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Woodward-Clyde Consultants

September 27, 1984
83C2236-8

#17

E.I. duPont de Nemours & Co., Inc.
Niagara Plant
26th Street and Buffalo Avenue
Niagara Falls, NY 14302

Attention: Mr. Timothy D. Van Domelen
Engineer - R & D

GROUNDWATER MODELING FOR REMEDIATION STUDIES
NIAGARA PLANT, NIAGARA FALLS, NEW YORK

Gentlemen:

We are pleased to present herein our report of Groundwater Modeling studies conducted as part of our Phase II remediation studies for the Niagara Plant, Niagara Falls, New York. Our Phase II Remediation Studies report was submitted July 5, 1984. This report supplements the Phase II Remediation Studies report in that it describes the groundwater model simulations for the alternatives described in our Phase II report. This report was originally issued in draft form dated August 3, 1984. After receipt of your comments, the draft was revised as appropriate.

We sincerely appreciate the opportunity to provide these services to you on the Niagara Plant project. If you have any questions concerning this report, please contact us.

Very truly yours,

WOODWARD-CLYDE CONSULTANTS

David W. Buzzell
David W. Buzzell
Senior Technician

Frank S. Waller
for Jeffrey C. Evans, Ph.D., P.E.
Project Manager

DWB/JCE/mm

cc: Mr. Richard J. Gentilucci, DuPont
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Mr. Alan P. Eggler, DuPont
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Mr. Mark N. Gallagher, WCC

GROUNDWATER MODELING FOR REMEDIATION STUDIES
NIAGARA PLANT, NIAGARA FALLS, NEW YORK

Submitted to:

E.I. DUPONT DE NEMOURS & CO., INC.

Niagara Falls, New York

Prepared by:

WOODWARD-CLYDE CONSULTANTS

Plymouth Meeting, Pennsylvania

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EXECUTIVE SUMMARY

In order to develop and implement a remediation program for the Niagara Plant Site, necessary engineering and geologic studies were conducted. The focus of the developed remediation program is to actively pursue remediation of the "source" (contamination in the overburden). As a result of our hydrogeologic investigations and remediation studies, a conceptual remedial program was developed. To investigate the impact of alternative remedial schemes upon the subsurface groundwater flow regimes, groundwater modeling of the alternatives was undertaken. This report describes these groundwater modeling studies and presents their results. Thus, this report serves as a supporting document for our Phase II Remediation Studies report, dated July 5, 1984.

Groundwater in the area of the DuPont Niagara Plant Site is encountered in both the unconsolidated overburden soils and the underlying bedrock. The source of groundwater recharge in the overburden in the vicinity of the Niagara Plant Site is primarily from direct infiltration of precipitation. Conceptual remediation systems were developed for both the east and west plant areas, since these represent isolated groundwater flow systems in the overburden zone. The recommended remediation alternative for both areas included the construction of a drain tile collection system in conjunction with a circumscribing slurry wall. The Prickett-Lonquist Aquifer Simulation Model was used to model the overburden groundwater flow regime for these Phase II Remediation Studies. This computer analysis is a widely used, well documented, two-dimensional finite difference numerical technique which simulates groundwater flow.

Both the east and west plant areas were digitized using evenly spaced grids with a node spacing of 100 feet x 100 feet. Utilizing our design input parameters the calibrated hydraulic equilibrium for the site closely resembled the historic conditions modeled. The effects of drain tile collection systems and slurry trench cutoff walls were examined by applying combinations of these hydraulic stresses to the calibrated model parameters. The models were used to calculate the response of the groundwater systems to pumping from a drain tile collection system with and without the presence of a low permeability vertical barrier to horizontal groundwater flow (i.e. a cutoff wall).

The drain tile collection systems were modeled at a location along DuPont Road to Adams Avenue for the east plant area, and at alternate locations for the west plant area, including Adams Avenue, DuPont Road and Riverside Avenue. For all cases, a two stage pumping schedule was considered appropriate. The first stage, concluding at roughly 97 days,was used to dewater the saturated flow zone, the second, to maintain the dewatered conditions. For both the east and west plant areas, it was found that utilizing any of the drain tile collection systems examined, without the presence of a cutoff wall, a partially effective hydraulic barrier would be expected to result. However, to further inhibit the off-site migration of contaminants and to provide protection in the event that the drain tile collection pumping system became temporarily inoperable, alternative cutoff wall locations were evaluated. These alternative locations included upgradient, downgradient, and circumscribing cutoff walls. As a result of these studies, it was concluded that a circumscribing slurry wall was most effective in reducing pumping rates and in providing positive means of containment in the event of temporary shutdowns in the pumping system for both the east and west plant areas. This combination of drain tile collection system and circumscribing slurry trench cutoff wall would be expected to create an effective and reliable hydraulic barrier for the plant. Note that the east plant and the west plant would each contain a separate drain tile collection system and circumscribing slurry wall.

INTRODUCTION

In order to develop and implement a remediation program for the Niagara Plant Site, necessary engineering and geologic studies were conducted. The geohydrologic investigations completed to date are described in our reports dated December 23, 1983, and February 17, 1984 and entitled "Geohydrologic Investigations" and "Manmade Passageways Investigations", respectively. Supplemental geohydrologic and manmade passageway investigations are presently on-going. In addition, remediation studies completed to date, include examination and compilation of available remedial techniques as described in our "Phase I Remediation Studies" report dated April 2, 1984 and development of a conceptual remediation program as described in our "Phase II Remediation Studies" report dated July 5, 1984.

The focus of the previous remediation studies followed the established project strategy, that is, to actively pursue remediation of the "source" (contamination in the overburden). As a result of our remediation studies, a conceptual remedial program was developed. To investigate the impact of alternative remedial schemes, groundwater modeling of the alternatives was undertaken. The following report describes the groundwater modeling studies and presents the results of those studies. Hence this report serves as a supporting document to our Phase II Remediation Studies report dated July 5, 1984.

BACKGROUND AND PROJECT DESCRIPTION

Investigations have been undertaken at the DuPont Niagara Plant to evaluate the presence and movement of suspect chemical contaminants in the overburden and bedrock groundwater flow regime. As described in our December 23, 1983 report, groundwater in the area of the DuPont Niagara Plant is encountered in both the unconsolidated overburden soils and in the underlying bedrock. The source of groundwater recharge in the overburden in the vicinity of the Niagara Plant Site is primarily from direct infiltration of precipitation. Source of groundwater recharge in the underlying Lockport Formation is from induced infiltration from the Niagara River and, to a lesser extent, from downward leakage of groundwater from the overlying overburden. As part of the initial investigations, chemical analyses were performed on groundwater samples obtained from monitoring and utility wells. Based upon field observations during the installation of monitoring wells and groundwater sampling, and the comparisons of specific analytical results with chemical solubility limits, it was concluded that nonaqueous phase fluid existed in several locations of the plant site. Further, the results of the analytical groundwater sampling program were compared to the location of previous plant process areas and events on the plant site. This comparison resulted in the correlation of process/event areas with presence of specific compounds. Based upon the data available regarding contaminant concentrations in groundwater flow, the total organic loading was estimated. These data were utilized for the basis of the remedial alternatives investigated.

Our Phase I remediation study was conducted to identify and evaluate available remediation techniques that would be applicable to the DuPont Niagara Plant Site. Potential remediation technologies evaluated included excavation and disposal, passive containment techniques, active containment techniques, insitu solidification, flushing, bioreclamation of contaminated groundwater, and conventional treatment of groundwater. During our Phase II studies, these alternatives were further evaluated. Conceptual remediation systems were developed for the east and west plant areas since these represent isolated groundwater flow systems in the overburden zone. The recommended remediation alternative for both the east and west plant area included the construction of a drain tile collection system in conjunction with a circumscribing slurry trench cutoff wall. If was further recommended that for final design studies, investigations should be undertaken regarding the cost effectiveness of reducing the infiltration recharge since infiltration of precipitation was identified as providing the prime source of groundwater in the overburden.

METHOD OF ANALYSIS

The Prickett-Lonnquist Aquifer Simulation Model[1] was used to model the overburden groundwater regime as part of the Phase II Remediation Studies. This is a widely used, well-documented, two-dimensional finite difference numerical technique which simulates groundwater flow. The model solves a form of the transient flow equation which allows for:

- o the inclusion of heterogeneity and anisotropy,
- o both confined and unconfined aquifer cases, and
- o both the steady-state and transient conditions.

PROGRAM DESCRIPTION

A mathematical model for steady-state and nonsteady-state (transient) groundwater conditions consists of a set of governing differential equations and boundary conditions which simulate the flow of groundwater in a domain. A closed form solution of the equations results in the determination of the hydraulic potential head at any and all points in the domain. For most cases, however, a closed form solution of the governing equations is not obtainable. In these cases, approximate methods employing numerical techniques are utilized to solve the mathematical model. The numerical technique used in the studies described in this report, is the method of finite differences. This provides a rationale for operating on the differential equations defining the model and for transforming them into a set of algebraic equations. Numerical solutions yield values for only a finite number of predetermined points in the problem domain. By limiting the need to know the head at a reasonable number of points, the set of partial differential equations is converted into a set of algebraic equations involving the number of unknown potentials. In using the finite difference method, a regularly or variably spaced grid is established in the flow domain. The intersection of grid lines are called nodes. The closer the node spacing selected, the nearer the approximate solution approaches the "exact" analytical solution. Derivatives in the governing partial differential equations are replaced by differences taken between nodes. If the area defined by the grid spacing is small compared to the total area considered, then the discrete model is a reasonable representation of the continuous system.

INPUT DATA AND ANALYSIS PROCEDURES

Described in the following section of the report is a generic description of the input data and model calibration procedure. Details regarding the input parameters utilized for this study are presented in a following section of this report.

A regularly spaced grid was superimposed onto a plan of the area of concern. At the grid intersections (nodes), model parameters were assigned values extrapolated, interpolated, and/or measured from monitored field data. The input necessary to solve the Prickett-Lonnquist model consist of the following information:

- Node locations, in a Cartesian coordinate system, to provide a means to proportionally weight the effects of each node to the system.

- Column and row indices, to digitize the grid for computer manipulation.

- Directional hydraulic conductivities, to simulate the effects of the flow media to groundwater movement in both planar directions.

- Storage coefficient, to simulate the ability of the flow media to contain or dispel water from its voids.

- Net volumetric discharge/recharge, to provide a means to model flow into or out of the system at specified nodes.

- Definition of boundary conditions, to establish perimeter and pertinent interior hydraulic anomalies, such as the constant head of a relatively infinite body of water, or the no-flow conditions of a groundwater divide.

- Bottom of aquifer (top of rock), to establish a thickness for the flow media.

- Initial value of piezometric head, to specify a temporal relationship to known historic hydraulic conditions.

- Time step, to provide a means to monitor the calculated effects to the flow regime with time.

- Error of convergence, to specify a toleration level between a predicted change in piezometric head and a calculated change.

MODEL CALIBRATION

The above input was initialized for model calculations. The final time period, preceded by numerous time intervals, was chosen as that point when no significant changes occured in the calculated hydraulic head. The model was calibrated by adjusting selected variables, (hydraulic head, permeability, and/or boundary conditions) to more closely align the calculated equilibrium with actual field data. Once the groundwater model was calibrated, the expected effects of proposed hydraulic stresses were calculated and analyzed.

SYSTEM STRESSES

The calibrated model was used to calculate the response of the groundwater system resulting from the simulation of various hydraulic stresses. These stresses included pumping from drain tiles and placement of a low permeability vertical barrier to horizontal groundwater flow (i.e. a cutoff wall).

TILE DRAIN: The tile drain system was simulated by the model in two ways, the choice dependent on the type of information sought. To determine the effects of a tile drain, an increase in both the storage coefficient and the hydraulic conductivity along the direction of the drain was utilized, coupled with specifying the head achieved at the drain nodes as the water is extracted. With this procedure, the time required to reach equilibrium and the final piezometric head were obtained. However, to determine the quantity of water required to be extracted to effect the drain, a modification of the procedure just described was used. Instead of increasing the storage coefficient, a pump rate was applied at the nodes on the drain. These withdrawal rates were then altered to achieve the desired drawdown at the drain nodes for the time period examined. In addition, staged pumping was utilized to combine the rapid effect of quick drawdown, with the long-term effects of equilibrium.

CUTOFF WALL: To simulate the effects of a low permeability vertical barrier, (i.e. a slurry trench cutoff wall) the hydraulic conductivities at the appropriate nodes were decreased. The temporal effects were then studied.

Note that the model will not converge on a solution if the calculated head drops below the bottom of the aquifer. However, if at those nodes the bottom is lowered, calculations may proceed, with the results still valid provided, the flow thickness at those nodes is relatively small at the selected time step.

ANALYSIS AND RESULTS

The groundwater regime investigated for this report was limited to the overburden material. Although local heterogeneity and anisotropy exists throughout the plant site, specific simplifying and unifying values were assigned to soil parameters. The design parameters were based on an averaging of field measurements and our knowledge of typical site soil characteristics. Specifically, a uniform permeability of 1.0×10^{-2} cm/sec was assumed for the overburden. This value was based on the single well permeability test results and subsurface conditions referenced to in our "Geohydrologic Investigations" report, dated December 23, 1983. The overburden was assigned a storage coefficient of 0.25. The Niagara River and Gill Creek were assigned an elevation of between 562.0 and 562.3. These assumptions were utilized to develop groundwater flow models describing the east and west plant site areas. A detailed account of the input parameter values assigned to each node of the two model grids is presented in Appendix A.

For each stress or combination of stresses simulated, a two-stage water withdrawal schedule was examined. The first stage, selected to occur within roughly 97 days, is to achieve the rapid effects of the presence of a drain system on the immediate groundwater head. The second stage is to subsequently maintain that effect as the influence of the drain is reflected throughout the system. Moreover, for the cases examined herein, the hydraulic conductivity of a cutoff wall was set so as to model the effects of a 10^{-6} cm/sec barrier.

Note, that throughout the plant site, it is possible that an upward gradient from the B-zone may result from reduction of the hydraulic head in the A-zone. The resultant upward gradient may produce additional flow. Specifically, any upward flow from the B-zone to the overburden would be dependent on the amount of drawdown induced by artificial means, the degree of hydraulic connection between the two regimes, and the withdrawal rate from the drain tile collection system. As the relationship between the two zones is, at this time, not known, the analyses conducted herein do not include this factor. Studies to quantify the interrelationship between the overburden and bedrock zones are presently on-going and indicate little interconnection.

EAST PLANT AREA

The east plant area was bounded on the south by the Niagara River, on the west by Gill Creek, on the north by Buffalo Avenue, and on the east by a border roughly 2000 feet east of Gill Creek. Presented in our "Phase II Remediation" Studies report and included herein on Plates 1 and 2, are both the overburden groundwater and top of rock contours. The top of rock contours were used to define the aquifer thickness. The groundwater contours were used to initialize the hydraulic head in the model. Gill Creek and the Niagara River describe the western and southern boundaries, respectively, and were defined as constant head/infinite recharge zones.

Also included in the modeling of the east plant area was the infiltration of precipitation. The precipitation infiltration was input at nodes selected to be representative of actual infiltration areas. For example, no infiltration input was modeled for nodes beneath paved areas. It was estimated that fifty percent of the east plant area south of Adams Avenue, is available for infiltration. Considering runoff from this area, it was assumed that one half of the annual precipitation would infiltrate. This results in an average infiltration of 13 gpm.

The east plant area was digitized utilizing a twenty by sixteen line evenly spaced grid, with each node assigned the values described above. The node spacing was 100 feet by 100 feet. An equilibrium condition was observed for the 65 day time step. The calibrated hydraulic equilibrium for the site (Plate 3) closely resembled the historic conditions modeled. Although this combination of input parameters does not constitute a unique solution for the governing equations used, the solution obtained utilized realistic input values, and would, therefore, be a realistic simulation of field conditions. After model calibration, the modeled effects of a combination of drain tile system and slurry walls were then analyzed.

DRAIN TILE COLLECTION SYSTEM: The first system stress examined involved the placement of a drain tile collection system along DuPont Road to Adams Avenue, as shown on Plate 4. The aquifer bottom along this alignment was adjusted to create a continuous slope, and the permeability in one direction along the drain was increased. Each node along the drain was then pumped in two stages, as previously discussed. The results of the first stage, where the total rate of withdrawal from the drain system amounted to roughly 29 gpm, are presented on Plate 5 as groundwater contours. The pump rate necessary to maintain these effects was calculated to be approximately 16 gpm. The equilibrium conditions created by this system demonstrate that a partially effective hydraulic barrier would be expected to result from the drain tile collection system described (see Plate 6). That is, this system would reduce the off-site migration of contaminated groundwater. However, the steepness of the hydraulic gradient preclude down-slope groundwater from being extracted by the drain tile collection system.

DOWNGRADIENT CUTOFF WALL: To further inhibit the off-site migration of contaminants, and to provide added protection in the event that the drain tile pumping is temporarily inoperable, the addition of a down-gradient cutoff wall was evaluated. Two options were considered for alignment of the wall; one excluding the northeast area west of Hyde Park Boulevard, the other, including it (see Plates 7 and 8, respectively). For both conditions, the calculated first and second stage withdrawal rates were determined to be 30 and 17 gpm, respectively. These values are slightly greater than those calculated where only the drain tile was present. This results from the "back-up" effect created when the water, which does flow beyond the drain tile, is subsequently hindered from additional movement. This groundwater is then recovered by the drain resulting in higher withdrawal rates. The equilibrium results where the northeast portion is excluded are presented on Plate 9. The results with the inclusion of the northeast portion, are similarly presented on Plate 10.

UPGRADIENT CUTOFF WALL: In order to decrease the amount of groundwater flow into the drain tile collection system, the placement of a low permeability cutoff wall along the south and west site recharge boundary was investigated, (see Plate 11). The resulting contours, shown on Plates 12 and 13, illustrate the immediate and long-term effects to the groundwater elevation when this cutoff wall location is combined with the drain tile. Although the first stage withdrawal rate remained 29 gpm, the second stage rate dropped nearly 3 gpm from the 17 gpm rate calculated for the drain tile only condition. However, as the equilibrium withdrawal rate remained relatively high at 14 gpm, it appears that the 13 gpm infiltration factor is the primary contributor to groundwater recharge in the overburden for the east plant area.

Note that, these withdrawal rates are order-of-magnitude values and that a 3 gpm difference is within the limits of calculation. It is expected, however, that an upgradient cutoff wall will reduce the required withdrawal rate.

CIRCUMSCRIBING CUTOFF WALL: The drain tile system coupled with a fully circumscribing cutoff wall (see Plate 14) was also modeled. An initial withdrawal of roughly 30 gpm would effect the desired results maintained by a 14 gpm pumping from the drain. The pumping rate is therefore primarily as a result of the infiltration. The results of both the first and second stage drain tile system withdrawal rates are depicted as contours on Plates 15 and 16.

WEST PLANT AREA

The west plant area was bounded on the north by roughly Buffalo Avenue, on the east by Gill Creek, on the south by the Niagara River, and on the west by a border roughly 2000 feet west of Gill Creek. Groundwater flow in the overburden (Plate 1) is to the southeast with a significant deviation in the southwest corner, where flow appears to be to an unidentified sink to the west. The top of rock contours (Plate 2) indicate a generally south to southwestward slope of the rock surface. Gill Creek and the Niagara River were defined as constant head boundaries.

Recharge was also assumed to be from the north, but it is recognized that this was likely an unrealistic assumption. Additional data is presently being obtained to define the hydraulic conditions in this area. As will be subsequently discussed, it is recommended that, for final design studies, the model be refined to incorporate the additional data.

Similar to the east area, a precipitation infiltration rate was applied to the site at the southwest and southeast portions of the model area, where recharge from rainfall would be expected to occur due to the presence of unpaved surfaces. The total infiltration rate was assumed to be an average of 7 gpm based on 25% of the area being unpaved and subject to an infiltration equal to one half of the annual rainfall.

The west plant area was digitized utilizing a twenty-one by eighteen line grid resulting in nodes on 100 foot centers. When the input parameters were used for calculation, an equilibrium condition occurred in 65 days. As the equilibrium conditions (see Plate 17) closely resembled the historic conditions (see Plate 1), no further calibration was required. Again, although this combination of input parameters does not constitute a unique solution to the governing equations used within the model, the solution obtained utilized realistic input values, and would, therefore, be expected to be a realistic simulation of field conditions. Subsequent analysis included the application of certain stresses to the calibrated model, including a drain tile system and this system in conjunction with a downgradient, upgradient and fully circumscribing cutoff wall.

DRAIN TILE COLLECTION SYSTEM: Three options were investigated for placement of a drain tile collection system. The first examined the effects of an alignment along Adams Avenue east to Alundum Road, continuing south to DuPont Road and then east again (see Plate 18). As shown by the contours presented on Plate 19, an effective hydraulic barrier may be achieved over much of the west plant.

The second alignment considered began on Adams Avenue, as before, but proceeded south to Riverside Avenue, and then east on Riverside. This layout is depicted on Plate 20. The hydraulic barrier effectiveness for this case also appears to be effective (See Plate 21).

The third alignment examined began on Adams Avenue, proceeded south on Chemical Road and then east again on DuPont Road (see Plate 22). An initial withdrawal of roughly 23 gpm followed by a second stage rate of 8 gpm was calculated to be required to achieve an effective hydraulic barrier for this alignment. Illustrative representations of the effects of the two pumping stages are depicted on Plates 23 and 24. This drain alignment also creates an effective barrier over most of the west plant.

As the DuPont Road drain tile alignment was that determined to be the most appropriate (refer to the "Phase II Remediation" report), withdrawal rates were not calculated for the other two configurations.

PARTIAL CUTOFF WALL: To inhibit contaminated groundwater from entering the Niagara River, the effect of a low permeability cutoff wall alignment along the river in conjunction with the DuPont Road drain tile system was studied (see Plate 25). It was calculated that no significant reduction to the required two stage pumping effort would occur. The equilibrium results of the hydraulic stress combination are presented on Plate 26.

In order to decrease the amount of groundwater flow into the drain tile collection system, the effects of a cutoff wall placed along the northwest and north site boundaries, as shown on Plate 27, were investigated. First stage pumping calculations indicated no change in initial withdrawal rate. The results of this stress stage are presented on Plate 28. Only a slight withdrawal decrease was observed in the second pumping stage. That is, the rate of groundwater removal by the drain system dropped from 8 to 7 gpm. An examination of the equilibrium condition, illustrated on Plate 29, indicate that a significant portion of the long-term pumping is due to the infiltration of precipitation. Specifically, 3 to 4 gpm of the withdrawal is due to the recharge of infiltration from within site borders.

CIRCUMSCRIBING CUTOFF WALL: Two options were examined for the location of a slurry wall fully circumscribing the site. The first included the northwest plant section in the vicinity of monitoring well clusters 19 and 20 (see Plate 30). The results of first stage withdrawal calculations for this option indicated that a 2 gpm increase in the pumping rate was required to achieve the desired short term effects. Moreover, the long-term second stage withdrawal effort required, calculated to be no more than 2 gpm less than that required for the case where only the drain tile collection system was present. The calculated results of the first and second stages are depicted on Plates 31 and 32, respectively.

The second option examined the location of a circumscribing slurry wall as presented on Plate 33. This restricted area excludes that region north of Adams Avenue. First stage pumping (contours of groundwater head are illustrated on Plate 34) results in a rate nearly 7 gpm less than that determined for the larger circumscribing wall. Moreover, second stage withdrawal rate dropped 2 to 3 gpm (to between 5 and 6 gpm) from that necessary to achieve a similar effect for the case where the drain tile system exists alone (see Plate 35 for illustrative representation). Both rate reductions were due in part to the exclusion of some precipitation infiltration, and in part to the rerouting of upgradient groundwater by the presence of the slurry wall.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

All the cases investigated and described above have been summarized in Table 1. A brief description of the case is presented along with its associated first and second stage withdrawal rate. Note that each rate has been given as a range. As mentioned previously, a two stage pumping schedule was considered so as to more accurately describe the desired effects of the drain tile collection system. In addition, for the reasons indicated previously, the effects of a potential upward flow from the B-zone have not been included in this computer analysis. However, it is assumed that any upward flow induced as a result of the examined stresses would have a minimal impact upon the pumping rates established for the drain tile collection system.

As recommended in our Phase II remediation study, it is recommended herein that, for final design studies, investigations be undertaken regarding the cost effectiveness of reducing the infiltration recharge. As demonstrated in these studies, the residual groundwater flow after the initial stage of pumping results primarily from precipitation infiltration recharge. Hence, the treatment cost could likely be reduced if this precipitation infiltration recharge were reduced.

EAST PLANT AREA

For the east plant area, it is concluded that a circumscribing slurry trench cutoff wall can be installed to effectively cutoff the east plant area, as shown on Plate 36. In conjunction with this cutoff wall, a drain tile collection system can be installed along DuPont Road and Adams Avenue, as shown on Plate 36, with a wet well near the intersection of Hyde Park Boulevard and Adams Avenue. The groundwater contours for this conceptual remediation program are shown on Plate 37. This plan would be expected to create an effective and reliable hydraulic barrier for the east plant area.

WEST PLANT AREA

The preferred remedial technique for the west plant area is similar to that for the east plant area. That is, a circumscribing slurry trench cutoff wall can be installed to circumscribe the west plant area, as shown on Plate 36. In conjunction with the cutoff wall, a drain tile collection system can be installed along DuPont Road from Gill Creek to Chemical Road, north on Chemical Road between DuPont Road and Adams Avenue, and west along Adams Avenue, as shown on Plate 36. The groundwater contours for the conceptual remediation program are shown on Plate 37. This plan would be expected to create an effective and reliable hydraulic barrier for the west plant area.

RECOMMENDATIONS

As previously noted, it is recommended that the groundwater model be revised to incorporate the results of the recent hydrogeologic investigations. This is particularly important for the west plant area along Buffalo Avenue. Further, given the inherent uncertainty in groundwater flow predictions, it may be desirable to conduct additional field verification work such as pumping from a trial section of the proposed drain tile collection system.

LIMITATIONS

The findings and conclusions presented in this report are based on interpretations developed from the geologic, subsurface and groundwater data of the aforementioned reports. These findings and conclusions are subject to confirmation and/or revision as additional information becomes available. The recommendations presented in this report are based on the assumption that the simulated model conditions are representative of those that would exist should the recommended groundwater control scheme be implemented. The assumptions made and the variability of the basic parameters influencing the Prickett-Lonnquist model, along with the nonuniqueness of the solution presented, have been discussed in this report. Moreover, as mentioned above, the flow rates presented in this report are order-of-magnitude values.

Tables

TABLE 1

FLOWS FOR MODELED CONDITIONS

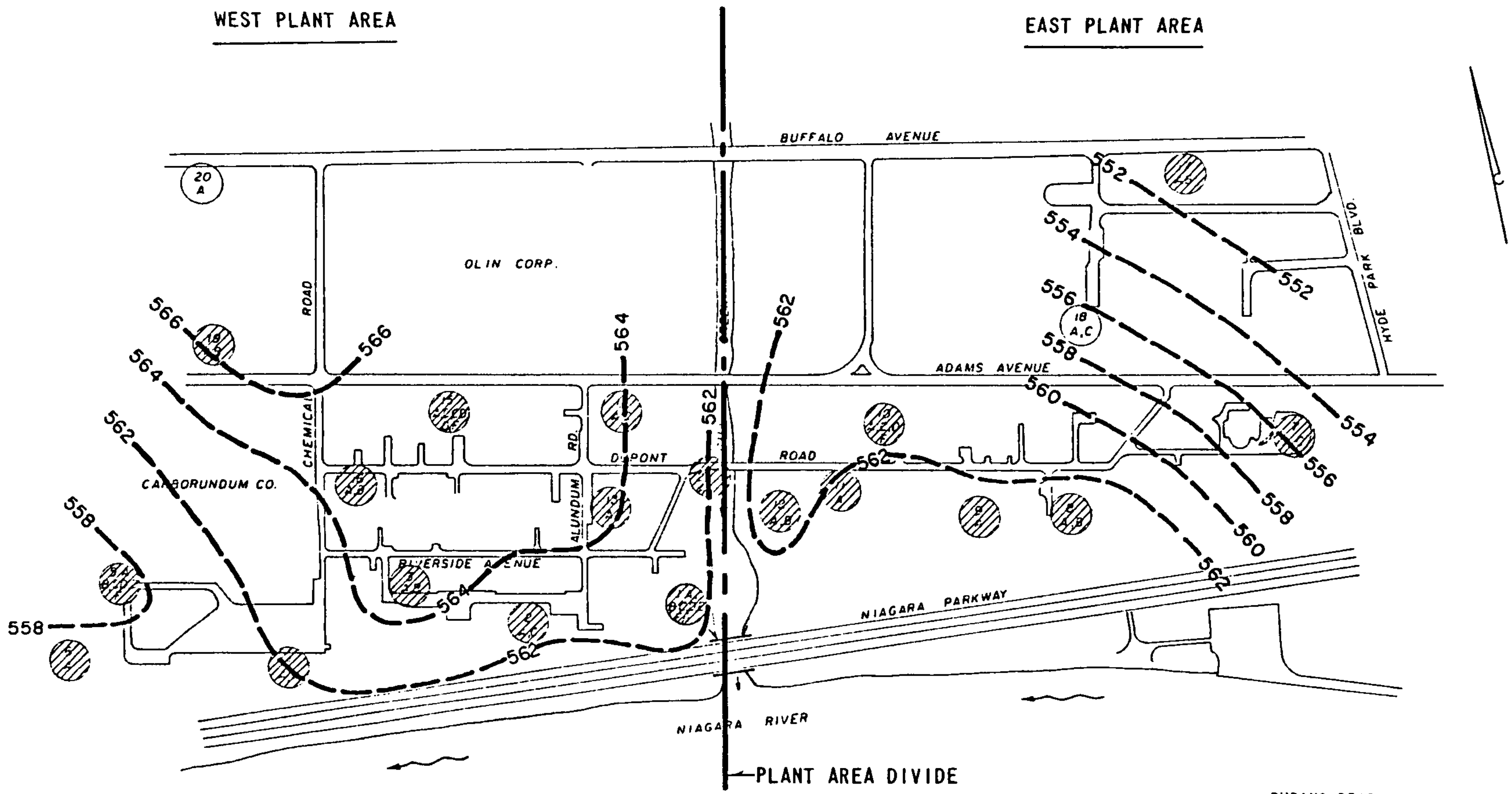
EAST PLANT AREA

Withdrawal Schedule (gpm)		
First Stage	Second Stage	Description
30-40	15-20	Drain tile collection system only
30-40	15-20	Drain tile with Option #1 downgradient slurry wall
30-40	15-20	Drain tile with Option #2 downgradient slurry wall
30-40	15-20	Drain tile with upgradient slurry wall
30-40	10-15	Drain tile with circumscribing slurry wall

WEST PLANT AREA

Withdrawal Schedule (gpm)		
First Stage	Second Stage	Description
20-25	5-10	Drain tile collection system along DuPont Road only
20-25	5-10	Drain tile with downgradient slurry wall
20-25	5-10	Drain tile with upgradient slurry wall
20-25	5-10	Drain tile with Option #1 circumscribing slurry wall
15-20	3-8	Drain tile with Option #2 circumscribing slurry wall

Plates



DURING RECOVERY TEST

OCTOBER 17, 1983, TIME ~ 1200

LEGEND:

WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)

WELL USED TO GENERATE CONTOUR MAP

561 GROUNDWATER ELEVATION

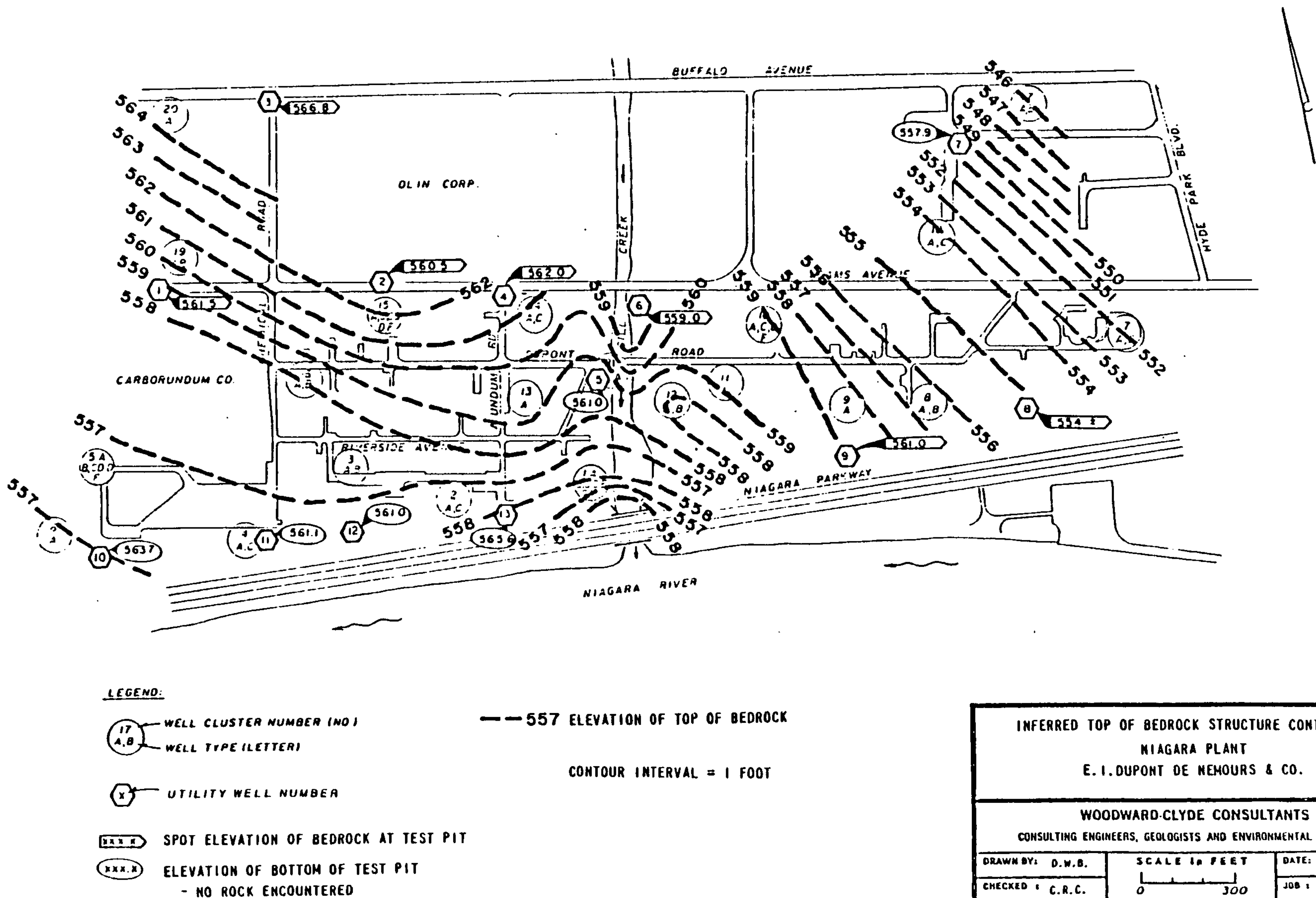
NOTE: GROUNDWATER CONTOURS HAVE BEEN INTERPOLATED BETWEEN DATA POINTS AND ACTUAL CONDITIONS CAN VARY FROM THAT SHOWN.

