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"HYDROLOGIC DATA FOR THE HAMILTON-NEW BALTIMORE AREA - 1984" BY THE MIAMI CONSERVANCY DISTRICT, OCTOBER 1985 (USED AS A REFERENCE IN THE OU 4 RI REPORT)

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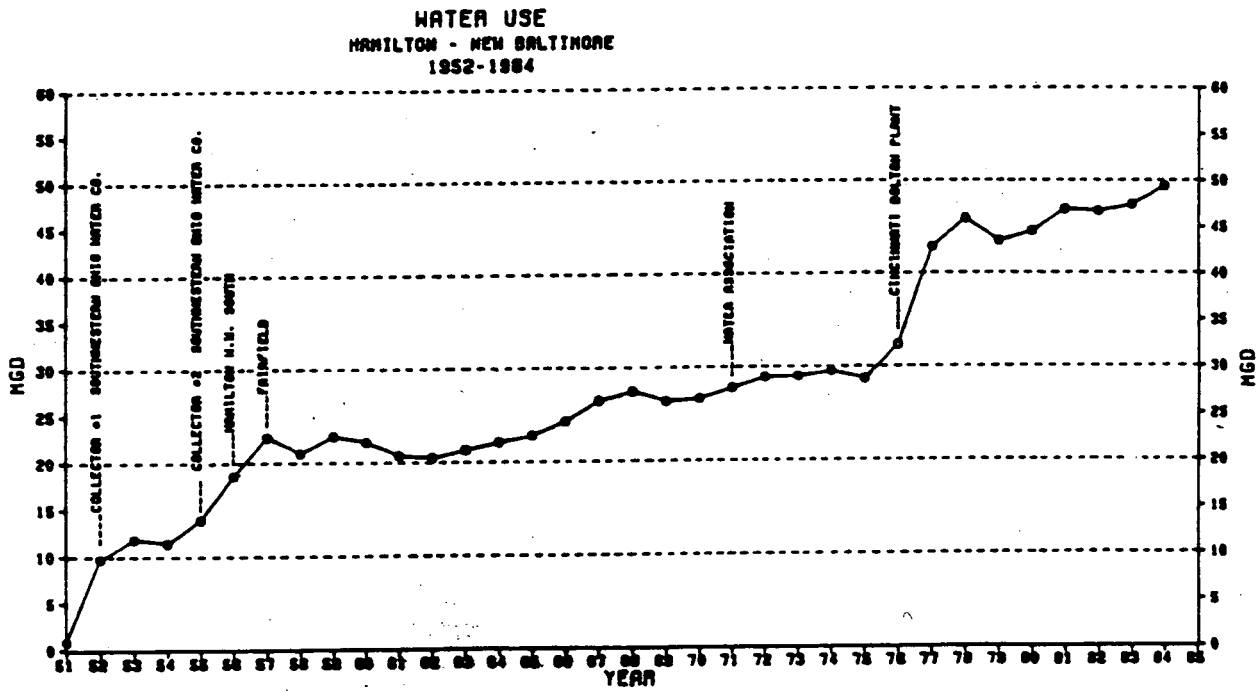
HYDROLOGIC DATA

for the

HAMILTON-NEW BALTIMORE AREA

1984



THE MIAMI CONSERVANCY DISTRICT

38 EAST MONUMENT AVE
DAYTON, OHIO 45402

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The Water Conservation Subdistrict
of The Miami Conservancy District

Hydrologic Data for the Hamilton-New Baltimore Area 1984

October 1985

38 East Monument Avenue
Dayton, Ohio 45402

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PREFACE

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This report is one of a series of hydrological reports of the Hamilton to New Baltimore area prepared by the Water Conservation Subdistrict of The Miami Conservancy District in accordance with the Official Plan, Phase Two, which was approved for implementation in June, 1968.

The Water Conservation Subdistrict of The Miami Conservancy District continued, during 1984,to collect and quantify the water resources of the Hamilton to New Baltimore area, Ohio. This report was prepared by Richard J. Weber of the staff of the Water Conservation Subdistrict under the general supervision of Paul M. Plummer, Engineer.

Hydrologic data presented by The Miami Conservancy District in this report is attained from several agencies and industries that express an interest in the water resource management of the project area. Cooperation from the Cities of Cincinnati, Hamilton, and Fairfield; Southwestern Ohio Water Company (SWOWC); The Water Association; National Lead of Ohio (NLO); Chevrolet-Pontiac-Canada Group of General Motors Corporation, Hamilton-Fairfield Plant; Southwest District of the Ohio Environmental Protection Agency (SWDO-OEPA); Ohio Department of Natural Resources, Division of Water (ODNR); and the U.S. Geological Survey (USGS) make this report possible.

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INTRODUCTION

Background

The Official Plan, Phase Two, of the Water Conservation Subdistrict of The Miami Conservancy District (WCSD-MCD), developed from concern that excessive withdrawal of ground water would deplete the aquifer within the Hamilton-New Baltimore area. Prior to the Plan's conception, three water users (the Cities of Hamilton, Fairfield and Southwestern Ohio Water Company) were withdrawing approximately 23 million gallons of water per day (MGD) from the area. Plans by the City of Cincinnati to establish a major well field in the same area brought concern by Butler County civic leaders that the water resources would be depleted.

As a result of a petition by the City of Hamilton and the Butler County Commissioners, the Butler Water Conservancy District (BWCD) was established in April, 1963, to regulate the water resources of the project area (Figure 1). Prior to this time the Water Conservation Subdistrict of The Miami Conservancy District had been organized in 1953 "to provide a water supply for domestic, industrial and public use, and to regulate the flow of streams and to conserve the waters thereof." Since the Butler Water Conservancy District had similar interest in subsurface water, and their area of interest in part overlapped (the BWCD encompassed a larger portion of southern Butler County) the boundaries of the WCSD-MCD, it was agreed by all affected parties that more effective monitoring could be performed by the MCD. The BWCD was merged with the WCSD-MCD in June, 1967, and an Official Plan was prepared in October, 1967, by the MCD staff. This was to be Phase Two of the Water Conservation Subdistrict (Phase One being a regional water quality management and monitoring plan). Its objectives were to:

1. Determine the supply of water.
2. Project short and long range use.
3. Develop and evaluate alternative programs to optimize the available water supply.

Amendment No.1 to the Official Plan was approved in 1980. It added a fourth objective to the Plan:

4. Monitor and evaluate water quality in the aquifer and make recommondations based thereon.

As stated in the Official Plan, Phase Two, the objectives were to be accomplished by "developing an observation network to collect data and information, providing staff to make necessary investigations, and receiving notices of proposed developments for increases in use of ground water." This report is a continuing effort to accomplish the objectives stated in the Official Plan.

Project Area Description

The limits of the project area as stated by the Official Plan, Phase Two, "were determined by the extent of the buried valley aquifer, sources of recharge to the aquifer, and locations of principle well fields." The area encompasses approximately 32 square miles and includes 14.1 stream miles of the Great Miami River. It is located in southern Butler and northern Hamilton Counties and is entirely contained between 39 degrees 15 minutes and 39 degrees 25 minutes north latitude, and 84 degrees 30 minutes and 84 degrees 42 minutes west longitude. A feature map is shown in Figure 2. Table 1 lists the location of the stream flow measurement stations on Figure 2.

The topography of the project area is gently rolling, dissected by numerous streams whose drainage patterns were shaped by the Quaternary ice sheets. Glacial depositional material, primarily sand and gravel laid down as valley train, occupies the bottom of the stream beds to a depth of as much as 200 feet in some places. This sand and gravel outwash formation is capable of storing a large quantity of ground water and producing a high yielding aquifer.

Scope

In cooperation with the WCSD-MCD, groundwater quality samples are obtained by the USGS four times a year at well MI-44, City of Troy well #4; MT-928, City of Miamisburg well #8; BU-36 owned by Champion Papers, Hamilton; and well H-19, SWOWC's Collector #1. Chemical-quality analysis is performed on each sample with 29 parameters reported. Stream water quality is assessed on the Great Miami River at New Baltimore by the USGS six times a year. The New Baltimore station is a part of USGS's national stream-quality accounting network (NASQAN) with chemical, biological, microbiological, temperature, and sediment parameters reported.

Precipitation data is available throughout the Great Miami River basin from the MCD which compiles daily rainfall data and reports statistical summaries. Forty-two stations comprise the MCD precipitation network of which thirty-nine are used to calculate monthly and total annual rainfall (Figure 3). Departures from normal are also computed and reported.

Within the project area, the MCD Hamilton station, measured by the MCD Hamilton caretaker at the Hamilton Sewage Treatment Plant, is included in the network.

Five other stations within the project area submit rainfall data to the MCD. One is at a Hamilton firehouse(MCD Hamilton Fire Department station). Another is the NLO station (MCD New Baltimore station) which is located at the Fernald facility. Two other stations are operated by residents of Fairfield: one is located on Deerhorn Drive;the other on Mack Road. The Deerhorn Drive station is equipped with a continuous rainfall recorder.

The fifth station in the project area is the National Oceanic and Atmospheric Administration's(NOAA) Hamilton-Fairfield station(MCD Fairfield station) located at the Fairfield Sewage Treatment Plant. Data from this station is published monthly in NOAA's Climalogical Data, Ohio.

Water use data is obtained from monthly operating reports of the Public Water Supply and Wastewater Pollution Control Divisions of the Southwest District Office of the Ohio Environmental Protection Agency. Pumpage rates are also obtained for National Lead of Ohio and the Chevrolet-Pontiac-Canada Group, GMC through communication with personnel from these respective facilities.

Groundwater levels are continuously recorded in 12 observation wells. Seven observation wells are serviced by the MCD,4 by ODNR, and 1 by USGS. The SWOWC obtains monthly measurements of groundwater levels from both of their Ranney collector wells (Nos. 1 & 2), from the Great Miami River at the State Route #126 bridge, and from 32 observation wells around the Ross, Ohio area. NLO measures 15 wells on their property. Most of the large water users measure water levels in their respective wells on an irregular basis. The MCD has located about 125 other wells and 13 ponds and pits (Figure 4) in which water levels are periodically measured to construct water level maps of the area.

WATER QUALITY

No water quality samples were collected by the MCD in 1984. Water quality data for 1984 is available for MI-44 (City of Troy Well #4), MT-928 (City of Miamisburg Well #8), BU-36 (Champion Papers), H-19 (SWOWC Collector #1), and the Great Miami River at New Baltimore which the USGS monitors and reports in Water Resources Data - Ohio, Water Year 1984, Vol.1 Ohio River Basin. Appendix A lists the USGS data.

PRECIPITATION

Precipitation in the Great Miami River basin averages about 38 inches per year. The yearly precipitation and departure from normal for the last twenty years is shown in Table 2. The total for 1984 was 37.91 inches, 0.03 inch below normal. The total represents the second consecutive year that precipitation was below normal in the basin. Although only slightly below normal, a closer examination of 1984 basin precipitation data indicates more significance than the yearly departure suggests. Through August the basin precipitation was 3.84 inches below normal, but a wetter than normal Fall, similar to 1983, increased the average yearly precipitation to just below normal. Monthly summaries indicate January and June as dry months(>2" below normal) and April, November, and December as months in which all stations in the basin reported above normal rainfall. The maximum and minimum for the 69 years of record (1915-1984), are 51.11 inches in 1950 and 24.43 inches in 1934.

Precipitation in the Hamilton-New Baltimore area averages about 40 inches per year. Rainfall data for Hamilton, for the last twenty years, is shown in Table 3. In 1984, precipitation at the Hamilton station totaled 40.61 inches; a yearly departure of 0.64 inch above normal. Significant months for Hamilton's rainfall in 1984 were January, in which the station reported the largest monthly departure (2.6" below normal) of any station in the basin and November (5.26"), the fourth largest amount reported in the basin for the month. The maximum and minimum rainfall for the 74-year period of record at Hamilton are 54.70 inches in 1950 and 22.06 inches in 1934.

A graph of departures from normal (Figure 5) for past 36 month intervals as listed in Tables 2 and 3 illustrates the short term cyclic nature of precipitation. For the 20-year period the average duration for precipitation to be either above or below normal is approximately 3 years. Periods of above normal precipitation for the Hamilton station occurred in 1970, 1973-1976, and 1979-1982, for a total of 9 years or 45% of the time. Periods of drought occurred in 1965-1969, 1971-1972, 1977-1978, and 1983-1984, for a total of 11 years or 55% of the time. If the pattern continues, it appears from the graph that an above normal yearly precipitation trend should occur in 1985. Figure 6 is a comparison of yearly departures for Hamilton and the basin for the last twenty years. As would be expected, the departures are typically larger for a single station than for the basin as a whole and the departure is typically in the same direction. However, in the years 1969, 1978, and 1981, although the basin's rainfall was above normal, Hamilton's rainfall was below normal. The opposite was true in 1970, 1977, and 1984, when Hamilton's rainfall was above normal and the Great Miami River basin's rainfall was below normal.

The monthly precipitation for the Hamilton, New Baltimore, Fairfield East, and Hamilton Fire Department stations for their respective period of record are shown in Tables 4 to 7.

RUNOFF

Closely associated with rainfall is runoff as shown in Figure 7. Runoff is that portion of precipitation which ultimately reaches streams. Runoff in the Great Miami River at Hamilton for the past twenty years is shown in Table 8. During the period, runoff has been above normal twice as many years as below normal. In 1984, runoff was 13.45 inches, 1.86 inches above normal. Comparing monthly rainfall and runoff at Hamilton in 1984, both were above normal 5 months, both were below normal 4 months, and each had opposite departures for 3 months. Cumulative runoff for the past 20 years was below normal from 1965-1971 and above normal since 1972.

The amount of ground water recharge is affected by the duration and amount of stream flow. A measure of ground water recharge which may result from high flows in the river is the number of days flow exceeds a certain discharge. A flow of 4,000 cubic feet per second (cfs) at Hamilton has been arbitrarily selected and the number of days when flows equalled or exceeded 4,000 cfs, counted. The data is shown in Table 9 for the past 20 years. In 1984, the discharge at Hamilton exceeded 4,000 cfs for a total of 107 days.

The drainage area of the Great Miami River at Hamilton is 3,630 square miles. At New Baltimore the drainage area is 3,814 square miles. Mean annual discharge and range of monthly mean discharge for the Great Miami River at Hamilton is listed in Table 10. In 1984, the mean annual discharge at Hamilton was 3,653 cfs. Monthly mean discharge for the year ranged from a maximum of 10,130 cfs in April to a minimum of 733 cfs in September. The maximum daily mean discharge for 1984 was 22,500 cfs on April 6. The minimum daily mean discharge was 547 cfs on September 2 and 3. The minimum daily discharge is affected by the storage and release of cooling and process water from the nearby power plant and paper mill.Table 10 also suggests that the greatest discharge is usually in the Spring and the least discharge is usually in the Fall. Again discharge figures reflect the overall water resource conditions for the year. In general, the area's water input was low for the first 8 months then recovered in the last 4 months for an average year.

WATER USE

Seven major ground water users in the Hamilton to New Baltimore area make up the consortium: entities that pump water from the aquifer exceeding 100,000 gallons per day (gpd) under normal conditions. There are thousands of other smaller industrial, commercial, agricultural, and private ground water users, but most of the water used is returned to the aquifer either through septic tanks or by surface infiltration. Table 11 is a list of the seven major water users, the type of water supply, and the number of people serviced by their water system.

Ground water use in the Hamilton - New Baltimore area is listed in Table 12. A graph of the yearly totals from Table 12 is shown in Figure 8. The labled data points of Figure 8 refer to the first year of pumpage for a particular water user.

Ground water withdrawal by the major users totaled 49.40 million gallons per day (MGD) during 1984. For the second consecutive year the total is the largest amount of water ever withdrawn from the aquifer in the study area for a one year period. A ratio of the total water use per day in the area versus the mileage of the primary stream (Great Miami River) computes to 3.50 MGD per stream mile for the year 1984. Similarly, a ratio of total water use per day versus the area of the project area results in 1.54 MGD of water used per square mile in 1984.

Nearly all of the water pumped by the Cincinnati Bolton Plant and the Southwestern Ohio Water Company is diverted out of the basin. The average diversion during 1984 was 31.75 MGD, or 64.3% of the water withdrawn is diverted from the recharge area.

Wastewater is returned to the Great Miami River by the City of Hamilton - Champion Papers and City of Fairfield wastewater treatment plants. Return flows from these two plants in 1984 were 19.27 MGD and 4.82 MGD respectively. Wastewater is also returned in significant amounts by other area industries. Chevrolet-Pontiac-Canada Group, GMC returned .085 MGD in 1984 through their outfall conduit. National Lead of Ohio returned 0.58 MGD in 1984 to the Great Miami River through their Paddy's Run conduit.

WATER LEVELS

Water levels in the Hamilton to New Baltimore area have been monitored since 1943 when the Federal Works Agency first started pumping water in significant amounts from the aquifer. Currently, ground water levels are continuously recorded in 12 observation wells. A list of each, with its maximum and minimum depth to water during 1984, is shown in Table 13. Table 14 lists the recorded maximum and minimum depth to water for 14 recorder observation wells during the years of operation. Of particular interest is that new maximum depths to water were recorded in 1984, in two recording observation wells: BU14 and C 2A. Well BU14 has established a new maximum depth to water in each of the last three years. Well C 2A's last maximum depth to water occurred in 1980. It will be interesting to see if this downward trend continues in subsequent years. Table 14 also reveals that of the 12 observation wells currently being continuously monitored, five have had maximum depths to water in the 1980's. Of course, it should be noted that more groundwater is being withdrawn from the aquifer in this area than ever before.

Hydrographs for the recorder observation wells are shown in Figures 9 through 31.

Annual maximum depths to water are listed for each of the 12 current recorder wells in Table 15. The elevations of the annual maximum depths were computed and are shown in Table 16.

Over 125 wells have been located and measured for water level surveys conducted by The Miami Conservancy District. Ten such surveys have been conducted since the inception of the Phase Two program. The most recent survey was taken between April 30 and May 3, 1984.

CONCLUSIONS

In summary, the water resources in the Hamilton-New Baltimore area, during 1984, continued to meet domestic, agricultural, and commercial requirements. Precipitation was only 0.03" below normal, although it was lower for most of the year. Runoff was 1.86" above normal for the year. Precipitation and stream infiltration are the main sources of recharge to the buried valley aquifer and are good indicators of replenishment potential. The rainfall and runoff in 1984 suggest that water input to the aquifer was greater than last year and appear to be adequate for the demands. Water use again was higher than any other year on record. The water use total is analogous to industrial areas of similar size and will most likely increase as the area becomes more urbanized. Limited infiltration coupled with large water volume output is a condition of concern to the viability of the aquifer. Fortunately, the buried valley aquifer which occupies the Hamilton-New Baltimore area is capable of storing and yielding a large quantity of water. Spieker(1968), using an analog model that he developed, predicted that the safe yield of the hydrologic system in the study area was at least 84 MGD. If this model is accurate, the 1984 withdrawal of 49.40 MGD from the project area represents only 59% of the predicted safe yield. The report Ground Water for Planning in Southwest Ohio, Report #23, Ohio Water Plan Inventory(1972) states that yields per valley mile along the Great Miami River in the south Hamilton area could range from 15 to 20 MGD. Using these yield figures to compute possible ground water withdrawal along the 14.1 stream miles of the Great Miami River within the project area, 211.5 to 282 MGD of water could be pumped from the area. The 1984 withdrawal of 49.40 MGD from the area amounts to almost 23.5 per cent of the total potential. Although these estimates suggest that considerably more water could be extracted from the aquifer, wise management of such a valuable resource is imperative to meet future demands.

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The Water Conservation Subdistrict
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TABLE 1

STREAM FLOW MEASUREMENT STATIONS
HAMILTON-NEW BALTIMORE AREA

Map #	Tributary Name	Location
118	Indian Creek	Near Millville
119	Indian Creek	Below Route 128 bridge
120		At bridge on Route 128, 500 feet north of Kraus Lane, Ross
121		At bridge on Herman Road, 4,000 feet north of Route 128 near Ross
122	Dry Run	At Layhigh Road near Ross
123	Dry Run Tributary	At Layhigh Road near Ross
124	Dry Run	At Route 126 bridge west of Ross
125		Culvert 1.5 miles west of Ross on Route 126
126	Dry Run	0.4 mi. southwest of Ross on Route 128
127		Culvert on Route 128, 0.9 mi. south of Ross and 200 ft. sw. of power line
128	Paddy's Run	At Willey Road near Fernald
129	Paddy's Run	At Route 128 near Fernald
130	Paddy's Run	At New Haven Road at Fernald
131		At E. Miami River Rd., 300 ft. north of Bypass 50, 0.4 mi. north of Colerain Pike bridge, Ross
132	Dunlap Run	At E. Miami River Rd. near Ross
133	Owl-Creek	At E. Miami River Rd. near New Baltimore
134		Culvert under E. Miami River Rd.,1,000 feet south of Owl Creek, 1.5 mi. north of New Baltimore
135	Blue Rock Creek	At E. Miami River Rd. at New Baltimore
136	Crawford Run	At corner of Hancock and Howell Roads, Hamilton
137		Bridge on Gilmore Road, 400 ft. south of Penn-Central RR near Hamilton
138	Pleasant Run	At Nilles Road, Fairfield
139	North Branch Pleasant Run	At May Avenue, Fairfield
140	Pleasant Run	At Groh Lane near Fairfield Water Plnt
141		At bridge on E. Miami River Rd. 2,300 south of Gray Rd. near Fairfield
142	Banklick Creek	At E. Miami River Rd. near Ross
143	Old River Channel	At Route 128, 2,000 feet east of Smith Road near Ross
144	(3 streams)	At Hine Rd. between Smith Rd. and Route 128 near Ross
145		At Rte.128 near Tanglewood Lake
146		At Rte.128, 1 mi.below Ham.gage house
147		At Rte.128,.25 mi.below Ham.gage house

The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 2

GREAT MIAMI RIVER BASIN
RAINFALL, INCHES
1965-1984

Year	Annual Average	Departure[1] Past 12 Months	Past 36 Months	Cumulative
1965	35.46	- 2.62	-14.72	- 2.62
1966	37.17	- 0.91	- 3.56	- 3.53
1967	37.46	- 0.62	- 4.15	- 4.15
1968	39.97	+ 1.89	+ 0.36	- 2.26
1969	38.31	+ 0.23	+ 1.50	- 2.03
1970	33.60	- 4.09	- 1.97	- 6.12
1971	35.64	- 2.05	- 5.91	- 8.17
1972	42.54	+ 4.85	- 1.29	- 3.32
1973	45.14	+ 7.45	+10.25	+ 4.13
1974	38.46	+ 0.77	+13.07	+ 4.90
1975	43.04	+ 5.35	+13.57	+10.25
1976	29.64	- 8.05	- 1.93	+ 2.20
1977	36.61	- 1.08	- 3.78	+ 1.12
1978	37.89	+ 0.20	- 8.93	+ 1.32
1979	46.49	+ 8.80	+ 7.92	+10.12
1980	39.71	+ 1.77	+10.77	+11.89
1981	38.73	+ 0.79	+11.36	+12.68
1982	39.56	+ 1.62	+ 4.18	+14.30
1983	37.59	- 0.35	+ 2.06	+13.95
1984	37.91	- 0.03	+ 1.24	+13.92

[1] Current base period is from 1915-1979. Normal = 37.94 inches.

The Water Conservation Subdistrict
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TABLE 3

HAMILTON, OHIO
RAINFALL, INCHES
1965-1984

Year	Annual Average	Departure[1] Past 12 Months	Past 36 Months	Cumulative
1965	35.84	- 4.05	-18.88	- 4.05
1966	36.08	- 3.81	- 8.34	- 7.86
1967	35.76	- 4.13	-11.99	-11.99
1968	45.00	+ 5.11	- 2.83	- 6.88
1969	38.80	- 1.09	- 0.11	- 7.97
1970	41.42	+ 1.53	+ 5.55	- 6.44
1971	34.47	- 5.42	- 4.98	-11.86
1972	42.88	+ 2.99	- 0.90	- 8.87
1973	48.01	+ 8.12	+ 5.69	- 0.75
1974	42.95	+ 3.06	+14.17	+ 2.31
1975	44.98	+ 5.09	+16.27	+ 7.40
1976	32.74	- 7.15	+ 1.00	+ 0.25
1977	40.63	+ 0.74	- 1.32	+ 0.99
1978	37.99	- 1.90	- 8.31	- 0.91
1979	49.62	+ 9.73	+ 8.57	+ 8.82
1980	43.41	+ 3.52	+11.35	+12.34
1981	35.84	- 4.05	+ 9.20	+ 8.29
1982	41.09	+ 1.20	+ 0.67	+ 9.49
1983	37.48	- 2.41	- 5.26	+ 7.08
1984	40.61	+ 0.64	- 0.57	+ 7.72

[1] Base period 1911-1984. Normal = 39.97 inches.

