S. S. PAPADOPULOS & ASSOCIATES, INC.

ENVIRONMENTAL & WATER-RESOURCE CONSULTANTS
7944 Wisconsin Avenue, Bethesda, MD 20814
Phone: 301-718-8900
Fax: 301-718-8909

Date: July 23, 1998

Total Number of Pages (including cover sheet) 14

To:	Company/Firm:	Fax Number:
Mike A. Hebert	USEPA	214.665.7446
Michael Donnellan	USDOJ	202.514.8395
Steven Amter	DSI	202.293.0169
Dennis McQuillan	NMED	505.827.2965
Ana Marie Ortiz	NMED	505.768.1628
John Stomp	City of Albuquerque, PWD	505.768.3629
Gary A. O'Dea	City of Albuquerque, LD	505.768.4525
Charles de Saillan	NMOAG	505.827.5826

From: Stavros S. Papadopulos

IF YOU DID NOT RECEIVE THE TOTAL NUMBER OF PAGES, PLEASE CALL US AT 301-718-8900

MESSAGE

S. S. Papadopulos & Associates, Inc. is pleased to submit on behalf of Sparton Technology, Inc., the attached "Alternative Proposal to Install a Recovery Well Pumping at Fifty Gallons per Minute" related to Sparton's Coors Road Facility in Albuquerque, New Mexico. The original of this document will be sent by regular mail.

TELECOPY EQUIPMENT: SHARP - FO - 5300

ALTERNATIVE PROPOSAL TO INSTALL A RECOVERY WELL PUMPING AT FIFTY GALLONS PER MINUTE

Prepared For:

SPARTON TECHNOLOGY, INC.
Coors Road Facility
Albuquerque, New Mexico

Prepared By:

S. S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

July 23, 1998

7944 Wisconsin Avenue, Bethesda, Maryland 20814-3620 · (301) 718-8900

ALTERNATIVE PROPOSAL TO INSTALL A RECOVERY WELL PUMPING AT FIFTY GALLONS PER MINUTE

1.0 INTRODUCTION

Sparton Technology, Inc. (Sparton) is currently operating an on-site groundwater recovery system at its Coors Road Facility in Albuquerque, New Mexico. The system consists of eight shallow monitoring wells completed across the water table (referred to as the Upper Flow Zone or UFZ) and which were converted to recovery wells; the water recovered from these wells is treated by an on-site air stripper and the treated water is discharged into the City of Albuquerque sewer system.

In an earlier proposal[1], Sparton proposed to replace these eight shallow on-site recovery wells with a deeper single recovery well installed immediately downgradient of the site and which pumping at a rate of 20 gallons per minute (gpm) would capture most of the constituents of concern leaving the Sparton property. In this Alternative Proposal, Sparton now proposes to install a 50 gpm recovery well instead of the 20 gpm well proposed earlier. This proposed 50 gpm well will not only capture a greater percentage of the constituent mass currently leaving the Sparton property, but will also contain potential on-site source areas. The water pumped by the well will be treated at a new air stripper to be installed on-site and returned to the aquifer through a series of rapid infiltration ponds.

[1] Proposal to Install a Recovery Well and Associated Facilities at the Sparton Technology, Inc. Coors Road Facility, Albuquerque, New Mexico, transmitted on behalf of Sparton Technology, Inc. by April 23, 1998 letter to Michael T. Donnellan, Esq. of the U. S. Department of Justice by Stavros S. Papadopulos of S. S. Papadopulos & Associates, Inc.

The purpose of this Alternative Proposal is to present details on the design of the proposed 50-gpm recovery well and of the associated facilities.

2.0 SITE CONDITIONS

The current distribution of constituents of concern on the Sparton property is illustrated in Figure 1 by the distribution of trichloroethylene (TCE), the primary volatile organic constituent at the site. This figure was prepared by interpolating logarithmically the TCE concentrations measured in monitoring and recovery wells in January and February 1998; for wells which were not sampled at that time, the most recent available measurement prior to that time was used. The figure represents an horizontal projection of the TCE distribution based on data from wells open either to the UFZ or to the LFZ; at monitoring well cluster locations, data from the well with the highest concentration at that cluster was used, regardless of its depth. As shown in Figure 1, near the center of the property there is an area where TCE concentrations exceed 5,000 µg/l. The concentrations in monitoring wells within this area are close to one percent of the effective solubility of TCE, and suggest the potential presence of sources within this area[2].

