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May 20, 1998

North Carolina Department of Environment
and Natural Resources
Division of Waste Management
401 Oberlin Road
Suite 150
Raleigh, North Carolina 27605

Attention: Ms. Martha T. Morgan
Environmental Engineer

Subject: Sampling and Analysis Plan
Weyerhaeuser Box Plant
Charlotte, North Carolina
Delta Project No. E092-051-1



Dear Marti:

Please find attached a copy of the Sampling and Analysis Plan (SAP) for the referenced site. Per our telephone conversation on May 5, 1998, the following revisions have been made:

- Depth to water measurements will be collected twice per year (May and November);
- Total depth of monitoring well measurements will be collected once per year (May); and
- The reference to laboratory supplied teflon bailers has been deleted to allow for the use of disposable teflon bailers.

Also as discussed in the Annual Post Closure Monitoring Report, ground water sampling for inorganics should be discontinued.

If you have any questions regarding this information, please contact me at (704) 541-9890.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Richard E. Powell

Richard E. Powell
Project Geologist

enclosure

cc: Ms. Angelia Risner, Weyerhaeuser

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GROUND WATER SAMPLING AND ANALYSIS PLAN

WEYERHAEUSER BOX PLANT

CHARLOTTE, NORTH CAROLINA

DELTA PROJECT NO. E092-051

Revised May 1998



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GROUND WATER SAMPLING AND ANALYSIS PLAN

**WEYERHAEUSER BOX PLANT
CHARLOTTE, NORTH CAROLINA
DELTA PROJECT NO. E092-051**

1.0 INTRODUCTION

This Ground Water Sampling and Analysis Plan (SAP) was prepared by Delta Environmental Consultants, Inc. (Delta) on behalf of the Weyerhaeuser Company, 5419 Hovis Road, Charlotte, North Carolina (Weyerhaeuser). The site location is shown in Figure 1.

The facility was constructed as a box manufacturing plant in 1961. No additions have been made to the facility building although the concrete storage and loading area adjacent to the south of the building was expanded approximately thirteen years ago. The facility's water and sewer needs are supplied by the City of Charlotte.

The area surrounding the facility is highly industrialized. An abandoned battery manufacturing facility, owned by Union Carbide, is located to the east across Hovis Road. The other surrounding properties are, a warehouse (the Texas Limited Partnership) to the south, Ryerson Steel Processing to the north, and a wooded area to the west.

A 90 pound disposal of 1,1,1-trichloroethane (TCA) occurred at the facility in 1990. The incident was reported to the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR), and the Solid Waste Management Division (Division) in September 1992. The Division requested a site investigation. The results of the investigation led to a administrative order of consent between Weyerhaeuser and the Division.

This SAP is required by an Administrative Order of Consent, Docket # 93-042 (Order), entered into between Weyerhaeuser and the NCDEHNR, Solid Waste Management Division. This order became effective on March 5, 1993.

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This plan presents details related to data collection including the following items:

- description of the ground water monitoring system;
- description of the ground water sample collection logbook;
- description of the water level monitoring procedure;
- description of the ground water sample collection procedure;
- description of sample identification and shipment procedures;
- specification of analytical methods and constituents; and,
- a sampling and reporting schedule.

This SAP is based on information obtained through Phase IV hydrogeologic investigations of the facility. Those investigations are documented in Delta's Phase I Site Characterization report dated September 29, 1992, the Phase II Site Characterization report dated November 3, 1992, the Phase III Site Characterization report dated September 3, 1993, and the Phase IV Site Characterization report dated July 14, 1995.

2.0 GROUND WATER MONITORING SYSTEM

2.1 Hydrogeologic Conditions

The site lies within the Charlotte Belt of the Piedmont Physiographic Province of south-central North Carolina. The area is mantled with a thick layer of unconsolidated material consisting of soil and weathered bedrock, commonly referred to as saprolite, overlying competent bedrock. Local surficial soils consist of dark reddish brown to tan silt, elastic silt, and lean clay. A gray clay to clayey silt underlies the site at a depth of approximately 10 feet. The underlying saprolite is approximately 50- to 60-feet deep and shows prominent parent rock structure and foliation.

The saprolite grades into a zone of partially weathered rock (PWR) ranging from 10- to 20-feet thick which grades into competent bedrock. Bedrock is reported to be Cambrian-age metamorphosed gray quartz diorite and tonalite, which is generally medium to coarse grained and foliated. Mineral constituents

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include plagioclase, feldspar, quartz, biotite, hornblende, and secondary epidote (Goldsmith and others, 1988).

2.2 Lithologic Logs and Well Completion Records

Copies of lithologic logs for the soil borings conducted during previous investigations are included as Appendix A. A site map and topographic map of the site area are illustrated in Figures 1 and 2, respectively.

Figure 3 shows the cross section location lines C-C' and D-D', respectively. The site stratigraphy is shown on cross sections C-C' (Figure 4) and D-D' (Figure 5). Monitoring well elevations including the top of screen, bottom of screen, measuring point (top of casing), and land surface along with well completion details are presented in Table 1.

2.3 Ground Water Hydrology

A ground water table elevation contour map, constructed from measurements collected from the monitoring system on June 15, 1995, is illustrated in Figure 6. Typical depth to water at the site is 4 to 5 feet below top of well casing. Ground water flow is generally towards the west.

The hydraulic gradient across the site was calculated between monitoring wells MW-3, MW-4 and MW-5 at approximately 0.03 feet per foot. The vertical gradient was measured between well pair MW-4/DW-1 at less than 0.0005 feet per foot upward. Cross section maps illustrating the vertical component of ground water flow are presented in Figures 4 and 5.

3.0 GROUND WATER SAMPLE COLLECTION LOG BOOK

A logbook documenting each sampling event for each monitoring well will be maintained on site. The logbook will contain the following information:

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- personnel on site;
- weather conditions;
- sample identification number and location;
- sampling point and date and time sampled;
- depth, to an accuracy of 0.01 feet, of ground water below a designated measuring point;
- date and time of the depth measurement;
- total depth of the well and casing diameter;
- type of instrument used for measurement of the depth to water and its serial number if available;
- ground water elevation;
- list of equipment used for purging of the well and their serial numbers if available;
- list of field measurements obtained during well purging to include pH, specific conductance, temperature, depth to water, and cumulative volume of water removed from the well;
- date and time the purging process begins and ends;
- list of equipment used for sample collection and their serial numbers if available;
- description of sample appearance and any problems encountered during the sampling process;
- description of any decontamination procedures conducted in the field;
- list of the type and number of sample containers filled at each well, preservation procedures, shipment procedures, and the analytical parameters requested;
- a comments section to record any other information deemed pertinent to the sampling event but not specifically requested by the form; and,
- the signatures of those person(s) completing the logbook and the person conducting the sampling.

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A sample page from the logbook is included as Appendix B. The logbook will be a notebook with insert sheets.

4.0 GROUND WATER ELEVATION MEASUREMENT

A site benchmark of 787.04 feet was established for the basis of vertical elevation control at the site during a 1961 topographic survey of the site. This benchmark is located at the top of the walkway at the front entrance to the facility. The top of casing (TOC) of all monitoring wells was surveyed by direct leveling relative to this established datum. In all cases TOC refers to the top of the monitoring well riser pipe.

Ground water level measurements will be collected on a semi-annual basis by Delta personnel using an electronic water level indicator marked in continuous 0.01 foot increments. All measurements will be recorded to the nearest 0.01 of a foot. The depth to ground water will be measured from the north side of the TOC. All measurements will be recorded in the Ground Water Sample Collection Logbook. The total depth of each monitoring well will be confirmed annually.

Collection of depth to ground water measurements will be performed in sequence from the monitoring well containing the lowest detectable levels of targeted parameters to the well with the highest detectable levels. Targeted parameter levels have been documented from chemical analysis of previous ground water samples. This data will be used to determine the initial sampling sequence. As additional analytical data becomes available the order of sampling may be adjusted to accommodate changing contaminate levels in the various monitoring wells. Air/water tight well caps will be loosened on all wells to allow for equilibration with the ambient air pressure prior to obtaining the depth to ground water measurements. All static depth to ground water measurements will be obtained from wells prior to beginning the well purging procedure.

To lessen the possibility of cross-contamination between monitoring wells, the electronic water level indicator probe will be decontaminated between wells using a phosphate-free soap and an organic-free

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water rinse. Care will be taken to prevent contact between the water level measurement device and any contaminated surface and the ground surface.

Disposable latex/nitrile gloves will be worn throughout the depth to ground water measurement procedure. Gloves will be changed between each well. No evidence exists for the presence of immiscible layers at this site. Therefore no provisions for checking for immiscible layers, either lighter or heavier than water have been made.

5.0 GROUND WATER SAMPLE COLLECTION PROCEDURE

5.1 Purging Procedure

Equipment used in monitoring well purging, during sampling events when metals are not be analyzed, will consist of a closed-top teflon bailer. New nylon rope or monofilament line will be used to lower the bailer down the subject well. Polyethylene sheeting approximately four feet by four feet square will be placed around the TOC of the monitoring well prior to removal of the air/water tight seal. This sheeting is intended to prevent purging equipment from contacting the ground surface. New sheeting will be used for each individual well. Disposable latex/nitrile gloves will be worn throughout the ground water purging and sampling procedures. Gloves will be changed between each well.

Although saprolite aquifers are relatively low-yielding, past monitoring well purging events at the site have not resulted in evacuation of any of the monitoring wells to dryness. Therefore stagnant ground water will be purged so that it is removed from the top of the water column contained in the well casing. This will be achieved by lowering the bailer to the top water column and introducing the bailer into the ground water. The bailer will be allowed to sink into the ground water until it is totally submerged. The bailer will then be withdrawn. This methodology will allow fresh water from the formation to move upward into the screen. If a well is bailed dry, it will be sampled after enough recovery to collect a sample.

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After the first bailer of ground water is removed an initial sample of the ground water will be obtained for measurement of pH, specific conductance, and temperature (field parameters). The purging procedure will continue until a minimum of three well casing volumes have been removed. Field parameters will also be measured following removal of the second and third well volumes. The volume of ground water purged and the field parameter measurements will be recorded in the ground water sample collection logbook.

If a monitoring well is bailed dry before three well volumes are removed, the purging will be stopped to allow sufficient time for ground water recovery prior to sampling. During sampling events where volatiles and metals are to be analyzed, the volatile samples will be collected as described below.

Low flow purging techniques will be used during sample collection for metals. Low flow is defined as a flow rate similar to the ambient flow rate in the screened formations. A peristaltic pump will be used to purge the wells and collect the samples. VOC loss through suction degassing is expected to be insignificant due to the very slow flow rates to be used. Purge volume will not be used based on well volume. However, because of the placement of the sampling device intake (discussed below), a minimum of one well volume will be removed. It has been demonstrated that purge volumes were independent of well depth and casing volumes (Puls and Paul, 1995). Additionally, rules of thumb applied to purge volume requirements (e.g. three to five well volumes) do not necessarily yield representative samples. Stabilization of certain indicator parameters at fixed pumping rates may provide consistent results (Barcelona, Wehrmann and Varljen, 1994). Both studies showed that water quality parameter (i.e. pH, specific conductance, turbidity, dissolved oxygen, and temperature) stabilization was a reasonable predictor of contaminant concentration stabilization. Generally, the contaminant concentrations stabilized before the water quality parameters did.

The following is the low-flow purge and sampling procedure that will be used during sample collection of metals:

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- The protective casing will be unlocked, the well cap will be removed, and escaping gases will be measured at the well head using a PID or FID. This will determine the need for respiratory protection.
- The well will be allowed to equilibrate to atmospheric pressure, in the event that a vent hole was not installed in the well.
- The static water level will be measured. The water volume in the well will then be calculated.
- The sampling device (1/4 inch ID polypropylene tubing) will be slowly lowered until the bottom end is placed within the screened interval of each well. Next, the water level probe will be placed into the well, just above the water.
- Purging will then begin. The discharge rate will be measured using a stopwatch and calibrated container. The flow rate will be adjusted to ambient flow conditions (i.e. <0.1 ft. of drawdown is observed in the well). Flow rates of less than 1 liter per minute (L/min) are expected.
- The water quality parameters, including turbidity, temperature, pH, and specific conductance will be measured frequently (every 2 minutes).
- Purging will be complete when three successive water quality parameter readings have stabilized within 10%, or there is no further discernible upward or downward trend. It has been experienced that at low values certain water quality parameters (such as turbidity and dissolved oxygen) may vary by more than 10%, but have reached a stable plateau.

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- Upon water quality parameter stabilization, groundwater samples for non-volatile parameters will be collected from a valve directly ahead of the flow through chamber used in ground water parameter measurements. Sample bottles will be labeled with a permanent marker prior to sample collection.
- Sampling for volatiles will proceed by capping the tubing, removing the tubing out of the well and allowing the purged water to slowly drain back into the sample containers.
- The polypropylene and silicon tubing from the pump will be replaced between each well.
- The sample containers will be stored in a cooler with ice and samples will be shipped to the laboratory within 24 hours of sample collection.

Sample preservatives (strong acids or bases) will be added to bottles by the laboratory. Disposable latex/nitrile gloves will be worn by the sampler before starting to fill the sample bottles.

All ground water samples will be collected as soon as technically feasible within 24 hours after purging. All purge and rinse water will be placed in the on site ground water treatment system.

5.2 Sampling Procedure

Monitoring well purging will proceed from the least to most contaminated monitoring well based on the latest analytical results.

Sample containers will be filled in the order of volatilization potential. Containers will be filled in the following order: Volatiles, TDS, TSS and metals. This procedure will be modified during sampling events that include analysis of metals and volatiles as previously described. Equipment used in obtaining the ground water samples will consist of the same closed-top teflon bailer and nylon rope used to purge

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the well, or tubing used during the low flow purge process. The bailer will be slowly lowered to the ground water surface and allowed to sink until the bailer is fully submerged. The bailer will then be slowly removed from the ground water column. Ground water captured in this manner will be used to fill the sample containers. Transfer of the ground water from the bailer to the sample containers will be accomplished by slowly pouring ground water from the bailer into the sample containers. Care will be taken to minimize the potential for volatilization of the sample by angling the sample container so that the ground water runs down the inside wall of the container to the bottom. This collection method should inhibit the formation of air bubbles in the sample and facilitate the complete filling of the containers.

A QA/QC program will be implemented during sampling events. The program includes the collection of one sample duplicate from an impacted well for comparison of the analytical results. The duplicate sample will be labeled in such a way as to prevent the laboratory from determining which well the sample duplicates. One equipment blank will be collected per sampling event by pouring laboratory grade water through a clean bailer and sampling the water. A trip blank will be included in the cooler containing all of the samples to ensure that contamination was not introduced during transport. Trip and equipment blank samples will be analyzed for volatile organics by EPA Method 8260. The duplicate sample will be analyzed for all targeted parameters.

The use of individual laboratory cleaned teflon bailers and new nylon rope, and tubing for each well precludes the necessity of in the field decontamination of purging and sampling equipment.

6.0 SAMPLE IDENTIFICATION, SHIPMENT, AND CHAIN OF CUSTODY

All sampling supplies will be prepared and furnished by a North Carolina certified laboratory in accordance with EPA methodology. The containers will arrive from the laboratory in a sealed cooler with a trip blank included. Prior to sample collection the cooler will be chilled with bagged ice.

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Prior to sample collection each container will be labeled to include sample date, sample time, analytical methodology, sampling point, and client designation. Sample labels will also indicate the type of preservative used, if applicable. Once filled, sample containers will be returned to the chilled cooler.

A Chain of Custody (COC) will be completed prior to shipment. The COC will include: client designation, samples collected by, samples shipped by, samples shipped to, suspected hazard, sampling point, field identification number, data and time of sample collection, number of containers, analyses requested, sample media, and sampler signature. Once all samples and the chain of custody have been placed in the cooler, it will be sealed with signed and dated adhesive strips. The sample pack will be shipped to the laboratory by overnight express mail to ensure arrival within twenty four hours. Upon arrival at the laboratory, the sample package will be checked and the condition of the seals will be noted on the COC. A copy of the signed chain of custody will be included in the laboratory report. A sample COC is included in Appendix C.