Table 4
THE MIAMI CONSERVANCY DISTRICT
MONTHLY PRECIPITATION TOTALS
74 YEARS OF RECORD
FOR HAMILTON STP

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1911	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	3.08	3.37	0.00
1912	-.05	2.42	5.03	7.22	-.05	2.49	1.90	4.24	3.07	1.61	-.05	2.03	0.00
1913	7.82	1.71	9.20	5.50	4.07	3.00	4.13	3.13	1.66	-.05	2.69	.79	0.00
1914	-.05	-.05	2.48	2.90	1.52	2.67	2.97	7.44	.73	3.51	1.18	2.83	0.00
1915	3.53	1.07	1.96	1.43	5.24	3.62	3.54	6.93	5.82	1.68	2.83	5.13	42.78
1916	-.05	1.18	2.83	2.08	5.09	5.92	4.13	1.70	2.20	1.95	1.86	2.51	0.00
1917	5.25	1.79	4.01	2.58	6.11	5.09	5.15	2.01	2.22	3.77	.49	1.27	39.74
1918	4.52	2.49	3.32	3.29	4.24	5.54	4.76	6.30	-.05	-.05	1.81	3.27	0.00
1919	1.78	.79	5.56	3.54	4.07	3.26	2.54	2.82	1.06	6.94	5.22	1.97	39.55
1920	2.68	1.17	3.68	4.23	4.01	2.44	3.76	6.62	4.48	1.24	2.67	2.28	39.26
1921	2.55	2.60	6.68	4.27	2.25	-.05	1.66	2.99	5.13	3.17	5.92	4.92	0.00
1922	2.13	2.10	8.16	6.09	4.46	1.26	1.86	4.61	4.16	2.18	2.27	5.05	44.33
1923	3.10	3.02	3.64	2.58	3.28	3.25	1.21	4.18	2.55	1.39	2.94	6.75	37.89
1924	4.10	1.89	4.53	2.74	3.65	6.31	1.85	1.57	2.73	.18	1.33	4.51	35.39
1925	1.58	2.27	2.49	2.49	1.33	2.02	5.27	3.79	5.64	5.48	6.43	.84	39.63
1926	2.90	4.38	3.05	4.43	4.77	2.00	5.10	10.33	5.09	5.71	1.81	2.72	52.29
1927	5.15	1.98	3.86	4.77	4.78	5.03	2.45	3.01	4.20	2.68	7.03	4.41	49.35
1928	1.72	3.66	1.84	3.92	1.77	7.23	3.40	1.67	1.06	1.84	4.42	2.52	35.05
1929	4.45	3.17	3.48	4.14	9.23	5.35	6.85	2.08	4.11	4.02	4.03	3.41	54.32
1930	5.64	3.45	2.26	2.18	1.53	1.35	2.57	2.51	4.02	1.49	1.57	1.35	29.92
1931	1.11	1.55	2.36	4.85	2.09	3.45	5.15	5.80	5.58	2.27	3.59	4.18	41.98
1932	7.31	1.62	2.85	1.97	.73	4.98	5.43	4.82	5.77	2.36	3.55	5.21	46.60
1933	2.52	2.61	8.40	4.44	7.69	2.11	2.57	3.00	4.56	2.51	1.42	3.94	45.77
1934	1.49	1.23	3.26	.94	.99	3.98	2.22	1.12	3.18	.42	1.49	1.74	22.06
1935	3.03	.75	6.05	2.89	4.97	3.15	1.33	3.20	3.60	2.86	2.89	1.75	36.47
1936	1.63	2.46	2.70	3.28	1.36	.39	1.00	3.94	5.02	6.76	3.25	2.22	34.01
1937	13.96	1.44	1.13	3.28	3.30	3.89	2.41	3.54	5.48	4.72	1.76	3.59	48.50
1938	1.52	2.72	5.17	1.75	6.53	3.55	3.74	1.61	8.37	.72	2.97	1.51	40.16
1939	3.49	4.14	4.34	6.35	1.17	7.62	6.17	.78	.85	2.15	1.08	1.52	39.66
1940	1.52	3.55	2.47	9.00	6.30	3.47	.69	1.29	1.57	1.08	4.15	2.18	37.27
1941	2.03	.54	.73	2.40	2.28	4.29	3.46	2.59	1.95	4.53	2.23	3.47	30.50
1942	1.75	2.68	2.31	2.59	3.24	4.85	5.08	3.53	2.22	1.44	5.33	3.61	38.63
1943	.50	2.61	6.80	3.38	5.21	4.66	6.04	1.88	2.83	1.62	1.13	1.67	38.33
1944	.70	3.55	5.49	4.54	2.21	1.51	2.42	3.88	3.45	.31	2.64	2.65	33.35
1945	1.63	5.58	10.78	5.33	3.57	5.16	4.75	1.15	5.70	2.00	4.93	2.87	53.45
1946	1.35	4.20	4.96	1.56	7.04	2.94	3.99	3.40	1.05	2.91	2.58	2.88	38.86
1947	4.94	.23	1.47	8.02	8.83	5.96	4.60	6.95	2.46	1.85	2.34	1.06	48.71
1948	2.40	3.81	4.83	4.66	2.77	2.65	4.82	1.96	1.48	1.69	6.30	2.87	40.24
1949	9.93	2.76	4.50	1.25	1.66	6.76	3.89	3.25	2.94	2.48	.49	2.57	42.48
1950	9.98	4.47	2.52	3.78	3.16	7.01	3.68	4.70	5.49	2.34	4.94	2.63	54.70
1951	5.02	3.54	4.56	2.38	2.73	3.74	2.02	1.21	2.67	1.96	3.82	4.78	38.43
1952	4.58	2.74	3.98	3.96	4.09	4.64	1.40	2.12	4.32	1.07	1.96	3.07	37.93

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Table 4 (cont.)
THE MIAMI CONSERVANCY DISTRICT
MONTHLY PRECIPITATION TOTALS
74 YEARS OF RECORD
FOR HAMILTON

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953	3.58	1.84	2.28	2.46	3.20	1.87	1.83	2.45	.88	.76	.78	1.55	23.48
1954	2.54	2.04	2.15	3.46	2.36	3.17	5.81	3.52	1.30	3.56	1.33	2.51	33.75
1955	1.98	4.97	5.48	2.95	3.21	3.43	2.85	1.15	7.73	3.77	3.68	.59	41.79
1956	2.14	3.68	3.11	4.84	4.30	5.33	5.27	2.89	2.07	1.12	1.63	3.28	39.66
1957	2.74	2.60	1.51	6.35	6.46	4.56	1.77	1.32	3.11	1.85	4.24	4.84	41.35
1958	2.04	.40	1.38	3.90	5.38	6.88	14.25	7.06	2.64	1.43	2.95	.61	48.92
1959	8.09	2.58	2.48	1.93	3.45	3.04	1.73	3.66	2.31	2.25	3.16	2.56	37.24
1960	2.41	2.99	.96	.94	4.19	5.86	3.27	2.74	1.48	1.92	2.08	1.70	30.54
1961	1.69	3.56	5.63	3.92	5.50	4.71	3.94	1.96	2.66	2.14	3.38	3.01	42.10
1962	2.88	4.39	3.05	.53	5.26	1.53	5.89	1.16	1.99	3.97	1.94	1.14	33.73
1963	1.41	.74	7.83	2.84	2.11	.65	3.93	3.66	.62	.14	.78	.83	25.54
1964	1.75	1.34	9.47	7.93	1.07	4.09	2.83	2.95	1.69	.42	2.01	3.86	39.41
1965	3.35	4.26	2.60	5.16	1.37	2.06	2.78	2.70	6.03	3.54	1.24	.75	35.84
1966	3.68	2.51	1.61	3.96	3.23	2.25	3.04	2.80	4.72	1.61	3.71	2.96	36.08
1967	.58	1.95	3.38	3.64	5.91	3.97	3.02	.54	1.45	3.96	3.09	4.27	35.76
1968	1.73	.37	2.61	3.29	9.85	5.49	5.46	3.39	3.08	2.45	3.48	3.80	45.00
1969	4.69	1.60	1.47	3.31	3.36	3.50	2.89	3.12	6.42	2.24	3.49	2.71	38.80
1970	1.04	1.51	4.50	6.92	2.26	5.84	4.07	2.93	3.44	3.32	2.62	2.97	41.42
1971	1.90	4.52	2.61	1.30	4.50	1.19	4.08	1.78	4.28	2.91	1.42	3.98	34.47
1972	1.31	1.43	2.92	6.08	4.57	4.03	2.84	2.34	4.39	2.12	7.18	3.67	42.88
1973	2.14	1.07	5.34	5.43	4.07	6.69	6.25	4.15	.83	4.04	5.52	2.48	48.01
1974	3.05	2.02	2.72	4.86	5.73	4.16	1.01	6.87	5.57	1.19	3.33	2.44	42.95
1975	3.87	4.37	6.86	4.67	1.25	4.60	1.57	4.23	4.13	4.64	1.65	3.14	44.98
1976	3.49	2.27	2.21	1.15	1.65	5.79	2.17	7.52	2.15	3.32	.61	.41	32.74
1977	1.23	1.40	4.13	3.16	2.91	3.99	1.97	5.19	2.42	6.49	2.97	4.77	40.63
1978	4.20	.06	2.68	2.09	3.20	4.21	5.46	5.43	.39	3.39	2.12	4.76	37.99
1979	4.18	3.04	1.40	4.67	2.96	5.39	5.10	6.05	7.07	1.84	5.34	2.58	49.62
1980	1.26	1.80	3.87	2.15	4.97	3.91	8.84	8.93	.93	3.30	2.13	1.32	43.41
1981	.28	2.80	1.87	5.43	6.19	2.57	3.78	2.08	3.25	2.19	2.74	2.66	35.84
1982	5.57	1.91	4.58	1.97	6.80	5.20	2.28	2.65	1.24	.53	4.42	3.94	41.09
1983	1.64	.74	2.84	4.33	8.88	1.09	1.33	1.16	1.42	7.23	4.25	2.57	37.48
1984	.71	2.40	3.06	4.69	4.59	1.80	5.05	1.80	4.39	2.98	5.26	3.88	40.61
TOTAL	224.44	173.08	278.31	273.29	288.06	281.44	268.32	253.83	236.55	185.51	218.95	210.44	2670.70
AVG													39.86
AVG	3.21	2.40	3.81	3.74	4.00	3.91	3.68	3.48	3.29	2.61	3.00	2.84	39.97
MAX	1937	1945	1945	1940	1968	1939	1958	1926	1938	1983	1972	1923	
MONTH	13.96	5.58	10.78	9.00	9.85	7.62	14.25	10.33	8.37	7.23	7.18	6.75	
MIN	1981	1978	1941	1962	1932	1936	1940	1967	1978	1963	1917	1976	
MONTH	.28	.06	.73	.53	.73	.39	.69	.54	.39	.14	.49	.41	

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THE MIAMI CONSERVANCY DISTRICT
MONTHLY PRECIPITATION TOTALS
10 YEARS OF RECORD
FOR NEW BALTIMORE

TABLE 5

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1975	3.07	3.94	6.19	2.69	2.47	3.47	1.50	4.72	4.22	4.40	1.71	3.05	41.43
1976	3.09	1.85	2.01	.94	1.33	4.87	1.89	5.59	3.71	3.23	.61	.41	29.53
1977	1.60	1.18	4.15	2.73	3.27	3.57	1.65	5.16	1.33	5.70	3.37	4.47	38.18
1978	3.73	.19	2.21	2.58	4.02	5.80	4.58	4.99	.54	3.23	2.22	5.10	39.19
1979	3.33	3.17	1.10	4.22	2.94	4.47	4.05	6.09	7.37	1.48	4.72	2.50	45.44
1980	2.04	1.24	3.29	1.50	3.98	3.04	8.16	4.54	.88	3.26	2.09	.87	34.89
1981	..17	3.28	1.42	4.55	4.14	3.85	3.85	3.25	2.43	2.08	2.91	2.27	34.20
1982	6.05	1.20	4.18	1.43	4.79	3.51	2.11	1.98	.81	.62	4.23	3.62	34.53
1983	1.38	.62	2.37	4.20	7.95	1.56	2.33	1.20	.55	7.34	3.69	2.47	35.66
1984	.66	2.36	2.88	3.96	3.56	1.49	3.29	1.71	3.17	2.81	4.25	3.84	33.98
TOTAL	25.12	19.03	29.80	28.80	38.45	35.63	33.41	39.23	25.01	34.15	29.80	28.60	367.03
AVG													36.70
AVG	2.51	1.90	2.98	2.88	3.85	3.56	3.34	3.92	2.50	3.42	2.98	2.86	36.70
MAX	1982	1975	1975	1981	1983	1978	1980	1979	1979	1983	1979	1978	
MONTH	6.05	3.94	6.19	4.55	7.95	5.80	8.16	6.09	7.37	7.34	4.72	5.10	
MIN	1981	1978	1979	1976	1976	1984	1975	1983	1978	1982	1976	1976	
MONTH	.17	.19	1.10	.94	1.33	1.49	1.50	1.20	.54	.62	.61	.41	

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THE MIAMI CONSERVANCY DISTRICT
MONTHLY PRECIPITATION TOTALS
3 YEARS OF RECORD
FOR FAIRFIELD EAST
MACK ROAD

TABLE 6

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1982						4.83	1.89	3.04	1.16	.67	4.14	3.04	
1983	.16	.27	2.00	5.19	7.62	1.21	1.75	2.41	1.36	7.73	3.43	1.77	34.90
1984	.64	2.30	2.98	4.20	5.39	1.74	4.66	3.75	4.06	3.20	5.45	4.08	42.45
TOTAL	.80	2.57	4.98	9.39	13.01	7.78	8.30	9.20	6.58	11.60	13.02	8.89	77.35
AVG													38.68
AVG	.40	1.29	2.49	4.70	6.51	2.59	2.77	3.07	2.19	3.87	4.34	2.96	37.17
MAX	1984	1984	1984	1983	1983	1982	1984	1984	1984	1983	1984	1984	
MONTH	.64	2.30	2.98	5.19	7.62	4.83	4.66	3.75	4.06	7.73	5.45	4.08	
MIN	1983	1983	1983	1984	1984	1983	1983	1983	1982	1982	1983	1983	
MONTH	.16	.27	2.00	4.20	5.39	1.21	1.75	2.41	1.16	.67	3.43	1.77	

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THE MIAMI CONSERVANCY DISTRICT
MONTHLY PRECIPITATION TOTALS
1 YEAR OF RECORD
FOR HAMILTON FIRE DEPARTMENT

TABLE 7

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1984	.85	2.57	3.26	4.66	4.39	1.30	5.06	1.78	3.40	2.87	5.34	4.09	39.57
TOTAL	.85	2.57	3.26	4.66	4.39	1.30	5.06	1.78	3.40	2.87	5.34	4.09	39.57
AVG													39.57
AVG	.85	2.57	3.26	4.66	4.39	1.30	5.06	1.78	3.40	2.87	5.34	4.09	39.57
MAX	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	
MONTH	.85	2.57	3.26	4.66	4.39	1.30	5.06	1.78	3.40	2.87	5.34	4.09	
MIN	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	
MONTH	.85	2.57	3.26	4.66	4.39	1.30	5.06	1.78	3.40	2.87	5.34	4.09	

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The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 8

GREAT MIAMI RIVER AT HAMILTON, OHIO
RUNOFF, INCHES
1965-1984

Year	Annual Run Off	Departure[1] Past 12 Months	Past 36 Months	Cumulative
1965	9.51	- 2.21	- 7.40	- 2.21
1966	9.58	- 2.14	- 5.91	- 4.35
1967	13.31	+ 1.59	- 2.76	- 2.76
1968	12.99	+ 1.27	+ 0.72	- 1.49
1969	13.10	+ 1.38	+ 4.24	- 0.11
1970	10.90	- 0.69	+ 1.96	- 0.80
1971	8.72	- 2.87	- 2.18	- 3.67
1972	16.36	+ 4.77	+ 1.21	+ 1.10
1973	18.38	+ 6.79	+ 8.69	+ 7.89
1974	14.17	+ 2.58	+14.14	+10.47
1975	16.15	+ 4.56	+13.93	+15.03
1976	8.60	- 2.99	+ 4.15	+12.04
1977	8.41	- 3.18	- 1.61	+ 8.86
1978	13.67	+ 2.08	- 4.09	+10.94
1979	20.48	+ 8.89	+ 7.79	+19.83
1980	15.39	+ 3.80	+14.77	+23.63
1981	12.30	+ 0.71	+13.40	+24.34
1982	16.65	+ 5.06	+ 9.57	+29.40
1983	11.22	- 0.37	+ 5.40	+29.03
1984	13.45	+ 1.86	+ 6.55	+30.89

[1] Current base period 1969-1975. Normal = 11.59 inches.

The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 9

NUMBER OF DAYS FLOW EXCEEDED 4,000 cfs
GREAT MIAMI RIVER AT HAMILTON
1965-1984

Year	Period: January 1-March 31	April 1-September 30	October 1-December 31	Total
1965	41	25	0	66
1966	17	17	23	57
1967	34	41	25	100
1968	20	40	23	83
1969	33	46	5	84
1970	33	35	1	69
1971	40	9	7	56
1972	27	44	61	132
1973	51	92	16	159
1974	54	32	16	102
1975	78	26	6	110
1976	43	3	0	46
1977	15	11	21	47
1978	27	68	10	105
1979	34	64	27	125
1980	42	65	0	107
1981	17	75	7	99
1982	69	39	9	117
1983	9	34	13	56
1984	39	46	22	107

The Water Conservation Subdistrict
of the Miami Conservancy District

TABLE 10

GREAT MIAMI RIVER AT HAMILTON
MEAN DISCHARGE, CUBIC FEET PER SECOND (cfs)
1965-1984

Year	Annual Mean Discharge[1]	Range of Monthly Mean Discharge Maximum	Month	Minimum	Month
1965	2,558	9,388	Apr	406	Aug
1966	2,572	7,191	Dec	591	Sept
1967	3,536	9,843	Mar	439	Sept
1968	3,470	9,945	May	670	Oct
1969	3,567	7,971	Jan	733	Oct
1970	2,887	10,140	Apr	560	Sept
1971	2,391	9,078	Feb	574	Aug
1972	4,389	10,500	Apr	717	Aug
1973	4,944	11,150	Mar	1,239	Sept
1974	3,799	9,596	Jan	910	Oct
1975	4,336	12,300	Feb	1,213	Nov
1976	2,277	7,981	Feb	516	Dec
1977	2,247	9,346	Dec	434	Jan
1978	3,611	13,520	Mar	1,108	Oct
1979	5,299	8,944	Mar	2,309	June
1980	4,218	9,869	Mar	1,060	Nov
1981	3,284	8,073	June	923	Jan
1982	4,469	12,620	Feb	658	Oct
1983	3,048	8,925	May	449	Sept
1984	3,653	10,130	Apr	733	Sept

[1] Average

The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 11

MAJOR WATER USERS
HAMILTON-NEW BALTIMORE AREA

NAME of WATER USER	TYPE of WATER SUPPLY	NUMBER of PEOPLE SERVED
POTABLE WATER		
1. CINCINNATI BOLTON PLANT	MUNICIPAL	760,000*
2. HAMILTON SOUTH	MUNICIPAL	80,000**
3. FAIRFIELD	MUNICIPAL	33,000
4. NATIONAL LEAD	NON-COMMUNITY	800
5. WATER ASSOCIATION	PUBLIC	22,000
NONPOTABLE WATER		
6. SOUTHWESTERN OHIO WATER COMPANY	INDUSTRIAL	13 Industries
7. CHEVROLET-PONTIAC-CANADA GROUP, GMC	INDUSTRIAL	1 Factory

* includes people served from Ohio River water plant(approx.90%)
** includes people served from Hamilton North Plant

The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 12

HAMILTON-NEW BALTIMORE AREA WATER USE
Million Gallons per Day

Year	Hamilton South	Fairfield City *	Southwestern Ohio Water Company	Water Association	Cincinnati Bolton Plant	National Lead	Chevrolet-Pontiac-Canada Group, GMC	TOTAL
1952			9.77**					9.77
53			11.86					11.86
54			11.39					11.39
55			13.93					13.93
56	5.26**	**	13.35					18.61
57	7.82	.17	14.72					22.71
58	7.70	.20	13.05					20.95
59	7.71	.31	14.79					22.81
1960	7.39	.36	14.37					22.12
61	7.35	.40	12.95					20.70
62	7.39	.47	12.61					20.47
63	7.83	.58	12.86					21.27
64	7.57	.66	13.87					22.10
65	7.93	.62	14.20					22.75
66	7.87	.71	15.69					24.27
67	7.70	.87	17.89					26.46
68	8.17	.91	18.34					27.42
69	8.32	.92	17.08					26.32
1970	8.71	.96	16.99					26.66
71	9.15	1.09	16.77	.01**		.73***	.14	27.75
72	9.39	1.15	17.19	.42		.73***	.17	28.88
73	8.80	1.15	17.68	.60		.73***	.15	28.96
74	10.06	1.30	16.71	.67		.73***	.13	29.47
75	11.07	1.34	14.85	.77		.63	.12	28.66
76	11.62	1.36	16.04	.84	1.93**	.48	.13	32.27
77	11.28	1.33	16.72	.86	12.30	.31	.14	42.80
78	12.11	1.40	17.66	1.06	13.34	.32	.15	45.89
79	11.77	1.29	18.07	1.32	10.73	.27	.15	43.45
1980	12.12	1.12	17.84	1.38	11.73	.35	.14	44.54
81	12.47	.79	16.75	1.42	15.05	.39	.14	46.87
82	13.14	.65	16.12	1.49	14.93	.36	.12	46.69
83	12.51	1.59	16.46	1.68	14.86	.31	.13	47.41
84	12.92	1.72	17.38	1.73	15.10	.42	.13	49.40

* Raw water pumped. Does not include water purchased from Hamilton and Cincinnati.
** First year for ground water pumpage.
*** Estimated.

