} =	151,215.7	cfd	>	8,314.9	cfd	Therefore OKAY

ATTACHMENT 9

STORM WATER MANAGEMENT

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	PLP	**DATE**	4/7/2005
CHECKED	TAB	**DATE**	5/24/05
PAGE	1 of 1	**REV.**	

CLIENT BFI Waste Systems of North America, Inc. - Colonial Landfill

DESCRIPTION Erosion Potential of Permit Renewal Application

Purpose: Evaluate Erosion Potential for Proposed Vertical Expansion

The USDA Universal Soil Loss Equation (USLE) predicts average annual soil loss as a product of six quantifiable factors. The equation is:

$$A = R * K * L * S * C * P$$

where,

A = average annual soil loss [tons/acre]
R = rainfall and runoff ersoivity index
K = soil erodibility factor [tons/acre]
L = slope-length factor
S = slope-steepness factor
C = cover-management factor
P = practice factor

Inputs

R =	550	(from average annual values of rainfall-erosivity factor)
K =	0.23	(for silty clay loam with 2% organics)
LS =	5.5	
C =	0.005	(for grass with no canopy and good ground cover)
P =	0.3	(assumes 6 equal slopes)

Therefore,

A = 1.36 tons/acre < 2.0 GOOD

ADDITIONAL ENGINEERING CALCULATIONS

CONTAMINATED STORM WATER CALCULATIONS

Providence Engineering and Environmental Group LLC
BATON ROUGE, LOUISIANA

CALCULATIONS AND SKETCHES

JOB NO.	018-005		
BY	DMM	**DATE**	3/8/2007
CHECKED		**DATE**	
PAGE	1 of 1	**REV.**	

CLIENT BFI Waste Systems of Louisiana, LLC
DESCRIPTION Volume of Runoff at Maximum Production Rate with Expansion

1) Calculate Volume of Leachate at Maximum Production, *i.e.*, Last Year Operation:

Current Landfill Area =	108.5	acres	
Proposed Expansion Area =	95.1	acres (Phase IIA, IIB, & III)	
Leachate Production Final Cover Area =	82	gallons/acre/day	(ref.: App. 30, March 1998 MMD)
Leachate Production Active Area =	2,306	gallons/acre/day	(ref.: App. 30, March 1998 MMD)

Maximum Leachate Production = Leachate Production (Active Area) + Leachate Production (Closed Area)

Leachate Production (Active Area) =	15 acre x 2306 gal/acre/day =	34,590	gallons/day
Leachate Production (Closed Area) =	188.6 acre x 82 gal/acre/day =	15,465	gallons/day
Maximum Leachate Production =		**50,055**	**gallons/day**
	=	**6,691.38**	**cubic feet/day**

2) Calculate the Volume of Leachate after the landfill closes

Current Landfill Area =	108.5	acres
Proposed Expansion Area =	95.1	acres (Phase IIA, IIB, & III)
Total Area =	203.6	acres
Leachate Production Final Cover Area =	82	gallons/acre/day

Leachate Production (Closed Area - 203.6 acres) = 16,695 gallons/day
= 2,231.81 cubic feet/day

3) Calculate average daily contaminated storm water volume

Average Annual Rainfall=	60	**inches**
24 hour-25 year storm event=	10	**inches**
Max area of landfill not containing interim compacted cover=	15	**acres**
Runoff coefficient=	0.75	

Contaminated Stormwater Production= 15 acre x 5 ft x 0.75

= 56.25 acre-ft/year
= 2,450,264 cubic feet/year
= 50,214 gallons/day
= 6,713 cubic feet/day

Contaminated Stormwater Generated from 24 hr, 25 year storm event

= 15 acre x 0.833 ft x 0.75
= 9.375 acre-ft
= 3,054,662 gallons
= 408,377 cubic feet

Capacity of 1/2 of existing leachate pond (5 acres and 15 feet deep): 24,400,000 gallons (3,267,000 cubic feet)