The current vertical distribution of TCE concentrations near the northwestern boundary of the Sparton property is shown in Figure 2. As shown on this figure, TCE concentrations along the northwestern property boundary are relatively low near the water table; the highest concentrations, and hence the greatest mass discharge across this boundary, occur at depths of about 20 to 40 feet below the water table.

[2]Pankow, J. F. and J. A. Cherry, 1996, **Dense Chlorinated Solvents and other DNAPLs in Groundwater**, Waterloo Press, Portland, Oregon.

Water-level contours, based on January 1998 measurements in wells open to the LFZ, and the average direction of groundwater flow across the Sparton property are shown in Figure 3. The hydraulic gradient across the property, calculated from these contours, is 0.00465 foot per foot. The transmissivity of the aquifer underlying the property has been previously determined to be 18,000 gallons per day per foot (gpd/ft) from a pumping test conducted on well PW-01 (see Figure 3 for well locations).

As stated earlier, the water pumped by the proposed 50-gpm recovery well will be treated and then returned to the aquifer through a series of rapid infiltration ponds. To obtain data for the design of these ponds, a series of vertical permeability tests were recently conducted by Metric Corporation[3]; the tests were conducted at a depth of 1.5 feet near the northeastern boundary of the Sparton property using the "Designation E-18" method of the Bureau of Reclamation[4]. The results of these tests indicate an average vertical hydraulic conductivity of about 180 feet per year (0.5 feet per day).

These available data were used in the design of the proposed 50-gpm recovery well and of the associated rapid infiltration ponds.

3.0 PROPOSED RECOVERY WELL AND ASSOCIATED FACILITIES

The proposed location of the 50-gpm recovery well is shown in Figure 4. This proposed location is an 80-foot easement on a property owned by Adobe Wells Partnership; therefore,

[3]Gary L. Richardson of Metric Corporation, personal communication, July 21, 1998.

[4]U. S. Department of Interior, Bureau of Reclamation, 1974, Earth Manual, A Water Resources Technical Publication, Second Edition.

installation of the well at this location is subject to reaching an agreement with Adobe Wells Partnership on an easement to install the well and a pipeline between the well and the treatment facilities on the Sparton property. The well will be completed with 4-inch nominal diameter casing and screen; the screened interval will extend from the water table to a depth of 50 feet below the water table.

After treatment, the water pumped from the recovery well will be discharged into three of six rapid infiltration ponds located within an approximately 3.6-acre fenced area within and along the northeastern boundary of the Sparton property (see Figure 4). The six ponds cover an area of about 2.2 acres and each pond is designed to accept one third of the 50-gpm discharge of the recovery well, or about 17 gpm; thus, at any given time three ponds will be utilized to discharge the treated-water. This six-pond design provides flexibility for switching between ponds for rehabilitation, maintenance and repair operations. To allow for the potential partial clogging of the pond bottoms during the operation of the ponds, a vertical hydraulic conductivity equal to 20 percent of the field-determined value was assumed in their design[3] As also shown in Figure 4, the air stripper (a new 50-gpm air stripper) will be installed within the fenced area and the existing control building will also be moved into this area.

4.0 CAPTURE ZONE OF THE PROPOSED RECOVERY WELL.

The areal limit of the capture zone of the proposed 50-gpm recovery well is shown in Figure 5. As shown in this figure, the capture zone of the well will contain the potential on-site source area, and will extend considerably beyond this area. With the potential source area under control, constituents remaining outside the limit of the capture zone will be flushed out by naturally

flowing groundwater and by water infiltrating from the ponds, and will eventually be captured by the off-site containment well.

The depicted capture zone of the well was determined using the transmissivity and hydraulic gradient values mentioned in Section 2.0 and the software AqModel[5]. The effects of the infiltration ponds were incorporated into this analysis by simulating each pond by multiple injection wells. Based on pan evaporation data from the Los Lunas Experiment Farm near Albuquerque, the evaporation rate from the ponds was calculated as 4.3 feet per year[6]; this approximately corresponds to a five percent evaporation loss from the ponds and it was taken into account in simulating the pond effects. As shown in Figure 5, recharge from the infiltration ponds will cause the capture zone to be somewhat skewed with respect to the average direction of groundwater flow. There will also be a slight change in the limit of the capture as discharge of the treated water is switched from one three-pond set to the other; however, the width of the capture zone along the northwestern property boundary will remain essentially the same, about 480 feet. The vertical projection of this width of the capture zone along the property boundary is shown in Figure 6, superimposed on the current vertical distribution of TCE concentrations. Based on these TCE concentrations, the mass of TCE to be captured by the recovery well is calculated to be about 85 percent of the TCE mass currently leaving the Sparton property across this boundary.

