Carmen Johnson
Fac/Perm/CO ID # 94-01
Date 5/14/12
Doc DIN

Delta Environmental Consultants, Inc.

6701 Carmel Road
Suite 200
Charlotte, NC 28226-3901
704/541-9890
FAX: 704/543-4035

December 10, 1998

DEC 1998
Received
Solid Waste Section

Ms. Cheryl Marks, Hydrogeologist
Solid Waste Section
North Carolina Department of Environment and Natural Resources
Division of Waste Management
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Subject: Response to NCDENR letter dated September 8, 1998
Weyerhaeuser Corporation
New Bern Landfill, New Bern, North Carolina
Delta Project No. E096-019-3.0001

Dear Ms. Marks,

The purpose of this letter is to provide additional information concerning the Weyerhaeuser, New Bern Landfill (site) as requested in your letter dated September 8, 1998. This information is being provided that the initial review process be completed. Each information request will be stated in bold and the response will follow.

Develop a historical table that includes the semi-annual groundwater monitoring from wells OWD-01, OWS-01, OWS-02 and OWS-03. Include results for all parameters tested. Include all water testing results from piezometer locations, also include any available TCLP results.

A summary of the ground water analytical results for every compound tested at the site from samples collected from OWD-01, OWS-01, OWS-02, OWS-03 and PZ00100 (PZ00100 was the only piezometer sampled) are provided in Table 1.

What are the vertical components of groundwater flow? Provide a cross-section indicating vertical components. The cross-section should also include lithology and the top of the water table.

Figure 1 is a map containing the locations of all cross-sections constructed at the site. Figure 2 is cross section E – E', which is perpendicular to the ground water flow direction at the site. It depicts the land surface, screened intervals of OWS-03, 0WD-01 and OWS-02, the water table as of August 31, 1998 and the lithology. Also shown on the cross section is a hydraulic gradient between OWD-01 and OWS-02. Figure 3 is a hydrograph containing water level elevation data from OWD-01 and OWS-02, which are the only nested pair at the site. From Figures 2 and 3 it is apparent that there is a consistent downward gradient between OWD-01 and OWS-02. The calculated vertical hydraulic gradient from data collected from OWD-01 and OWS-02 on August 31, 1998 is approximately 0.1 feet/feet downward.

Provide a potentiometric map depicting groundwater elevations at the surveyed observation locations (monitoring wells and piezometers), the date in which groundwater elevations were taken (this must be within a 24 hour period).

Water level elevation measurements taken from the monitoring wells and piezometers within a 24 hour period are not available. Figure 4 is a water table contour map from data collected from the monitoring wells on 05/29/96. Figure 5 is a water table contour map from data collected from the piezometers on

06/13/97. From Figure 4 it appears that shallow groundwater flows in a northeasterly direction across the site toward Swift Creek. Figure 5, however, depicts ground water flowing to the east toward Swift Creek. It is our opinion that Figure 4, which contains the data from all of the site monitoring wells, better represents ground water flow in the area. The ground water contour map presented as Figure 5 is limited to data collected from piezometers located within the landfill. Figure 5 probably presents a local flow system caused by the man-made nature of the landfill.

Provide at least two cross-sections showing the thickness of waste and its contact with the natural soils, and where possible the water table. Show the cross-section lines on the potentiometric map.

Cross-sections through the landfill are provided as Figures 6 and 7. Their locations are shown on both Figure 1 and Figure 5. From Figures 6 and 7 it is apparent that the thickness of the waste is between 25 and 50 feet thick. It is also evident that portions of the landfill waste profile are submerged. The submerged portion of the waste is comprised of primarily ash and grit and wood fragments.

What are the dimensions of the leachate canal? Include depth, width and length.

The approximate planned dimensions of the leachate canal are as follows:

The canal will be trapezoidal in shape.
Depth = 3 feet
Width =16 foot upper width, 4 foot lower width (2:1 slope of side walls)
Length = 2400 feet

How much water run-off from the mill is contributed to dilution in the canal?

During the peak flow design (25 year/24 hour flood event) of approximately 193 cubic feet per second (cfs) at 12.3 hours the contribution from the mill is 24 cfs. The peak flow from the mill is 156 cfs but is delayed by approximately 1.3 hours.

There is a wetland area beyond the leachate canal. Is there any information available concerning its size?

Figure 8 is a USGS topographic map of the site and vicinity. The area beyond the leachate canal occupied by the wetland is clearly noted. The area between the landfill and Swift Creek occupied by wetland is approximately 31 acres. This wetland may act as a buffer zone, which could diminish potential impacts from the landfill to Swift Creek.

What is the pumping rate from the base of the leachate canal to the leachate fields?

The leachate from the canal is pumped to the on-site waste water treatment system, not the leachate fields. The pump is currently rated at 30,000 gallons per day.

Are there any other factors that relate to the groundwater effects from the facility?

The Weyerhaeuser New Bern Mill has an extensive array of equipment and management systems in place to avoid impact to groundwater underlying the facility. These include, but are not limited to:

Process Wastewater System

Two sets of sewers lead from the main production areas to the waste treatment system. One carries alkaline wastewater and one carries acidic wastewater. Both systems include conductivity monitors, which alert production and maintenance personnel of changes in conductivity of the wastewater, which could indicate a spill has occurred. All surface drains in the main production area flow to the waste treatment system,

therefore spills to the surface of any material are captured and treated using the existing sewer and treatment systems.

Secondary Containment

All petroleum products used at the facility are stored in aboveground storage tanks (ASTs) or drums. All ASTs include secondary containment adequate to contain 110% of the volume of the largest tank in the enclosure. Drums and other small vessels are stored inside secondary containment as well. In addition, methanol storage and turpentine collection and storage facilities are also secondarily contained.

Spill and Emergency Response Plans

The facility maintains current plans as required by various environmental regulations to address:

- inspection of storage, filling and dispensing equipment;
- supervision during filling operations;
- location and use of spill response equipment; and, emergency response notification requirements.

The basic dispersion-advection equation by Domenico and Robbins was used to estimate concentration of total dissolved solids (TDS) in groundwater. The equation is not included in the report. Please provide the equation and calculations used for results.

The basic Domenico and Robbins equation is as follows:

$$C_{(x,y,z,t)} = \left(\frac{C_0}{8}\right) erfc\left[\frac{(x-vt)}{2(a_x vt)^{1/2}}\right]\left\{erf\left[\frac{y+\frac{Y}{2}}{2(a_y x)^{1/2}}\right] - erf\left[\frac{y-\frac{Y}{2}}{2(a_y x)^{1/2}}\right]\right\}\left\{erf\left[\frac{z+Z}{2(a_z x)^{1/2}}\right] - erf\left[\frac{z-Z}{2(a_z x)^{1/2}}\right]\right\}$$

where:

C_0 =903 mg/l (TDS concentration in groundwater estimated downgradient of landfill after mixing)
x = 217.63 meters (receptor location x coordinate, in this case Swift Creek)
y = 0 meters (receptor location y coordinate)
z = 0 meters (receptor location z coordinate)
v = 0.0144 meters/day (ground water flow velocity)
t = 18250 days (time, set to mimic steady state after 50 years)
a_x = 4.35 meters (longitudial dispersivity)
a_y = 1.45 meters (transverse dispersivity, y direction)
a_z = 0.22 meters (transverse dispersivity, z direction)
Y = 262.9 meters (source geometry, width)
Z = 3.048 meters (source geometry, depth)

Since y = 0 and z = 0 the equation reduces to:

$$C_{(x,0,0,t)} = \left(\frac{C_0}{2}\right) erfc\left[\frac{(x-vt)}{2(a_x vt)^{1/2}}\right]\left\{erf\left[\frac{Y}{4(a_y x)^{1/2}}\right] erf\left[\frac{Z}{2(a_z x)^{1/2}}\right]\right\}$$

Solution:

$$\left(\frac{C_0}{2}\right)$$

$$erfc\left[\frac{(x-vt)}{2(a_x vt)^{1/2}}\right] = 2 \text{ (therefore steady state)}$$

$$erf\left[\frac{Y}{4(a_y x)^{1/2}}\right] = 1$$

$$erf\left[\frac{Z}{2(a_z x)^{1/2}}\right] = 0.42$$

rejoin parts

$$C_{(x,0,0,t)} = \left(\frac{C_0}{2}\right)(2)(1)(0.42) = 0.42(C_0) = 379 \text{ mg/l}$$

HELP3 modeling was used to estimate annual leachate production based on TDS obtained from a sample collected from PZ00100 for TDS. Include the HELP3 model run.

The results of the HELP3 model run are provided in Appendix A.

What is the groundwater flow velocity calculated from data collected on June 13, 1997? What are the porosity and hydraulic conductivity values? Provide the calculations.

Hydraulic Conductivity = K = 1 x 10^{-5} meters/second (0.8640 meters per day) (obtained from laboratory analysis of split spoon samples, value is consistent with published values for silty sand observed during completion of the monitoring wells)
Porosity = n = 0.30 (obtained from laboratory analysis of split spoon samples)
Hydraulic gradient = $\frac{dh}{dl}$ = 0.0050 (determined mathematically from ground water elevation data collected on June 13, 1997)

Ground water flow velocity can be calculated using the following equation:

$$\left(\frac{dh}{dl}\right)\left(\frac{K}{n}\right) = \text{ground water flow velocity}$$

$$(0.0050)\left(\frac{0.8640}{0.30}\right) = 0.0144 \text{ meters/day}$$

Modeling constituents should consider hydrogeologic conditions, appropriate boundary conditions (and initial conditions), and provide sensitivity analysis. Provide a flow net to show flow boundaries, identify compliance boundaries, and surface hydrogeologic features.

A flow-net for the landfill and surrounding area is provided as Figure 9. Additionally, an isoconcentration map of TDS in ground water is included as Figure 10. Figure 10 also contains a visual representation of the compliance and review boundaries applicable to the landfill area. It is important to note that TDS concentrations detected in ground water samples collected from upgradient monitoring wells during the August 13, 1998 sampling event ranged from 239 mg/l to 763 mg/l. A ground water sample collected from PZ00100 (shown on Figure 1) on June 13, 1997 contained 2835 mg/l. A surface water sample collected from Swift Creek downgradient of the landfill on August 15, 1997 contained 120 mg/l TDS. Although the aforementioned samples were collected at different times it is our opinion that the data reinforces our modeling results and our conceptual model of the flow system. Our conceptual model is comprised of the following points:

- TDS concentrations in ground water are somewhat elevated upgradient of the landfill;
- The landfill contributes TDS to ground water flowing both below and through the waste profile;
- TDS levels downgradient of the landfill decrease with distance from the landfill due to dispersion, mixing and degradation; and,
- TDS concentrations at the compliance boundary and at Swift Creek are below the NCAC 2L standard of 500 mg/l.

What is the length of time it takes for a constituent leaching from the base of the landfill to reach the compliance boundary?

The compliance boundary is 500 feet (152.4 meters) from the landfill. The flow velocity was calculated to be 0.0144 meters per day. Therefore the length of time it takes for a constituent leaching from the base of the landfill to reach the compliance boundary is approximately 29 years. Additionally, modeling results indicate that TDS concentrations at the compliance boundary will not exceed the NCAC 2L standard of 500 mg/l.

SUMMARY

The landfill at Weyerhaeuser's New Bern Facility does not appear to be adversely impacting ground water. The following results and observations support this finding:

- Modeling results indicate that TDS concentrations at the compliance boundary will not be in excess of the NCAC 2L standard of 500 mg/l;
- The wetland located between the landfill and Swift Creek likely acts as a buffer zone, which could diminish any impacts the landfill may have on Swift Creek; and,
- Weyerhaeuser maintains a proactive spill management program that is designed to prevent any unforeseen impacts to ground water. The program emphasizes continuous monitoring, process controls as well as physical preventative measures that will limit a spill should one occur.

