

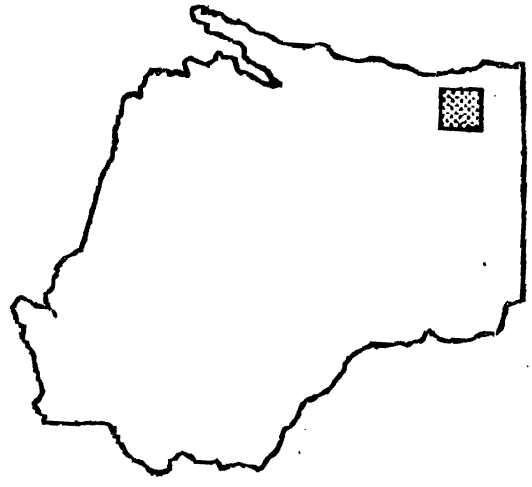
Attachment B

SEWRPC TR-20 Analysis

FLOOD INSURANCE STUDY



WAUKESHA COUNTY, WISCONSIN UNINCORPORATED AREAS



REVISED:
DECEMBER 18, 1986



Federal Emergency Management Agency

UNITED STATES DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEMA FORM 1-550 (4-78)

(6)

The hydrologic analysis for most rivers within the Fox River Basin, including Brancy Brook, Fox River, Genesee Creek, Jericho Creek, Mukwonago River, Pebble Brook, Pebble Creek, Poplar Creek, and Sussex Creek, were taken directly from the publication "A Comprehensive Plan for the Fox River Watershed" (Reference 4). This publication developed discharges using the Soil Conservation Service TR 20 hydrologic Computer Code (Reference 5). The principal function of this model is to compute a unit hydrograph for each basin, as well as excess rainfall for each of the different frequency storms. Rainfall excess was computed from accumulated rainfall using an SCS runoff equation which equates runoff as a function of soil type, antecedent moisture conditions and land use (Reference 5). This model can also be used to account for overbank storage which may result in lower peak discharges as you move downstream. This phenomena can be found on various rivers within the county (see Table 2). The resulting discharges were checked for validity and were deemed acceptable for this study.

Although the hydrology for both Jericho Creek and the Mukwonago River were taken from the Fox River Plan (Reference 4), an adjustment was made to the reaches between SR 99 (Jericho Creek) and the private bridge at Section 2 (Mukwonago River) where a natural diversion causes a portion of the flood discharges to bypass the normal channel.

The hydrology for Deer Creek was taken directly from the Flood Insurance Study for the City of Brookfield, Wisconsin (Reference 23).

The hydrology for the Bark River Reach between Dousman and Lower Yemahtin Lake was obtained from the Dousman Flood Hazard Study (Reference 7), completed by SCS in 1978. This study computed discharges using the same TR 20 computer model (Reference 5) as previously explained. The hydrology for the Bark River upstream of the Menabin Lakes have been taken from the Flood Insurance Studies for the City of Delafield and the Village of Hartland (References 24 and 17). Again the TR 20 model was utilized to establish the discharges (Reference 5).

The hydrologic analysis for the Pewaukee River was taken from the Floodland Information Report No. 9 (Reference 32). The discharges in this report were developed with the use of the Hydrocomp Computer Model (Reference 34). The principal function of this model is to determine the volume and temporal distribution of runoff from the land to the stream segments.

TABLE 2 (continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA	PEAK DISCHARGES			
	SQ. MILES	10-YEAR	50-YEAR	100-YEAR	500-YEAR
GENESSEE CREEK					
Upstream of Fox River	23.5	845	1,400	1,675	2,400
Upstream of Section J	19.1	540	830	970	1,300
Upstream of Section W	6.4	325	475	550	750
JERICO CREEK					
Upstream of Mukwonago River	16.0	700	960	1,100	1,780
Upstream of State Highway 99	14.3	700	1,200	1,440	2,200
MASON CREEK					
Upstream of North Lake	8.0	165	375	430	710
Upstream of County Highway EC	7.5	165	375	480	810
MUKWONAGO RIVER					
Upstream of Fox River	91.9	640	920	1,040	1,350
Upstream of Lower Phantom Lake	73.4	1,000	1,700	2,045	3,000
Upstream of Beulah Road	64.5	715	1,245	1,505	2,250
Upstream of Golf Club House Dr.	62.5	700	1,200	1,450	2,100
Upstream of Section Z	60.0	730	1,000	1,130	1,830
OCONOMOWOC RIVER					
Jefferson-Waukesha County Line	111.0	480	700	790	1,000
Upstream of County Highway BB	109.0	420	595	670	850
Oconomowoc East Corp. Limits	87.0	400	530	600	720
Upstream of Section P	85.0	270	325	345	390
Oconomowoc Lake Corp. Limits	81.0	80	180	230	400
Upstream of Okauchee Lake	71.0	275	550	680	1,150
Upstream of North Lake	44.0	600	1,050	1,150	1,900
Upstream of Section AJ	35.0	540	730	790	900

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
MUKWONAGO RIVER (continued)								
J	23022	454	1164	1.3	794.0	794.0	794.0	0.0
K	25207	719	3261	0.6	795.0	795.0	795.0	0.0
L	26167	298	1288	1.6	795.4	795.4	795.4	0.0
M	28787	821	2527	0.8	796.3	796.3	796.3	0.0
N	30402	172	720	2.8	797.3	797.3	797.3	0.0
O	33032	770	2524	0.8	798.7	798.7	798.7	0.0
P	35369	322	951	1.6	800.4	800.4	800.4	0.0
Q	36689	593	1795	0.8	801.0	801.0	801.0	0.0
R	38569	735	1965	0.8	801.4	801.4	801.4	0.0
S	39274	664	1230	1.2	801.9	801.9	801.9	0.0
T	41429	1192	1054	1.4	803.9	803.9	803.9	0.0
U	42279	1094	1311	1.1	804.4	804.4	804.4	0.0
V	43919	404	1244	1.2	805.5	805.5	805.5	0.0
W	44219	274	1142	1.3	805.9	805.9	805.9	0.0
X	44444	484	1542	1.0	806.1	806.1	806.1	0.0
Y	47391	450	1514	1.0	808.7	808.7	808.7	0.0
Z	48708	404	1710	0.7	809.3	809.3	809.3	0.0
AA	50458	658	1455	0.8	809.7	809.7	809.7	0.0
AB	51858	364	814	1.4	810.4	810.4	810.4	0.0
AC	54950	297	618	1.8	813.4	813.4	813.4	0.0
AD	56442	34	139	8.1	817.4	817.4	817.4	0.0

¹ FEET ABOVE MOUTH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAUKESHA COUNTY, WI