The horizontal and vertical extent of the capture zone presented in Figures 5 and 6 are based on calculations that assume a well fully penetrating the saturated interval corresponding to the

---

[5]O'Neill, G. T., 1992, **AqModel Version 2.1 User's Manual**, WellWare™, 3160 Woods Circle, Davis, California 95616

[6]Gary L. Richardson of Metric Corporation, personal communication, July 22, 1998.

transmissivity of 18,000 gpd/ft. Because the proposed recovery well will be partially penetrating this interval, its capture zone could be wider and shallower[7].

After the recovery well is put into operation, pumpage from the existing on-site shallow recovery wells will be discontinued. During the first month of operation, the pumping rate of the well and water levels in the recovery well and in existing monitoring wells on the Sparton property and its vicinity will be monitored to assess the performance of the recovery system. The procedures to be used for this assessment will be similar to those that will be used to evaluate the performance of the off-site containment well[8].

---

[7] Bair, Scott E. and Terry D. Lahm, 1996, **Variations in Capture-Zone Geometry of a Partially Penetrating Pumping Well in an Unconfined Aquifer**, Ground Water, v. 34, no. 5, pp 842-852.

[8] S. S. Papadopulos & Associates, Inc., 1998, **Work Plan for the Evaluation of the Off-Site Containment System Performance**, prepared for Sparton Technology, Inc., Coors Road Facility, Albuquerque, New Mexico, July 14.