A-ZONE GROUNDWATER CONTOURS
INITIAL CONDITIONS
NIAGARA PLANT SITE
E.I. DUPONT DE NEMOURS & CO., INC.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.W.B.	SCALE in FEET: 0 — 300	DATE: 9/27/84
CHECKED: C.R.C.		JOB: 83C2236-8

PLATE 1

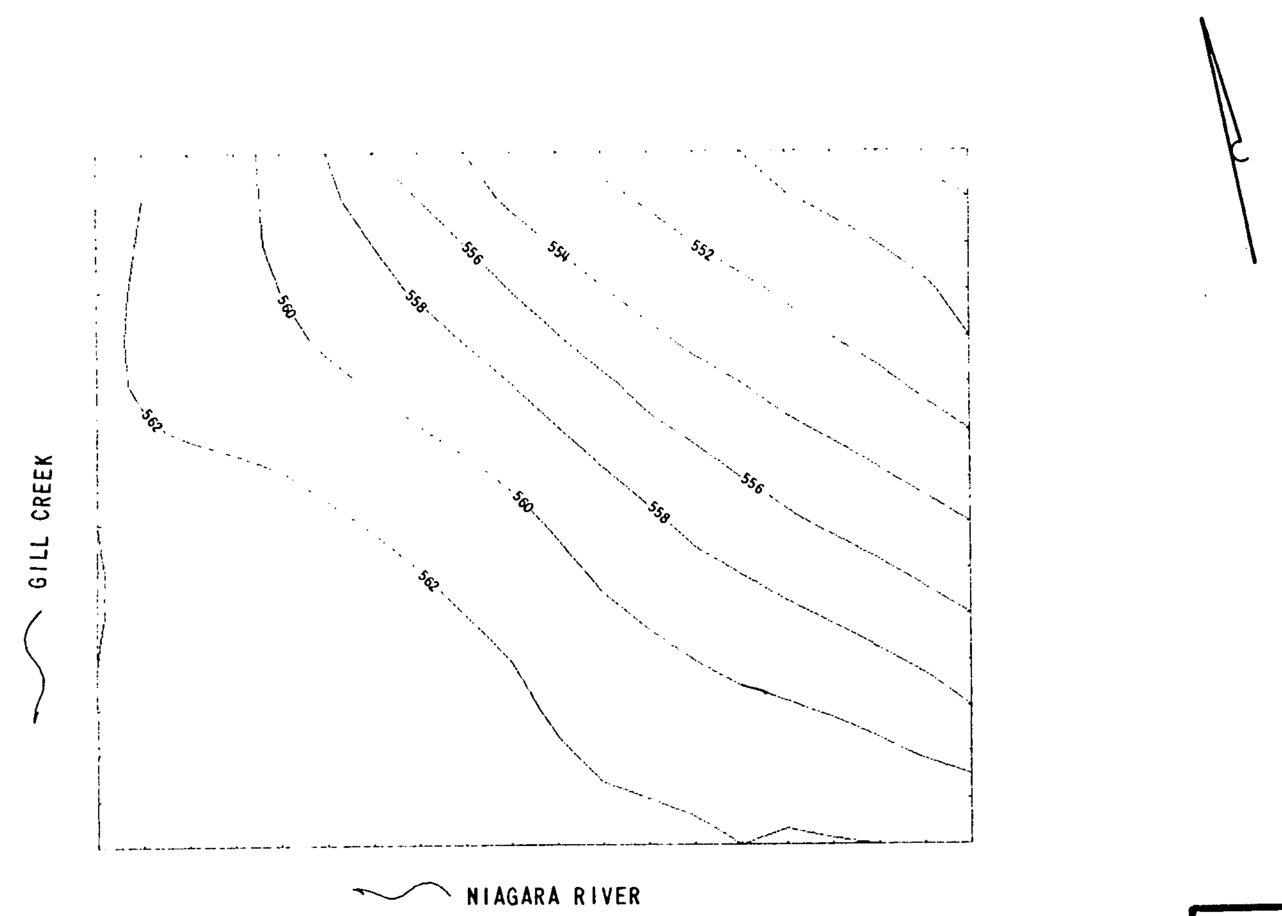


INFERRED TOP OF BEDROCK STRUCTURE CONTOUR MAP
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.W.B.	SCALE in FEET 0 — 300	DATE: 9/27/84
CHECKED: C.R.C.		JOB: 83C2236-8

PLATE 2

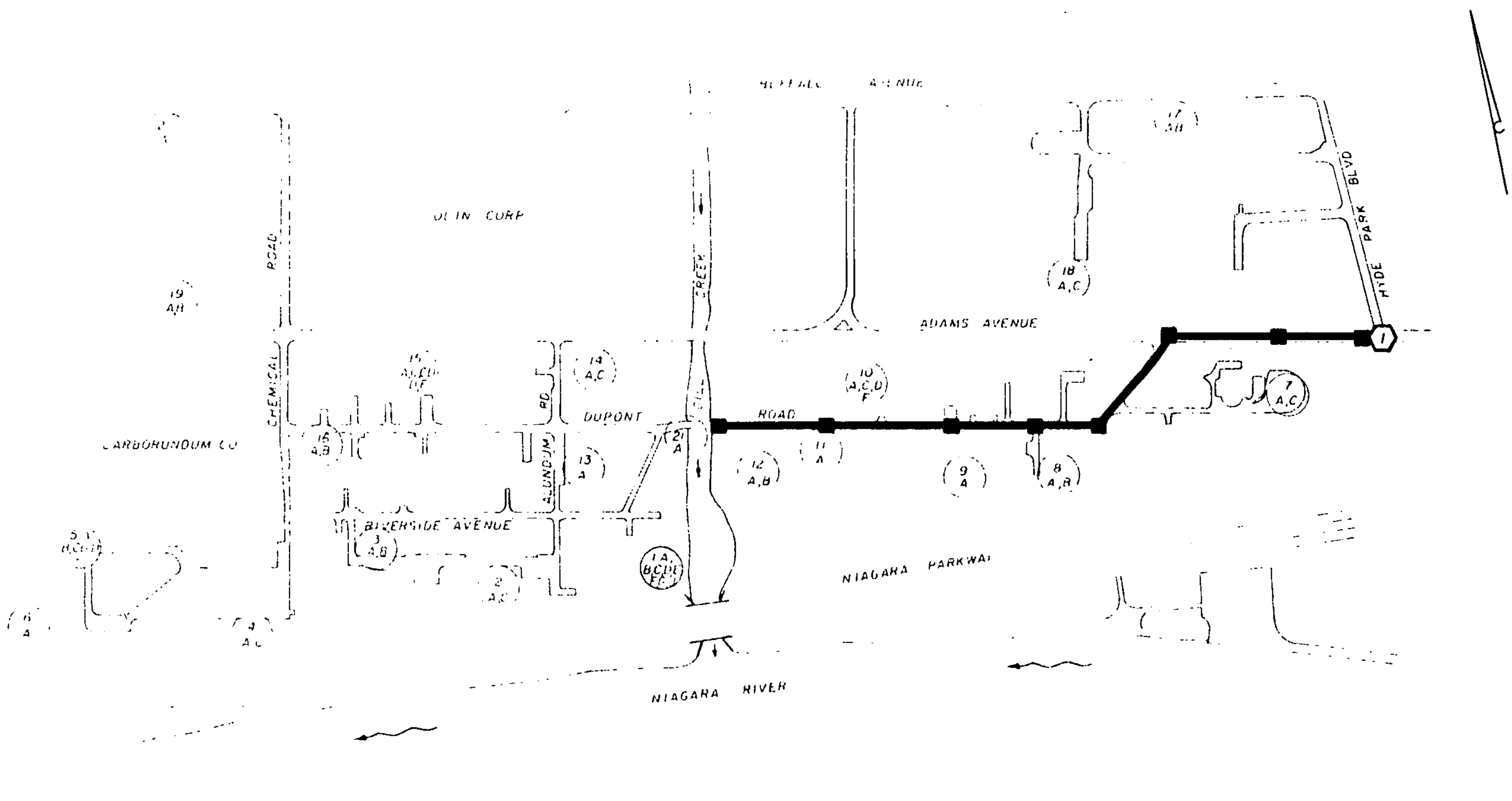


SIMULATED INITIAL CONDITION GROUNDWATER CONTOURS
EAST PLANT AREA
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 3



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

PUMP

MANHOLE

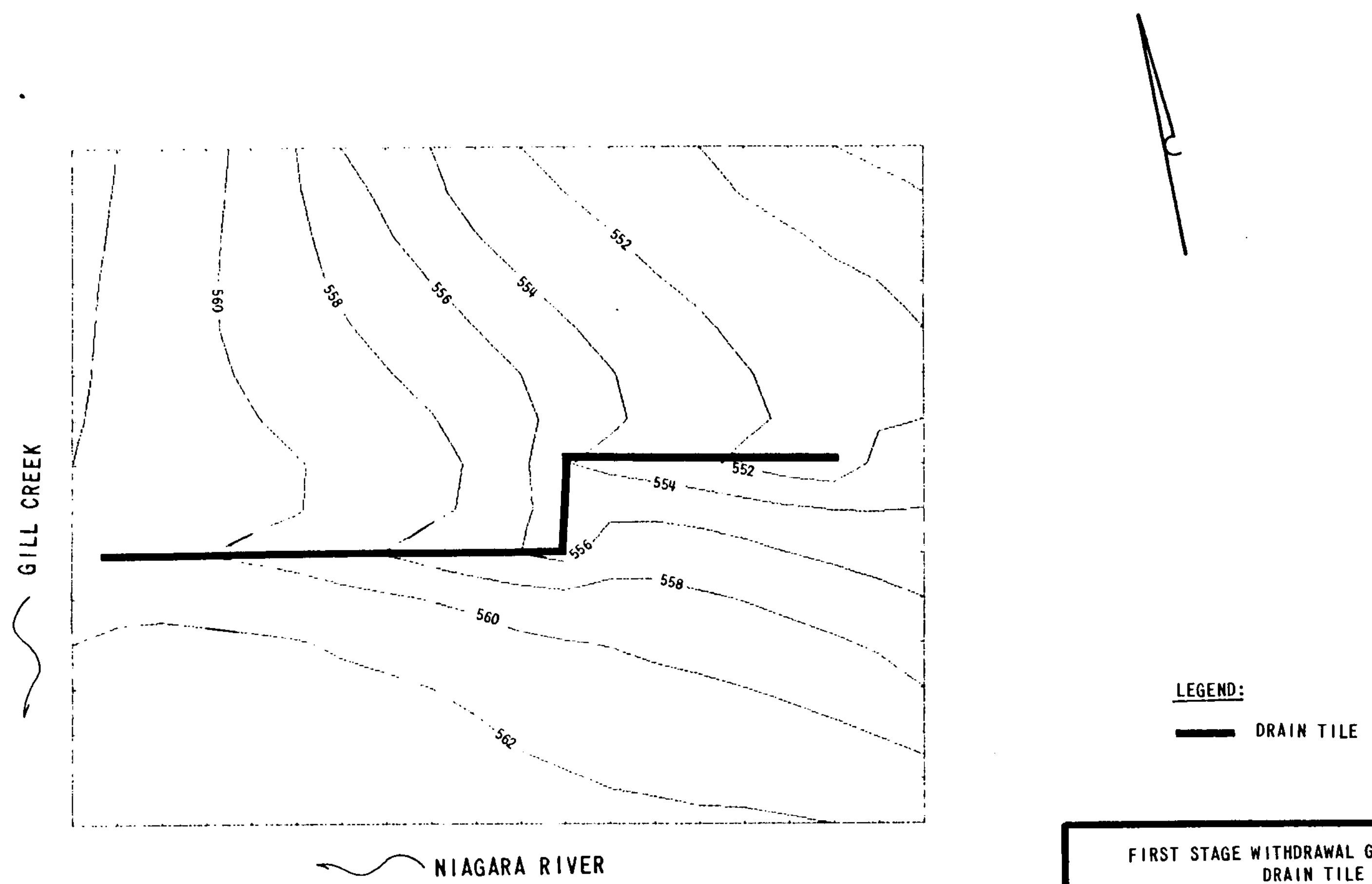
DRAIN TILE

DRAIN TILE COLLECTION SYSTEM
EAST PLANT AREA
NIAGARA PLANT
E.I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.J.	SCALE in FEET 0 300	DATE: 9/27/84
CHECKED: D.W.B.		JOB: 83C2236-8

PLATE 4

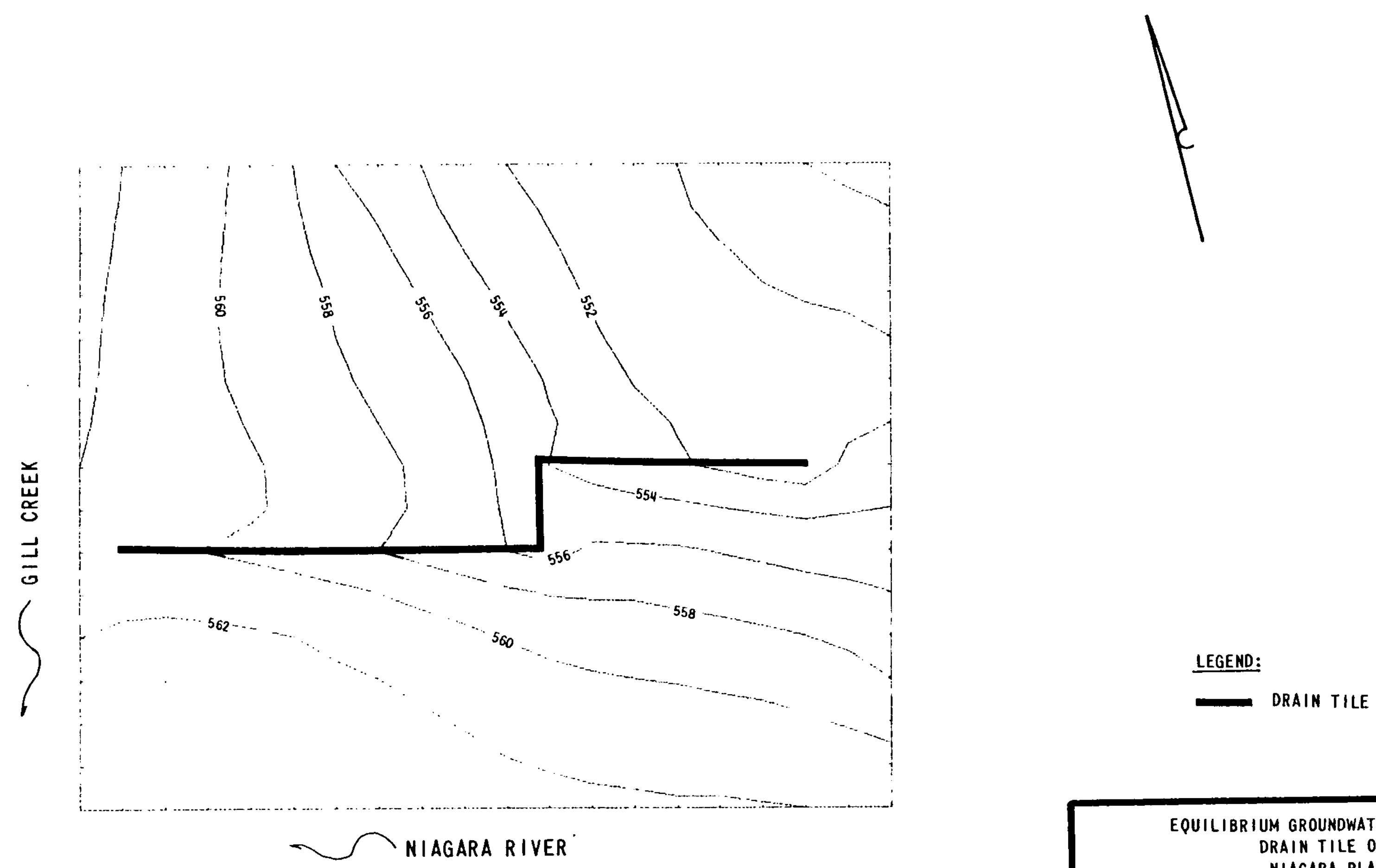


FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS
DRAIN TILE ONLY
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 5

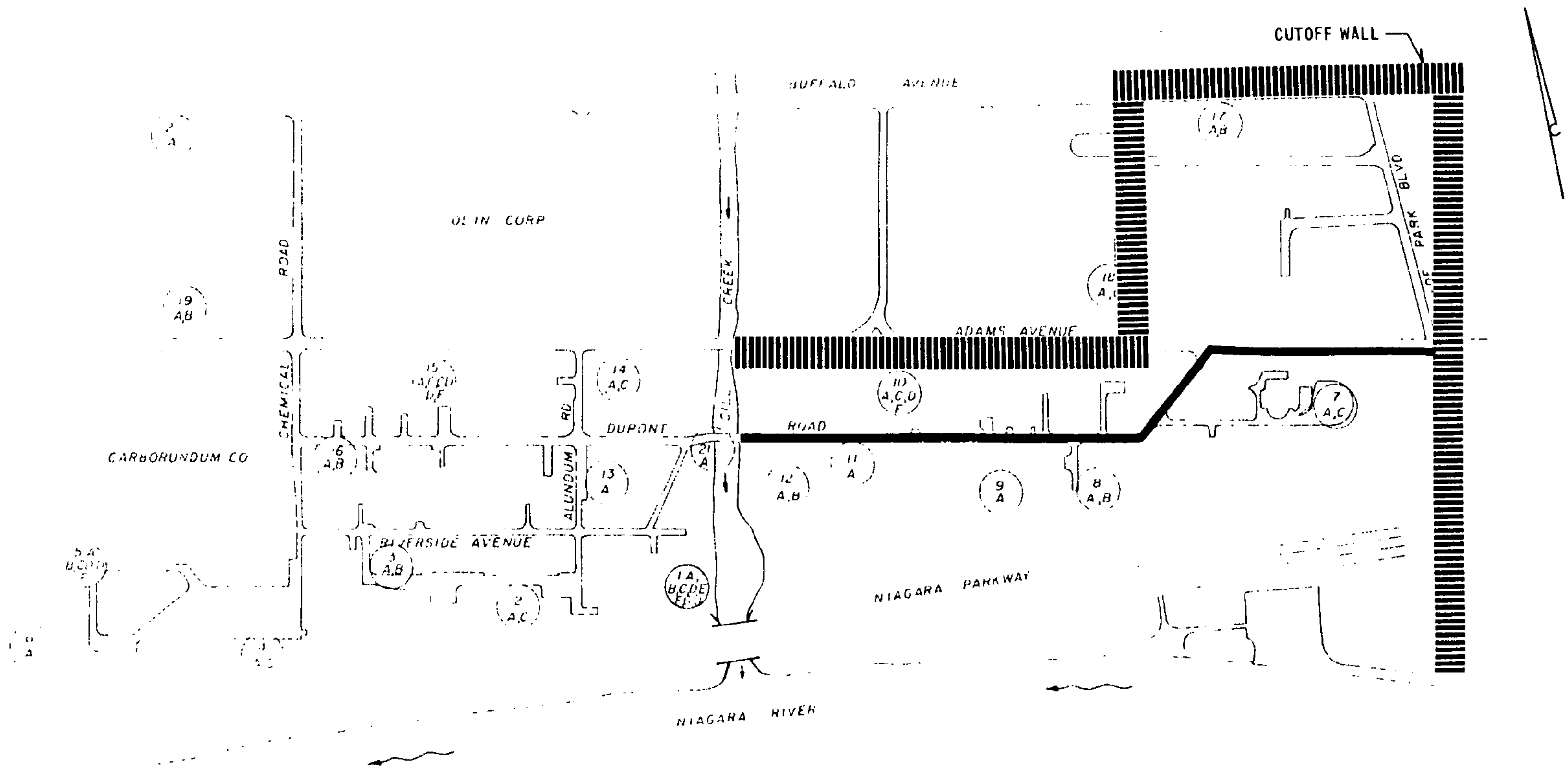


EQUILIBRIUM GROUNDWATER CONTOURS
DRAIN TILE ONLY
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 6



LEGEND:

(17 A,B) — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

DRAIN TILE

NOTE: ILLUSTRATIVE REPRESENTATION

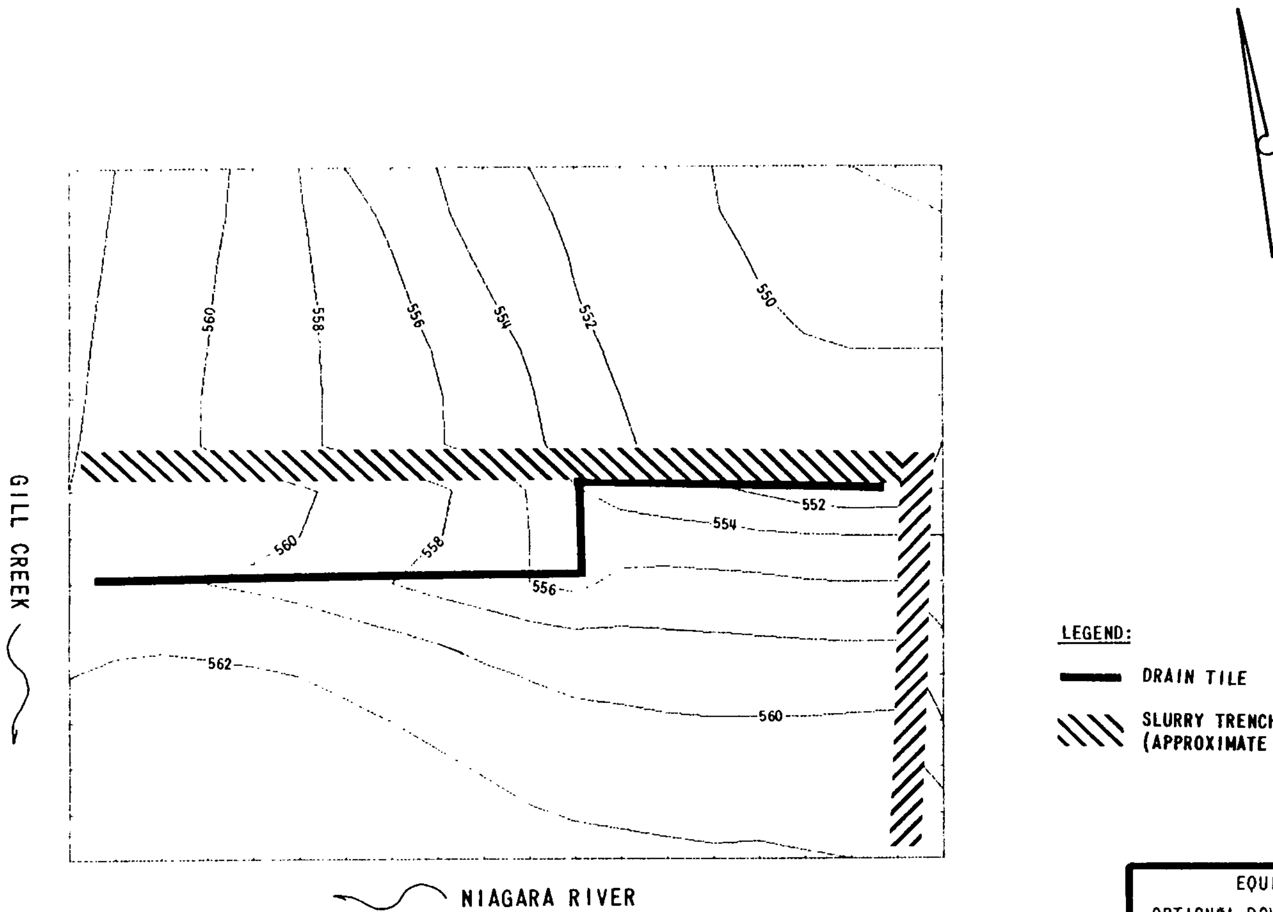
CUTOFF WALL - APPROXIMATE PERMEABILITY
10^{-6} cm/sec

OPTION#2 DOWNGRADIENT CUTOFF WALL WITH DRAIN TILE
EAST PLANT AREA
NIAGARA PLANT
E.I.DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.W.B.	SCALE in FEET	0 — 300	DATE: 9/27/84
CHECKED: C.R.C.			JOB: 83C2236-8

PLATE 8



LEGEND:

DRAIN TILE

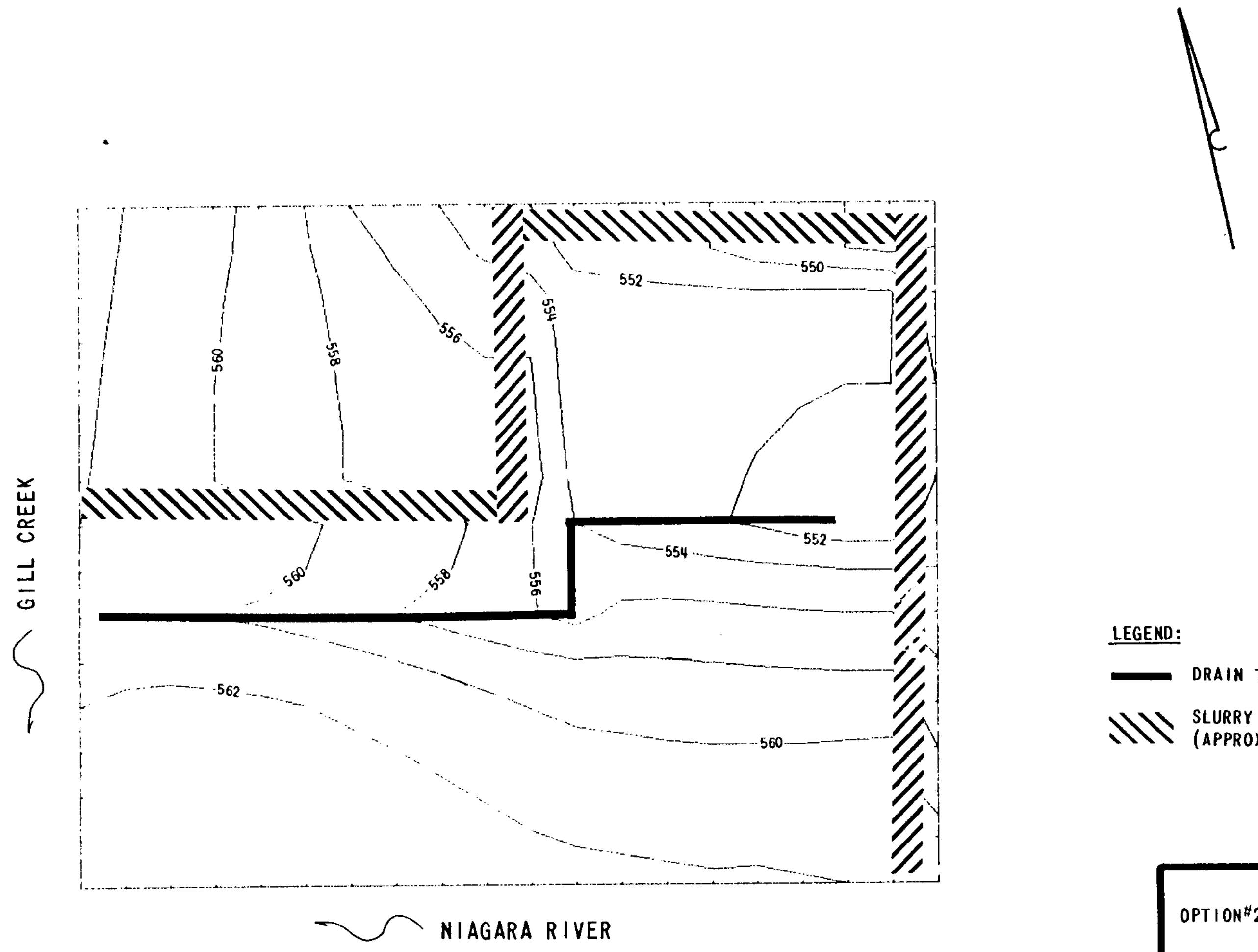
SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

EQUILIBRIUM GROUNDWATER CONTOURS
OPTION#1 DOWNGRADIENT CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84	
Checked: D.W.B.		Job: 83C2236-8	

PLATE 9



LEGEND:

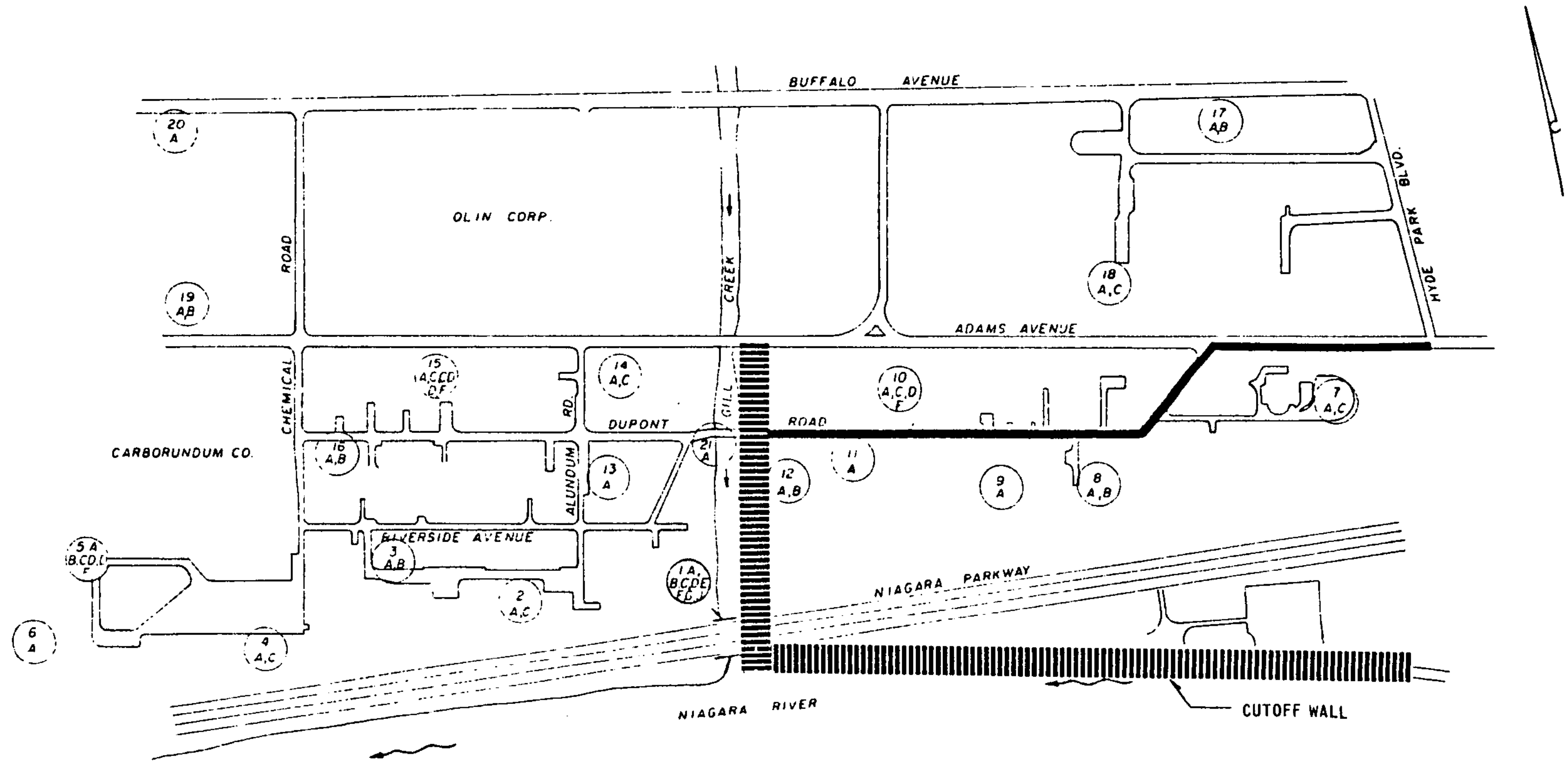
- DRAIN TILE
- SLURRY TRENCH CUTOFF WALL (APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

EQUILIBRIUM GROUNDWATER CONTOURS
OPTION#2 DOWNGRADIENT CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 10



LEGEND:

(17 A,B) — WELL CLUSTER NUMBER (NO.) — WELL TYPE (LETTER)

DRAIN TILE

NOTE: ILLUSTRATIVE REPRESENTATION

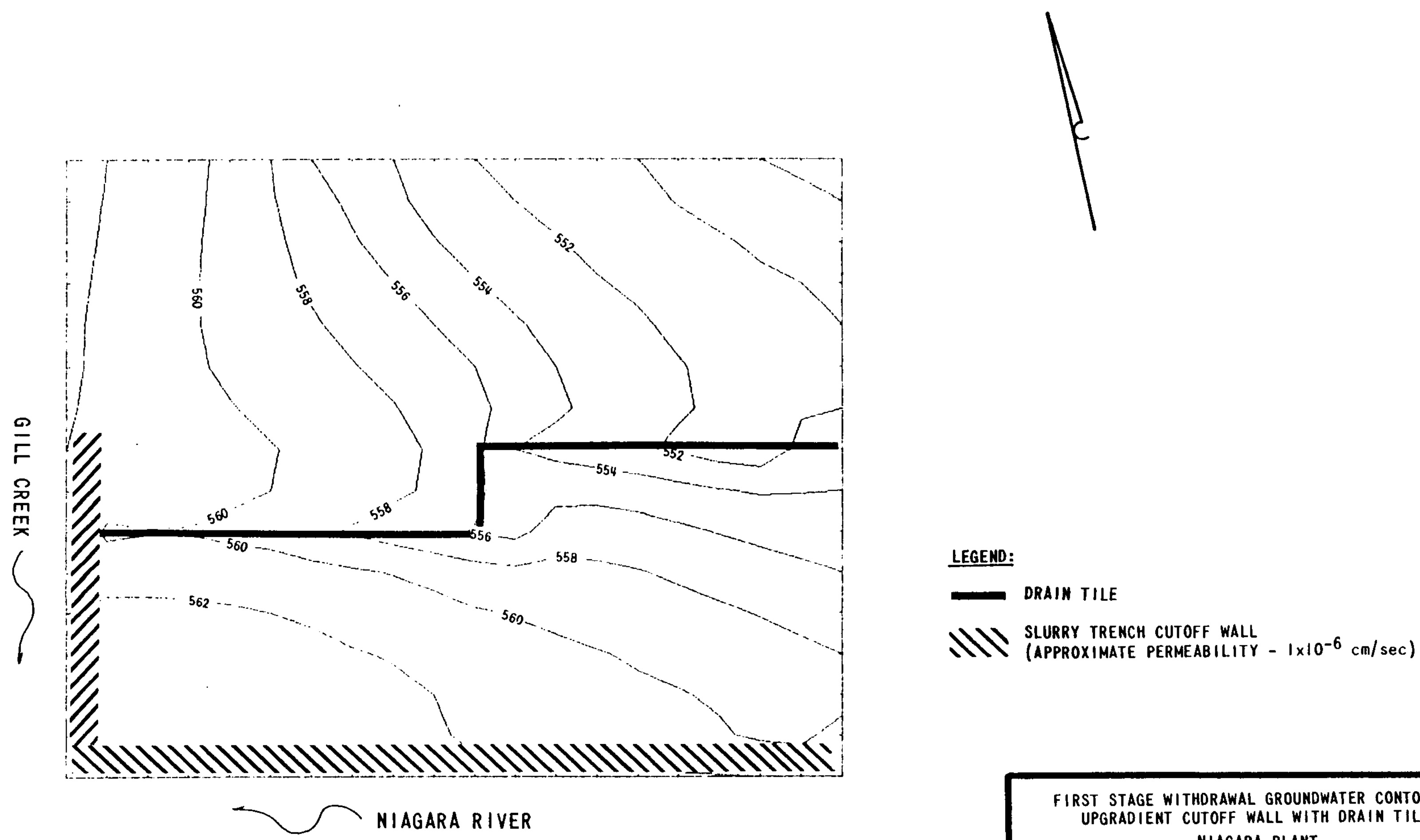
CUTOFF WALL - APPROXIMATE PERMEABILITY
10^{-6} cm/sec

UPGRADIENT CUTOFF WALL WITH DRAIN TILE
EAST PLANT AREA
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.J.	SCALE IN FEET	DATE: 9/27/84	
CHECKED: C.R.C.	0 300	JOB: 83C2236-8	

PLATE 11



FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS, UPGRADIENT CUTOFF WALL WITH DRAIN TILE

NIAGARA PLANT

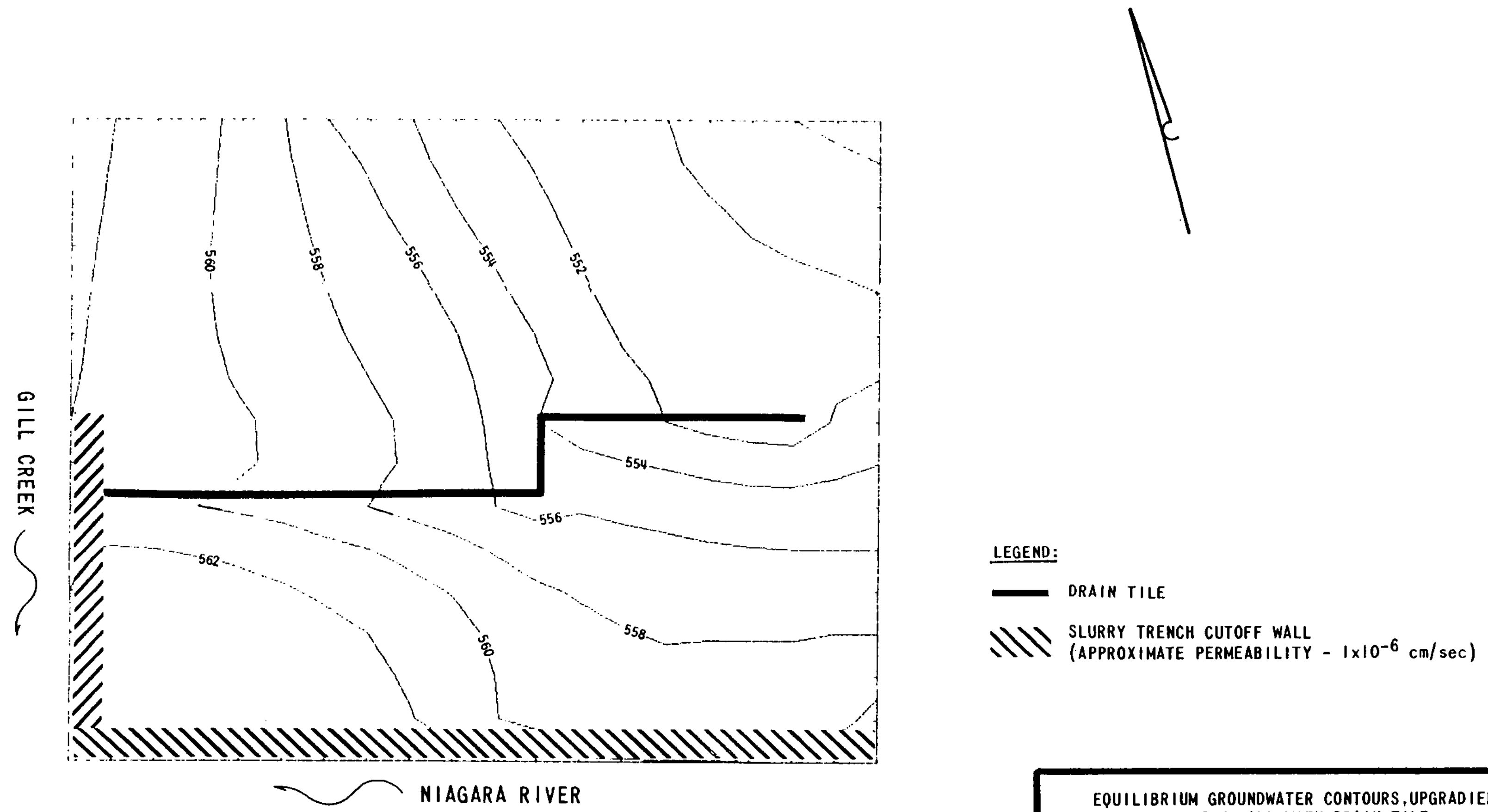
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

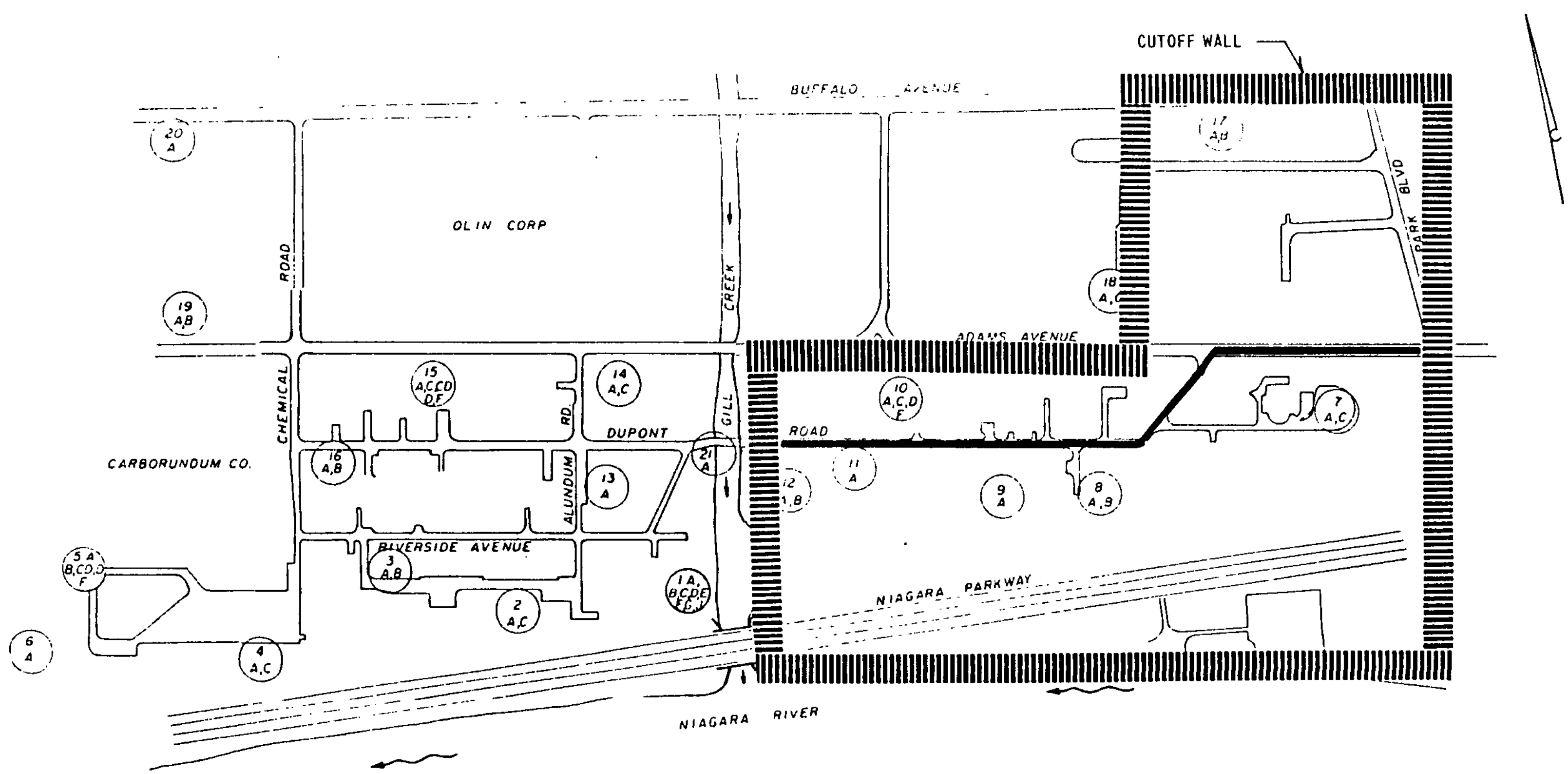
Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 12



EQUILIBRIUM GROUNDWATER CONTOURS, UPGRADIENT CUTOFF WALL WITH DRAIN TILE NIAGARA PLANT E. I. DuPONT DE NEMOURS & CO.		
WOODWARD-CLYDE CONSULTANTS CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS		
Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 13



LEGEND:

(17 A,B) — WELL CLUSTER NUMBER (NO) / WELL TYPE (LETTER)

DRAIN TILE

NOTE: ILLUSTRATIVE REPRESENTATION

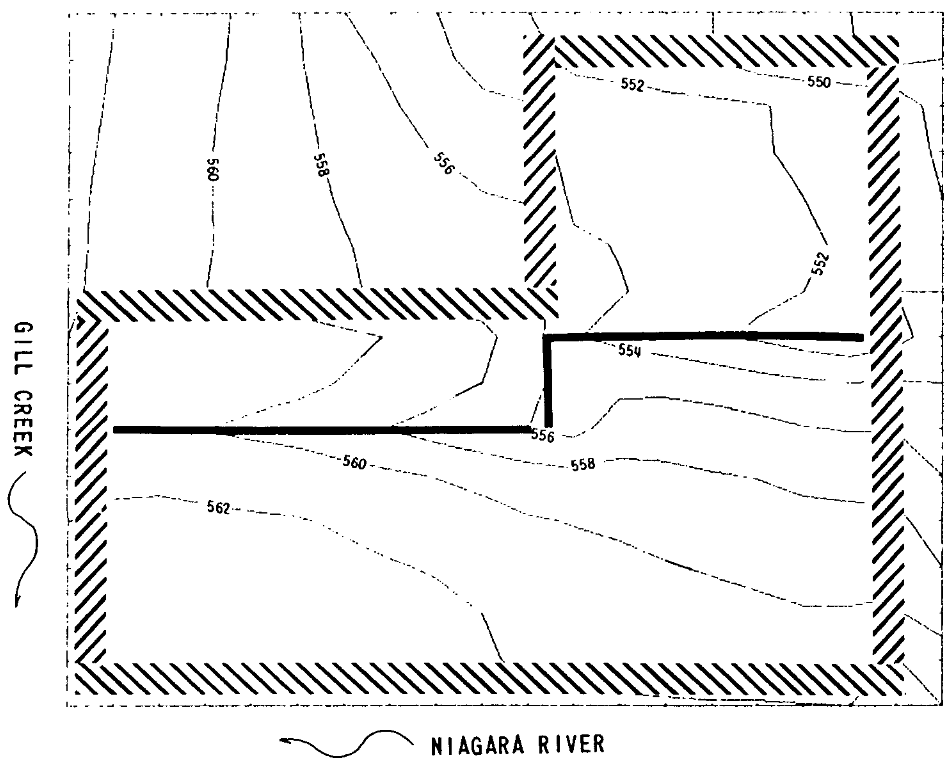
CUTOFF WALL - APPROXIMATE PERMEABILITY
10^{-6} cm/sec

CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
EAST PLANT AREA
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISIS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	Date: 9/27/84	
Checked: D.W.B.	0 300	Job: 83C2236-8	

PLATE 14



LEGEND:

DRAIN TILE

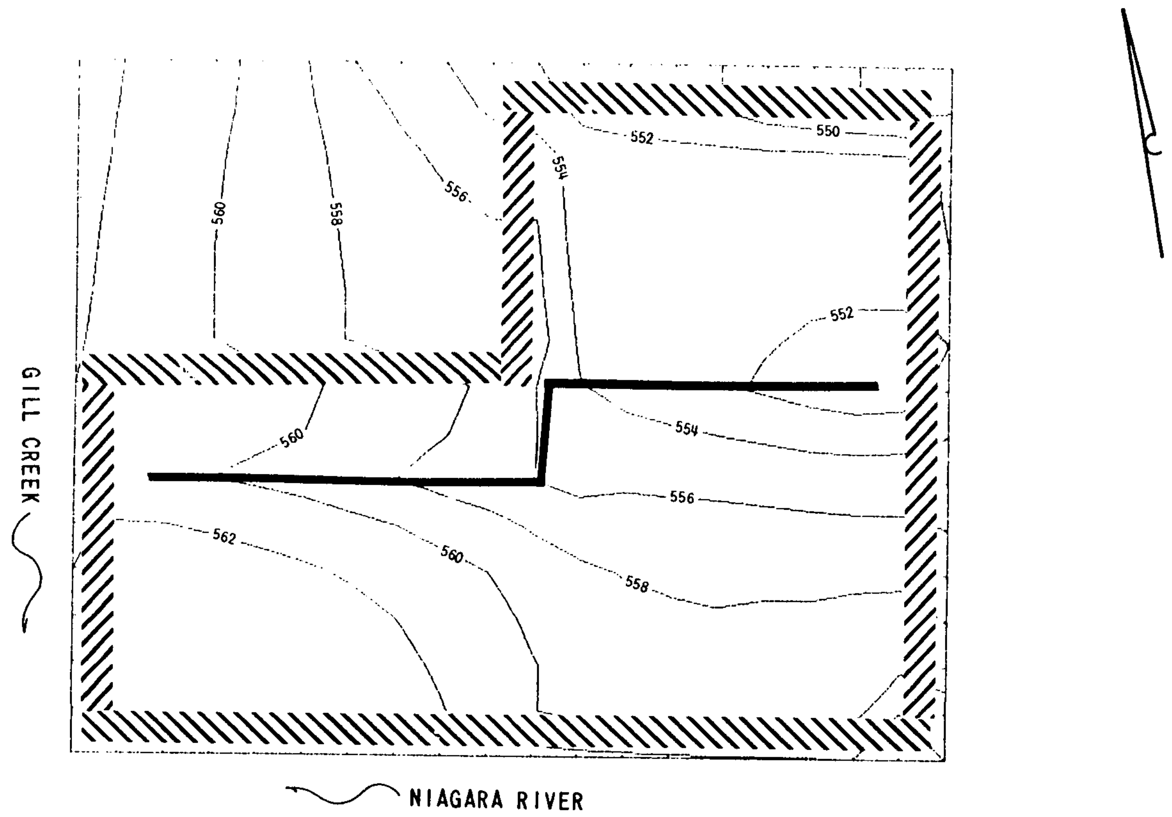
SLURRY TRENCH CUTOFF WALL (APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS, CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date 9/27/84
Checked: D.W.B.		Job: 83C2236-B

PLATE 15



LEGEND:

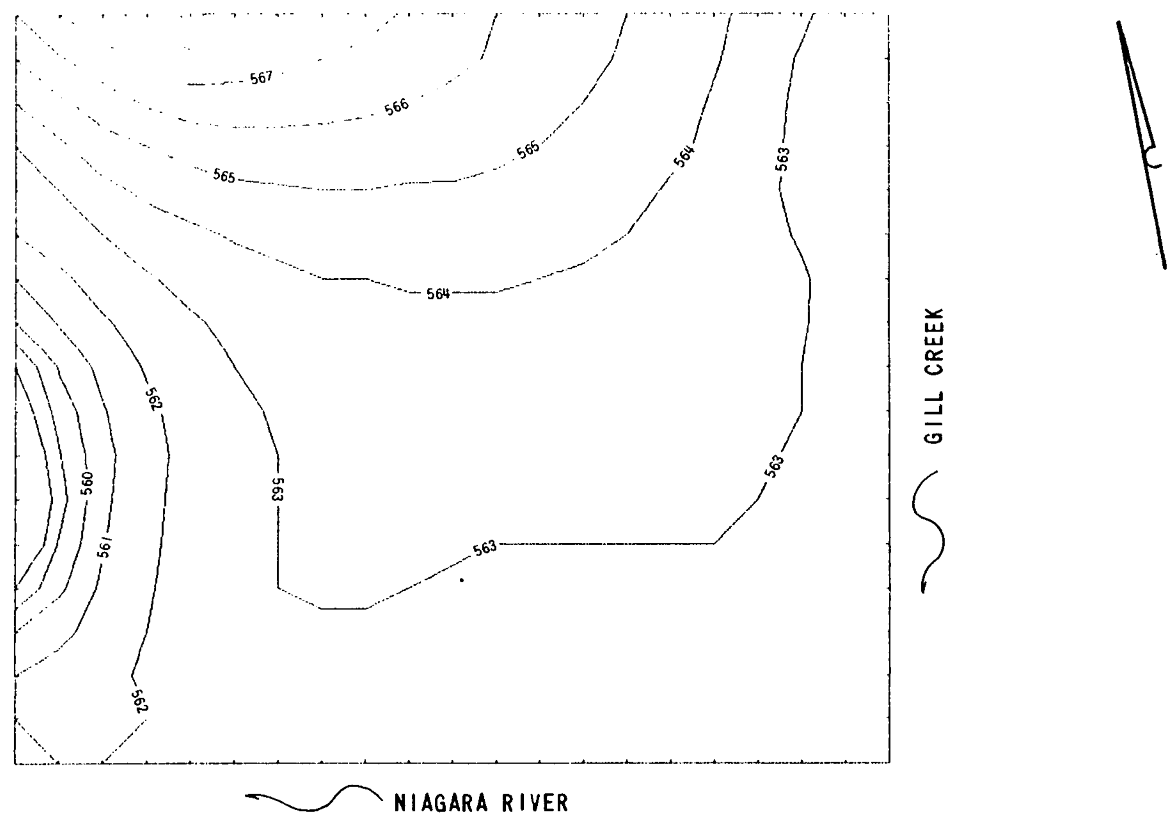
DRAIN TILE

SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

EQUILIBRIUM GROUNDWATER CONTOURS,
CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	Date 9/27/84	
Checked: D.W.B.	0 300	Job: 83C2236-8	

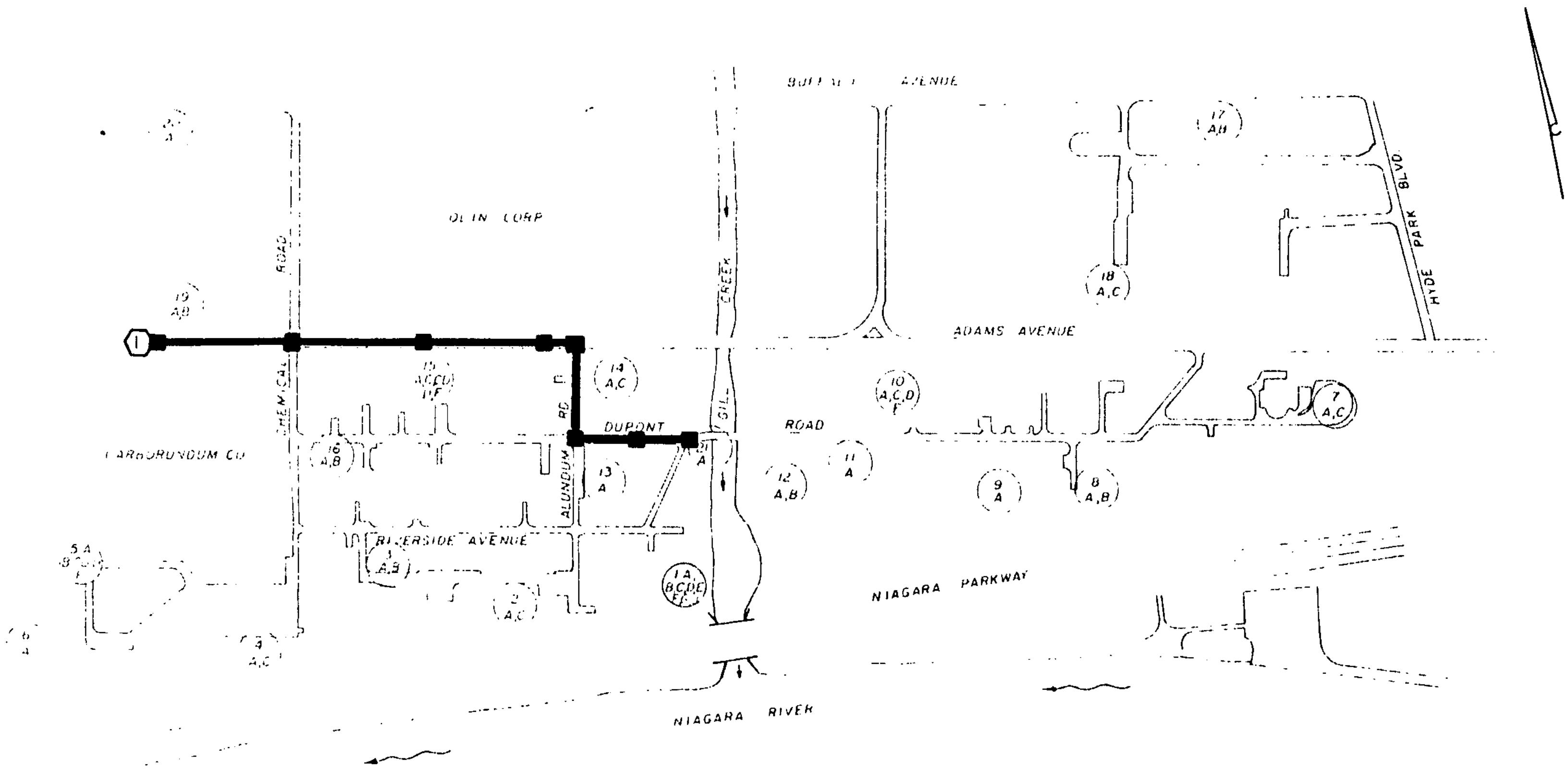


SIMULATED INITIAL CONDITION GROUNDWATER CONTOURS, WEST PLANT AREA
NIAGARA PLANT
E.I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 17



LEGEND:

(17 A,B) WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

(1) PUMP

■ MANHOLE

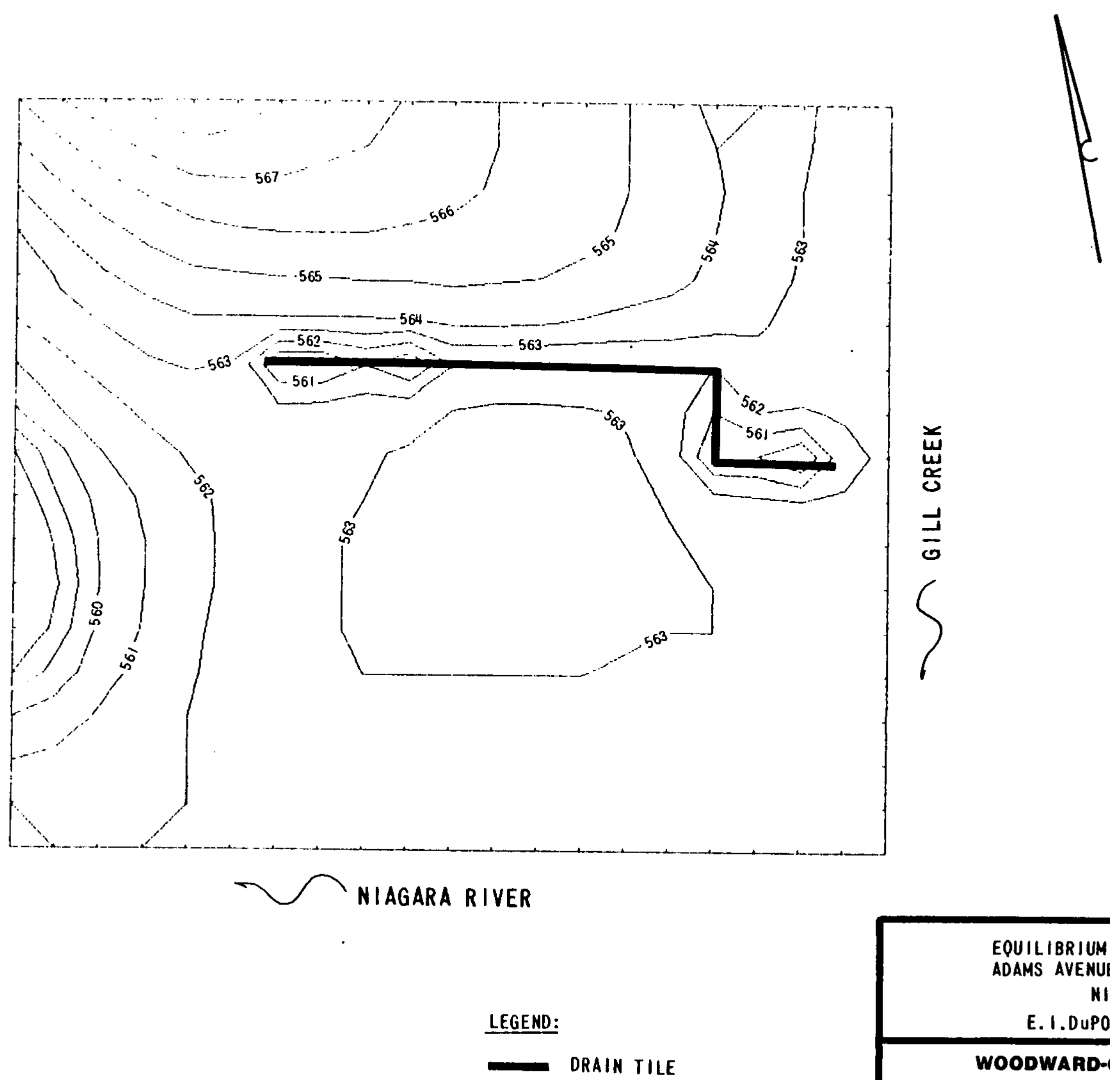
▬ DRAIN TILE

ADAMS AVENUE DRAIN TILE COLLECTION SYSTEM
ALIGNMENT, WEST PLANT AREA
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84	
Checked: D.W.B.		Job: 83C2236-8	

PLATE 18

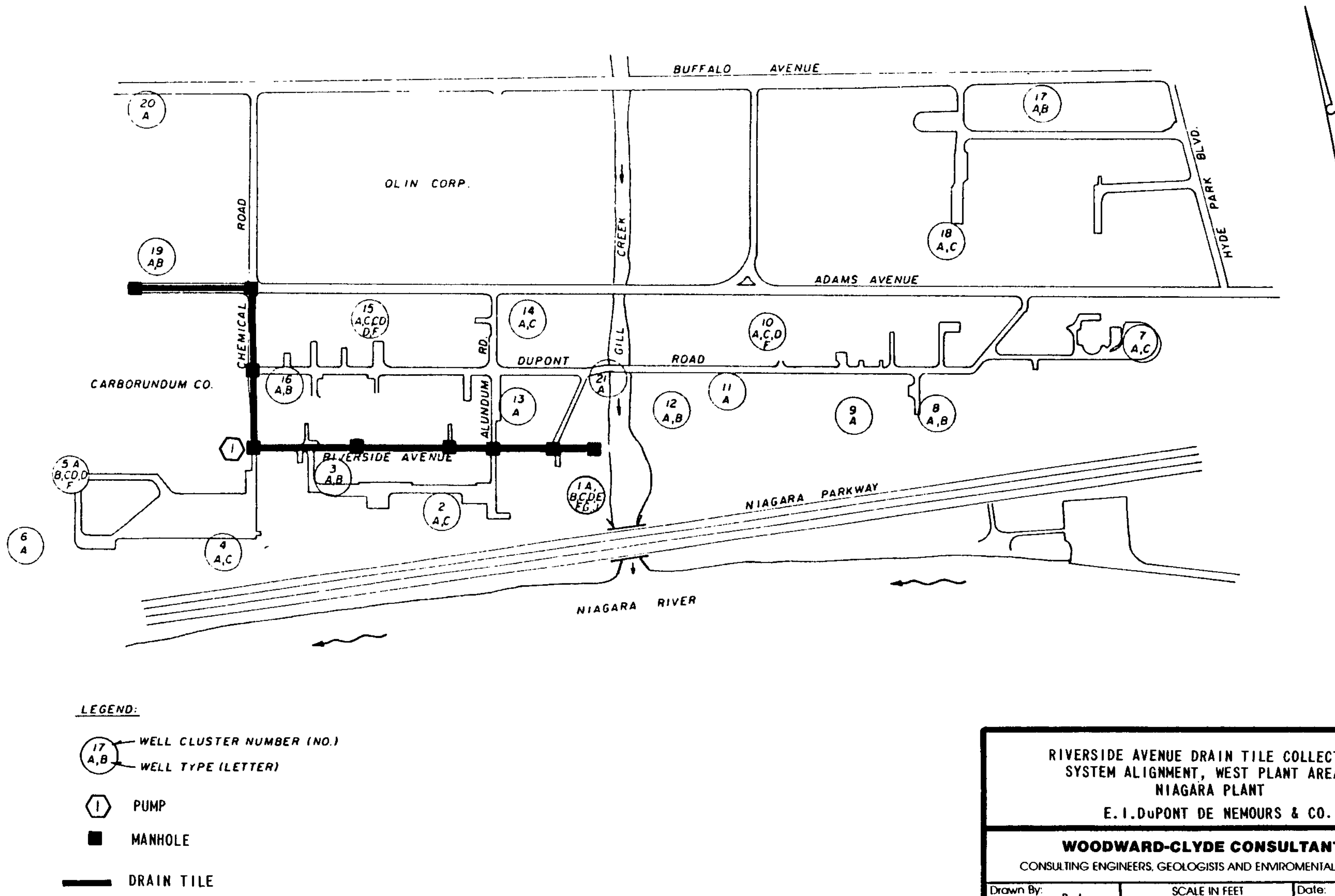


EQUILIBRIUM GROUNDWATER CONTOURS,
ADAMS AVENUE DRAIN TILE ALIGNMENT
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTIAL SCIENIISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 19