FLOODWAY DATA

MUKWONAGO RIVER

TABLE

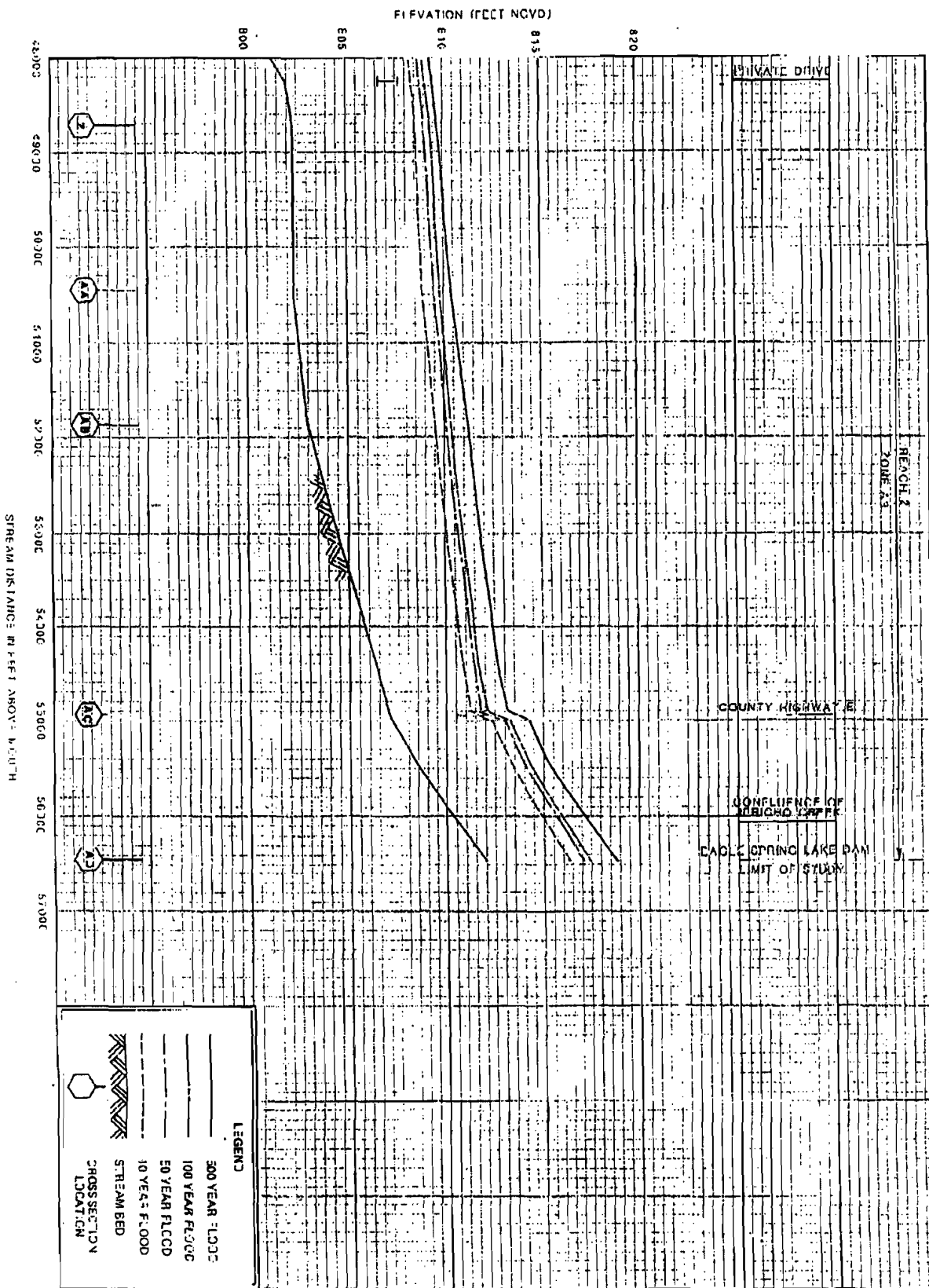
A Flood Hazard Boundary Map has been published by the Federal Insurance Administration (Reference 35). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 330 South Wacker Drive, Chicago, Illinois 60605.

8.0 REFERENCES AND BIBLIOGRAPHY

1. Wisconsin Legislative Reference Bureau, The State of Wisconsin 1961-1962 Blue Book, 1962
2. U.S. Department of Commerce, Technical Paper 40, Rainfall Atlas of the United States, January 1963
3. Samuel Weidman and Alfred Schultz, State of Wisconsin, The Underground and Surface Water Supplies of Wisconsin, 1915
4. Southeastern Wisconsin Regional Planning Commission, Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, February 1970
5. U.S. Department of Agriculture Soil Conservation Service, Control Technical Unit, Computer Program for Project Formulation, Technical Release No. 20, May 1965
6. United States Department of Agriculture Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972
7. United States Department of Agriculture Soil Conservation Service, Flood Hazard Study, Bark River, Village of Deussen and Vicinity, June 1978
8. Duane K. Conger, Estimating Magnitude and Frequency of Floods in Wisconsin, 1971
9. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California, Computer Program 723-X6-L210 HEC-1 Flood Hydrologic Package
10. Aero-Metronics Engineering, Inc., Waukesha County, 2-foot contour maps, scale 1:2400, 1965



FEDERAL EMERGENCY MANAGEMENT AGENCY

WAUKESHA COUNTY, WI
(UNINCORPORATED AREAS)

FLOOD PROFILES

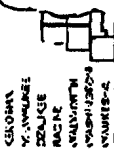
MUKWONAGO RIVER

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TO: Dru Vangipuram

Graef Anhalt Schloemer & Associates Inc.

FAX NUMBER: (414) 259-0037 NUMBER OF PAGES TO FOLLOW: Six

FROM: Michael G. Hahn

DATE: 11/23/00

COMMENTS:

8	798.5000	450.0000	182.0000
8	799.0000	620.0000	211.0000
8	799.5999	900.0000	249.0000
8	800.0000	1095.0000	276.9998
9	ENDTBL		

3 STRUCT STRUCT NO.
 14

	ELEVATION	DISCHARGE	STORAGE
8	802.0000	0.0	100.0000
9	ENDTBL		

3 STRUCT STRUCT NO.
 15

	ELEVATION	DISCHARGE	STORAGE
8	778.0000	0.0	669.9995
8	779.0000	120.0000	1969.9998
8	780.0000	260.0000	3749.9998
8	781.0000	450.0000	5859.9922
8	782.0000	710.0000	8249.9922
8	782.5000	880.0000	9049.9922
8	783.0000	1050.0000	10899.9922
8	783.5000	1250.0000	12399.9922
8	784.0000	1490.0000	13749.9922
8	784.5000	1725.0000	15199.9922
8	785.0000	2000.0000	16849.9922
8	785.5000	2290.0000	18519.9922
8	786.0000	2600.0000	20199.9922
9	ENDTBL		

3 STRUCT STRUCT NO.
 16

Eagle Spring Lake

	ELEVATION	DISCHARGE	STORAGE
8	817.0000	0.0	665.9998
8	817.5000	19.0000	729.9995
8	818.0000	60.0000	799.9995
8	818.5000	92.0000	879.9995
8	819.0000	112.0000	959.9995
8	819.5000	127.0000	1039.9995
8	820.0000	141.0000	1199.9995
9	ENDTBL		

40.00	DISCHG	61.36	39.55	24.98	15.47	9.36	5.60	3.25	1.76	0.85	0.37
60.00	DISCHG	0.16	0.07	0.03	0.01	0.00					
TOTAL WATER, IN INCHES ON DRAINAGE AREA= 2.0327 CFS-HRS= 26892.35 ACRE-FT= 2222.38											

SUBROUTINE SAVMOV CROSS SECTION 95
INPUT HYDROGRAPH= 7 OUTPUT HYDROGRAPH= 3

SUBROUTINE RUNOFF STRUCTURE 16 Eagle Spring Lake Inflow
AREA= 21.00 INPUT RUNOFF CURVE= 60.0 TIME OF CONCENTRATION= 30.00

