

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS = 300.00 CM
 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 1

THICKNESS = 50.00 CM
 POROSITY = 0.4170 VOL/VOL
 FIELD CAPACITY = 0.0450 VOL/VOL
 WILTING POINT = 0.0180 VOL/VOL
 INITIAL SOIL WATER CONTENT = 0.1664 VOL/VOL
 EFFECTIVE SAT. HYD. COND. = 0.999999978000E-02 CM/SEC
 SLOPE = 5.96 PERCENT
 DRAINAGE LENGTH = 38.0 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.15 CM
 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 = 0.00 HOLES/HECTARE
 FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 1 - PERFECT

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE # 6 WITH BARE
 GROUND CONDITIONS, A SURFACE SLOPE OF 6.% AND
 A SLOPE LENGTH OF 38. METERS.

SCS RUNOFF CURVE NUMBER = 86.70
 FRACTION OF AREA ALLOWING RUNOFF = 60.0 PERCENT
 AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 INITIAL WATER IN EVAPORATIVE ZONE = 4.168 CM

UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
 LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
 INITIAL SNOW WATER = 7.842 CM
 INITIAL WATER IN LAYER MATERIALS = 100.089 CM
 TOTAL INITIAL WATER = 107.930 CM
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
ST-CHARLES-GARNIER QUEBEC

STATION LATITUDE = 48.33 DEGREES
 MAXIMUM LEAF AREA INDEX = 0.00
 START OF GROWING SEASON (JULIAN DATE) = 144
 END OF GROWING SEASON (JULIAN DATE) = 260
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 AVERAGE ANNUAL WIND SPEED = 13.70 KPH
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
67.5	62.0	77.5	74.0	90.5	90.5
104.5	102.3	98.5	98.5	86.0	87.0

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-14.2	-12.2	-6.0	1.1	8.7	14.5
17.5	16.1	10.5	4.4	-2.5	-10.6

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR CARIBOU MAINE
AND STATION LATITUDE = 48.33 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 25

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC

PRECIPITATION						

TOTALS	75.14 106.67	75.05 93.01	70.32 96.04	53.24 97.61	83.53 84.77	87.05 81.64
STD. DEVIATIONS	20.77 33.67	28.64 35.94	40.00 41.30	19.52 32.38	31.27 25.76	36.26 32.08
RUNOFF						

TOTALS	0.000 3.920	0.061 2.634	30.712 4.777	156.438 4.114	22.010 11.485	2.743 0.510
STD. DEVIATIONS	0.000 6.390	0.304 2.880	39.643 6.926	58.510 5.642	34.297 13.291	3.998 1.613
EVAPOTRANSPIRATION						

TOTALS	8.113 76.690	7.462 69.938	12.408 54.647	10.739 31.073	59.897 11.739	71.964 7.217
STD. DEVIATIONS	1.093 18.815	1.166 21.574	2.388 10.607	4.538 5.401	16.693 4.201	23.753 0.943
LATERAL DRAINAGE COLLECTED FROM LAYER 3						

TOTALS	12.9786 33.9264	2.7841 19.8932	1.3409 20.3670	7.5737 29.4249	59.4355 37.3835	75.6760 43.6759
STD. DEVIATIONS	11.1060 14.0947	1.5652 9.6822	0.3986 12.4662	9.5198 16.8012	25.9756 18.0331	16.5147 24.1396
PERCOLATION/LEAKAGE THROUGH LAYER 4						

TOTALS	0.0001 0.0001	0.0000 0.0001	0.0000 0.0001	0.0000 0.0001	0.0003 0.0002	0.0003 0.0002
STD. DEVIATIONS	0.0000 0.0001	0.0000 0.0000	0.0000 0.0001	0.0000 0.0001	0.0001 0.0001	0.0001 0.0001

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)						