7.0 ANALYTICAL METHODS

The parameters to be analyzed by the laboratory are outlined in Table 2.

8.0 SAMPLING AND REPORTING SCHEDULES

Analysis of ground water samples will be conducted according to the schedule outlined below:

POST CLOSURE MONITORING

<u>Well #</u>	<u>Sample Collection Date</u>	<u>Parameter List</u>
MW-01, 06, 07, and 13	November	Cadmium, chromium, lead, selenium, TDS, and TSS
MW-04, 05, 13, DW-01, and DW-04	May, November	Volatile organic compounds (8260)
Off-site wells (MW-11, MW-12, MW-14 and any additional off-site wells)	May, November	1,1,1-Trichloroethane (TCA) and its degradation compounds (8260)*

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* Samples collected from monitoring wells off-site are to be analyzed only for TCA and its degradation compounds (1,1-dichloroethane, 1,1-dichloroethene, chloroethane, and vinyl chloride) using Method 8260.

ASSESSMENT MONITORING

Following the installation of new monitoring wells, each well will be sampled and analyzed for a minimum of two consecutive sampling events for the following parameters:

<u>Parameter</u>	<u>EPA Method</u>
Volatiles	8260
Cadmium	6010
Chromium	6010
Lead	6010
Selenium	6010
TDS	160.1
TSS	160.2

* The methods outlined above may change based on proposed changes by the EPA.

Existing and newly installed monitoring wells will be sampled during the Phase V Investigation. Periodic sampling will be conducted on selected wells to properly complete the ground water assessment. Ground water elevation data will be collected from each monitoring well prior to sample collection.

Semi-Annual Post Closure Monitoring Reports will be submitted 45 days following the receipt of analytical reports. An Annual Post Closure Monitoring Report will be submitted on or before March 31 of the year following the annual monitoring period. The reports will include a cumulative summary of recent and historical ground water depth and elevation measurements, hydrographs, summaries of analytical results, and graphs of targeted parameter concentrations through time. Copies of the laboratory reports will be included as an appendix to the report.

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9.0 NOTIFICATION OF MODIFICATION

Any modification to the SAP will be submitted in writing to the Department of Environment and Natural Resources (DENR) 60 days prior to implementing the modification. Modifications to the Plan resulting from an unexpected event will be documented and submitted to the DEHNR within 30 days after the event occurs.

10.0 REFERENCES

Barcelona, M.J., H.A. Wehrmann and M.D.Varljen, 1994, "Reproducible Well Purging Procedures and VOC Stabilization Criteria for Ground-water Sampling.", *Ground Water*, 32, no. 1:12-22.

Goldsmith, Richard and others, 1988, Geologic Map of the Charlotte 1° x 2° Quadrangle North and South Carolina.

Puls, R.W., and R.M. Paul, 1995, "Low-flow Purging and Sampling of Ground Water Monitoring Wells with Dedicated Systems", *Ground Water Monitoring and Remediation*, Winter 1995.

11.0 REMARKS

The discussions contained in this report represent our professional opinions. These opinions are arrived at in accordance with currently accepted hydrogeologic practices at this time and location. Other than this, no warranty is implied or intended.

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This report was prepared by:

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Richard E Powell

Richard A. Powell
Project Geologist

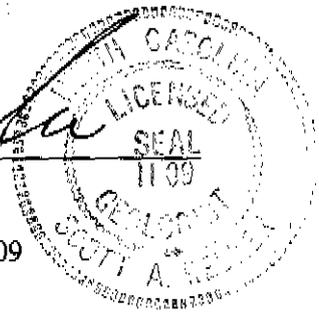
5/20/98

Date

This report was reviewed by:

Scott A. Recker

Scott A. Recker, P.G.
Senior Hydrogeologist
North Carolina Licensed Geologist #1109



5-20-98

Date

/mcw



TABLES

MONITORING WELL DATA
WEYERHAEUSER BOX PLANT
CHARLOTTE, NORTH CAROLINA

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SITE	WELL DEPTH TOTAL (feet bgs)	CASING DIAMETER (inches)	SCREENED INTERVAL (feet bgs)		FILTER PACK INTERVAL (feet bgs)		FIRST SEAL INTERVAL (feet bgs)		SECOND SEAL INTERVAL (feet bgs)		GROUND SURFACE ELEVATION ¹⁾ (feet)	MP ELEVATION ¹⁾ (feet)
			TOP	BOTTOM	TOP	BOTTOM	TYPE	INTERVAL	TYPE	INTERVAL		
DW-01	59.00	2.00	54.00	59.00	51.00	59.00	GR	0.00-38.00	BP	38.00-51.00	781.68	781.31
DW-02	33.50	2.00	31.00	33.50	30.50	33.50	GR	0.00-28.00	BP	28.00-30.50	779.88	779.53
DW-03	30.00	2.00	27.50	30.00	27.00	30.00	GR	0.50-25.50	BP	25.50-27.00	783.68	783.12
DW-04	60.00	2.00	55.00	60.00	53.00	60.00	BE	51.00-53.00			780.30	779.97
MW-01	15.00	2.00	3.00	13.00	4.00	15.00	GR	0.00-3.00	BP	3.00-4.00	780.10	779.67
MW-02B	20.00	2.00	10.00	20.00	8.00	20.00	BE	6.00-8.00			779.70	782.67
MW-03	15.00	2.00	4.50	14.50	3.50	15.00	BP	2.50-3.50			780.98	780.60
MW-04	20.00	2.00	10.00	20.00	9.00	20.00	GR	0.00-8.00	BP	8.00-9.00	781.77	784.01
MW-05	20.00	2.00	10.00	20.00	9.00	20.00	GR	0.00-8.00	BP	8.00-9.00	780.60	780.25
MW-06	15.00	2.00	5.00	15.00	4.00	15.00	GR	0.00-2.00	BP	2.00-4.00	779.30	781.77
MW-07	15.00	2.00	5.00	15.00	4.00	15.00	GR	0.50-2.00	BP	2.00-4.00	779.48	779.05
MW-08	20.00	2.00	5.00	20.00	4.00	20.00	GR	0.50-3.00	BP	3.00-4.00	796.10	796.81
MW-09	13.00	2.00	3.00	10.00	2.50	13.00	GR	0.50-2.00	BP	2.00-2.50	782.28	781.60
MW-10	13.00	2.00	3.00	13.00	2.50	13.00	GR	0.50-2.00	BP	2.00-2.50	783.57	783.06
MW-11	18.00	4.00	8.00	18.00	6.00	18.00	GR	0.50-4.00	BP	4.00-6.00	782.50	781.89
MW-12	18.00	4.00	8.00	18.00	6.00	18.00	GR	0.50-4.00	BP	4.00-6.00	781.97	781.97
MW-13	20.00	2.00	10.00	20.00	8.00	20.00	BE	6.00-8.00			781.10	780.95
MW-14	20.00	2.00	10.00	20.00	8.00	20.00	BE	6.00-8.00			786.60	786.37

(1) Measurements Based on Mean Sea Level

TABLE 2

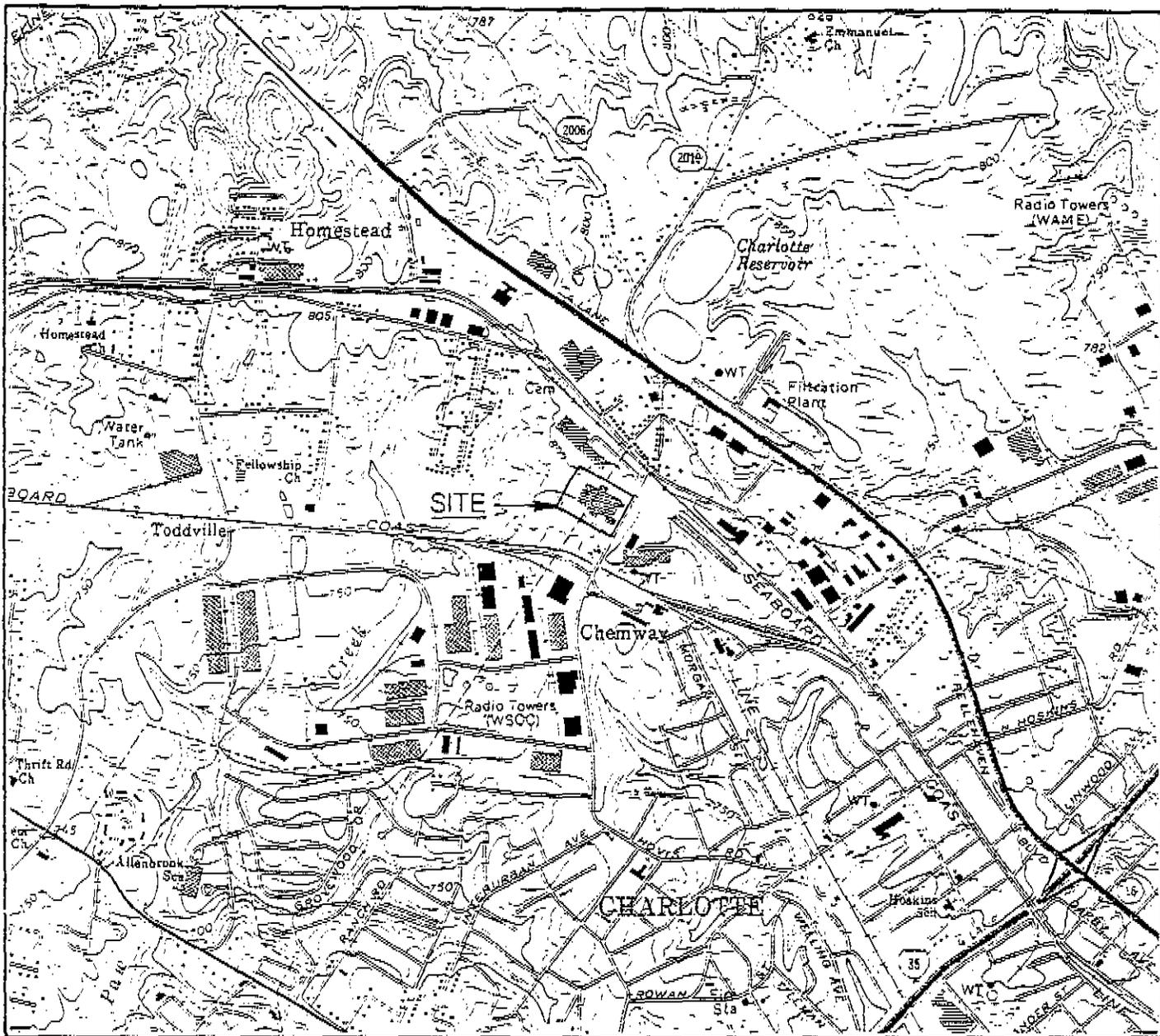
SAMPLING PARAMETERS
 WEYERHAEUSER BOX PLANT
 CHARLOTTE, NORTH CAROLINA
 DELTA PROJECT NO. E0-92-051

Parameter	EPA Method	Number/Type Sample Container	Preservative
Volatiles	8260 *	3 40 ml VOA vials	Cool to 4 degrees C/HCl to pH <2
Selenium	270.2	1 Liter	Nitric Acid to pH <2
Lead	238.2		
Cadmium	200.7		
Chromium	200.7		
Total Dissolved Solids	160.1	1 3.5 Liter	Cool to 4 degrees C H ₂ SO ₄
Total Suspended Solids	160.2	polyethylene 1 250 ml polyethylene	

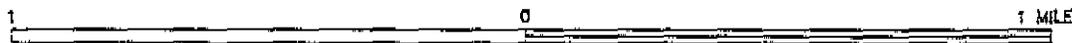
* Samples collected from monitoring wells sampled off-site are to be analyzed only for TCA and its degradation compounds using Method 8260.



FIGURES



SCALE 1:24000



CONTOUR INTERVAL 10 FEET

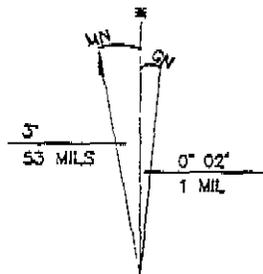
MOUNTAIN ISLAND LAKE, NC

35080-C8-TF-24

1989

PHOTOINSPECTED 1983

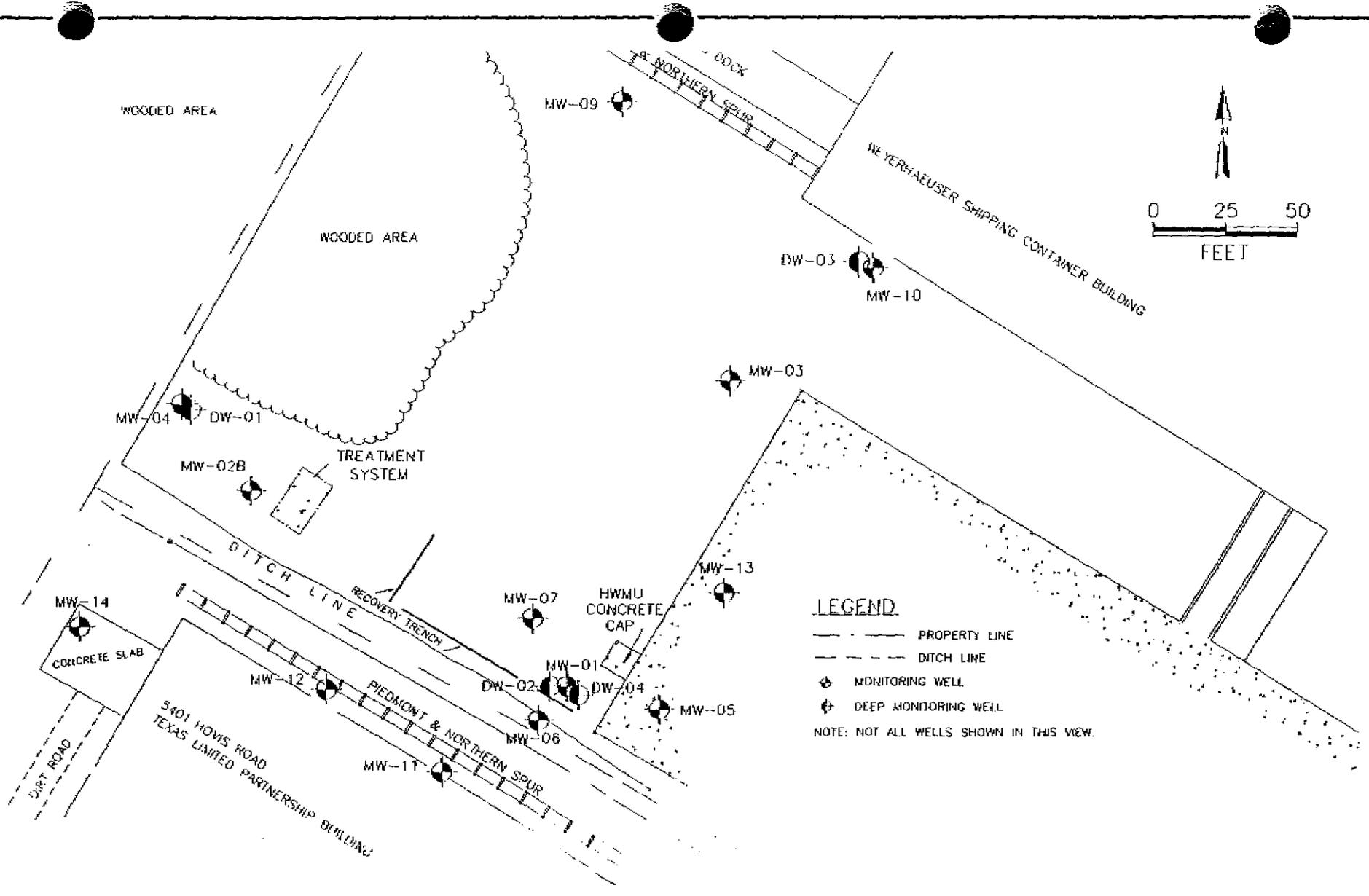
DMA 4864 IV SW-SERIES 7842



Delta

Environmental Consultants, Inc.
Charlotte, North Carolina 28226

FIGURE NO. 1	CLIENT/LOCATION WEYERHAEUSER COMPANY CHARLOTTE, NC
DELTA PROJECT NO. 50-92-051	DESCRIPTION AREA TOPOGRAPHIC MAP
DRAWN BY C. GREENE	
REVIEWED BY <i>CR</i>	DATE 9-8-92
	SCALE AS SHOWN
	CAD NO. 051-TOPO