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The Water Conservation Subdistrict
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TABLE 13

MAXIMUM AND MINIMUM
WATER LEVELS IN RECORDING OBSERVATION WELLS
(in feet)

1 9 8 4

Well Name	Land Surface Elevation	Latitude (DD MM SS)	Longitude (DD MM SS)	Maximum (DBLS)	Elevation	Date	Minimum (DBLS)	Elevation	Date
BU 7	575.00	39 20 17	84 34 52	30.38	544.62	09/24	22.31	552.69	04/27
BU 8	630.00	39 20 48	84 31 14	54.34	575.66	01/22	44.63	585.37	05/11
BU11	539.89	39 18 55	84 37 40	19.61	520.28	10/15	6.19	533.70	04/25
BU12	547.70	39 19 04	84 37 18	19.84	527.86	01/13	10.20	537.50	04/08
BU13	547.10	39 18 36	84 35 40	25.58	521.52	10/22	16.81	530.29	04/25
BU14	563.72	39 19 07	84 36 09	31.82 *	531.90	09/24	21.82	541.90	04/26
BU56	583.60	39 20 21	84 34 03	37.35	546.25	10/25	28.49	555.11	05/06
BU67	555.49	39 20 35	84 36 00	15.16	540.33	10/22	7.80	547.69	04/25-26
** BU80	570.02	39 19 26	84 37 58	41.98	528.04	09/27	34.50	535.52	04/30
C 2A	561.00	39 18 58	84 36 32	34.62 *	526.38	09/27	23.91	537.09	04/29
H 2	534.32	39 17 33	84 39 24	19.06	515.26	10/20	10.70	523.62	04/09
H 4	541.80	39 18 17	84 39 33	25.38	516.42	10/28	16.54	525.26	04/26-27

(DD MM SS) Degrees Minutes Seconds
(DBLS) Depth Below Land Surface
* Maximum for Period of Record
** Recorder removed in Aug., 1977

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The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 14

MAXIMUM AND MINIMUM
WATER LEVELS IN RECORDING OBSERVATION WELLS
(in feet)

Period of Record

Well Name	Land Surface Elevation	Latitude (DD MM SS)	Longitude (DD MM SS)	Period of Record	Maximum (DBLS)	Elevation	Date	Minimum (DBLS)	Elevation	Date
BU 7	575.00	39 20 17	84 34 52	1943-1984	31.17	543.83	01/13/77	11.50	563.50	06/06/47
BU 8	630.00	39 20 48	84 31 14	1944-1984	71.70	558.30	10/24/44	38.20	591.80	06/08/47
BU11	539.89	39 18 55	84 37 40	1968-1984	21.43	518.46	01/18/77	*	541.37	04/03/70
BU12	547.70	39 19 04	84 37 18	1968-1984	22.87	524.83	10/10/82	*	550.28	05/24/68
BU13	547.10	39 18 36	84 35 40	1968-1984	27.22	519.88	11/28/71 11/29/71	13.80	533.30	02/26/75
BU14	563.72	39 19 07	84 36 09	1969-1984	31.82	531.90	04/26/84	13.15	550.57	02/25/75
BU56	583.60	39 20 21	84 34 03	1969-1984	39.11	544.49	02/26/77	26.79	556.81	04/11/75
BU57(F-4)	571.55	39 22 30	84 35 40	1967-1971	29.42	542.13	09/16/67 09/26/67 08/31/71	16.50	555.05	05/25/68**
BU59(F-3)	559.73	38 19 54	84 35 43	1967-1971	20.08	539.65	11/22/71	10.08	549.65	05/29/68
BU67	555.49	39 20 35	84 36 00	1972-1984	15.67	539.82	10/05/83	*	558.42	02/24/75
*** BU80	570.02	39 19 28	84 37 58	1972-1984	43.28	526.74	11/02/82	26.90	543.12	09/26/79
C 2A	561.00	39 18 58	84 36 32	1976-1984	34.62	526.38	09/27/84	13.97	547.03	02/25/79
H 2	534.32	39 17 33	84 39 24	1952-1984	24.37	509.95	09/13/72 09/25/72	*	-?-	01/22/59
H 4	541.80	39 18 17	84 39 33	1955-1984	32.23	509.57	12/05/71	*	-?-	01/22/59

(DD MM SS) Degrees Minutes Seconds
(DBLS) Depth Below Land Surface
* Above Land Surface
** Estimated from Stream Flow Hydrographs and Other Nearby Wells
*** Recorder removed in Aug., 1977

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The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 15

DEPTH BELOW LAND SURFACE
ANNUAL MAXIMUM
GROUND WATER LEVEL
(in feet)

WELL NAME	BU 7	BU 8	BU11	BU12	BU13	BU14	BU56	BU67	BU80	C 2A	H 2	H 4
LAND SURFACE ELEVATION	575	630	539.89	547.7	547.1	563.72	583.6	555.49	570.02*	561	534.32	541.8
1943	26.12											
1944	28.10	71.70										
1945	28.01	66.02										
1946	22.96	54.13										
1947	22.56	54.01										
1948	23.63	53.42										
1949	24.97	56.40										
1950	24.55	56.30										
1951	26.75	56.95										
1952	24.45	57.60									18.80	
1953	25.15	59.30									19.80	
1954	25.85	66.90									21.70	
1955	25.50	67.15									21.75	25.50
1956	28.25	62.00									19.90	26.93
1957	28.25	60.45									20.00	26.53
1958	26.38	58.00									17.35	22.93
1959	28.43	59.93									17.40	26.92
1960	29.52	64.25									21.74	28.33
1961	29.04	65.40									22.13	28.81
1962	28.80	60.74									19.68	26.18
1963	28.67	62.36									19.80	26.55
1964	28.80	64.38									20.05	27.25
1965	27.99	61.13									19.31	27.02
1966	28.75	59.42									22.18	29.68
1967	28.75	59.18									22.50	30.25
1968	28.33	58.90	12.19	16.13							22.85	29.94
1969	28.93	58.54	12.40	16.35	26.17	28.41					22.68	30.15
1970	29.44	58.64	12.73	17.21	26.49	28.62	37.67	12.30	40.16		22.93	30.92
1971	29.30	59.08	12.78	17.29	27.22	28.80	37.36	13.40	41.77		24.30	32.22
1972	28.32	58.79	12.72	17.35	26.97	27.81	36.12	12.64	41.69		24.37	32.14
1973	28.10	51.66	12.13	16.90	25.93	28.30	34.51	12.13	39.86		22.29	28.55
1974	28.44	50.84	12.11	17.01	25.35	28.20	37.28	12.41	40.15		21.74	28.06
1975	29.33	54.30	12.24	16.90	24.58	28.10	36.05	12.76	40.53		19.32	24.95
1976	30.68	59.78	20.68	20.89	26.54	30.31	38.10	13.99	41.68	32.66	22.26	29.56
1977	31.17	61.75	21.43	21.74	27.18	30.51	39.11	14.52	42.01	33.35	23.46	30.91
1978	29.85	56.56	21.21	19.80	25.63	28.93	36.80	13.70	40.65	31.80	20.90	27.72
1979	26.81	50.64	20.50	19.18	24.90	28.16	34.26	12.66	37.96	30.77	17.76	23.18
1980	29.09	51.31	19.90	20.76	25.00	30.00	35.65	14.04	40.82	34.10	20.90	25.79
1981	30.32	57.34	19.02	21.80	25.27	30.16	36.47	14.83	42.70	33.01	21.59	27.02
1982	30.32	57.37	20.21	22.87	25.73	31.10	36.53	15.24	43.28	32.21	18.77	25.39
1983	30.59	56.92	18.20	21.45	25.80	31.38	36.48	15.67	42.85	33.04	18.03	24.41
1984	30.38	54.34	19.61	19.84	25.58	31.82	37.35	15.16	41.38	34.62	19.06	25.38
AVERAGE	27.85	58.88	16.47	19.03	25.90	29.41	36.65	12.70	41.21	32.84	20.82	27.64
STND DEVIATION	2.17	4.71	4.02	2.25	.81	1.32	1.27	1.19	1.38	1.17	1.94	2.47

* Elevation is depth below measuring point.

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The Water Conservation Subdistrict
of The Miami Conservancy District

TABLE 16

ANNUAL MINIMUM
GROUND WATER ELEVATION
PHASE TWO WELLS
(feet above mean sea level)

WELL NAME	BU 7	BU 8	BU11	BU12	BU13	BU14	BU56	BU67	BU80	C 2A	H 2	H 4
LAND SURFACE ELEVATION	575	630	529.89	547.7	547.1	563.72	583.6	555.49	570.02*	561	534.22	541.9
1943	548.88											
1944	546.90	558.30										
1945	546.99	563.98										
1946	552.04	575.87										
1947	552.44	575.99										
1948	551.37	576.58										
1949	550.03	573.60										
1950	550.45	573.70										
1951	548.25	573.05										
1952	550.55	572.40									515.52	
1953	549.85	570.70									514.52	
1954	549.15	563.10									512.62	
1955	549.50	562.85									512.57	516.30
1956	546.75	568.00									514.42	514.87
1957	546.75	569.55									514.32	515.27
1958	548.62	572.00									516.97	518.87
1959	546.57	570.07									516.92	514.88
1960	545.48	565.75									512.58	513.47
1961	545.96	564.60									512.19	512.99
1962	546.20	569.26									514.64	515.62
1963	546.33	567.64									514.52	515.25
1964	546.20	565.62									514.27	514.55
1965	547.01	568.87									515.01	514.78
1966	546.25	570.58									512.14	512.12
1967	546.25	570.82									511.82	511.55
1968	546.67	571.10	527.70	531.57							511.47	511.86
1969	546.07	571.46	527.49	531.35	520.93	535.31					511.64	511.65
1970	545.56	571.36	527.16	530.49	520.61	535.10	545.93	543.19	529.86		511.40	510.88
1971	545.70	570.92	527.11	530.41	519.88	534.92	546.24	542.09	528.25		510.02	509.57
1972	546.68	571.21	527.17	530.35	520.13	535.91	547.48	542.85	528.33		509.95	509.66
1973	546.90	578.34	527.76	530.80	521.17	535.42	549.09	543.36	530.16		512.03	513.25
1974	546.56	579.16	527.78	530.69	521.75	535.52	546.32	543.08	529.87		512.58	513.74
1975	545.67	575.70	527.65	530.80	522.52	535.62	547.55	542.73	529.49		515.00	516.85
1976	544.32	570.22	519.21	526.81	520.56	533.41	545.50	541.50	528.34	528.34	512.06	512.24
1977	543.83	568.25	518.46	525.96	519.92	533.21	544.49	540.97	528.01	527.65	510.86	510.89
1978	545.15	573.44	518.68	527.90	521.47	534.79	546.80	541.79	529.37	529.20	513.42	514.08
1979	548.19	579.36	519.39	528.52	522.20	535.56	549.34	542.83	532.06	530.23	516.56	518.62
1980	545.91	578.69	519.99	526.94	522.10	533.72	547.95	541.45	529.20	526.90	513.42	516.01
1981	544.68	572.66	520.87	525.90	521.83	533.56	547.13	540.66	527.32	527.99	512.74	514.78
1982	544.68	572.63	519.68	524.83	521.37	532.62	547.07	540.25	526.74	528.79	515.55	516.41
1983	544.41	573.08	521.69	526.25	521.30	532.34	547.12	539.82	527.17	527.96	516.29	517.39
1984	544.62	575.66	520.28	527.86	521.52	531.90	546.25	540.33	528.04	526.38	515.26	516.42
AVERAGE	547.15	571.12	523.42	528.67	521.20	534.31	546.95	541.79	528.81	528.16	513.49	514.16
MAXIMUM	552.44	579.36	527.78	531.57	522.52	535.91	549.34	543.36	532.06	530.23	516.97	518.87
MINIMUM	543.83	558.30	518.46	524.83	519.88	521.90	544.49	539.82	526.74	526.28	509.95	509.57

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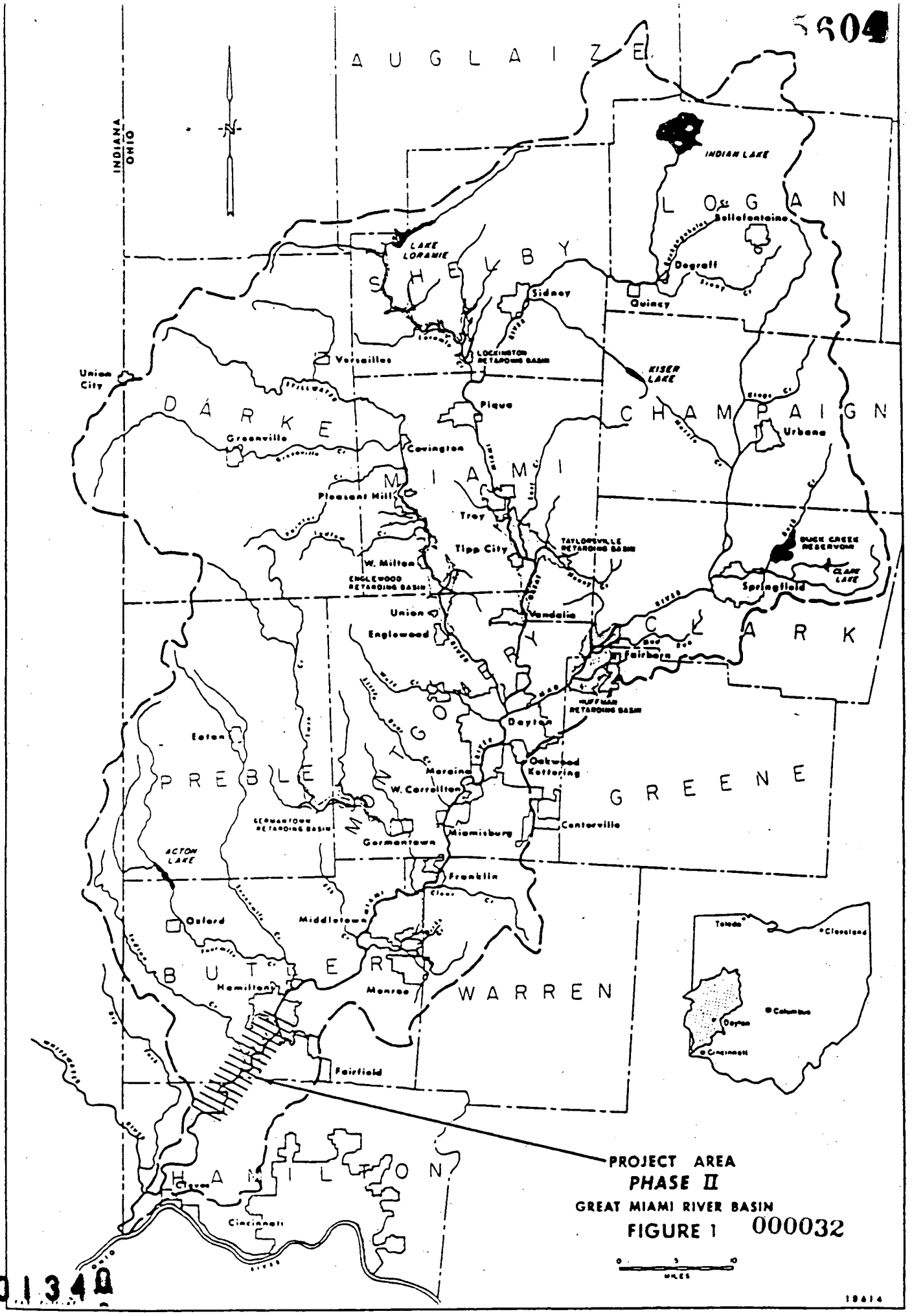
5604
AUGLAIZE
INDIANA
OHIO
N
INDIAN LAKE
LOGAN
Bellefontaine
Degraff
Quincy
LAKE LORAMIE
SHELBY
Sidney
LOCKINGTON RETARDING BASIN
Versailles
Union City
KISER LAKE
DARKE
Piqua
CHAMPAIGN
Urbana
Greenville
Covington
MIAMI
Pleasant Hill
Troy
Tipp City
TAYLORSVILLE RETARDING BASIN
BUCK CREEK RESERVOIR
CLARK LAKE
W. Milton
ENGLEWOOD RETARDING BASIN
Springfield
Union
Vandalia
Englewood
CLARK
Fairborn
HUFFMAN RETARDING BASIN
Dayton
Eaton
MONTGOMERY
Moraine
Oakwood
Kettering
PREBLE
W. Carrollton
GREENE
GERMANTOWN RETARDING BASIN
Miamisburg
Centerville
Germantown
ACTON LAKE
Franklin
Oxford
Middletown
BUTLER
Hamilton
Monroe
WARREN
Fairfield
HAMILTON
Cincinnati
Toledo
Cleveland
Columbus
Dayton
Cincinnati
PROJECT AREA
PHASE II
GREAT MIAMI RIVER BASIN
FIGURE 1
000032
MILES
18614

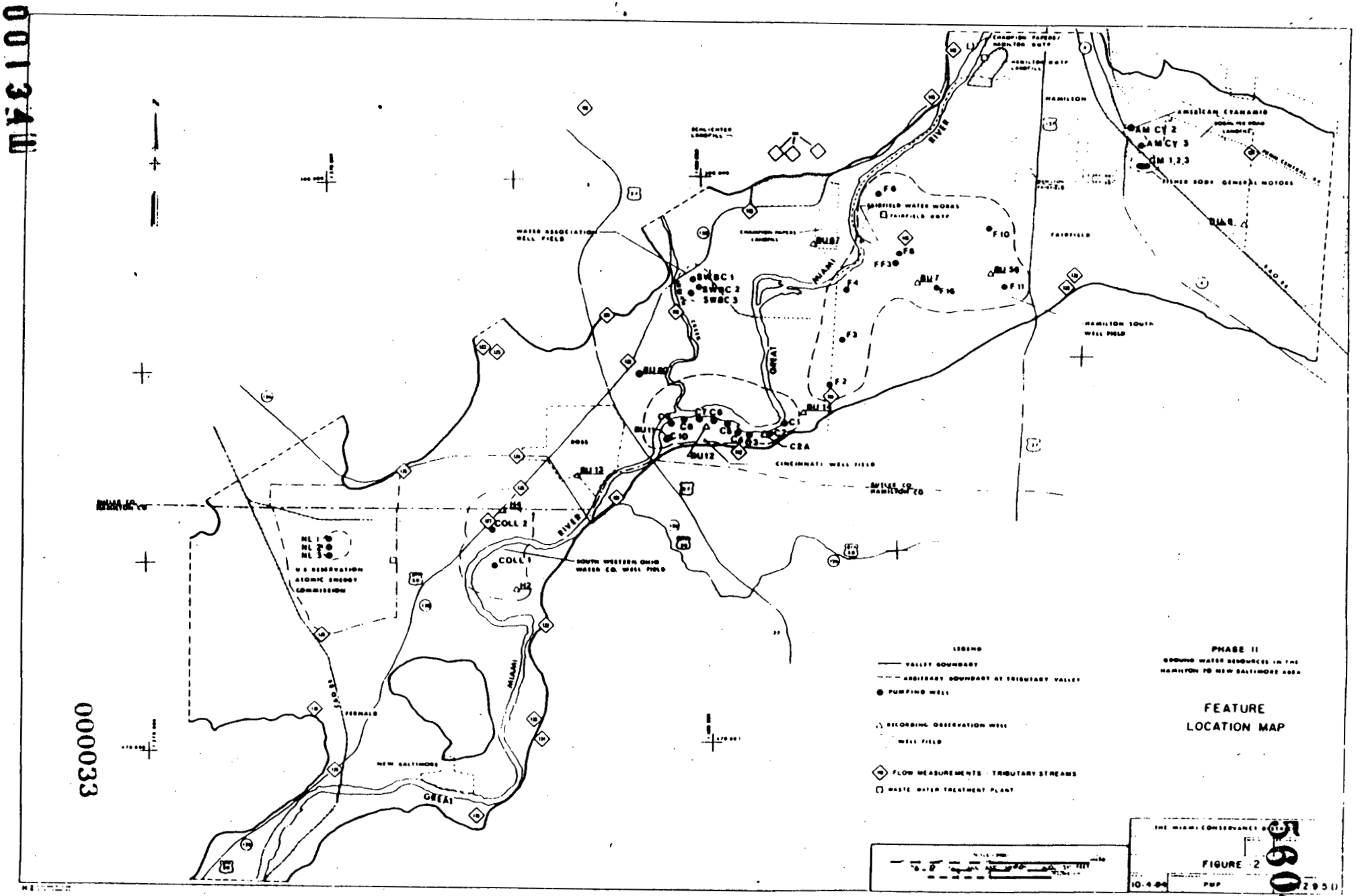

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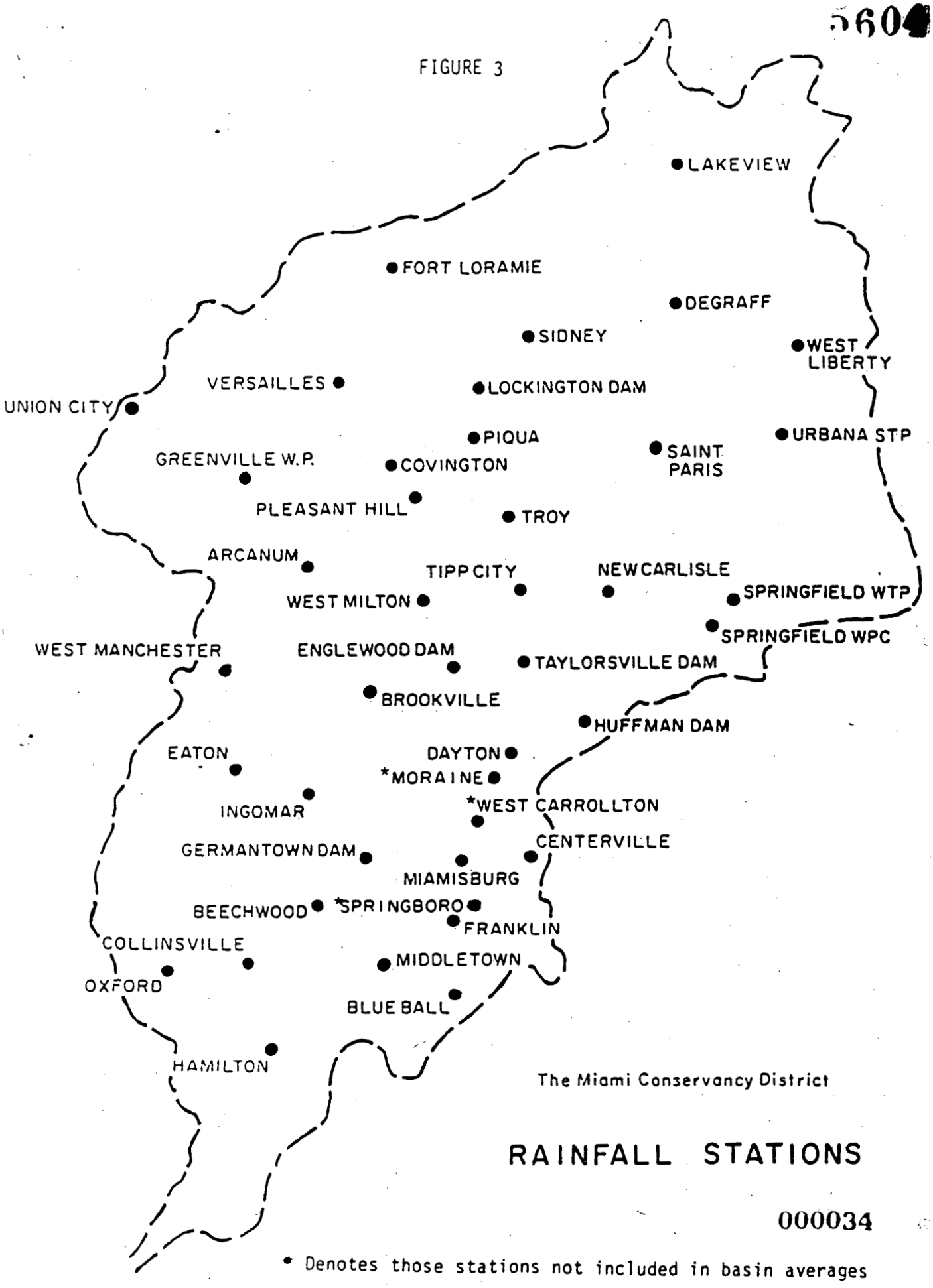
FIGURE 3