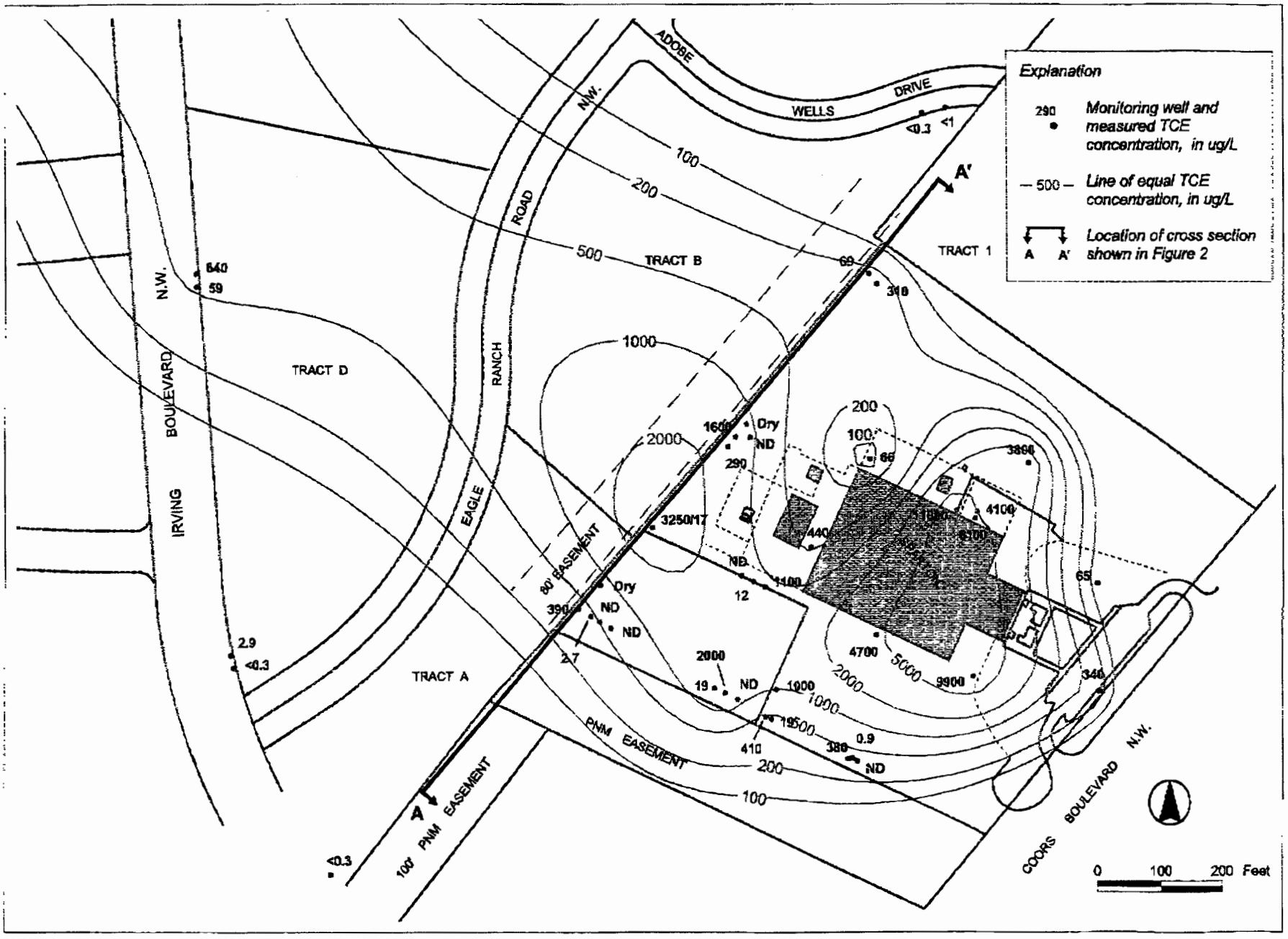

Figure 1 Distribution of TCE Concentrations at the Sparton Property and Vicinity