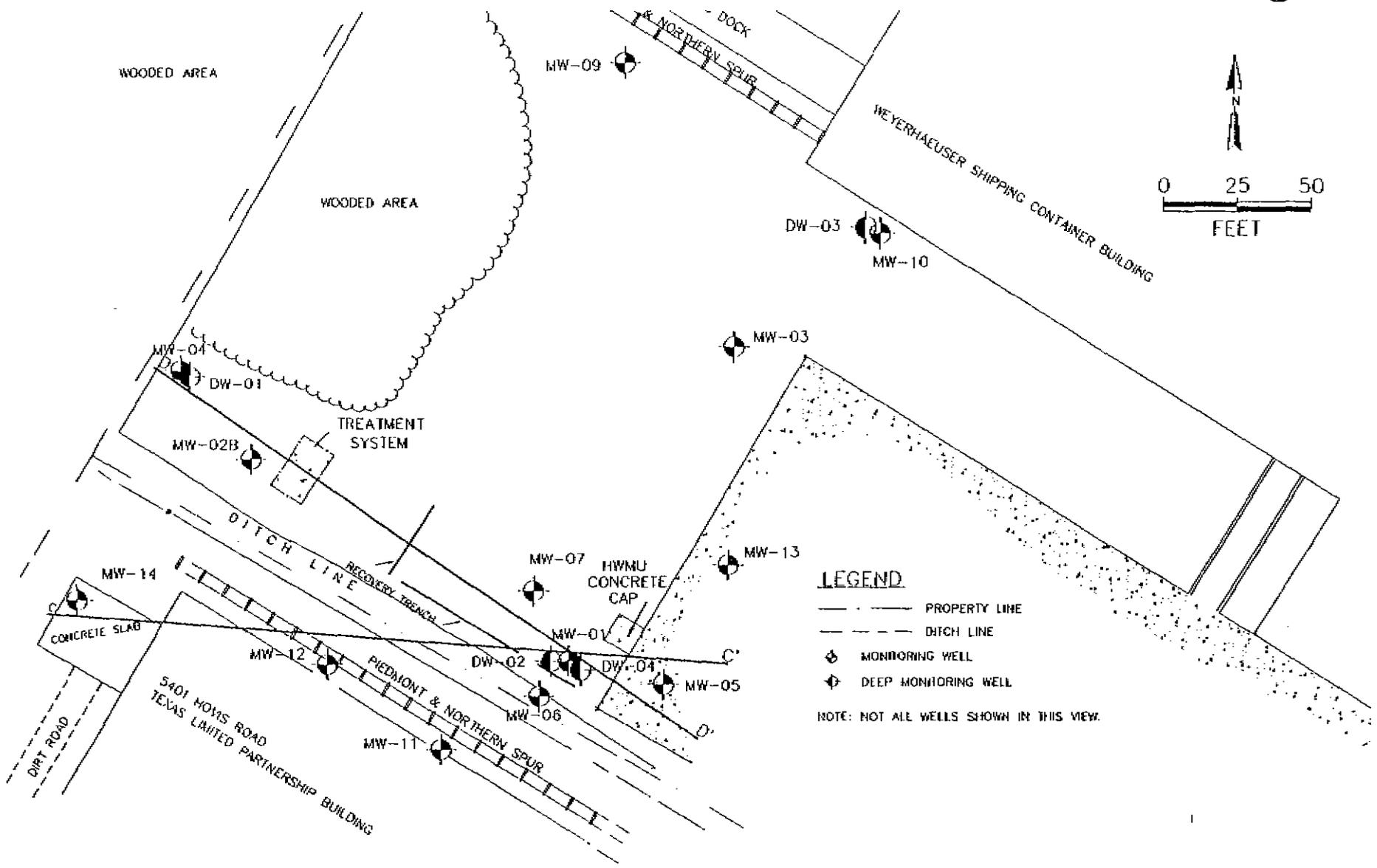


Delta
Environmental Consultants, Inc.
Charlotte, North Carolina

TITLE:
SITE MAP
WEYERHAEUSER BOX PLANT
CHARLOTTE, NORTH CAROLINA

DWN: BLG	DES.:
CHKD: BLG	APPD.:
DATE: 02/21/96	REV: <i>AK</i>

PROJECT NO.:	E092-51
FIGURE NO.:	2



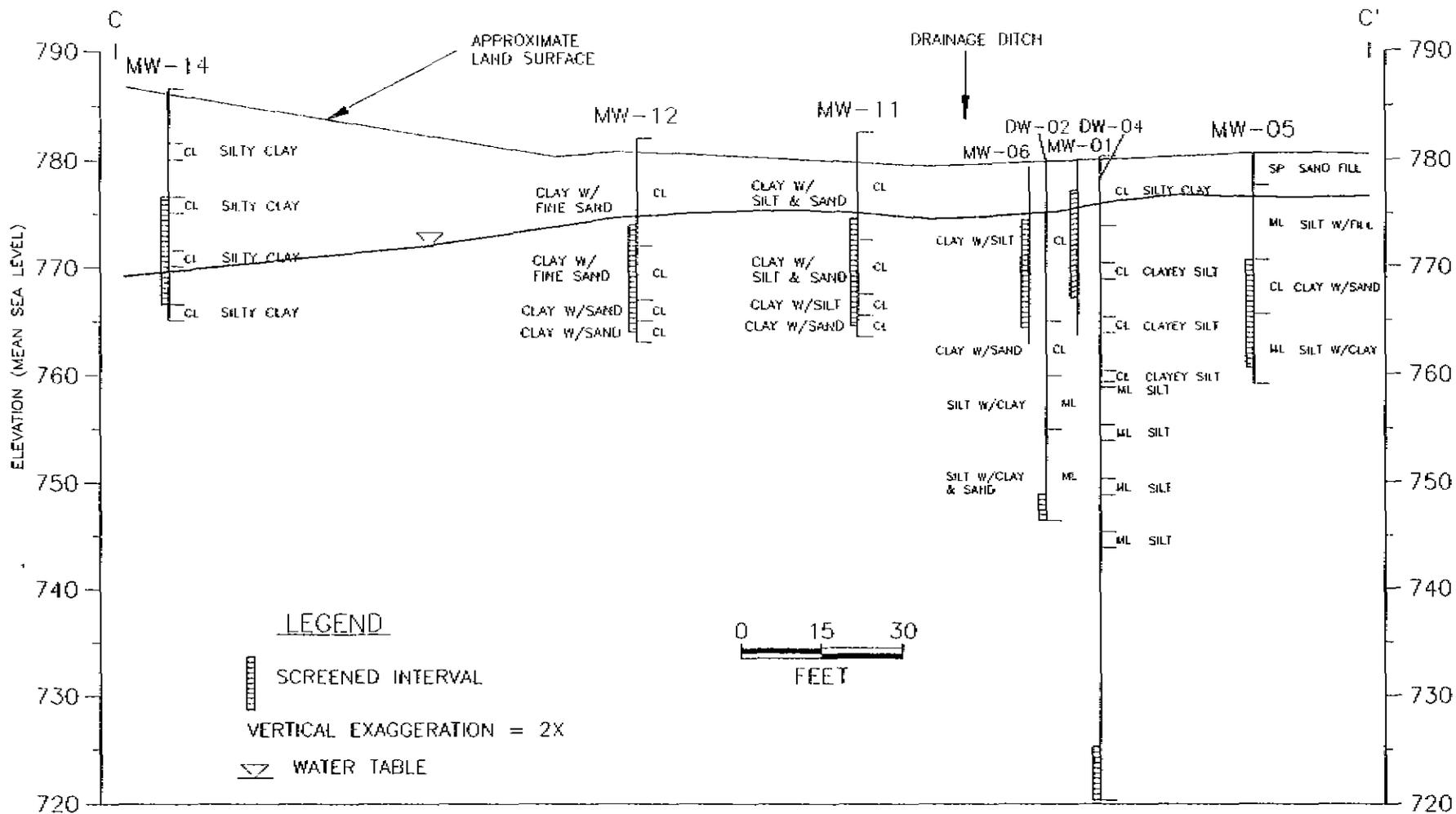
Delta
Environmental Consultants, Inc.
Charlotte, North Carolina

TITLE:
CROSS SECTION LOCATION MAP
WEYERHAEUSER BOX PLANT
CHARLOTTE, NORTH CAROLINA

DWT: BLG
CHKD:
DATE: 02/22/96

DES.:
APPD:
REV: *car*

PROJECT NO.: E092-051
FIGURE NO.: 3



Delta

Environmental Consultants, Inc.
Charlotte, North Carolina

TITLE:

GEOLOGIC CROSS SECTION C-C'
WEYERHAEUSER BOX PLANT
CHARLOTTE, NORTH CAROLINA

DWR:

DEK

CHKD:

DATE:

06/30/95

DES.:

APPD:

REV.:

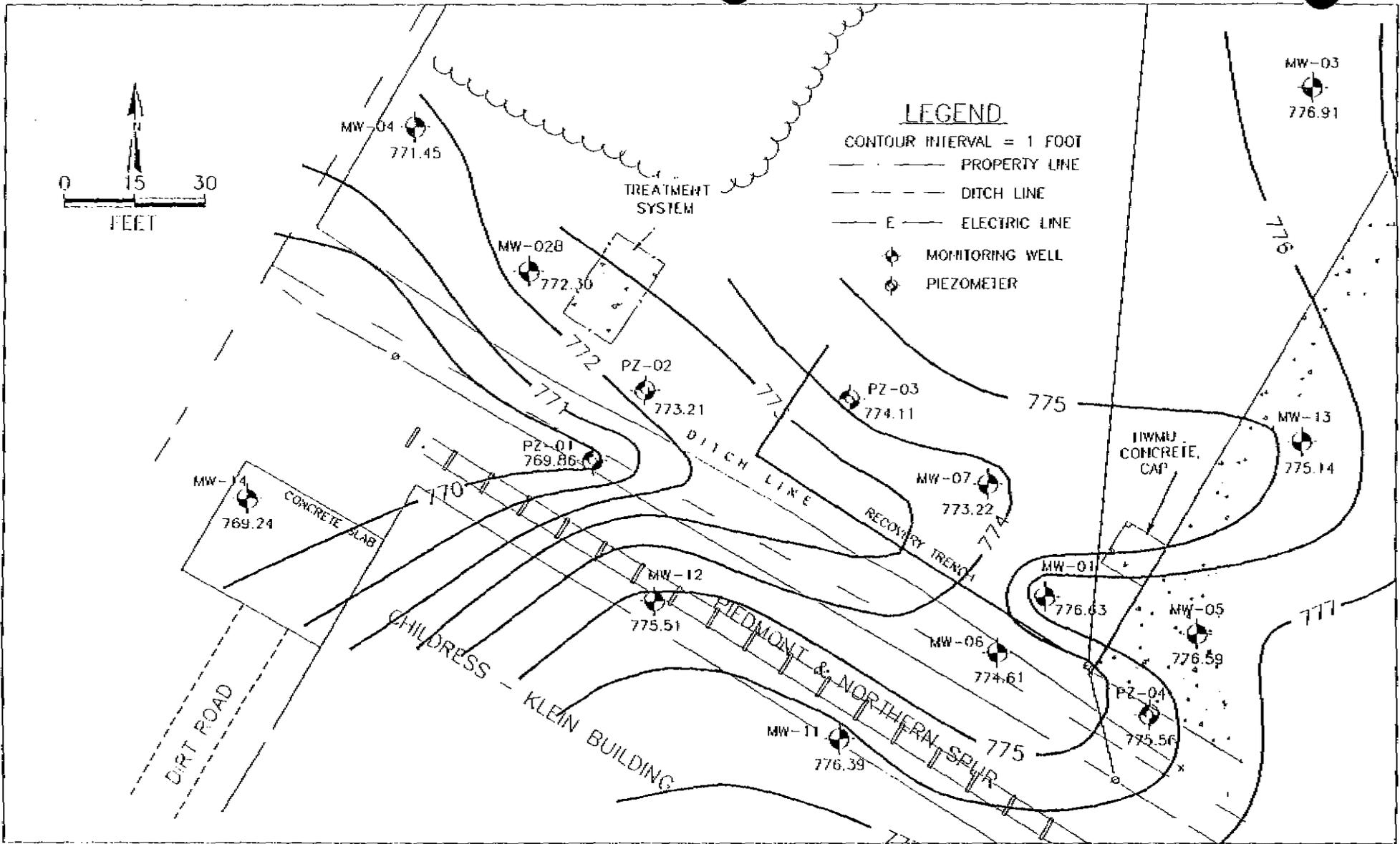
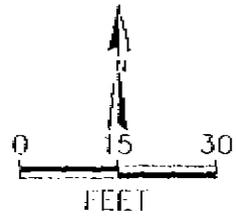
car

PROJECT NO.:

E092-051

FIGURE NO.:

4



TITLE:
 WATER TABLE CONTOUR MAP (06/15/95)
 WEYERHAEUSER BOX PLANT
 CHARLOTTE, NORTH CAROLINA

DWN: DEK
 DES.:
 CHKD:
 APPD:
 DATE: 07/12/95
 REV: *DK*

PROJECT NO.:
 E092-051
 FIGURE NO.:
 6



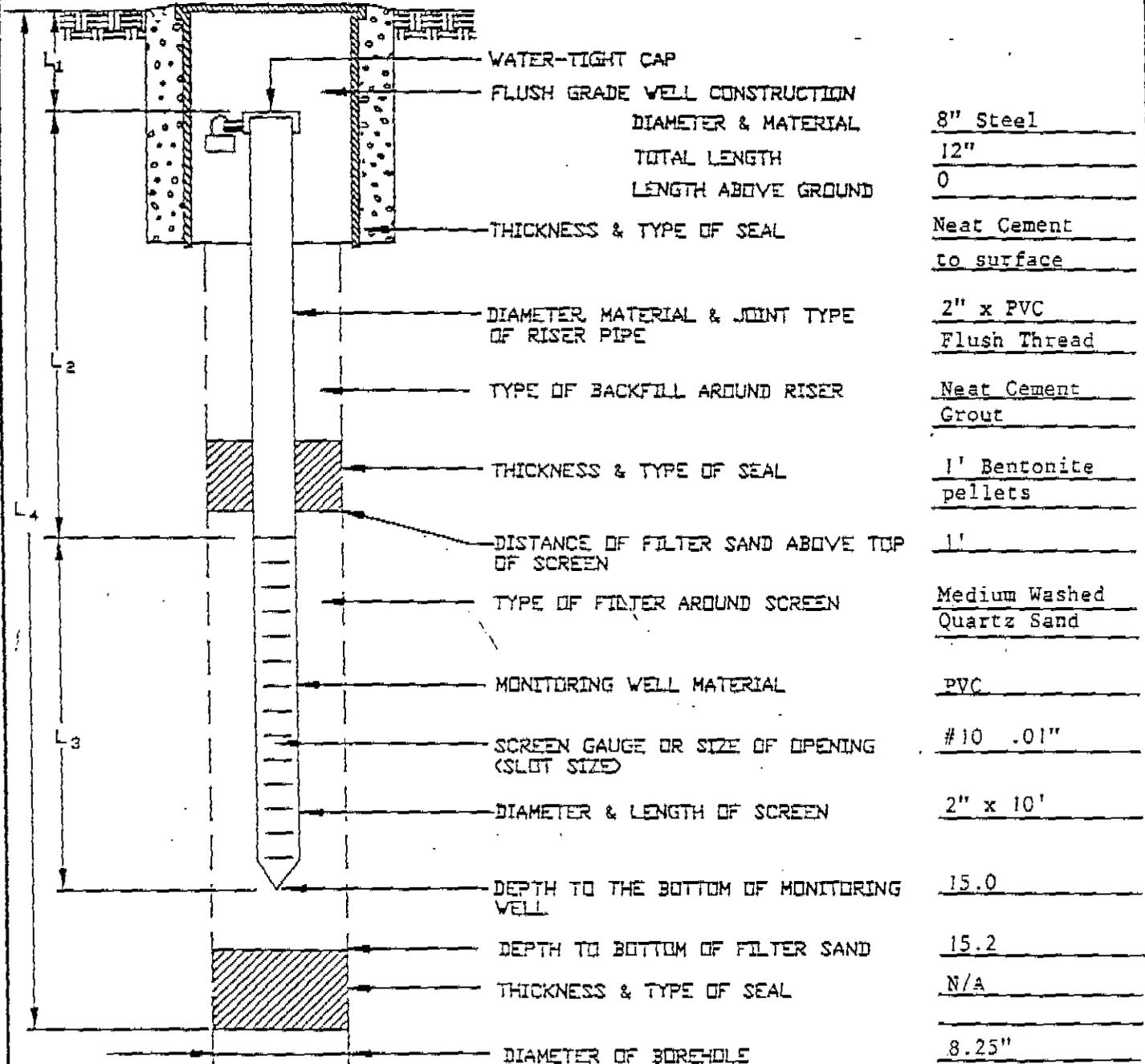
APPENDICES

APPENDIX A

MONITORING CONSTRUCTION WELL DETAILS

INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser Charlotte Box Plant MONITORING WELL NO. MW-1
 JOB NO. 50-92-051 TOP OF RISER ELEVATION: 779.67