RIVERSIDE AVENUE DRAIN TILE COLLECTION
SYSTEM ALIGNMENT, WEST PLANT AREA
NIAGARA PLANT

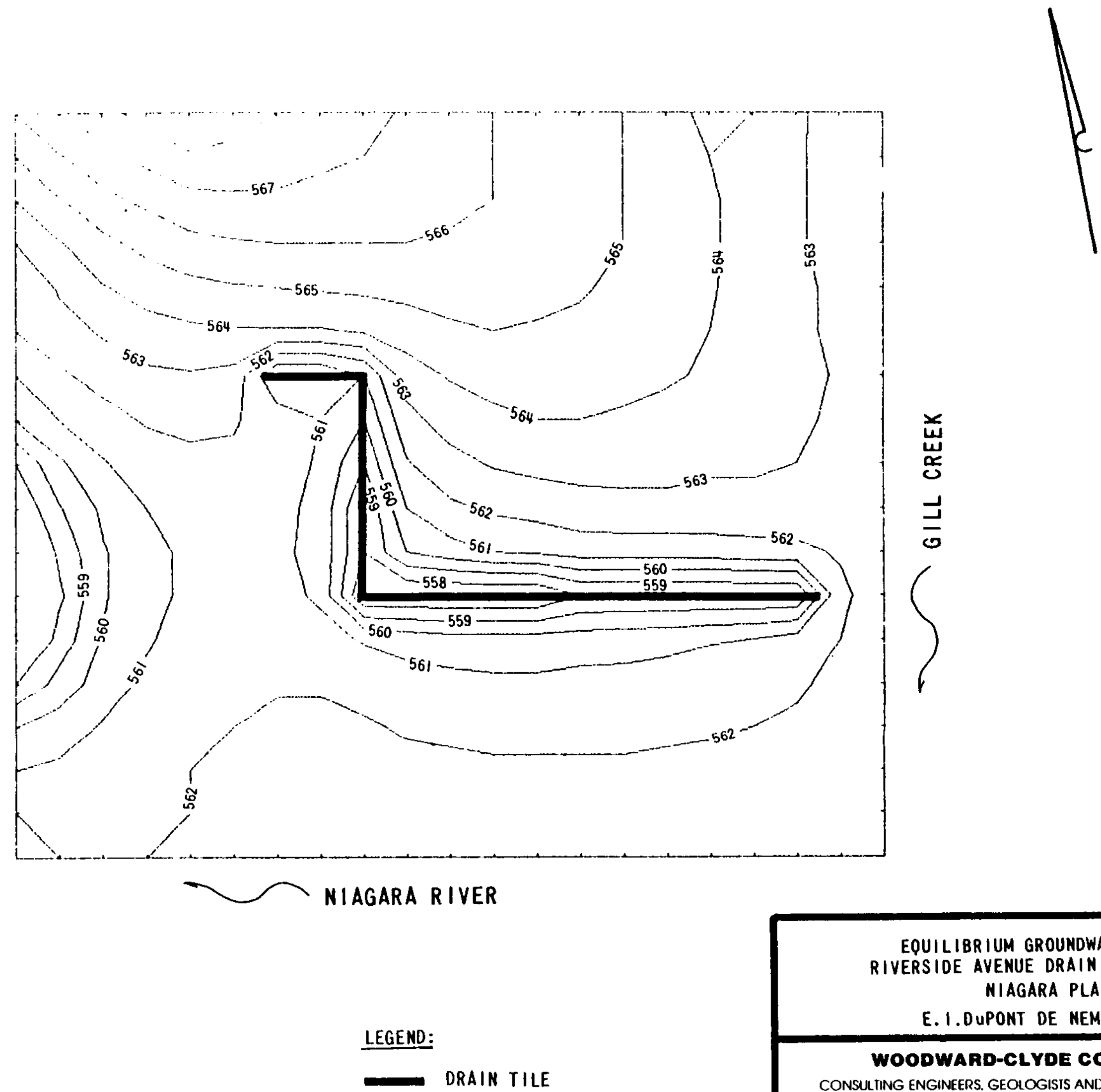
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	Date: 9/27/84	
Checked: D.W.B.	0 300	Job: 83C2236-8	

PLATE 20

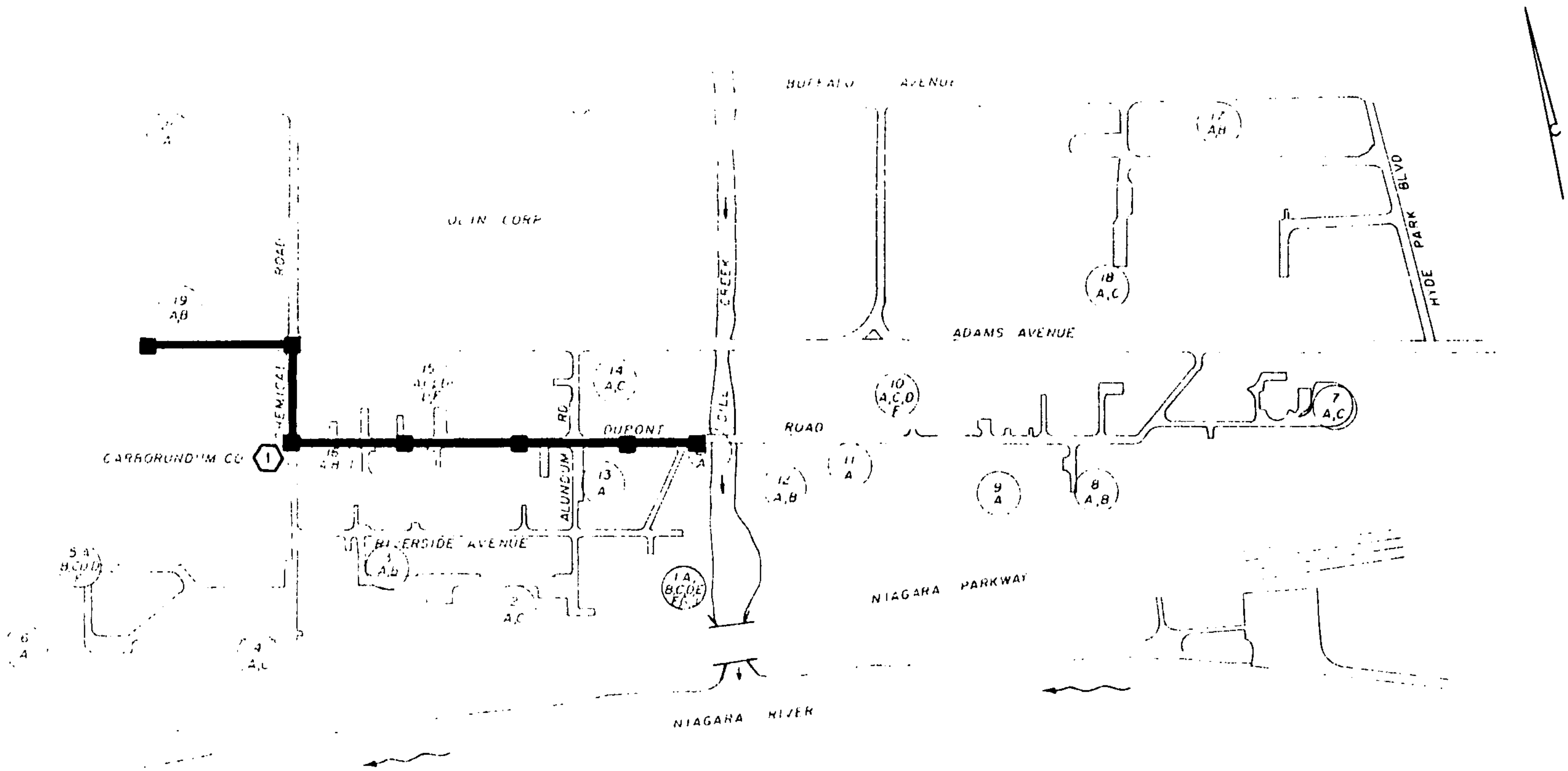


EQUILIBRIUM GROUNDWATER CONTOURS,
RIVERSIDE AVENUE DRAIN TILE ALIGNMENT
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date 9/27/84
Checked: D.W.B.		Job 83C2236-8

PLATE 21



LEGEND:

WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)

PUMP

MANHOLE

DRAIN TILE

DUPONT ROAD DRAIN TILE COLLECTION SYSTEM
ALIGNMENT, WEST PLANT AREA
NIAGARA PLANT

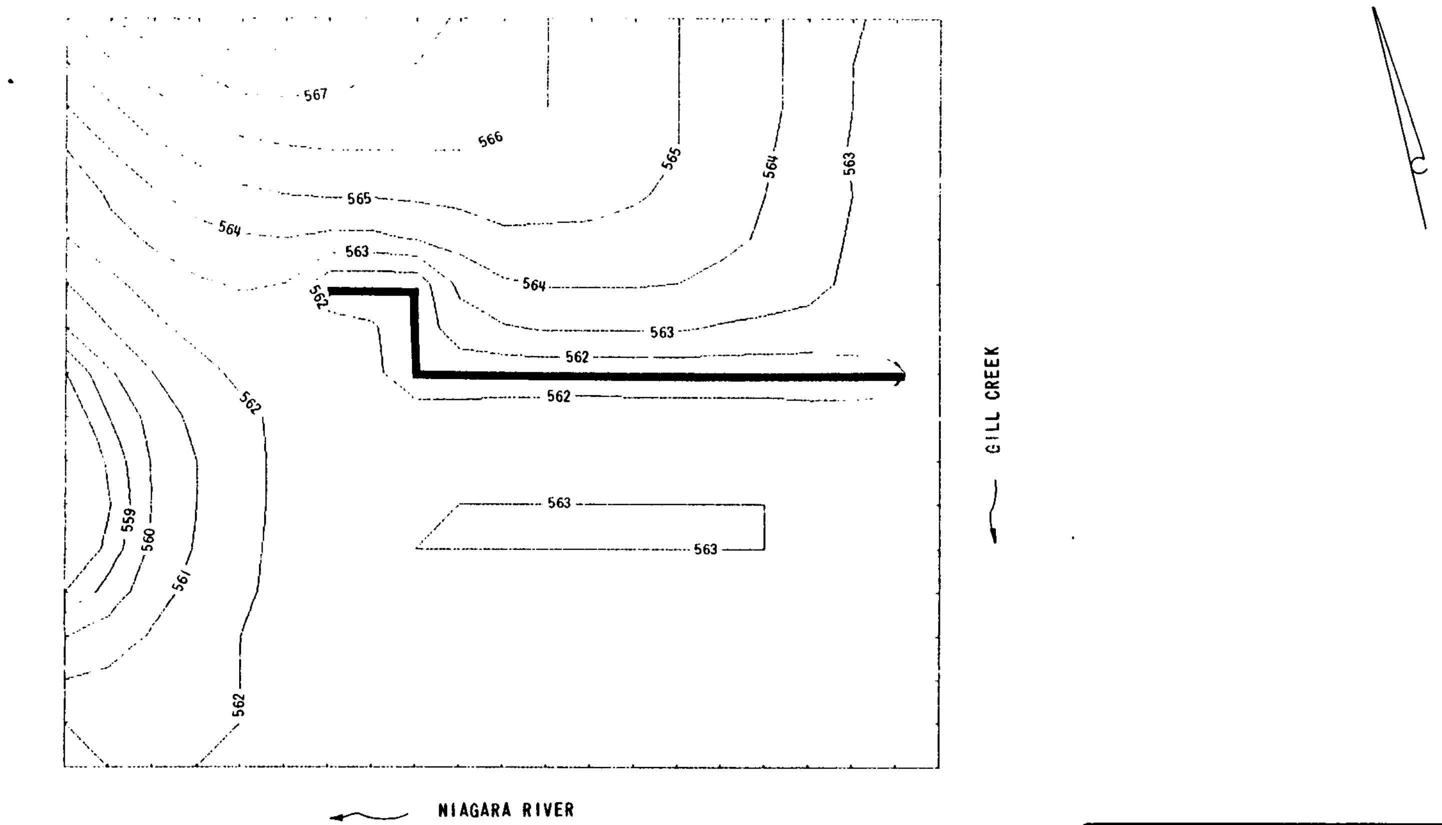
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	Date: 9/27/84
Checked: D.W.B.	0 300	Job: 83C2236-8

PLATE 22



LEGEND:

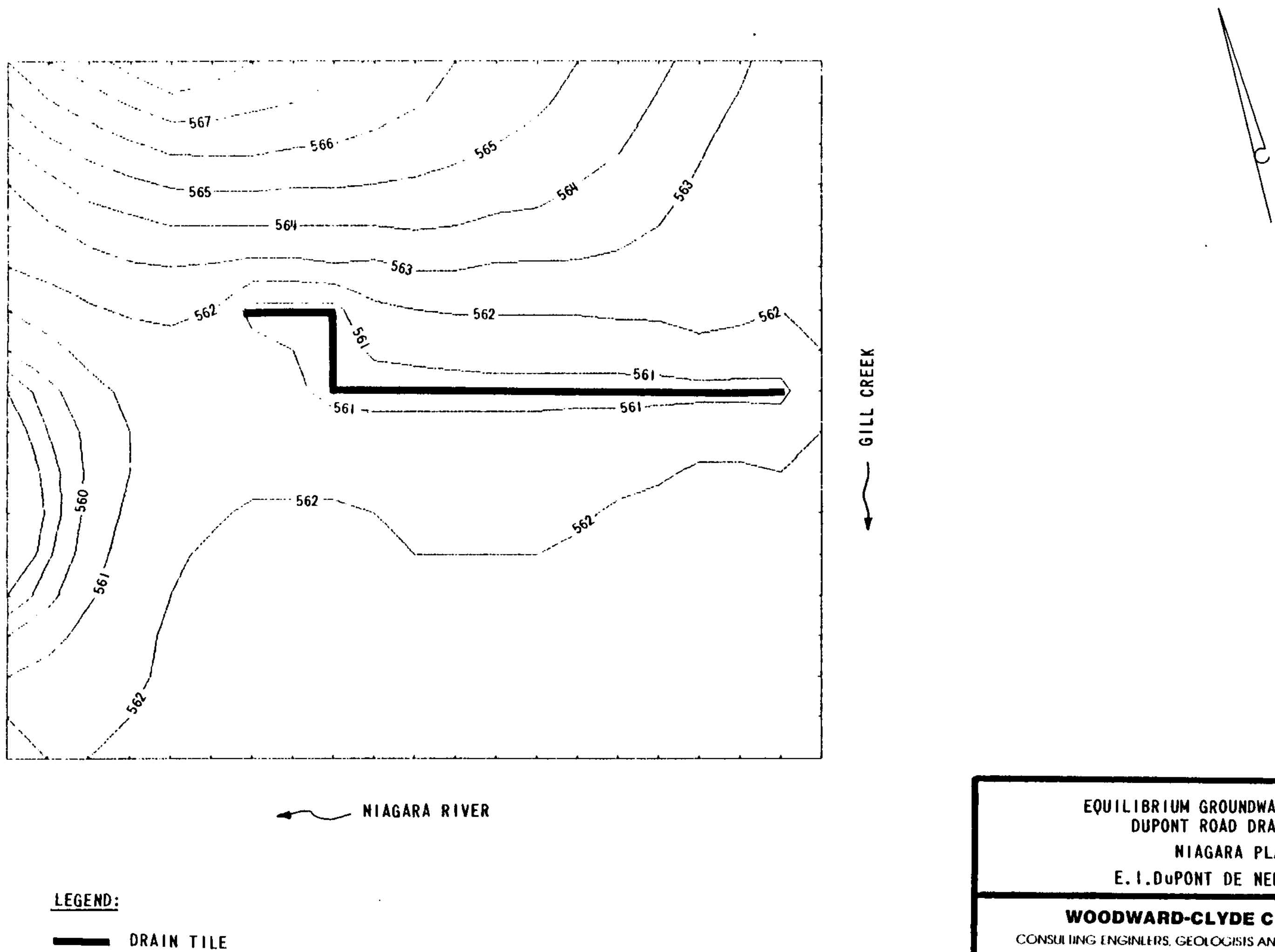
DRAIN TILE

FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS
DUPONT ROAD DRAIN TILE
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 23

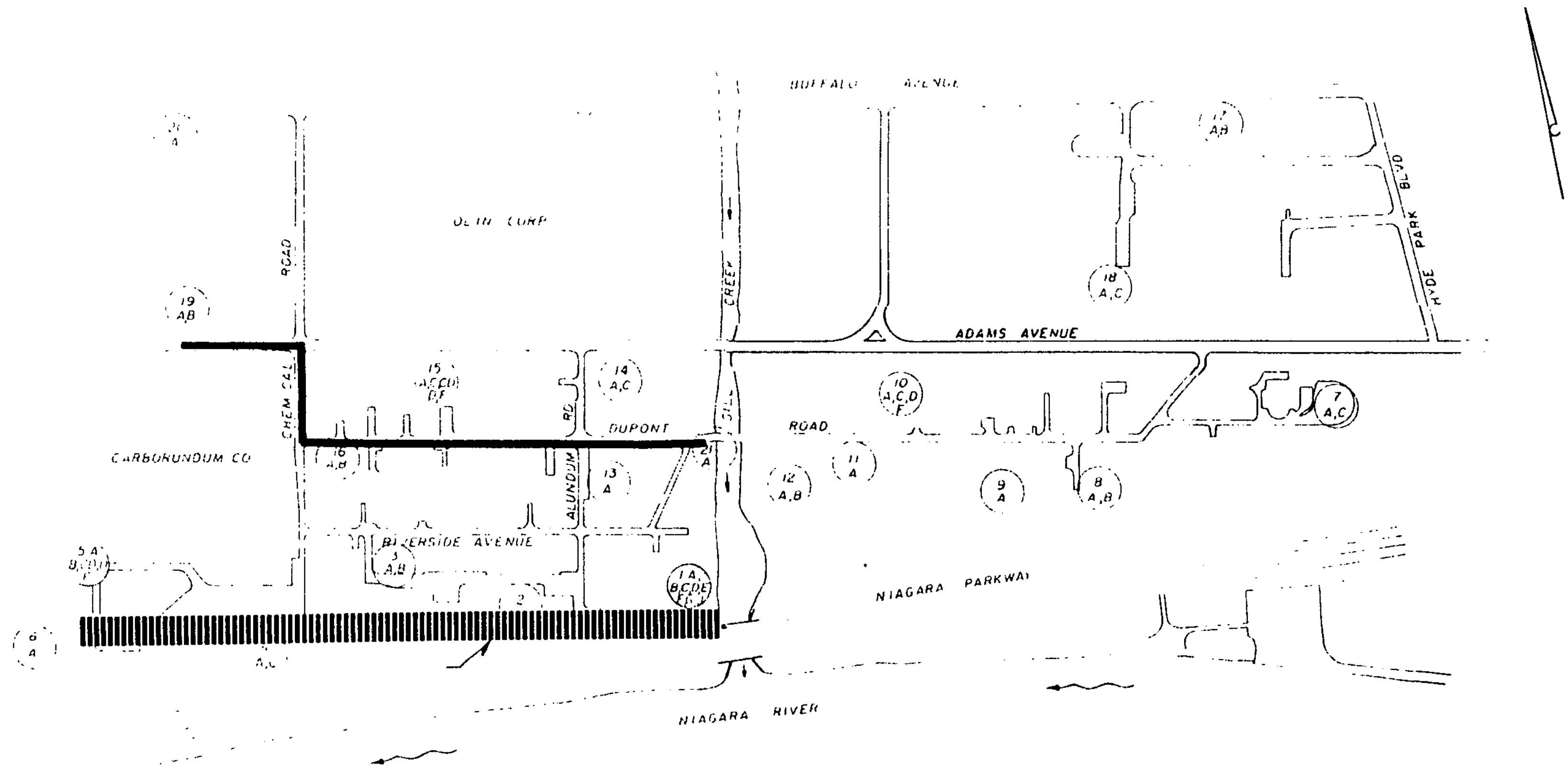


EQUILIBRIUM GROUNDWATER CONTOURS,
DUPONT ROAD DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D. J.	SCALE IN FEET	Date: 9/27/84	
Checked: D.W.B.	0 — 300	Job: 83C2236-8	

PLATE 24



LEGEND:

(17 / A,B) — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

DRAIN TILE

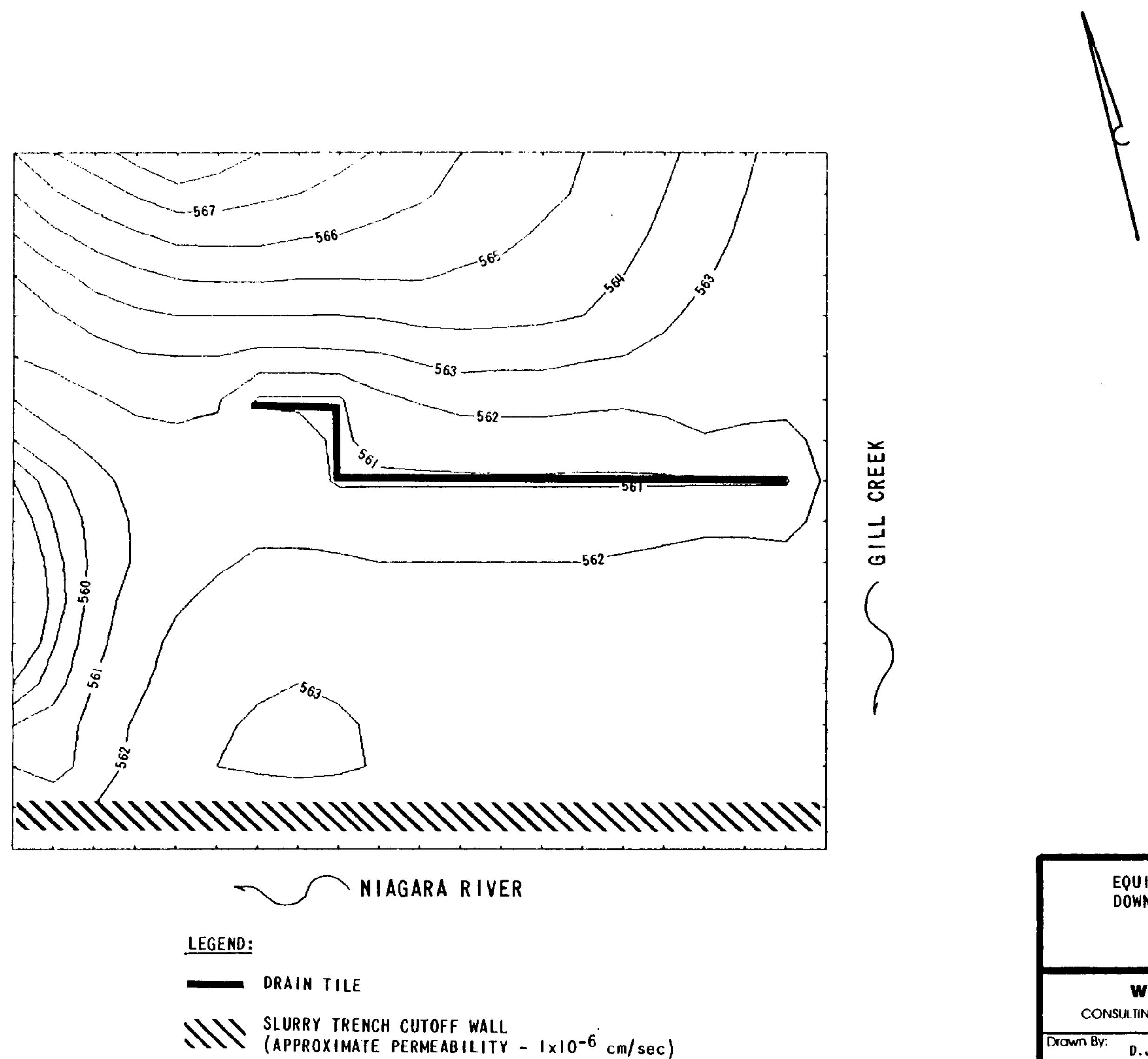
NOTE: ILLUSTRATIVE REPRESENTATION

CUTOFF WALL - APPROXIMATE PERMEABILITY 10^{-6} cm/sec

PARTIAL DOWNGRADIENT CUTOFF WALL WITH DRAIN TILE, WEST PLANT AREA
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

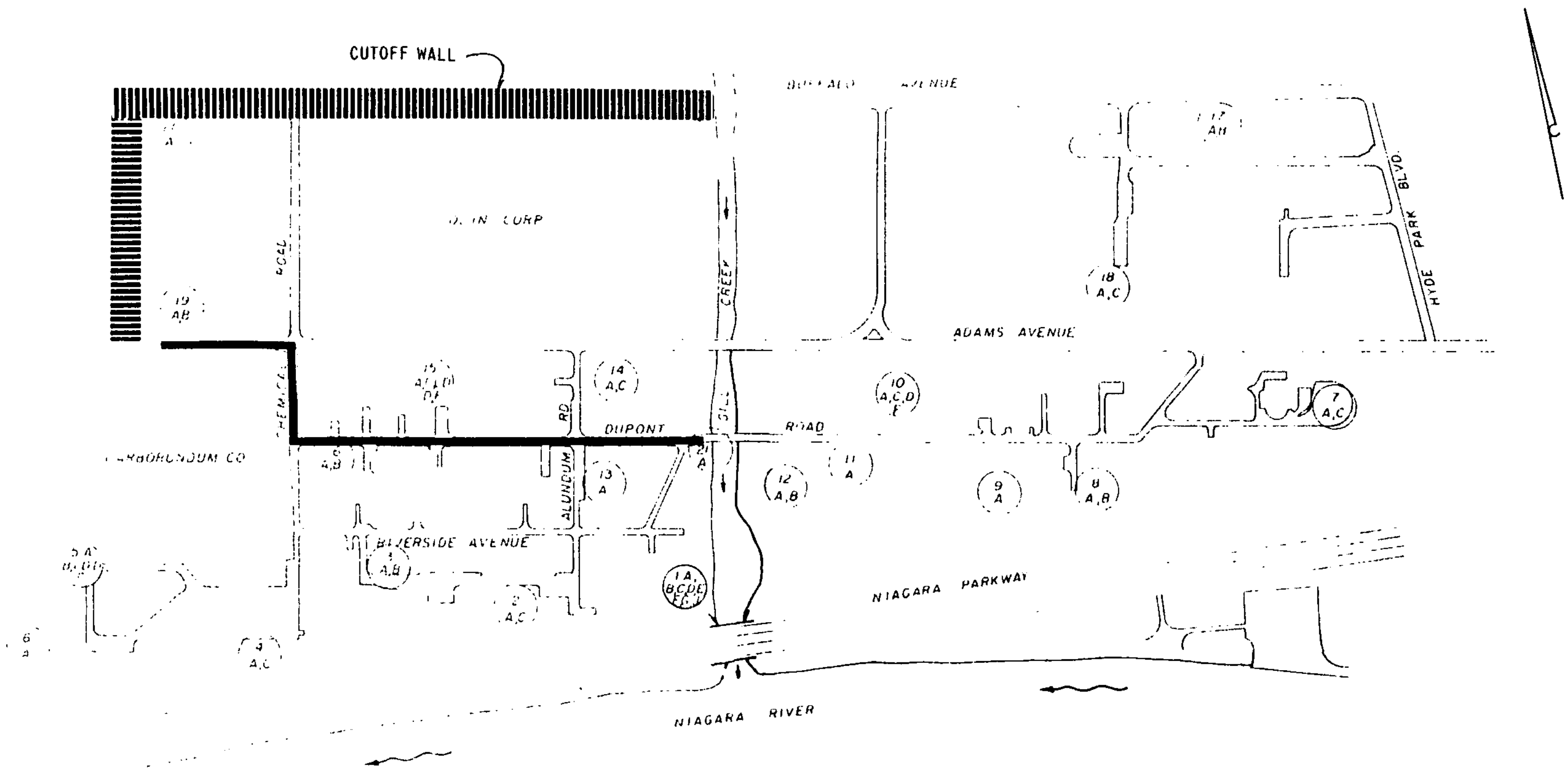
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84	
Checked: D.W.B.		Job: 83C2236-8	



EQUILIBRIUM GROUNDWATER CONTOURS, PARTIAL DOWNGRADIENT CUTOFF WALL WITH DRAIN TILE NIAGARA PLANT E.I.DuPONT DE NEMOURS & CO.		
WOODWARD-CLYDE CONSULTANTS CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS		
Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 26



LEGEND:

(17 / A,B) — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

CUTOFF WALL - APPROXIMATE PERMEABILITY 10^{-6} cm/sec

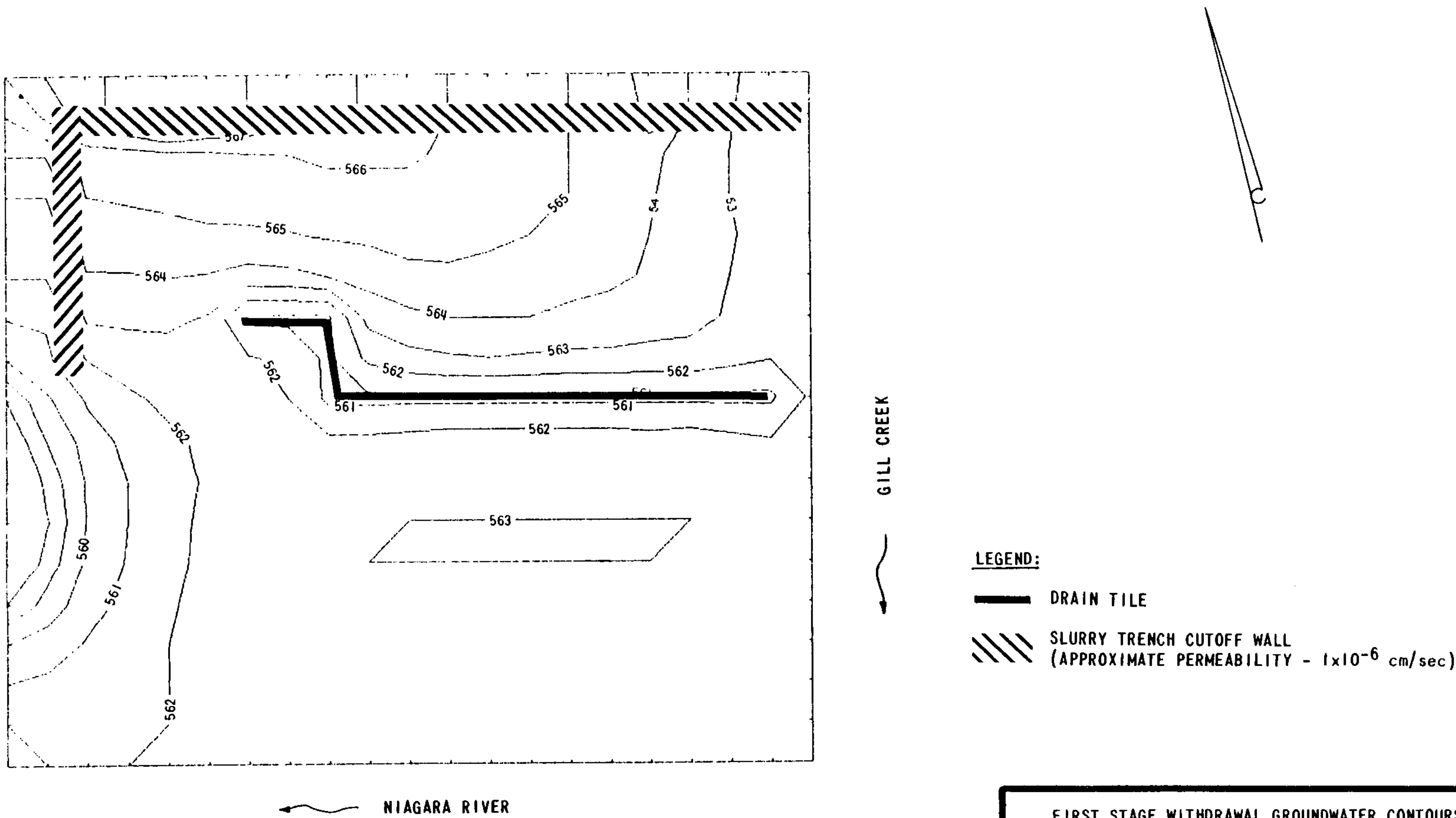
NOTE: ILLUSTRATIVE REPRESENTATION

PARTIAL UPGRADIENT CUTOFF WALL WITH DRAIN TILE, WEST PLANT AREA
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

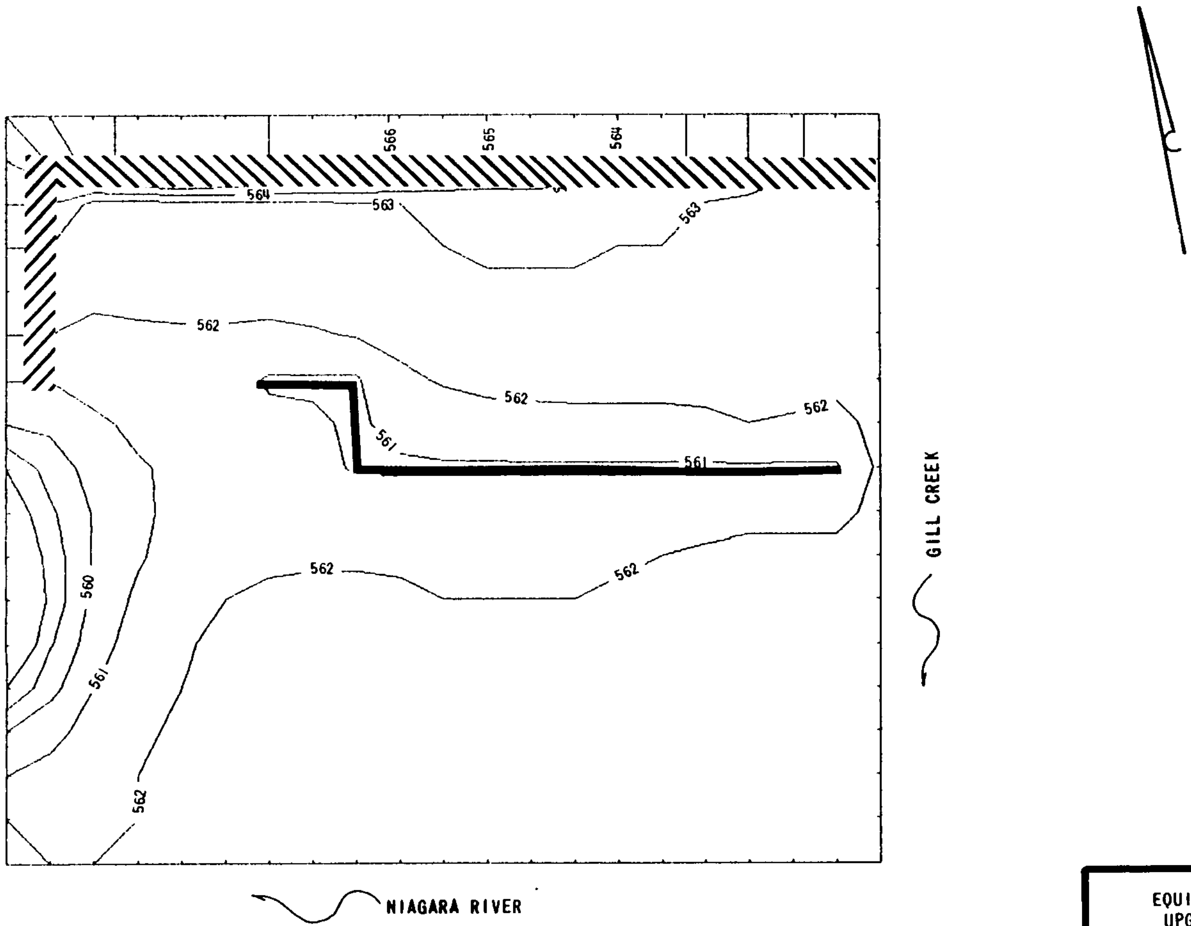
Drawn By: D.J.	SCALE IN FEET	Date: 9/27/84	
Checked: D.W.B.	0 300	Job: 83C2236-8	