COMPUTED CURVE NO.= 60.0

PEAK TIMES 32.90 PEAK DISCHARGES 681.442 PEAK ELEVATIONS (RUNOFF)

TIME	HYDROGRAPH, TZERO= 0.0	DELTA T= 2.00	DRAINAGE AREA= 21.00
0.0	DISCHG 0.0	0.0	3.39 11.29 19.20 51.05 86.89 133.94 208.99
20.00	DISCHG 284.04	369.64 459.46 544.40 600.06 655.71 678.88 677.67 676.46 632.86	
40.00	DISCHG 589.25	540.25 484.18 428.07 379.34 331.85 287.93 252.96 217.99 190.39	
60.00	DISCHG 165.74	142.14 124.82 107.50 93.27 81.35 69.42 61.09 52.76 45.52	
80.00	DISCHG 39.72	33.93 29.65 25.62 21.97 19.27 16.57 14.42 12.49 10.61	
100.00	DISCHG 9.02	7.43 6.01 4.70 3.39 2.54 1.69 1.04 0.69 0.31	
120.00	DISCHG 0.17	0.07 0.0	
TOTAL WATER, IN INCHES ON DRAINAGE AREA= 1.6234 CFS-HRS= 22001.02 ACRE-FT= 1818.16			

SUBROUTINE RESVOR STRUCTURE 16 Eagle Spring Lake Outflow
SURFACE ELEVATION= 817.00

PEAK TIMES 57.94 PEAK DISCHARGES 192.032 PEAK ELEVATIONS 821.82

TIME	HYDROGRAPH, TZERO= 0.0	DELTA T= 2.00	DRAINAGE AREA= 21.00
0.0	DISCHG 0.0	0.0	0.08 0.43 1.14 2.77 5.94 10.94 18.63

PAGE 159

20.00	DISCHG	39.33	86.50	105.34	121.23	131.56	139.25	146.99	154.60	161.78
40.00	DISCHG	168.23	178.79	182.77	185.94	188.38	190.12	191.28	191.91	192.09
60.00	DISCHG	191.88	190.51	189.44	188.16	186.71	185.12	183.39	181.58	179.68
80.00	DISCHG	177.71	173.62	171.52	169.40	167.27	165.12	162.97	160.83	158.68
100.00	DISCHG	156.54	152.29	150.18	148.09	146.30	143.94	141.89	139.86	137.86
120.00	DISCHG	135.89	132.01	130.12	128.25	125.74	121.90	118.18	114.58	110.78
140.00	DISCHG	106.29	97.86	93.90	88.99	83.30	77.97	72.98	68.30	63.93
160.00	DISCHG	55.77	49.24	44.69	40.57	36.82	33.42	30.33	27.53	24.99
180.00	DISCHG	22.68	18.84	17.93	17.08	16.26	15.48	14.74	14.03	13.36
200.00	DISCHG	12.72	11.53	10.98	10.45	9.93	9.47	9.02	8.59	8.18
220.00	DISCHG	7.79	7.41	6.72	6.40	6.09	5.80	5.52	5.26	5.00
240.00	DISCHG	4.77	4.54	4.11	3.92	3.73	3.55	3.33	3.22	3.06
260.00	DISCHG	2.92	2.78	2.52	2.40	2.28	2.17	2.07	1.97	1.87
280.00	DISCHG	1.78	1.70	1.54	1.47	1.40	1.33	1.27	1.20	1.15
300.00	DISCHG	1.09	1.04	0.94	0.90	0.85	0.81	0.77	0.74	0.70
320.00	DISCHG	0.67	0.64	0.58	0.55	0.52	0.50	0.47	0.45	0.43
340.00	DISCHG	0.41	0.39	0.37	0.33	0.32	0.30	0.29	0.27	0.26
360.00	DISCHG	0.25	0.24	0.23	0.20	0.19	0.19	0.18	0.17	0.16
380.00	DISCHG	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.10
400.00	DISCHG	0.09	0.09	0.08	0.08	0.07	0.07	0.06	0.06	0.05
420.00	DISCHG	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04
440.00	DISCHG	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
460.00	DISCHG	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
480.00	DISCHG	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
500.00	DISCHG	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL WATER, IN INCHES ON DRAINAGE AREA=										1.6232
CFS-HRS=										21998.73
ACRE-FT=										1817.87

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PAGES TO FOLLOW: ThreeFROM: Michael G. HahnDATE: 11/22/00

COMMENTS:

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OKH

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December 16, 1985

Mr. Randall C. Melody
Senior Planner
Waukesha County Park and Planning
500 Riverview Avenue
Waukesha, Wisconsin 53188

OKH

Dear Mr. Melody:

Pursuant to your recent telephone conversation with Mr. Robert P. Biebel of the Commission staff, we have reviewed the 100-year recurrence interval flood elevation for Eagle Spring Lake located in the Town of Eagle. A 100-year flood elevation of 818.2 feet National Geodetic Vertical Datum (NGVD) had been developed by the Commission staff and was reported in a letter of April 27, 1984, to Mr. David F. Abell, Registered Land Surveyor, a copy of which letter was provided to your Department.

The analyses conducted were based upon calculated stage discharge curves for both of the two outlet structures located on the eastern shore of the lake and a flood elevation developed which was related to a vertical distance above the outlet structure. Upon further review of this matter, the Commission staff determined that due to a survey error, the elevations of the two outlet structures as reported were in error--those elevations having been based upon an elevation for a brass cap set on one of the two structures by the Wisconsin Railroad Commission in the early 1900s, the elevation of the cap having been determined in error by the Wisconsin Railroad Commission. More recent survey information by this Commission has indicated that the correct elevation of that benchmark is 2.9 feet higher than the original elevation and, therefore, the correct 100-year flood elevation for Eagle Spring Lake is 821.1 feet NGVD rather than 818.2.

We trust this information will be helpful to you. Should you have any questions concerning this matter, please do not hesitate to call.

Sincerely,

Kurt W. Bauer
Executive Director

KWB/lb

cc: Mr. David F. Abell
Kolb Land Consulting, Inc.

2 x 3

David F. Abell
Page 2
April 26, 1984

- a. Eagle Spring Lake has two outlet control structures, both located on the eastern shoreline, which are used to regulate the lake level. The 100-year recurrence interval flood discharge from both outlets is estimated at 80 cubic feet per second (cfs).
- b. Information contained in the Commission files pertaining to the control structures was utilized to generate stage discharge curves for both outlet structures. Using these curves, the Commission staff determined a 100-year recurrence interval lake elevation of 818.2 feet NGVD, based on a discharge of 80 cfs.
4. There are no adequate large-scale topographic maps currently available for the subject area. Consequently, the Commission staff cannot make a precise determination as to what portion of the subject parcel lies below this estimated 100-year recurrence interval flood stage. To make this determination, a plat of survey showing the topographic features of the property should be prepared. The ground elevations on this plat should be referenced to the NGVD. With that information you would be able to delineate the actual floodplain boundary using the elevation noted above; in the alternative, the Commission staff would be pleased to delineate the limits of the 100-year recurrence interval floodplain as it relates to the subject parcel upon receipt of such a plat of survey. This floodplain information can then be provided to the Waukesha County Park and Planning Department for their review and use in preparing an amendment to the floodplain zoning map, if an amendment is required.

We trust the foregoing information will be helpful to you. Should you have any questions concerning this matter, please do not hesitate to contact us.