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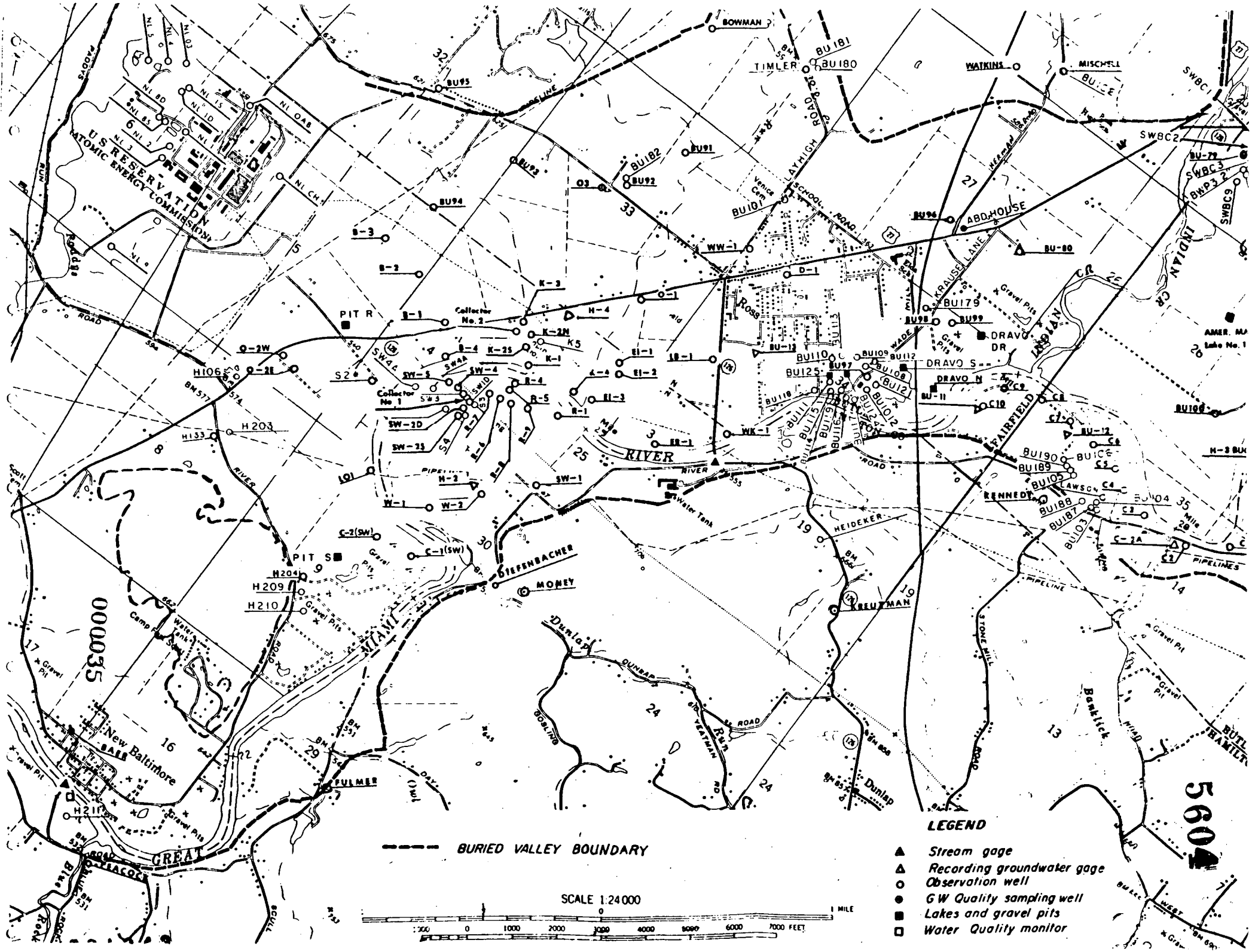
* Denotes those stations not included in basin averages



BURIED VALLEY BOUNDARY
LEGEND
Stream gage
Recording groundwater gage
Observation well
G W Quality sampling well
Lakes and gravel pits
Water Quality monitor
SCALE 1:24000
1 MILE
7000 FEET
US RESERVATION
ATOMIC ENERGY COMMISSION
BOWMAN
TIMLER
WATKINS
MISCHELL
ABD HOUSE
KRAUSE LANE
DRAVO DR
DRAVO S
DRAVO N
PIT R
PIT S
Collector No. 2
Collector No. 1
Water Tank
DIEFENBACHER
MONEY
FULMER
New Baltimore
BAER
PEACOCK
REUTMAN
KENNEDY
LAWSON
FAIRFIELD
INDIAN CR
MIAMI
RIVER
GREAT
Dunlap
Banklick
Gravel Pits
Camp Fox Scout
Water Tank
PIPELINES
PIPELINE
STONE MILL
HEIDEKER
SCHOOL ROAD
LAYHIGH ROAD
DUNLAP ROAD
YEATMAN RD
BOBLING
Venice Cem
Ross
Owl
000035
5604

FIGURE 5

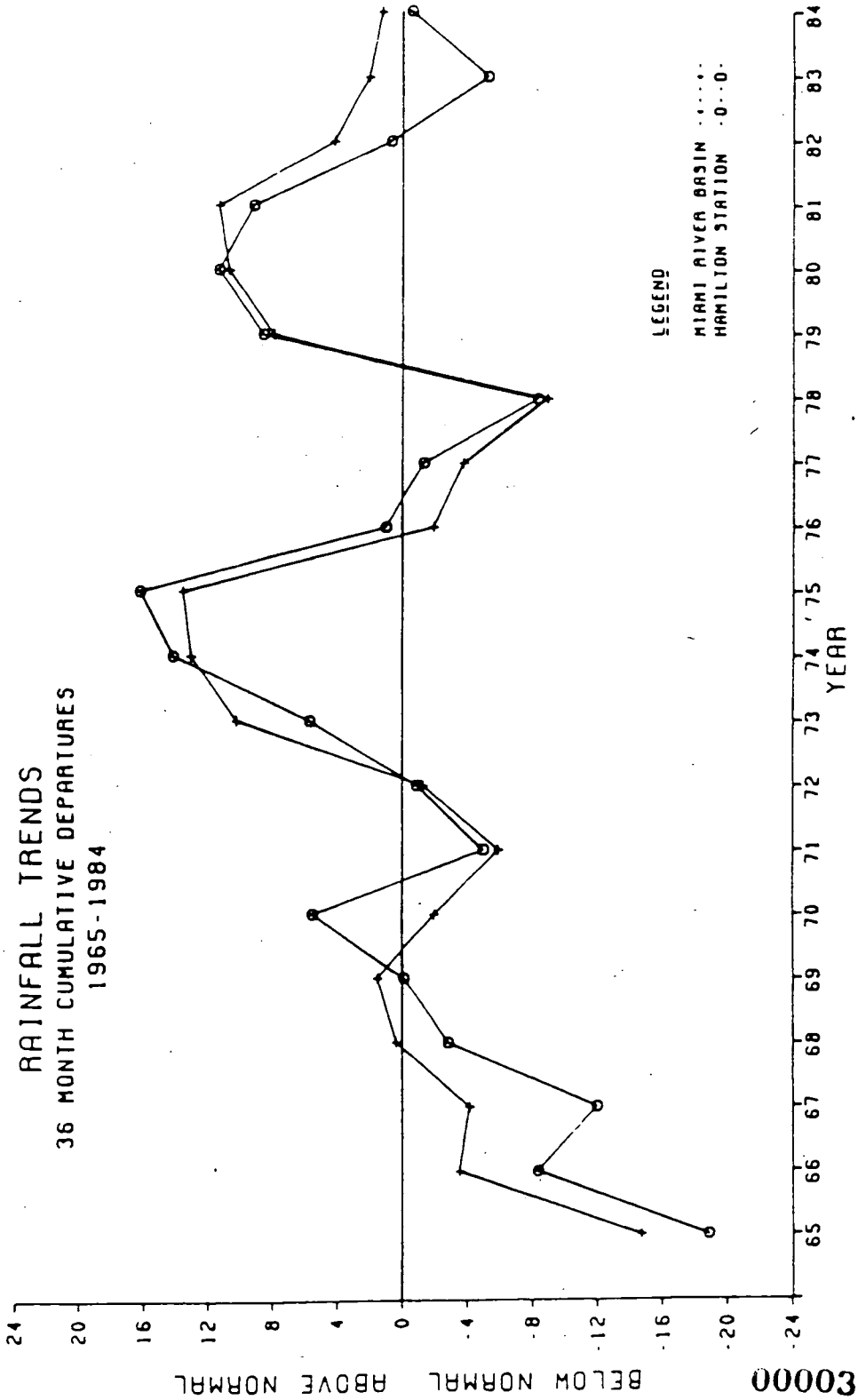

RAINFALL TRENDS
36 MONTH CUMULATIVE DEPARTURES
1965-1984
LEGEND
MIAMI RIVER BASIN
HAMILTON STATION
YEAR
65
66
67
68
69
70
71
72
73
74
'75
76
77
78
79
80
81
82
83
84
24
20
16
12
8
4
0
-4
-8
-12
-16
-20
-24
ABOVE NORMAL
BELOW NORMAL

FIGURE 6

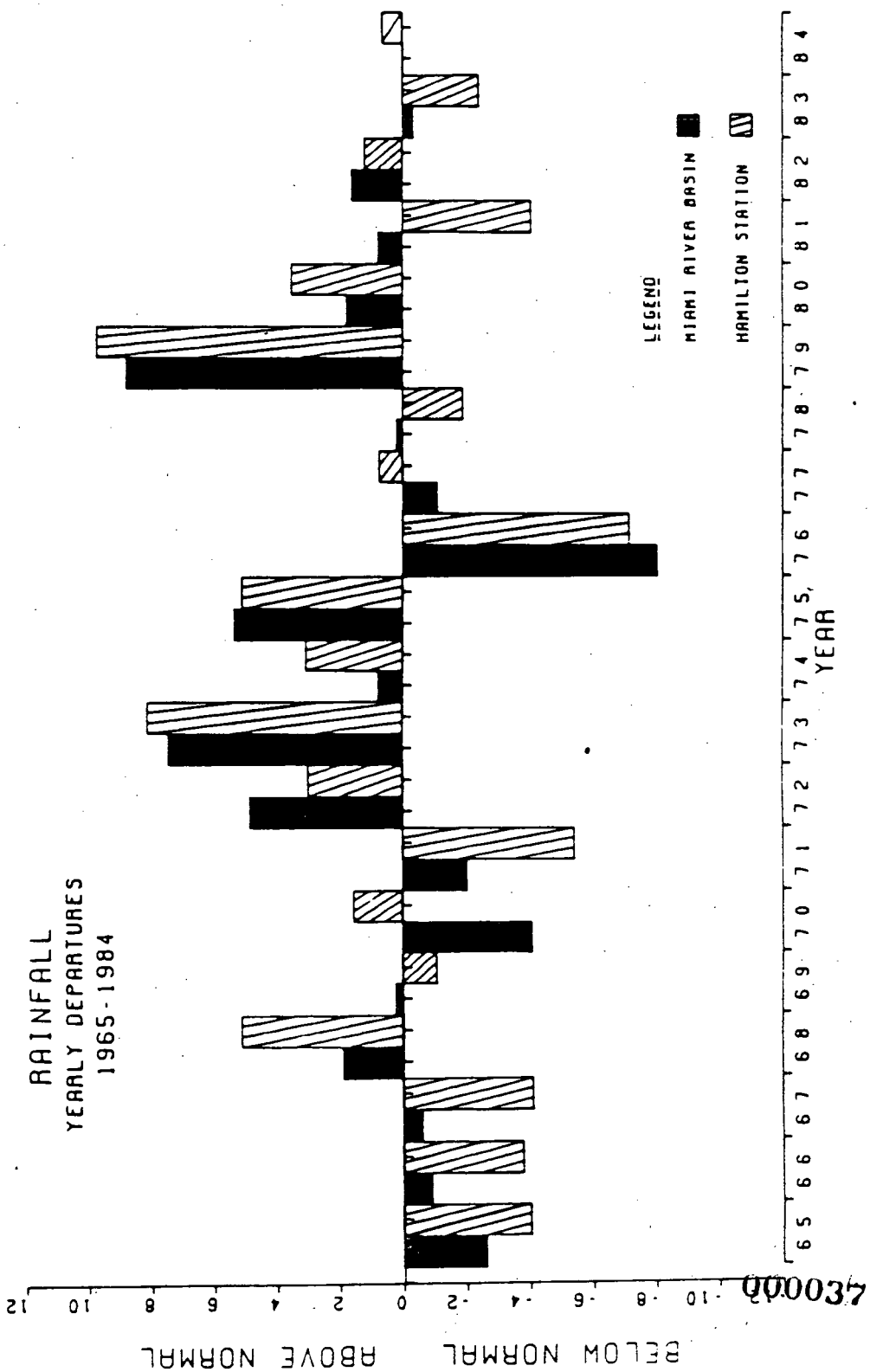


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FIGURE 7

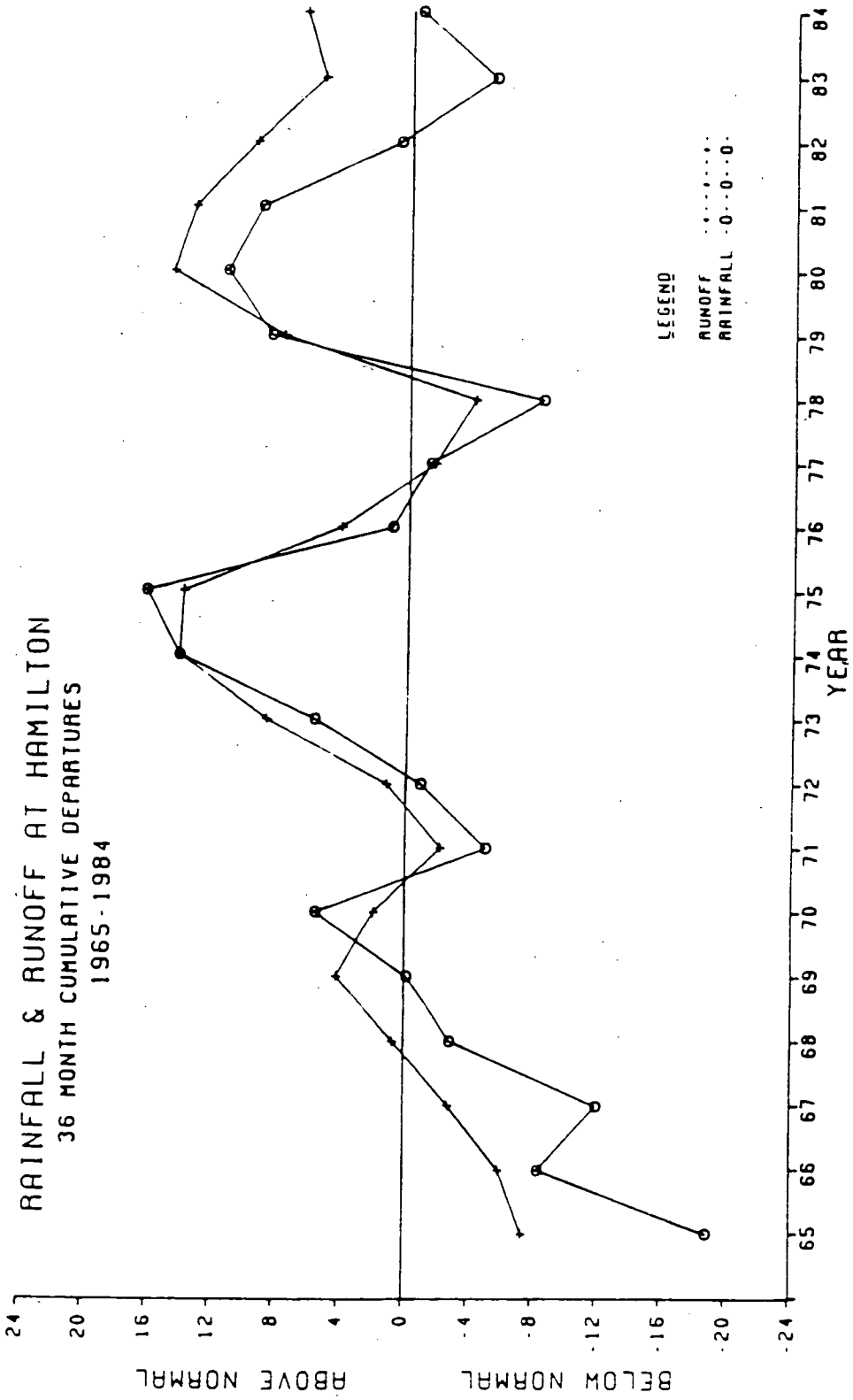
RAINFALL & RUNOFF AT HAMILTON
36 MONTH CUMULATIVE DEPARTURES
1965-1984
ABOVE NORMAL
BELOW NORMAL
24
20
16
12
8
4
0
-4
-8
-12
-16
-20
-24
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
YEAR
LEGEND
RUNOFF
RAINFALL

FIGURE 8

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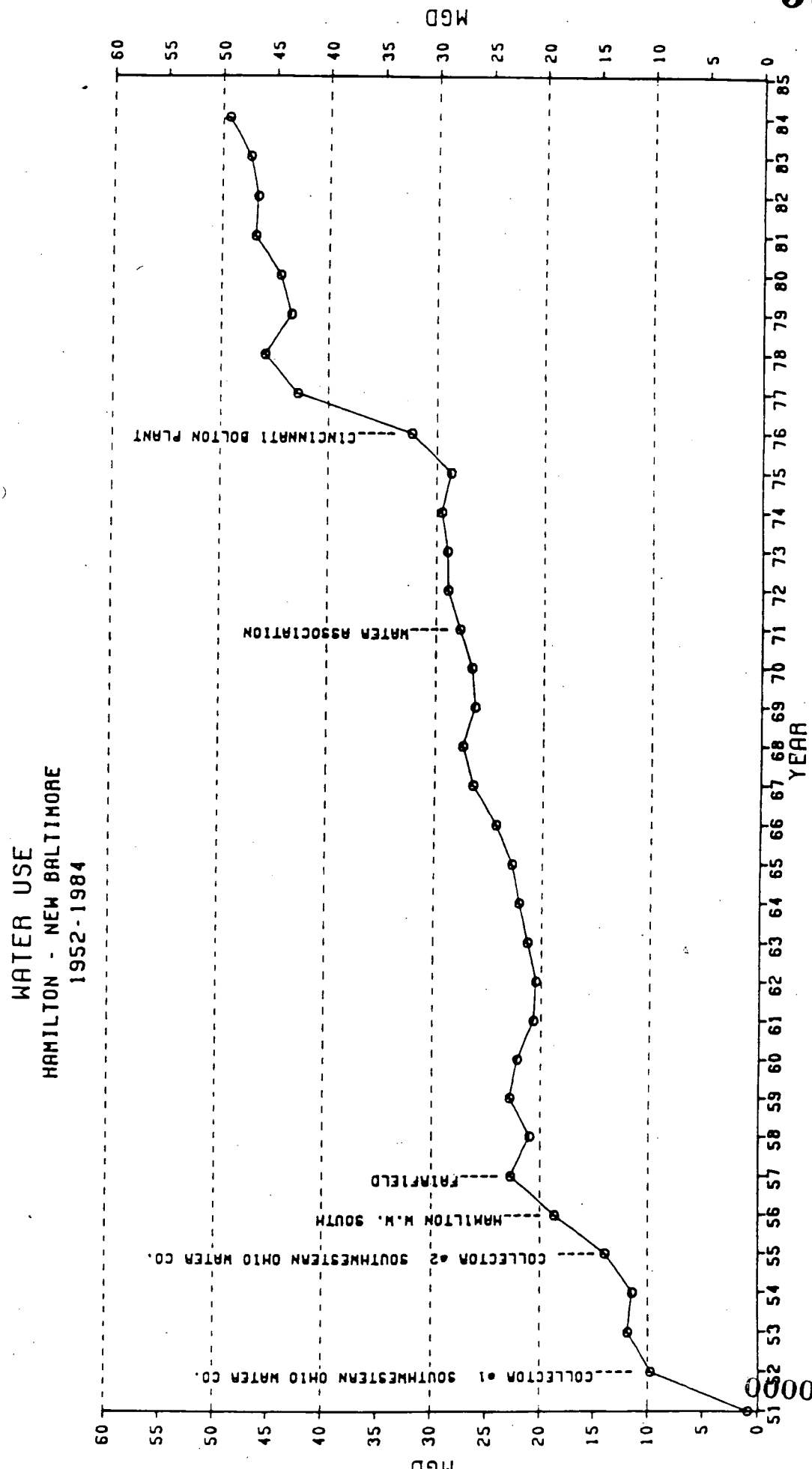

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Range in Groundwater Elevation
Observation Well BU 7

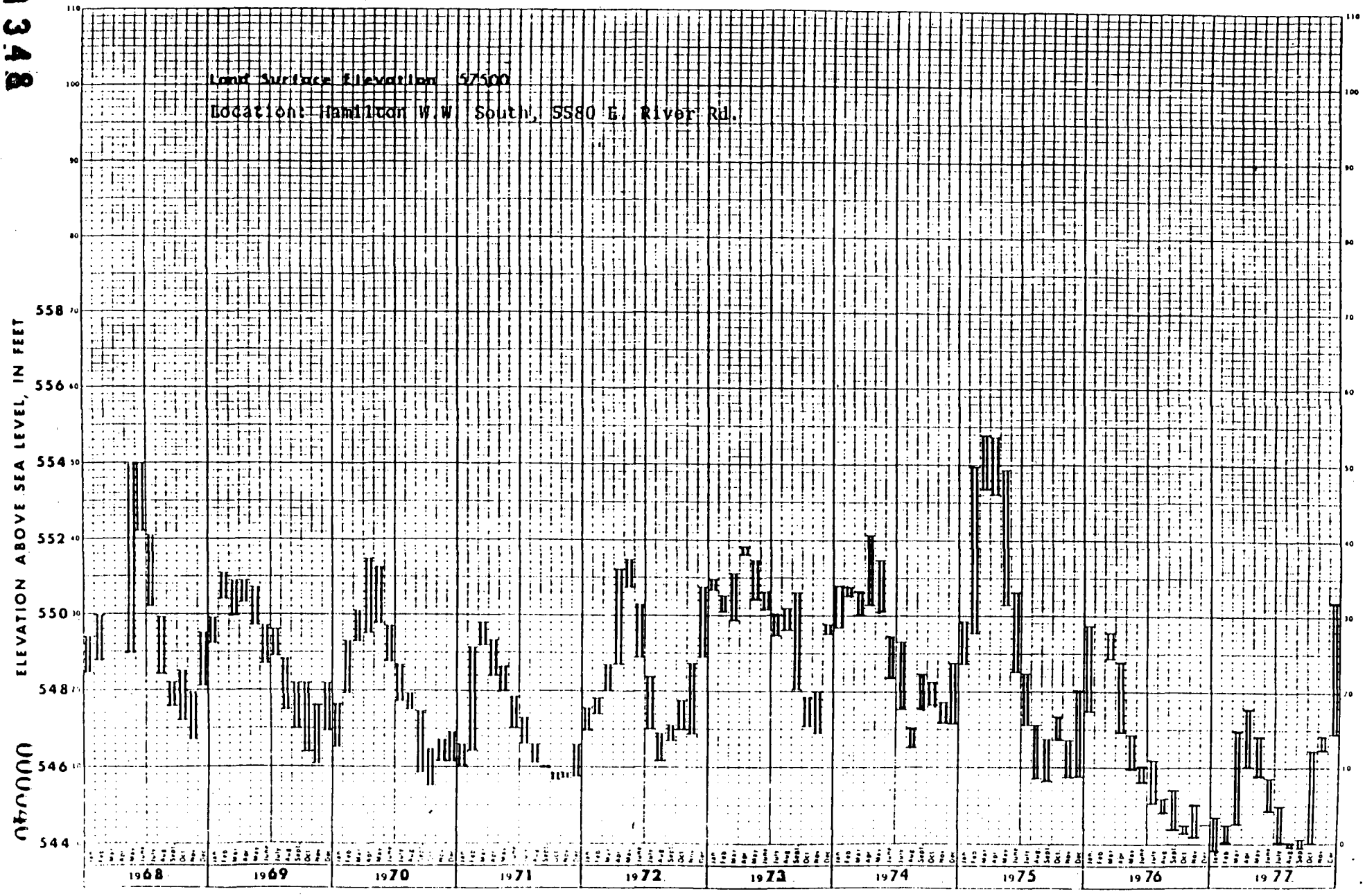

FIGURE 9

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FIGURE 10

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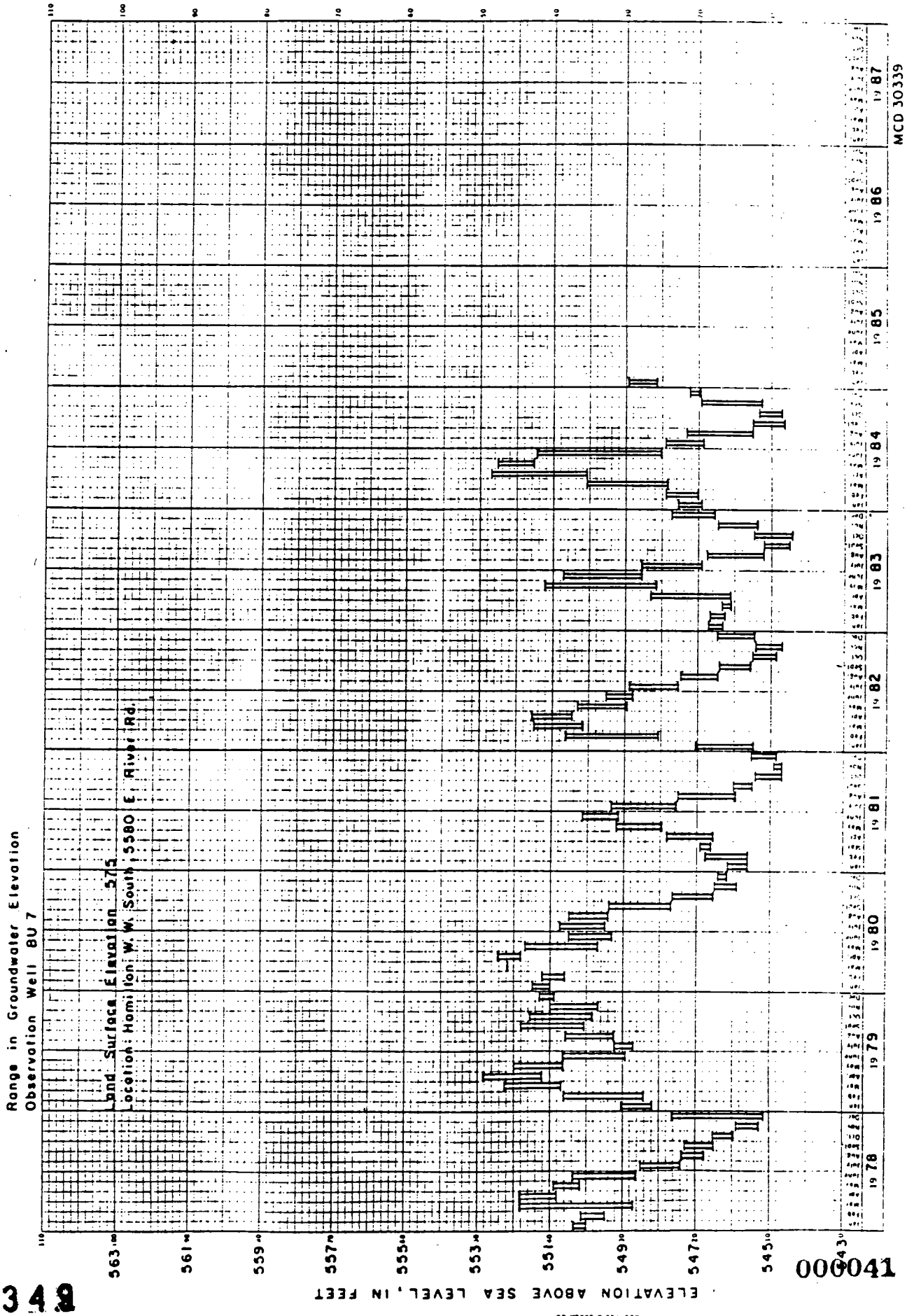