If you have any questions or comments on the information presented in this correspondence please contact Scott Recker at (704) 543-3915 or myself at (704) 543-3917.

Sincerely yours,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Scott Recker, P.G.
Unit Manager

David Kroening, P.G.
Project Hydrogeologist

NORTH CAROLINA LICENSED SEAL 1538 GEOLOGIST DAVID ERIC KROENING

/mcw

enclosures

cc: Dave Gardner, Weyerhaeuser
Bill Morris, Weyerhaeuser

TABLES

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

Standard mg/L SITE	DATE	0.3 Iron (MG/L)	0.015 Lead (MG/L)	0.05 Manganese (MG/L)	0.0011 Mercury (MG/L)	0.018 Silver (MG/L)	0.06 Arsenic (MG/L)	2.0 Barium (MG/L)	0.005 Cadmium (MG/L)
OWD-01	08/17/89	63.30	0.017	1.800	<0.0002	<0.005	0.006	2.408	<0.005
OWD-01	06/28/90	39.90	<0.005	2.460	<0.0002	<0.005	0.010	3.012	<0.005
OWD-01	07/18/91	23.07	<0.005	1	<0.0002	<0.005	0.007	(0.172)	<0.005
OWD-01	02/09/93	27.71	<0.005	4.914	<0.0002	<0.005	0.008	0.167	<0.005
OWD-01	08/03/93	29.26	<0.005	3.652	<0.0002	<0.005	<0.005	0.238	<0.001
OWD-01	02/08/94	25.27	<0.005	4.395	<0.0002	<0.005	0.009	0.200	<0.001
OWD-01	08/10/94	18.90	<0.010	5.035	<0.0002	<0.010	<0.010	<0.50	<0.001
OWD-01	02/07/95	23.51	<0.010	4.475	<0.0002	<0.010	<0.010	<0.50	<0.001
OWD-01	08/07/95	32.08	<0.010	3.605	<0.0005	<0.010	<0.010	<0.50	0.003
OWD-01	02/13/96	19.69	<0.010	4.570	<0.0005	<0.010	<0.010	<0.50	<0.001
OWD-01	08/01/96	15.20	0.018	0.203	<0.0010	<0.010	<0.010	<0.50	<0.001
OWD-01	02/06/97	30.21	<0.01	1.193	<0.001	<0.01	0.011	<0.5	<0.001
OWD-01	08/15/97	0.760	<0.01	2.060	<0.001	<0.01	<0.01	<0.5	<0.001
OWD-01	02/16/98	25.76	<0.01	2.78	<0.001	<0.01	<0.01	<0.5	<0.001
OWD-01	08/31/98	25.04	<0.01	2.25	<0.0005	<0.01	<0.01	<0.01	<0.01
OWS-01	08/17/89	177	0.056	1.110	0.0005	<0.005	0.006	1.368	<0.005
OWS-01	06/28/90	43.10	0.016	1.110	<0.0002	<0.005	<0.005	0.534	<0.001
OWS-01	07/18/91	95.30	0.013	0.877	<0.0002	<0.005	<0.005	(0.270)	<0.005
OWS-01	02/09/93	35.45	<0.005	0.408	<0.0002	<0.005	<0.005	0.075	<0.001
OWS-01	08/03/93	55.48	<0.005	0.971	<0.0002	<0.005	<0.005	0.224	<0.001
OWS-01	02/08/94	97.60	0.026	0.767	<0.0002	<0.005	<0.005	0.162	<0.001
OWS-01	08/10/94	38.13	0.013	0.370	0.0003	<0.010	<0.010	<0.50	<0.001
OWS-01	02/07/95	35.18	0.011	1.506	<0.0002	<0.010	<0.010	<0.50	<0.001
OWS-01	08/07/95	43.11	<0.010	0.454	<0.0005	<0.010	<0.010	<0.50	<0.001
OWS-01	02/13/96	14.28	<0.010	0.331	<0.0005	<0.010	<0.010	<0.50	<0.001
OWS-01	08/01/96	55.58	0.011	0.457	<0.0010	<0.010	<0.010	<0.50	<0.001
OWS-01	02/06/97	36.68	0.011	0.493	<0.001	<0.01	<0.01	<0.5	<0.001

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For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

Standard mg/L SITE	DATE	0.05 Chromium (MG/L)	1.0 Copper (MG/L)	2.1 Zinc (MG/L)	0.05 Selenium (MG/L)	pH Hydrogen ion (UNITS)	10.0 Nitrate (MG/L)	250.0 Sulfate (MG/L)	250.0 Chloride (MG/L)
OWD-01	08/17/89	0.079	0.019	0.078	<0.005	6.9	<0.02	45	23
OWD-01	06/28/90	0.072	0.30	0.109	<0.005	6.8	<0.02	29	17
OWD-01	07/18/91	<0.010	0.075	0.012	<0.005	6.7	<0.02	26	19
OWD-01	02/09/93	0.006	0.032	<0.010	<0.005	6.6	<0.02	36	15
OWD-01	08/03/93	<0.005	0.019	<0.010	<0.010	7.6	0.10	40	16
OWD-01	02/08/94	<0.005	0.021	<0.010	<0.010	6.7	<0.02	50	16
OWD-01	08/10/94	<0.010	<0.200	<0.050	<0.020	6.4	<0.04	40	17
OWD-01	02/07/95	<0.010	<0.200	<0.050	<0.020	6.6	<0.04	50	19
OWD-01	08/07/95	<0.010	<0.200	<0.050	<0.020	6.4	0.04	29	14
OWD-01	02/13/96	<0.010	<0.200	<0.050	<0.020	6.4	<0.04	76	15
OWD-01	08/01/96	0.016	<0.200	<0.050	<0.020	---	<0.04	38	17
OWD-01	02/06/97	<0.01	<0.2	<0.05	<0.02	---	<0.04	48	17
OWD-01	08/15/97	<0.01	<0.2	<0.05	<0.02	---	<0.04	48.3	19
OWD-01	02/16/98	<0.01	<0.2	<0.05	<0.02	---	<0.04	35.4	15
OWD-01	08/31/98	<0.01	<0.01	<0.05	<0.02	---	<0.04	30.9	14
OWS-01	08/17/89	0.011	0.082	0.270	<0.005	6.5	<0.02	29	15
OWS-01	06/28/90	0.017	0.028	0.050	<0.005	6.3	0.03	26	(11)
OWS-01	07/18/91	0.093	0.043	0.127	<0.005	6.1	<0.02	24	12
OWS-01	02/09/93	0.020	0.029	0.036	<0.005	6.4	<0.02	10	5
OWS-01	08/03/93	0.015	0.024	0.033	<0.010	6.1	0.02	1	23
OWS-01	02/08/94	0.048	0.056	0.091	<0.010	6.2	<0.02	6	16
OWS-01	08/10/94	0.027	<0.200	<0.050	<0.020	6.1	<0.04	4	8
OWS-01	02/07/95	0.016	<0.200	<0.050	<0.020	6.2	<0.04	15	14
OWS-01	08/07/95	0.023	<0.200	<0.050	<0.020	6.3	0.04	8	10
OWS-01	02/13/96	<0.010	<0.200	<0.050	<0.020	6.0	<0.04	<5	8
OWS-01	08/01/96	0.025	<0.200	<0.050	<0.020	---	<0.04	6	16
OWS-01	02/06/97	0.014	<0.2	<0.05	<0.02	---	<0.04	<5.0	19

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For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	2,0 Fluoride (MG/L)	BOD (MG/L)	COD (MG/L)	TOC (MG/L)	Total Organic Halides (MG/L)	Residue, filterable (MG/L)	Specific Conductivity (UMHO)	Turbidity (MG/L)
OWD-01	08/17/89	0.36	11	205	8.50	0.016	568	738	---
OWD-01	06/28/90	<0.10	1.6	51	9.64	0.017	404	772	---
OWD-01	07/18/91	<0.10	1.3	39	11.76	0.012	392	725	---
OWD-01	02/09/93	<0.10	1.2	38	14.19	0.017	487	750	---
OWD-01	08/03/93	0.14	2.6	40	9.77	0.015	475	880	---
OWD-01	02/08/94	<0.10	2.2	28	17.07	0.024	469	810	---
OWD-01	08/10/94	<0.10	2.2	31	14.02	0.014	498	860	---
OWD-01	02/07/95	0.24	1.3	20	11.81	0.017	498	910	---
OWD-01	08/07/95	(0.015)	1.8	46	10.45	0.016	547	890	---
OWD-01	02/13/96	<0.10	3.3	37	11.78	0.018	542	770	---
OWD-01	08/01/96	<0.10	6.4	40	10.33	0.021	525	---	---
OWD-01	02/06/97	---	3.9	32	9.75	0.020	501	---	---
OWD-01	08/15/97	---	6.2	31	13.61	0.020	463	---	---
OWD-01	02/16/98	---	4.9	22	8.74	0.016	524	---	---
OWD-01	08/31/98	---	5.2	39	9.75	0.018	471	---	---
OWS-01	08/17/89	<0.10	8.9	126	12.36	0.024	147	228	---
OWS-01	06/28/90	<0.10	3.1	197	11.9	0.019	142	439	---
OWS-01	07/18/91	<0.10	2.8	65	23.99	0.024	133	190	---
OWS-01	02/09/93	<0.10	1.3	45	18.64	0.020	195	220	---
OWS-01	08/03/93	<0.10	6.6	41	18.16	0.020	248	460	---
OWS-01	02/08/94	<0.10	3.6	48	24.90	0.016	272	330	---
OWS-01	08/10/94	<0.10	3.3	54	18.98	0.022	389	250	---
OWS-01	02/07/95	0.30	1.9	22	18.28	0.024	225	210	---
OWS-01	08/07/95	0.24	2.5	51	19.70	0.022	328	200	---
OWS-01	02/13/96	<0.10	4.4	29	13.67	0.019	265	190	---
OWS-01	08/01/96	<0.10	2.5	67	22.10	0.016	190	---	---
OWS-01	02/06/97	---	3.4	43	20.16	0.018	235	---	---

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For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	Temperature (C)
OWD-01	08/17/89	24
OWD-01	06/28/90	25
OWD-01	07/18/91	21
OWD-01	02/09/93	15
OWD-01	08/03/93	24
OWD-01	02/08/94	16
OWD-01	08/10/94	18
OWD-01	02/07/95	11
OWD-01	08/07/95	20
OWD-01	02/13/96	16
OWD-01	08/01/96	---
OWD-01	02/06/97	---
OWD-01	08/15/97	---
OWD-01	02/16/98	---
OWD-01	08/31/98	---
OWS-01	08/17/89	24
OWS-01	06/28/90	25
OWS-01	07/18/91	21
OWS-01	02/09/93	15
OWS-01	08/03/93	23
OWS-01	02/08/94	14
OWS-01	08/10/94	22
OWS-01	02/07/95	8
OWS-01	08/07/95	23
OWS-01	02/13/96	9
OWS-01	08/01/96	---
OWS-01	02/06/97	---