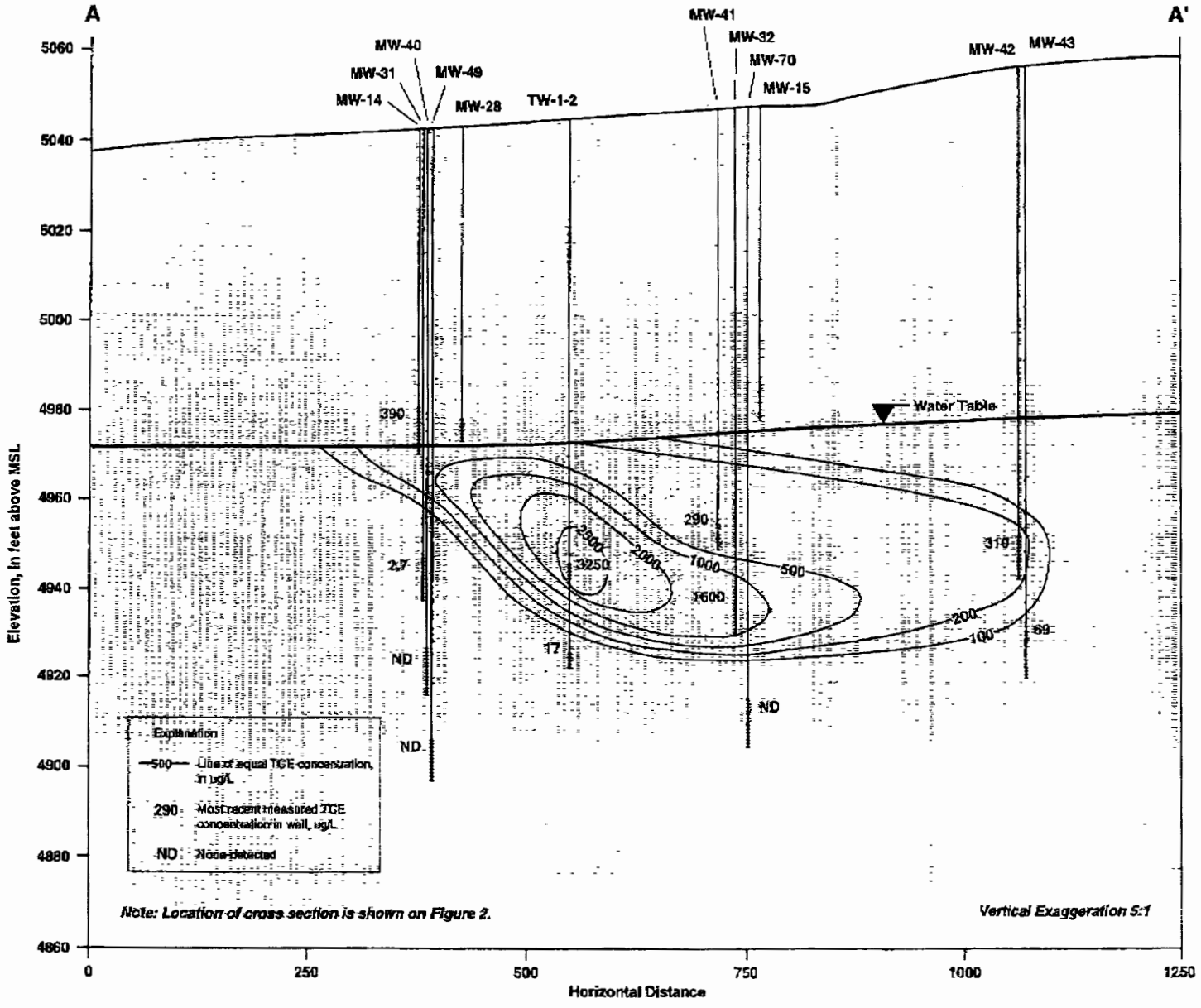

Figure 2 Vertical Distribution of TCE Concentrations along the Northwestern Property Boundary