4) Calculate the anticipated change in condensate production volume

Previous Anticipated daily condensate production volume = 100 to 200 cubic feet/day
Percenate increase with modification area = 188%

Revised Anticipated daily condensate production volume = 188 to 375 cubic feet/day

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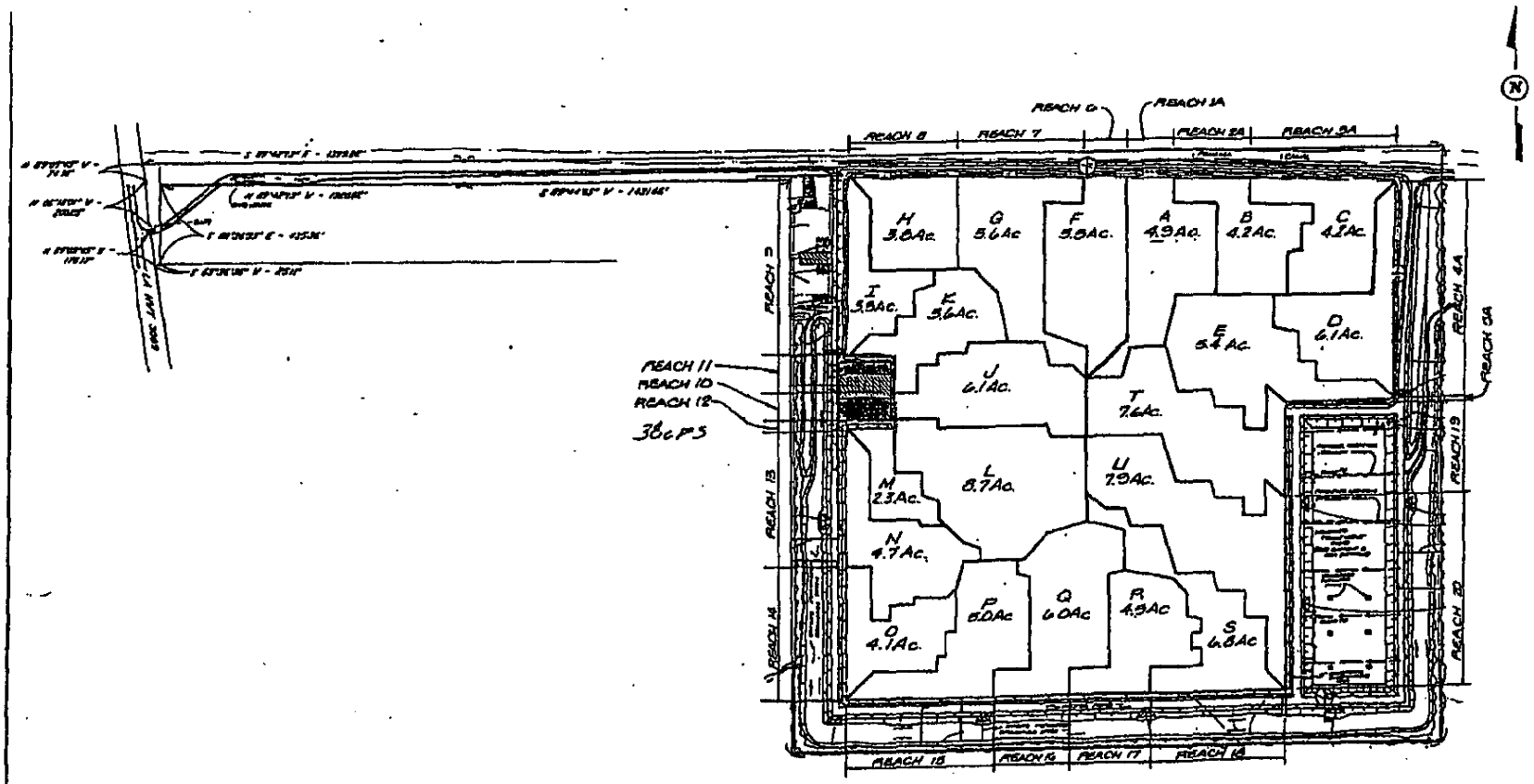
INTERIOR DITCH CALCULATIONS