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For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	0.3 Iron (MG/L)	0.015 Lead (MG/L)	0.05 Manganese (MG/L)	0.0011 Mercury (MG/L)	0.018 Silver (MG/L)	0.05 Arsenic (MG/L)	2.0 Barium (MG/L)	0.005 Cadmium (MG/L)
OWS-01	08/15/97	27.60	<0.01	0.665	<0.001	<0.01	<0.01	<0.5	<0.001
OWS-01	02/16/98	20.51	<0.01	1.029	<0.001	<0.01	<0.01	0.525	<0.001
OWS-01	08/31/98	30.72	<0.01	0.43	<0.0005	<0.01	<0.01	<0.01	<0.01
OWS-02	08/17/89	111	0.010	1.330	<0.0002	<0.005	0.014	0.792	<0.005
OWS-02	06/28/90	109	<0.005	1.250	<0.0002	<0.005	0.006	1.452	<0.005
OWS-02	07/18/91	155.1	0.020	1.038	<0.0002	<0.005	0.010	(0.269)	<0.005
OWS-02	02/09/93	114.60	0.026	1.638	0.0002	<0.005	0.007	0.210	<0.001
OWS-02	08/03/93	130.6	<0.005	1.048	<0.0002	<0.005	<0.005	0.326	<0.001
OWS-02	02/08/94	57.35	<0.005	2.528	<0.0002	<0.005	<0.005	0.155	<0.001
OWS-02	08/10/94	82.70	<0.010	1.487	<0.0002	<0.010	<0.010	<0.50	<0.001
OWS-02	02/07/95	42.58	<0.010	1.800	<0.0002	<0.010	<0.010	<0.50	<0.001
OWS-02	08/07/95	63.10	<0.010	1.068	<0.0005	<0.010	<0.010	<0.50	<0.001
OWS-02	02/13/96	(0.835)	<0.010	0.737	<0.0005	<0.010	<0.010	<0.50	<0.001
OWS-02	08/01/96	77.54	<0.010	1.226	<0.0010	<0.010	<0.010	<0.50	<0.001
OWS-02	02/06/97	0.094	<0.01	<0.010	<0.001	<0.01	<0.01	<0.5	<0.001
OWS-02	08/15/97	85.20	<0.01	1.680	<0.001	<0.01	<0.01	0.661	<0.001
OWS-02	02/16/98	54.5	0.014	0.715	<0.001	<0.01	<0.01	<0.5	<0.001
OWS-02	08/31/98	30.23	<0.01	0.943	<0.0005	<0.01	<0.01	0.65	<0.01
OWS-03	08/17/89	50.80	0.015	0.909	<0.0002	<0.005	<0.005	1.280	<0.005
OWS-03	06/28/90	21.30	0.005	0.314	<0.0002	<0.005	<0.005	2.284	<0.005
OWS-03	07/18/91	30.57	<0.005	0.383	<0.0002	<0.005	<0.005	(0.148)	<0.005
OWS-03	02/09/93	27.71	<0.005	4.914	<0.0002	<0.005	<0.005	0.068	<0.001
OWS-03	08/03/93	8.330	<0.005	0.096	<0.0002	<0.005	<0.005	0.150	<0.001
OWS-03	02/08/94	8.225	<0.005	0.171	<0.0002	<0.005	<0.005	0.089	<0.001
OWS-03	08/10/94	(3.827)	<0.010	0.127	<0.0002	<0.010	<0.010	<0.50	<0.001
OWS-03	02/07/95	8.275	<0.010	0.177	<0.0002	<0.010	<0.010	<0.50	<0.001
OWS-03	08/07/95	7.120	<0.010	0.098	<0.0005	<0.010	<0.010	<0.50	<0.001

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
() = Less than Reporting Limit

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	0.05 Chromium (MG/L)	1.0 Copper (MG/L)	2.1 Zinc (MG/L)	0.05 Selenium (MG/L)	Hydrogen Ion (UNITS)	10.0 Nitrate (MG/L)	250.0 Sulfate (MG/L)	250.0 Chloride (MG/L)
OWS-01	08/15/97	0.010	<0.2	<0.05	<0.02	---	0.08	<5.0	17
OWS-01	02/16/98	<0.01	<0.2	<0.05	<0.02	---	0.84	157.1	14
OWS-01	08/31/98	0.01	<0.01	<0.05	<0.02	---	<0.04	17.5	11
OWS-02	08/17/89	<0.10	0.015	(0.044)	<0.005	6.5	<0.02	18	31
OWS-02	06/28/90	0.019	0.20	0.047	<0.005	6.4	<0.02	20	<1
OWS-02	07/18/91	0.061	0.036	0.068	<0.005	6.3	<0.02	9	21
OWS-02	02/09/93	0.077	0.048	0.064	<0.005	6.3	0.72	16	14
OWS-02	08/03/93	<0.005	0.019	0.011	<0.010	6.2	0.02	10	<1
OWS-02	02/08/94	0.015	0.025	0.014	<0.010	6.6	0.03	16	16
OWS-02	08/10/94	<0.010	<0.200	<0.050	<0.020	6.3	<0.04	21	16
OWS-02	02/07/95	<0.010	<0.200	<0.050	<0.020	6.3	0.52	30	16
OWS-02	08/07/95	<0.010	<0.200	<0.050	<0.020	6.4	0.04	6	10
OWS-02	02/13/96	<0.010	<0.200	<0.050	<0.020	6.1	6.78	40	12
OWS-02	08/01/96	<0.010	<0.200	<0.050	<0.020	---	<0.04	12	16
OWS-02	02/06/97	<0.01	<0.2	<0.05	<0.02	---	2.12	14	15
OWS-02	08/15/97	<0.01	<0.2	<0.05	<0.02	---	<0.04	30.8	17
OWS-02	02/16/98	<0.01	<0.2	0.054	<0.02	---	<0.04	<5	15
OWS-02	08/31/98	<0.01	<0.01	<0.05	<0.02	---	0.47	21.2	17
OWS-03	08/17/89	(0.047)	0.021	(0.032)	<0.005	6.9	0.26	73	11
OWS-03	06/28/90	0.011	0.015	0.102	<0.005	6.6	<0.02	8	7
OWS-03	07/18/91	0.013	0.011	<0.010	<0.005	6.6	<0.02	8	11
OWS-03	02/09/93	0.009	0.018	<0.010	<0.005	6.5	<0.02	3	<1
OWS-03	08/03/93	<0.005	0.018	0.032	<0.010	6.3	1.14	8	4
OWS-03	02/08/94	0.006	0.018	<0.010	<0.010	6.1	0.04	7	3
OWS-03	08/10/94	<0.010	<0.200	<0.050	<0.020	6.3	<0.04	16	2
OWS-03	02/07/95	<0.010	<0.200	<0.050	<0.020	6.5	0.16	17	7
OWS-03	08/07/95	<0.010	<0.200	<0.050	<0.020	6.5	0.10	<5	2

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
() = Less than Reporting Limit

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	2.0 Fluoride (MG/L)	BOD (MG/L)	COD (MG/L)	TOC (MG/L)	Total Organic Halides (MG/L)	Residue, filterable (MG/L)	Specific Conductivity (UMHO)	Turbidity (MG/L)
OWS-01	08/15/97	---	7.5	51	20.78	0.020	225	---	---
OWS-01	02/16/98	---	0	57	28.27	0.022	767	---	---
OWS-01	08/31/98	---	3.4	39	14.87	0.03	241	---	---
OWS-02	08/17/89	<0.10	18	197	28.96	0.046	643	975	---
OWS-02	06/28/90	<0.10	6.9	194	23.4	0.052	424	703	---
OWS-02	07/18/91	<0.10	6.0	263	34.01	0.044	291	616	---
OWS-02	02/09/93	<0.10	1.8	90	45.68	0.024	492	820	---
OWS-02	08/03/93	<0.10	6.5	81	27.42	0.027	594	750	---
OWS-02	02/08/94	<0.10	3.9	59	37.41	0.031	585	1000	---
OWS-02	08/10/94	<0.10	5.5	93	30.16	0.028	655	1000	---
OWS-02	02/07/95	0.36	1.9	<10	20.87	0.028	513	680	---
OWS-02	08/07/95	<0.10	5.2	71	21.86	0.028	809	1400	---
OWS-02	02/13/96	<0.10	4.4	72	30.38	0.035	894	1000	---
OWS-02	08/01/96	<0.10	4.4	47	32.85	0.031	637	---	---
OWS-02	02/06/97	---	<6.3	59	25.41	0.027	524	---	---
OWS-02	08/15/97	---	<11	62	22.82	0.033	486	---	---
OWS-02	02/16/98	---	8.1	29	18.47	0.03	276	---	---
OWS-02	08/31/98	---	6.4	60	22.35	0.027	763	---	---
OWS-03	08/17/89	<0.10	19	130	16.29	0.046	500	617	---
OWS-03	06/28/90	<0.10	3.6	435	16.1	0.039	367	625	---
OWS-03	07/18/91	<0.10	1.7	63	18.61	0.042	311	541	---
OWS-03	02/09/93	<0.10	2.9	27	13.12	(0.006)	242	340	---
OWS-03	08/03/93	<0.10	6.6	27	38.09	0.011	285	530	---
OWS-03	02/08/94	<0.10	2.8	18	14.21	0.014	294	510	---
OWS-03	08/10/94	<0.10	2.7	33	16.10	0.016	333	520	---
OWS-03	02/07/95	0.34	2.1	<10	9.34	0.019	309	370	---
OWS-03	08/07/95	0.10	2.3	24	11.29	0.014	356	420	---

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() = Less than Reporting Limit

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	Temperature (C)
OWS-01	08/15/97	---
OWS-01	02/16/98	---
OWS-01	08/31/98	---
OWS-02	08/17/89	23
OWS-02	06/28/90	25
OWS-02	07/18/91	21
OWS-02	02/09/93	15
OWS-02	08/03/93	23
OWS-02	02/08/94	15
OWS-02	08/10/94	22
OWS-02	02/07/95	11
OWS-02	08/07/95	22
OWS-02	02/13/96	15
OWS-02	08/01/96	---
OWS-02	02/06/97	---
OWS-02	08/15/97	---
OWS-02	02/16/98	---
OWS-02	08/31/98	---
OWS-03	08/17/89	25
OWS-03	06/28/90	25
OWS-03	07/18/91	21
OWS-03	02/09/93	15
OWS-03	08/03/93	24
OWS-03	02/08/94	17
OWS-03	08/10/94	25
OWS-03	02/07/95	10
OWS-03	08/07/95	25

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	0.3 Iron (MG/L)	0.015 Lead (MG/L)	0.05 Manganese (MG/L)	0.0011 Mercury (MG/L)	0.018 Silver (MG/L)	0.05 Arsenic (MG/L)	2.0 Barium (MG/L)	0.005 Cadmium (MG/L)
OWS-03	02/13/96	(0.891)	<0.010	0.065	<0.0005	<0.010	<0.010	<0.50	<0.001
OWS-03	08/01/96	41.52	<0.010	2.422	<0.0010	<0.010	<0.010	<0.50	<0.001
OWS-03	02/06/97	29.75	<0.01	0.146	<0.001	<0.01	<0.01	<0.5	<0.001
OWS-03	08/15/97	14.43	<0.01	0.110	<0.001	<0.01	<0.01	0.695	<0.001
OWS-03	02/16/98	66.3	0.014	0.307	<0.001	<0.01	0.011	<0.5	<0.001
OWS-03	08/31/98	35.77	0.018	0.114	<0.0005	<0.01	<0.01	<0.01	<0.01
PZ00100	06/13/97	---	---	---	---	---	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed
() = Less than Reporting Limit
For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	0.05 Chromium (MG/L)	1.0 Copper (MG/L)	2.1 Zinc (MG/L)	0.05 Selenium (MG/L)	Hydrogen Ion (UNITS)	10.0 Nitrate (MG/L)	250 Sulfate (MG/L)	250 Chloride (MG/L)
OWS-03	02/13/96	<0.010	<0.200	<0.050	<0.020	6.5	<0.04	12	2
OWS-03	08/01/96	<0.010	<0.200	<0.050	<0.020	---	<0.04	17	4
OWS-03	02/06/97	0.024	<0.2	<0.05	<0.02	---	<0.04	8	10
OWS-03	08/15/97	<0.01	<0.2	<0.05	<0.02	---	0.05	29.3	8
OWS-03	02/16/98	0.039	<0.2	0.063	<0.02	---	0.3	9.4	7
OWS-03	08/31/98	0.062	<0.01	0.065	<0.02	---	0.15	12.7	7
PZ00100	06/13/97	---	---	---	---	7.5	---	---	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