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FIGURE 11

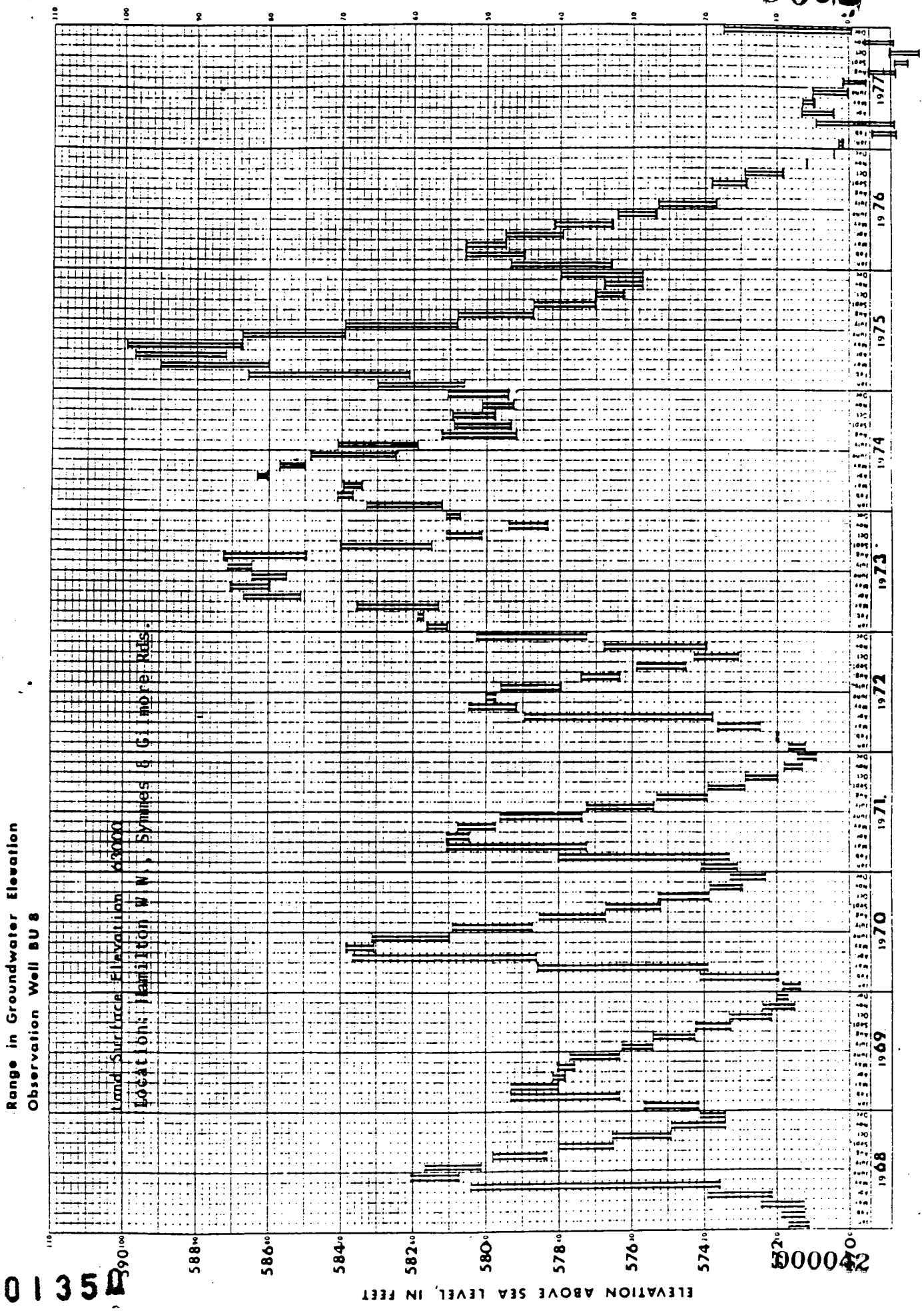
Range in Groundwater Elevation
Observation Well BU 8
Land Surface Elevation 63000
Location: Hamilton W.W., Symmes & Gilmore Rds.
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
590
588
586
584
582
580
578
576
574
572
570
ELEVATION ABOVE SEA LEVEL, IN FEET

FIGURE 12

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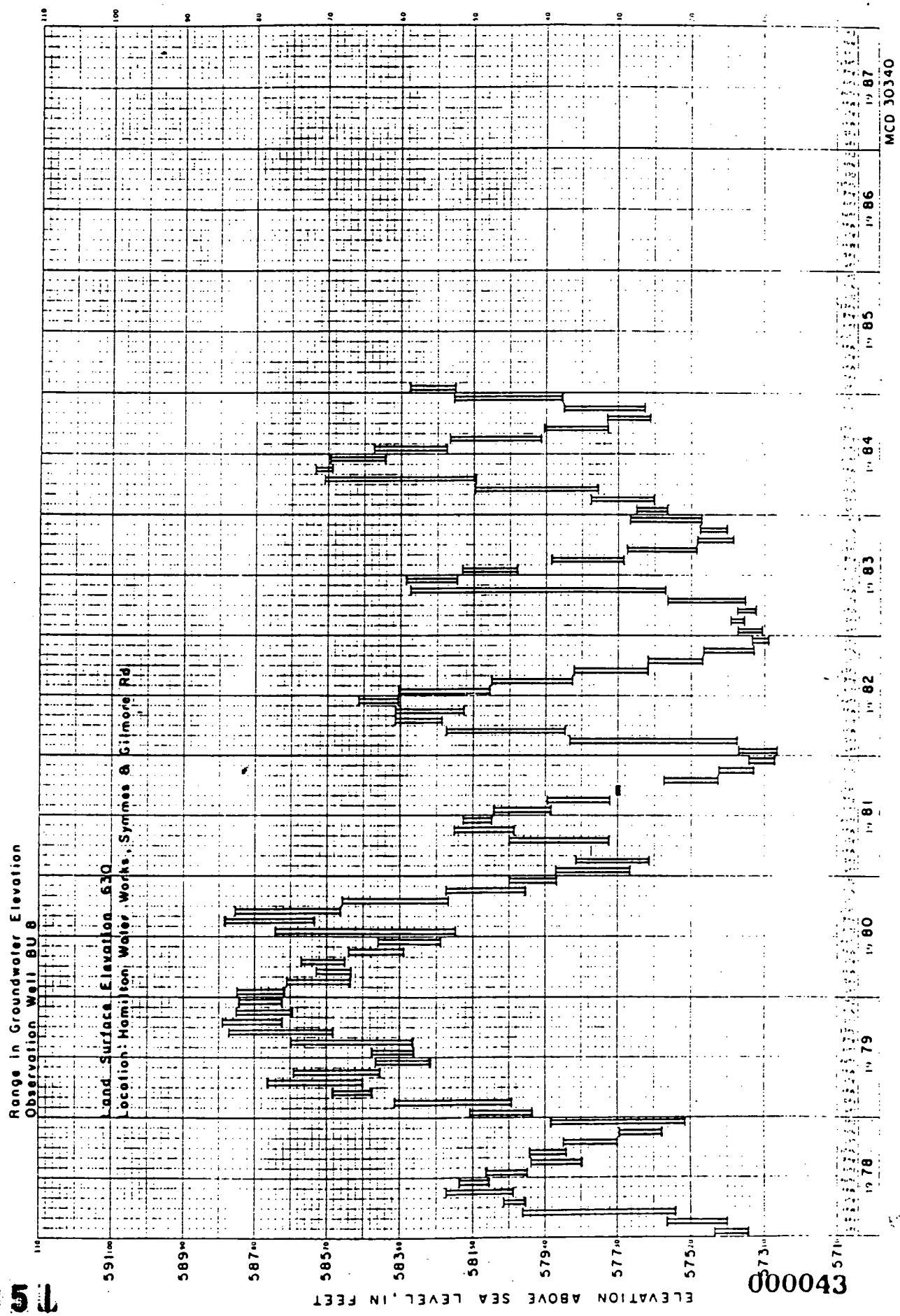

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FIGURE 13

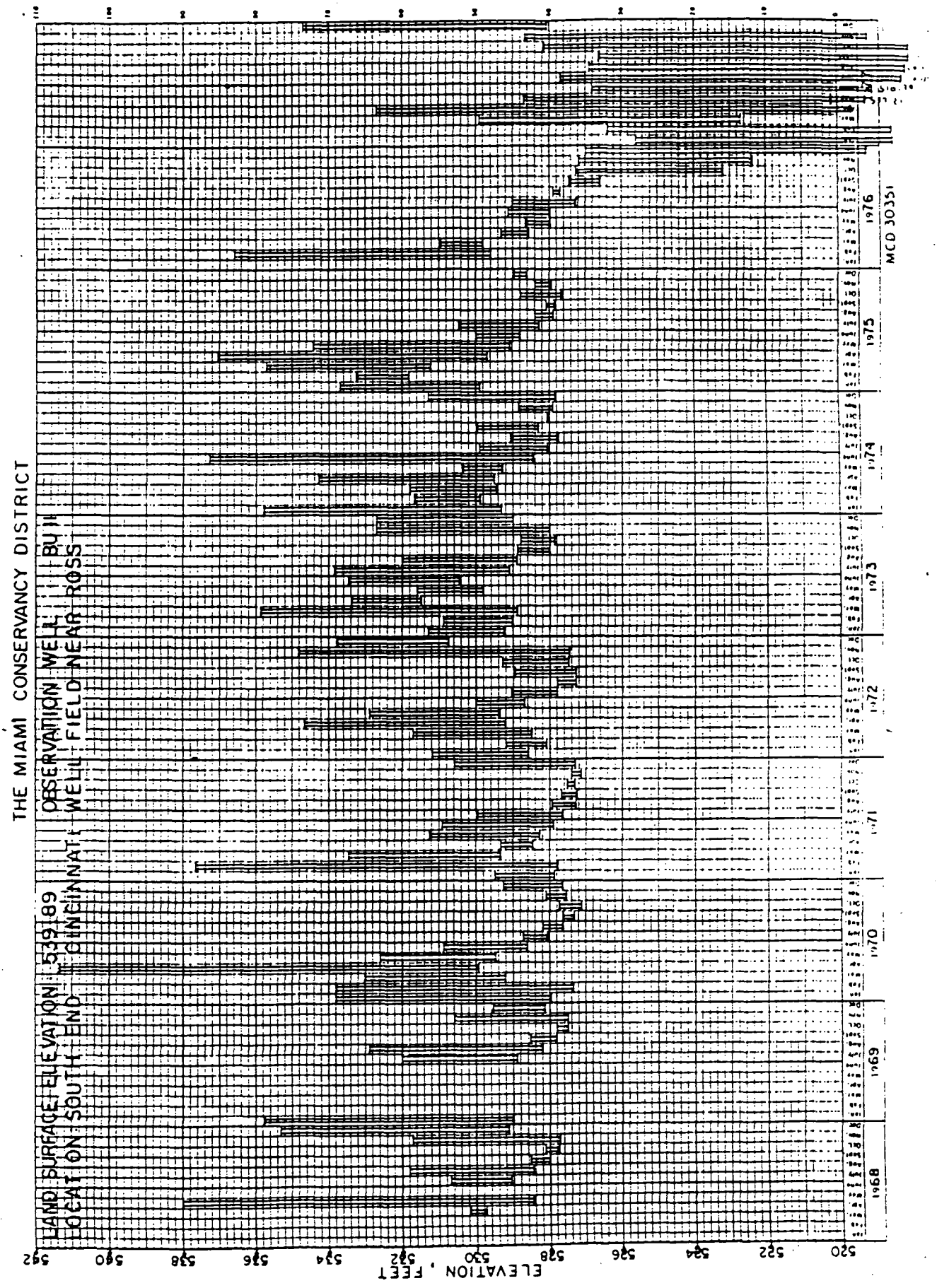
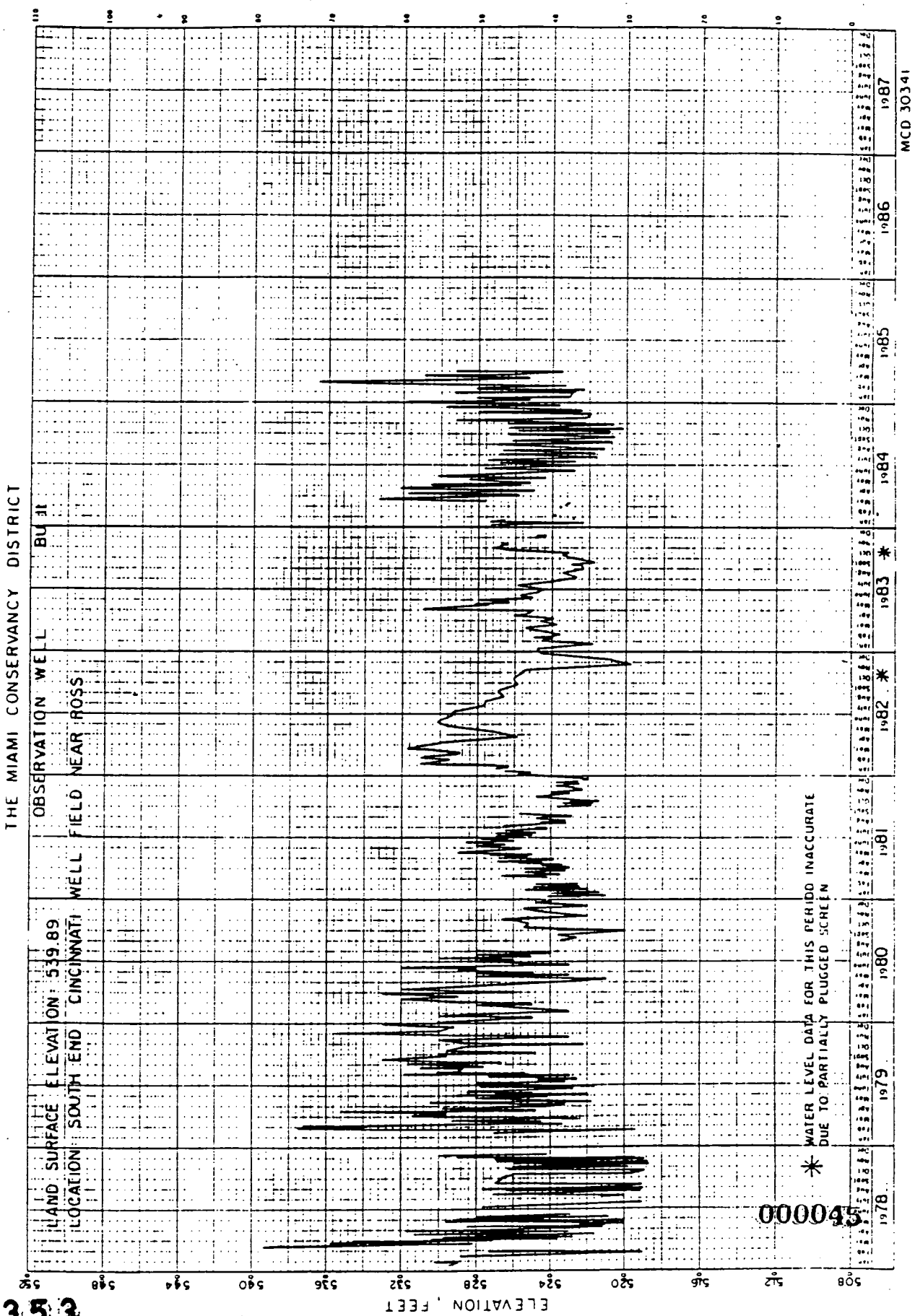

THE MIAMI CONSERVANCY DISTRICT
LAND SURFACE ELEVATION 539.89
OBSERVATION WELL BU 11
LOCATION SOUTH END CINCINNATI WELL FIELD NEAR ROSS
1968
1969
1970
1971
1972
1973
1974
1975
1976
MCD 30351
ELEVATION, FEET
520
522
524
526
528
530
532
534
536
538
590
592

FIGURE 14



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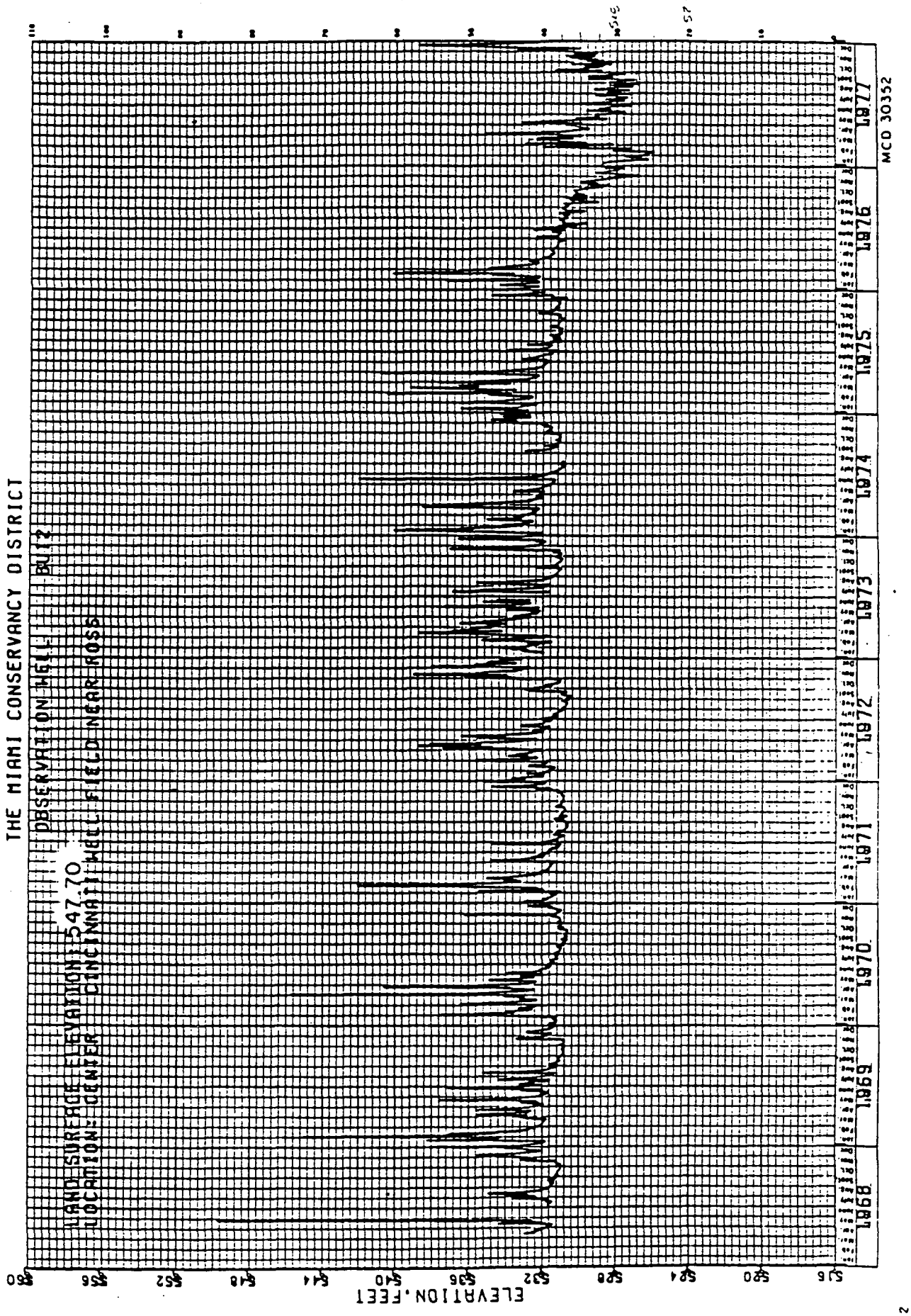
001353