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
- DIAMETER & MATERIAL 8" Steel
- TOTAL LENGTH 12"
- LENGTH ABOVE GROUND 0
- THICKNESS & TYPE OF SEAL Neat Cement to surface
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 2" x PVC Flush Thread
- TYPE OF BACKFILL AROUND RISER Neat Cement Grout
- THICKNESS & TYPE OF SEAL 1' Bentonite pellets
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 1'
- TYPE OF FILTER AROUND SCREEN Medium Washed Quartz Sand
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) #10 .01"
- DIAMETER & LENGTH OF SCREEN 2" x 10'
- DEPTH TO THE BOTTOM OF MONITORING WELL 15.0
- DEPTH TO BOTTOM OF FILTER SAND 15.2
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 8.25"

L₁ = .20 FT
 L₂ = 3 FT
 L₃ = 10 FT
 L₄ = 13.20 FT

INSTALLATION COMPLETED:
 DATE: 8-31-92
 TIME: 13:40

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

(*) DEPTH BELOW TOP OF RISER BOX _____

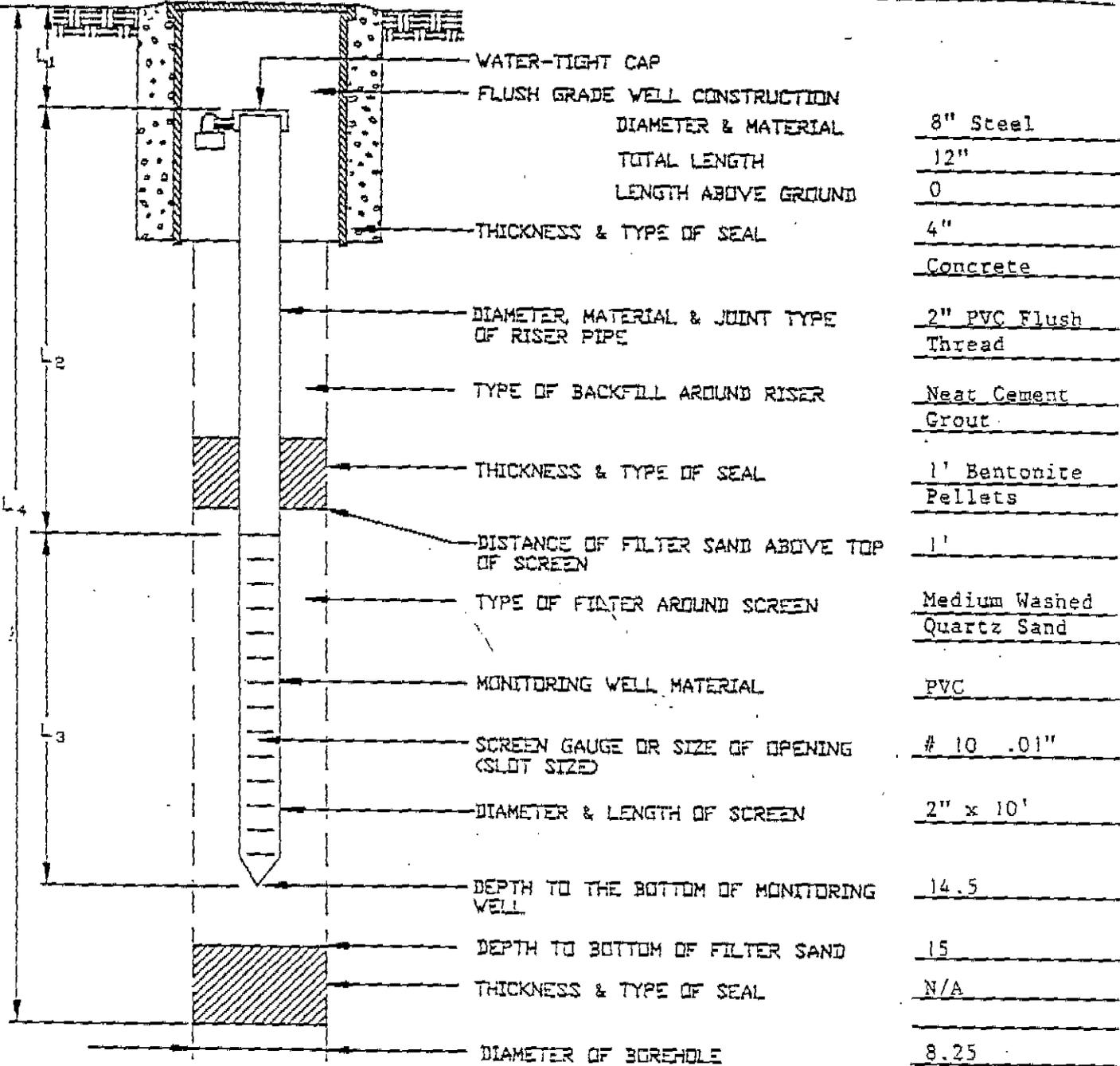


Project Number: E092-051	Site Id: MW-02B
Project Name: BOX PLANT	Location: CHARLOTTE, NORTH CAROLINA
Contractor: GEOLOGIC EXPLORATION	Elevation: 779.70'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: MEAN SEA LEVEL
By: A. Risner	Conductor Casing: type: dia: .00in fm: .00' to: .00'
Dates: 05/18/95 - 05/18/95	Blank Casing: type: PVC dia: 2.00in fm: -2.9' to: 10.00'
Purpose: Well	Screens: type: Slotted size: .010in dia: 2.00in fm: 10.00' to: 20.00'
Drilling Method: Hollow Stem Auger	Remarks:
Annular Fill: type: CONCRETE fm: .00' to: 5.00' type: Bentonite Chips fm: 5.00' to: 8.00' type: 20-28 Torpedo Sand fm: 8.00' to: 20.00'	

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	Vapor	Graphic Log	USCS Code	Material Description	Well Construction MP. EL. 782.87
			1	2			CL	RED AND YELLOW SILTY CLAY; HARD; MOIST; FINE GRAINED; MEDIUM PLASTICITY	
	10		2	2			CL	AS ABOVE BLACK CLAYEY SILT; SOFT; MOIST; HIT WATER?; FINE GRAINED; LOW PLASTICITY	
			3	4			ML	GREENISH GRAY SILT; MEDIUM GRAINED; MOIST; FULL SPOON; LOW PLASTICITY	
760	20		4	1			ML	AS ABOVE	
750	30								
740									

INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser Charlotte Box MONITORING WELL NO. MW-3
 JOB NO. 50-92-151 Plant TOP OF RISER ELEVATION: 780.60



DIAMETER & MATERIAL	8" Steel
TOTAL LENGTH	12"
LENGTH ABOVE GROUND	0
THICKNESS & TYPE OF SEAL	4" Concrete
DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE	2" PVC Flush Thread
TYPE OF BACKFILL AROUND RISER	Neat Cement Grout
THICKNESS & TYPE OF SEAL	1' Bentonite Pellets
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	1'
TYPE OF FILTER AROUND SCREEN	Medium Washed Quartz Sand
MONITORING WELL MATERIAL	PVC
SCREEN GAUGE OR SIZE OF OPENING (SLIT SIZE)	# 10 .01"
DIAMETER & LENGTH OF SCREEN	2" x 10'
DEPTH TO THE BOTTOM OF MONITORING WELL	14.5
DEPTH TO BOTTOM OF FILTER SAND	15
THICKNESS & TYPE OF SEAL	N/A
DIAMETER OF BOREHOLE	8.25

L₁ = 5 FT
 L₂ = 4.5 FT
 L₃ = 10 FT
 L₄ = 15 FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

INSTALLATION COMPLETED:
 DATE: 9-1-92
 TIME: 15:30

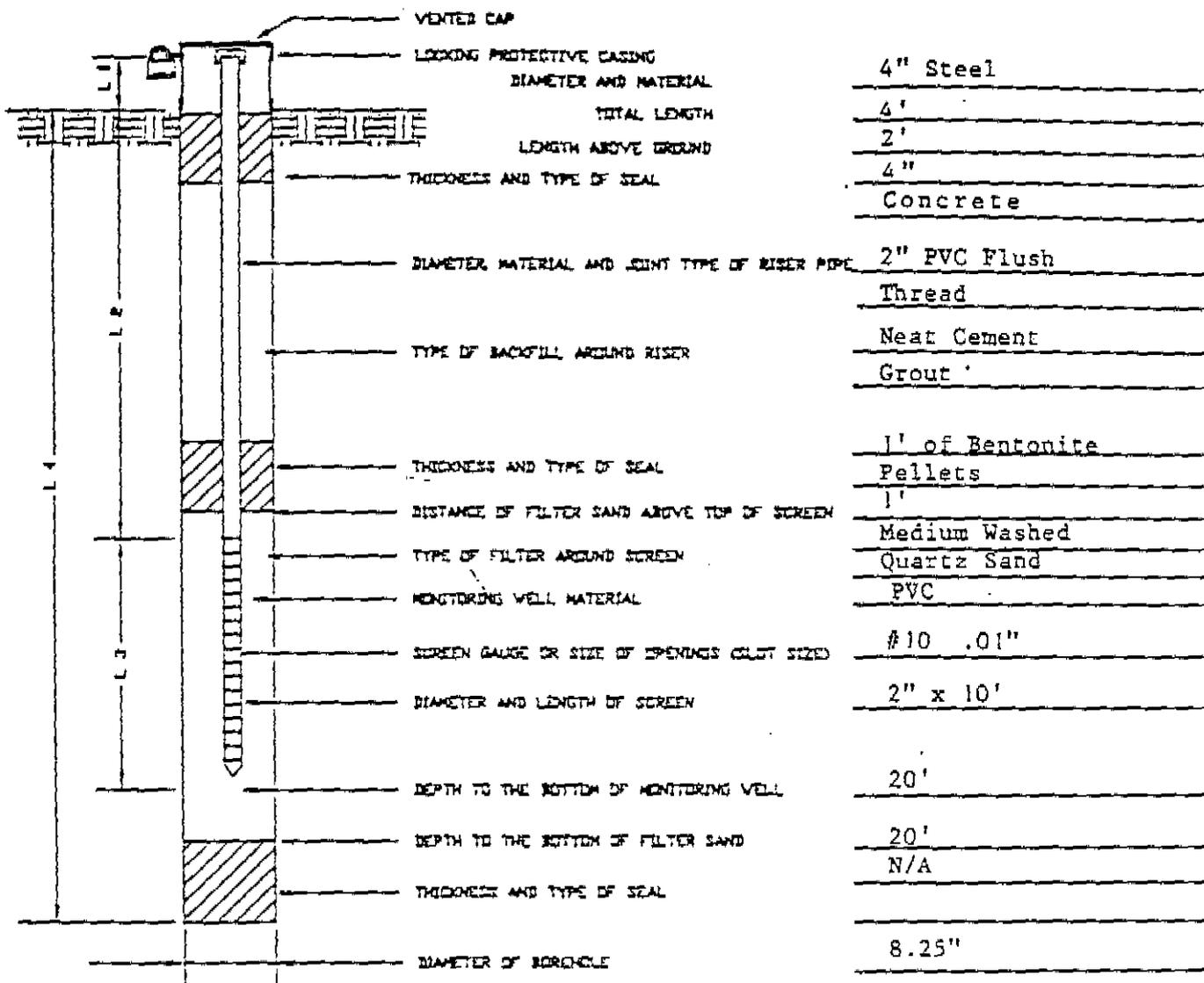
(*) DEPTH BELOW TOP OF RISER BOX



INSTALLATION OF ABOVE GROUND MONITORING WELL

PROJECT Weyerhaeuser Charlotte Box
Plant
 DELTA NO. 50-92-051

MONITORING WELL NO. MW-4
 ELEVATIONS: TDP OF RISER 784.01



L 1 = 2.5 FT.
 L 2 = 10 FT.
 L 3 = 10 FT.
 L 4 = 20 FT.

INSTALLATION COMPLETED
 DATE: 9-1-92
 TIME: 15:30

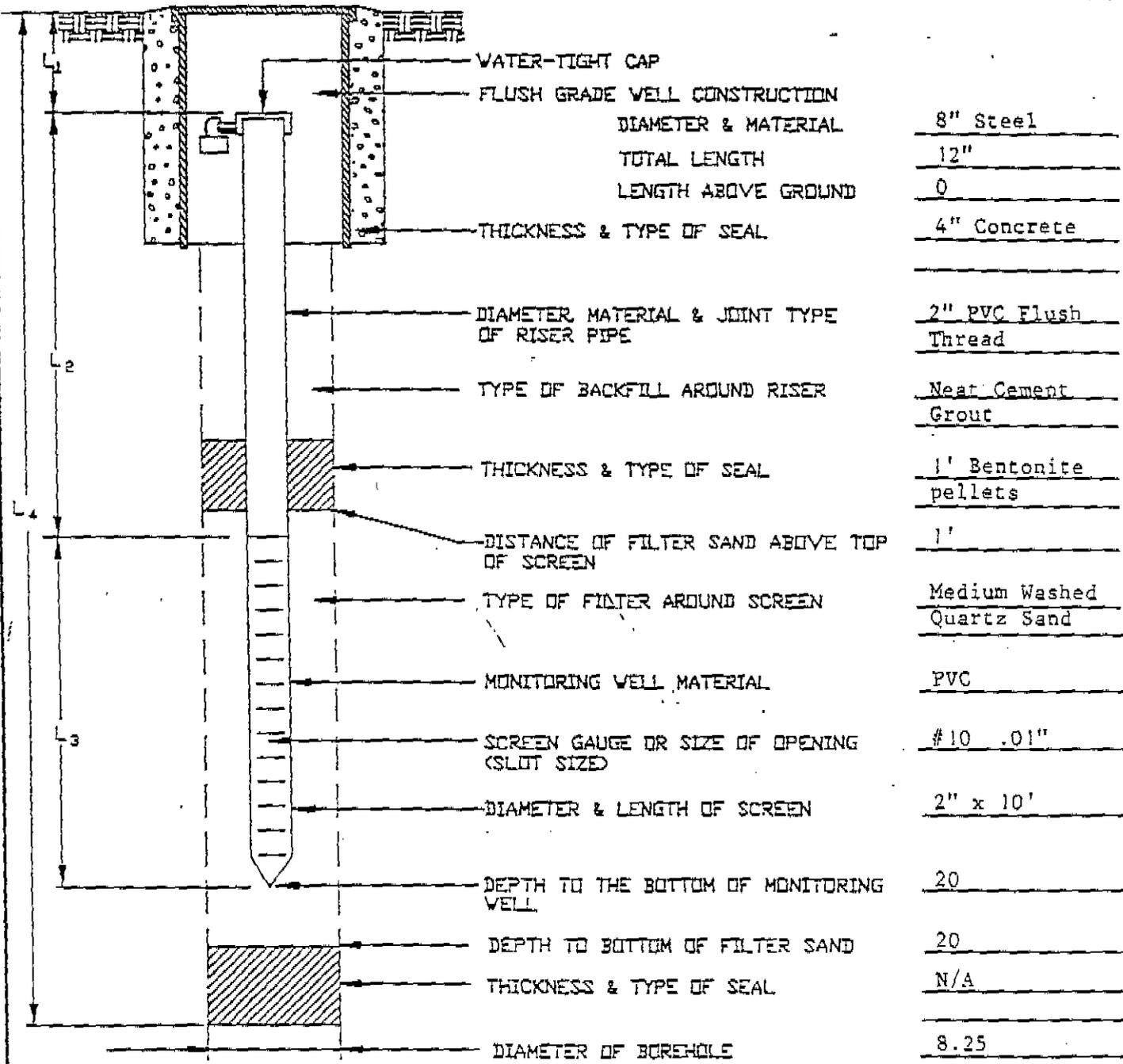
MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