DELTA PROJECT NO. E096-019

SITE	DATE	Fluoride (MG/L)	BOD (MG/L)	COD (MG/L)	TOC (MG/L)	Total Organic Halides (MG/L)	Residue, filterable (MG/L)	Specific Conductivity (UMHO)	Turbidity (MG/L)
OWS-03	02/13/96	<0.10	2.4	<10	5.16	0.014	278	390	---
OWS-03	08/01/96	<0.10	4.6	47	10.08	0.017	321	---	---
OWS-03	02/06/97	---	3.2	29	12.09	0.017	344	---	---
OWS-03	08/15/97	---	3.4	28	8.27	0.018	327	---	---
OWS-03	02/16/98	---	1	21	10.29	0.019	335	---	---
OWS-03	08/31/98	---	2.9	24	14.09	0.016	239	---	---
PZ00100	06/13/97	---	8	380	---	0.13	2835	---	320

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL NC-RESPONS

TABLE 1

GROUND WATER ANALYTICAL RESULTS
WEYERHAEUSER: NEW BERN LANDFILL
NEW BERN, NORTH CAROLINA

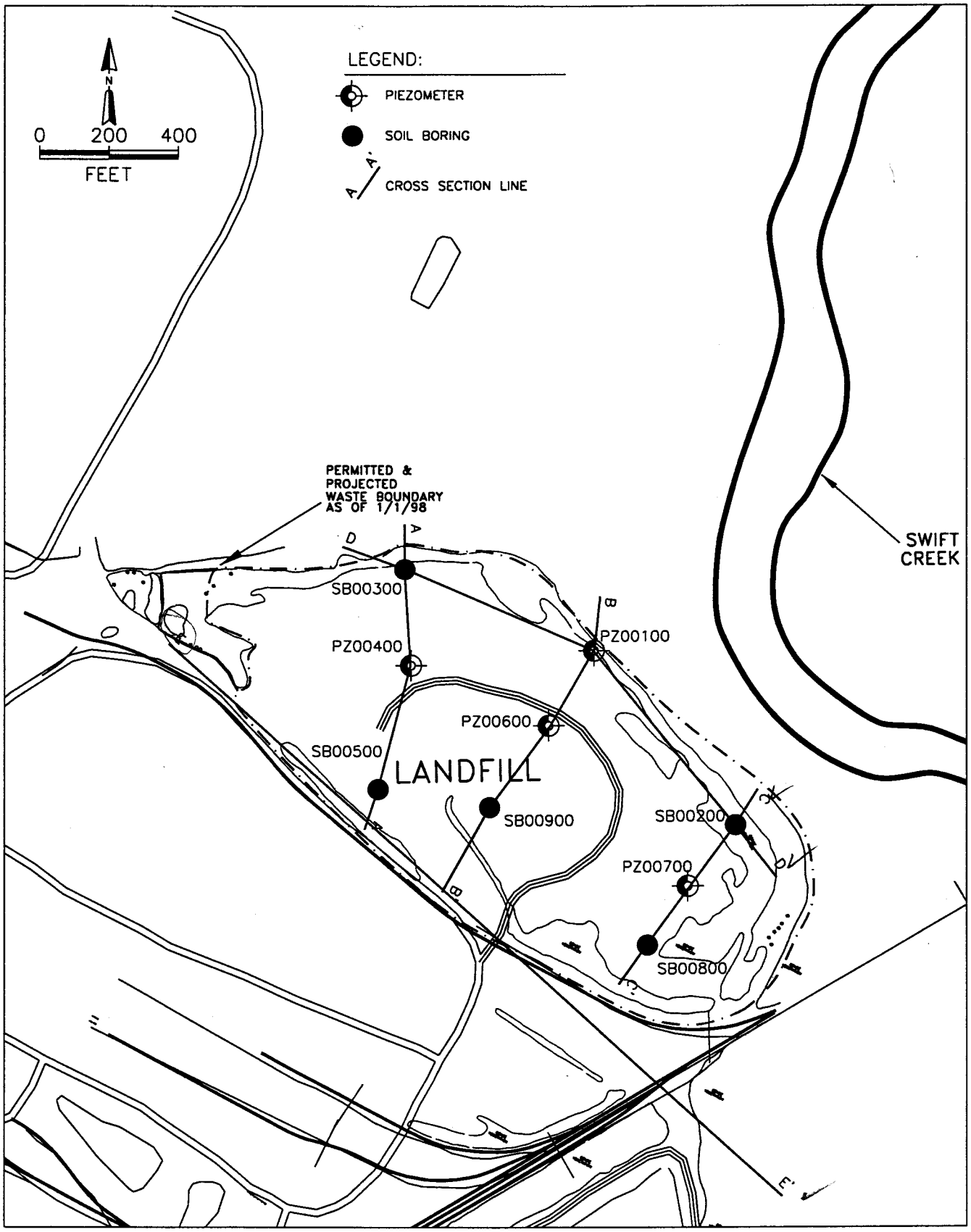
DELTA PROJECT NO. E096-019

SITE	DATE	Temperature (C)
OWS-03	02/13/96	14
OWS-03	08/01/96	---
OWS-03	02/06/97	---
OWS-03	08/15/97	---
OWS-03	02/16/98	---
OWS-03	08/31/98	---
PZ00100	06/13/97	---

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL NC-RESPONS

FIGURES



Delta Environmental Consultants, Inc.	TITLE: CROSS SECTION LOCATION MAP WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
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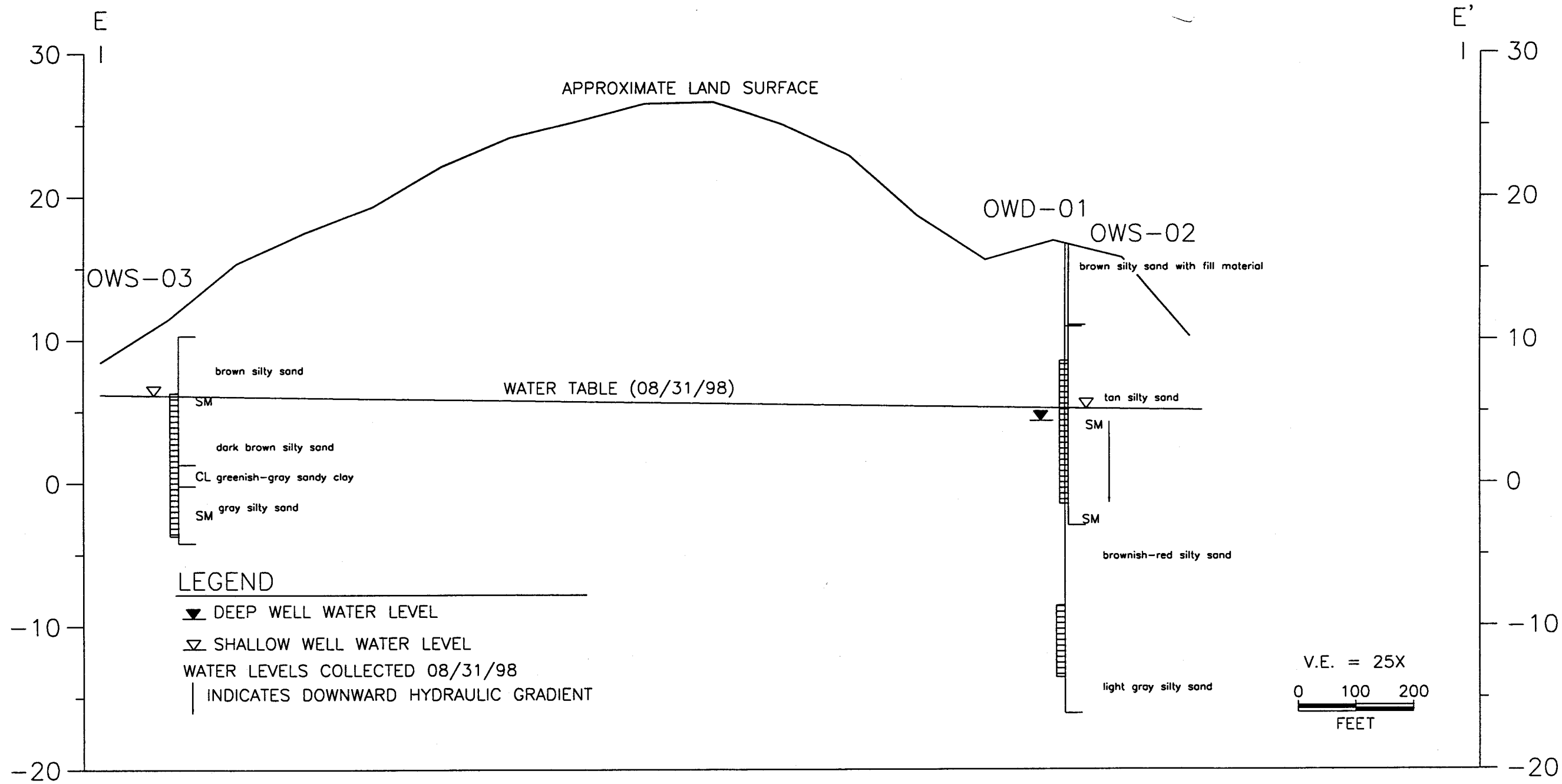
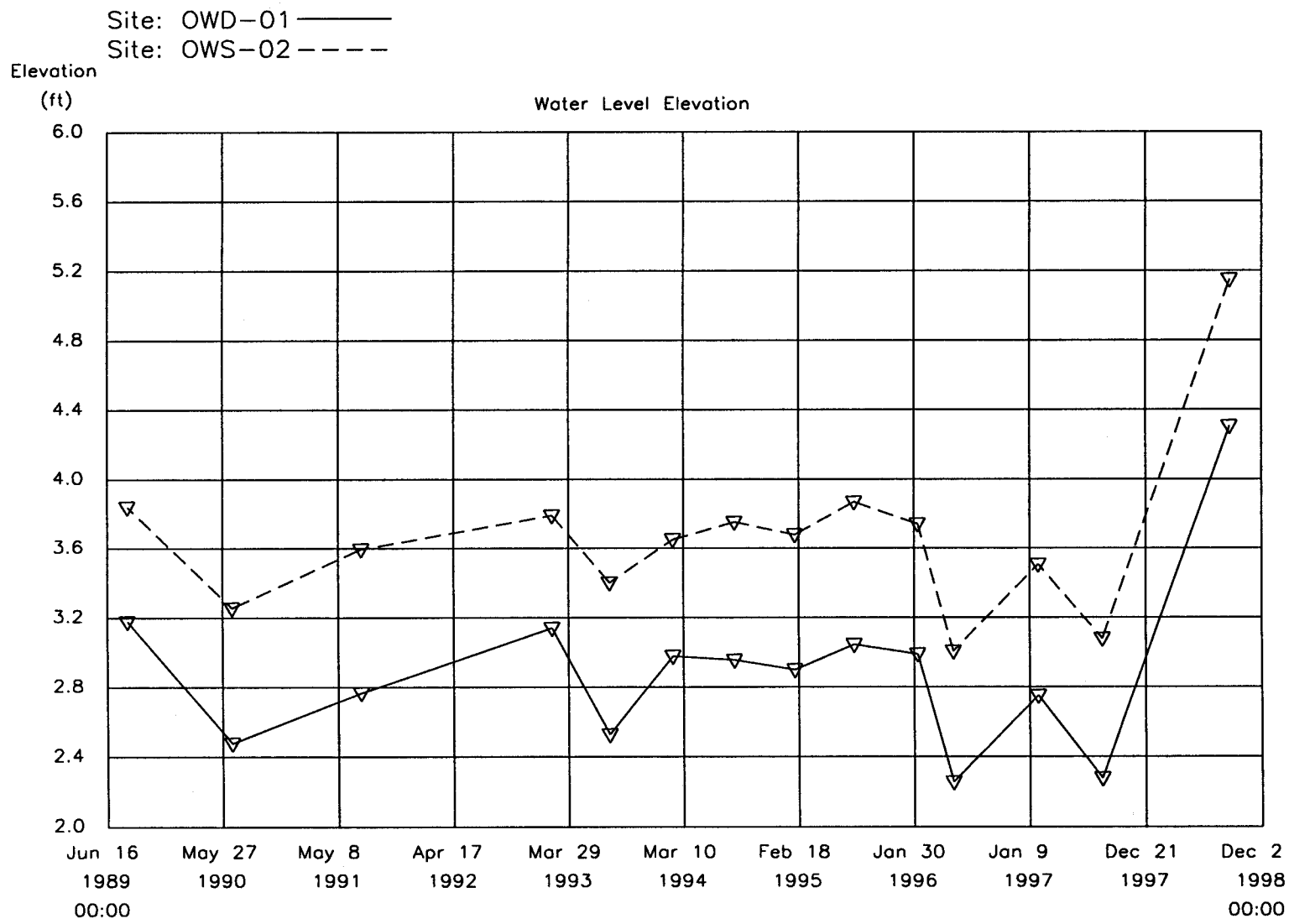
		DATE: 11/23/98	REV.:	