FIGURE 15



BU12

FIGURE 16

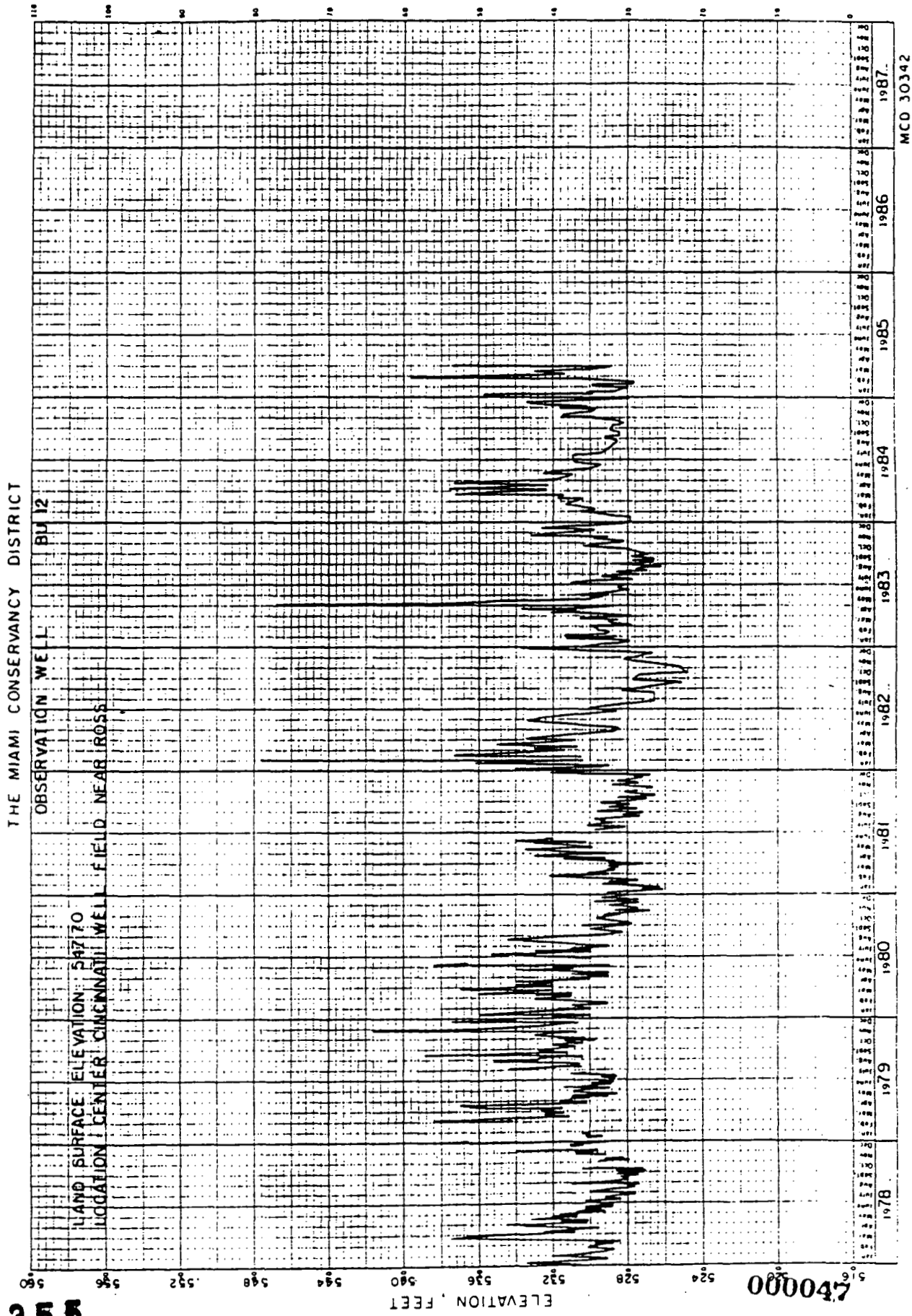
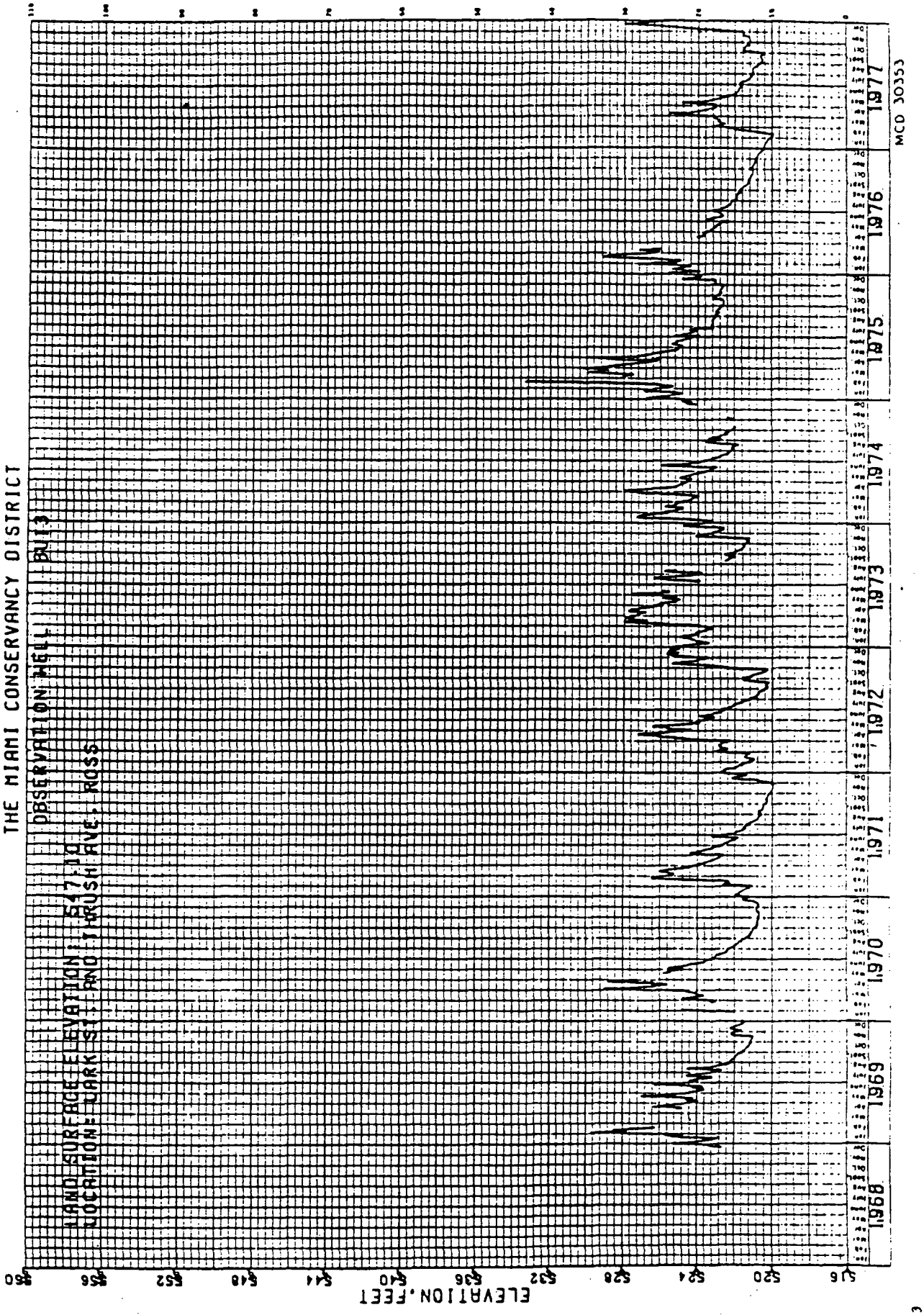

THE MIAMI CONSERVANCY DISTRICT
OBSERVATION WELL BU 12
LAND SURFACE ELEVATION: 547.70
LOCATION: CENTER CINCINNATI WELL FIELD NEAR ROSS
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
ELEVATION, FEET
516
520
524
528
532
536
540
544
548
552
556
560
MCO 30342

FIGURE 17

5604



000048

001356

FIGURE 18

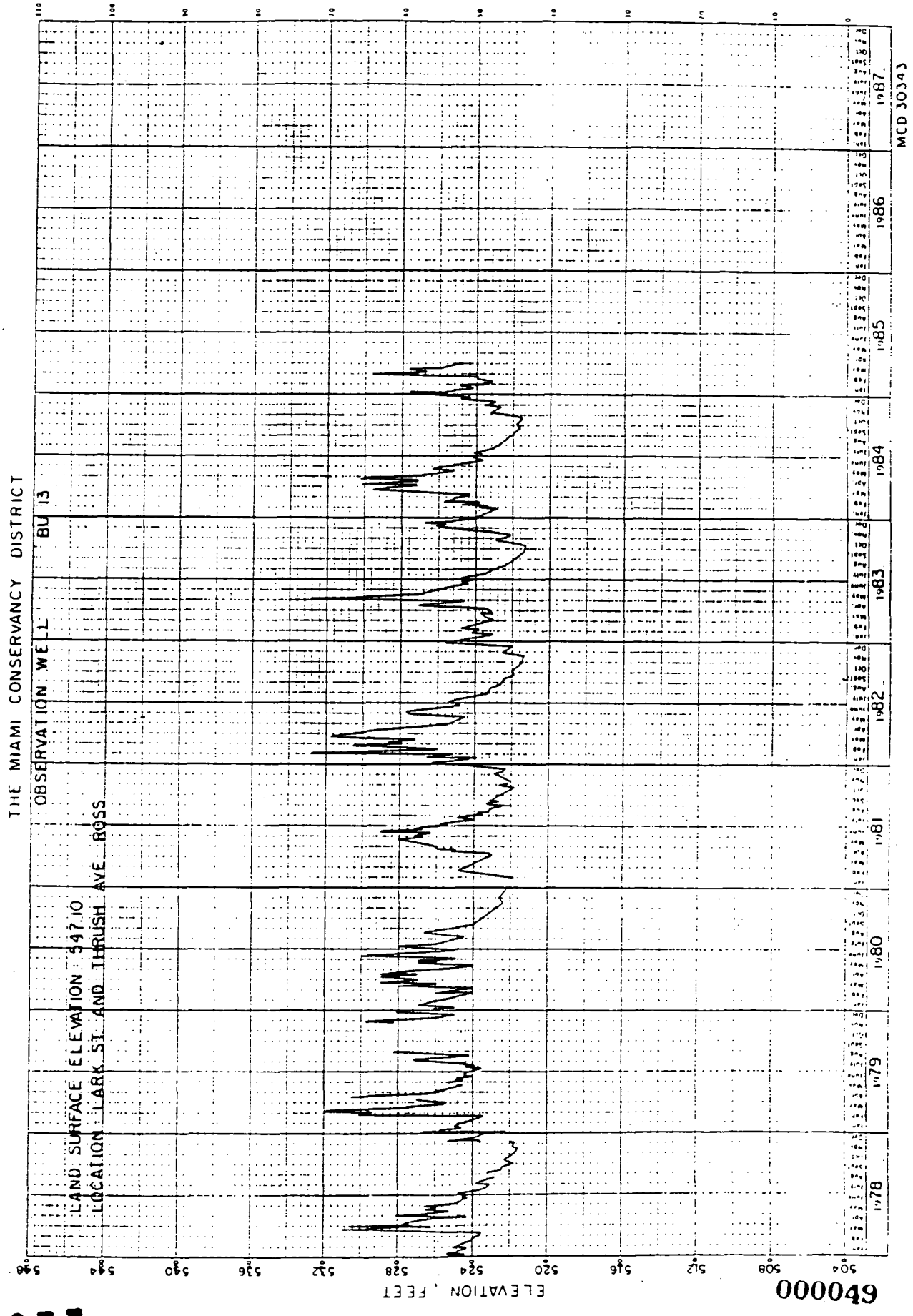
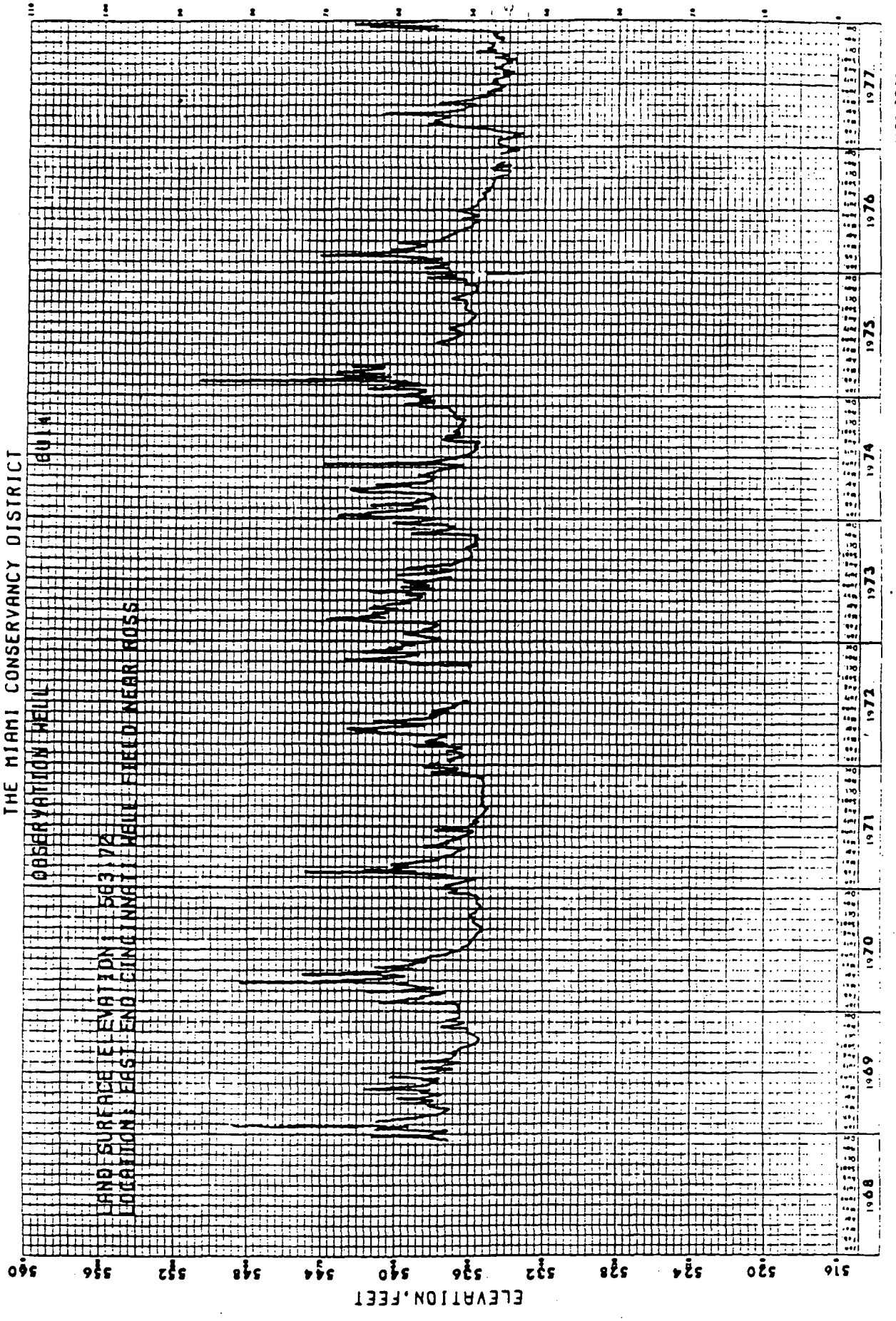

THE MIAMI CONSERVANCY DISTRICT
OBSERVATION WELL BU 13
LAND SURFACE ELEVATION 547.10
LOCATION LARK ST AND THRUSH AVE ROSS
ELEVATION, FEET
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
MCD 30343

FIGURE 19



MCO 30354

FIGURE 20

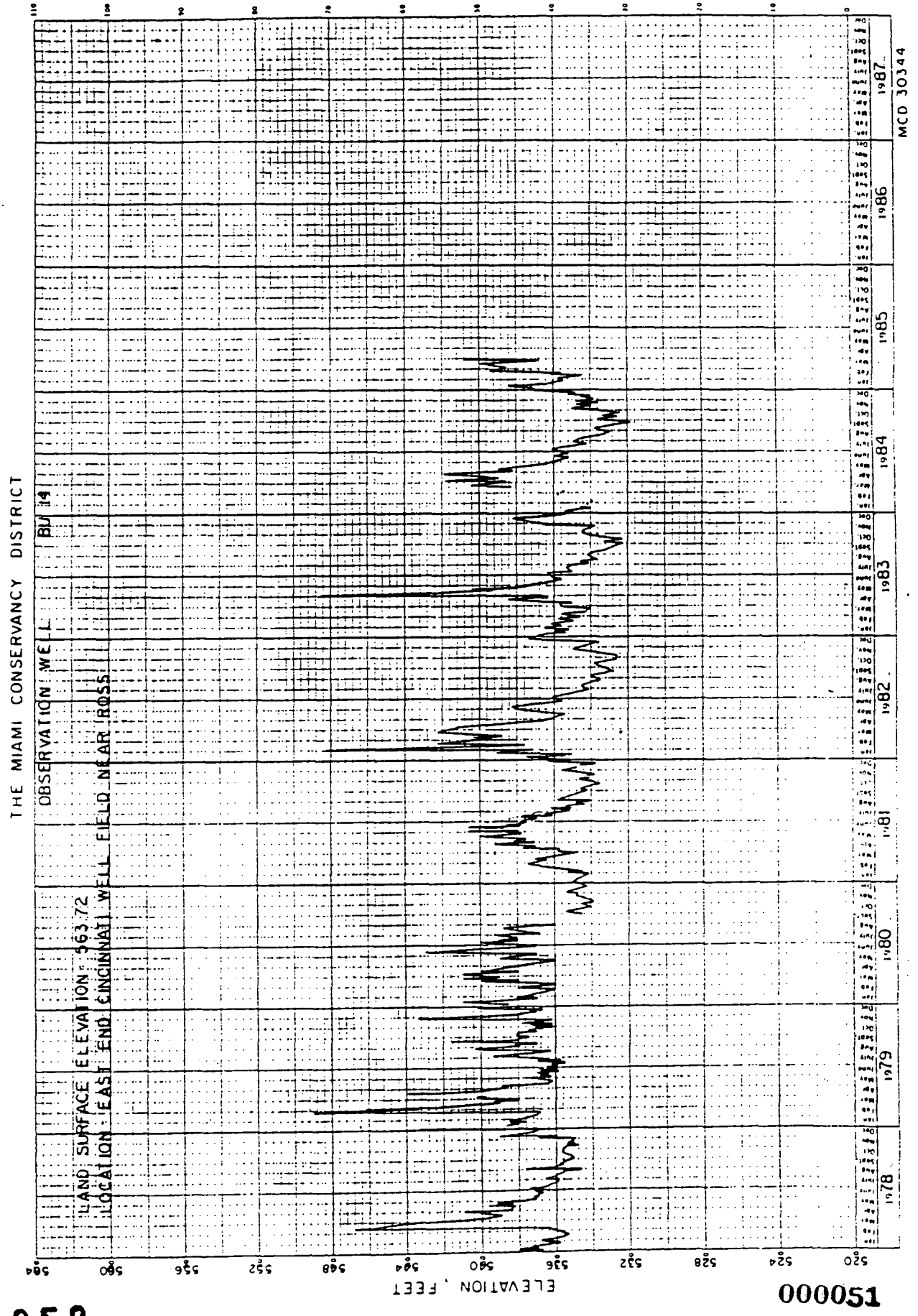
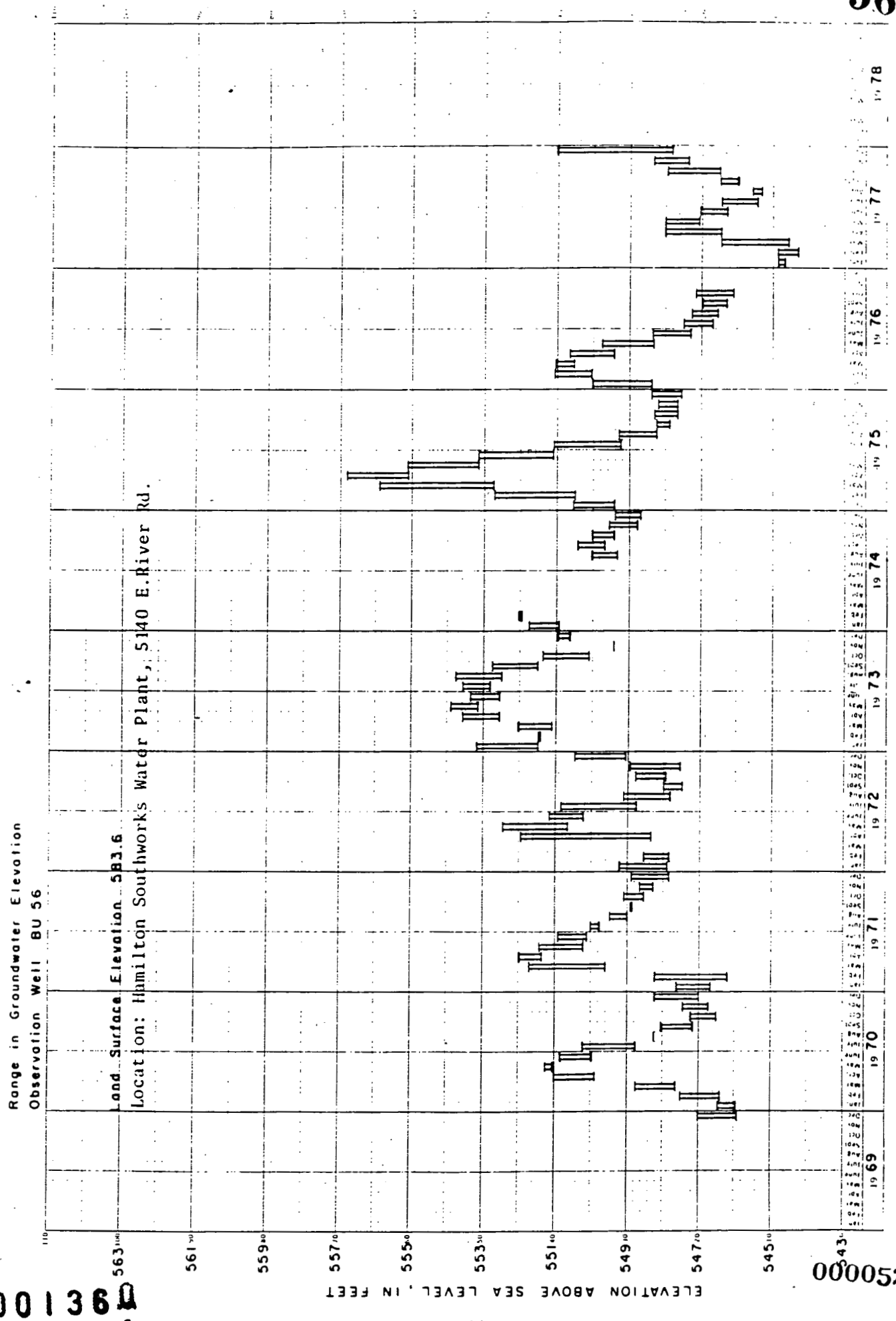

THE MIAMI CONSERVANCY DISTRICT
OBSERVATION WELL BU 14
LAND SURFACE ELEVATION: 563.72
LOCATION: EAST END CINCINNATI WELL FIELD NEAR ROSS
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
MCD 30344
ELEVATION, FEET
520
524
528
532
536
540
544
548
552
556
560
564