PLATE 27



FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS, PARTIAL UPGRADIENT CUTOFF WALL WITH DRAIN TILE NIAGARA PLANT E.I.DuPONT DE NEMOURS & CO.	
WOODWARD-CLYDE CONSULTANTS CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS	
Drawn By D.J.	SCALE IN FEET 0 300
Checked: D.W.B.	
Date 9/27/84	Job: 83C2236-8

PLATE 28



LEGEND:

DRAIN TILE

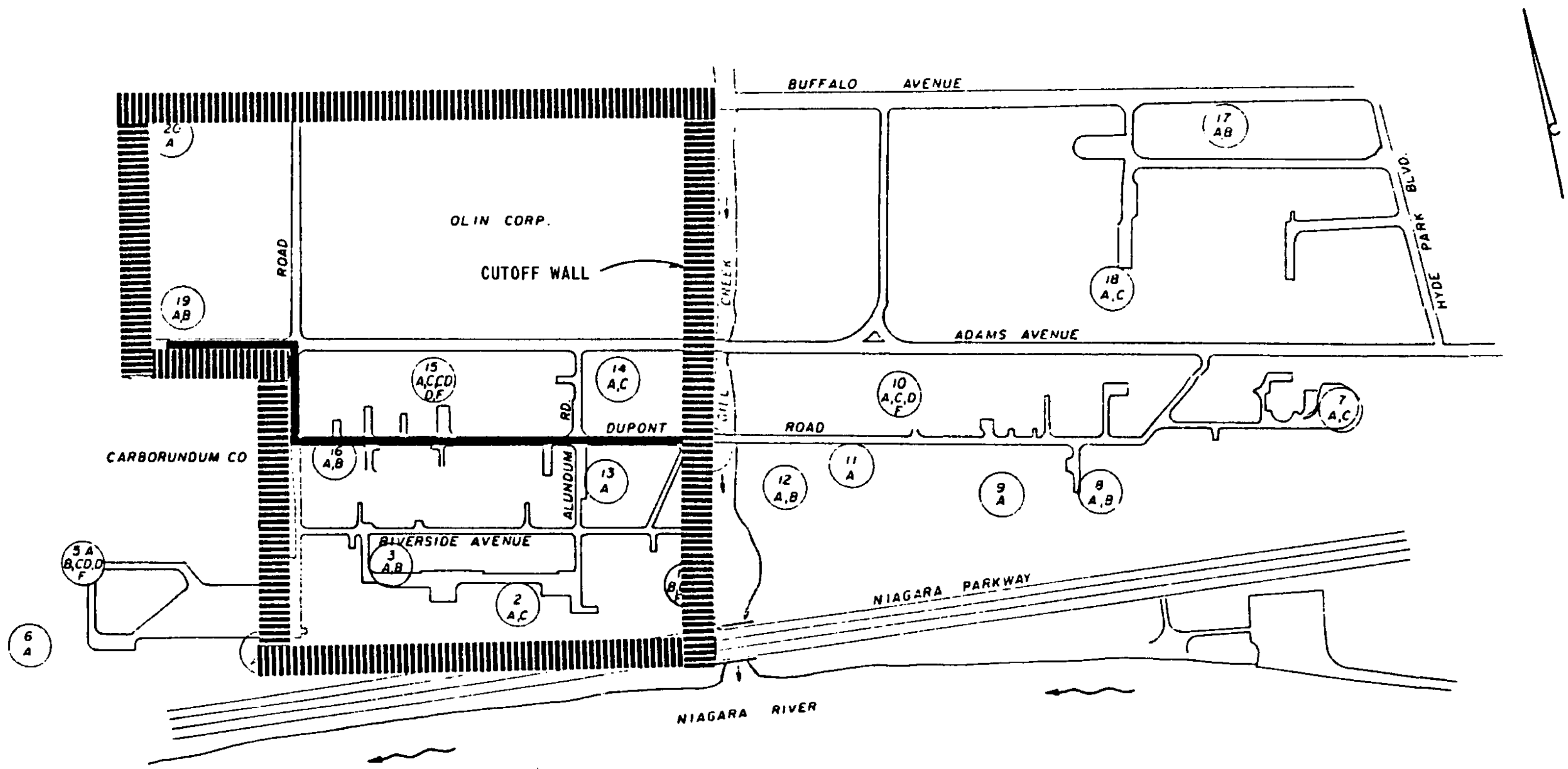
SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

EQUILIBRIUM GROUNDWATER CONTOURS, PARTIAL UPGRADIENT CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 29



LEGEND:

(17 / A,B) — WELL CLUSTER NUMBER (NO.) — WELL TYPE (LETTER)

DRAIN TILE

SLURRY TRENCH CUTOFF WALL (APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

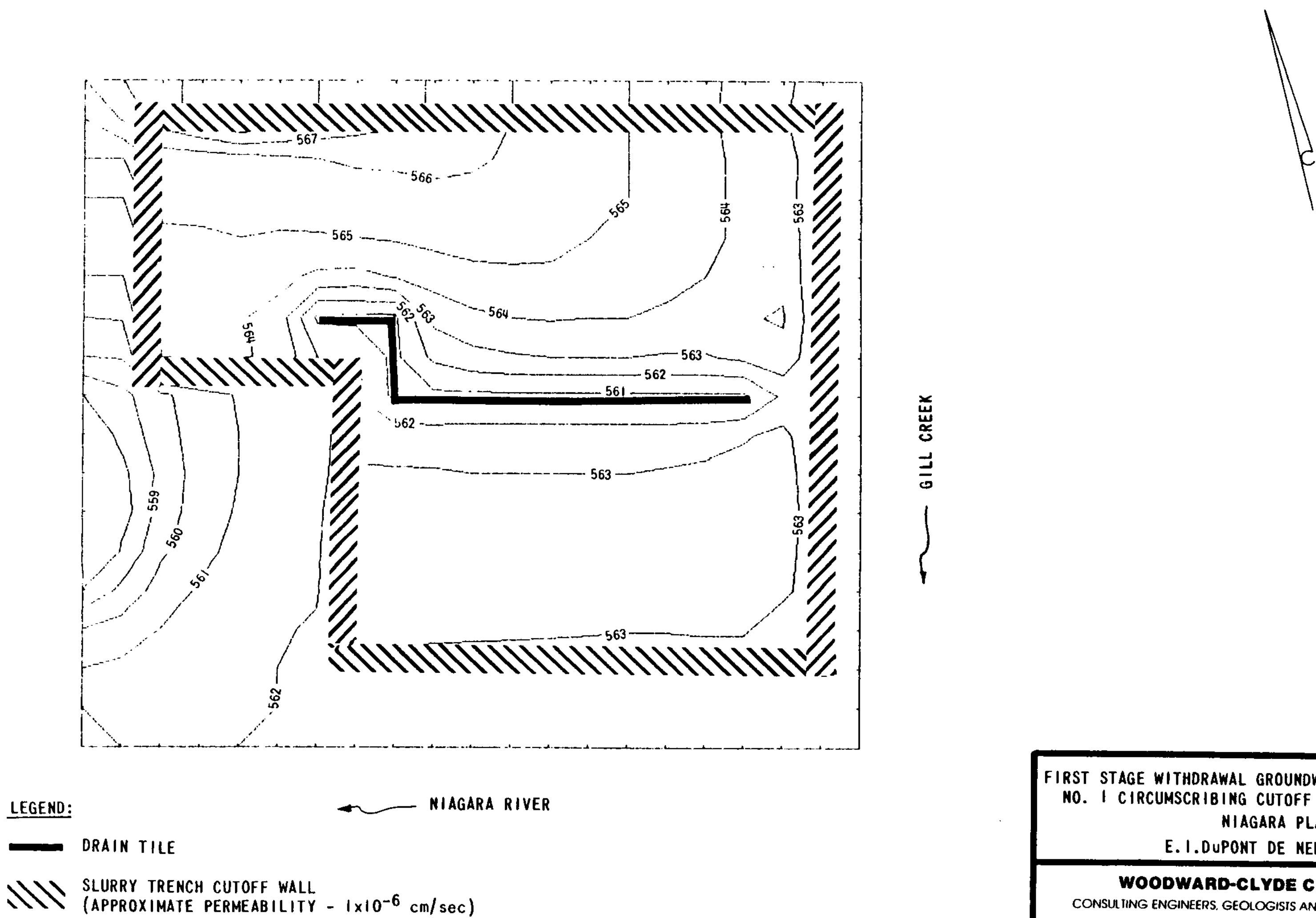
NOTE: ILLUSTRATIVE REPRESENTATION

OPTION #1 CIRCUMSCRIBING CUTOFF WALL
WEST PLANT SITE
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D. J.	SCALE in FEET 0 — 300	DATE: 9/27/84
CHECKED: D. W. B.		JOB: 83C2236-8

PLATE 30

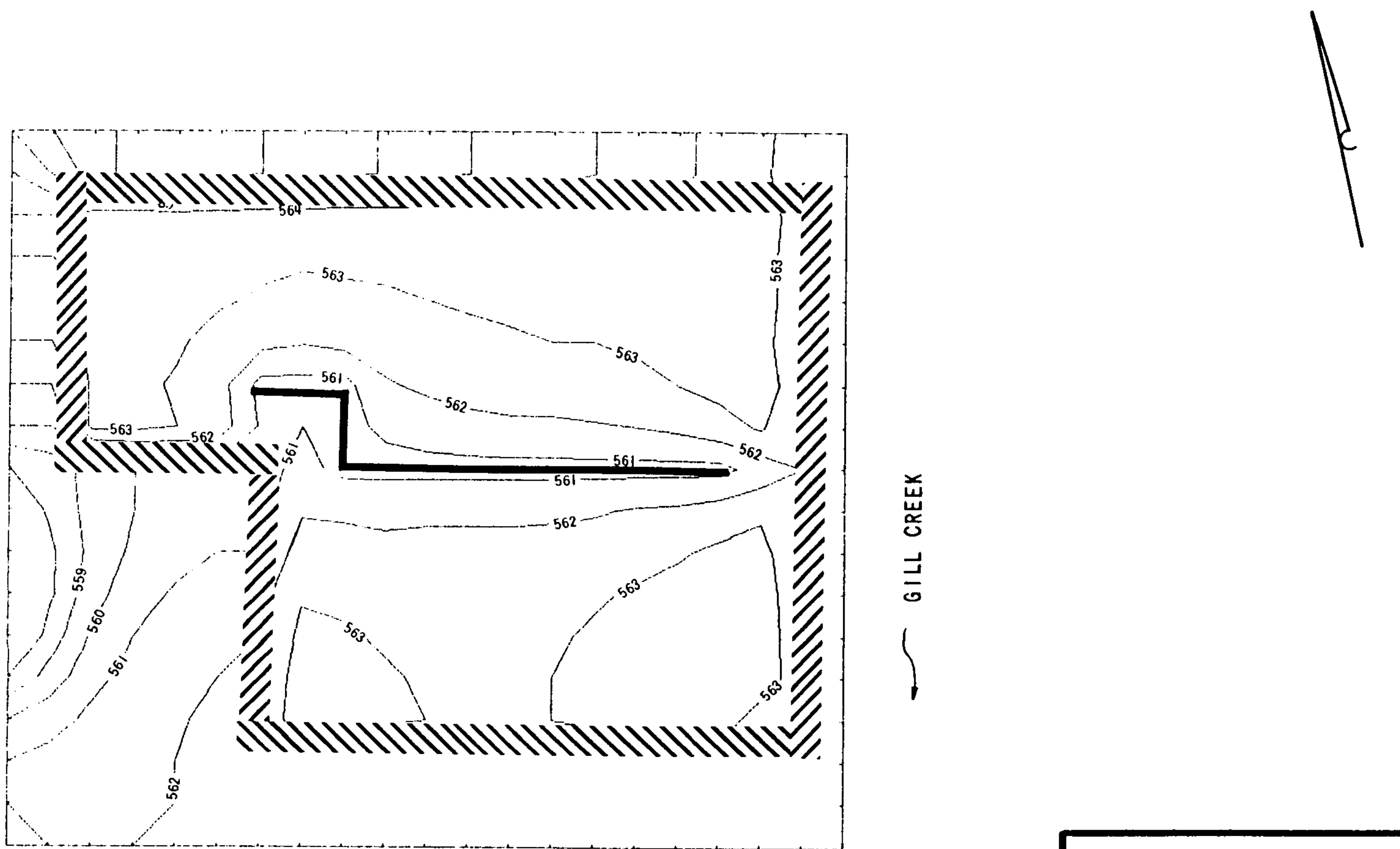


FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS, OPTION NO. 1 CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	0 — 300	Date: 9/27/84
Checked: D.W.B.			Job: 83C2236-8

PLATE 31



LEGEND:

DRAIN TILE

SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

EQUILIBRIUM GROUNDWATER CONTOURS, OPTION NO. 1
CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET	Date: 9/27/84	
Checked: D.W.B.	0 300	Job: 83C2236-8	

PLATE 32

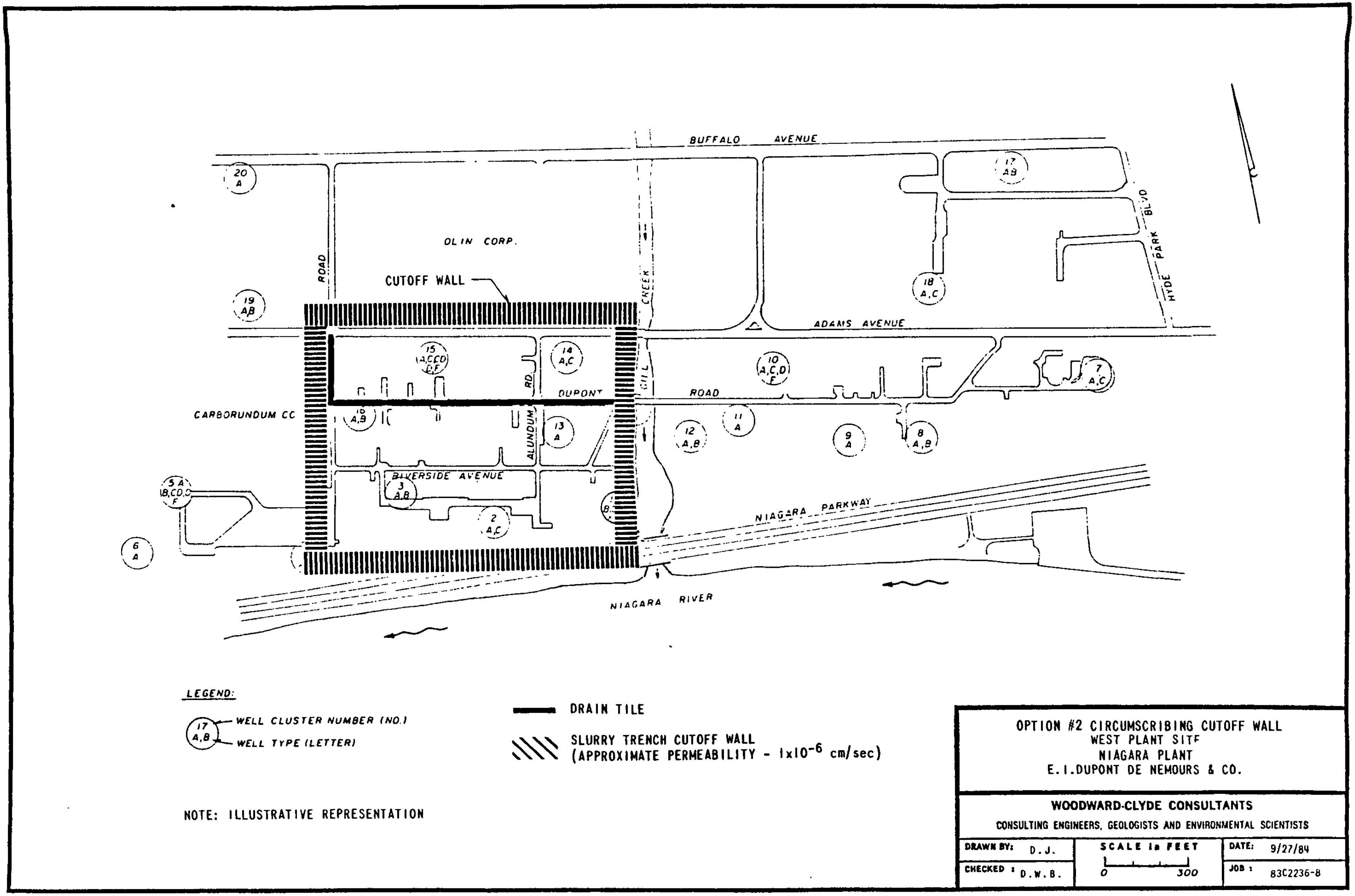
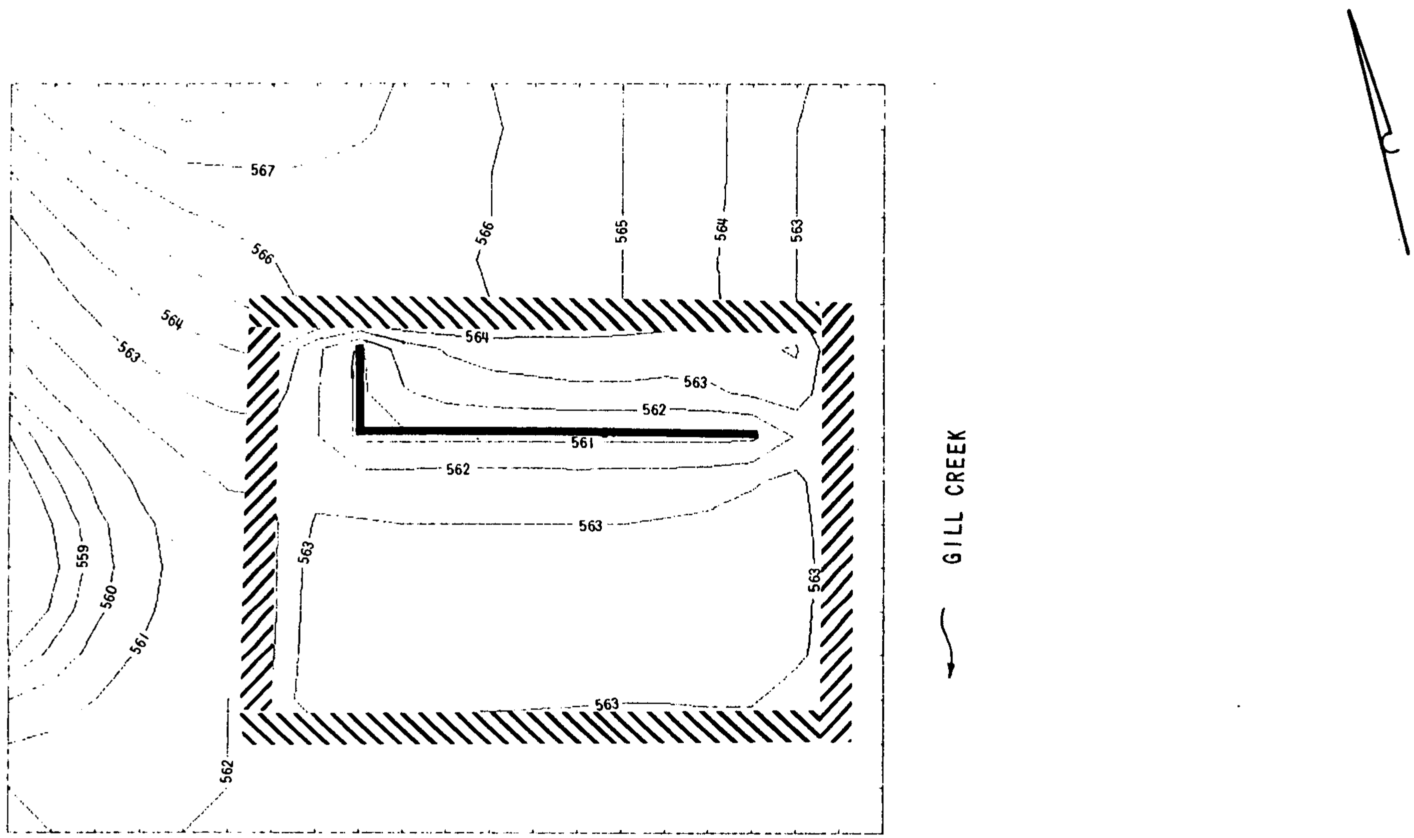

BUFFALO AVENUE
ADAMS AVENUE
HYDE PARK BLVD
OLIN CORP.
CUTOFF WALL
ROAD
CREEK
GILL
DUPONT
ROAD
RD.
ALUNDUM
RIVERSIDE AVENUE
CARBORUNDUM CC
NIAGARA PARKWAY
NIAGARA RIVER
20 A
19 A,B
17 A,B
18 A,C
15 A,C,D F
14 A,C
16 A,B
13 A
3 A,B
2 A,C
10 A,C,D F
11 A
12 A,B
9 A
8 A,B
7 A,C
5 A B,C,D F
6 A
LEGEND:
WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)
17 A,B
DRAIN TILE
SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1x10-6 cm/sec)
NOTE: ILLUSTRATIVE REPRESENTATION
OPTION #2 CIRCUMSCRIBING CUTOFF WALL
WEST PLANT SITE
NIAGARA PLANT
E.I.DUPONT DE NEMOURS & CO.
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
DRAWN BY: D.J.
CHECKED: D.W.B.
SCALE in FEET
0 300
DATE: 9/27/84
JOB: 83C2236-8

PLATE 33



LEGEND:

DRAIN TILE

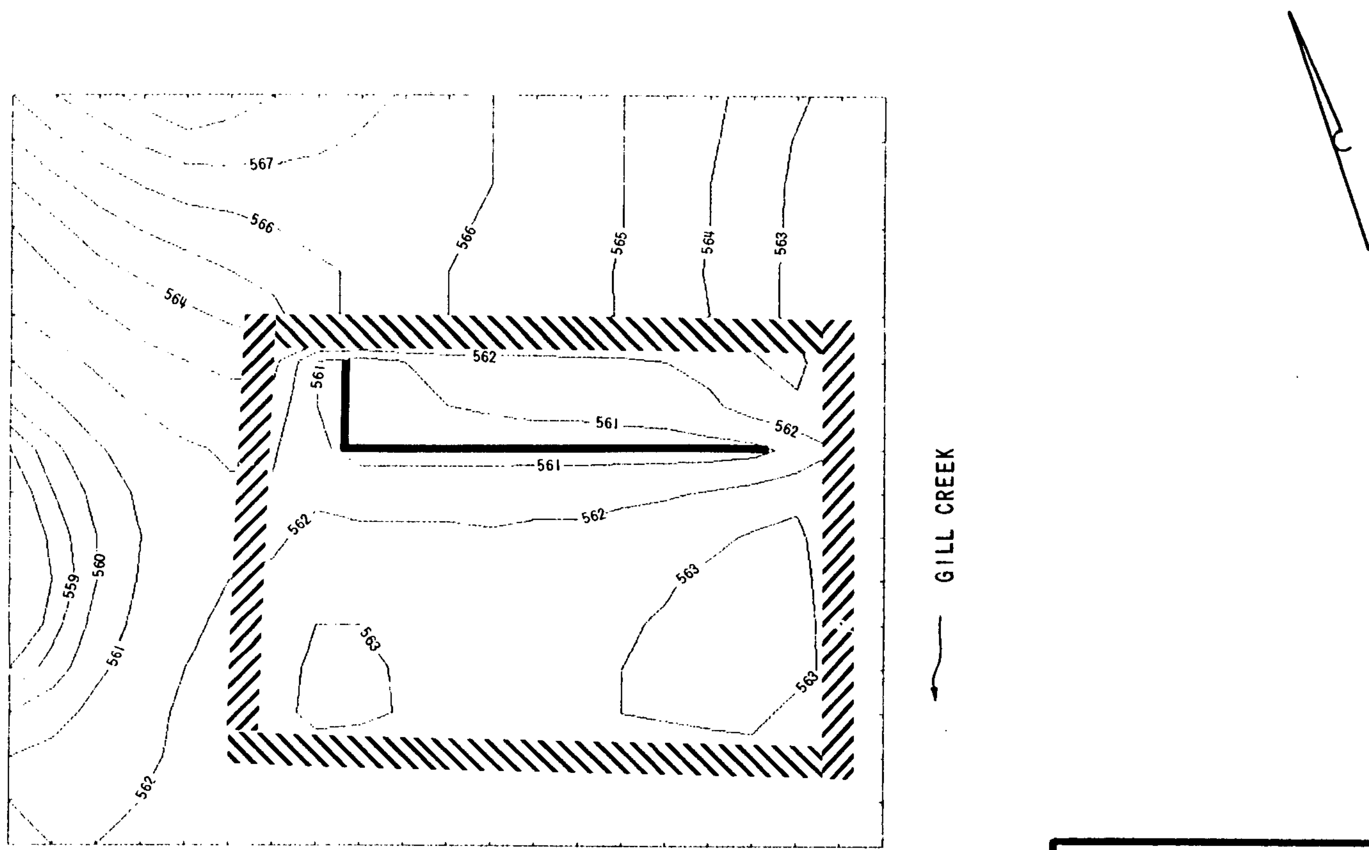
SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

FIRST STAGE WITHDRAWAL GROUNDWATER CONTOURS, OPTION NO.2 CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84	
Checked: D.W.B.		Job: 83C2236-8	

PLATE 34



LEGEND:

DRAIN TILE

SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

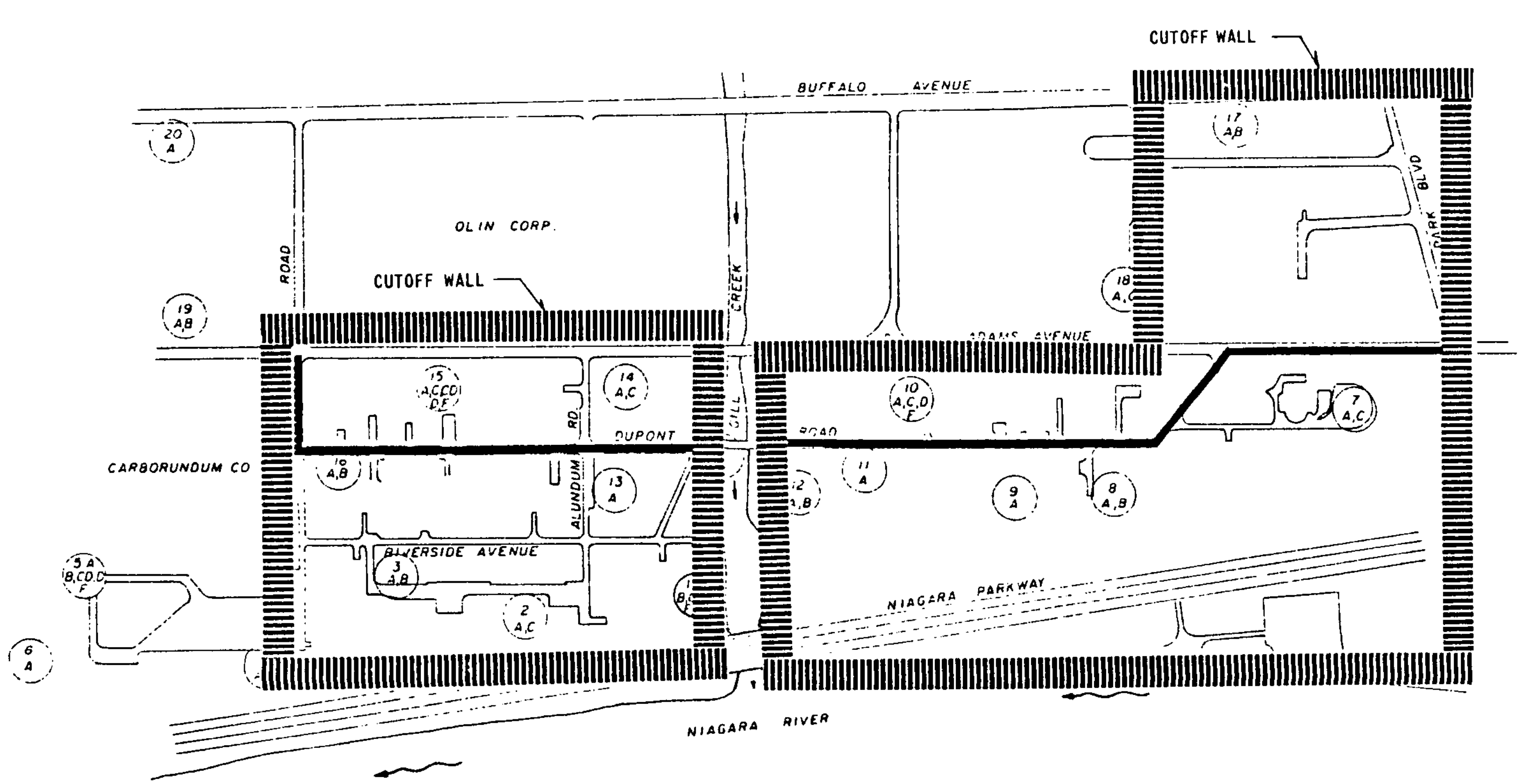
EQUILIBRIUM GROUNDWATER CONTOURS, OPTION NO.2
CIRCUMSCRIBING CUTOFF WALL WITH DRAIN TILE
NIAGARA PLANT

E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By: D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 35



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

DRAIN TILE

SLURRY TRENCH CUTOFF WALL (APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

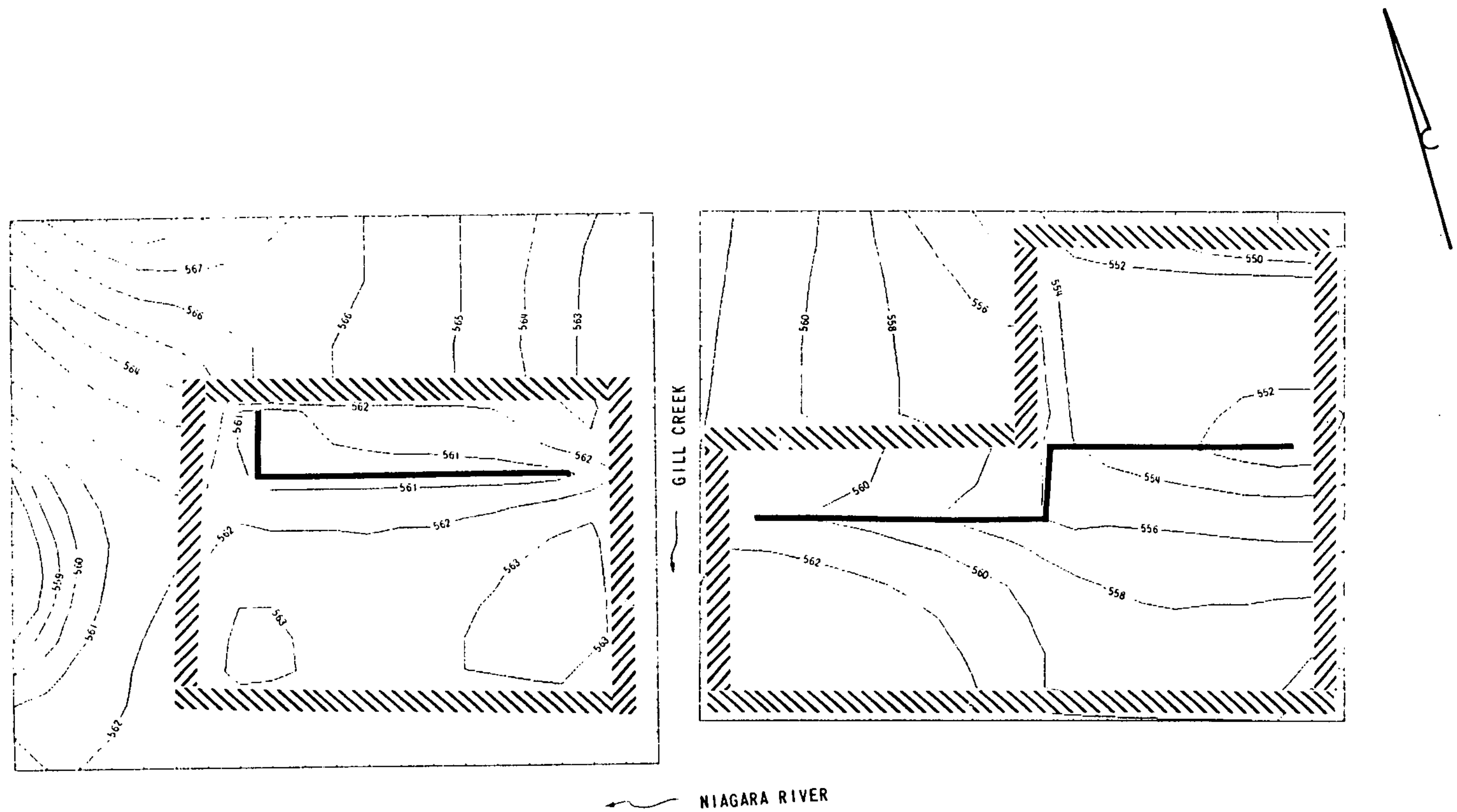
NOTE: ILLUSTRATIVE REPRESENTATION

CONCEPTUAL REMEDIATION PLAN
EAST AND WEST PLANT AREAS
NIAGARA PLANT
E.I.DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.J.	SCALE in FEET	0 — 300	DATE: 9/27/84
CHECKED: D.W.B.			JOB: 83C2236-8