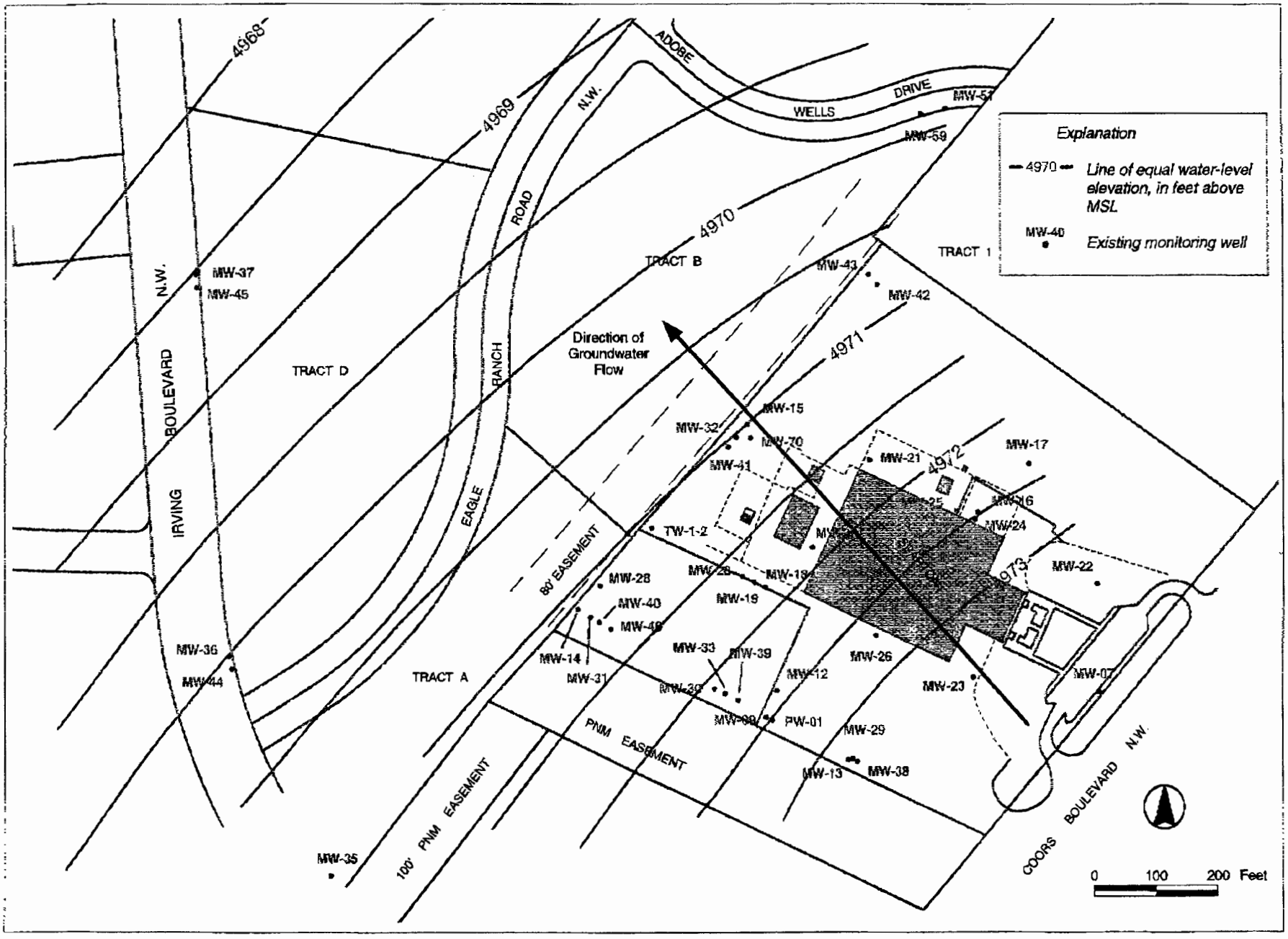

Figure 3 Water Levels and Direction of Groundwater Flow in the Lower Flow Zone

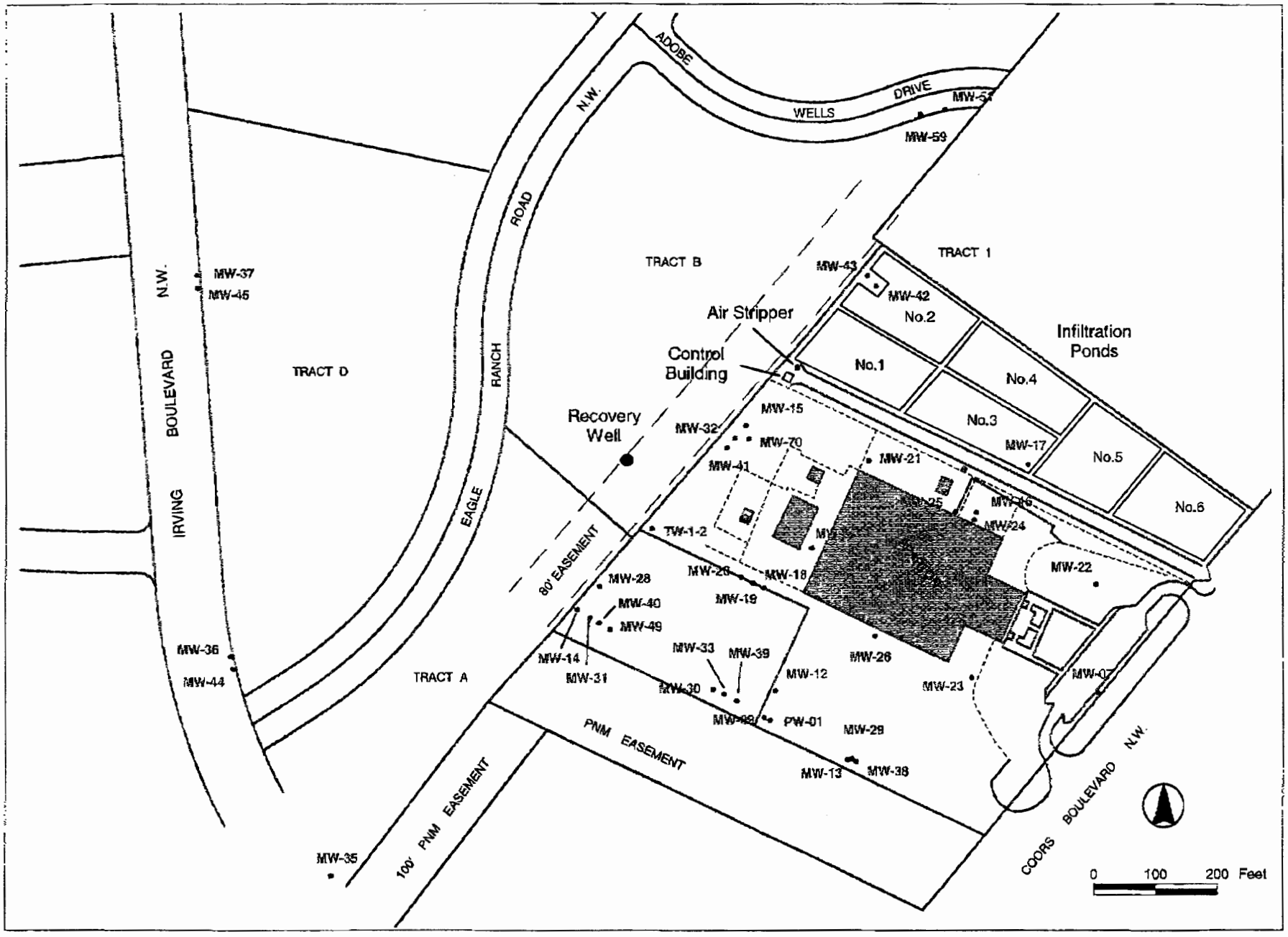