DRAINAGE AREA MAP
FINAL PLAN

COLONIAL SANITARY LANDFILL

BROWNING-FERRIS, INC.

mader-miers

LDEQ-EDMS Document 36275708, Page 476 of 499

MADER-MIERS ENGINEERING, INC.
USING
RATIONAL METHOD
AND
LOUISIANA DOTD HYDRAULIC MANUAL

oject Name Colonial
scription Intermediate
lculations By

Project No.
Design Storm Year
Sheet No. of

AREA									SYSTEM							
				Overland												
esc.	Area Acres	Coeff. C	A X C	Dist. Feet	Slope %	Time Concen. Min.	Rain Inten. In/Hr.	Runoff CFS	Reach Desc.	Cumul A.C.	Time Concen. Min.	Rain Inten. In./Hr	Runoff CFS	Flow Length Feet	Flow Veloc. Ft/Sec	Fl Ti Mi
B	5.52	0.3	1.7	191	25	11	7.7	13.0						1340	2	11
									1D	1.7	22	6.2	10.5	800	1.3	10
A	2.04	0.3	0.6	183	25	11	7.7	4.6								
									2D	2.3	32	5.3	12.0	1470	1.5	16
C	20.79	0.3	6.2	813	4	27	5.7	35.3								
									3D	8.5	48	4.4	37.4	700	4.7	3
D	12.52	0.3	3.8	813	4	27	5.7	21.7								
									4D	12.3	51	4.3	52.9			
E	4.36	0.3	1.3	191	25	11								1080	2	9
									5D	1.3	20	6.4	8.3	940	1.0	16
F	2.30	0.3	0.7	184	25	11	7.7	5.4								
									6D	2.0	36	5.1	10.2	450	1.3	6
G	6.23	0.3	1.9	813	4	27	5.7	10.8								
									7D	3.9	42	4.8	18.7			
								SYSTEM-	8D	16.2	51	4.3	69.7		8.7	

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140 11986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
INTERMEDIATE DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH1D
DESIGN DISCHARGE (C.F.S.)	10.50
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.42
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH2D
DESIGN DISCHARGE (C.F.S.)	12.00
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.52
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH3D
DESIGN DISCHARGE (C.F.S.)	37.40
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.61
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR3140 11/986
HYDRAULICS SECTION

DESIGNER: HADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
INTERMEDIATE DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH4D
DESIGN DISCHARGE (C.F.S.)	52.90
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	3.06
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH5D
DESIGN DISCHARGE (C.F.S.)	8.30
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.28
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH6D
DESIGN DISCHARGE (C.F.S.)	10.20
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.40
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140 111986
HYDRAULICS SECTION

DESIGNER: MADEO-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
INTERMEDIATE DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH7D
DESIGN DISCHARGE (C.F.S.)	18.70
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.89
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH8D
DESIGN DISCHARGE (C.F.S.)	63.70
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	3.46
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