Sincerely,

Kurt W. Mauer
Executive Director

KWB/ilb
Enclosure

COPY

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April 27, 1984

Mr. David F. Abell
 Registered Land Surveyor
 Kolb Land Consulting, Inc.
 929 Williams
 Lake Geneva, Wisconsin 53147

RE: SEWRPC No. CA-709-03

Dear Mr. Abell:

This is to acknowledge receipt of your letter of April 17, 1984, in which you request the Commission staff to assist you in determining the location of shoreland and floodland zoning jurisdictional limits on two riparian parcels on Eagle Spring Lake in U. S. Public Land Survey Section 36, Township 5 North, Range 17 East, Town of Eagle, Waukesha County, Wisconsin, which parcels are identified on a proposed certified survey map included with your letter. You indicate in your letter that this information was requested by the Waukesha County Park and Planning Department in conjunction with your plans to obtain approval of a proposed certified survey map. Pursuant to your request, the Commission staff has evaluated the available data and offers the following information and comments for your use and consideration:

1. The 100-year recurrence interval flood hazard boundary for Eagle Spring Lake was developed by the Federal Emergency Management Agency (FEMA) using approximate methods rather than detailed hydrologic-hydraulic analyses. The extent of this area adjacent to Eagle Spring Lake is shown on the attached Exhibit A.
2. Under the provisions of Chapter NR 116 of the Wisconsin Administrative Code, counties are required to establish floodplain zoning districts in floodlands adjacent to lakes and streams. In this case the floodland area corresponds to the FEMA delineated flood hazard area. In addition, under Chapter 115 of the Wisconsin Administrative Code, Counties was required to establish shoreland zoning districts on areas within 300 feet of streams and 1,000 feet of lakes, or to the landward side of the floodplain, whichever is greater. The subject parcels are accordingly entirely within the County's shoreland zoning district and, as further discussed below, are partially within the floodland zoning district.
3. The Commission staff has determined the 100-year recurrence interval flood stage for Eagle Spring Lake to be 118.2 feet National Caudetic Vertical Datum (NGVD). The method of determination was as follows:

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December 6, 2000

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Mr. Stephen G. Hauser, P.E., R.L.S.
Manager, Municipal Client Services
Graef, Anhalt, Schloemer & Associates, Inc.
One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470

Dear Mr. Hauser:

Pursuant to your letter request of November 28, 2000, the Commission staff is providing herewith hydrologic data for Eagle Springs Lake, on the Mukwonago River in the Town of Eagle, Waukesha County. It is our understanding that the Eagle Springs Lake Management District has hired your firm to perform a dam failure analysis for the Wambold and Kroll Dams, which serve as the outlets for Eagle Springs Lake.

Specifically, we are providing 100-year recurrence interval inflow and outflow tabular hydrographs for Eagle Springs Lake as computed using the September 20, 1967, version of the U.S. Soil Conservation Service (SCS), TR-20 computer program and the lake elevation-volume-discharge relationship used for the hydrograph routing. That relationship accounts for discharge from both of the lake outlet structures. The TR-20 model was developed under the planning effort documented in SEWRPC Planning Report No. 12, *A Comprehensive Plan for the Fox River Watershed*. The hydrographs, which represent runoff based on then-planned (1990) land use, were developed for a 100-year, 24-hour storm distributed using the SCS Type II distribution. The peak 100-year Lake discharge is not published in the December 18, 1986, Federal Emergency Management Agency flood insurance study (FIS) for Waukesha County, Wisconsin. Therefore, the TR-20 model results along the Mukwonago River downstream from the Lake were compared with flood discharges reported in the FIS. The peak 100-year discharges on the Mukwonago River downstream of Eagle Springs Lake, as computed with the TR-20 model for which hydrographs are provided, are about 25 percent greater than the corresponding peak discharges reported in the FIS. That TR-20 model matches the FIS results more closely than any other models in our files, and it is the best available information.

In order that we can maintain an updated database for the Fox River watershed, it is requested that the hydraulic models developed through your project be provided to the Commission.

We trust that data provided will meet your needs. Should you have any questions regarding this matter, please contact Mr. Michael G. Hahn of the Commission staff directly.

Sincerely,

Philip C. Evenson
Executive Director

PCE/JAM/pk
#35331 V1 - EAGLE SPRING LAKE FLOWS

Enclosure

cc: Mr. Thomas Day, Chairman, Eagle Spring Lake Management District
Mr. Konstantin E. Margovsky, WDNR-Madison

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TO: Dru Vangipuram

Graci Anhalt Schloemer & Associates Inc.

FAX NUMBER: (414) 259-0037 NUMBER OF PAGES TO FOLLOW: Eight

FROM: Michael G. Hahn

DATE: 12/13/00

COMMENTS: The following pages are all we could find regarding the development of Eagle Spring Lake rating curve.

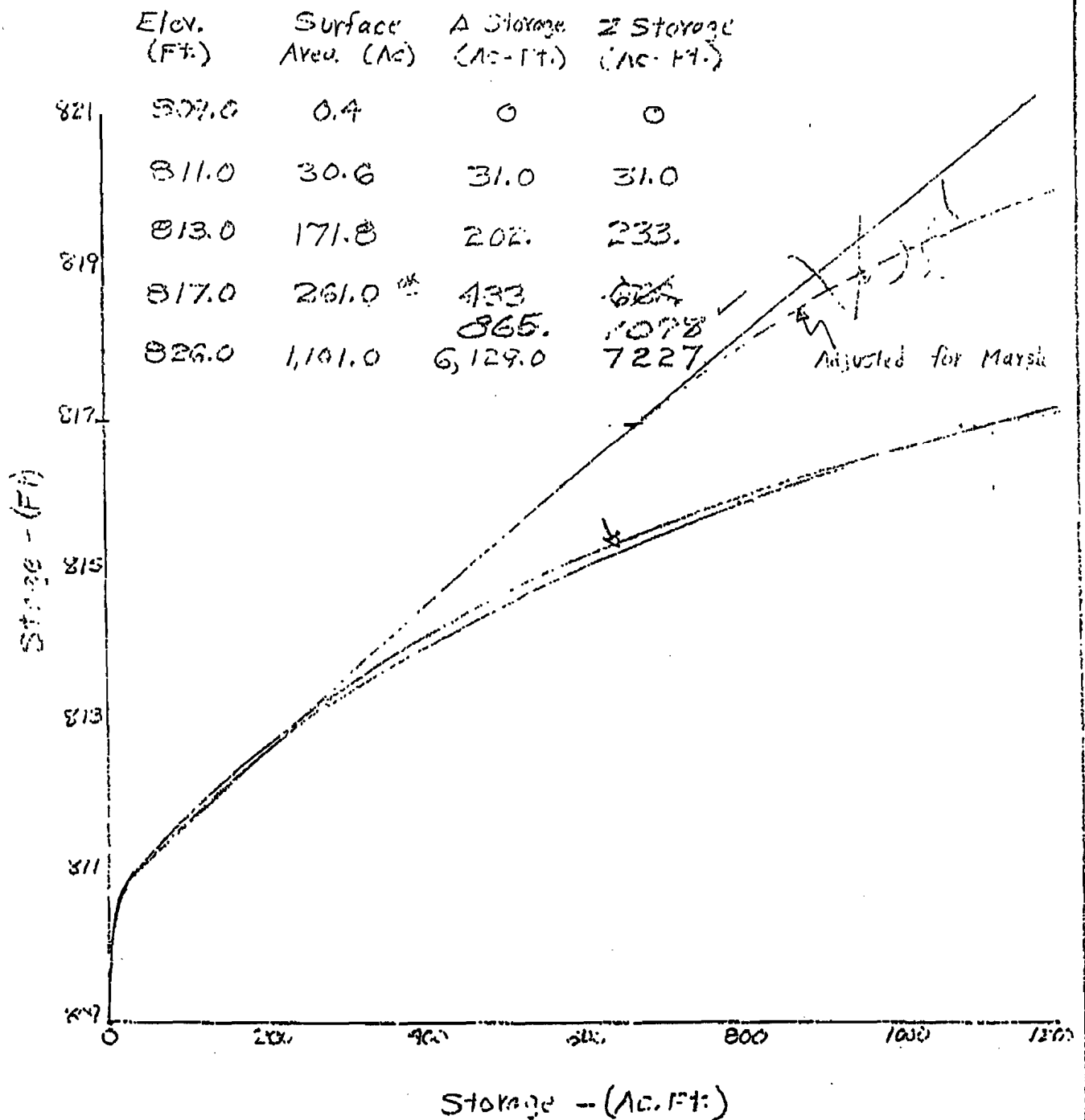
Wisconsin Fox River - S.E.W.R.P.C.