Delta Environmental

TITLE:
CROSS SECTION E − E'
WEYERHAEUSER COMPANY − LANDFILL
NEW BERN, NORTH CAROLINA

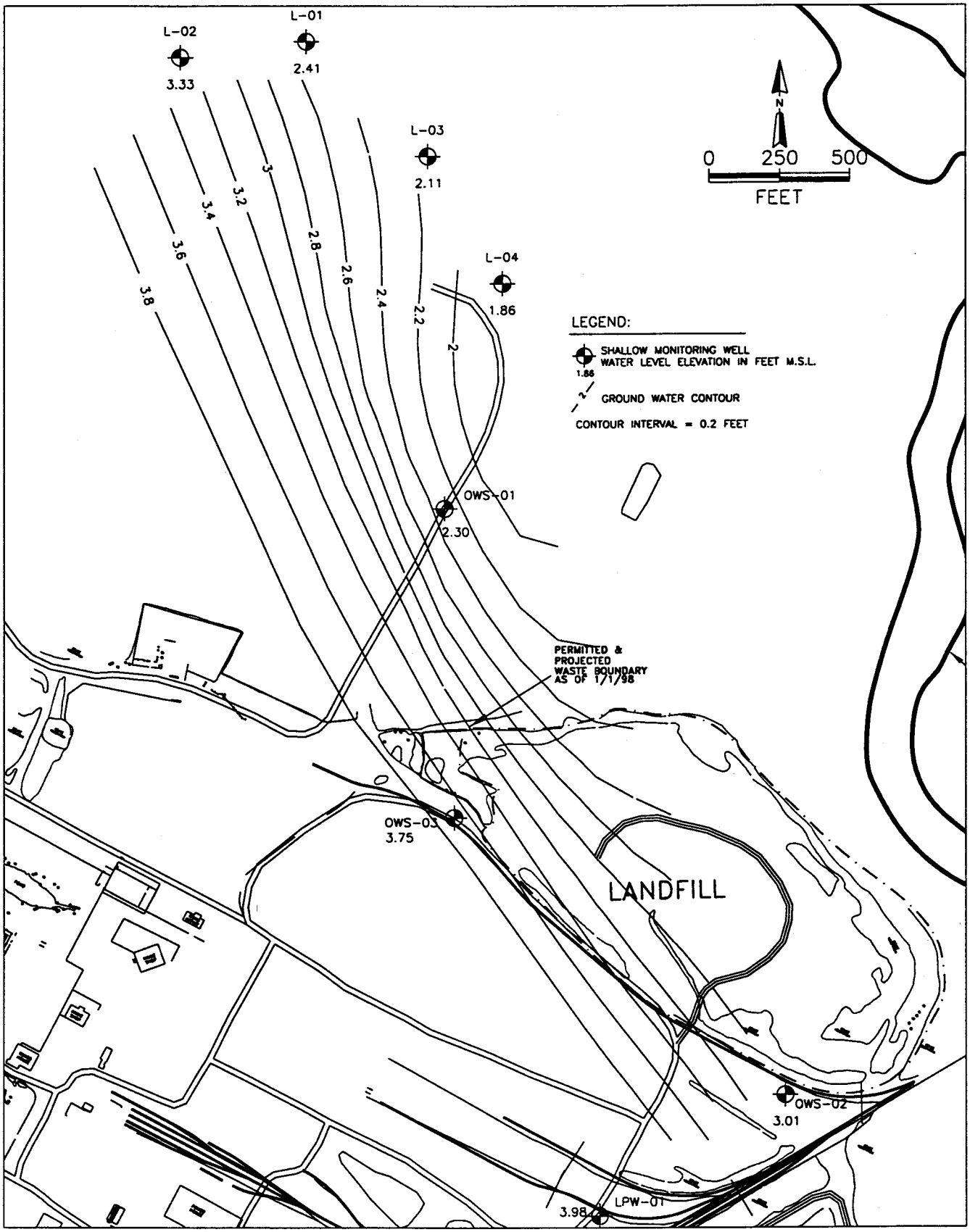
DWN: DEK	DES.:	PROJECT NO.: E096−019
CHKD:	APPD:	FIGURE NO.: 2
DATE:	REV.:	



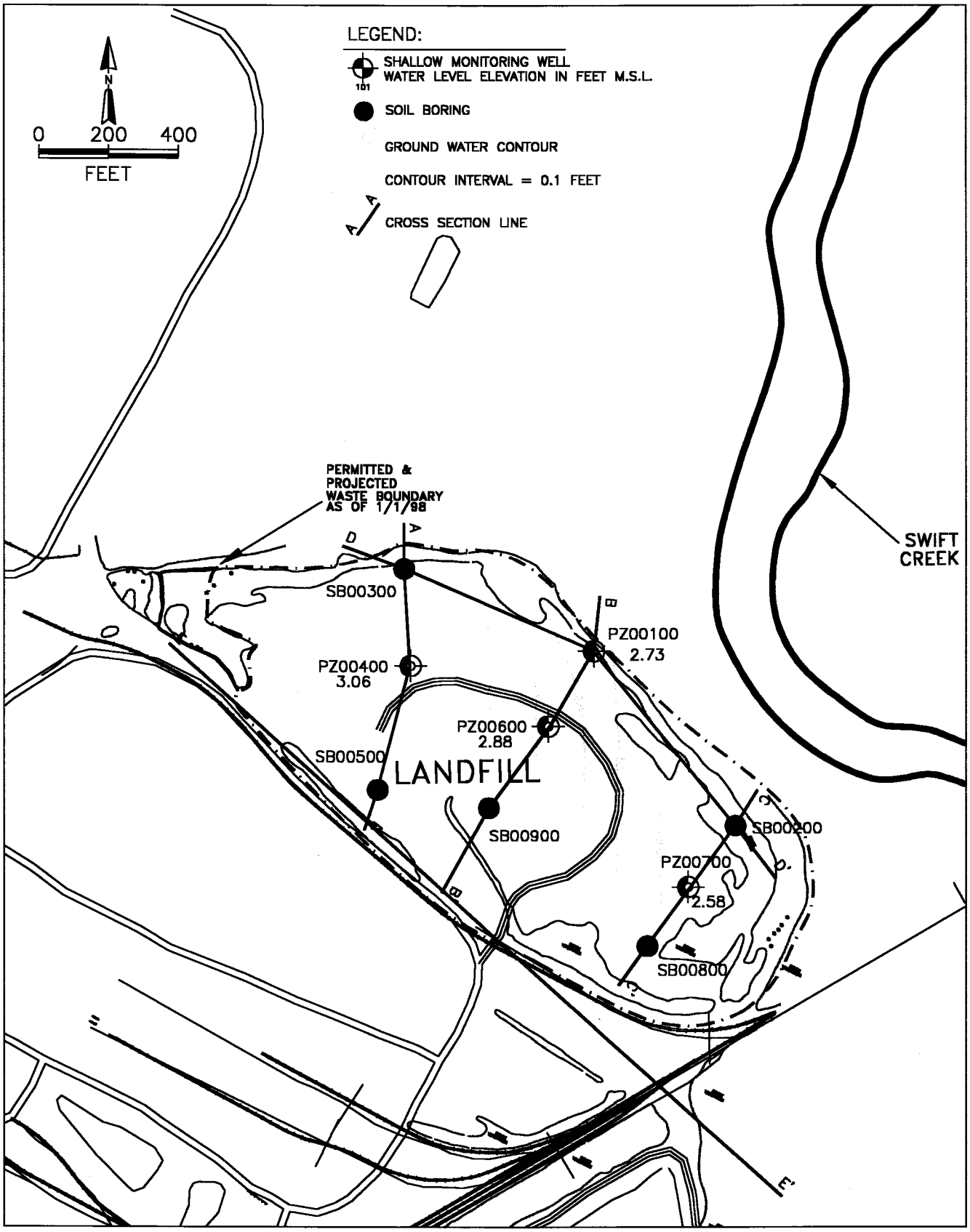
Delta Environmental Consultants, Inc.

TITLE:
HYDROGRAPH: OWD-01 & OWS-02
WEYERHAEUSER
NEW BERN, NORTH CAROLINA

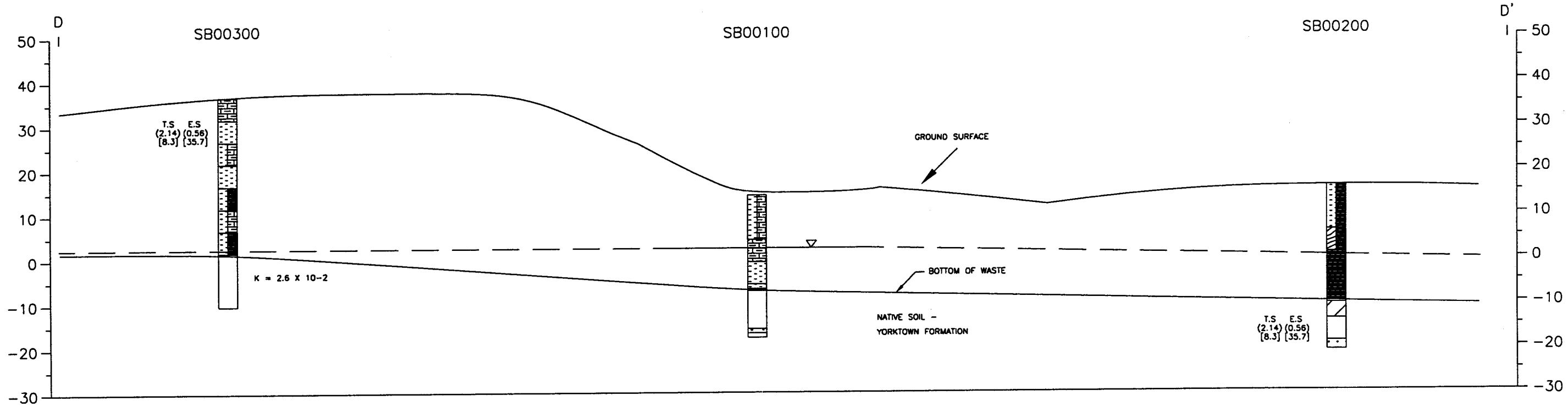
DWN: DEK	DES.:	PROJECT NO.: E096-019
CHKD:	APPD:	FIGURE NO.: 3
DATE: 12/03/98	REV.:	



Delta Environmental Consultants, Inc.	TITLE: WATER TABLE CONTOUR MAP (05/29/96) WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 4
		DATE: 12/03/98	REV.:	