MAUER-MIERS ENGINEERING, INC.
USING
RATIONAL METHOD
AND
LOUISIANA DOTD HYDRAULIC MANUAL

Project Name Colonial Sanitary Lanfill
Description Final Design
Calculations By

Project No. 1012-09
Design Storm 25 Year
Sheet No. ____ of ____

AREA									SYSTEM							
				Overland												
Desc.	Area Acres	Coeff. C	A X C	Dist. Feet	Slope %	Time Concen. Min.	Rain Inten. In/Hr.	Runoff CFS	Reach Desc.	Cumul A.C.	Time Concen. Min.	Rain Inten. In./Hr	Runoff CFS	Flow Length Feet	Flow Veloc. Ft/Sec	Fl Ti Mi
A	4.9	0.3	1.47	950	7.5	27	5.7	8.4								
B	4.2	0.3	1.26	700	8.4				2A	1.47	27	5.7	8.4	340	1.2	5
C	4.2	0.3	1.26	800	7.4				3A	2.73	32	5.3	14.5	630	2.1	5
D		0.3		700	8.4	23	6.1	9.9	4A	3.99	37	5.0	20.0	940	2.8	6
										5.82	43	4.7	27.3			
E	5.4	0.3	1.62	700	8.4	23	6.1	9.9								
									5A	1.6	23	6.1	9.9	470	1.4	6
									OUTFALL	7.4	43	4.7	35.0			

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH2A
DESIGN DISCHARGE (C.F.S.)	8.40
WIDTH OF CHANNEL BOTTOM (FT.)	4.00
DEPTH OF FLOW (FT.)	1.37
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH3A
DESIGN DISCHARGE (C.F.S.)	14.50
WIDTH OF CHANNEL BOTTOM (FT.)	4.00
DEPTH OF FLOW (FT.)	1.77
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH4A
DESIGN DISCHARGE (C.F.S.)	20.00
WIDTH OF CHANNEL BOTTOM (FT.)	4.00
DEPTH OF FLOW (FT.)	2.06
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