D.D.S. 27 June 67

Stage - Storage Curve - Eagle Spring Lake

Stage - Storage relationship estimated from W.C.D.

Lake Survey Map and U.S.G.S. Quad Sheets

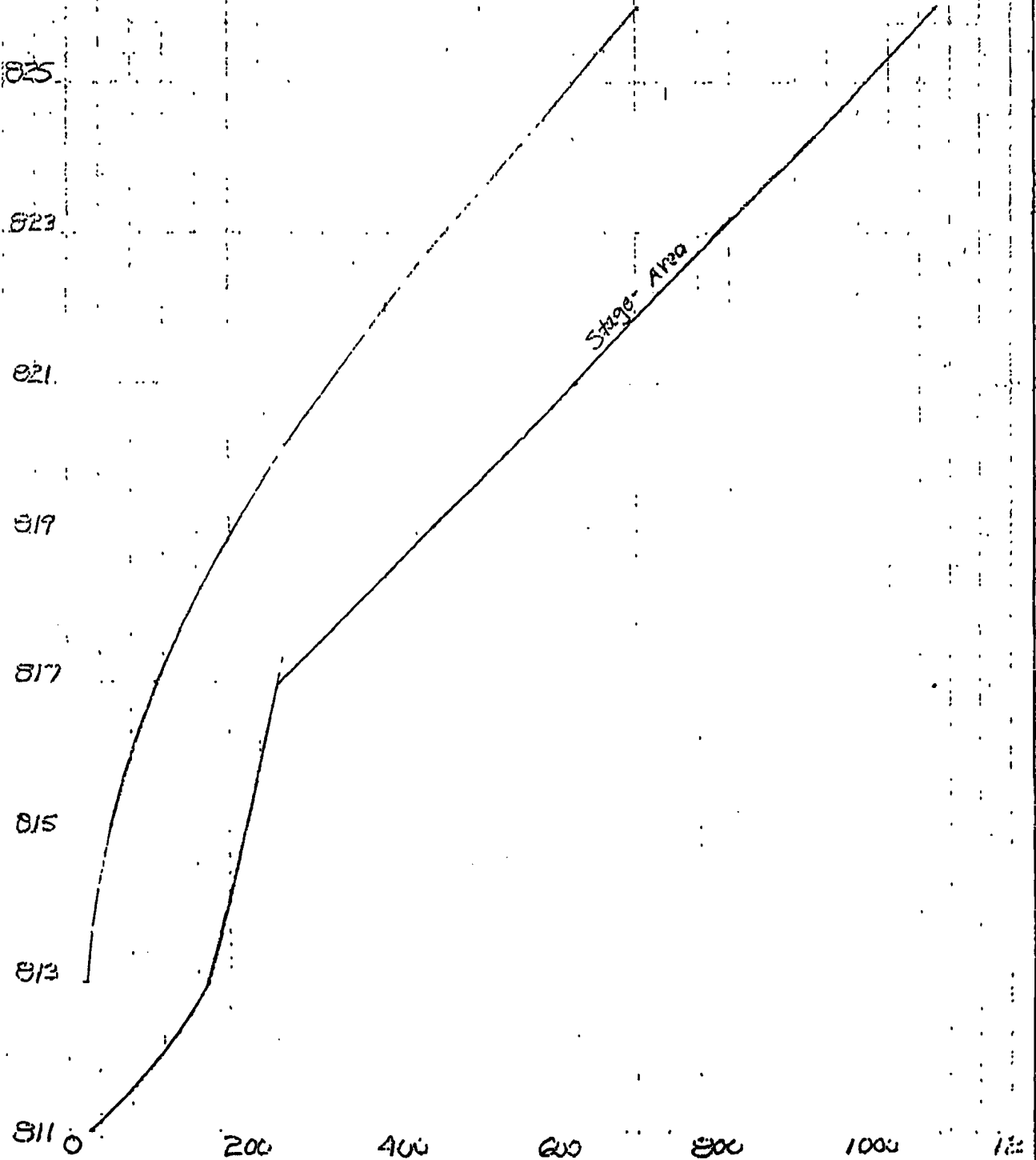


DATE: 12/13/2000
BY: [illegible]

PROJECT: [illegible]
SHEET: [illegible]

PROJECT: Wisconsin
DATE: 12 Apr. 68
BY: DDS
SHEET: 12

Stage-Storage, Eagle Spring Lake (Revised)



DESIGNATION: 100-100-100
 DATE: 10/1/00

DESIGNER: J. J. J. J. J.
 CHECKED: J. J. J. J. J.

BY: J. J. J. J. J.

PROJECT: J. J. J. J. J.

IN: J. J. J. J. J.