* MEASURE POINT: _____



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser Charlotte Box Plant MONITORING WELL NO. MW-5
 JOB NO. 50-92-051 TOP OF RISER ELEVATION: 780.25



WATER-TIGHT CAP	
FLUSH GRADE WELL CONSTRUCTION	
DIAMETER & MATERIAL	8" Steel
TOTAL LENGTH	12"
LENGTH ABOVE GROUND	0
THICKNESS & TYPE OF SEAL	4" Concrete
DIAMETER MATERIAL & JOINT TYPE OF RISER PIPE	2" PVC Flush Thread
TYPE OF BACKFILL AROUND RISER	Neat Cement Grout
THICKNESS & TYPE OF SEAL	1' Bentonite pellets
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	1'
TYPE OF FILTER AROUND SCREEN	Medium Washed Quartz Sand
MONITORING WELL MATERIAL	PVC
SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE)	#10 .01"
DIAMETER & LENGTH OF SCREEN	2" x 10'
DEPTH TO THE BOTTOM OF MONITORING WELL	20
DEPTH TO BOTTOM OF FILTER SAND	20
THICKNESS & TYPE OF SEAL	N/A
DIAMETER OF BOREHOLE	8.25

L₁ = .50 FT
 L₂ = 9.5 FT
 L₃ = 10 FT
 L₄ = 20 FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL #

INSTALLATION COMPLETED:
 DATE: 9-2-92
 TIME: 17:00

(*) DEPTH BELOW TOP OF RISER BOX _____



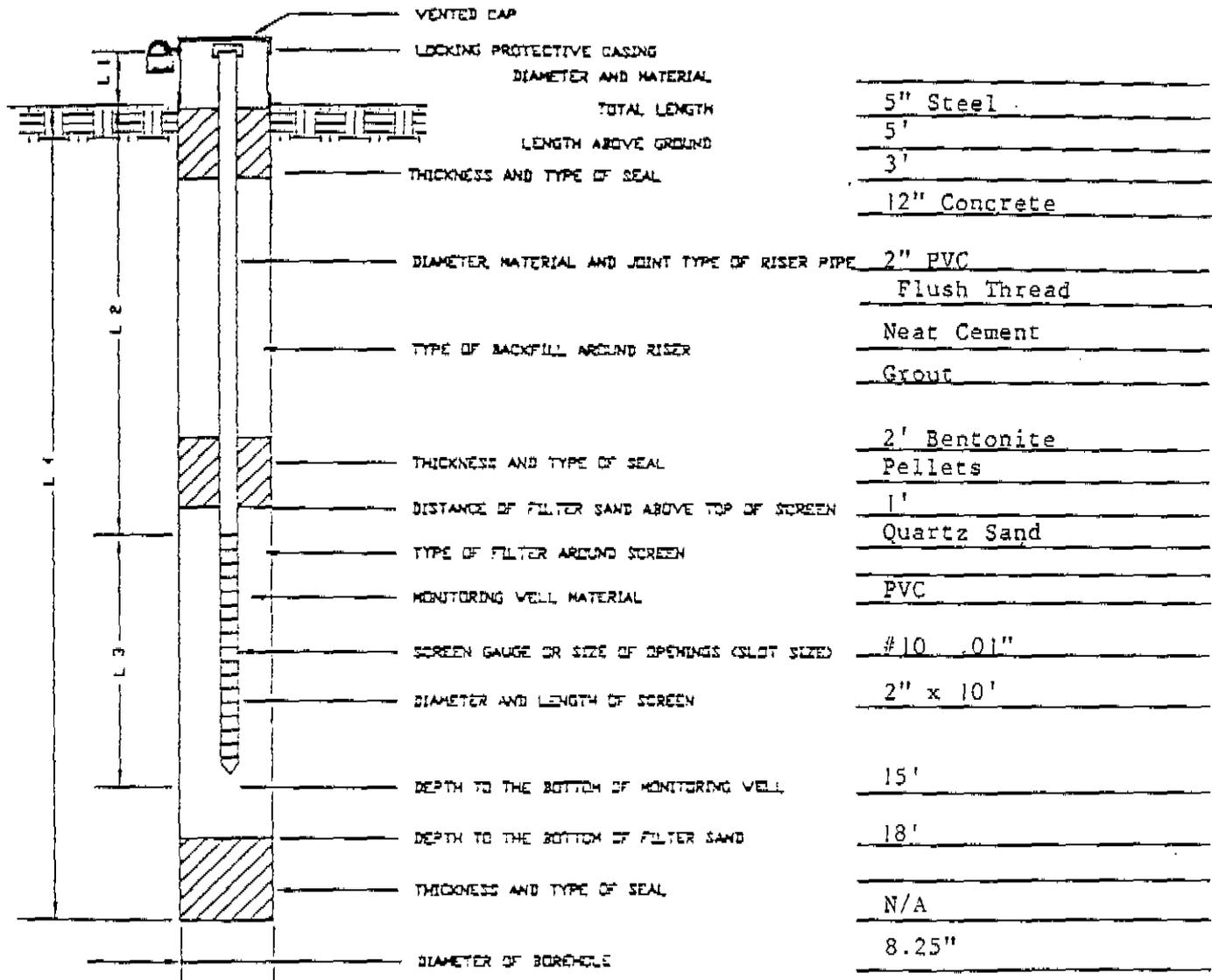
INSTALLATION OF ABOVE GROUND MONITORING WELL

PROJECT Weyerhaeuser Paper Company

MONITORING WELL NO. MW-6

DELTA NO. 50-92-051.03

ELEVATIONS: TOP OF RISER 781.77
GROUND LEVEL 779.34



L 1 = 3 FT.
L 2 = 5 FT.
L 3 = 10 FT.
L 4 = 15 FT.

INSTALLATION COMPLETED

DATE: 10-7-92
TIME: 12:00

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

* MEASURE POINT: _____



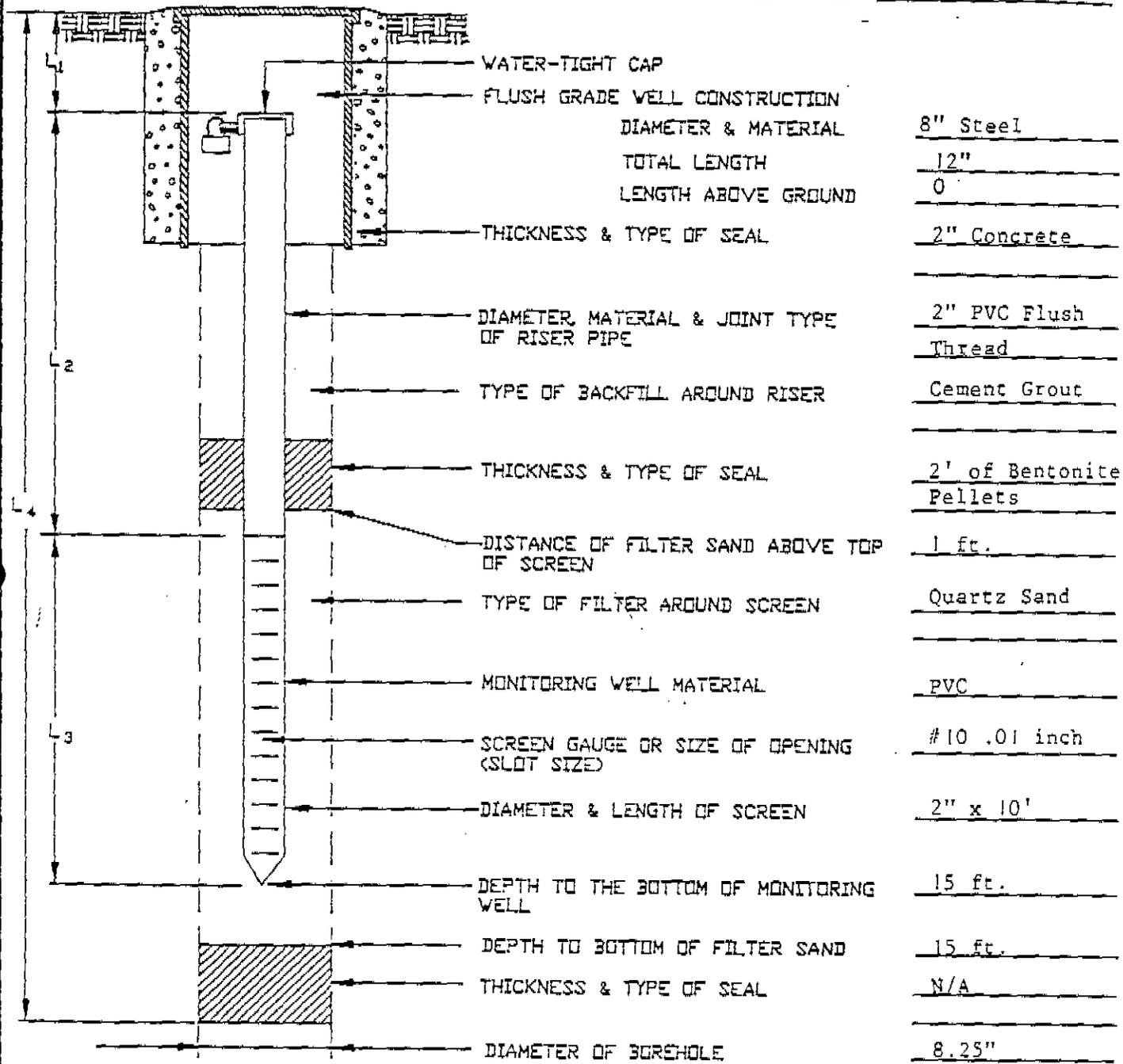
INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser

MONITORING WELL NO. MW-7

JOB NO. 50-92-051.13

TOP OF RISER ELEVATION: 781.77



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
 - DIAMETER & MATERIAL 8" Steel
 - TOTAL LENGTH 12"
 - LENGTH ABOVE GROUND 0
- THICKNESS & TYPE OF SEAL 2" Concrete
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 2" PVC Flush Thread
- TYPE OF BACKFILL AROUND RISER Cement Grout
- THICKNESS & TYPE OF SEAL 2' of Bentonite Pellets
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 1 ft.
- TYPE OF FILTER AROUND SCREEN Quartz Sand
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) #10 .01 inch
- DIAMETER & LENGTH OF SCREEN 2" x 10'
- DEPTH TO THE BOTTOM OF MONITORING WELL 15 ft.
- DEPTH TO BOTTOM OF FILTER SAND 15 ft.
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 8.25"

$L_1 = .5$ FT
 $L_2 = 4.5$ FT
 $L_3 = 10$ FT
 $L_4 = 15$ FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

INSTALLATION COMPLETED:
 DATE: 10-7-92
 TIME: 14:00

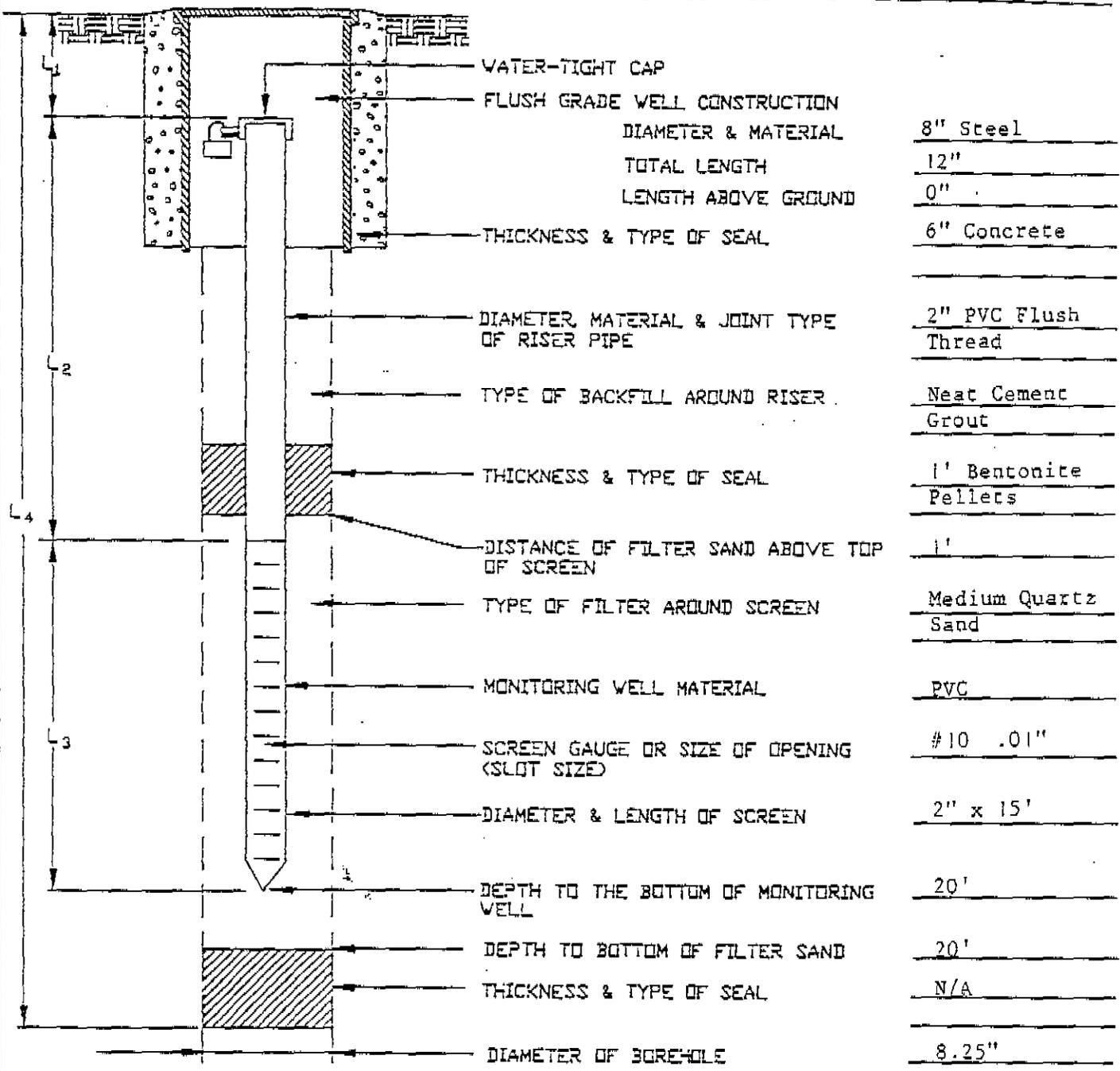
(*) DEPTH BELOW TOP OF RISER BOX _____



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser
 JOB NO. 50-92-051

MONITORING WELL NO. MW-8
 TOP OF RISER ELEVATION: _____



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
- DIAMETER & MATERIAL 8" Steel
- TOTAL LENGTH 12"
- LENGTH ABOVE GROUND 0"
- THICKNESS & TYPE OF SEAL 6" Concrete
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 2" PVC Flush Thread
- TYPE OF BACKFILL AROUND RISER Neat Cement Grout
- THICKNESS & TYPE OF SEAL 1' Bentonite Pellets
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 1'
- TYPE OF FILTER AROUND SCREEN Medium Quartz Sand
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) #10 .01"
- DIAMETER & LENGTH OF SCREEN 2" x 15'
- DEPTH TO THE BOTTOM OF MONITORING WELL 20'
- DEPTH TO BOTTOM OF FILTER SAND 20'
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 8.25"