Figure 4 Proposed 50-gpm Recovery Well and Associated Facilities

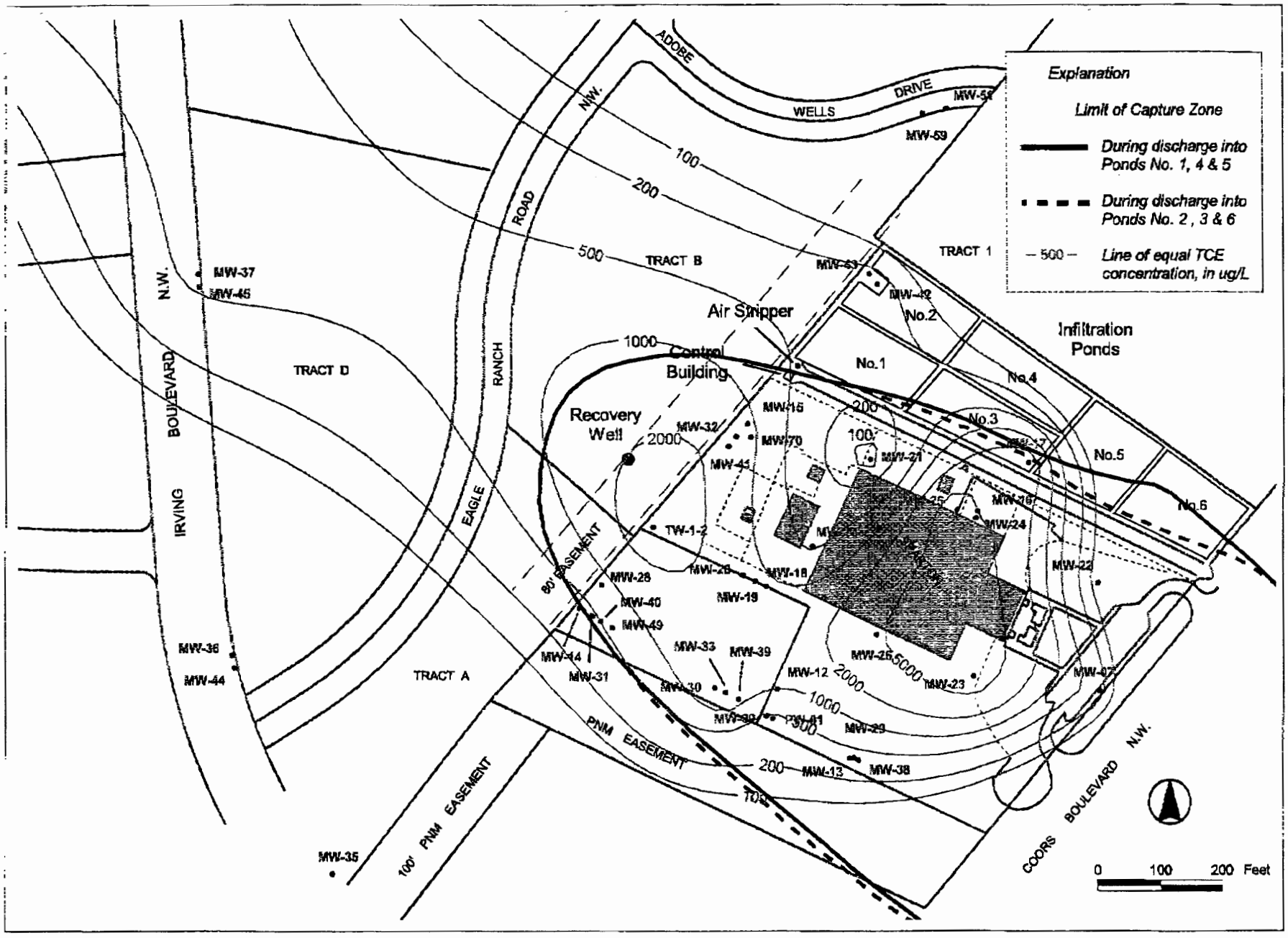

Figure 5 Areal Limit of the Capture Zone of