PLATE 36



LEGEND:

DRAIN TILE

SLURRY TRENCH CUTOFF WALL
(APPROXIMATE PERMEABILITY - 1×10^{-6} cm/sec)

CONCEPTUAL REMEDIATION PLAN GROUNDWATER CONTOURS
NIAGARA PLANT
E.I.DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

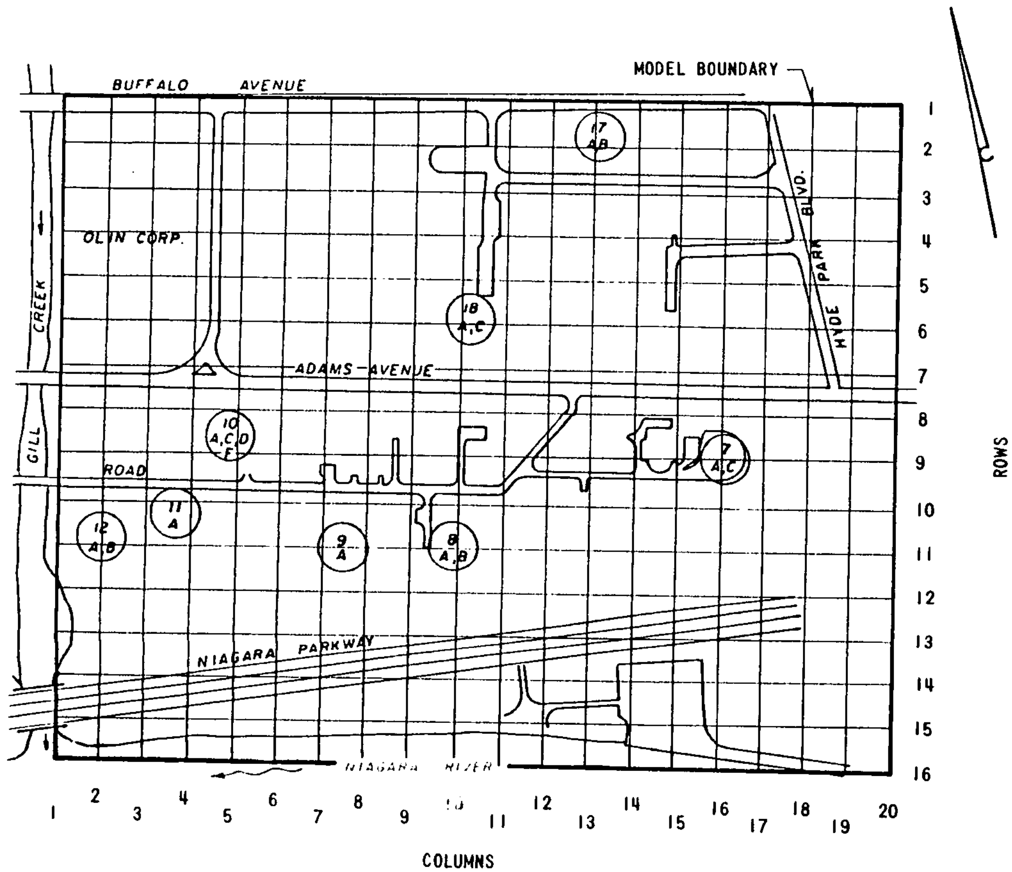
Drawn By D.J.	SCALE IN FEET 0 — 300	Date: 9/27/84
Checked: D.W.B.		Job: 83C2236-8

PLATE 37

Appendix A

APPENDIX A
MODEL INPUT DATA

Presented in this appendix are the input parameters utilized in the modeling of DuPont's Niagara Plant Site. As described in the text of this report, the site was divided into two areas; east and west of Gill Creek. As shown on Plates A1 and A2, a grid was placed on each of the areas with 100 feet spacing between grid lines. At each of the nodes, parameter values were assigned from extrapolated/interpolated measured field data. Boundary nodes were assigned constant head values by increasing their storage coefficient value to a very large number (i.e. from 0.25 to 9999.0). Precipitation was introduced at certain nodes by injecting water into the system (i.e. negative pump rates at those nodes). Presented in Table A1 are the specific initial input parameter values assigned to each node of the east plant area grid used to generate the calibrated groundwater contours. Likewise, Table A2 presents those values for the west plant area grid. Presented in Tables 3 and 4 are the input parameter values representing the conceptual remediation scheme for the east and west plant areas, respectively. These values were used to generate the first stage withdrawal contours (see Plate 31 of text) of the conceptual remediation scheme.

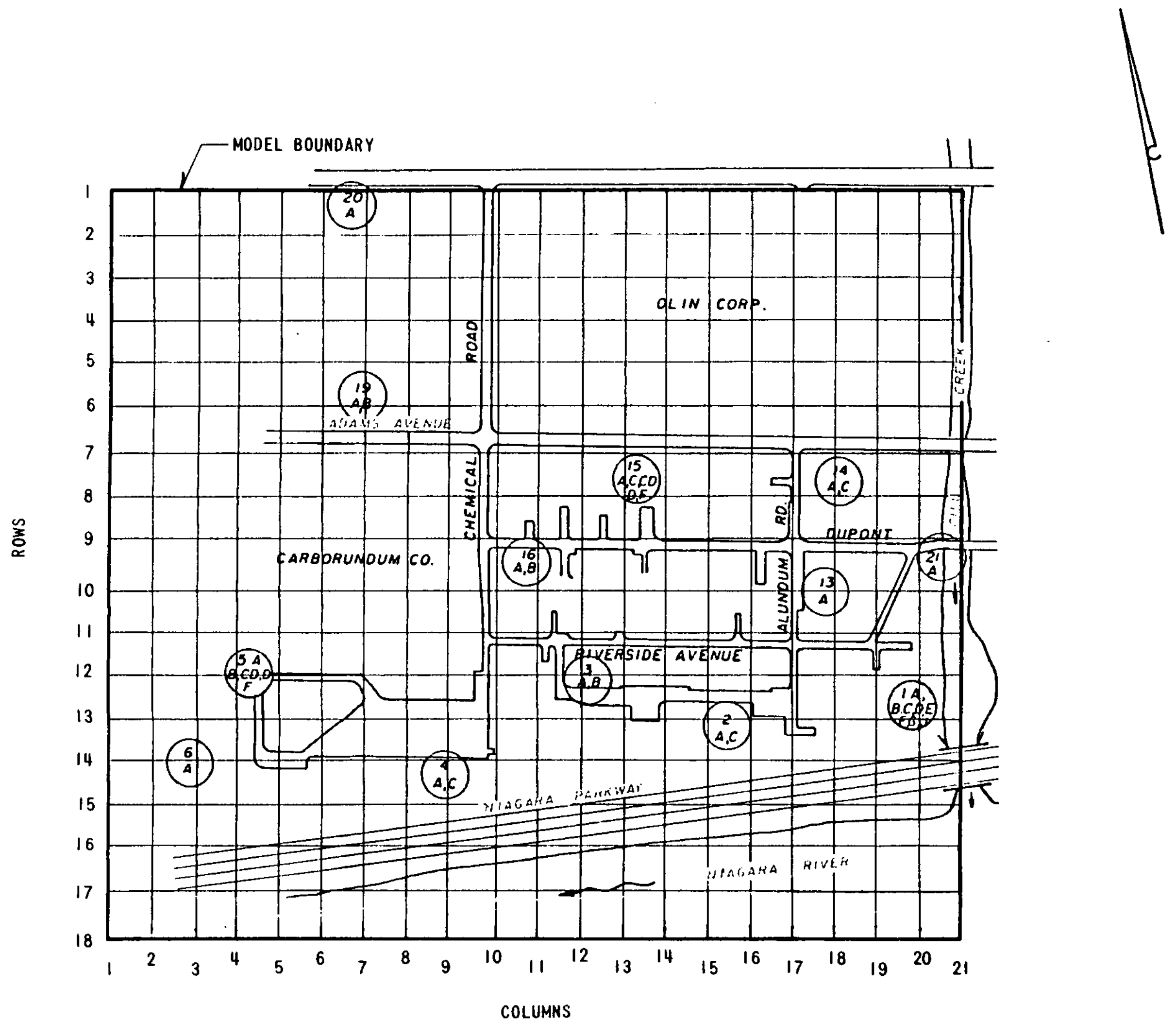


EAST PLANT AREA
GROUNDWATER MODEL GRID
NIAGARA PLANT SITE
E.I. DUPONT DE NEMOURS & CO., INC.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By T.P.	SCALE IN FEET 0 300	Date 9/27/84
Checked D.W.B.		Job 83C2236-8

PLATE A1



WEST PLANT AREA
GROUNDWATER MODEL GRID
NIAGARA PLANT SITE
E.I. DUPONT DE NEMOURS & CO., INC.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIROMENTAL SCIENTISTS

Drawn By T.P.	SCALE IN FEET	Date 9/27/84
Checked D.W.B.	0 300	Job 83C2236-8

PLATE A2

DO NOT COPY
FROM A-4 to A-33

TABLE AI
EAST PLANT AREA
CALIBRATED INITIAL INPUT PARAMETER VALUES
DUPONT NIAGARA PLANT, NIAGARA FALLS, NEW YORK

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
1	1	62.7	0.	9999.00	212.0	212.0	59.0
1	2	62.6	0.	9999.00	212.0	212.0	59.0
1	3	62.5	0.	9999.00	212.0	212.0	59.0
1	4	62.4	0.	9999.00	212.0	212.0	59.0
1	5	62.3	0.	9999.00	212.0	212.0	59.0
1	6	62.2	0.	9999.00	212.0	212.0	59.0
1	7	62.1	0.	9999.00	212.0	212.0	59.0
1	8	62.0	0.	9999.00	212.0	212.0	59.0
1	9	62.0	0.	9999.00	212.0	212.0	59.0
1	10	61.9	0.	9999.00	212.0	212.0	60.0
1	11	61.9	0.	9999.00	212.0	212.0	59.0
1	12	62.0	0.	9999.00	212.0	212.0	58.0
1	13	62.1	0.	9999.00	212.0	212.0	57.0
1	14	62.2	0.	9999.00	212.0	212.0	58.0
1	15	62.3	0.	9999.00	212.0	212.0	58.0
1	16	62.4	0.	9999.00	212.0	212.0	58.0
2	1	62.0	0.	9999.00	212.0	212.0	59.0
2	2	62.0	0.	.25	212.0	212.0	59.0
2	3	62.0	0.	.25	212.0	212.0	59.0
2	4	62.0	0.	.25	212.0	212.0	59.0
2	5	62.0	0.	.25	212.0	212.0	60.0
2	6	62.0	0.	.25	212.0	212.0	60.0
2	7	62.0	0.	.25	212.0	212.0	60.0
2	8	61.0	-223.	.25	212.0	212.0	60.0
2	9	62.0	-223.	.25	212.0	212.0	60.0
2	10	62.0	-223.	.25	212.0	212.0	59.0
2	11	62.0	-223.	.25	212.0	212.0	58.0
2	12	62.0	-223.	.25	212.0	212.0	58.0
2	13	62.0	-223.	.25	212.0	212.0	58.0
2	14	62.0	-223.	.25	212.0	212.0	57.0
2	15	62.0	-223.	.25	212.0	212.0	57.0
2	16	62.4	0.	9999.00	212.0	212.0	58.0
3	1	62.0	0.	9999.00	212.0	212.0	57.0
3	2	62.0	0.	.25	212.0	212.0	57.0
3	3	61.0	0.	.25	212.0	212.0	57.0
3	4	61.0	0.	.25	212.0	212.0	58.0
3	5	61.0	0.	.25	212.0	212.0	58.0
3	6	61.0	0.	.25	212.0	212.0	59.0
3	7	61.0	0.	.25	212.0	212.0	59.0
3	8	61.0	-223.	.25	212.0	212.0	60.0
3	9	61.0	-223.	.25	212.0	212.0	60.0
3	10	62.0	-223.	.25	212.0	212.0	59.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
3	11	62.0	-223.	.25	212.0	212.0	59.0
3	12	62.0	-223.	.25	212.0	212.0	58.0
3	13	62.0	-223.	.25	212.0	212.0	58.0
3	14	62.0	-223.	.25	212.0	212.0	58.0
3	15	62.0	-223.	.25	212.0	212.0	58.0
3	16	62.6	0.	9999.00	212.0	212.0	57.0
4	1	61.0	0.	9999.00	212.0	212.0	55.0
4	2	60.0	0.	.25	212.0	212.0	55.0
4	3	60.0	0.	.25	212.0	212.0	56.0
4	4	60.0	0.	.25	212.0	212.0	57.0
4	5	60.0	0.	.25	212.0	212.0	57.0
4	6	60.0	0.	.25	212.0	212.0	58.0
4	7	60.0	0.	.25	212.0	212.0	59.0
4	8	61.0	-223.	.25	212.0	212.0	59.0
4	9	61.0	-223.	.25	212.0	212.0	59.0
4	10	62.0	-223.	.25	212.0	212.0	59.0
4	11	62.0	-223.	.25	212.0	212.0	59.0
4	12	62.0	-223.	.25	212.0	212.0	59.0
4	13	62.0	-223.	.25	212.0	212.0	58.0
4	14	62.0	-223.	.25	212.0	212.0	58.0
4	15	62.0	-223.	.25	212.0	212.0	58.0
4	16	62.9	0.	9999.00	212.0	212.0	57.0
5	1	59.0	0.	9999.00	212.0	212.0	54.0
5	2	59.0	0.	.25	212.0	212.0	55.0
5	3	59.0	0.	.25	212.0	212.0	55.0
5	4	59.0	0.	.25	212.0	212.0	56.0
5	5	59.0	0.	.25	212.0	212.0	56.0
5	6	59.0	0.	.25	212.0	212.0	57.0
5	7	60.0	0.	.25	212.0	212.0	58.0
5	8	61.0	-223.	.25	212.0	212.0	58.0
5	9	62.0	-223.	.25	212.0	212.0	58.0
5	10	62.0	-223.	.25	212.0	212.0	59.0
5	11	62.0	-223.	.25	212.0	212.0	59.0
5	12	62.0	-223.	.25	212.0	212.0	59.0
5	13	62.0	-223.	.25	212.0	212.0	58.0
5	14	62.0	-223.	.25	212.0	212.0	58.0
5	15	62.0	-223.	.25	212.0	212.0	58.0
5	16	63.0	0.	9999.00	212.0	212.0	58.0
6	1	58.0	0.	9999.00	212.0	212.0	54.0
6	2	58.0	0.	.25	212.0	212.0	54.0
6	3	58.0	0.	.25	212.0	212.0	55.0
6	4	58.0	0.	.25	212.0	212.0	55.0
6	5	58.0	0.	.25	212.0	212.0	56.0
6	6	59.0	0.	.25	212.0	212.0	56.0
6	7	60.0	0.	.25	212.0	212.0	57.0
6	8	61.0	-223.	.25	212.0	212.0	57.0
6	9	61.0	-223.	.25	212.0	212.0	58.0
6	10	62.0	-223.	.25	212.0	212.0	59.0
6	11	62.0	-223.	.25	212.0	212.0	59.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
6	12	62.0	-223.	.25	212.0	212.0	59.0
6	13	62.0	-223.	.25	212.0	212.0	59.0
6	14	62.0	-223.	.25	212.0	212.0	58.0
6	15	62.0	-223.	.25	212.0	212.0	58.0
6	16	62.9	0.	9999.00	212.0	212.0	58.0
7	1	56.0	0.	9999.00	212.0	212.0	53.0
7	2	56.0	0.	.25	212.0	212.0	54.0
7	3	56.0	0.	.25	212.0	212.0	54.0
7	4	57.0	0.	.25	212.0	212.0	55.0
7	5	58.0	0.	.25	212.0	212.0	55.0
7	6	58.0	0.	.25	212.0	212.0	55.0
7	7	59.0	0.	.25	212.0	212.0	56.0
7	8	60.0	-223.	.25	212.0	212.0	56.0
7	9	61.0	-223.	.25	212.0	212.0	57.0
7	10	62.0	-223.	.25	212.0	212.0	58.0
7	11	62.0	-223.	.25	212.0	212.0	58.0
7	12	62.0	-223.	.25	212.0	212.0	59.0
7	13	62.0	-223.	.25	212.0	212.0	59.0
7	14	62.0	-223.	.25	212.0	212.0	59.0
7	15	62.0	-223.	.25	212.0	212.0	59.0
7	16	62.7	0.	9999.00	212.0	212.0	59.0
8	1	55.0	0.	9999.00	212.0	212.0	52.0
8	2	55.0	0.	.25	212.0	212.0	53.0
8	3	55.0	0.	.25	212.0	212.0	54.0
8	4	56.0	0.	.25	212.0	212.0	54.0
8	5	57.0	0.	.25	212.0	212.0	54.0
8	6	58.0	0.	.25	212.0	212.0	55.0
8	7	59.0	0.	.25	212.0	212.0	55.0
8	8	60.0	-223.	.25	212.0	212.0	56.0
8	9	61.0	-223.	.25	212.0	212.0	56.0
8	10	62.0	-223.	.25	212.0	212.0	58.0
8	11	62.0	-223.	.25	212.0	212.0	58.0
8	12	62.0	-223.	.25	212.0	212.0	58.0
8	13	62.0	-223.	.25	212.0	212.0	58.0
8	14	62.0	-223.	.25	212.0	212.0	59.0
8	15	62.0	-223.	.25	212.0	212.0	59.0
8	16	62.7	0.	9999.00	212.0	212.0	59.0
9	1	54.0	0.	9999.00	212.0	212.0	51.0
9	2	54.0	0.	.25	212.0	212.0	52.0
9	3	54.0	0.	.25	212.0	212.0	53.0
9	4	55.0	0.	.25	212.0	212.0	53.0
9	5	56.0	0.	.25	212.0	212.0	54.0
9	6	57.0	0.	.25	212.0	212.0	54.0
9	7	59.0	0.	.25	212.0	212.0	55.0
9	8	60.0	-223.	.25	212.0	212.0	55.0
9	9	61.0	-223.	.25	212.0	212.0	56.0
9	10	62.0	-223.	.25	212.0	212.0	56.0
9	11	62.0	-223.	.25	212.0	212.0	57.0
9	12	62.0	-223.	.25	212.0	212.0	57.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft²) ROW	PERMEABILITY (gpd/ft²) COLUMN	BOTTOM OF AQUIFER (ft)
9	13	62.0	-223.	.25	212.0	212.0	58.0
9	14	62.0	-223.	.25	212.0	212.0	58.0
9	15	62.0	-223.	.25	212.0	212.0	58.0
9	16	62.7	0.	9999.00	212.0	212.0	58.0
10	1	52.5	0.	9999.00	212.0	212.0	49.0
10	2	53.0	0.	.25	212.0	212.0	50.0
10	3	54.0	0.	.25	212.0	212.0	52.0
10	4	55.0	0.	.25	212.0	212.0	53.0
10	5	56.0	0.	.25	212.0	212.0	54.0
10	6	57.0	0.	.25	212.0	212.0	54.0
10	7	58.0	0.	.25	212.0	212.0	55.0
10	8	59.0	-223.	.25	212.0	212.0	55.0
10	9	61.0	-223.	.25	212.0	212.0	55.0
10	10	62.0	-223.	.25	212.0	212.0	56.0
10	11	62.0	-223.	.25	212.0	212.0	57.0
10	12	62.0	-223.	.25	212.0	212.0	57.0
10	13	62.0	-223.	.25	212.0	212.0	57.0
10	14	62.0	-223.	.25	212.0	212.0	58.0
10	15	62.0	-223.	.25	212.0	212.0	58.0
10	16	62.7	0.	9999.00	212.0	212.0	58.0
11	1	52.0	0.	9999.00	212.0	212.0	48.0
11	2	52.0	0.	.25	212.0	212.0	49.0
11	3	53.0	0.	.25	212.0	212.0	50.0
11	4	54.0	0.	.25	212.0	212.0	52.0
11	5	55.0	0.	.25	212.0	212.0	53.0
11	6	56.0	0.	.25	212.0	212.0	54.0
11	7	57.0	0.	.25	212.0	212.0	54.0
11	8	59.0	0.	.25	212.0	212.0	55.0
11	9	60.0	0.	.25	212.0	212.0	55.0
11	10	61.0	0.	.25	212.0	212.0	55.0
11	11	62.0	0.	.25	212.0	212.0	56.0
11	12	62.0	0.	.25	212.0	212.0	56.0
11	13	62.0	0.	.25	212.0	212.0	57.0
11	14	62.0	0.	.25	212.0	212.0	57.0
11	15	62.0	0.	.25	212.0	212.0	57.0
11	16	62.6	0.	9999.00	212.0	212.0	58.0
12	1	51.5	0.	9999.00	212.0	212.0	47.0
12	2	52.0	0.	.25	212.0	212.0	48.0
12	3	53.0	0.	.25	212.0	212.0	49.0
12	4	53.0	0.	.25	212.0	212.0	50.0
12	5	55.0	0.	.25	212.0	212.0	52.0
12	6	56.0	0.	.25	212.0	212.0	53.0
12	7	57.0	0.	.25	212.0	212.0	54.0
12	8	58.0	0.	.25	212.0	212.0	54.0
12	9	59.0	0.	.25	212.0	212.0	55.0
12	10	61.0	0.	.25	212.0	212.0	55.0
12	11	62.0	0.	.25	212.0	212.0	55.0
12	12	62.0	0.	.25	212.0	212.0	56.0
12	13	62.0	0.	.25	212.0	212.0	56.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
12	14	62.0	0.	.25	212.0	212.0	56.0
12	15	62.0	0.	.25	212.0	212.0	57.0
12	16	62.5	0.	9999.00	212.0	212.0	57.0
13	1	51.0	0.	9999.00	212.0	212.0	46.0
13	2	51.0	0.	.25	212.0	212.0	47.0
13	3	52.0	0.	.25	212.0	212.0	48.0
13	4	53.0	0.	.25	212.0	212.0	49.0
13	5	54.0	0.	.25	212.0	212.0	51.0
13	6	55.0	0.	.25	212.0	212.0	52.0
13	7	56.0	0.	.25	212.0	212.0	53.0
13	8	57.0	0.	.25	212.0	212.0	54.0
13	9	58.0	0.	.25	212.0	212.0	54.0
13	10	60.0	0.	.25	212.0	212.0	55.0
13	11	61.0	0.	.25	212.0	212.0	55.0
13	12	62.0	0.	.25	212.0	212.0	56.0
13	13	62.0	0.	.25	212.0	212.0	56.0
13	14	62.0	0.	.25	212.0	212.0	56.0
13	15	62.0	0.	.25	212.0	212.0	56.0
13	16	62.4	0.	9999.00	212.0	212.0	57.0
14	1	50.5	0.	9999.00	212.0	212.0	46.0
14	2	51.0	0.	.25	212.0	212.0	46.0
14	3	52.0	0.	.25	212.0	212.0	47.0
14	4	52.0	0.	.25	212.0	212.0	48.0
14	5	53.0	0.	.25	212.0	212.0	49.0
14	6	54.0	0.	.25	212.0	212.0	51.0
14	7	55.0	0.	.25	212.0	212.0	52.0
14	8	56.0	0.	.25	212.0	212.0	53.0
14	9	58.0	0.	.25	212.0	212.0	53.0
14	10	59.0	0.	.25	212.0	212.0	54.0
14	11	60.0	0.	.25	212.0	212.0	55.0
14	12	61.0	0.	.25	212.0	212.0	55.0
14	13	62.0	0.	.25	212.0	212.0	56.0
14	14	62.0	0.	.25	212.0	212.0	56.0
14	15	62.0	0.	.25	212.0	212.0	56.0
14	16	62.3	0.	9999.00	212.0	212.0	57.0
15	1	50.0	0.	9999.00	212.0	212.0	45.0
15	2	50.0	0.	.25	212.0	212.0	46.0
15	3	51.0	0.	.25	212.0	212.0	46.0
15	4	52.0	0.	.25	212.0	212.0	47.0
15	5	53.0	0.	.25	212.0	212.0	48.0
15	6	54.0	0.	.25	212.0	212.0	49.0
15	7	55.0	0.	.25	212.0	212.0	51.0
15	8	56.0	0.	.25	212.0	212.0	52.0
15	9	57.0	0.	.25	212.0	212.0	53.0
15	10	58.0	0.	.25	212.0	212.0	53.0
15	11	59.0	0.	.25	212.0	212.0	54.0
15	12	60.0	0.	.25	212.0	212.0	55.0
15	13	61.0	0.	.25	212.0	212.0	55.0
15	14	62.0	0.	.25	212.0	212.0	55.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
15	15	62.0	0.	.25	212.0	212.0	56.0
15	16	62.0	0.	9999.00	212.0	212.0	56.0
16	1	49.0	0.	9999.00	212.0	212.0	45.0
16	2	50.0	0.	.25	212.0	212.0	45.0
16	3	51.0	0.	.25	212.0	212.0	46.0
16	4	51.0	0.	.25	212.0	212.0	46.0
16	5	52.0	0.	.25	212.0	212.0	47.0
16	6	53.0	0.	.25	212.0	212.0	49.0
16	7	54.0	0.	.25	212.0	212.0	50.0
16	8	55.0	0.	.25	212.0	212.0	51.0
16	9	56.0	0.	.25	212.0	212.0	52.0
16	10	57.0	0.	.25	212.0	212.0	53.0
16	11	58.0	0.	.25	212.0	212.0	53.0
16	12	59.0	0.	.25	212.0	212.0	54.0
16	13	60.0	-223.	.25	212.0	212.0	54.0
16	14	61.0	-223.	.25	212.0	212.0	55.0
16	15	62.0	-223.	.25	212.0	212.0	56.0
16	16	62.2	0.	9999.00	212.0	212.0	56.0
17	1	48.5	0.	9999.00	212.0	212.0	45.0
17	2	49.0	0.	.25	212.0	212.0	45.0
17	3	50.0	0.	.25	212.0	212.0	46.0
17	4	51.0	0.	.25	212.0	212.0	46.0
17	5	52.0	0.	.25	212.0	212.0	46.0
17	6	52.0	0.	.25	212.0	212.0	48.0
17	7	53.0	0.	.25	212.0	212.0	49.0
17	8	54.0	0.	.25	212.0	212.0	50.0
17	9	55.0	0.	.25	212.0	212.0	51.0
17	10	56.0	0.	.25	212.0	212.0	52.0
17	11	57.0	0.	.25	212.0	212.0	3.0
17	12	58.0	0.	.25	212.0	212.0	53.0
17	13	59.0	-223.	.25	212.0	212.0	54.0
17	14	61.0	-223.	.25	212.0	212.0	55.0
17	15	62.0	-223.	.25	212.0	212.0	55.0
17	16	62.1	0.	9999.00	212.0	212.0	56.0
18	1	48.0	0.	9999.00	212.0	212.0	45.0
18	2	49.0	0.	.25	212.0	212.0	45.0
18	3	49.0	0.	.25	212.0	212.0	45.0
18	4	50.0	0.	.25	212.0	212.0	45.0
18	5	51.0	0.	.25	212.0	212.0	46.0
18	6	52.0	0.	.25	212.0	212.0	47.0
18	7	53.0	0.	.25	212.0	212.0	48.0
18	8	53.0	0.	.25	212.0	212.0	49.0
18	9	54.0	0.	.25	212.0	212.0	50.0
18	10	55.0	0.	.25	212.0	212.0	51.0
18	11	57.0	0.	.25	212.0	212.0	52.0
18	12	58.0	0.	.25	212.0	212.0	53.0
18	13	59.0	-223.	.25	212.0	212.0	53.0
18	14	60.0	-223.	.25	212.0	212.0	54.0
18	15	61.0	-223.	.25	212.0	212.0	55.0

TABLE AI (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
18	16	62.0	0.	9999.00	212.0	212.0	55.0
19	1	47.5	0.	9999.00	212.0	212.0	45.0
19	2	48.0	0.	.25	212.0	212.0	45.0
19	3	49.0	0.	.25	212.0	212.0	45.0
19	4	50.0	0.	.25	212.0	212.0	45.0
19	5	51.0	0.	.25	212.0	212.0	46.0
19	6	51.0	0.	.25	212.0	212.0	46.0
19	7	52.0	0.	.25	212.0	212.0	47.0
19	8	53.0	0.	.25	212.0	212.0	49.0
19	9	54.0	0.	.25	212.0	212.0	50.0
19	10	55.0	0.	.25	212.0	212.0	51.0
19	11	56.0	0.	.25	212.0	212.0	52.0
19	12	57.0	0.	.25	212.0	212.0	53.0
19	13	58.0	-223.	.25	212.0	212.0	53.0
19	14	59.0	-223.	.25	212.0	212.0	54.0
19	15	61.0	-223.	.25	212.0	212.0	55.0
19	16	62.0	0.	9999.00	212.0	212.0	55.0
20	1	47.0	0.	9999.00	212.0	212.0	45.0
20	2	48.0	0.	9999.00	212.0	212.0	45.0
20	3	49.0	0.	9999.00	212.0	212.0	45.0
20	4	49.5	0.	9999.00	212.0	212.0	45.0
20	5	50.0	0.	9999.00	212.0	212.0	46.0
20	6	51.0	0.	9999.00	212.0	212.0	46.0
20	7	52.0	0.	9999.00	212.0	212.0	47.0
20	8	53.0	0.	9999.00	212.0	212.0	48.0
20	9	54.0	0.	9999.00	212.0	212.0	49.0
20	10	55.0	0.	9999.00	212.0	212.0	50.0
20	11	56.0	0.	9999.00	212.0	212.0	51.0
20	12	57.0	0.	9999.00	212.0	212.0	52.0
20	13	58.0	0.	9999.00	212.0	212.0	53.0
20	14	59.0	0.	9999.00	212.0	212.0	53.0
20	15	61.0	0.	9999.00	212.0	212.0	54.0
20	16	62.0	0.	9999.00	212.0	212.0	55.0