DAILY AVERAGE HEAD ON TOP OF LAYER 4						

AVERAGES	1.5503 4.0526	0.3653 2.3763	0.1602 2.5140	0.9349 3.5149	7.0998 4.6145	9.3411 5.2172
STD. DEVIATIONS	1.3267 1.6837	0.2063 1.1566	0.0476 1.5388	1.1751 2.0070	3.1029 2.2259	2.0385 2.8836

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 25

	MM		CU. METERS	PERCENT
PRECIPITATION	1004.06	(106.025)	10040.6	100.00
RUNOFF	239.405	(46.6596)	2394.05	23.844
EVAPOTRANSPIRATION	421.887	(38.0458)	4218.87	42.018
LATERAL DRAINAGE COLLECTED FROM LAYER 3	344.45972	(70.25723)	3444.597	34.30655
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00147	(0.00030)	0.015	0.00015
AVERAGE HEAD ON TOP OF LAYER 4	34.784	(7.083)		
CHANGE IN WATER STORAGE	-1.689	(2.2996)	-16.89	-0.168

PEAK DAILY VALUES FOR YEARS	1 THROUGH	25
	(MM)	(CU. METERS)
PRECIPITATION	63.40	634.000
RUNOFF	81.530	815.2963
DRAINAGE COLLECTED FROM LAYER 3	4.96724	49.67241
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000021	0.00021
AVERAGE HEAD ON TOP OF LAYER 4	183.940	
MAXIMUM HEAD ON TOP OF LAYER 4	289.172	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	8.0 METERS	
SNOW WATER	468.39	4683.8555
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0372

*** 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 25

LAYER	(CM)	(VOL/VOL)
1	5.6966	0.2848
2	87.5999	0.2920
3	4.1384	0.0828
4	0.0000	0.0000
SNOW WATER	6.274	

 **
 **
 ** 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 **
 **

PRECIPITATION DATA FILE: C:\mitis\30189.D4
 TEMPERATURE DATA FILE: C:\mitis\30189.D7
 SOLAR RADIATION DATA FILE: C:\mitis\30189.D13
 EVAPOTRANSPIRATION DATA: C:\mitis\30189.D11
 SOIL AND DESIGN DATA FILE: C:\mitis\eau100.D10
 OUTPUT DATA FILE: C:\mitis\eau100.OUT

TIME: 15: 4 DATE: 2/13/2007

TITLE: LA REDEMPTION - Charge hydraulique sur le 1er niveau

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	=	20.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2084	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999975000E-04	CM/SEC

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 18

THICKNESS	=	300.00	CM
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 1

THICKNESS	=	50.00	CM
POROSITY	=	0.4170	VOL/VOL
FIELD CAPACITY	=	0.0450	VOL/VOL
WILTING POINT	=	0.0180	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1644	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.999999978000E-02	CM/SEC
SLOPE	=	5.96	PERCENT
DRAINAGE LENGTH	=	38.0	METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER

MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.15	CM
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 = 0.00 HOLES/HECTARE
 FML INSTALLATION DEFECTS = 0.00 HOLES/HECTARE
 FML PLACEMENT QUALITY = 1 - PERFECT

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
 SOIL DATA BASE USING SOIL TEXTURE # 6 WITH BARE
 GROUND CONDITIONS, A SURFACE SLOPE OF 6.% AND
 A SLOPE LENGTH OF 38. METERS.

SCS RUNOFF CURVE NUMBER = 86.70
 FRACTION OF AREA ALLOWING RUNOFF = 100.0 PERCENT
 AREA PROJECTED ON HORIZONTAL PLANE = 1.0000 HECTARES
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 INITIAL WATER IN EVAPORATIVE ZONE = 4.168 CM
 UPPER LIMIT OF EVAPORATIVE STORAGE = 8.340 CM
 LOWER LIMIT OF EVAPORATIVE STORAGE = 0.360 CM
 INITIAL SNOW WATER = 7.842 CM
 INITIAL WATER IN LAYER MATERIALS = 99.986 CM
 TOTAL INITIAL WATER = 107.827 CM
 TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
 ST-CHARLES-GARNIER QUEBEC