L₁ = 0.5 FT
 L₂ = 4.5 FT
 L₃ = 15 FT
 L₄ = 20 FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

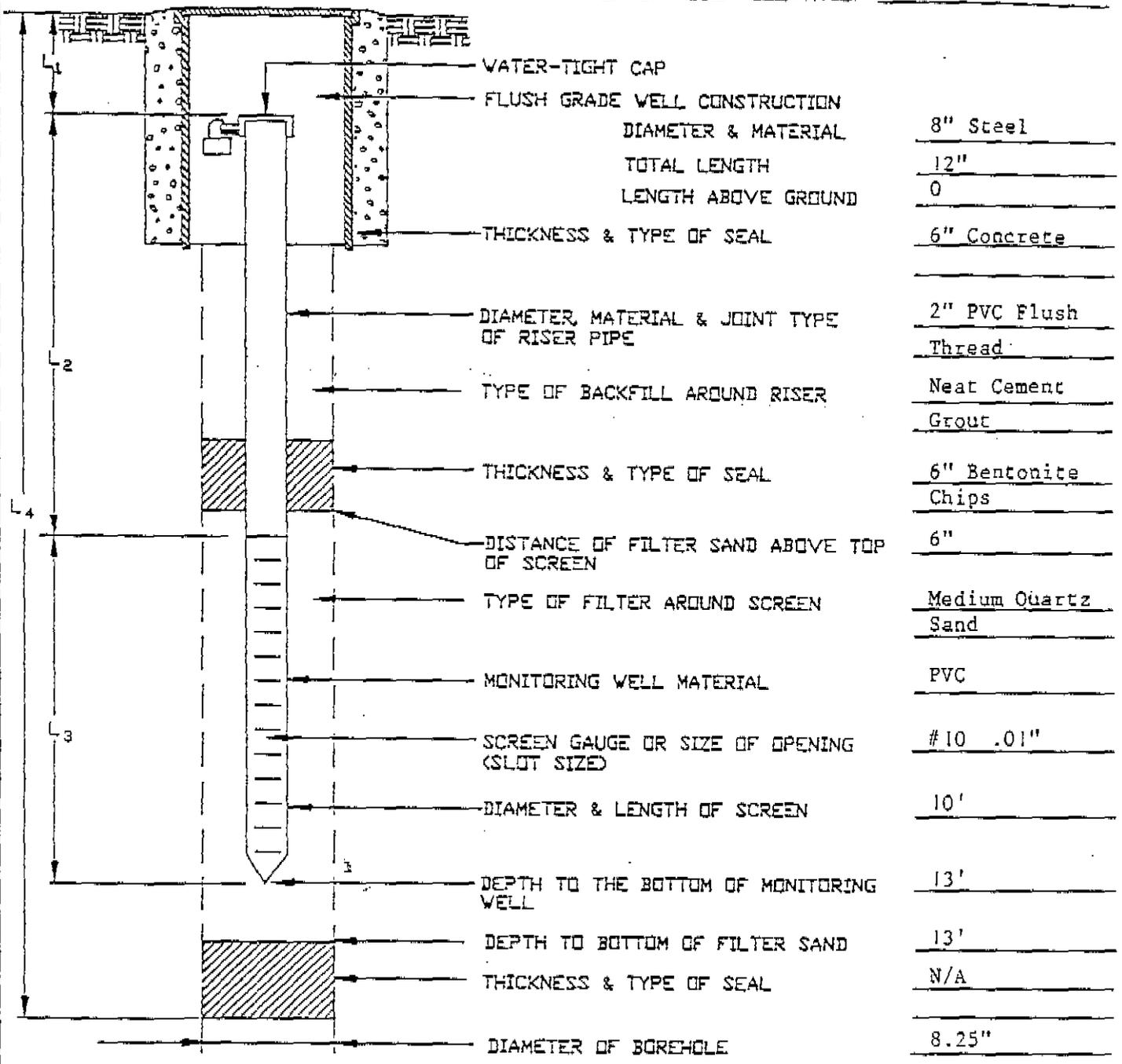
INSTALLATION COMPLETED:
 DATE: 6-3-93
 TIME: 13:00

(*) DEPTH BELOW TOP OF RISER BOX _____



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weverhaeuser MONITORING WELL NO. MW-9
 JOB NO. 50-92-051 TOP OF RISER ELEVATION: _____



DIAMETER & MATERIAL	8" Steel
TOTAL LENGTH	12"
LENGTH ABOVE GROUND	0
THICKNESS & TYPE OF SEAL	6" Concrete
DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE	2" PVC Flush Thread
TYPE OF BACKFILL AROUND RISER	Neat Cement Grout
THICKNESS & TYPE OF SEAL	6" Bentonite Chips
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	6"
TYPE OF FILTER AROUND SCREEN	Medium Quartz Sand
MONITORING WELL MATERIAL	PVC
SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE)	#10 .01"
DIAMETER & LENGTH OF SCREEN	10'
DEPTH TO THE BOTTOM OF MONITORING WELL	13'
DEPTH TO BOTTOM OF FILTER SAND	13'
THICKNESS & TYPE OF SEAL	N/A
DIAMETER OF BOREHOLE	8.25"

L₁ = .5 FT
 L₂ = 2.5 FT
 L₃ = 10 FT
 L₄ = 13 FT

DATE	TIME	WATER LEVEL *

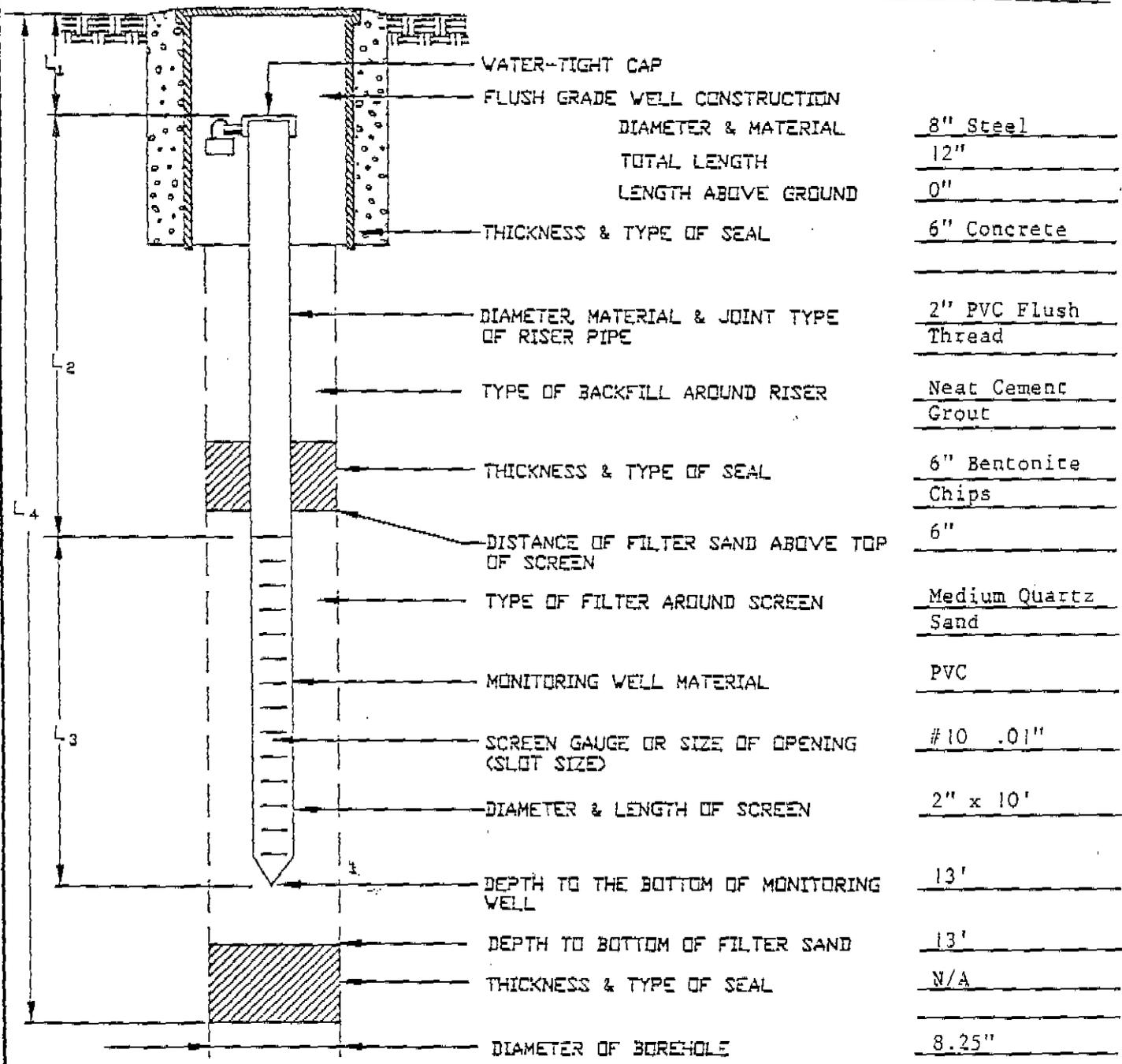
INSTALLATION COMPLETED
 DATE: 6-3-93
 TIME: 16:00

(*) DEPTH BELOW TOP OF RISER BOX _____



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser MONITORING WELL NO. MW-10
 JOB NO. 50-92-051 TOP OF RISER ELEVATION: _____



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
 - DIAMETER & MATERIAL 8" Steel
 - TOTAL LENGTH 12"
 - LENGTH ABOVE GROUND 0"
- THICKNESS & TYPE OF SEAL 6" Concrete
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 2" PVC Flush Thread
- TYPE OF BACKFILL AROUND RISER Neat Cement Grout
- THICKNESS & TYPE OF SEAL 6" Bentonite Chips
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 6"
- TYPE OF FILTER AROUND SCREEN Medium Quartz Sand
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) #10 .01"
- DIAMETER & LENGTH OF SCREEN 2" x 10'
- DEPTH TO THE BOTTOM OF MONITORING WELL 13'
- DEPTH TO BOTTOM OF FILTER SAND 13'
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 8.25"

L₁ = 5 FT
 L₂ = 2.5 FT
 L₃ = 10' FT
 L₄ = 13' FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

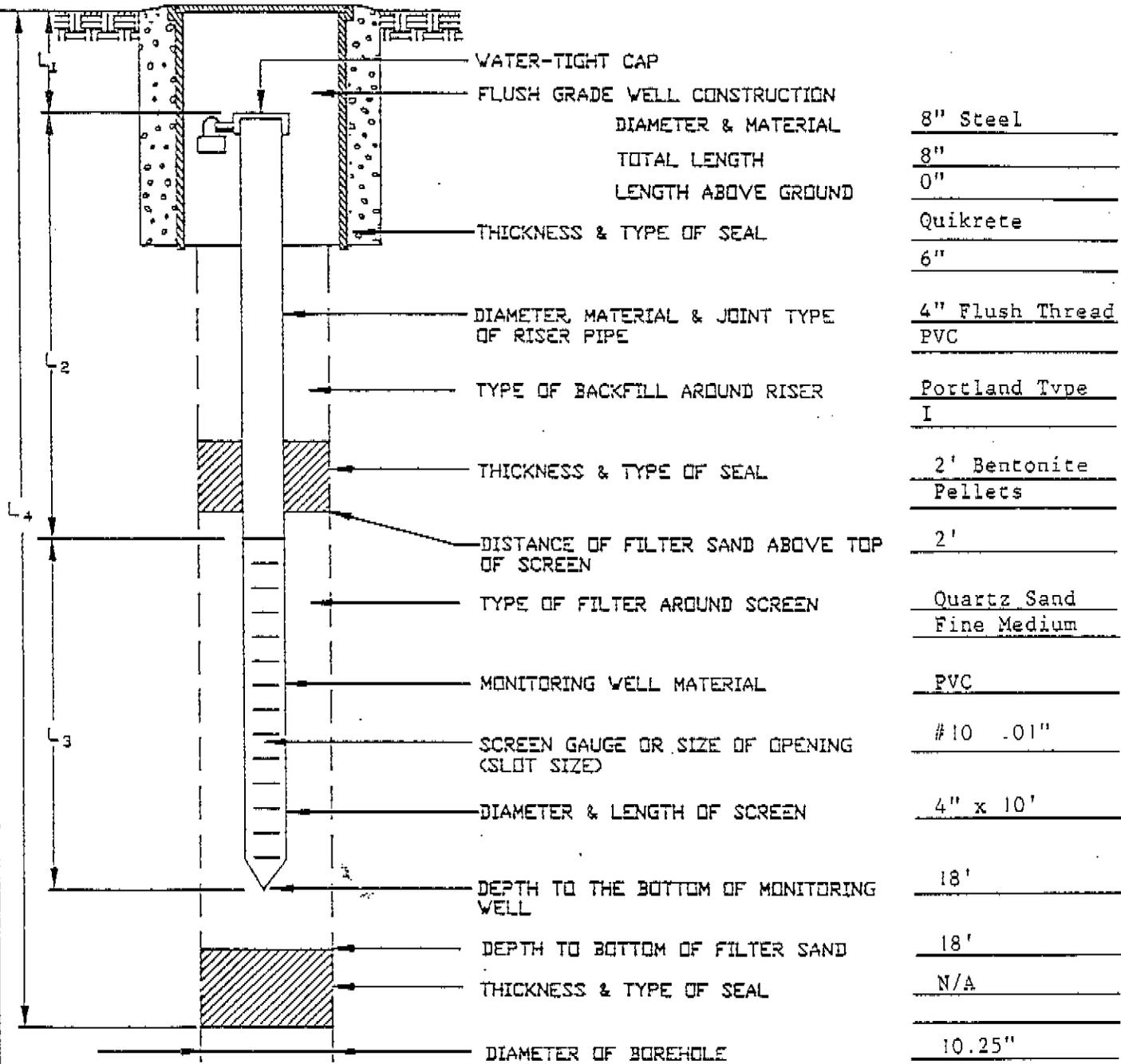
INSTALLATION COMPLETED:
 DATE: 6-3-93
 TIME: 18:30

(*) DEPTH BELOW TOP OF RISER BOX _____



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weverhaeuser MONITORING WELL NO. MW-11
 JOB NO. 50-92-051 TOP OF RISER ELEVATION: _____



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
- DIAMETER & MATERIAL 8" Steel
- TOTAL LENGTH 8"
- LENGTH ABOVE GROUND 0"
- THICKNESS & TYPE OF SEAL Quikrete
- 6"
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 4" Flush Thread PVC
- TYPE OF BACKFILL AROUND RISER Portland Type I
- THICKNESS & TYPE OF SEAL 2' Bentonite Pellets
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 2'
- TYPE OF FILTER AROUND SCREEN Quartz Sand Fine Medium
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) #10 .01"
- DIAMETER & LENGTH OF SCREEN 4" x 10'
- DEPTH TO THE BOTTOM OF MONITORING WELL 18'
- DEPTH TO BOTTOM OF FILTER SAND 18'
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 10.25"