TABLE A2
WEST PLANT AREA
CALIBRATED INITIAL INPUT PARAMETER VALUES
DUPONT NIAGARA PLANT, NIAGARA FALLS, NEW YORK

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
1	1	66.0	0.	9999.00	212.0	212.0	62.0
1	2	65.0	0.	9999.00	212.0	212.0	61.0
1	3	64.0	0.	9999.00	212.0	212.0	60.0
1	4	63.0	0.	9999.00	212.0	212.0	59.0
1	5	62.0	0.	9999.00	212.0	212.0	59.0
1	6	62.0	0.	9999.00	212.0	212.0	59.0
1	7	61.0	0.	9999.00	212.0	212.0	58.0
1	8	60.0	0.	9999.00	212.0	212.0	58.0
1	9	58.0	0.	9999.00	212.0	212.0	56.0
1	10	57.0	0.	9999.00	212.0	212.0	55.0
1	11	56.0	0.	9999.00	212.0	212.0	54.0
1	12	55.0	0.	9999.00	212.0	212.0	53.0
1	13	56.0	0.	9999.00	212.0	212.0	54.0
1	14	58.0	0.	9999.00	212.0	212.0	54.0
1	15	60.0	0.	9999.00	212.0	212.0	56.0
1	16	61.0	0.	9999.00	212.0	212.0	56.0
1	17	62.0	0.	9999.00	212.0	212.0	56.0
1	18	62.0	0.	9999.00	212.0	212.0	56.0
2	1	67.0	0.	9999.00	212.0	212.0	62.0
2	2	66.0	0.	.25	212.0	212.0	62.0
2	3	65.0	0.	.25	212.0	212.0	61.0
2	4	64.0	0.	.25	212.0	212.0	60.0
2	5	63.0	0.	.25	212.0	212.0	59.0
2	6	62.0	0.	.25	212.0	212.0	59.0
2	7	62.0	0.	.25	212.0	212.0	58.0
2	8	61.0	0.	.25	212.0	212.0	58.0
2	9	59.0	0.	.25	212.0	212.0	58.0
2	10	58.0	0.	.25	212.0	212.0	57.0
2	11	58.0	0.	.25	212.0	212.0	57.0
2	12	58.0	0.	.25	212.0	212.0	57.0
2	13	58.0	0.	.25	212.0	212.0	57.0
2	14	58.0	0.	.25	212.0	212.0	57.0
2	15	60.0	0.	.25	212.0	212.0	57.0
2	16	61.0	0.	.25	212.0	212.0	56.0
2	17	62.0	0.	.25	212.0	212.0	56.0
2	18	62.0	0.	9999.00	212.0	212.0	56.0
3	1	67.6	0.	9999.00	212.0	212.0	63.0
3	2	67.0	0.	.25	212.0	212.0	62.0
3	3	66.0	0.	.25	212.0	212.0	61.0
3	4	65.0	0.	.25	212.0	212.0	61.0
3	5	64.0	0.	.25	212.0	212.0	60.0
3	6	63.0	0.	.25	212.0	212.0	59.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
3	7	63.0	0.	.25	212.0	212.0	58.0
3	8	62.0	0.	.25	212.0	212.0	58.0
3	9	60.0	0.	.25	212.0	212.0	58.0
3	10	59.0	0.	.25	212.0	212.0	57.0
3	11	58.0	0.	.25	212.0	212.0	57.0
3	12	58.0	-187.	.25	212.0	212.0	57.0
3	13	58.0	-187.	.25	212.0	212.0	57.0
3	14	58.0	-187.	.25	212.0	212.0	57.0
3	15	60.0	-187.	.25	212.0	212.0	57.0
3	16	62.0	-187.	.25	212.0	212.0	57.0
3	17	62.0	0.	.25	212.0	212.0	57.0
3	18	62.0	0.	9999.00	212.0	212.0	56.0
4	1	68.4	0.	9999.00	212.0	212.0	64.0
4	2	68.0	0.	.25	212.0	212.0	63.0
4	3	67.0	0.	.25	212.0	212.0	62.0
4	4	66.0	0.	.25	212.0	212.0	61.0
4	5	65.0	0.	.25	212.0	212.0	60.0
4	6	64.0	0.	.25	212.0	212.0	59.0
4	7	63.0	0.	.25	212.0	212.0	59.0
4	8	62.0	0.	.25	212.0	212.0	58.0
4	9	61.0	0.	.25	212.0	212.0	58.0
4	10	61.0	0.	.25	212.0	212.0	57.0
4	11	59.0	0.	.25	212.0	212.0	57.0
4	12	58.0	-187.	.25	212.0	212.0	57.0
4	13	58.0	-187.	.25	212.0	212.0	57.0
4	14	59.0	-187.	.25	212.0	212.0	57.0
4	15	61.0	-187.	.25	212.0	212.0	57.0
4	16	62.0	-187.	.25	212.0	212.0	57.0
4	17	62.0	0.	.25	212.0	212.0	57.0
4	18	62.0	0.	9999.00	212.0	212.0	57.0
5	1	69.3	0.	9999.00	212.0	212.0	64.0
5	2	68.0	0.	.25	212.0	212.0	63.0
5	3	68.0	0.	.25	212.0	212.0	63.0
5	4	67.0	0.	.25	212.0	212.0	62.0
5	5	66.0	0.	.25	212.0	212.0	61.0
5	6	65.0	0.	.25	212.0	212.0	60.0
5	7	64.0	0.	.25	212.0	212.0	59.0
5	8	63.0	0.	.25	212.0	212.0	58.0
5	9	62.0	0.	.25	212.0	212.0	58.0
5	10	62.0	0.	.25	212.0	212.0	57.0
5	11	61.0	0.	.25	212.0	212.0	57.0
5	12	60.0	-187.	.25	212.0	212.0	57.0
5	13	59.0	-187.	.25	212.0	212.0	57.0
5	14	60.0	-187.	.25	212.0	212.0	57.0
5	15	62.0	-187.	.25	212.0	212.0	57.0
5	16	62.0	-187.	.25	212.0	212.0	57.0
5	17	62.0	0.	.25	212.0	212.0	57.0
5	18	62.0	0.	9999.00	212.0	212.0	57.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
6	1	68.5	0.	9999.00	212.0	212.0	64.0
6	2	68.0	0.	.25	212.0	212.0	64.0
6	3	68.0	0.	.25	212.0	212.0	63.0
6	4	67.0	0.	.25	212.0	212.0	62.0
6	5	67.0	0.	.25	212.0	212.0	61.0
6	6	66.0	0.	.25	212.0	212.0	60.0
6	7	65.0	0.	.25	212.0	212.0	59.0
6	8	64.0	0.	.25	212.0	212.0	58.0
6	9	63.0	0.	.25	212.0	212.0	58.0
6	10	63.0	0.	.25	212.0	212.0	57.0
6	11	62.0	0.	.25	212.0	212.0	57.0
6	12	62.0	-187.	.25	212.0	212.0	57.0
6	13	61.0	-187.	.25	212.0	212.0	57.0
6	14	62.0	-187.	.25	212.0	212.0	57.0
6	15	62.0	-187.	.25	212.0	212.0	57.0
6	16	62.0	-187.	.25	212.0	212.0	57.0
6	17	62.0	0.	.25	212.0	212.0	57.0
6	18	62.0	0.	9999.00	212.0	212.0	57.0
7	1	68.0	0.	9999.00	212.0	212.0	64.0
7	2	68.0	0.	.25	212.0	212.0	64.0
7	3	67.0	0.	.25	212.0	212.0	64.0
7	4	67.0	0.	.25	212.0	212.0	63.0
7	5	67.0	0.	.25	212.0	212.0	62.0
7	6	66.0	0.	.25	212.0	212.0	61.0
7	7	66.0	0.	.25	212.0	212.0	60.0
7	8	65.0	0.	.25	212.0	212.0	59.0
7	9	64.0	0.	.25	212.0	212.0	58.0
7	10	63.0	0.	.25	212.0	212.0	58.0
7	11	63.0	0.	.25	212.0	212.0	57.0
7	12	62.0	-187.	.25	212.0	212.0	57.0
7	13	62.0	-187.	.25	212.0	212.0	57.0
7	14	62.0	-187.	.25	212.0	212.0	57.0
7	15	62.0	-187.	.25	212.0	212.0	57.0
7	16	62.0	-187.	.25	212.0	212.0	57.0
7	17	62.0	0.	.25	212.0	212.0	57.0
7	18	62.2	0.	9999.00	212.0	212.0	57.0
8	1	67.6	0.	9999.00	212.0	212.0	65.0
8	2	67.0	0.	.25	212.0	212.0	64.0
8	3	67.0	0.	.25	212.0	212.0	64.0
8	4	67.0	0.	.25	212.0	212.0	63.0
8	5	67.0	0.	.25	212.0	212.0	62.0
8	6	66.0	0.	.25	212.0	212.0	61.0
8	7	66.0	0.	.25	212.0	212.0	60.0
8	8	65.0	0.	.25	212.0	212.0	59.0
8	9	64.0	0.	.25	212.0	212.0	58.0
8	10	64.0	0.	.25	212.0	212.0	58.0
8	11	63.0	0.	.25	212.0	212.0	57.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
8	12	63.0	-187.	.25	212.0	212.0	57.0
8	13	63.0	-187.	.25	212.0	212.0	57.0
8	14	62.0	-187.	.25	212.0	212.0	57.0
8	15	62.0	-187.	.25	212.0	212.0	57.0
8	16	62.0	-187.	.25	212.0	212.0	57.0
8	17	62.0	0.	.25	212.0	212.0	57.0
8	18	62.2	0.	9999.00	212.0	212.0	57.0
9	1	67.3	0.	9999.00	212.0	212.0	65.0
9	2	67.0	0.	.25	212.0	212.0	65.0
9	3	67.0	0.	.25	212.0	212.0	64.0
9	4	67.0	0.	.25	212.0	212.0	64.0
9	5	67.0	0.	.25	212.0	212.0	63.0
9	6	66.0	0.	.25	212.0	212.0	62.0
9	7	66.0	0.	.25	212.0	212.0	61.0
9	8	65.0	0.	.25	212.0	212.0	60.0
9	9	64.0	0.	.25	212.0	212.0	59.0
9	10	64.0	0.	.25	212.0	212.0	58.0
9	11	64.0	0.	.25	212.0	212.0	58.0
9	12	63.0	-187.	.25	212.0	212.0	57.0
9	13	63.0	-187.	.25	212.0	212.0	57.0
9	14	63.0	-187.	.25	212.0	212.0	57.0
9	15	62.0	-187.	.25	212.0	212.0	57.0
9	16	62.0	-187.	.25	212.0	212.0	57.0
9	17	62.0	0.	.25	212.0	212.0	57.0
9	18	62.2	0.	9999.00	212.0	212.0	57.0
10	1	66.9	0.	9999.00	212.0	212.0	65.0
10	2	67.0	0.	.25	212.0	212.0	65.0
10	3	67.0	0.	.25	212.0	212.0	64.0
10	4	67.0	0.	.25	212.0	212.0	64.0
10	5	66.0	0.	.25	212.0	212.0	63.0
10	6	66.0	0.	.25	212.0	212.0	62.0
10	7	66.0	0.	.25	212.0	212.0	60.0
10	8	65.0	0.	.25	212.0	212.0	60.0
10	9	65.0	0.	.25	212.0	212.0	59.0
10	10	64.0	0.	.25	212.0	212.0	59.0
10	11	64.0	0.	.25	212.0	212.0	58.0
10	12	64.0	0.	.25	212.0	212.0	57.0
10	13	64.0	0.	.25	212.0	212.0	57.0
10	14	63.0	0.	.25	212.0	212.0	57.0
10	15	63.0	0.	.25	212.0	212.0	58.0
10	16	62.0	0.	.25	212.0	212.0	58.0
10	17	62.0	0.	.25	212.0	212.0	58.0
10	18	62.2	0.	9999.00	212.0	212.0	57.0
11	1	66.4	0.	9999.00	212.0	212.0	65.0
11	2	66.0	0.	.25	212.0	212.0	65.0
11	3	66.0	0.	.25	212.0	212.0	65.0
11	4	66.0	0.	.25	212.0	212.0	64.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
11	5	66.0	0.	.25	212.0	212.0	64.0
11	6	66.0	0.	.25	212.0	212.0	63.0
11	7	66.0	0.	.25	212.0	212.0	62.0
11	8	65.0	0.	.25	212.0	212.0	61.0
11	9	65.0	0.	.25	212.0	212.0	60.0
11	10	65.0	0.	.25	212.0	212.0	59.0
11	11	64.0	0.	.25	212.0	212.0	58.0
11	12	64.0	0.	.25	212.0	212.0	57.0
11	13	64.0	0.	.25	212.0	212.0	57.0
11	14	64.0	0.	.25	212.0	212.0	57.0
11	15	63.0	0.	.25	212.0	212.0	58.0
11	16	62.0	0.	.25	212.0	212.0	58.0
11	17	62.0	0.	.25	212.0	212.0	58.0
11	18	62.2	0.	9999.00	212.0	212.0	57.0
12	1	66.0	0.	9999.00	212.0	212.0	65.0
12	2	66.0	0.	.25	212.0	212.0	65.0
12	3	66.0	0.	.25	212.0	212.0	65.0
12	4	66.0	0.	.25	212.0	212.0	64.0
12	5	66.0	0.	.25	212.0	212.0	64.0
12	6	66.0	0.	.25	212.0	212.0	63.0
12	7	65.0	0.	.25	212.0	212.0	62.0
12	8	65.0	0.	.25	212.0	212.0	61.0
12	9	65.0	0.	.25	212.0	212.0	60.0
12	10	65.0	0.	.25	212.0	212.0	59.0
12	11	65.0	0.	.25	212.0	212.0	58.0
12	12	64.0	0.	.25	212.0	212.0	57.0
12	13	64.0	0.	.25	212.0	212.0	57.0
12	14	64.0	0.	.25	212.0	212.0	57.0
12	15	63.0	0.	.25	212.0	212.0	58.0
12	16	62.0	0.	.25	212.0	212.0	58.0
12	17	62.0	0.	.25	212.0	212.0	58.0
12	18	62.2	0.	9999.00	212.0	212.0	57.0
13	1	65.8	0.	9999.00	212.0	212.0	65.0
13	2	66.0	0.	.25	212.0	212.0	65.0
13	3	66.0	0.	.25	212.0	212.0	65.0
13	4	66.0	0.	.25	212.0	212.0	64.0
13	5	66.0	0.	.25	212.0	212.0	64.0
13	6	65.0	0.	.25	212.0	212.0	63.0
13	7	65.0	0.	.25	212.0	212.0	62.0
13	8	65.0	0.	.25	212.0	212.0	61.0
13	9	65.0	0.	.25	212.0	212.0	60.0
13	10	65.0	0.	.25	212.0	212.0	59.0
13	11	65.0	0.	.25	212.0	212.0	58.0
13	12	64.0	0.	.25	212.0	212.0	57.0
13	13	64.0	0.	.25	212.0	212.0	57.0
13	14	63.0	0.	.25	212.0	212.0	57.0
13	15	62.0	0.	.25	212.0	212.0	58.0
13	16	62.0	0.	.25	212.0	212.0	58.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
13	17	62.0	0.	.25	212.0	212.0	58.0
13	18	62.2	0.	9999.00	212.0	212.0	57.0
14	1	65.4	0.	9999.00	212.0	212.0	64.0
14	2	65.0	0.	.25	212.0	212.0	64.0
14	3	65.0	0.	.25	212.0	212.0	64.0
14	4	65.0	0.	.25	212.0	212.0	64.0
14	5	65.0	0.	.25	212.0	212.0	64.0
14	6	65.0	0.	.25	212.0	212.0	63.0
14	7	65.0	0.	.25	212.0	212.0	62.0
14	8	65.0	0.	.25	212.0	212.0	61.0
14	9	65.0	0.	.25	212.0	212.0	60.0
14	10	65.0	0.	.25	212.0	212.0	59.0
14	11	64.0	0.	.25	212.0	212.0	59.0
14	12	64.0	0.	.25	212.0	212.0	58.0
14	13	64.0	0.	.25	212.0	212.0	57.0
14	14	63.0	0.	.25	212.0	212.0	57.0
14	15	62.0	0.	.25	212.0	212.0	58.0
14	16	62.0	0.	.25	212.0	212.0	57.0
14	17	62.0	0.	.25	212.0	212.0	57.0
14	18	62.2	0.	9999.00	212.0	212.0	56.0
15	1	65.0	0.	9999.00	212.0	212.0	64.0
15	2	65.0	0.	.25	212.0	212.0	64.0
15	3	65.0	0.	.25	212.0	212.0	64.0
15	4	65.0	0.	.25	212.0	212.0	64.0
15	5	65.0	0.	.25	212.0	212.0	64.0
15	6	65.0	0.	.25	212.0	212.0	63.0
15	7	65.0	0.	.25	212.0	212.0	62.0
15	8	65.0	0.	.25	212.0	212.0	62.0
15	9	65.0	0.	.25	212.0	212.0	60.0
15	10	64.0	0.	.25	212.0	212.0	60.0
15	11	64.0	0.	.25	212.0	212.0	59.0
15	12	64.0	0.	.25	212.0	212.0	58.0
15	13	63.0	0.	.25	212.0	212.0	57.0
15	14	62.0	0.	.25	212.0	212.0	58.0
15	15	62.0	0.	.25	212.0	212.0	58.0
15	16	62.0	0.	.25	212.0	212.0	57.0
15	17	62.0	0.	.25	212.0	212.0	57.0
15	18	62.2	0.	9999.00	212.0	212.0	56.0
16	1	64.7	0.	9999.00	212.0	212.0	64.0
16	2	65.0	0.	.25	212.0	212.0	64.0
16	3	65.0	0.	.25	212.0	212.0	64.0
16	4	65.0	0.	.25	212.0	212.0	64.0
16	5	65.0	0.	.25	212.0	212.0	63.0
16	6	65.0	0.	.25	212.0	212.0	63.0
16	7	65.0	0.	.25	212.0	212.0	62.0
16	8	65.0	0.	.25	212.0	212.0	61.0
16	9	65.0	0.	.25	212.0	212.0	60.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
16	10	64.0	0.	.25	212.0	212.0	60.0
16	11	64.0	0.	.25	212.0	212.0	59.0
16	12	64.0	0.	.25	212.0	212.0	58.0
16	13	63.0	0.	.25	212.0	212.0	57.0
16	14	62.0	0.	.25	212.0	212.0	58.0
16	15	62.0	0.	.25	212.0	212.0	58.0
16	16	62.0	0.	.25	212.0	212.0	57.0
16	17	62.0	0.	.25	212.0	212.0	57.0
16	18	62.2	0.	9999.00	212.0	212.0	56.0
17	1	64.2	0.	9999.00	212.0	212.0	63.0
17	2	64.0	0.	.25	212.0	212.0	63.0
17	3	64.0	0.	.25	212.0	212.0	63.0
17	4	64.0	0.	.25	212.0	212.0	63.0
17	5	64.0	0.	.25	212.0	212.0	63.0
17	6	64.0	0.	.25	212.0	212.0	62.0
17	7	64.0	0.	.25	212.0	212.0	62.0
17	8	64.0	0.	.25	212.0	212.0	61.0
17	9	64.0	0.	.25	212.0	212.0	60.0
17	10	64.0	0.	.25	212.0	212.0	59.0
17	11	64.0	0.	.25	212.0	212.0	59.0
17	12	64.0	-187.	.25	212.0	212.0	58.0
17	13	63.0	-187.	.25	212.0	212.0	57.0
17	14	62.0	-187.	.25	212.0	212.0	58.0
17	15	62.0	0.	.25	212.0	212.0	58.0
17	16	62.0	0.	.25	212.0	212.0	57.0
17	17	62.0	0.	.25	212.0	212.0	57.0
17	18	62.2	0.	9999.00	212.0	212.0	57.0
18	1	63.7	0.	9999.00	212.0	212.0	63.0
18	2	64.0	0.	.25	212.0	212.0	63.0
18	3	64.0	0.	.25	212.0	212.0	63.0
18	4	64.0	0.	.25	212.0	212.0	63.0
18	5	64.0	0.	.25	212.0	212.0	62.0
18	6	64.0	0.	.25	212.0	212.0	62.0
18	7	64.0	-187.	.25	212.0	212.0	61.0
18	8	64.0	-187.	.25	212.0	212.0	61.0
18	9	64.0	-187.	.25	212.0	212.0	60.0
18	10	64.0	-187.	.25	212.0	212.0	59.0
18	11	64.0	-187.	.25	212.0	212.0	59.0
18	12	63.0	-187.	.25	212.0	212.0	58.0
18	13	63.0	-187.	.25	212.0	212.0	57.0
18	14	62.0	-187.	.25	212.0	212.0	58.0
18	15	62.0	0.	.25	212.0	212.0	57.0
18	16	62.0	0.	.25	212.0	212.0	58.0
18	17	62.0	0.	.25	212.0	212.0	58.0
18	18	62.2	0.	9999.00	212.0	212.0	57.0
19	1	63.2	0.	9999.00	212.0	212.0	62.0
19	2	63.0	0.	.25	212.0	212.0	62.0

TABLE A2 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
19	3	63.0	0.	.25	212.0	212.0	62.0
19	4	63.0	0.	.25	212.0	212.0	62.0
19	5	63.0	0.	.25	212.0	212.0	61.0
19	6	63.0	0.	.25	212.0	212.0	61.0
19	7	63.0	-187.	.25	212.0	212.0	60.0
19	8	63.0	-187.	.25	212.0	212.0	60.0
19	9	63.0	-187.	.25	212.0	212.0	59.0
19	10	63.0	-187.	.25	212.0	212.0	59.0
19	11	63.0	-187.	.25	212.0	212.0	58.0
19	12	63.0	-187.	.25	212.0	212.0	58.0
19	13	63.0	-187.	.25	212.0	212.0	58.0
19	14	62.0	-187.	.25	212.0	212.0	57.0
19	15	62.0	0.	.25	212.0	212.0	58.0
19	16	62.0	0.	.25	212.0	212.0	58.0
19	17	62.0	0.	.25	212.0	212.0	58.0
19	18	62.2	0.	9999.00	212.0	212.0	57.0
20	1	62.5	0.	9999.00	212.0	212.0	61.0
20	2	62.0	0.	.25	212.0	212.0	61.0
20	3	62.0	0.	.25	212.0	212.0	61.0
20	4	62.0	0.	.25	212.0	212.0	61.0
20	5	62.0	0.	.25	212.0	212.0	61.0
20	6	62.0	0.	.25	212.0	212.0	60.0
20	7	62.0	0.	.25	212.0	212.0	60.0
20	8	62.0	0.	.25	212.0	212.0	60.0
20	9	62.0	0.	.25	212.0	212.0	59.0
20	10	62.0	0.	.25	212.0	212.0	59.0
20	11	62.0	0.	.25	212.0	212.0	58.0
20	12	62.0	0.	.25	212.0	212.0	57.0
20	13	62.0	0.	.25	212.0	212.0	58.0
20	14	62.0	0.	.25	212.0	212.0	58.0
20	15	62.0	0.	.25	212.0	212.0	58.0
20	16	62.0	0.	.25	212.0	212.0	58.0
20	17	62.0	0.	.25	212.0	212.0	58.0
20	18	62.2	0.	9999.00	212.0	212.0	57.0
21	1	62.2	0.	9999.00	212.0	212.0	60.0
21	2	62.2	0.	9999.00	212.0	212.0	60.0
21	3	62.2	0.	9999.00	212.0	212.0	60.0
21	4	62.2	0.	9999.00	212.0	212.0	60.0
21	5	62.2	0.	9999.00	212.0	212.0	60.0
21	6	62.2	0.	9999.00	212.0	212.0	60.0
21	7	62.2	0.	9999.00	212.0	212.0	60.0
21	8	62.2	0.	9999.00	212.0	212.0	59.0
21	9	62.2	0.	9999.00	212.0	212.0	59.0
21	10	62.2	0.	9999.00	212.0	212.0	58.0
21	11	62.2	0.	9999.00	212.0	212.0	58.0
21	12	62.2	0.	9999.00	212.0	212.0	57.0
21	13	62.2	0.	9999.00	212.0	212.0	58.0
21	14	62.2	0.	9999.00	212.0	212.0	57.0
21	15	62.2	0.	9999.00	212.0	212.0	58.0
21	16	62.2	0.	9999.00	212.0	212.0	58.0
21	17	62.2	0.	9999.00	212.0	212.0	58.0
21	18	62.2	0.	9999.00	212.0	212.0	57.0

TABLE A3
EAST PLANT AREA
CONCEPTUAL REMEDIATION SCHEME INPUT PARAMETER VALUES
DUPONT NIAGARA PLANT, NIAGARA FALLS, NEW YORK

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
1	1	62.7	0.	9999.00	212.00	212.00	59.0
1	2	62.6	0.	9999.00	212.00	212.00	59.0
1	3	62.5	0.	9999.00	212.00	212.00	59.0
1	4	62.4	0.	9999.00	212.00	212.00	59.0
1	5	62.3	0.	9999.00	212.00	212.00	59.0
1	6	62.2	0.	9999.00	212.00	212.00	59.0
1	7	62.1	0.	9999.00	.07	.07	59.0
1	8	62.0	0.	9999.00	.07	.07	59.0
1	9	62.0	0.	9999.00	.07	.07	59.0
1	10	61.9	0.	9999.00	.07	.07	60.0
1	11	61.9	0.	9999.00	.07	.07	59.0
1	12	62.0	0.	9999.00	.07	.07	58.0
1	13	62.1	0.	9999.00	.07	.07	57.0
1	14	62.2	0.	9999.00	.07	.07	58.0
1	15	62.3	0.	9999.00	.07	.07	58.0
1	16	62.4	0.	9999.00	212.00	212.00	58.0
2	1	62.0	0.	9999.00	212.00	212.00	59.0
2	2	62.0	0.	.25	212.00	212.00	59.0
2	3	62.0	0.	.25	212.00	212.00	59.0
2	4	62.0	0.	.25	212.00	212.00	59.0
2	5	62.0	0.	.25	212.00	212.00	60.0
2	6	62.0	0.	.25	212.00	212.00	60.0
2	7	62.0	0.	.25	.07	.07	60.0
2	8	61.0	-223.	.25	212.00	212.00	59.0
2	9	62.0	-223.	.25	212.00	212.00	59.0
2	10	62.0	1600.	.25	212.00	2120.0	58.5
2	11	62.0	-223.	.25	212.00	212.00	58.0
2	12	62.0	-223.	.25	212.00	212.00	58.0
2	13	62.0	-223.	.25	212.00	212.00	58.0
2	14	62.0	-223.	.25	212.00	212.00	57.0
2	15	62.0	-223.	.25	.07	.07	57.0
2	16	62.4	0.	9999.00	212.00	212.00	58.0
3	1	62.0	0.	9999.00	212.00	212.00	57.0
3	2	62.0	0.	.25	212.00	212.00	57.0
3	3	61.0	0.	.25	212.00	212.00	57.0
3	4	61.0	0.	.25	212.00	212.00	58.0
3	5	61.0	0.	.25	212.00	212.00	58.0
3	6	61.0	0.	.25	212.00	212.00	59.0
3	7	61.0	0.	.25	.07	.07	59.0
3	8	61.0	-223.	.25	212.00	212.00	60.0
3	9	61.0	-223.	.25	212.00	212.00	59.0
3	10	62.0	627.	.25	212.00	212.00	58.5

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
3	11	62.0	-223.	.25	212.00	212.00	59.0
3	12	62.0	-223.	.25	212.00	212.00	58.0
3	13	62.0	-223.	.25	212.00	212.00	58.0
3	14	62.0	-223.	.25	212.00	212.00	58.0
3	15	62.0	-223.	.25	.07	.07	58.0
3	16	62.6	0.	9999.00	212.00	212.00	57.0
4	1	61.0	0.	9999.00	212.00	212.00	55.0
4	2	60.0	0.	.25	212.00	212.00	55.0
4	3	60.0	0.	.25	212.00	212.00	56.0
4	4	60.0	0.	.25	212.00	212.00	57.0
4	5	60.0	0.	.25	212.00	212.00	57.0
4	6	60.0	0.	.25	212.00	212.00	58.0
4	7	60.0	0.	.25	.07	.07	59.0
4	8	61.0	-223.	.25	212.00	212.00	59.0
4	9	61.0	-223.	.25	212.00	212.00	58.0
4	10	62.0	-148.	.25	212.00	2120.0	58.0
4	11	62.0	-223.	.25	212.00	212.00	59.0
4	12	62.0	-223.	.25	212.00	212.00	59.0
4	13	62.0	-223.	.25	212.00	212.00	58.0
4	14	62.0	-223.	.25	212.00	212.00	58.0
4	15	62.0	-223.	.25	.07	.07	58.0
4	16	62.9	0.	9999.00	212.00	212.00	57.0
5	1	59.0	0.	9999.00	212.00	212.00	54.0
5	2	59.0	0.	.25	212.00	212.00	55.0
5	3	59.0	0.	.25	212.00	212.00	55.0
5	4	59.0	0.	.25	212.00	212.00	56.0
5	5	59.0	0.	.25	212.00	212.00	56.0
5	6	59.0	0.	.25	212.00	212.00	57.0
5	7	60.0	0.	.25	.07	.07	58.0
5	8	61.0	-223.	.25	212.00	212.00	58.0
5	9	62.0	-223.	.25	212.00	212.00	58.0
5	10	62.0	2100.	.25	212.00	2120.0	57.6
5	11	62.0	-223.	.25	212.00	212.00	59.0
5	12	62.0	-223.	.25	212.00	212.00	59.0
5	13	62.0	-223.	.25	212.00	212.00	58.0
5	14	62.0	-223.	.25	212.00	212.00	58.0
5	15	62.0	-223.	.25	.07	.07	58.0
5	16	63.0	0.	9999.00	212.00	212.00	58.0
6	1	58.0	0.	9999.00	212.00	212.00	54.0
6	2	58.0	0.	.25	212.00	212.00	54.0
6	3	58.0	0.	.25	212.00	212.00	55.0
6	4	58.0	0.	.25	212.00	212.00	55.0
6	5	58.0	0.	.25	212.00	212.00	56.0
6	6	59.0	0.	.25	212.00	212.00	56.0
6	7	60.0	0.	.25	.07	.07	57.0
6	8	61.0	-223.	.25	212.00	212.00	57.0
6	9	61.0	-223.	.25	212.00	212.00	58.0
6	10	62.0	0.	.25	212.00	2120.0	57.3
6	11	62.0	-223.	.25	212.00	212.00	58.0

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
6	12	62.0	-223.	.25	212.00	212.00	59.0
6	13	62.0	-223.	.25	212.00	212.00	59.0
6	14	62.0	-223.	.25	212.00	212.00	58.0
6	15	62.0	-223.	.25	.07	.07	58.0
6	16	62.9	0.	9999.00	212.00	212.00	58.0
7	1	56.0	0.	9999.00	212.00	212.00	53.0
7	2	56.0	0.	.25	212.00	212.00	54.0
7	3	56.0	0.	.25	212.00	212.00	54.0
7	4	57.0	0.	.25	212.00	212.00	55.0
7	5	58.0	0.	.25	212.00	212.00	55.0
7	6	58.0	0.	.25	212.00	212.00	55.0
7	7	59.0	0.	.25	.07	.07	56.0
7	8	60.0	-223.	.25	212.00	212.00	56.0
7	9	61.0	-223.	.25	212.00	212.00	57.0
7	10	62.0	1857.	.25	212.00	2120.0	56.6
7	11	62.0	-223.	.25	212.00	212.00	58.0
7	12	62.0	-223.	.25	212.00	212.00	59.0
7	13	62.0	-223.	.25	212.00	212.00	59.0
7	14	62.0	-223.	.25	212.00	212.00	59.0
7	15	62.0	-223.	.25	.07	.07	59.0
7	16	62.7	0.	9999.00	212.00	212.00	59.0
8	1	55.0	0.	9999.00	212.00	212.00	52.0
8	2	55.0	0.	.25	212.00	212.00	53.0
8	3	55.0	0.	.25	212.00	212.00	54.0
8	4	56.0	0.	.25	212.00	212.00	54.0
8	5	57.0	0.	.25	212.00	212.00	54.0
8	6	58.0	0.	.25	212.00	212.00	55.0
8	7	59.0	0.	.25	.07	.07	55.0
8	8	60.0	-223.	.25	212.00	212.00	56.0
8	9	61.0	-223.	.25	212.00	212.00	56.0
8	10	62.0	2477.	.25	212.00	2120.0	56.0
8	11	62.0	-223.	.25	212.00	212.00	58.0
8	12	62.0	-223.	.25	212.00	212.00	58.0
8	13	62.0	-223.	.25	212.00	212.00	58.0
8	14	62.0	-223.	.25	212.00	212.00	59.0
8	15	62.0	-223.	.25	.07	.07	59.0
8	16	62.7	0.	9999.00	212.00	212.00	59.0
9	1	54.0	0.	9999.00	212.00	212.00	51.0
9	2	54.0	0.	.25	212.00	212.00	52.0
9	3	54.0	0.	.25	212.00	212.00	53.0
9	4	55.0	0.	.25	212.00	212.00	53.0
9	5	56.0	0.	.25	212.00	212.00	54.0
9	6	57.0	0.	.25	212.00	212.00	54.0
9	7	59.0	0.	.25	.07	.07	55.0
9	8	60.0	-223.	.25	212.00	212.00	55.0
9	9	61.0	-223.	.25	212.00	212.00	56.0
9	10	62.0	2650.	.25	212.00	2120.0	55.3
9	11	62.0	-223.	.25	212.00	212.00	57.0
9	12	62.0	-223.	.25	212.00	212.00	57.0

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
9	13	62.0	-223.	.25	212.00	212.00	58.0
9	14	62.0	-223.	.25	212.00	212.00	58.0
9	15	62.0	-223.	.25	.07	.07	58.0
9	16	62.7	0.	9999.00	212.00	212.00	58.0
10	1	52.5	0.	9999.00	212.00	212.00	49.0
10	2	53.0	0.	.25	212.00	212.00	50.0
10	3	54.0	0.	.25	212.00	212.00	52.0
10	4	55.0	0.	.25	212.00	212.00	53.0
10	5	56.0	0.	.25	212.00	212.00	54.0
10	6	57.0	0.	.25	212.00	212.00	54.0
10	7	58.0	0.	.25	.07	.07	55.0
10	8	59.0	-223.	.25	212.00	212.00	55.0
10	9	61.0	-223.	.25	212.00	212.00	55.0
10	10	62.0	2800.	.25	212.00	2120.0	54.7
10	11	62.0	-223.	.25	212.00	212.00	57.0
10	12	62.0	-223.	.25	212.00	212.00	57.0
10	13	62.0	-223.	.25	212.00	212.00	57.0
10	14	62.0	-223.	.25	212.00	212.00	58.0
10	15	62.0	-223.	.25	.07	.07	58.0
10	16	62.7	0.	9999.00	212.00	212.00	58.0
11	1	52.0	0.	9999.00	212.00	212.00	48.0
11	2	52.0	0.	.25	.07	.07	49.0
11	3	53.0	0.	.25	.07	.07	50.0
11	4	54.0	0.	.25	.07	.07	52.0
11	5	55.0	0.	.25	.07	.07	53.0
11	6	56.0	0.	.25	.07	.07	54.0
11	7	57.0	0.	.25	.07	.07	54.0
11	8	59.0	0.	.25	212.00	212.00	55.0
11	9	60.0	0.	.25	212.00	212.00	55.0
11	10	61.0	2400.	.25	212.00	2120.0	54.1
11	11	62.0	0.	.25	212.00	212.00	56.0
11	12	62.0	0.	.25	212.00	212.00	56.0
11	13	62.0	0.	.25	212.00	212.00	57.0
11	14	62.0	0.	.25	212.00	212.00	57.0
11	15	62.0	0.	.25	.07	.07	57.0
11	16	62.6	0.	9999.00	212.00	212.00	58.0
12	1	51.5	0.	9999.00	212.00	212.00	47.0
12	2	52.0	0.	.25	.07	.07	48.0
12	3	53.0	0.	.25	212.00	212.00	49.0
12	4	53.0	0.	.25	212.00	212.00	50.0
12	5	55.0	0.	.25	212.00	212.00	52.0
12	6	56.0	0.	.25	212.00	212.00	53.0
12	7	57.0	0.	.25	212.00	212.00	54.0
12	8	58.0	1600.	.25	2120.0	2120.0	52.2
12	9	59.0	2400.	.25	2120.0	212.00	52.8
12	10	61.0	2400.	.25	212.00	212.00	53.4
12	11	62.0	0.	.25	212.00	212.00	55.0
12	12	62.0	0.	.25	212.00	212.00	56.0
12	13	62.0	0.	.25	212.00	212.00	56.0