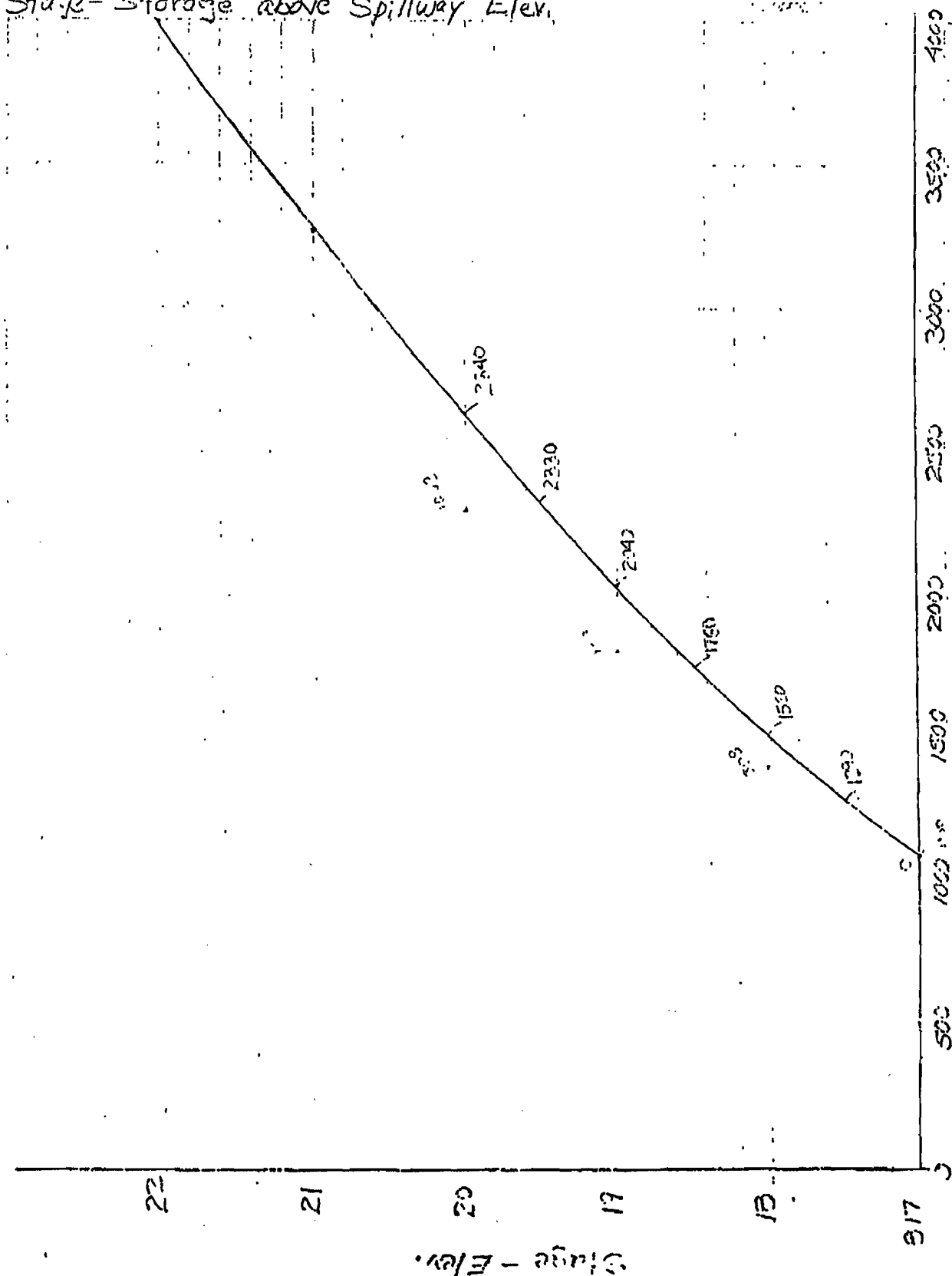
DATE: J. J. J. J. J.

CHECKED: J. J. J. J. J.

BY: J. J. J. J. J.

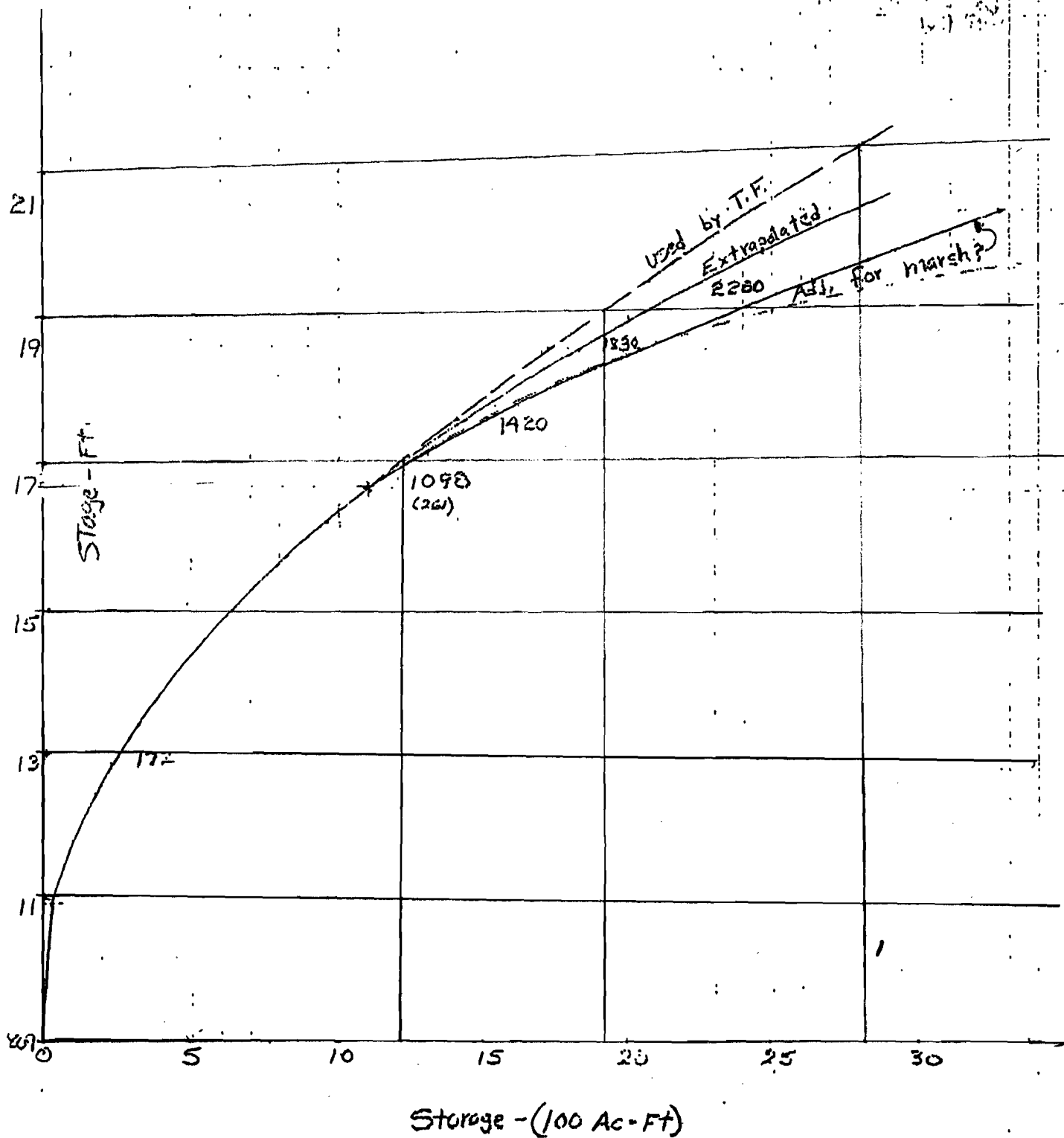
DATE: J. J. J. J. J.

Stage - Storage above Spillway Elev.



Stage - 100 - Ft.

Eagle Spring Lake



WISCONSIN

FOX RIVER - S.E.W.R.P.C.

D. P. S. 27 June 67

Rating Curve - Eagle Spring Lake

1

3

Str. 125 (North Outlet)

$L = 10.5 \text{ Ft.}$

$Q = CLH^{3/2}$

Elev.	C	L	H	$H^{3/2}$	Q
817.1	—	—	0	0	0
817.5	3.3	10.5	1.4	.253	8.8
818.0	3.3	10.5	0.9	.854	27.6
818.5	3.3	10.5	1.4	1.656	52.4

→ Orifice flow begins - $Q = CA\sqrt{2gh}$

Elev.	C	A	$h^{15.12}$	$\sqrt{2gh}$	Q
818.5	0.6	25.2	1.2	8.79	132.9
819.0	0.6	25.2	1.7	10.46	158.2
819.5	0.6	25.2	2.2	11.90	179.9
820.0	0.6	25.2	2.7	13.17	197.4

Assume Flash Bypass Reopened to Elev. 816.1

813.5	3.3	10.5	2.4	3.713	128.5
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Wisconsin

Fox River - S.E.W.R.P.C.