FIGURE 21

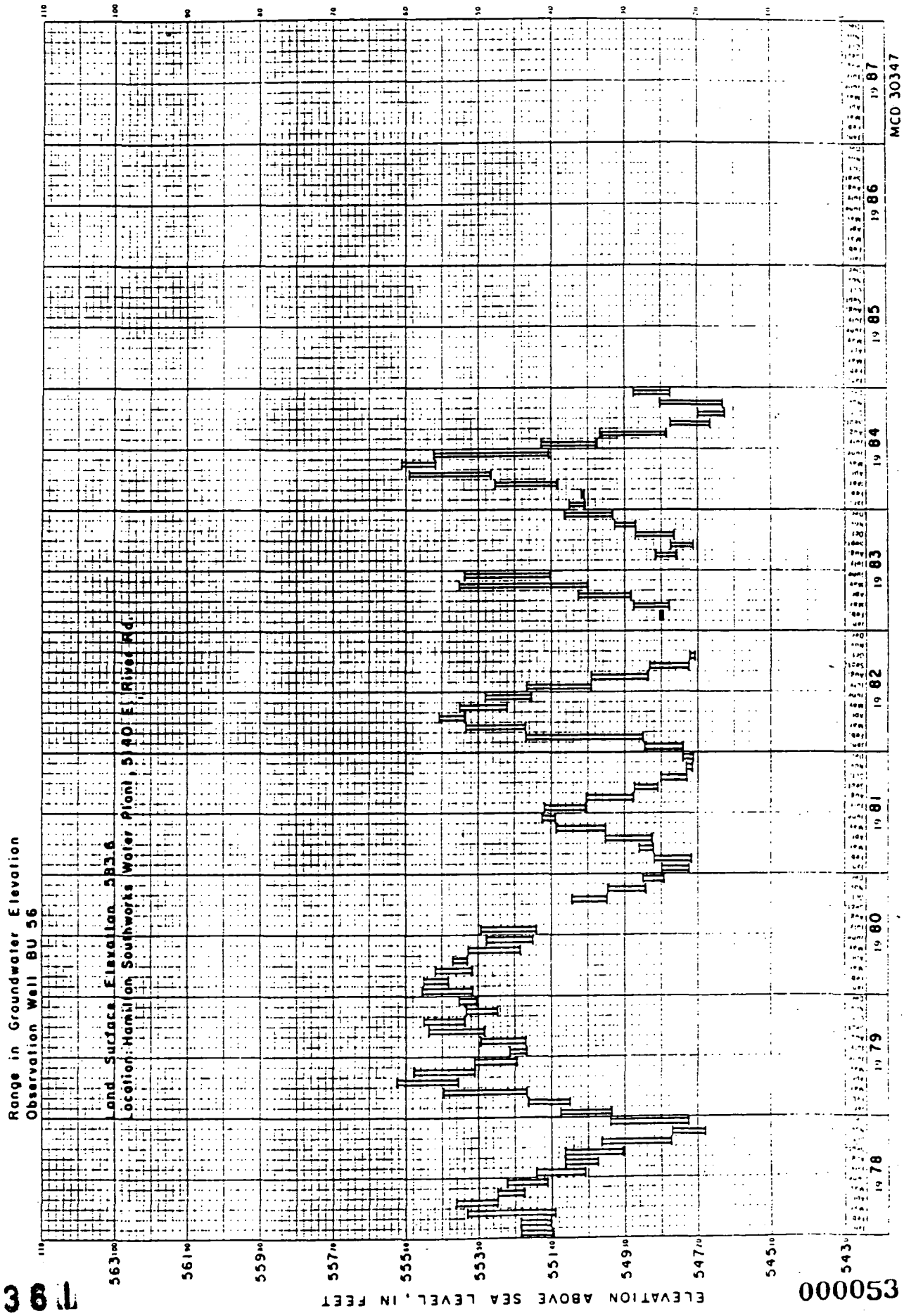
5604



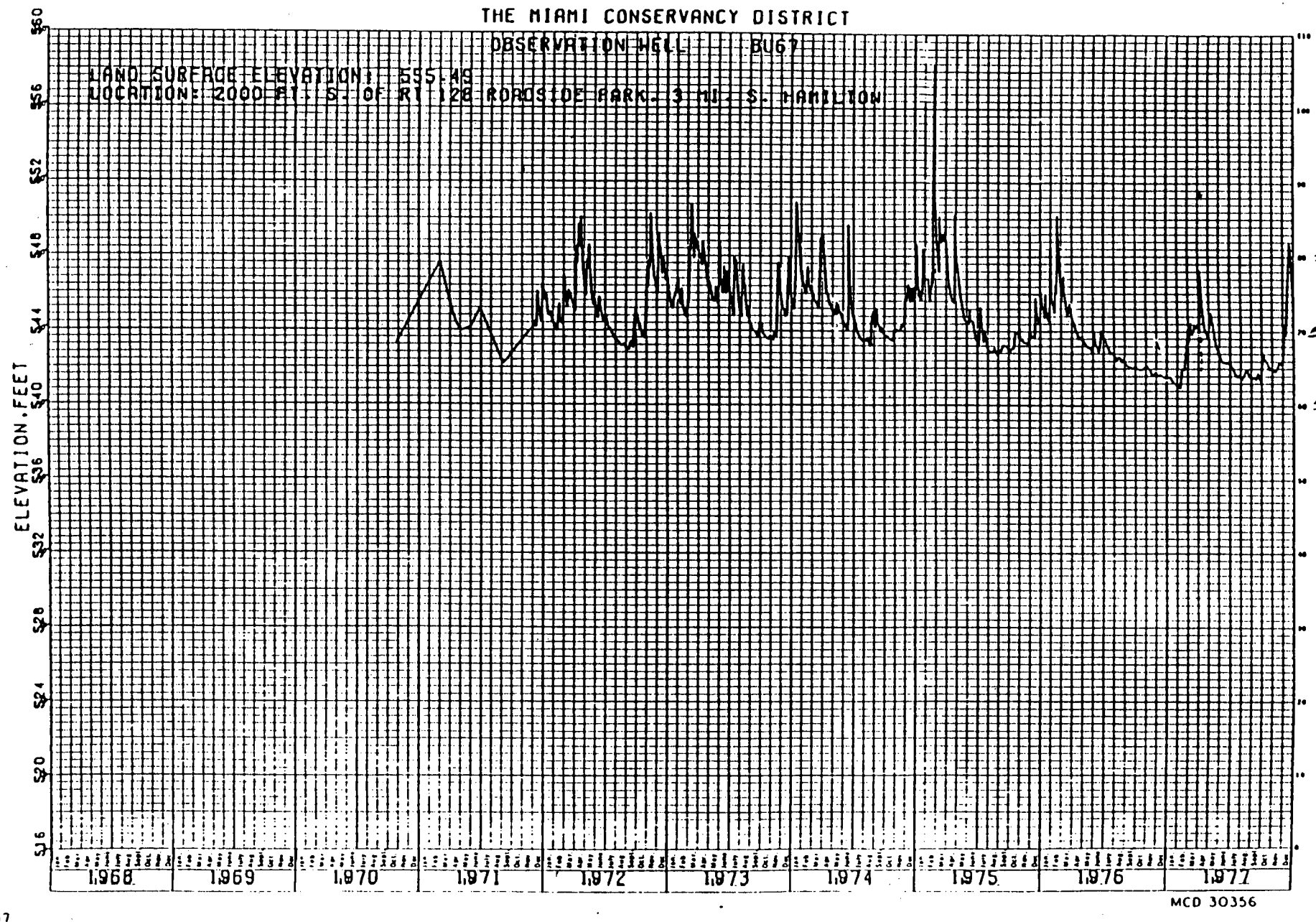
000052

00136

FIGURE 22


Range in Groundwater Elevation
Observation Well BU 56
Land Surface Elevation 583.6
Location: Hamilton Southworks Water Plant, 540 E. River Rd.
ELEVATION ABOVE SEA LEVEL, IN FEET
563.00
561.00
559.00
557.00
555.00
553.00
551.00
549.00
547.00
545.00
543.00
19 78
19 79
19 80
19 81
19 82
19 83
19 84
19 85
19 86
19 87
MCD 30347

001362



000054

BU67

5604

FIGURE 24

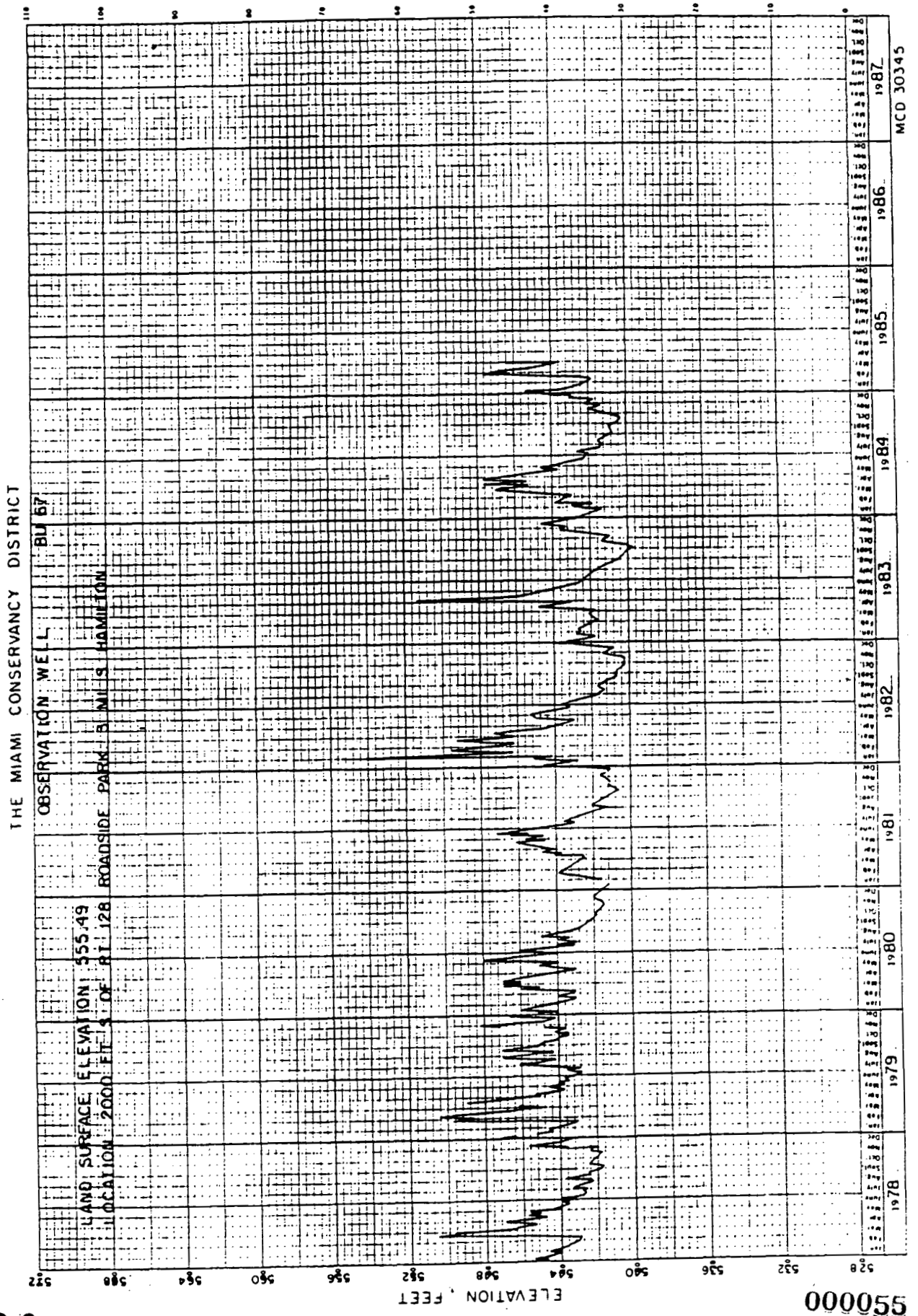
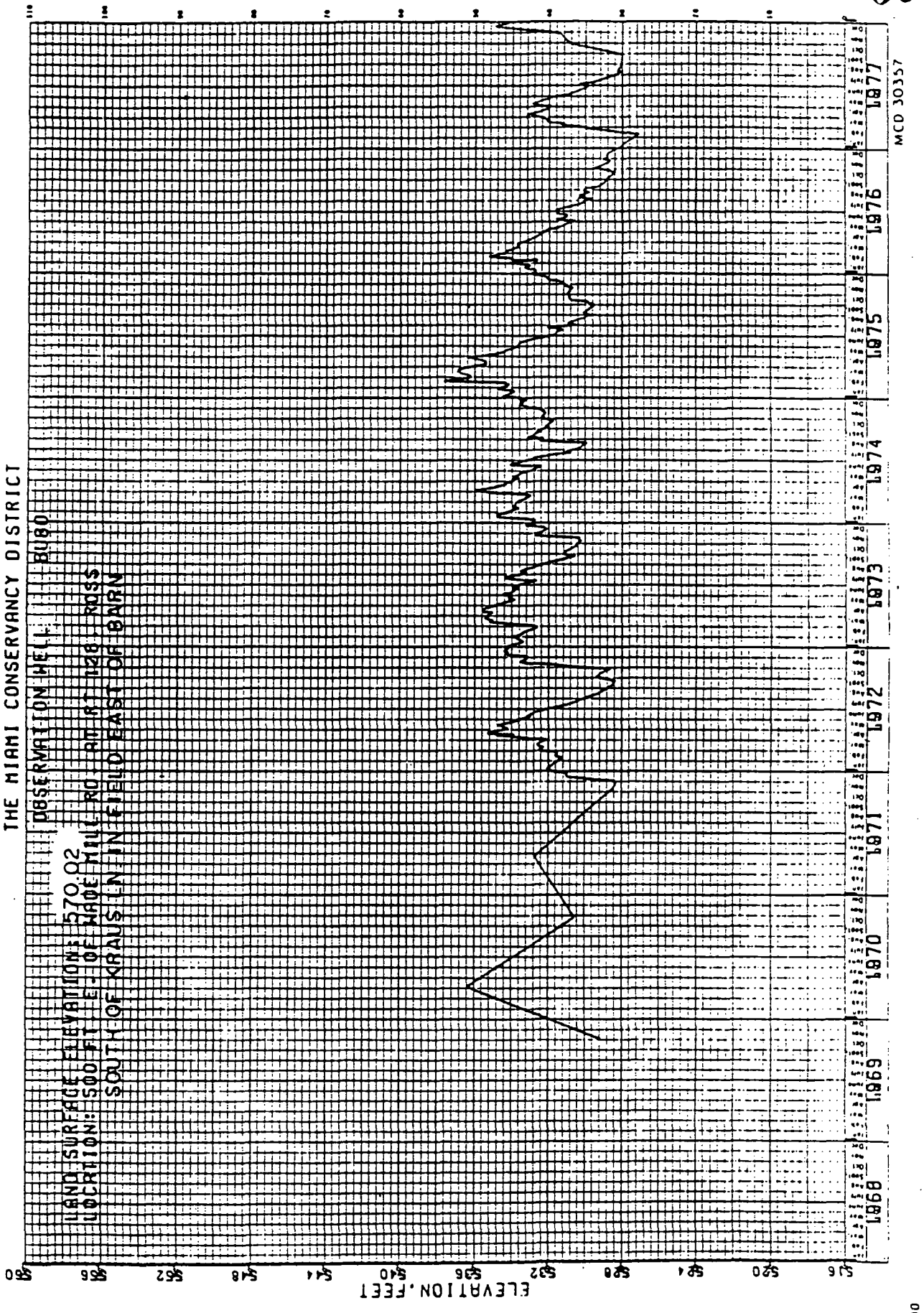

THE MIAMI CONSERVANCY DISTRICT
OBSERVATION WELL BU 67
LAND SURFACE ELEVATION 555.49
LOCATION 2000 FT. S OF RT. 128 ROADSIDE PARK 8 MILS HAMILTON
ELEVATION, FEET
528
532
536
540
544
548
552
556
560
564
568
572
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
MCD 30345

FIGURE 25

5604



000056

001364

FIGURE 26

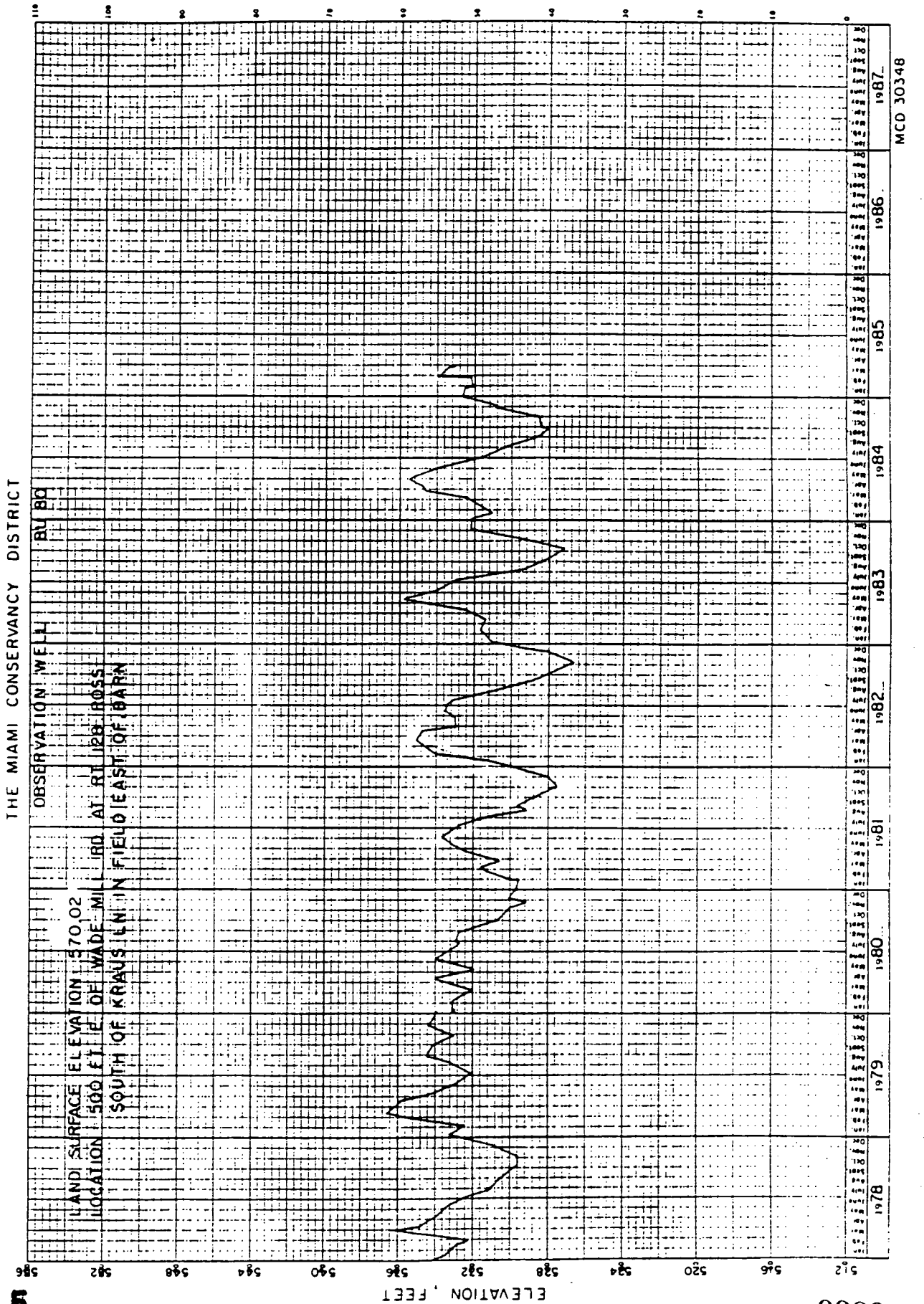

THE MIAMI CONSERVANCY DISTRICT
OBSERVATION WELL BU BQ
LAND SURFACE ELEVATION 570.02
LOCATION 500 FT. E. OF WADE MILL RD. AT RT. 128 ROSS
SOUTH OF KRAUS LN. IN FIELD EAST OF BARN
ELEVATION, FEET
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
MCD 30348

FIGURE 27

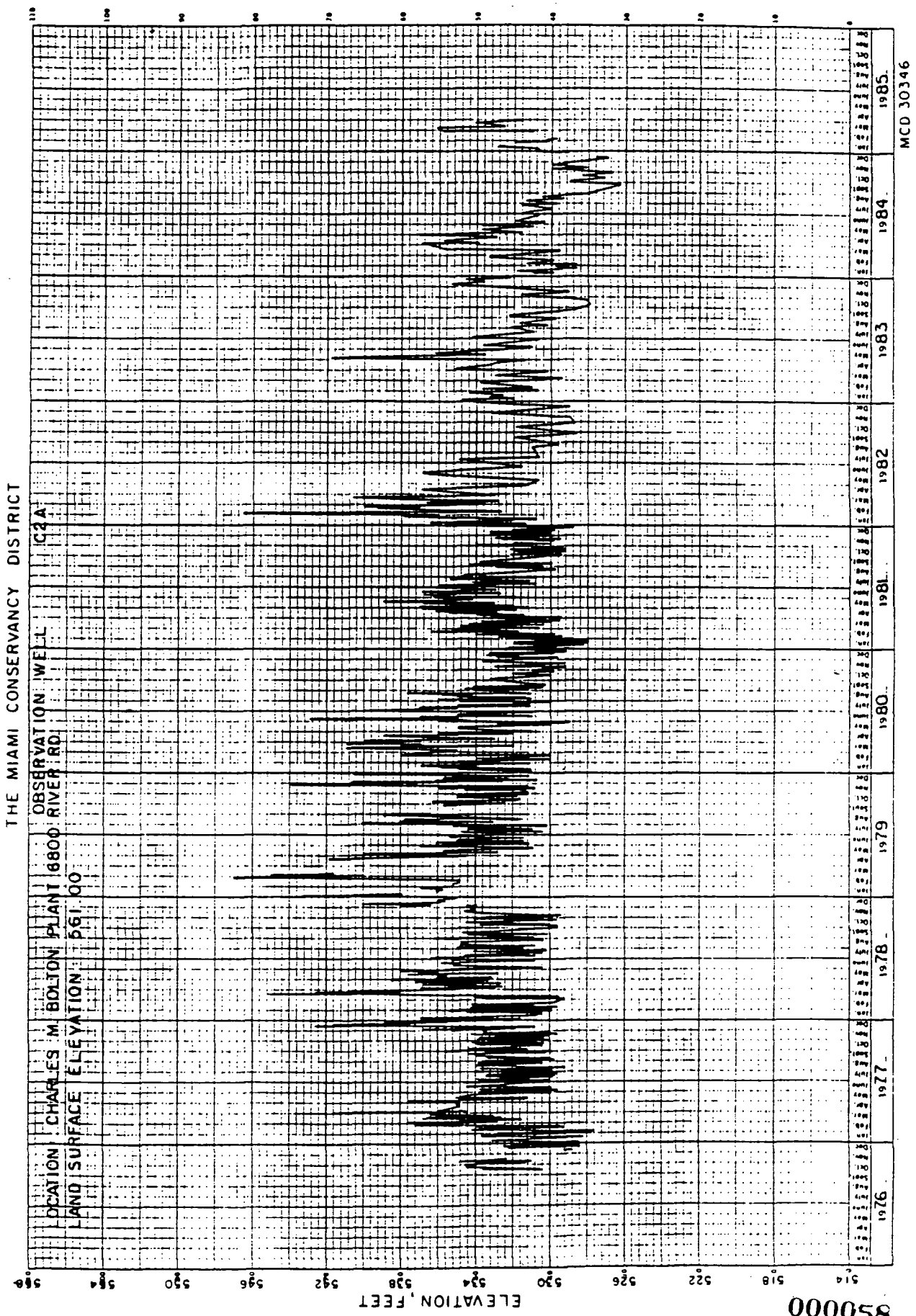
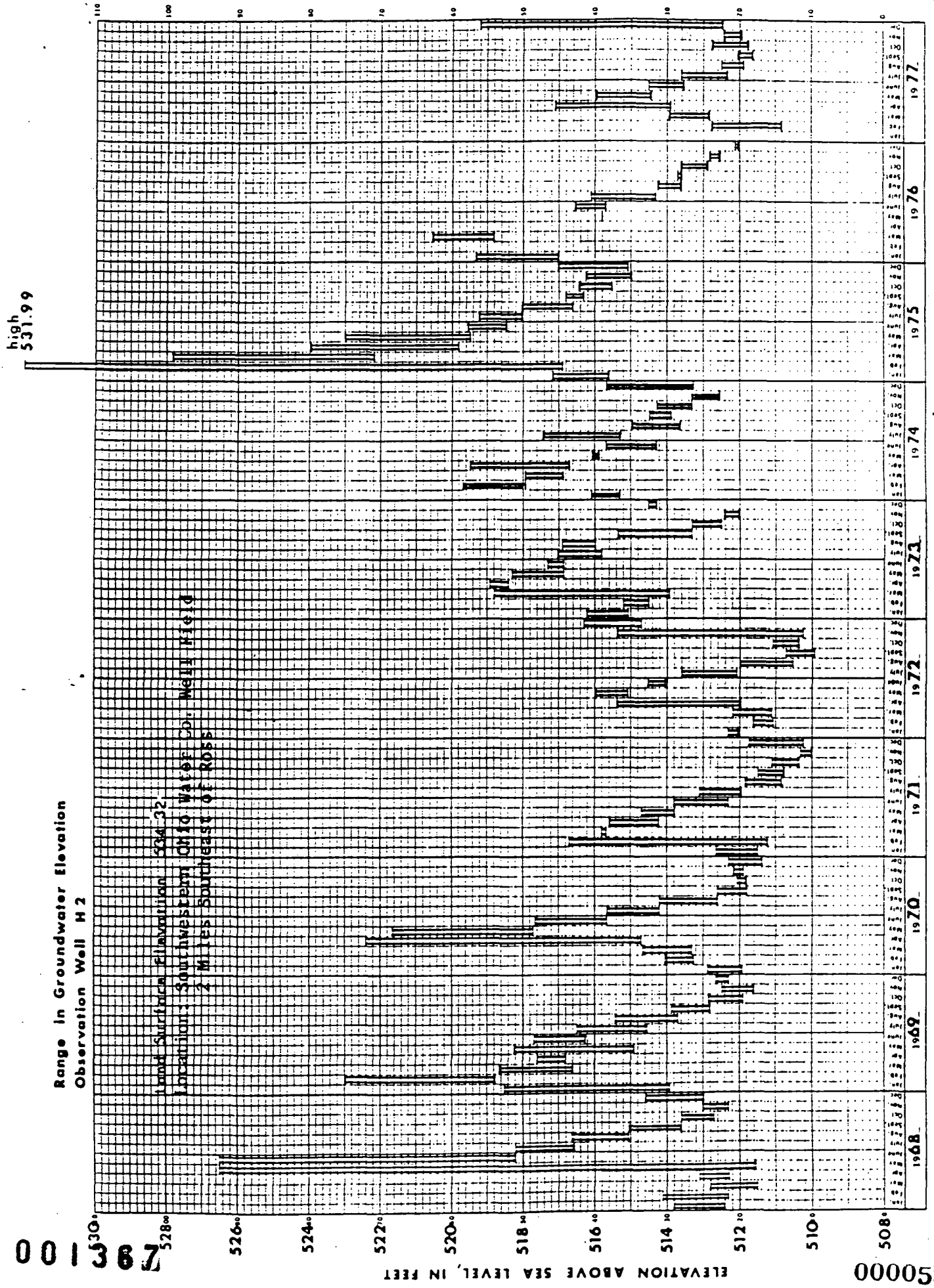