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
12	14	62.0	0.	.25	212.00	212.00	56.0
12	15	62.0	0.	.25	.07	.07	57.0
12	16	62.5	0.	9999.00	212.00	212.00	57.0
13	1	51.0	0.	9999.00	212.00	212.00	46.0
13	2	51.0	0.	.25	.07	.07	47.0
13	3	52.0	0.	.25	212.00	212.00	48.0
13	4	53.0	0.	.25	212.00	212.00	49.0
13	5	54.0	0.	.25	212.00	212.00	51.0
13	6	55.0	0.	.25	212.00	212.00	52.0
13	7	56.0	0.	.25	212.00	212.00	53.0
13	8	57.0	1850.	.25	212.00	2120.0	51.5
13	9	58.0	0.	.25	212.00	212.00	54.0
13	10	60.0	0.	.25	212.00	212.00	55.0
13	11	61.0	0.	.25	212.00	212.00	55.0
13	12	62.0	0.	.25	212.00	212.00	56.0
13	13	62.0	0.	.25	212.00	212.00	56.0
13	14	62.0	0.	.25	212.00	212.00	56.0
13	15	62.0	0.	.25	.07	.07	56.0
13	16	62.4	0.	9999.00	212.00	212.00	57.0
14	1	50.5	0.	9999.00	212.00	212.00	46.0
14	2	51.0	0.	.25	.07	.07	46.0
14	3	52.0	0.	.25	212.00	212.00	47.0
14	4	52.0	0.	.25	212.00	212.00	48.0
14	5	53.0	0.	.25	212.00	212.00	49.0
14	6	54.0	0.	.25	212.00	212.00	51.0
14	7	55.0	0.	.25	212.00	212.00	52.0
14	8	56.0	2050.	.25	212.00	2120.0	50.9
14	9	58.0	0.	.25	212.00	212.00	53.0
14	10	59.0	0.	.25	212.00	212.00	54.0
14	11	60.0	0.	.25	212.00	212.00	55.0
14	12	61.0	0.	.25	212.00	212.00	55.0
14	13	62.0	0.	.25	212.00	212.00	56.0
14	14	62.0	0.	.25	212.00	212.00	56.0
14	15	62.0	0.	.25	.07	.07	56.0
14	16	62.3	0.	9999.00	212.00	212.00	57.0
15	1	50.0	0.	9999.00	212.00	212.00	45.0
15	2	50.0	0.	.25	.07	.07	46.0
15	3	51.0	0.	.25	212.00	212.00	46.0
15	4	52.0	0.	.25	212.00	212.00	47.0
15	5	53.0	0.	.25	212.00	212.00	48.0
15	6	54.0	0.	.25	212.00	212.00	49.0
15	7	55.0	0.	.25	212.00	212.00	51.0
15	8	56.0	2200.	.25	212.00	2120.0	50.3
15	9	57.0	0.	.25	212.00	212.00	53.0
15	10	58.0	0.	.25	212.00	212.00	53.0
15	11	59.0	0.	.25	212.00	212.00	54.0
15	12	60.0	0.	.25	212.00	212.00	55.0
15	13	61.0	0.	.25	212.00	212.00	55.0
15	14	62.0	0.	.25	212.00	212.00	55.0

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
15	15	62.0	0.	.25	.07	.07	56.0
15	16	62.2	0.	9999.00	212.00	212.00	56.0
16	1	49.0	0.	9999.00	212.00	212.00	45.0
16	2	50.0	0.	.25	.07	.07	45.0
16	3	51.0	0.	.25	212.00	212.00	46.0
16	4	51.0	0.	.25	212.00	212.00	46.0
16	5	52.0	0.	.25	212.00	212.00	47.0
16	6	53.0	0.	.25	212.00	212.00	49.0
16	7	54.0	0.	.25	212.00	212.00	50.0
16	8	55.0	2200.	.25	212.00	2120.0	49.7
16	9	56.0	0.	.25	212.00	212.00	52.0
16	10	57.0	0.	.25	212.00	212.00	53.0
16	11	58.0	0.	.25	212.00	212.00	53.0
16	12	59.0	0.	.25	212.00	212.00	54.0
16	13	60.0	-223.	.25	212.00	212.00	54.0
16	14	61.0	-223.	.25	212.00	212.00	55.0
16	15	62.0	-223.	.25	.07	.07	56.0
16	16	62.2	0.	9999.00	212.00	212.00	56.0
17	1	48.5	0.	9999.00	212.00	212.00	45.0
17	2	49.0	0.	.25	.07	.07	45.0
17	3	50.0	0.	.25	212.00	212.00	46.0
17	4	51.0	0.	.25	212.00	212.00	46.0
17	5	52.0	0.	.25	212.00	212.00	46.0
17	6	52.0	0.	.25	212.00	212.00	48.0
17	7	53.0	0.	.25	212.00	212.00	49.0
17	8	54.0	3600.	.25	212.00	2120.0	49.1
17	9	55.0	0.	.25	212.00	212.00	51.0
17	10	56.0	0.	.25	212.00	212.00	52.0
17	11	57.0	0.	.25	212.00	212.00	53.0
17	12	58.0	0.	.25	212.00	212.00	53.0
17	13	59.0	-223.	.25	212.00	212.00	54.0
17	14	61.0	-223.	.25	212.00	212.00	55.0
17	15	62.0	-223.	.25	.07	.07	55.0
17	16	62.1	0.	9999.00	212.00	212.00	56.0
18	1	48.0	0.	9999.00	212.00	212.00	45.0
18	2	49.0	0.	.25	.07	.07	45.0
18	3	49.0	0.	.25	212.00	212.00	45.0
18	4	50.0	0.	.25	212.00	212.00	45.0
18	5	51.0	0.	.25	212.00	212.00	46.0
18	6	52.0	0.	.25	212.00	212.00	47.0
18	7	53.0	0.	.25	212.00	212.00	48.0
18	8	53.0	6200.	.25	212.00	212.00	48.5
18	9	54.0	0.	.25	212.00	212.00	50.0
18	10	55.0	0.	.25	212.00	212.00	51.0
18	11	57.0	0.	.25	212.00	212.00	52.0
18	12	58.0	0.	.25	212.00	212.00	53.0
18	13	59.0	-223.	.25	212.00	212.00	53.0
18	14	60.0	-223.	.25	212.00	212.00	54.0
18	15	61.0	-223.	.25	.07	.07	55.0

TABLE A3 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
18	16	62.0	0.	9999.00	212.00	212.00	55.0
19	1	47.5	0.	9999.00	212.00	212.00	45.0
19	2	48.0	0.	.25	.07	.07	45.0
19	3	49.0	0.	.25	.07	.07	45.0
19	4	50.0	0.	.25	.07	.07	45.0
19	5	51.0	0.	.25	.07	.07	46.0
19	6	51.0	0.	.25	.07	.07	46.0
19	7	52.0	0.	.25	.07	.07	47.0
19	8	53.0	0.	.25	.07	.07	48.0
19	9	54.0	0.	.25	.07	.07	50.0
19	10	55.0	0.	.25	.07	.07	51.0
19	11	56.0	0.	.25	.07	.07	52.0
19	12	57.0	0.	.25	.07	.07	53.0
19	13	58.0	-223.	.25	.07	.07	53.0
19	14	59.0	-223.	.25	.07	.07	54.0
19	15	61.0	-223.	.25	.07	.07	55.0
19	16	62.0	0.	9999.00	212.00	212.00	55.0
20	1	47.0	0.	9999.00	212.00	212.00	45.0
20	2	48.0	0.	9999.00	212.00	212.00	45.0
20	3	49.0	0.	9999.00	212.00	212.00	45.0
20	4	49.5	0.	9999.00	212.00	212.00	45.0
20	5	50.0	0.	9999.00	212.00	212.00	46.0
20	6	51.0	0.	9999.00	212.00	212.00	46.0
20	7	52.0	0.	9999.00	212.00	212.00	47.0
20	8	53.0	0.	9999.00	212.00	212.00	48.0
20	9	54.0	0.	9999.00	212.00	212.00	49.0
20	10	55.0	0.	9999.00	212.00	212.00	50.0
20	11	56.0	0.	9999.00	212.00	212.00	51.0
20	12	57.0	0.	9999.00	212.00	212.00	52.0
20	13	58.0	0.	9999.00	212.00	212.00	53.0
20	14	59.0	0.	9999.00	212.00	212.00	53.0
20	15	61.0	0.	9999.00	212.00	212.00	54.0
20	16	62.0	0.	9999.00	212.00	212.00	55.0

TABLE A4
WEST PLANT AREA
CONCEPTUAL REMEDIATION SCHEME INPUT PARAMETER VALUES
DUPONT NIAGARA PLANT, NIAGARA FALLS, NEW YORK

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	PERMEABILITY (gpd/ft^2) COLUMN	BOTTOM OF AQUIFER (ft)
1	1	66.0	0.	9999.00	212.00	212.00	62.0
1	2	65.0	0.	9999.00	212.00	212.00	61.0
1	3	64.0	0.	9999.00	212.00	212.00	60.0
1	4	63.0	0.	9999.00	212.00	212.00	59.0
1	5	62.0	0.	9999.00	212.00	212.00	59.0
1	6	62.0	0.	9999.00	212.00	212.00	59.0
1	7	61.0	0.	9999.00	212.00	212.00	58.0
1	8	60.0	0.	9999.00	212.00	212.00	58.0
1	9	58.0	0.	9999.00	212.00	212.00	56.0
1	10	57.0	0.	9999.00	212.00	212.00	55.0
1	11	56.0	0.	9999.00	212.00	212.00	54.0
1	12	55.0	0.	9999.00	212.00	212.00	53.0
1	13	56.0	0.	9999.00	212.00	212.00	54.0
1	14	58.0	0.	9999.00	212.00	212.00	54.0
1	15	60.0	0.	9999.00	212.00	212.00	56.0
1	16	61.0	0.	9999.00	212.00	212.00	56.0
1	17	62.0	0.	9999.00	212.00	212.00	56.0
1	18	62.0	0.	9999.00	212.00	212.00	56.0
2	1	67.0	0.	9999.00	212.00	212.00	62.0
2	2	66.0	0.	.25	212.00	212.00	62.0
2	3	65.0	0.	.25	212.00	212.00	61.0
2	4	64.0	0.	.25	212.00	212.00	60.0
2	5	63.0	0.	.25	212.00	212.00	59.0
2	6	62.0	0.	.25	212.00	212.00	59.0
2	7	62.0	0.	.25	212.00	212.00	58.0
2	8	61.0	0.	.25	212.00	212.00	58.0
2	9	59.0	0.	.25	212.00	212.00	58.0
2	10	58.0	0.	.25	212.00	212.00	57.0
2	11	58.0	0.	.25	212.00	212.00	57.0
2	12	58.0	0.	.25	212.00	212.00	57.0
2	13	58.0	0.	.25	212.00	212.00	57.0
2	14	58.0	0.	.25	212.00	212.00	57.0
2	15	60.0	0.	.25	212.00	212.00	57.0
2	16	61.0	0.	.25	212.00	212.00	56.0
2	17	62.0	0.	.25	212.00	212.00	56.0
2	18	62.0	0.	9999.00	212.00	212.00	56.0
3	1	67.6	0.	9999.00	212.00	212.00	63.0
3	2	67.0	0.	.25	212.00	212.00	62.0
3	3	66.0	0.	.25	212.00	212.00	61.0
3	4	65.0	0.	.25	212.00	212.00	61.0
3	5	64.0	0.	.25	212.00	212.00	60.0
3	6	63.0	0.	.25	212.00	212.00	59.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
3	7	63.0	0.	.25	212.00	212.00	58.0
3	8	62.0	0.	.25	212.00	212.00	58.0
3	9	60.0	0.	.25	212.00	212.00	58.0
3	10	59.0	0.	.25	212.00	212.00	57.0
3	11	58.0	0.	.25	212.00	212.00	57.0
3	12	58.0	-187.	.25	212.00	212.00	57.0
3	13	58.0	-187.	.25	212.00	212.00	57.0
3	14	58.0	-187.	.25	212.00	212.00	57.0
3	15	60.0	-187.	.25	212.00	212.00	57.0
3	16	62.0	-187.	.25	212.00	212.00	57.0
3	17	62.0	0.	.25	212.00	212.00	57.0
3	18	62.0	0.	9999.00	212.00	212.00	56.0
4	1	68.4	0.	9999.00	212.00	212.00	64.0
4	2	68.0	0.	.25	212.00	212.00	63.0
4	3	67.0	0.	.25	212.00	212.00	62.0
4	4	66.0	0.	.25	212.00	212.00	61.0
4	5	65.0	0.	.25	212.00	212.00	60.0
4	6	64.0	0.	.25	212.00	212.00	59.0
4	7	63.0	0.	.25	212.00	212.00	59.0
4	8	62.0	0.	.25	212.00	212.00	58.0
4	9	61.0	0.	.25	212.00	212.00	58.0
4	10	61.0	0.	.25	212.00	212.00	57.0
4	11	59.0	0.	.25	212.00	212.00	57.0
4	12	58.0	-187.	.25	212.00	212.00	57.0
4	13	58.0	-187.	.25	212.00	212.00	57.0
4	14	59.0	-187.	.25	212.00	212.00	57.0
4	15	61.0	-187.	.25	212.00	212.00	57.0
4	16	62.0	-187.	.25	212.00	212.00	57.0
4	17	62.0	0.	.25	212.00	212.00	57.0
4	18	62.0	0.	9999.00	212.00	212.00	57.0
5	1	69.3	0.	9999.00	212.00	212.00	64.0
5	2	68.0	0.	.25	212.00	212.00	63.0
5	3	68.0	0.	.25	212.00	212.00	63.0
5	4	67.0	0.	.25	212.00	212.00	62.0
5	5	66.0	0.	.25	212.00	212.00	61.0
5	6	65.0	0.	.25	212.00	212.00	60.0
5	7	64.0	0.	.25	212.00	212.00	59.0
5	8	63.0	0.	.25	212.00	212.00	58.0
5	9	62.0	0.	.25	212.00	212.00	58.0
5	10	62.0	0.	.25	212.00	212.00	57.0
5	11	61.0	0.	.25	212.00	212.00	57.0
5	12	60.0	-187.	.25	212.00	212.00	57.0
5	13	59.0	-187.	.25	212.00	212.00	57.0
5	14	60.0	-187.	.25	212.00	212.00	57.0
5	15	62.0	-187.	.25	212.00	212.00	57.0
5	16	62.0	-187.	.25	212.00	212.00	57.0
5	17	62.0	0.	.25	212.00	212.00	57.0
5	18	62.0	0.	9999.00	212.00	212.00	57.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
6	1	68.5	0.	9999.00	212.00	212.00	64.0
6	2	68.0	0.	.25	212.00	212.00	64.0
6	3	68.0	0.	.25	212.00	212.00	63.0
6	4	67.0	0.	.25	212.00	212.00	62.0
6	5	67.0	0.	.25	212.00	212.00	61.0
6	6	66.0	0.	.25	212.00	212.00	60.0
6	7	65.0	0.	.25	212.00	212.00	59.0
6	8	64.0	0.	.25	212.00	212.00	58.0
6	9	63.0	0.	.25	212.00	212.00	58.0
6	10	63.0	0.	.25	212.00	212.00	57.0
6	11	62.0	0.	.25	212.00	212.00	57.0
6	12	62.0	-187.	.25	212.00	212.00	57.0
6	13	61.0	-187.	.25	212.00	212.00	57.0
6	14	62.0	-187.	.25	212.00	212.00	57.0
6	15	62.0	-187.	.25	212.00	212.00	57.0
6	16	62.0	-187.	.25	212.00	212.00	57.0
6	17	62.0	0.	.25	212.00	212.00	57.0
6	18	62.0	0.	9999.00	212.00	212.00	57.0
7	1	68.0	0.	9999.00	212.00	212.00	64.0
7	2	68.0	0.	.25	212.00	212.00	64.0
7	3	67.0	0.	.25	212.00	212.00	64.0
7	4	67.0	0.	.25	212.00	212.00	63.0
7	5	67.0	0.	.25	212.00	212.00	62.0
7	6	66.0	0.	.25	.07	.07	61.0
7	7	66.0	0.	.25	.07	.07	60.0
7	8	65.0	0.	.25	.07	.07	59.0
7	9	64.0	0.	.25	.07	.07	58.0
7	10	63.0	0.	.25	.07	.07	58.0
7	11	63.0	0.	.25	.07	.07	57.0
7	12	62.0	-187.	.25	.07	.07	57.0
7	13	62.0	-187.	.25	.07	.07	57.0
7	14	62.0	-187.	.25	.07	.07	57.0
7	15	62.0	-187.	.25	.07	.07	57.0
7	16	62.0	-187.	.25	212.00	212.00	57.0
7	17	62.0	0.	.25	212.00	212.00	57.0
7	18	62.2	0.	9999.00	212.00	212.00	57.0
8	1	67.6	0.	9999.00	212.00	212.00	65.0
8	2	67.0	0.	.25	212.00	212.00	64.0
8	3	67.0	0.	.25	212.00	212.00	64.0
8	4	67.0	0.	.25	212.00	212.00	63.0
8	5	67.0	0.	.25	212.00	212.00	62.0
8	6	66.0	0.	.25	.07	.07	61.0
8	7	66.0	0.	.25	212.00	212.00	60.0
8	8	65.0	0.	.25	212.00	212.00	59.0
8	9	64.0	0.	.25	212.00	212.00	58.0
8	10	64.0	0.	.25	212.00	212.00	58.0
8	11	63.0	0.	.25	212.00	212.00	57.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft²)		BOTTOM OF AQUIFER (ft)
					ROW	COLUMN	
8	12	63.0	-187.	.25	212.00	212.00	57.0
8	13	63.0	-187.	.25	212.00	212.00	57.0
8	14	62.0	-187.	.25	212.00	212.00	57.0
8	15	62.0	-187.	.25	.07	.07	57.0
8	16	62.0	-187.	.25	212.00	212.00	57.0
8	17	62.0	0.	.25	212.00	212.00	57.0
8	18	62.2	0.	9999.00	212.00	212.00	57.0
9	1	67.3	0.	9999.00	212.00	212.00	65.0
9	2	67.0	0.	.25	212.00	212.00	65.0
9	3	67.0	0.	.25	212.00	212.00	64.0
9	4	67.0	0.	.25	212.00	212.00	64.0
9	5	67.0	0.	.25	212.00	212.00	63.0
9	6	66.0	0.	.25	.07	.07	62.0
9	7	66.0	2100.	.25	212000.0	212.00	60.5
9	8	65.0	2100.	.25	212000.0	212.00	59.5
9	9	64.0	2100.	.25	212000.0	212.00	58.5
9	10	64.0	0.	.25	212.00	212.00	58.0
9	11	64.0	0.	.25	212.00	212.00	58.0
9	12	63.0	-187.	.25	212.00	212.00	57.0
9	13	63.0	-187.	.25	212.00	212.00	57.0
9	14	63.0	-187.	.25	212.00	212.00	57.0
9	15	62.0	-187.	.25	.07	.07	57.0
9	16	62.0	-187.	.25	212.00	212.00	57.0
9	17	62.0	0.	.25	212.00	212.00	57.0
9	18	62.2	0.	9999.00	212.00	212.00	57.0
10	1	66.9	0.	9999.00	212.00	212.00	65.0
10	2	67.0	0.	.25	212.00	212.00	65.0
10	3	67.0	0.	.25	212.00	212.00	64.0
10	4	67.0	0.	.25	212.00	212.00	64.0
10	5	66.0	0.	.25	212.00	212.00	63.0
10	6	66.0	0.	.25	.07	.07	62.0
10	7	66.0	0.	.25	212.00	212.00	60.0
10	8	65.0	0.	.25	212.00	212.00	60.0
10	9	65.0	2100.	.25	212.00	212000.0	58.5
10	10	64.0	0.	.25	212.00	212.00	59.0
10	11	64.0	0.	.25	212.00	212.00	58.0
10	12	64.0	0.	.25	212.00	212.00	57.0
10	13	64.0	0.	.25	212.00	212.00	57.0
10	14	63.0	0.	.25	212.00	212.00	57.0
10	15	63.0	0.	.25	.07	.07	58.0
10	16	62.0	0.	.25	212.00	212.00	58.0
10	17	62.0	0.	.25	212.00	212.00	58.0
10	18	62.2	0.	9999.00	212.00	212.00	57.0
11	1	66.4	0.	9999.00	212.00	212.00	65.0
11	2	66.0	0.	.25	212.00	212.00	65.0
11	3	66.0	0.	.25	212.00	212.00	65.0
11	4	66.0	0.	.25	212.00	212.00	64.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
11	5	66.0	0.	.25	212.00	212.00	64.0
11	6	66.0	0.	.25	.07	.07	63.0
11	7	66.0	0.	.25	212.00	212.00	62.0
11	8	65.0	0.	.25	212.00	212.00	61.0
11	9	65.0	2100.	.25	212.00	212000.0	59.5
11	10	65.0	0.	.25	212.00	212.00	59.0
11	11	64.0	0.	.25	212.00	212.00	58.0
11	12	64.0	0.	.25	212.00	212.00	57.0
11	13	64.0	0.	.25	212.00	212.00	57.0
11	14	64.0	0.	.25	212.00	212.00	57.0
11	15	63.0	0.	.25	.07	.07	58.0
11	16	62.0	0.	.25	212.00	212.00	58.0
11	17	62.0	0.	.25	212.00	212.00	58.0
11	18	62.2	0.	9999.00	212.00	212.00	57.0
12	1	66.0	0.	9999.00	212.00	212.00	65.0
12	2	66.0	0.	.25	212.00	212.00	65.0
12	3	66.0	0.	.25	212.00	212.00	65.0
12	4	66.0	0.	.25	212.00	212.00	64.0
12	5	66.0	0.	.25	212.00	212.00	64.0
12	6	66.0	0.	.25	.07	.07	63.0
12	7	65.0	0.	.25	212.00	212.00	62.0
12	8	65.0	0.	.25	212.00	212.00	61.0
12	9	65.0	2100.	.25	212.00	212000.0	59.5
12	10	65.0	0.	.25	212.00	212.00	59.0
12	11	65.0	0.	.25	212.00	212.00	58.0
12	12	64.0	0.	.25	212.00	212.00	57.0
12	13	64.0	0.	.25	212.00	212.00	57.0
12	14	64.0	0.	.25	212.00	212.00	57.0
12	15	63.0	0.	.25	.07	.07	58.0
12	16	62.0	0.	.25	212.00	212.00	58.0
12	17	62.0	0.	.25	212.00	212.00	58.0
12	18	62.2	0.	9999.00	212.00	212.00	57.0
13	1	65.8	0.	9999.00	212.00	212.00	65.0
13	2	66.0	0.	.25	212.00	212.00	65.0
13	3	66.0	0.	.25	212.00	212.00	65.0
13	4	66.0	0.	.25	212.00	212.00	64.0
13	5	66.0	0.	.25	212.00	212.00	64.0
13	6	65.0	0.	.25	.07	.07	63.0
13	7	65.0	0.	.25	212.00	212.00	62.0
13	8	65.0	0.	.25	212.00	212.00	61.0
13	9	65.0	2100.	.25	212.00	212000.0	59.5
13	10	65.0	0.	.25	212.00	212.00	59.0
13	11	65.0	0.	.25	212.00	212.00	58.0
13	12	64.0	0.	.25	212.00	212.00	57.0
13	13	64.0	0.	.25	212.00	212.00	57.0
13	14	63.0	0.	.25	212.00	212.00	57.0
13	15	62.0	0.	.25	.07	.07	58.0
13	16	62.0	0.	.25	212.00	212.00	58.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
13	17	62.0	0.	.25	212.00	212.00	58.0
13	18	62.2	0.	9999.00	212.00	212.00	57.0
14	1	65.4	0.	9999.00	212.00	212.00	64.0
14	2	65.0	0.	.25	212.00	212.00	64.0
14	3	65.0	0.	.25	212.00	212.00	64.0
14	4	65.0	0.	.25	212.00	212.00	64.0
14	5	65.0	0.	.25	212.00	212.00	64.0
14	6	65.0	0.	.25	.07	.07	63.0
14	7	65.0	0.	.25	212.00	212.00	62.0
14	8	65.0	0.	.25	212.00	212.00	61.0
14	9	65.0	2100.	.25	212.00	212000.0	59.5
14	10	65.0	0.	.25	212.00	212.00	59.0
14	11	64.0	0.	.25	212.00	212.00	59.0
14	12	64.0	0.	.25	212.00	212.00	58.0
14	13	64.0	0.	.25	212.00	212.00	57.0
14	14	63.0	0.	.25	212.00	212.00	57.0
14	15	62.0	0.	.25	.07	.07	58.0
14	16	62.0	0.	.25	212.00	212.00	57.0
14	17	62.0	0.	.25	212.00	212.00	57.0
14	18	62.2	0.	9999.00	212.00	212.00	56.0
15	1	65.0	0.	9999.00	212.00	212.00	64.0
15	2	65.0	0.	.25	212.00	212.00	64.0
15	3	65.0	0.	.25	212.00	212.00	64.0
15	4	65.0	0.	.25	212.00	212.00	64.0
15	5	65.0	0.	.25	212.00	212.00	64.0
15	6	65.0	0.	.25	.07	.07	63.0
15	7	65.0	0.	.25	212.00	212.00	62.0
15	8	65.0	0.	.25	212.00	212.00	62.0
15	9	65.0	2100.	.25	212.00	212000.0	59.5
15	10	64.0	0.	.25	212.00	212.00	60.0
15	11	64.0	0.	.25	212.00	212.00	59.0
15	12	64.0	0.	.25	212.00	212.00	58.0
15	13	63.0	0.	.25	212.00	212.00	57.0
15	14	62.0	0.	.25	212.00	212.00	58.0
15	15	62.0	0.	.25	.07	.07	58.0
15	16	62.0	0.	.25	212.00	212.00	57.0
15	17	62.0	0.	.25	212.00	212.00	57.0
15	18	62.2	0.	9999.00	212.00	212.00	56.0
16	1	64.7	0.	9999.00	212.00	212.00	64.0
16	2	65.0	0.	.25	212.00	212.00	64.0
16	3	65.0	0.	.25	212.00	212.00	64.0
16	4	65.0	0.	.25	212.00	212.00	64.0
16	5	65.0	0.	.25	212.00	212.00	63.0
16	6	65.0	0.	.25	.07	.07	63.0
16	7	65.0	0.	.25	212.00	212.00	62.0
16	8	65.0	0.	.25	212.00	212.00	61.0
16	9	65.0	2100.	.25	212.00	212000.0	59.5

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
16	10	64.0	0.	.25	212.00	212.00	60.0
16	11	64.0	0.	.25	212.00	212.00	59.0
16	12	64.0	0.	.25	212.00	212.00	58.0
16	13	63.0	0.	.25	212.00	212.00	57.0
16	14	62.0	0.	.25	212.00	212.00	58.0
16	15	62.0	0.	.25	.07	.07	58.0
16	16	62.0	0.	.25	212.00	212.00	57.0
16	17	62.0	0.	.25	212.00	212.00	57.0
16	18	62.2	0.	9999.00	212.00	212.00	56.0
17	1	64.2	0.	9999.00	212.00	212.00	63.0
17	2	64.0	0.	.25	212.00	212.00	63.0
17	3	64.0	0.	.25	212.00	212.00	63.0
17	4	64.0	0.	.25	212.00	212.00	63.0
17	5	64.0	0.	.25	212.00	212.00	63.0
17	6	64.0	0.	.25	.07	.07	62.0
17	7	64.0	0.	.25	212.00	212.00	62.0
17	8	64.0	0.	.25	212.00	212.00	61.0
17	9	64.0	2100.	.25	212.00	212000.0	59.5
17	10	64.0	0.	.25	212.00	212.00	59.0
17	11	64.0	0.	.25	212.00	212.00	59.0
17	12	64.0	-187.	.25	212.00	212.00	58.0
17	13	63.0	-187.	.25	212.00	212.00	57.0
17	14	62.0	-187.	.25	212.00	212.00	58.0
17	15	62.0	0.	.25	.07	.07	58.0
17	16	62.0	0.	.25	212.00	212.00	57.0
17	17	62.0	0.	.25	212.00	212.00	57.0
17	18	62.2	0.	9999.00	212.00	212.00	57.0
18	1	63.7	0.	9999.00	212.00	212.00	63.0
18	2	64.0	0.	.25	212.00	212.00	63.0
18	3	64.0	0.	.25	212.00	212.00	63.0
18	4	64.0	0.	.25	212.00	212.00	63.0
18	5	64.0	0.	.25	212.00	212.00	62.0
18	6	64.0	0.	.25	.07	.07	62.0
18	7	64.0	-187.	.25	212.00	212.00	61.0
18	8	64.0	-187.	.25	212.00	212.00	61.0
18	9	64.0	2100.	.25	212.00	212000.0	59.5
18	10	64.0	-187.	.25	212.00	212.00	59.0
18	11	64.0	-187.	.25	212.00	212.00	59.0
18	12	63.0	-187.	.25	212.00	212.00	58.0
18	13	63.0	-187.	.25	212.00	212.00	57.0
18	14	62.0	-187.	.25	212.00	212.00	58.0
18	15	62.0	0.	.25	.07	.07	57.0
18	16	62.0	0.	.25	212.00	212.00	58.0
18	17	62.0	0.	.25	212.00	212.00	58.0
18	18	62.2	0.	9999.00	212.00	212.00	57.0
19	1	63.2	0.	9999.00	212.00	212.00	62.0
19	2	63.0	0.	.25	212.00	212.00	62.0

TABLE A4 (CONTINUED)

COLUMN NO.	ROW NO.	PIEZOMETRIC HEAD (ft)	PUMP RATE (gpd)	STORAGE COEFFICIENT	PERMEABILITY (gpd/ft^2) ROW	COLUMN	BOTTOM OF AQUIFER (ft)
19	3	63.0	0.	.25	212.00	212.00	62.0
19	4	63.0	0.	.25	212.00	212.00	62.0
19	5	63.0	0.	.25	212.00	212.00	61.0
19	6	63.0	0.	.25	.07	.07	61.0
19	7	63.0	-187.	.25	212.00	212.00	60.0
19	8	63.0	-187.	.25	212.00	212.00	60.0
19	9	63.0	2100.	.25	212.00	212.00	58.5
19	10	63.0	-187.	.25	212.00	212.00	59.0
19	11	63.0	-187.	.25	212.00	212.00	58.0
19	12	63.0	-187.	.25	212.00	212.00	58.0
19	13	63.0	-187.	.25	212.00	212.00	58.0
19	14	62.0	-187.	.25	212.00	212.00	57.0
19	15	62.0	0.	.25	.07	.07	58.0
19	16	62.0	0.	.25	212.00	212.00	58.0
19	17	62.0	0.	.25	212.00	212.00	58.0
19	18	62.2	0.	9999.00	212.00	212.00	57.0
20	1	62.5	0.	9999.00	212.00	212.00	61.0
20	2	62.0	0.	.25	212.00	212.00	61.0
20	3	62.0	0.	.25	212.00	212.00	61.0
20	4	62.0	0.	.25	212.00	212.00	61.0
20	5	62.0	0.	.25	212.00	212.00	61.0
20	6	62.0	0.	.25	.07	.07	60.0
20	7	62.0	0.	.25	.07	.07	60.0
20	8	62.0	0.	.25	.07	.07	60.0
20	9	62.0	0.	.25	.07	.07	59.0
20	10	62.0	0.	.25	.07	.07	59.0
20	11	62.0	0.	.25	.07	.07	58.0
20	12	62.0	0.	.25	.07	.07	57.0
20	13	62.0	0.	.25	.07	.07	58.0
20	14	62.0	0.	.25	.07	.07	58.0
20	15	62.0	0.	.25	.07	.07	58.0
20	16	62.0	0.	.25	212.00	212.00	58.0
20	17	62.0	0.	.25	212.00	212.00	58.0
20	18	62.0	0.	9999.00	212.00	212.00	57.0
21	1	62.3	0.	9999.00	212.00	212.00	60.0
21	2	62.3	0.	9999.00	212.00	212.00	60.0
21	3	62.3	0.	9999.00	212.00	212.00	60.0
21	4	62.3	0.	9999.00	212.00	212.00	60.0
21	5	62.3	0.	9999.00	212.00	212.00	60.0
21	6	62.2	0.	9999.00	212.00	212.00	60.0
21	7	62.2	0.	9999.00	212.00	212.00	60.0
21	8	62.2	0.	9999.00	212.00	212.00	59.0
21	9	62.2	0.	9999.00	212.00	212.00	59.0
21	10	62.2	0.	9999.00	212.00	212.00	58.0
21	11	62.2	0.	9999.00	212.00	212.00	58.0
21	12	62.2	0.	9999.00	212.00	212.00	57.0
21	13	62.2	0.	9999.00	212.00	212.00	58.0
21	14	62.2	0.	9999.00	212.00	212.00	57.0
21	15	62.2	0.	9999.00	212.00	212.00	58.0
21	16	62.2	0.	9999.00	212.00	212.00	58.0
21	17	62.2	0.	9999.00	212.00	212.00	58.0
21	18	62.2	0.	9999.00	212.00	212.00	57.0