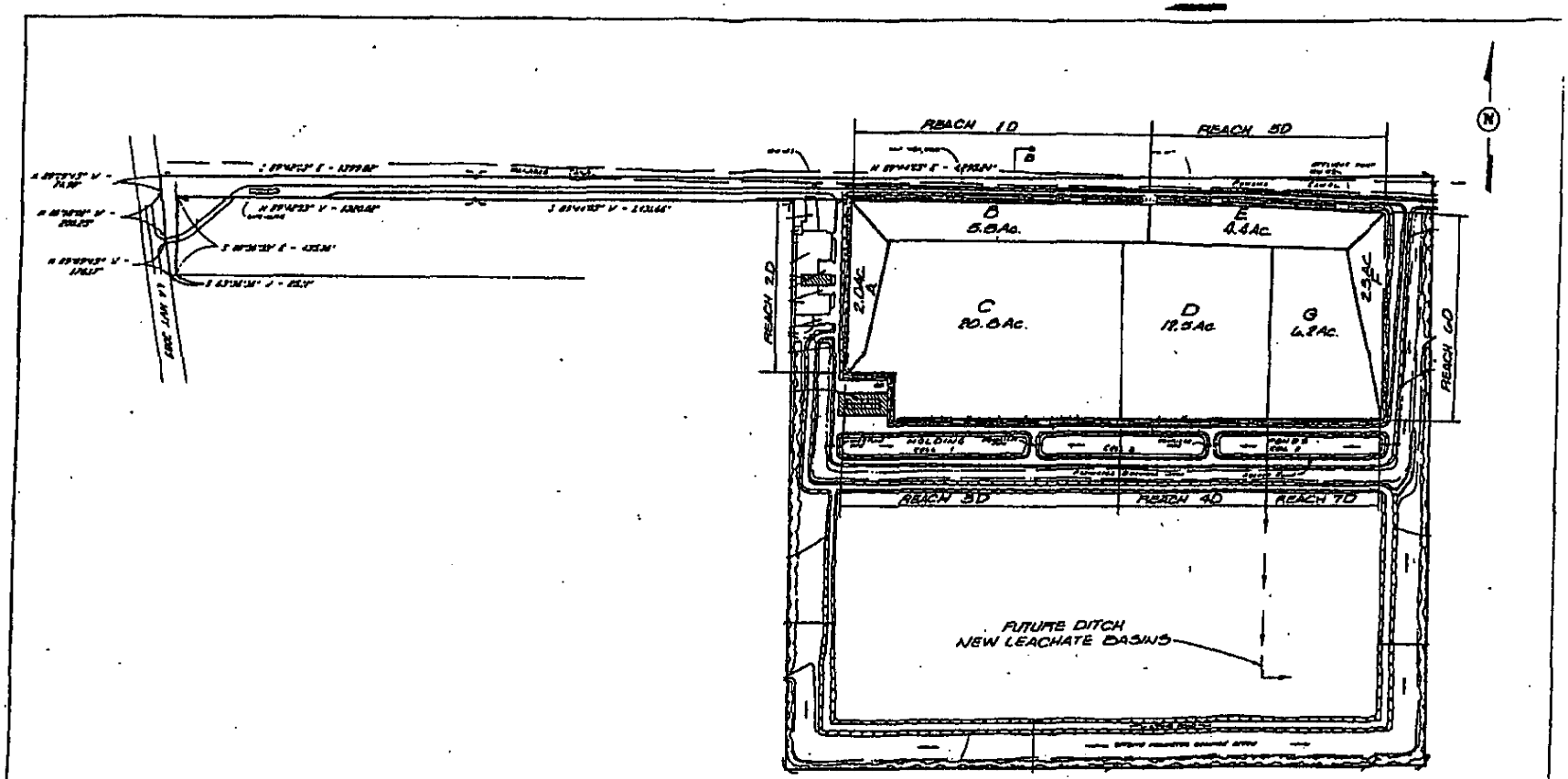
****

COMPARISON OPEN CHANNEL DESIGN

USING OPEN CHANNEL DESIGN DEPTHS AND CALCULATED DEPTH OF FLOW

1. Use Top Bank Elevation for Area 6.0
2. Used Depth of Flow shown in computations using La. DOTD HYDR 1140 program.

Area No.	Reach No.	Length Reach	Slope Channel	Inv. Elev. Channel	Depth Channel	Depth Flow	OK
	1D	1330	0.0005	3.16	2.84	1.42	X
	2D	800	0.0005	2.50	3.5	152	X
	3D	1470	0.0005	1.36	4.6	2.61	X
	4D	690	0.0005	1.02	5.0	3.06	X
							X
	5D	1080	0.0005	3.29	2.7	1.26	X
	6D	940	0.0005	2.75	3.3	1.40	X
	7D	470	0.0005	2.28	3.7	1.89	X
	8D	1200	0.0005	2.04	4.0	3.46	X
	OUTFALL			1.44	4.6		



DRAINAGE AREA MAP
AREA I
COLONIAL SANITARY LANDFILL
BROWNING-FERRIS, INC.

mader

LDEQ-EDMS Document 36275708, Page 484 of 499

CALCULATIONS FOR NORTHEAST CORNER OF COLONIAL LANDFILL

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH5A
DESIGN DISCHARGE (C.F.S.)	9.90
WIDTH OF CHANNEL BOTTOM (FT.)	4.00
DEPTH OF FLOW (FT.)	1.48
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	OUTFALL
DESIGN DISCHARGE (C.F.S.)	34.80
WIDTH OF CHANNEL BOTTOM (FT.)	4.00
DEPTH OF FLOW (FT.)	2.34
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

COMPARISON OPEN CHANNEL DESIGN

USING OPEN CHANNEL DESIGN DEPTHS AND CALCULATED DEPTH OF FLOW

1. Use Top Bank Elevation for Area 6.0
2. Used Depth of Flow shown in computations using La. DOTD HYDR 1140 program.

Area No.	Reach No.	Length Reach	Slope Channel	Inv. Elev. Channel	Depth Channel	Depth Flow	OK
	1A	120	0.0005	3.29	2.71		X
	2A	340	0.0005	3.23	2.77	1.37	X
	3A	625	0.0005	3.06	2.94	1.77	X
	4A	940	0.0005	2.74	3.26	2.06	X
				2.27	3.73		X
	5A	470	0.0005	2.52	3.48	1.48	
		OUTFALL		2.28	3.73		