Delta Environmental Consultants, Inc.	TITLE: WATER TABLE CONTOUR MAP (06/13/97) WEYERHAEUSER NEW BERN LANDFILL NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 5
		DATE: 11/23/98	REV.:	



A.G. = ASH & GRIT

L.M. = LIME MUD

W.C. = WOOD FRAGMENTS

W.F. = PULP & DREGS

S.C. = CLAYEY SAND

S.P. = SAND, LITTLE/NO FINES

S.W. = GRAVELLY SAND, LITTLE/NO FINES

N

0 60 120

FEET

VERTICAL EXAGGERATION = 5X

K = HYDRAULIC CONDUCTIVITY

T.S = TOTAL STRENGTH
(2.14) = C, ksf
[8.3] = o, deg

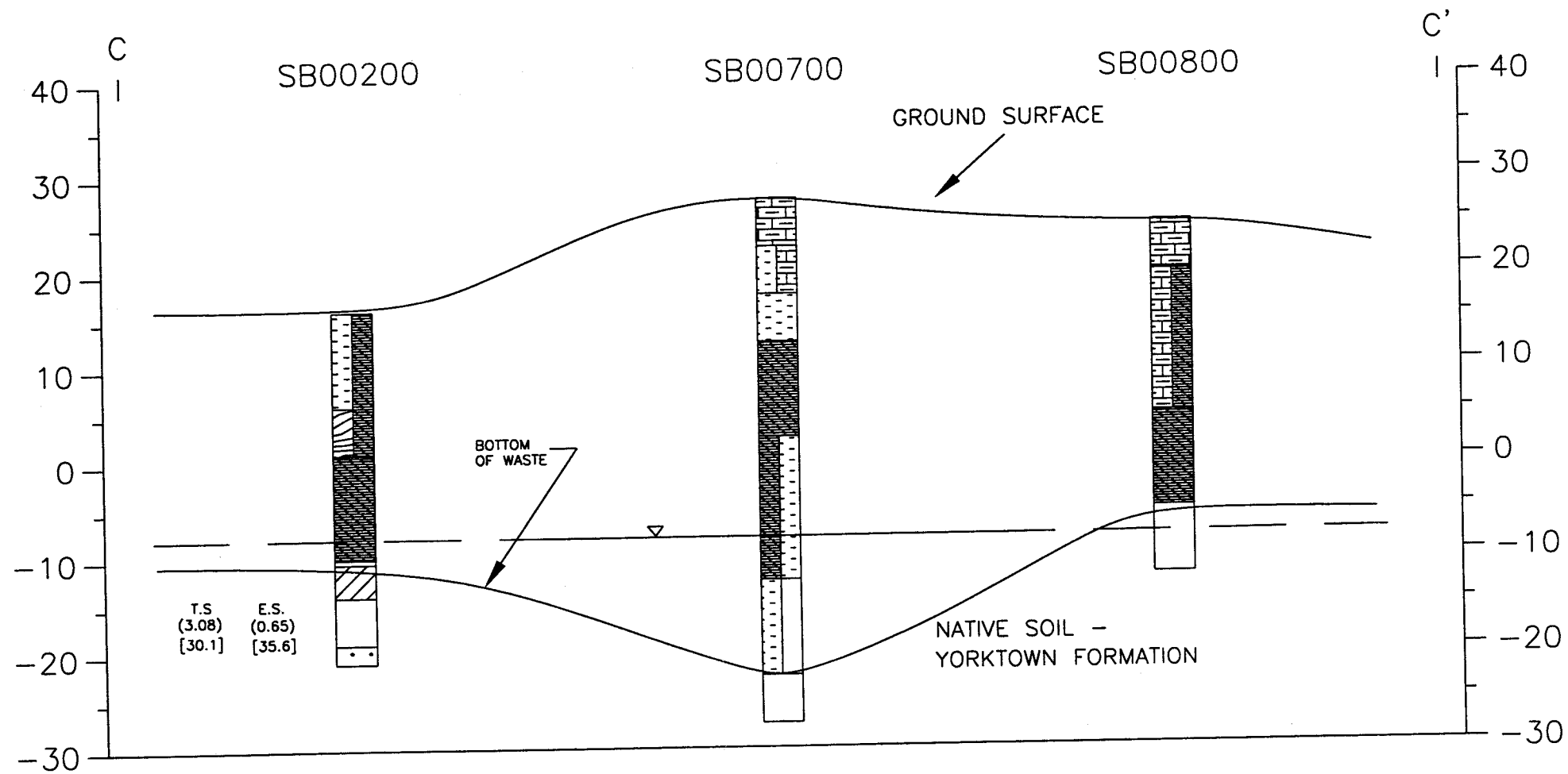
E.S = EFFECTIVE STRENGTH
(0.65) = C, ksf
[35.6] = o, deg

▽ = WATER LEVEL 6/13/97

Delta Environmental Consultants, Inc.

TITLE:
CROSS SECTION D – D'
WEYERHAEUSER COMPANY – LANDFILL
NEW BERN, NORTH CAROLINA

DWN: BLG	DES.:	PROJECT NO.: E096-019
CHKD:	APPD:	FIGURE NO.: 6
DATE: 08/07/97	REV.:	



AG ASH & GRIT

LM LIME MUD

WC WOOD FRAGMENTS

SC CLAYEY SAND

SP SAND, LITTLE/NO FINES

SW GRAVELLY SAND, LITTLE/NO FINES

0 40 80
FEET

VERTICAL EXAGGERATION = 5X

T.S. = TOTAL STRENGTH
(3.08) = C, ksf
[30.1] = ϕ, deg
E.S. = EFFECTIVE STRENGTH
(0.65) = C, ksf
[35.6] = ϕ, deg

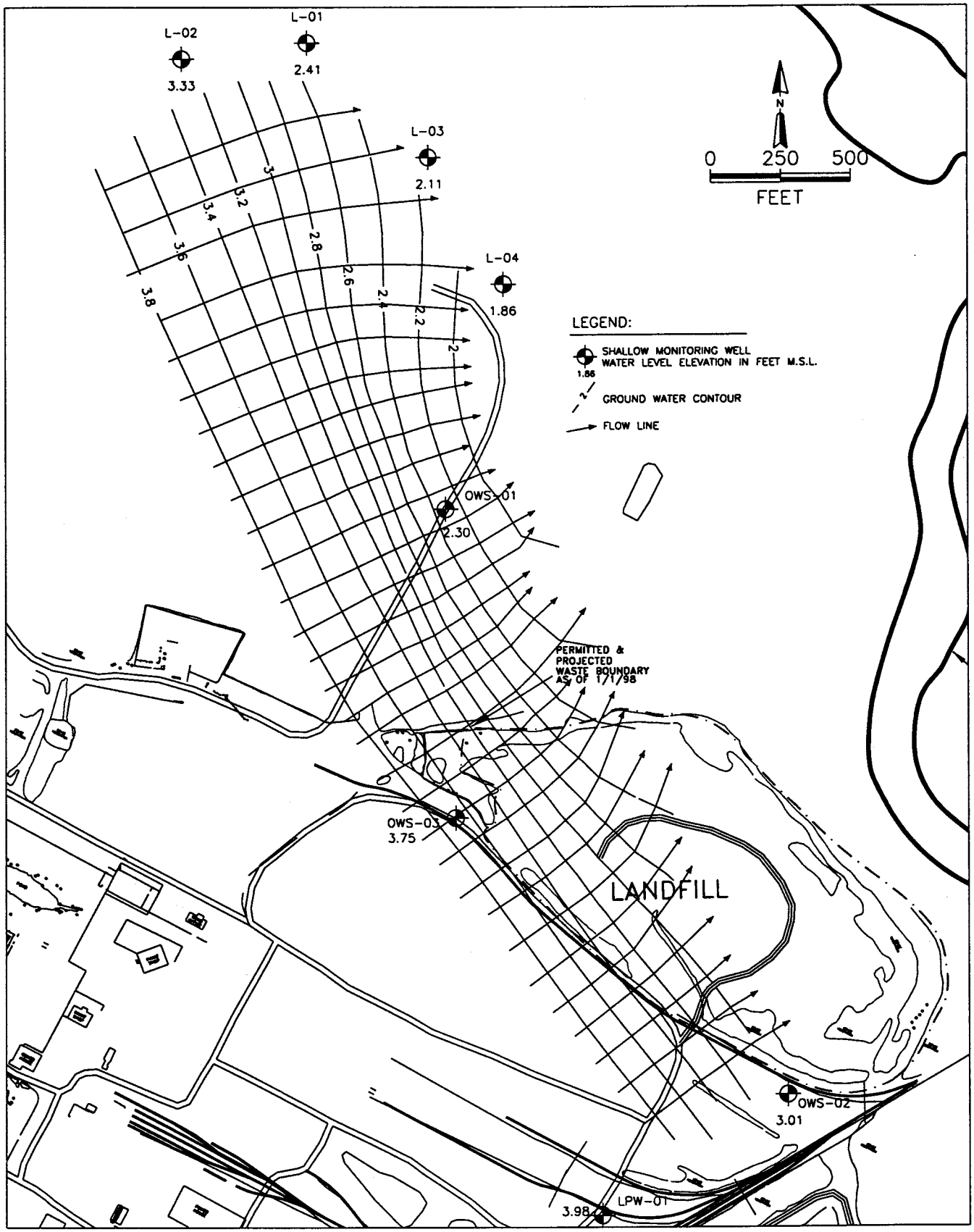
▽ = WATER LEVEL 6/13/97

Delta Environmental Consultants, Inc.

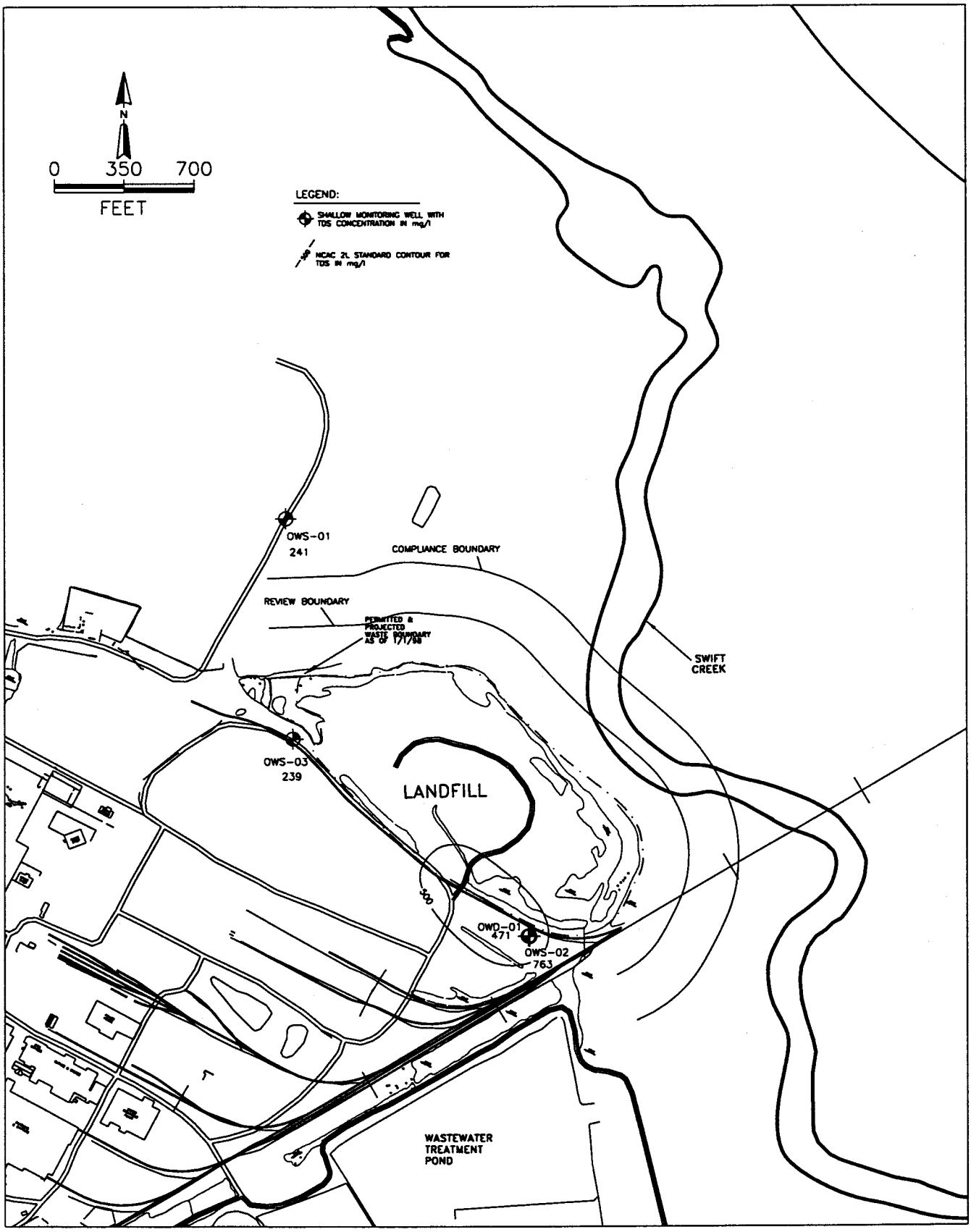
TITLE:
CROSS SECTION C – C'
WEYERHAEUSER COMPANY – LANDFILL
NEW BERN, NORTH CAROLINA