D.O.S. 27 June 67

Rating Curve - Eagle Spring Lake

2

3

Str. 126 (South Outlet)

$$L = 9.0 \text{ FT.}$$

$$Q = CLH^{3/2}$$

Elev.	C	L	H	$H^{3/2}$	Q
817.0	—	—	0	0	0
817.5	3.3	9.0	0.5	.354	10.5
818.0	3.3	9.0	1.0	1.00	29.7
818.5	3.3	9.0	1.5	1.84	54.6
Office Flow —					
		(Δ)	(h)	$\sqrt[9.12]{29h}$	
819.0	0.6	15.3	1.1	8.4	77.1
819.5	0.6	15.3	1.6	10.1	92.7
820.0	0.6	15.3	2.1	11.6	106.5

Check Office @ Outlet —

Elev.	C	Δ	h	$\sqrt[12.0]{29h}$	Q
817.0	0.6	2.5	5.8	19.2	29.0
817.5	0.6	2.5	6.3	20.1	30.0
818.0	0.6	2.5	6.8	20.9	31.4
818.5	0.6	2.5	7.3	21.7	32.6
819.0	0.6	2.5	7.8	22.4	33.6
819.5	0.6	2.5	8.2	23.1	34.6
820.0	0.6	2.5	8.8	23.8	35.7
821.0	0.6	2.5	9.8	25.1	37.6

Wisconsin

Fox River - S.E.W.R.P.C.

D. D. S. 27 June 67

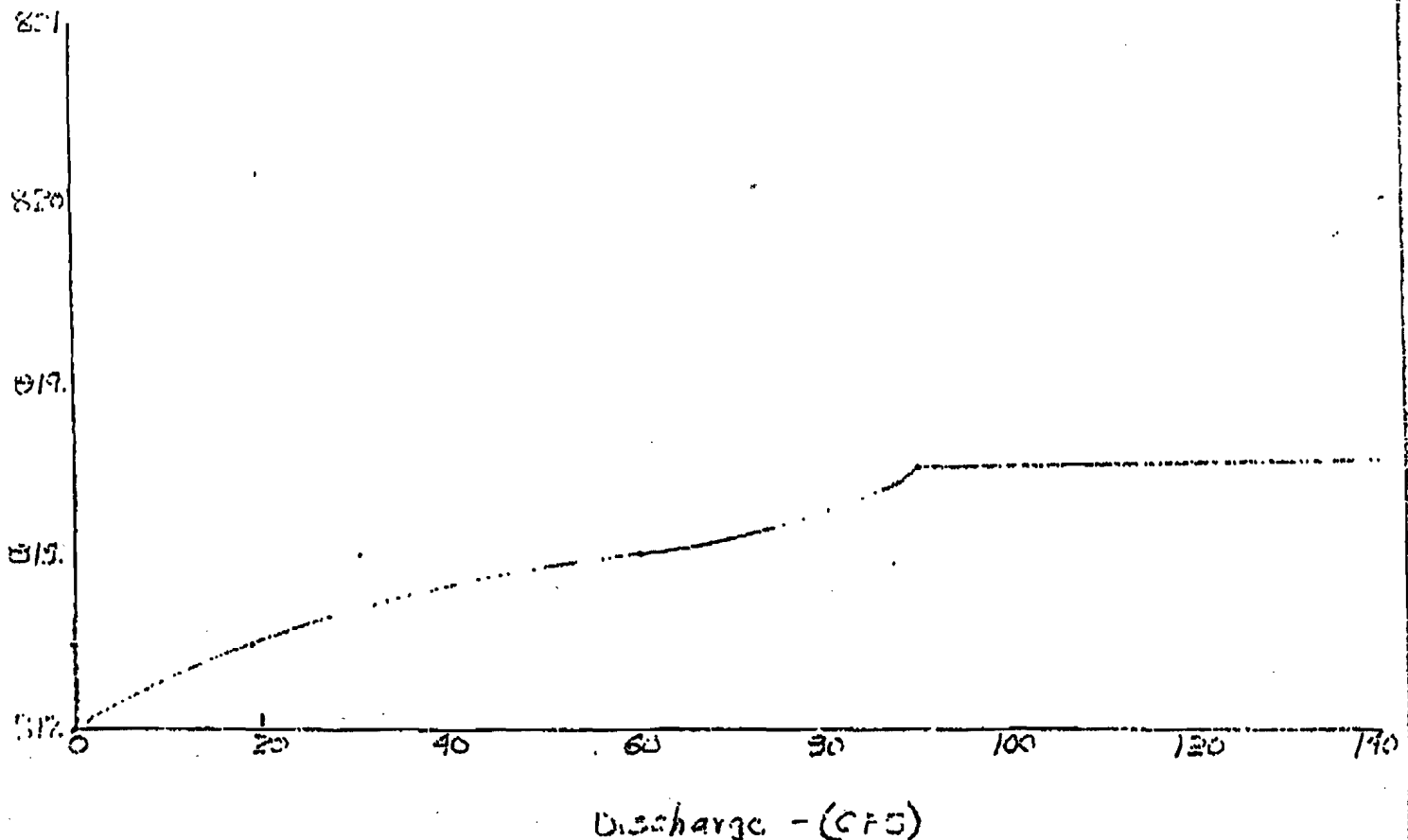
Rating Curve - Eagle Spring Lake

3

3

Combined Capacity of North & South Outlets

Elev.	Q _N	Q _S	Q _T
817.0	0	0	0
817.5	8.6	10.5	19. ✓
818.0	30.	30.	60. ✓
818.5	57.	33.	90. ✓
818.5	129.	33.	162. ✓
819.0	158	34.	192 ✓
819.5	180	35.	215 ✓
820.0	199.	36.	235 ✓