L₁ = .50 FT
 L₂ = 7.50 FT
 L₃ = 10.00 FT
 L₄ = 18.00 FT

MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

INSTALLATION COMPLETED:
 DATE: 8-5-93
 TIME: 13:00

(*) DEPTH BELOW TOP OF RISER BOX _____



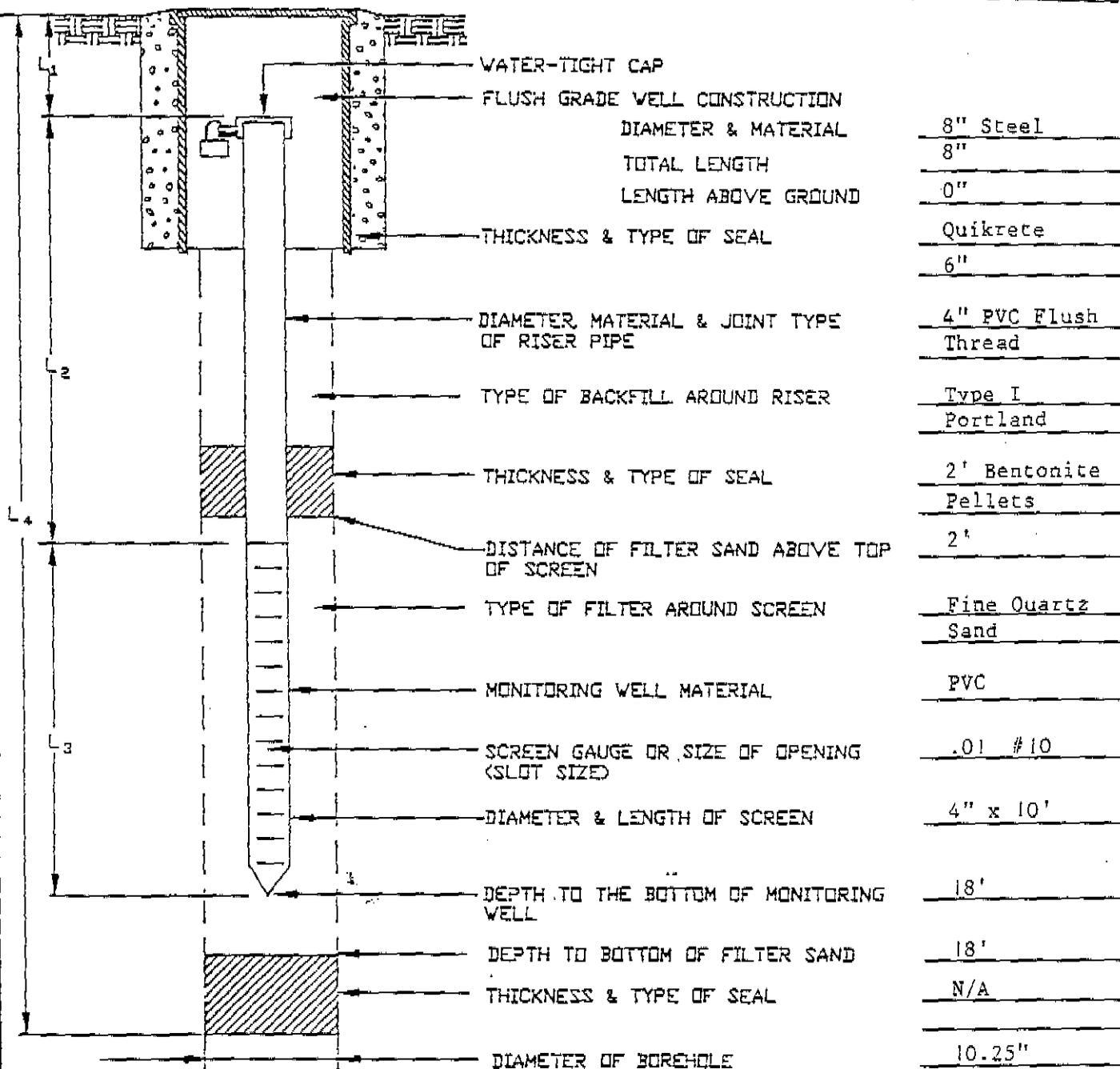
INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT: Weyerhaeuser

MONITORING WELL NO. MW-12

JOB NO. 50-92-051

TOP OF RISER ELEVATION: _____



- WATER-TIGHT CAP
- FLUSH GRADE WELL CONSTRUCTION
- DIAMETER & MATERIAL 8" Steel
- TOTAL LENGTH 8"
- LENGTH ABOVE GROUND 0"
- THICKNESS & TYPE OF SEAL Quikrete
- 6"
- DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE 4" PVC Flush Thread
- TYPE OF BACKFILL AROUND RISER Type I Portland
- THICKNESS & TYPE OF SEAL 2' Bentonite Pellets
- DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 2'
- TYPE OF FILTER AROUND SCREEN Fine Quartz Sand
- MONITORING WELL MATERIAL PVC
- SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE) .01 #10
- DIAMETER & LENGTH OF SCREEN 4" x 10'
- DEPTH TO THE BOTTOM OF MONITORING WELL 18'
- DEPTH TO BOTTOM OF FILTER SAND 18'
- THICKNESS & TYPE OF SEAL N/A
- DIAMETER OF BOREHOLE 10.25"

L₁ = .50 FT
 L₂ = 7.5 FT
 L₃ = 10 FT
 L₄ = 18 FT

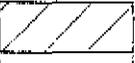
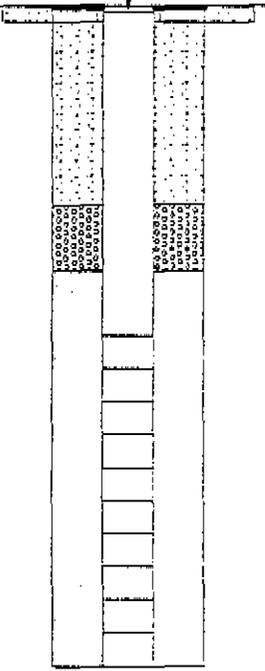
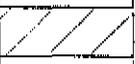
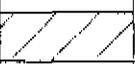
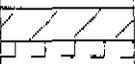
MONITORING WELL WATER LEVEL MEASUREMENTS		
DATE	TIME	WATER LEVEL *

INSTALLATION COMPLETED:
 DATE: 8-5-93
 TIME: _____

(*) DEPTH BELOW TOP OF RISER BOX _____



Project Number: E092-051	Site Id: MW-13
Project Name: BOX PLANT	Location: CHARLOTTE, NORTH CAROLINA
Contractor: GEOLOGIC EXPLORATION	Elevation: 781.10'
Consulting Firm: DELTA ENVIRONMENTAL	Datum: MEAN SEA LEVEL
Designed By: A. Risner	Conductor Casing: type: PVC dia: 8.00in fm: .00' to: .50'
Date: 05/20/95 - 05/20/95	Blank Casing: type: PVC dia: 2.00in fm: .2' to: 10.00'
Purpose: Well	Screens: type: Slotted size: .010in dia; 2.00in fm: 10.00' to: 20.00'
Drilling Method: Hollow Stem Auger	Remarks:
Annular Fill: type: CONCRETE fm: .50' to: 6.00' type: Bentonite Chips fm: 6.00' to: 8.00' type: 20-28 Torpedo Sand fm: 8.00' to: 20.00'	

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	FID	Graphic Log	USCS Code	Material Description	Well Construction
780									MP. EL. 780.95
			1	6	6 ppm		CL	RED SILTY CLAY; MOIST; HARD; FINE GRAINED; MEDIUM PLASTICITY	
	10		2	3	3 ppm		CL	AS ABOVE YELLOW SILTY CLAY; HARD; MOIST; FINE GRAINED; MEDIUM PLASTICITY	
			3	2	2 ppm		CL	AS ABOVE GRAY CLAY; HIGH PLASTICITY; FINE GRAINED; MOIST	
760	20		4	2	2 ppm		CL ML	AS ABOVE RED CLAYEY SILT; LOW PLASTICITY; SOFT; MOIST; FINE TO MEDIUM GRAINED	
	30								
750									

Project Number: E092-051	Site Id: MW-14
Project Name: BOX PLANT	Location: CHARLOTTE, NORTH CAROLINA
Contractor: GEOLOGIC EXPLORATION	Elevation: 786.60'

Consulting Firm: DELTA ENVIRONMENTAL	Datum: MEAN SEA LEVEL
--------------------------------------	-----------------------

Log By: A. Risner	Conductor Casing:
Date: 05/20/95 - 05/20/95	type: PVC dia: 8.00in fm: .00' to: .50'

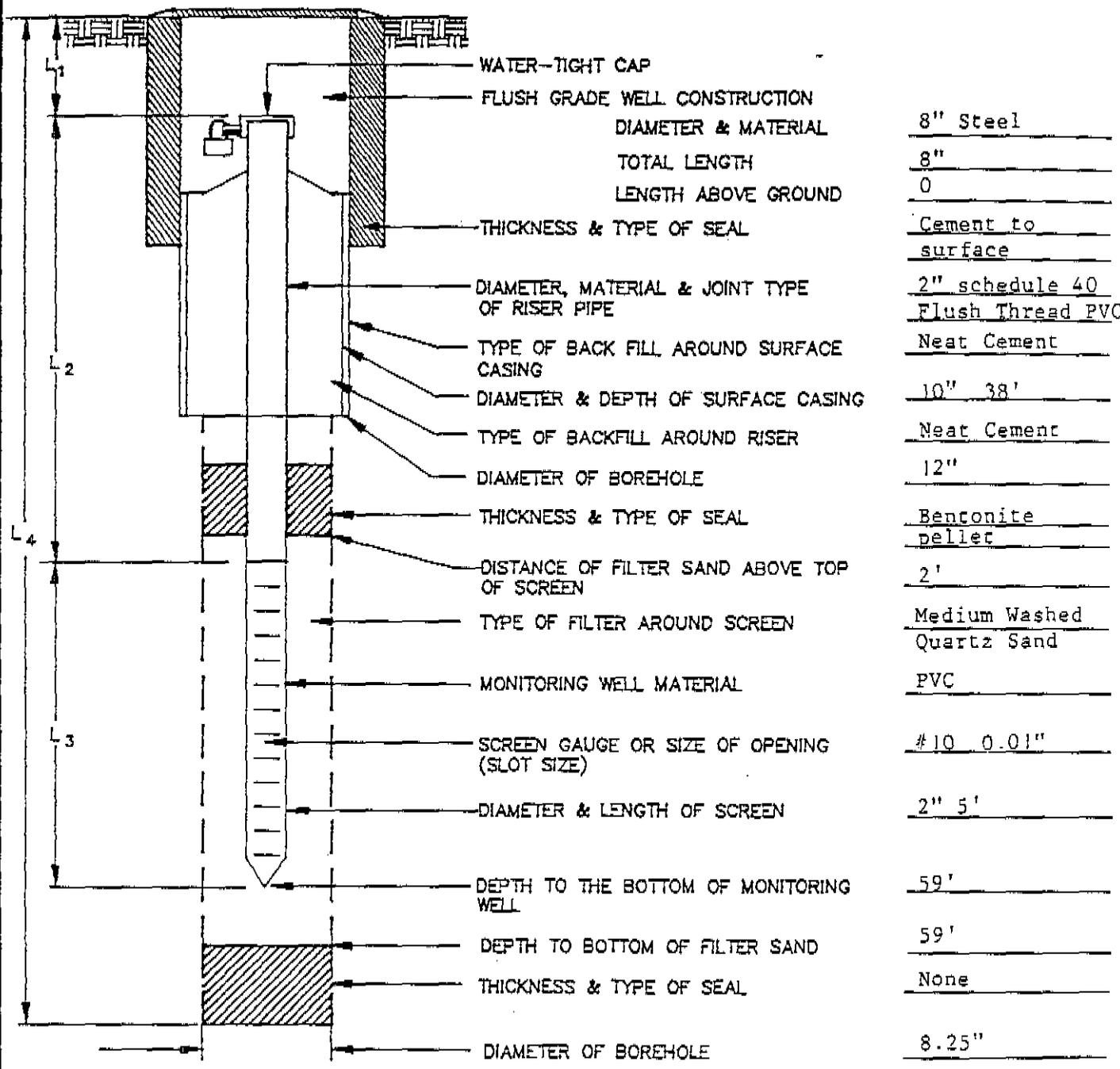
Purpose: Well	Blank Casing:
Drilling Method: Hollow Stem Auger	type: PVC dia: 2.00in fm: .2' to: 10.00'

Annular Fill:	Screens:
type: CONCRETE fm: .50' to: 5.00'	type: Slotted size: .010in dia: 2.00in fm: 10.00' to: 20.00'
type: Bentonite Chips fm: 5.00' to: 8.00'	Remarks:
type: 20-28 Torpedo Sand fm: 8.00' to: 20.00'	

Elevation (ft)	Depth (ft)	Recovery	Sample No.	Blow Count	FID	Graphic Log	USCS Code	Material Description	Well Construction
780	10	1	1	16 ppm			CL	RED SILTY CLAY; FINE GRAINED; MEDIUM TO HIGH PLASTICITY; MOIST; GRAVEL MIXED IN; SOFT	
		2	2	250 ppm			CL	RED SILTY CLAY; FINE GRAINED; MEDIUM PLASTICITY; SOFT; GRAVEL MIXED IN GRAY CLAY; HARD; FINE GRAINED; HIGH PLASTICITY; MOIST	
770		3	3	3000 ppm			CL	BROWN SILTY CLAY; SOFT; FINE GRAINED; MOIST; LOW PLASTICITY	
	20	4	4	2500 ppm			CL	AS ABOVE	
760	30								
750									

FLUSH GRADE DEEP MONITORING WELL CONSTRUCTION DETAIL

PROJECT: Weverhaeuser Charlotte Box Plant MONITORING WELL NO. DW-1
 JOB NO. 50-92-051



DIAMETER & MATERIAL	8" Steel
TOTAL LENGTH	8"
LENGTH ABOVE GROUND	0
THICKNESS & TYPE OF SEAL	Cement to surface
DIAMETER, MATERIAL & JOINT TYPE OF RISER PIPE	2" schedule 40 Flush Thread PVC
TYPE OF BACK FILL AROUND SURFACE CASING	Neat Cement
DIAMETER & DEPTH OF SURFACE CASING	10" 38'
TYPE OF BACKFILL AROUND RISER	Neat Cement
DIAMETER OF BOREHOLE	12"
THICKNESS & TYPE OF SEAL	Bentonite pellet
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	2'
TYPE OF FILTER AROUND SCREEN	Medium Washed Quartz Sand
MONITORING WELL MATERIAL	PVC
SCREEN GAUGE OR SIZE OF OPENING (SLOT SIZE)	#10 0.01"
DIAMETER & LENGTH OF SCREEN	2" 5'
DEPTH TO THE BOTTOM OF MONITORING WELL	59'
DEPTH TO BOTTOM OF FILTER SAND	59'
THICKNESS & TYPE OF SEAL	None
DIAMETER OF BOREHOLE	8.25"