DWN: BLG	DES.:	PROJECT NO.: E096-019
CHKD:	APPD:	FIGURE NO.: 7
DATE: 07/29/97	REV.:	

Drawing Under Seperate Cover



Delta Environmental Consultants, Inc.	TITLE: GROUND WATER FLOW NET (05/29/96) WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 9
		DATE: 12/03/98	REV.:	



Delta Environmental Consultants, Inc.	TITLE: ISOCONCENTRATION CONTOUR MAP: TDS (08/31/98) WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 10
		DATE: 11/23/98	REV.:	

APPENDIX A

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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                 HELP MODEL VERSION 3.05  (30 MARCH 1996)                 **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\DAVIDK\HELP3\data4.D4
TEMPERATURE DATA FILE:       C:\DAVIDK\HELP3\data7.D7
SOLAR RADIATION DATA FILE:   C:\davidk\HELP3\data13.D13
EVAPOTRANSPIRATION DATA:     C:\davidk\HELP3\data11.D11
SOIL AND DESIGN DATA FILE:   C:\DAVIDK\HELP3\FINAL.D10
OUTPUT DATA FILE:            c:\davidk\help3\final.OUT


TIME:   8:52     DATE:  10/27/97



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     TITLE:  Weyerhaueser New Bern Landfill, New Bern, North Carolina

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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  11
          THICKNESS                    =     18.00   INCHES
          POROSITY                     =      0.4640 VOL/VOL
          FIELD CAPACITY               =      0.3100 VOL/VOL
          WILTING POINT                =      0.1870 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.3032 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.639999998000E-04 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
```

FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 13

THICKNESS	=	18.00	INCHES
POROSITY	=	0.4300	VOL/VOL
FIELD CAPACITY	=	0.3210	VOL/VOL
WILTING POINT	=	0.2210	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4300	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.330000003000E-04	CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 28

THICKNESS	=	480.00	INCHES
POROSITY	=	0.4520	VOL/VOL
FIELD CAPACITY	=	0.4110	VOL/VOL
WILTING POINT	=	0.3110	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4332	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.120000004000E-05	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #11 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 20.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	83.20	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	29.190	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	1.738	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.784	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.122	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	221.111	INCHES
TOTAL INITIAL WATER	=	221.111	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
RALEIGH NORTH CAROLINA

STATION LATITUDE	=	35.87	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	86	
END OF GROWING SEASON (JULIAN DATE)	=	310	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	66.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	70.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	72.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.55	3.43	3.69	2.91	3.67	3.66
4.38	4.44	3.29	2.73	2.87	3.14

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
39.60	41.60	49.30	59.50	67.20	73.90
77.70	77.00	71.00	59.70	50.00	42.00

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA
AND STATION LATITUDE = 35.87 DEGREES

****

MONTHLY TOTALS (MM) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	37.3	104.9	73.7	35.8	45.2	147.3
	129.3	151.1	44.7	87.9	17.8	119.4
RUNOFF	0.00	0.91	0.00	0.00	0.00	0.32
	3.86	2.27	0.00	0.44	0.00	0.09
EVAPOTRANSPIRATION	28.26	48.60	67.16	41.25	41.66	111.92
	113.00	83.67	41.43	59.24	1.91	25.16
PERCOLATION/LEAKAGE THROUGH	8.097	47.871	14.776	0.880	8.039	18.189
LAYER 2	32.445	50.684	3.484	44.445	0.000	94.289
PERCOLATION/LEAKAGE THROUGH	1.421	8.853	5.212	0.041	13.564	15.089
LAYER 3	10.990	7.093	1.094	1.680	10.682	19.208

MONTHLY SUMMARIES FOR DAILY HEADS (CM)

AVERAGE DAILY HEAD ON	0.021	0.136	0.025	0.003	0.012	0.039
TOP OF LAYER 2	0.142	0.108	0.016	0.125	0.000	0.182
STD. DEVIATION OF DAILY	0.106	0.310	0.056	0.008	0.043	0.133
HEAD ON TOP OF LAYER 2	0.777	0.312	0.073	0.276	0.000	0.314

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ANNUAL TOTALS FOR YEAR 1

	MM	CU. METERS	PERCENT
PRECIPITATION	994.41	117469.945	100.00
RUNOFF	7.890	932.089	0.79
EVAPOTRANSPIRATION	663.266	78351.758	66.70
PERC./LEAKAGE THROUGH LAYER 2	323.200378	38179.762	32.50
AVG. HEAD ON TOP OF LAYER 2	0.6735		
PERC./LEAKAGE THROUGH LAYER 3	94.925827	11213.618	9.55
CHANGE IN WATER STORAGE	228.328	26972.494	22.96
SOIL WATER AT START OF YEAR	5616.226	663446.562	

SOIL WATER AT END OF YEAR	5844.554	690419.062	
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	-0.0002	-0.019	0.00

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AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	37.34	104.90	73.66	35.81	45.21	147.32
	129.29	151.13	44.70	87.88	17.78	119.38
STD. DEVIATIONS	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
RUNOFF						
TOTALS	0.000	0.911	0.000	0.000	0.000	0.322
	3.861	2.266	0.000	0.440	0.000	0.089
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION						
TOTALS	28.263	48.604	67.157	41.248	41.661	111.918
	112.999	83.674	41.433	59.238	1.910	25.160
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	8.0975	47.8714	14.7760	0.8800	8.0389	18.1894
	32.4453	50.6839	3.4840	44.4447	0.0000	94.2892
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 3

TOTALS	1.4211	8.8529	5.2119	0.0408	13.5637	15.0886
	10.9898	7.0926	1.0945	1.6801	10.6819	19.2078
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 (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0211	0.1362	0.0248	0.0025	0.0122	0.0392
	0.1417	0.1075	0.0160	0.1251	0.0000	0.1818
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 1

	MM		CU. METERS	PERCENT
PRECIPITATION	994.41	(0.000)	117469.9	100.00
RUNOFF	7.890	(0.0000)	932.09	0.793
EVAPOTRANSPIRATION	663.266	(0.0000)	78351.76	66.699
PERCOLATION/LEAKAGE THROUGH LAYER 2	323.20038	(0.00000)	38179.762	32.50173
AVERAGE HEAD ON TOP OF LAYER 2	0.673	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 3	94.92583	(0.00000)	11213.617	9.54595
CHANGE IN WATER STORAGE	228.328	(0.0000)	26972.49	22.961

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 1

	(MM)	(CU. METERS)
PRECIPITATION	51.05	6031.025
RUNOFF	3.861	456.1092
PERCOLATION/LEAKAGE THROUGH LAYER 2	28.296270	3342.64722
AVERAGE HEAD ON TOP OF LAYER 2	43.261	
PERCOLATION/LEAKAGE THROUGH LAYER 3	1.036783	122.47554
SNOW WATER	37.87	4474.0415

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4439
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1870

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FINAL WATER STORAGE AT END OF YEAR 1

LAYER	(CM)	(VOL/VOL)
1	13.8697	0.3034
2	19.6596	0.4300
3	550.9261	0.4519
SNOW WATER	0.000	

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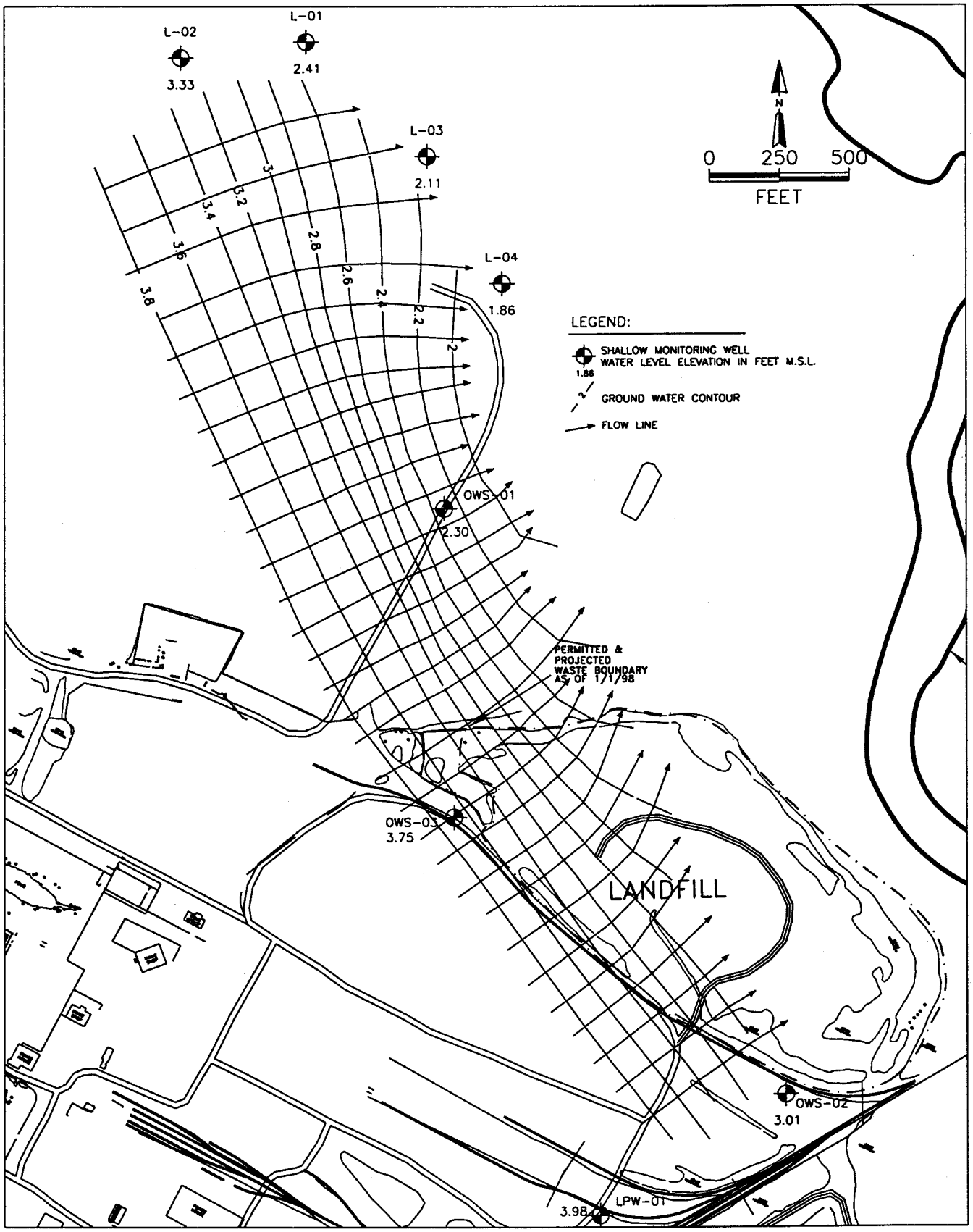
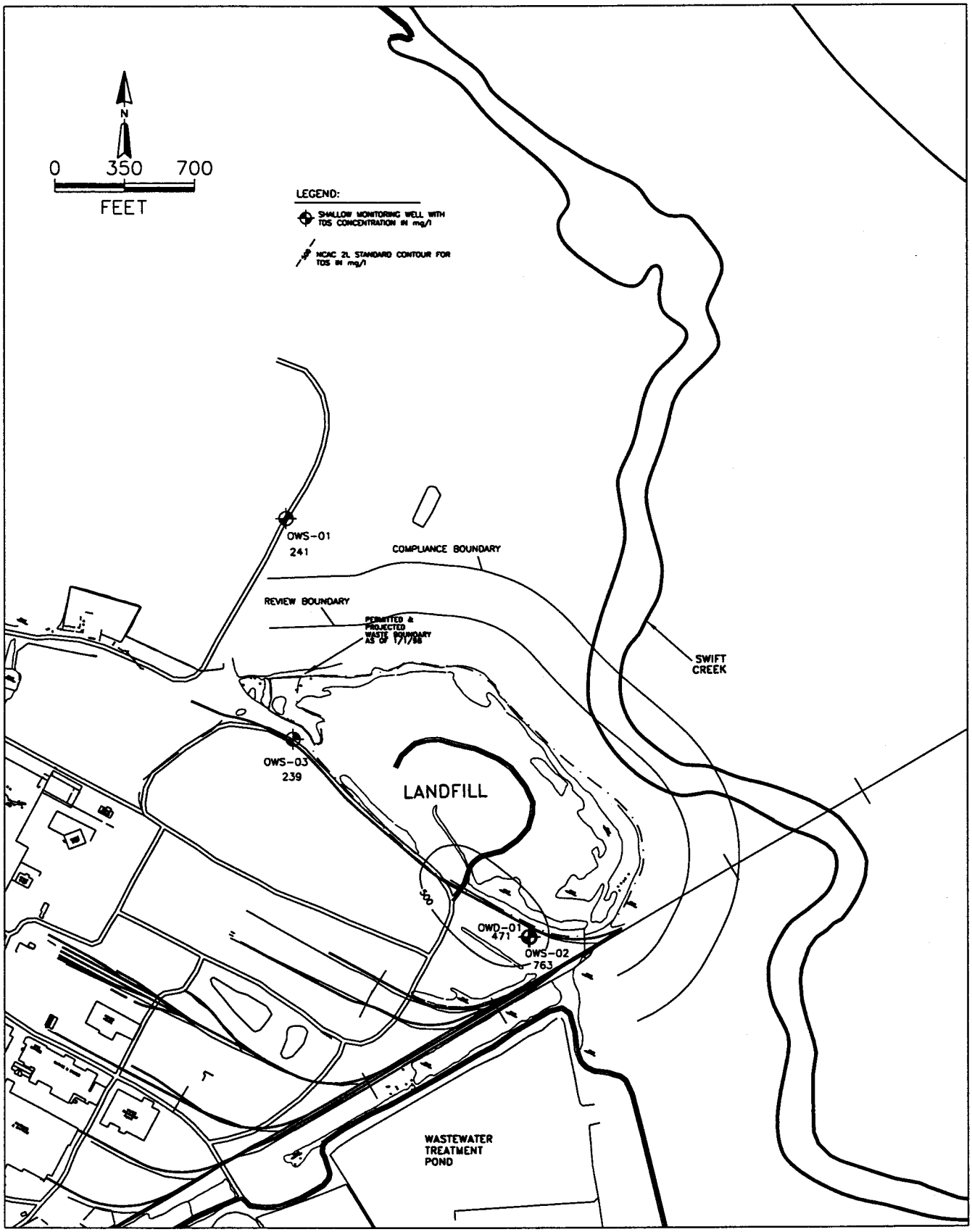
Drawing Under Seperate Cover



Delta Environmental Consultants, Inc.	TITLE: GROUND WATER FLOW NET (05/29/96) WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 9
		DATE: 12/03/98	REV.:	



Delta Environmental Consultants, Inc.	TITLE: ISOCONCENTRATION CONTOUR MAP: TDS (08/31/98) WEYERHAEUSER NEW BERN, NORTH CAROLINA	DWN: DEK	DES.:	PROJECT NO.: E096-019
		CHKD:	APPD:	FIGURE NO.: 10
		DATE: 11/23/98	REV.:	

APPENDIX A

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**                                                                          **
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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                 HELP MODEL VERSION 3.05  (30 MARCH 1996)                 **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\DAVIDK\HELP3\data4.D4
TEMPERATURE DATA FILE:       C:\DAVIDK\HELP3\data7.D7
SOLAR RADIATION DATA FILE:   C:\davidk\HELP3\data13.D13
EVAPOTRANSPIRATION DATA:     C:\davidk\HELP3\data11.D11
SOIL AND DESIGN DATA FILE:   C:\DAVIDK\HELP3\FINAL.D10
OUTPUT DATA FILE:            c:\davidk\help3\final.OUT


TIME:   8:52     DATE:  10/27/97



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

     TITLE:  Weyerhaueser New Bern Landfill, New Bern, North Carolina

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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  11
          THICKNESS                    =     18.00   INCHES
          POROSITY                     =      0.4640 VOL/VOL
          FIELD CAPACITY               =      0.3100 VOL/VOL
          WILTING POINT                =      0.1870 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.3032 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.639999998000E-04 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  3.00
```

FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 13

THICKNESS	=	18.00	INCHES
POROSITY	=	0.4300	VOL/VOL
FIELD CAPACITY	=	0.3210	VOL/VOL
WILTING POINT	=	0.2210	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4300	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.330000003000E-04	CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 28

THICKNESS	=	480.00	INCHES
POROSITY	=	0.4520	VOL/VOL
FIELD CAPACITY	=	0.4110	VOL/VOL
WILTING POINT	=	0.3110	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4332	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.120000004000E-05	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #11 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 20.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	83.20	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	29.190	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	1.738	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.784	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.122	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	221.111	INCHES
TOTAL INITIAL WATER	=	221.111	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
RALEIGH NORTH CAROLINA

STATION LATITUDE	=	35.87	DEGREES
MAXIMUM LEAF AREA INDEX	=	2.00	
START OF GROWING SEASON (JULIAN DATE)	=	86	
END OF GROWING SEASON (JULIAN DATE)	=	310	
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	7.70	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	66.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	70.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	78.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	72.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.55	3.43	3.69	2.91	3.67	3.66
4.38	4.44	3.29	2.73	2.87	3.14

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
39.60	41.60	49.30	59.50	67.20	73.90
77.70	77.00	71.00	59.70	50.00	42.00

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR RALEIGH NORTH CAROLINA
AND STATION LATITUDE = 35.87 DEGREES

****

MONTHLY TOTALS (MM) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	37.3	104.9	73.7	35.8	45.2	147.3
	129.3	151.1	44.7	87.9	17.8	119.4
RUNOFF	0.00	0.91	0.00	0.00	0.00	0.32
	3.86	2.27	0.00	0.44	0.00	0.09
EVAPOTRANSPIRATION	28.26	48.60	67.16	41.25	41.66	111.92
	113.00	83.67	41.43	59.24	1.91	25.16
PERCOLATION/LEAKAGE THROUGH	8.097	47.871	14.776	0.880	8.039	18.189
LAYER 2	32.445	50.684	3.484	44.445	0.000	94.289
PERCOLATION/LEAKAGE THROUGH	1.421	8.853	5.212	0.041	13.564	15.089
LAYER 3	10.990	7.093	1.094	1.680	10.682	19.208

MONTHLY SUMMARIES FOR DAILY HEADS (CM)

AVERAGE DAILY HEAD ON	0.021	0.136	0.025	0.003	0.012	0.039
TOP OF LAYER 2	0.142	0.108	0.016	0.125	0.000	0.182
STD. DEVIATION OF DAILY	0.106	0.310	0.056	0.008	0.043	0.133
HEAD ON TOP OF LAYER 2	0.777	0.312	0.073	0.276	0.000	0.314

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ANNUAL TOTALS FOR YEAR 1

	MM	CU. METERS	PERCENT
PRECIPITATION	994.41	117469.945	100.00
RUNOFF	7.890	932.089	0.79
EVAPOTRANSPIRATION	663.266	78351.758	66.70
PERC./LEAKAGE THROUGH LAYER 2	323.200378	38179.762	32.50
AVG. HEAD ON TOP OF LAYER 2	0.6735		
PERC./LEAKAGE THROUGH LAYER 3	94.925827	11213.618	9.55
CHANGE IN WATER STORAGE	228.328	26972.494	22.96
SOIL WATER AT START OF YEAR	5616.226	663446.562	

SOIL WATER AT END OF YEAR	5844.554	690419.062	
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	-0.0002	-0.019	0.00

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AVERAGE MONTHLY VALUES (MM) FOR YEARS 1 THROUGH 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	37.34	104.90	73.66	35.81	45.21	147.32
	129.29	151.13	44.70	87.88	17.78	119.38
STD. DEVIATIONS	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
RUNOFF						
TOTALS	0.000	0.911	0.000	0.000	0.000	0.322
	3.861	2.266	0.000	0.440	0.000	0.089
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION						
TOTALS	28.263	48.604	67.157	41.248	41.661	111.918
	112.999	83.674	41.433	59.238	1.910	25.160
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	8.0975	47.8714	14.7760	0.8800	8.0389	18.1894
	32.4453	50.6839	3.4840	44.4447	0.0000	94.2892
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 3

TOTALS	1.4211	8.8529	5.2119	0.0408	13.5637	15.0886
	10.9898	7.0926	1.0945	1.6801	10.6819	19.2078
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 (CM)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0211	0.1362	0.0248	0.0025	0.0122	0.0392
	0.1417	0.1075	0.0160	0.1251	0.0000	0.1818
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 1

	MM		CU. METERS	PERCENT
PRECIPITATION	994.41	(0.000)	117469.9	100.00
RUNOFF	7.890	(0.0000)	932.09	0.793
EVAPOTRANSPIRATION	663.266	(0.0000)	78351.76	66.699
PERCOLATION/LEAKAGE THROUGH LAYER 2	323.20038	(0.00000)	38179.762	32.50173
AVERAGE HEAD ON TOP OF LAYER 2	0.673	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 3	94.92583	(0.00000)	11213.617	9.54595
CHANGE IN WATER STORAGE	228.328	(0.0000)	26972.49	22.961

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 1

	(MM)	(CU. METERS)
PRECIPITATION	51.05	6031.025
RUNOFF	3.861	456.1092
PERCOLATION/LEAKAGE THROUGH LAYER 2	28.296270	3342.64722
AVERAGE HEAD ON TOP OF LAYER 2	43.261	
PERCOLATION/LEAKAGE THROUGH LAYER 3	1.036783	122.47554
SNOW WATER	37.87	4474.0415

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4439
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1870

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FINAL WATER STORAGE AT END OF YEAR 1

LAYER	(CM)	(VOL/VOL)
1	13.8697	0.3034
2	19.6596	0.4300
3	550.9261	0.4519
SNOW WATER	0.000	

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