Wisc. Fox River - SEWRPC
 TF 13 Jan 69
 Rating Curve - Eagle Spring Lake

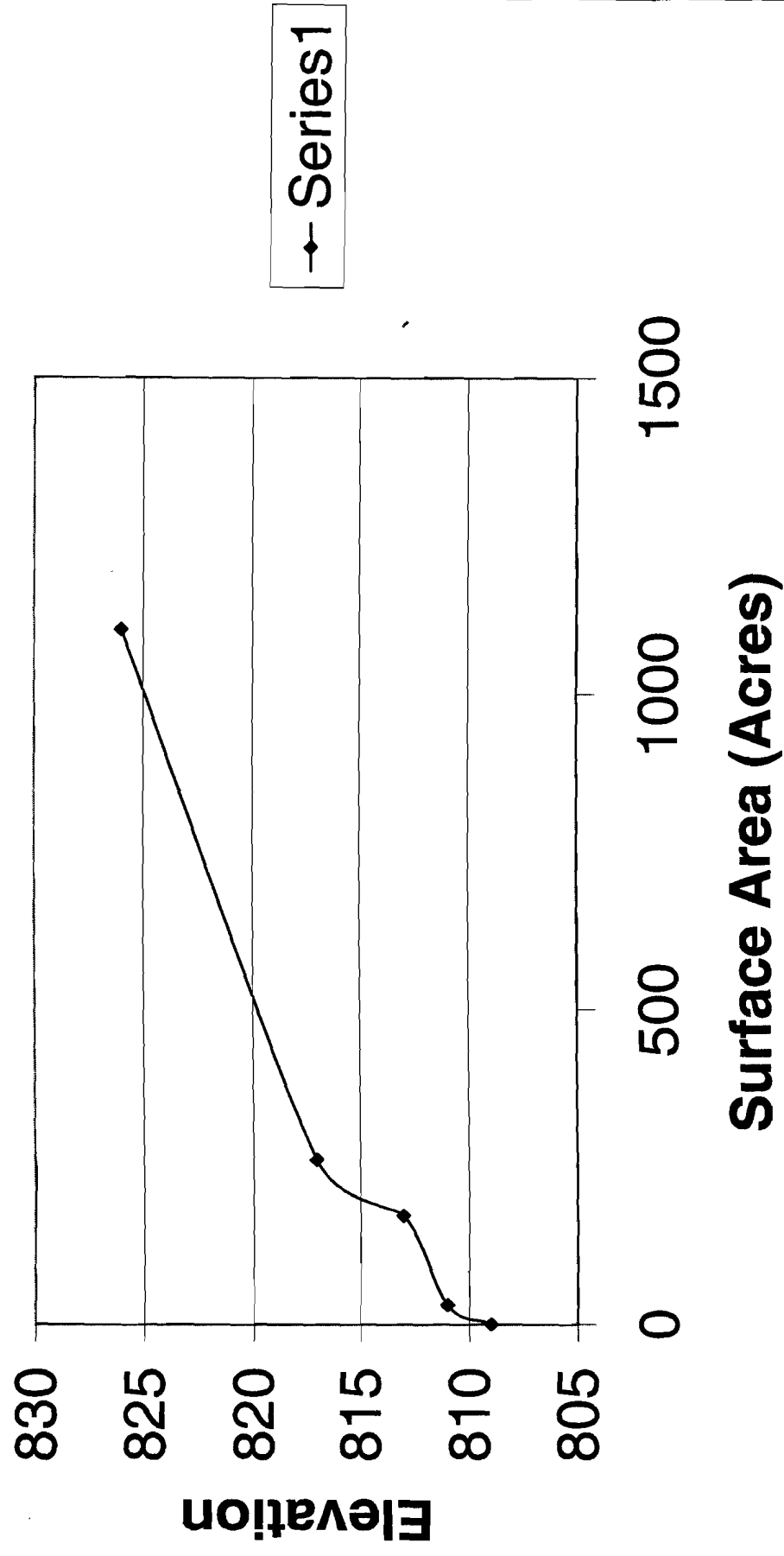
North Outlet $L = 20$ Crest 817.5

817.0	0	0	20	3.1	0
817.5	0	0	"	"	0
818.0	.5	.35	"	"	22
818.5	1.0	1.0	"	"	62
819.0	1.5	1.84	"	"	119
819.5	2.0	2.83	"	"	176

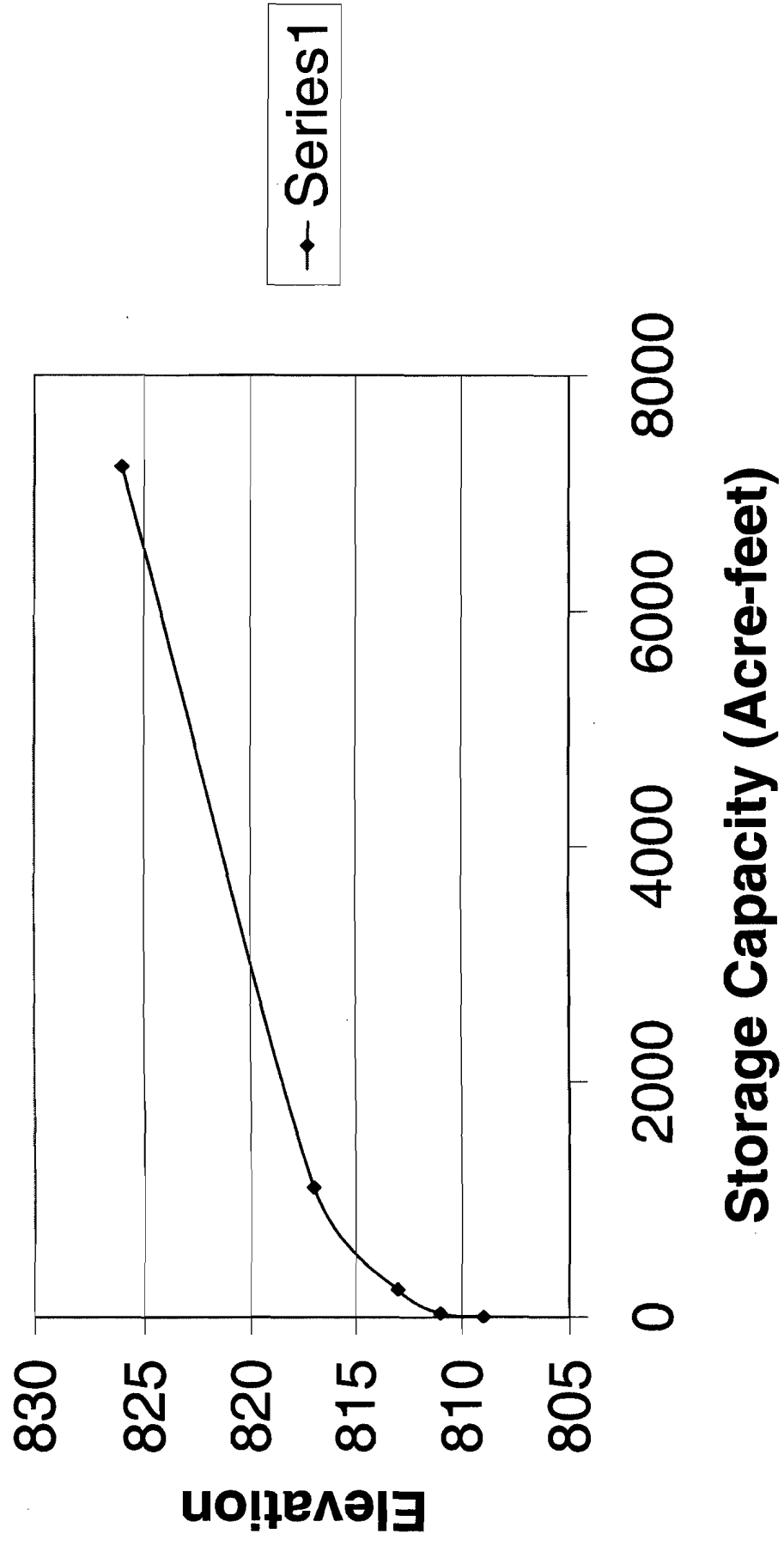
South Outlet

817.0	0	0	9	3.3	0	Q _r 0
817.5	0	0	9	3.3	0	0
818.0	.5	.35	9	3.3	10	52
818.5	1.0	1.0	9	3.3	30	92
819.0	1.5	1.84	9	3.3	55	169
819.5	$= .6 \times 18 \times \sqrt{69.9 \times 1.5}$				106	282

**Figure: Surface Area-Elevation
Relationship for Eagle Spring Lake**



**Figure: Elevation-Storage Capacity
Relationship for Eagle Spring Lake**



**Figure: Discharge Rating Curve for
North & South Outlets of Eagle Spring
Lake**