the Proposed 50-gpm Recovery Well

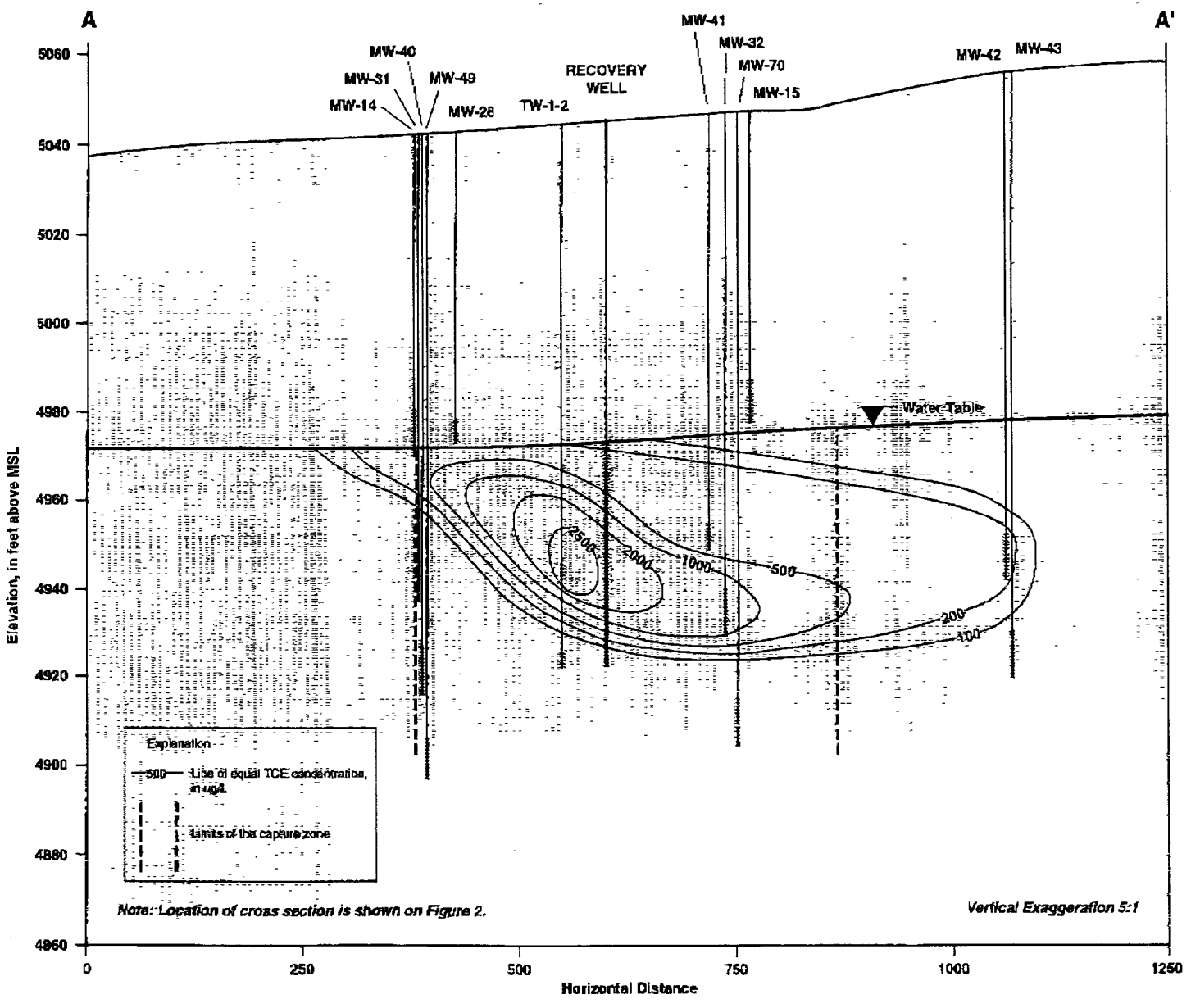

Figure 6 Vertical Limit of the Capture Zone of the Proposed 50-gpm Recovery Well