CALCULATIONS FOR NORTHWEST CORNER OF COLONIAL LANDFILL

HAUER-MIERS ENGINEERING, INC.
USING
RATIONAL METHOD
AND
LOUISIANA DOTD HYDRAULIC MANUAL

Project Name Colonial Sanitary Lanfill
Description Final Design
Calculations By

Project No. 1012-09
Design Storm 25 Year
Sheet No. 2 of

AREA									SYSTEM							
				Overland												
Desc.	Area Acres	Coeff. C	A X C	Dist. Feet	Slope %	Time Concen. Min.	Rain Inten. In/Hr.	Runoff CFS	Reach Desc.	Cumul A.C.	Time Concen. Min.	Rain Inten. In./Hr	Runoff CFS	Flow Length Feet	Flow Veloc. Ft/Sec	Fl T Mi
F	5.5	0.3	1.65	1200	6.1	31	5.4	8.9								
									7	1.65	31	5.4	8.9	570	1.11	9
G	5.6	0.3	1.68													
									8	3.33	40	4.8	16.0	680	2.0	6
H	3.8	0.3	1.14													
									9	4.47	46	4.5	20.1	780	2.5	5
I	3.5	0.3	1.05	1000	7.3	28	5.6	10.2								
										5.52	46	4.5	24.8			
J	6.1	0.3	1.83	1000	7.3	28	5.6	10.2								
	3.6	0.3	1.08						10	1.83	28	5.6	10.2	500	2.0	4
									11	2.91	32	5.3	15.4			
									OUTFALL	8.4	46	4.5	38.0			

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH 7
DESIGN DISCHARGE (C.F.S.)	8.90
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.31
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH 8
DESIGN DISCHARGE (C.F.S.)	16.00
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.75
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH 9
DESIGN DISCHARGE (C.F.S.)	20.10
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.95
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH10
DESIGN DISCHARGE (C.F.S.)	10.20
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.40
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH11
DESIGN DISCHARGE (C.F.S.)	15.40
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.75
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	OUTFALL
DESIGN DISCHARGE (C.F.S.)	36.20
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.57
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:I)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

COMPARISON OPEN CHANNEL DESIGN

USING OPEN CHANNEL DESIGN DEPTHS AND CALCULATED DEPTH OF FLOW

1. Use Top Bank Elevation for Area
2. Used Depth of Flow shown in computations using La. DOTD HYDR 1140 program.

Area No.	Reach No.	Length Reach	Slope Channel	Inv. Elev. Channel	Depth Channel	Depth Flow	OK
	6	250	0.0005	3.16	2.84		
	7	290	0.0005	3.03	2.97	1.31	X
	8	680	0.0005	2.89	3.11	1.75	X
	9	780	0.0005	2.55	3.45	1.95	X
	OUTFALL			2.16	3.84		
	10	230	0.0005	2.36	3.64	1.40	X
	11	200	0.0005	2.24	3.76	1.75	X
	OUTFALL			2.14	3.86	2.57	X