L₁ = 0.5 FT
 L₂ = 53.5 FT

L₃ = 5 FT
 L₄ = 59 FT

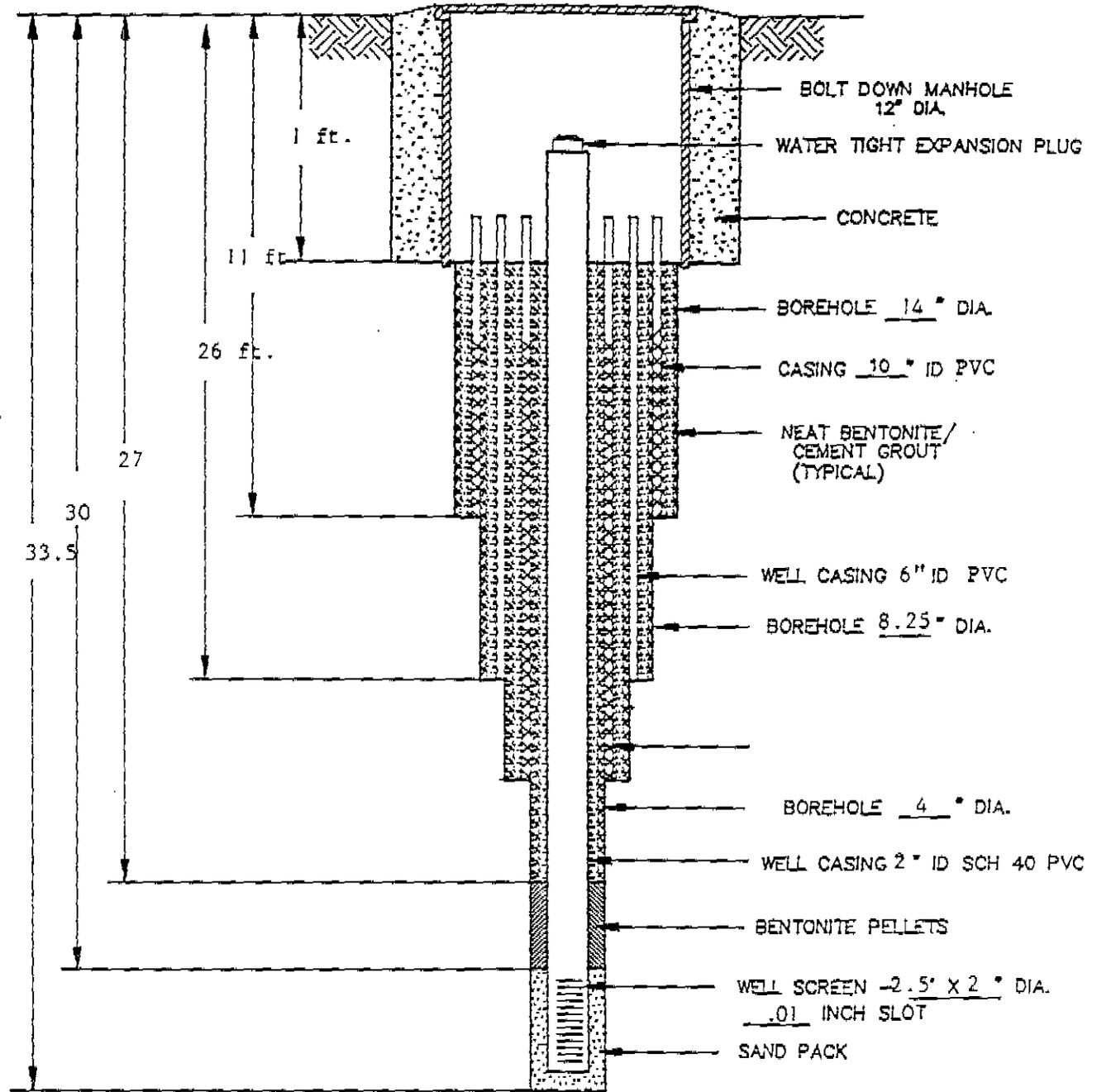
Installation completed:
 Date 8-3-92
 Time 12:00



FLUSH GRADE DEEP MONITORING WELL CONSTRUCTION

PROJECT: Weyerhaeuser
 JOB NO. 50-92-051.13

MONITORING WELL: DW-2
 Riser Elevation 779.53



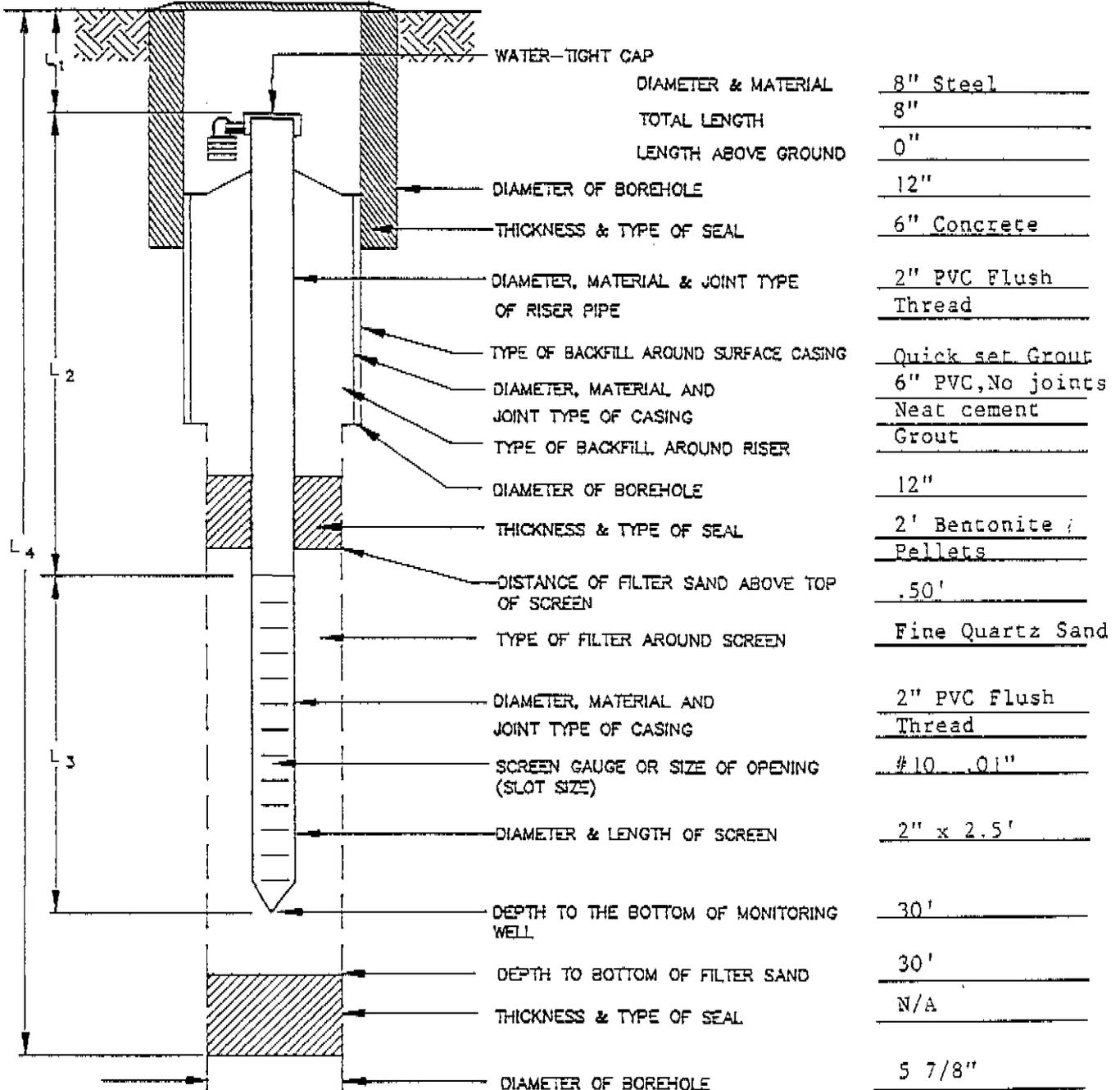
NOTE: DRAWING NOT TO SCALE

CAD NO. FGDW2



INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT Weyerhaeuser Box Plant MONITORING WELL NO. DW-3
 JOB NO. 50-92-051.25 TOP OF RISER ELEVATION _____



$L_1 =$.50'

$L_3 =$ 2.5'

$L_2 =$ 27'

$L_4 =$ 30'





Project Number: E092-051

Site Id: DW-04

Project Name: BOX PLANT

Location: CHARLOTTE, NORTH CAROLINA

Contractor: GEOLOGIC EXPLORATION

Elevation: 780.30'

Consulting Firm: DELTA ENVIRONMENTAL

Datum: MEAN SEA LEVEL

Log By: A. Risner

Measuring Point: 779.97'

Date(s): 05/18/95 - 05/18/95

Conductor Casing:
type: PVC dia: 6.00in fm: .50' to: 35.00'

Purpose: Monitoring Well, Intermediate

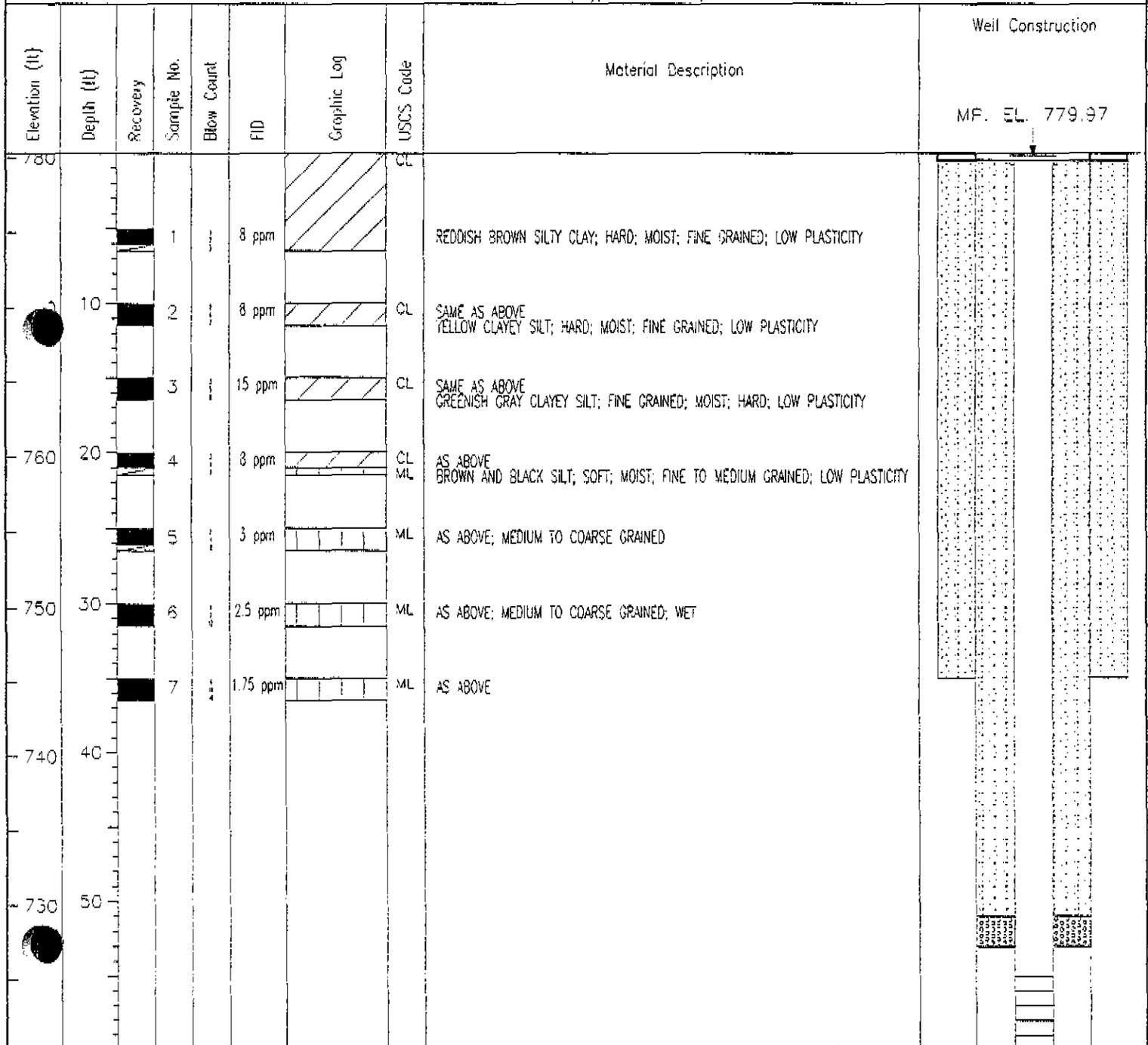
Blank Casing:
type: PVC dia: 2.00in fm: .5' to: 55.00'

Drilling Method: Hollow Stem Auger

Remarks:

Screens:
type: Slotted size: .010in dia: 2.00in fm: 55.00' to: 60.00'

Annular Fill:
type: CONCRETE fm: .50' to: 51.00'
type: Bentonite Chips fm: 51.00' to: 53.00'
type: 20-28 Torpedo Sand fm: 53.00' to: 60.00'



APPENDIX B

SAMPLING PAGE LOG BOOK

WEYERHAEUSER GROUNDWATER SAMPLING RECORD

Company <input type="checkbox"/> ES&T/WTC <input type="checkbox"/> ES&T/NB	Project No. Facility	Site ID Date (m/d/y)
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Description Monitoring Well Extraction Well Irrigation Well Spring Borehole Probe Other:

Air Temp: °C °F Weather:

Well Locked? yes no Damaged/Repairs Needed:

TOC MP Description:

TOC/MP Stickup: ft m above/below ground Well Inside Diameter (ID): 2-inch 4-inch Other:

Site Remarks (neaby wells pumping, tide, stream stage, etc.)

Water Level Data Measurement Units: ft m Well or Borehole Total Depth (TD) from MP or TOC:

<input type="checkbox"/> E-Tape, #	<input type="checkbox"/> Steel Tape <input type="checkbox"/> Other	Initial	Confirmation	At Start of Purging	At End of Purging		Remarks
Time (hh:mm)							
Depth to Water							
Tape Correction							
Water Level (WL)							
Product Thickness							
Product Recovery							
<input type="checkbox"/> gallons <input type="checkbox"/> liters							

Measures water level from fixed measuring point (MP) or top of well casing (TOC). Record water depth to nearest 0.01 ft or 0.002 m, with minus (-) sign if level is above MP or TOC. If no mark on MP or TOC, measure water level from north side of casing. Measure static or free-purging water level twice; record initial and confirmation measurements and measurement times (in 24-hour clock format). MP/TOC Stickup measurement is from ground surface to nearest 0.1 ft or 0.01 m. Depth to Water codes: N - not measured; D - dry; O - obstructed; P - pumping; F - flowing (artesian well); R - recently pumped; C - cascading. Water Level (WL) = Depth to Water - Tape Correction factor. Record free product presence at time of water level measurement; use "S" for free product thickness if sheen observed. If free product removed from well, record volume removed in gallons or liters; list product type in "Remarks" column.

Field WQ Data Purge Depth: Grab Bailor Pump Description:

Flowing Volume: [(TD) - (WL)] * [(Well ID)]² * [(Conversion Factor)] = gal liters Well Goes Dry While Purging

Conversion Factor = 0.0408 for feet and gallons; 0.1544 for feet and liters; 0.5066 for meters and liters; Well ID in inches

<input type="checkbox"/> Cum. Vol. Purged	<input type="checkbox"/> Pumping Rate				(Final)	Meter Type	Remarks
Time Measured (hh:mm)							
pH <input type="checkbox"/> Temp. Compensated							
Temperature <input type="checkbox"/> °C <input type="checkbox"/> °F							
Dissolved Oxygen mg/l							
<input type="checkbox"/> SC or <input type="checkbox"/> EC uS/cm							
Turbidity <input type="checkbox"/> NTU							
Color/Tint							
Odor							

Record time purging starts and ends in Water Level Data section. Cum. Vol. Purged: cumulative volume removed before sampling, in gallons or liters. Pumping Rate is gpm or Lpm, depending on box checked in casing volume calculation. Use "Final" column above for recording sample field measurements, total volume purged before sampling or average pumping rate during purging. Record equipment calibration methods, decontamination procedures, equipment failures, purge water disposal method, etc. in daily field notes. SC, Specific Conductance corrected for temperature (µS/cm at 25°C); EC, Electrical Conductivity not corrected for temperature (µS/cm). 1 gallon (US) = 3.785 L = 0.233 imperial gallon.

Sample Data Sample Depth: Grab Bailor Pump Description:

Field Sample ID (unique ID on bottles)	Result Code	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Lab ID	Case ID	SDG ID	Remarks
	P0								

Sample ID may be up to 16 characters. Sample Result Code, Date, and Time must be entered. Result Codes: P0, Primary Sample; D#, Duplicate Sample; S#, Split Sample (sent to second lab); BF#, Field Blank; BR#, Equipment Rinse; BT#, Trip Blank; SF#, Field Spike (# * 1 to 3). Lab ID (up to 5 characters) is name of laboratory that will analyze the sample. Case ID (up to 3 characters) and SDG ID (sample delivery group, up to 15 characters) are required for blanks. Case ID may be the lab service request number or yy-mm. SDG may be lab's SDG, a cooler ID number, or mm/dd/yy. Enter sample preservation and handling data on chain-of-custody form. Also record detailed information about duplicate, split, rinseate, spike, and/or blank sample collection/tracking in daily field notes.

Sampled By (print)	Signature
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APPENDIX C

SAMPLE CHAIN OF CUSTODY