THE MIAMI CONSERVANCY DISTRICT
LOCATION CHARLES M. BOLTON PLANT 6800 RIVER RD.
LAND SURFACE ELEVATION 561.00
OBSERVATION WELL C2A
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
ELEVATION, FEET
514
518
522
526
530
534
538
542
546
550
554
558
MCD 30346

FIGURE 28

5604



001367

000059

FIGURE 29

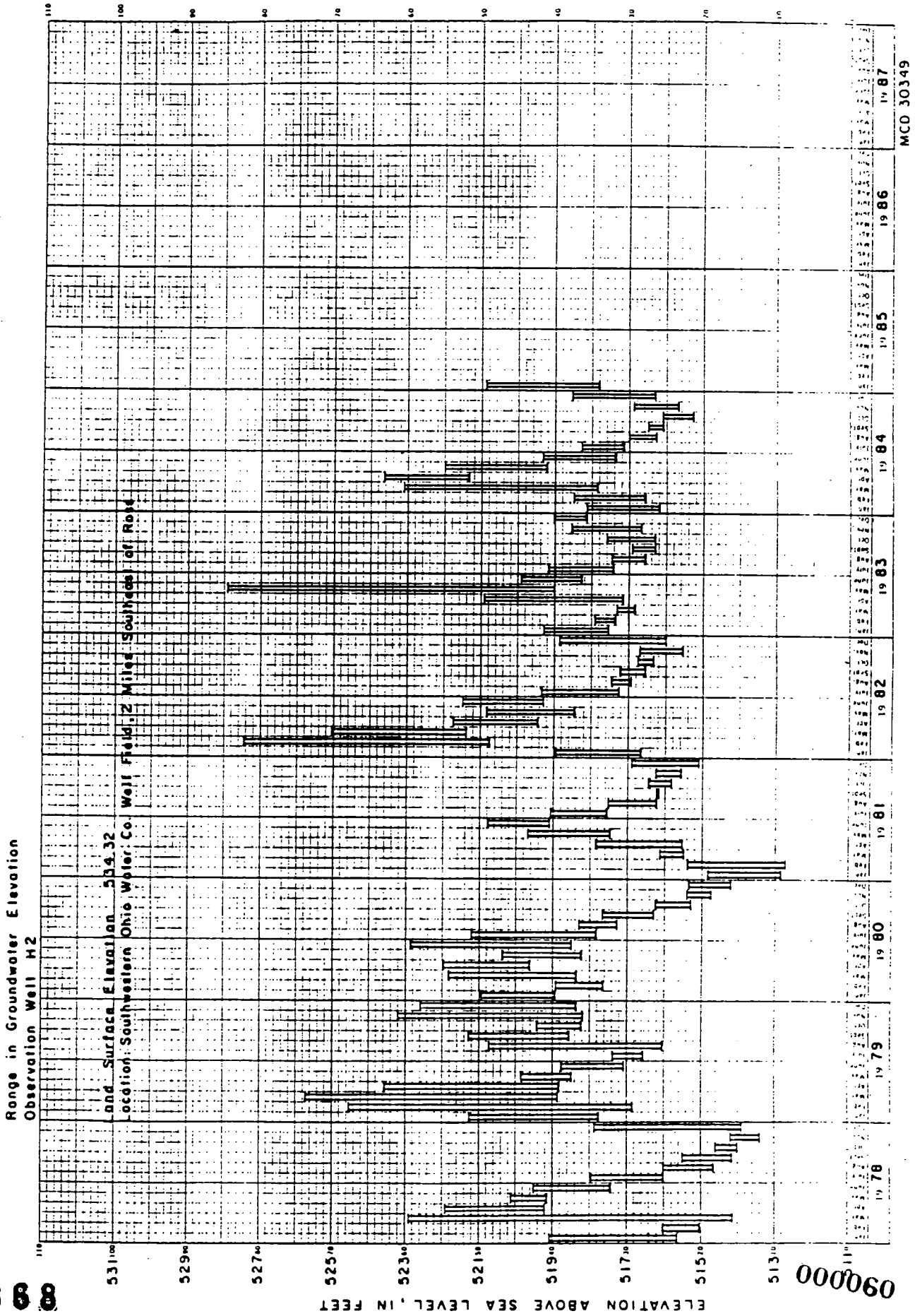
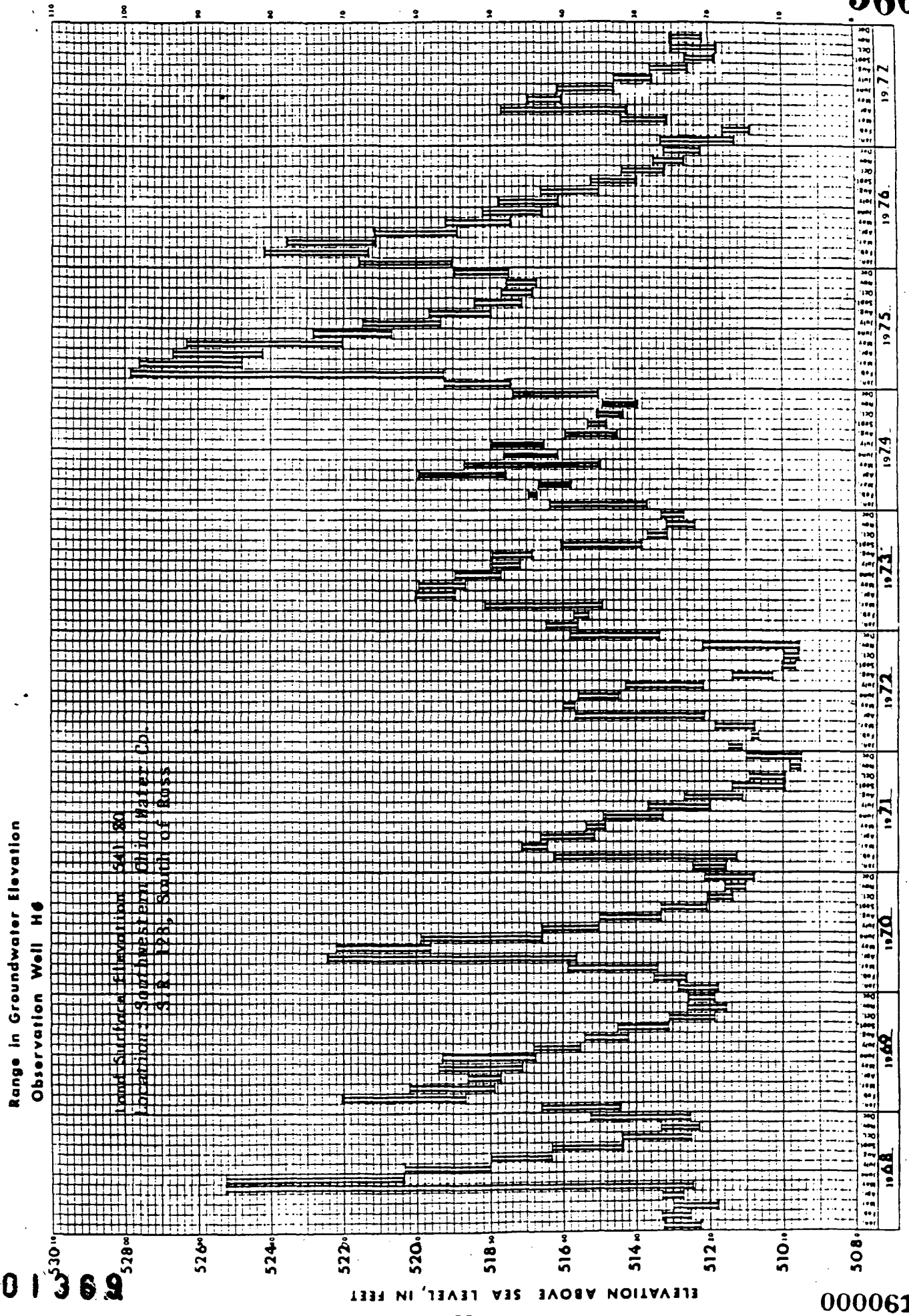

Range in Groundwater Elevation
Observation Well H2
Land Surface Elevation 534.32
Location: Southwestern Ohio Water Co. Well Field, 2 Miles Southeast of Rose
ELEVATION ABOVE SEA LEVEL, IN FEET
531
529
527
525
523
521
519
517
515
513
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
MCD 30349

FIGURE 30

5604

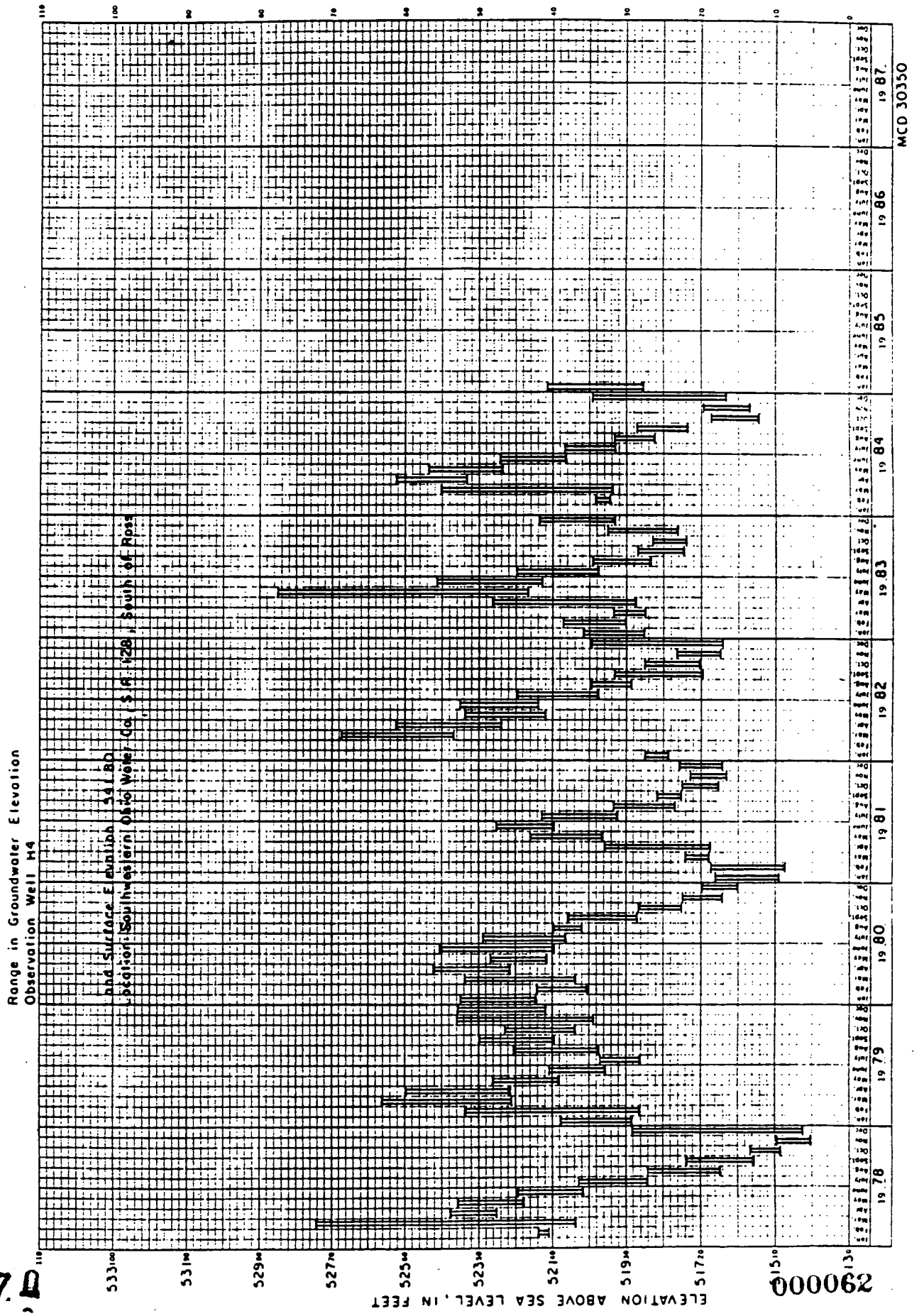


001369

000061

FIGURE 31

5604



D 00137

000062

APPENDIX A

U.S. Geological Survey

Water Quality Data

GROUND-WATER RECORDS

MIAMI COUNTY--Continued

400208084112900. Local number, MI-44.
LOCATION.--Lat 40°02'08", long 84°11'29", Hydrologic Unit 05080001, on left bank of Great Miami River 0.7 mi east of city hall in Troy.
Owner: City of Troy.
AQUIFER.--Sand and gravel of Pleistocene Age.
WELL CHARACTERISTICS.--Drilled public supply water-table well, diameter 26 in, depth 105 ft, screened below 89 ft.
PERIOD OF RECORD.--August 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SPECIFIC CONDUCTANCE (UMHOS)	PH (STANDARD UNITS)	TEMPERATURE, AIR (DEG C)	TEMPERATURE (DEG C)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)
OCT										
26...	1500	725	7.6	11.0	13.0	12	340	26	83	33
FEB										
23...	0900	695	7.5	2.0	12.0	<10	360	41	83	34
JUN										
28...	1530	720	7.6	31.0	13.5	<10	320	13	85	26
AUG										
15...	1430	705	7.8	27.0	13.5	<10	330	19	78	32

DATE	ALKALINITY FIELD (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, TOTAL (MG/L AS F)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	ARSENIC DISSOLVED (UG/L AS AS)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
OCT										
26...	318	63	28	.5	424	442	.010	.100	1	10
FEB										
23...	307	64	30	1.6	358	407	<.010	<.100	--	--
JUN										
28...	307	63	28	1.0	463	465	<.010	<.100	--	--
AUG										
15...	308	65	29	--	433	435	<.010	<.100	1	10

DATE	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT										
26...	10	10	10	1500	3	3	60	20	7	1.5
FEB										
23...	--	--	--	1500	--	--	50	--	--	1.6
JUN										
28...	--	--	--	1700	--	--	50	--	--	1.1
AUG										
15...	10	3	1	1700	4	4	40	30	12	.00

GROUND-WATER RECORDS

MONTGOMERY COUNTY

393757084173600. Local number, MT-928
LOCATION.--Lat 39°37'57", long 84°17'36", Hydrologic Unit 05080002, on right bank of Great Miami River 0.2 mi south of Linden Ave. bridge, Miamisburg
Owner: City of Miamisburg.
AQUIFER.--Sand and gravel of Pleistocene Age.
WELL CHARACTERISTICS.--Drilled municipal supply water table well, 20 in, depth 95 ft, screened below 70 ft.
PERIOD OF RECORD.--September 1983.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SPECIFIC CONDUCTANCE (UMHOS)	PH (STANDARD UNITS)	TEMPERATURE, AIR (DEG C)	TEMPERATURE (DEG C)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)
OCT										
27...	0900	820	7.4	1.0	13.0	12	370	69	94	32
APR										
25...	1100	730	7.4	20.5	16.5	<10	360	61	93	30
JUN										
28...	1300	810	7.5	30.0	14.0	<10	320	27	93	21
AUG										
15...	1130	835	7.6	29.0	12.5	<10	360	39	90	32

DATE	ALKALINITY FIELD (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, TOTAL (MG/L AS F)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	ARSENIC DISSOLVED (UG/L AS AS)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
OCT										
27...	298	67	68	.2	488	490	.020	.700	1	10
APR										
25...	295	64	54	.8	469	--	.020	2.20	--	--
JUN										
28...	292	59	58	.3	539	586	.030	2.60	--	--
AUG										
15...	318	64	67	--	527	530	.010	1.60	1	10

DATE	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT										
27...	10	8	8	80	5	2	160	20	14	1.7
APR										
25...	--	--	--	110	--	--	170	--	--	1.0
JUN										
28...	--	--	--	140	--	--	150	--	--	2.2
AUG										
15...	10	9	9	100	6	5	160	20	8	1.0

GROUND-WATER RECORDS

BUTLER COUNTY--Continued

392445084333000. Local number BU-36.
LOCATION.--Lat 39°24'45", long 84°33'30", Hydrologic Unit 05080002. on right bank of Great Miami River 300 ft downstream from Twomile Creek in Hamilton.
Owner: Champion Paper Company.
AQUIFER.--Sand and gravel of Pleistocene Age.
WELL CHARACTERISTICS.--Drilled industrial supply water-table well, diameter 30 in, depth 168 ft cased.
PERIOD OF RECORD.--December 1965 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SPECIFIC CONDUCTANCE (UMHOS)	PH (STANDARD UNITS)	TEMPERATURE, AIR (DEG C)	TEMPERATURE (DEG C)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)
OCT										
26...	1100	885	7.2	5.5	15.0	10	410	81	110	33
FEB										
22...	1500	860	7.5	15.0	15.0	<10	450	120	120	36
JUN										
28...	1030	900	7.3	25.0	25.5	<10	410	83	120	27
AUG										
15...	0900	875	7.2	16.0	15.0	14	410	85	110	33

DATE	ALKALINITY FIELD (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, TOTAL (MG/L AS F)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	ARSENIC DISSOLVED (UG/L AS AS)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
OCT										
26...	330	100	48	.2	536	567	<.010	1.70	1	20
FEB										
22...	328	100	52	.6	520	528	<.010	1.40	--	--
JUN										
28...	328	98	49	.2	570	599	<.010	1.40	--	--
AUG										
15...	326	110	51	--	597	598	<.010	1.60	1	10

DATE	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT										
26...	10	6	6	80	3	3	10	20	7	1.1
FEB										
22...	--	--	--	100	--	--	10	--	--	1.3
JUN										
28...	--	--	--	130	--	--	10	--	--	1.0
AUG										
15...	10	3	3	100	5	3	<10	10	9	.90

GROUND-WATER RECORDS

HAMILTON COUNTY--Continued

391748084393800. Local number, H-19.
LOCATION.--Lat 39°17'48", long 84°39'38", Hydrologic Unit 05080002, on left bank of Great Miami River 1.3 mi southwest of Venice.
Owner: Southwest Ohio Water Company.
AQUIFER.--Sand and gravel of Pleistocene Age.
WELL CHARACTERISTICS.--Collector-type industrial supply water-table well, diameter 20 ft, depth 144 ft horizontal intakes at 95-100 ft.
PERIOD OF RECORD.--1964 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	SPECIFIC CONDUCTANCE (UMHOS)	PH (STANDARD UNITS)	TEMPERATURE, AIR (DEG C)	TEMPERATURE (DEG C)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)
OCT										
26...	0930	770	8.1	3.0	15.0	15	330	76	86	28
FEB										
22...	1630	740	7.6	16.0	15.0	<10	330	84	86	28
JUN										
28...	0900	720	8.0	21.0	15.0	<10	280	44	85	17
AUG										
14...	1400	720	7.5	30.0	16.5	<10	300	62	79	26

DATE	ALKALINITY FIELD (MG/L AS CACO3)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, TOTAL (MG/L AS F)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	ARSENIC DISSOLVED (UG/L AS AS)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)
OCT										
26...	254	81	64	.3	454	487	.020	1.50	1	10
FEB										
22...	246	75	54	.5	352	411	.020	2.50	--	--
JUN										
28...	239	70	47	.3	496	496	.020	2.80	--	--
AUG										
14...	243	75	52	--	473	475	.020	2.20	1	10

DATE	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT										
26...	10	12	12	140	5	5	270	40	18	1.6
FEB										
22...	--	--	--	120	--	--	250	--	--	2.5
JUN										
28...	--	--	--	220	--	--	250	--	--	1.2
AUG										
14...	10	4	4	110	4	2	260	10	10	1.2

GREAT MIAMI RIVER BASIN

03274600 GREAT MIAMI RIVER AT NEW BALTIMORE, OH
(National stream-quality accounting network station)

LOCATION.--Lat 39°15'47", long 84°40'04", in N 1/2 sec. 34, R.1, T.2, Hamilton County, Hydrologic Unit 05080002, at Blue Rock Road bridge at New Baltimore, 6.4 mi downstream from Indian Creek, and 14.3 mi downstream from discharge station at Hamilton.

DRAINAGE AREA.--3,814 mi .

PERIOD OF RECORD.--July 1966 to current year.

REMARKS.--Four parameter (Specific conductance, pH, Water temperature, and Dissolved oxygen) water quality monitor at site from July 1966 to September 1981. See records of daily discharge for station at Hamilton (station 03274000).

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)
OCT											
25...	1530	3470	20	1	92	<.5	<1	<1	<3	10	23
DEC											
14...	0930	9740	70	1	66	<.5	<1	<1	<3	8	14
FEB											
22...	1230	3470	--	--	--	--	--	--	--	--	--
MAY											
02...	0900	4350	<10	2	91	<1	<1	1	<3	8	11
JUN											
27...	1300	2180	20	2	92	<1	<1	2	<3	10	12
AUG											
14...	1200	-1110	--	--	--	--	--	--	--	--	--

DATE	LEAD, DIS-SOLVED (UG/L AS PB)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)
OCT											
25...	4	5	2	.2	<10	6	<1	<1	780	<6	15
DEC											
14...	2	<4	2	.2	<10	4	<1	<1	420	<6	98
FEB											
22...	--	--	--	--	--	--	--	--	--	--	--
MAY											
02...	2	10	6	.1	<10	7	1	<1	710	<6	14
JUN											
27...	3	8	4	.2	<10	6	1	<1	580	<6	19
AUG											
14...	--	--	--	--	--	--	--	--	--	--	--

GREAT MIAMI RIVER BASIN

03274600 GREAT MIAMI RIVER AT NEW BALTIMORE, OH--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE, AIR (DEG C)	TEMPER-ATURE (DEG C)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)
OCT										
25...	1530	3470	605	8.1	12.0	14.0	65	9.4	93	8000
DEC										
14...	0930	9740	520	8.1	4.5	8.0	85	10.2	90	12000
FEB										
22...	1230	3470	675	8.2	5.0	8.0	13	12.2	106	2200
MAY										
02...	0900	4350	680	8.0	7.0	14.5	20	10.0	101	1700
JUN										
27...	1300	2180	620	8.1	25.0	24.0	60	8.6	106	8500
AUG										
14...	1200	1110	740	--	27.0	25.0	1.2	7.9	99	980

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	PERCENT SODIUM	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY LAB (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT										
25...	5900	68	24	20	14	.5	4.9	162	71	37
DEC										
14...	18000	61	21	11	9	.3	2.6	152	52	27
FEB										
22...	1000	78	29	21	13	.5	2.7	209	68	43
MAY										
02...	520	78	29	19	12	.5	2.6	212	55	37
JUN										
27...	2800	65	25	22	15	.6	3.7	181	58	40
AUG										
14...	4000	68	29	36	21	.9	4.0	211	78	64

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)
OCT										
25...	.30	8.1	391	8.00	.240	.31	1.6	.620	.240	.240
DEC										
14...	.20	7.1	315	1.10	.090	.10	.80	.240	.160	.010
FEB										
22...	.30	5.9	436	6.60	.520	.67	.60	.340	.280	.250
MAY										
02...	.30	4.8	456	5.20	.130	.17	2.3	.290	.210	.190
JUN										
27...	.40	7.2	401	5.90	.220	.28	.80	.360	.320	.280
AUG										
14...	.50	3.7	411	3.50	<.010	--	1.5	.610	.400	.380

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	TEMPER-ATURE (DEG C)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)
OCT					
25...	1530	3470	14.0	140	1310
DEC					
14...	0930	9740	8.0	184	4840
FEB					
22...	1230	3470	8.0	24	225
MAY					
02...	0900	4350	14.5	64	752
JUN					
27...	1300	2180	24.0	88	518
AUG					
14...	1200	1110	26.0	54	162