CALCULATIONS FOR SOUTHERN PORTION OF COLONIAL LANDFILL

HAUER-HIERS ENGINEERING, INC.
USING
RATIONAL METHOD
AND
LOUISIANA DOTD HYDRAULIC MANUAL

oject Name Colonial Sanitary Lanfill
scription Final Design
lculations By

Project No. 1012-09
Design Storm 20 Year
Sheet No. 3 of

AREA									SYSTEM							
				Overland												
esc.	Area Acres	Coeff. C	A X C	Dist. Feet	Slope %	Time Concen. Min.	Rain Inten. In/Hr.	Runoff CFS	Reach Desc.	Cumul A.C.	Time Concen. Min.	Rain Inten. In./Hr	Runoff CFS	Flow Length Feet	Flow Veloc. Ft/Sec	Fl Ti Mi
T	7.6	0.3	2.28	1250	5.8	32	5.3	12.1								
									19	2.28	32	5.3	12.1	420	1.5	5
U	7.9	0.3	2.37													
									20	4.65	37	5.0	23.3	440	2.9	3
L	8.7	0.3	2.61	1210	6.0	31	5.4	14.1								
									12	2.61	31	5.4	14.1	210	1.8	2
M	2.3	0.3	0.69													
									13	3.30	33	5.3	17.5	610	2.2	5
N	4.7	0.3	1.41													
									14	4.71	38	5.0	23.6	590	3.0	3
O	4.1	0.3	1.23													
									15	5.94	41	4.8	28.5	645	3.6	3
P	5.0	0.3	1.50													
									16	7.44	44	4.7	35.0	340	4.4	1
Q	6.0	0.3	1.80													
									17	9.24	45	4.6	42.5	350	5.3	1
R	4.5	0.3	1.35													
									18	10.59	46	4.5	47.7	600	6.0	2
S		0.3														
										12.63	48	4.4	55.6		6.4	
									OUTFALL	17.28	50	4.4	76.0			
										76	cfs for culvert					

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH19
DESIGN DISCHARGE (C.F.S.)	12.10
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.53
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH20
DESIGN DISCHARGE (C.F.S.)	23.30
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.09
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH12
DESIGN DISCHARGE (C.F.S.)	14.10
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.64
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH13
DESIGN DISCHARGE (C.F.S.)	17.50
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	1.82
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH14
DESIGN DISCHARGE (C.F.S.)	23.60
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.11
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH15
DESIGN DISCHARGE (C.F.S.)	28.50
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.30
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH16
DESIGN DISCHARGE (C.F.S.)	35.00
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.53
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	REACH17
DESIGN DISCHARGE (C.F.S.)	42.50
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.77
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

HYDR1140-111986
HYDRAULICS SECTION

DESIGNER: MADER-MIERS ENGINEERING DATE: 04/08/1990

COLONIAL SANITARY LANDFILL
FINAL DESIGN 25 YEAR RAINFALL
HYDRAULIC DESIGN
OPEN CHANNEL DESIGN

****

STATION	REACH18
DESIGN DISCHARGE (C.F.S.)	47.70
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	2.92
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

STATION	OUTFALL
DESIGN DISCHARGE (C.F.S.)	76.00
WIDTH OF CHANNEL BOTTOM (FT.)	5.00
DEPTH OF FLOW (FT.)	3.01
SIDE SLOPE RATIO, LEFT (FT.:1)	3.0
SIDE SLOPE RATIO, RIGHT (FT.:1)	3.0
ROUGHNESS COEFFICIENT	.040
SLOPE OF CHANNEL BOTTOM (FT./FT.)	.00050

****

COMPARISON OPEN CHANNEL DESIGN

USING OPEN CHANNEL DESIGN DEPTHS AND CALCULATED DEPTH OF FLOW

1. Use Top Bank Elevation for Area 6.0
2. Used Depth of Flow shown in computations using La. DOTD HYDR 1140 program.

Area No.	Reach No.	Length Reach	Slope Channel	Inv. Elev. Channel	Depth Channel	Depth. Flow	OK
	19	350	0.0005	0.95	3.81	1.53	X
	20	850	0.0005	0.77	4.01	2.09	X
				0.35			
	12	220	0.0005	2.45	2.55	1.82	X
	13	600	0.0005	2.34	2.65	2.11	X
	14	590	0.0005	2.04	2.95	2.30	X
	15	650	0.0005	1.75	3.25	2.53	X
	16	340	0.0005	1.42	3.58	2.77	X
	17	345	0.0005	1.25	3.75	2.92	X
	18	640	0.0005	1.08	3.92	3.01	X
		Outfall	N/A	0.76	4.24	3.59	X