STATION LATITUDE = 48.33 DEGREES
 MAXIMUM LEAF AREA INDEX = 0.00
 START OF GROWING SEASON (JULIAN DATE) = 144
 END OF GROWING SEASON (JULIAN DATE) = 260
 EVAPORATIVE ZONE DEPTH = 20.0 CM
 AVERAGE ANNUAL WIND SPEED = 13.70 KPH
 AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 70.00 %
 AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 69.00 %
 AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 76.00 %
 AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 78.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY PRECIPITATION (MM)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
67.5	62.0	77.5	74.0	90.5	90.5
104.5	102.3	98.5	98.5	86.0	87.0

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES CELSIUS)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
-14.2	-12.2	-6.0	1.1	8.7	14.5
17.5	16.1	10.5	4.4	-2.5	-10.6

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
 COEFFICIENTS FOR CARIBOU MAINE
 AND STATION LATITUDE = 48.33 DEGREES

AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 25

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	75.14	75.05	70.32	53.24	83.53	87.05
	106.67	93.01	96.04	97.61	84.77	81.64
STD. DEVIATIONS	20.77	28.64	40.00	19.52	31.27	36.26
	33.67	35.94	41.30	32.38	25.76	32.08
RUNOFF						
TOTALS	0.000	0.065	47.136	248.049	33.575	4.428
	6.157	4.179	7.419	6.238	17.758	0.616
STD. DEVIATIONS	0.000	0.327	61.925	94.639	54.591	6.312
	9.842	4.398	10.336	8.272	20.741	1.976
EVAPOTRANSPIRATION						
TOTALS	8.113	7.462	12.408	10.740	59.918	71.429
	76.911	69.918	54.392	31.059	11.741	7.217
STD. DEVIATIONS	1.093	1.166	2.388	4.538	16.705	23.747
	18.512	21.529	10.518	5.399	4.201	0.943
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	12.4100	2.7060	1.2941	0.7867	3.9123	29.1362
	19.3276	16.3772	18.6493	27.4047	35.5431	41.5013
STD. DEVIATIONS	10.8985	1.5410	0.3702	0.1239	3.9704	7.2532
	8.4058	8.1386	10.8972	15.4413	16.9092	23.0759
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002

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

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 4

AVERAGES	1.4824	0.3550	0.1546	0.0971	0.4673	3.5964
	2.3088	1.9563	2.3020	3.2736	4.3873	4.9575
STD. DEVIATIONS	1.3019	0.2031	0.0442	0.0153	0.4743	0.8953
	1.0041	0.9722	1.3451	1.8445	2.0872	2.7565

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 25

	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	1004.06	(106.025)	10040.6	100.00
RUNOFF	375.621	(76.0493)	3756.21	37.410
EVAPOTRANSPIRATION	421.304	(37.7505)	4213.04	41.960
LATERAL DRAINAGE COLLECTED FROM LAYER 3	209.04823	(52.36867)	2090.482	20.82021
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00090	(0.00022)	0.009	0.00009
AVERAGE HEAD ON TOP OF LAYER 4	21.115	(5.283)		
CHANGE IN WATER STORAGE	-1.910	(2.1361)	-19.10	-0.190

PEAK DAILY VALUES FOR YEARS 1 THROUGH 25		
	(MM)	(CU. METERS)
PRECIPITATION	63.40	634.000
RUNOFF	135.197	1351.9712
DRAINAGE COLLECTED FROM LAYER 3	3.39641	33.96406
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000014	0.00014
AVERAGE HEAD ON TOP OF LAYER 4	125.771	
MAXIMUM HEAD ON TOP OF LAYER 4	207.526	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	6.5 METERS	
SNOW WATER	468.39	4683.8555
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.3867
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0372

*** 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 25		
LAYER	(CM)	(VOL/VOL)
1	5.0396	0.2520
2	87.5999	0.2920
3	4.1383	0.0828
4	0.0000	0.0000
SNOW WATER	6.274	
