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LOWER RARITAN/MIDDLESEX COUNTY
208 Water Quality Management Planning
Program

Analysis Report: Task 4.7, October 1975 Geometry Survey

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May 5, 1976

Mr. William Kruse
Middlesex County Planning Board
40 Livingston Avenue
New Brunswick, N.J. 08901

RE: Task 4.7, Geometry Survey

Dear Sirs:

Enclosed is our report on the methods used and data collected in the
October, 1975 Geometry Survey.

If you have any questions on this, please call us.

Very truly yours,


Patrick J. Lawler

PJL:ljs

Enclosures

I. INTRODUCTION

A. SCOPE AND RATIONALE

The physical characteristics of a stream or estuary are important in determining how it will react to input pollutant loadings. These physical characteristics, such as depth, width, and channel slope determine times of travel, velocities, and reaeration potential. In addition, in small streams, organisms which dwell on the bottom can play a role in oxygen consumption. Whereas channel slopes can be determined from topographic maps and navigational charts, the cross sectional characteristics of the study area surface waters had not been documented in the past, and therefore required a field survey.

Other information with regard to surface waters is also valuable to technical analysis, but is obtainable only by inspection in the field. Such items such as location of rapids and pools, presence of weeds, algae or slime, degree of shade, observed presence of fish, and so on, add to the the understanding of a surface water body.

The objective of the geometry survey was primarily to provide cross-sectional information on the surface waterbodies for which low-flow, steady-state modeling was to be performed:

- Upper Millstone River
- Lower Millstone River
- Raritan River and Estuary
- Manalapan Brook
- Matchaponix Brook

Data were to be collected at spatially closer intervals, than the low flow sampling stations, to provide a more complete idea of the variations in channel characteristics over the rivers' lengths. The channel characteristic information was to be supplemented by velocity measurements and the visual observations mentioned above.

The survey was conducted in two parts:

1. In the Raritan and South River estuaries, the geometry information was collected in conjunction with the low flow sampling, on 8-9 October, 1975. This was done by equipping the boat used for low-flow sampling with a fathometer and obtaining fathometric charts of cross-sectional transects.
2. In the non-tidal waters, the geometry information was collected in a separate survey, on 28-31 October 1975. The low-flow survey had included sampling only at stations accessible by car, whereas the spacing of stations felt to be needed for the geometry information necessitated the use of boats.

The initial intention was to perform the geometry survey at flow conditions similar to those prevailing during the low flow survey. Because of manpower availability, the geometry survey was scheduled to be performed about one week after the low-flow survey, (8-10 October, 1975). At that time, however, from 17-20 October, a large storm occurred, with total precipitation of over 2.5 inches, and the geometry sampling was postponed. In order to complete the work prior to die-off of all vegetation, and because there was no guarantee it would not rain again, the stream geometry survey was conducted at a time when the flows were, in fact, quite a bit higher (roughly 50%) than during the low-flow survey. As a result, the Task 5 modeling effort has included conversion of these results to low flow condition depths and cross-sectional areas, based on time of travel estimations.

B. REPORT OUTLINE

The report has been organized to discuss the geometry survey under the following topics:

1. Program Outline
2. Data Summary

The Program Outline chapter will include the rivers and estuaries covered in the survey and the methods of obtaining the data. The Data Summary chapter presents the milepoint system utilized for the study and the field data collected.

II. PROGRAM OUTLINE

A. RIVERS AND ESTUARIES COVERED

The following rivers were surveyed for their geometric characteristics: Upper and Lower Millstone, Manalapan and Matchaponix Brooks, and the Raritan River from its confluence with the Millstone to M.P. 11.5. The Raritan Estuary was surveyed from the mouth to M.P. 12.0 and the South River was surveyed from the mouth to Old Bridge.

B. METHODS

The vehicle utilized for transport on the Upper Millstone, Manalapan and Matchaponix brooks was a canoe, whereas a fourteen-foot aluminum John boat equipped with a motor was used on the Lower Millstone and Raritan rivers. At several places along the Upper Millstone, Manalapan and Matchaponix, the canoe had to be carried across land to avoid log jams on the streams which made passage impossible.

The depth of the streams was measured using a meter stick on the shallow streams and a calibrated weighted line on the deeper streams. Depending on the width of the stream, depth drops were made every 2.5 to 20 feet, to obtain a profile of the cross section of the channel. Where possible, the channel width was measured utilizing a calibrated line. In cases where the channel was too wide for the line (i.e., portions of Raritan River), the width was measured off topographical maps.

The depths of the two estuaries, the Raritan River and the South River, were measured with a Roff Fineline fathometer. Continuous readings were taken across the entire width of the estuary at each station in order to obtain the cross-sectional profiles. A 19-ft Robalo boat equipped with an outboard motor was utilized for transportation.

The width of the channel was determined by two methods: the speed of the boat was coordinated with the speed at which the paper passed through the fathometer, yielding one measurement, and, as a check, the same width measurements were obtained from topographical maps. Based on the cross-sectional profile determined from the above data, the cross-sectional area was computed and the average depth was then obtained by dividing the cross-sectional area by the top width. Water volume was evaluated from the cross-sectional area and river length of each of two consecutive segments.

In the tidal reach, the tidal average hydraulic data are required for water quality modeling. Tidal data for the survey date were obtained from the U.S. Department of Commerce Tide Tables, 1975, and were used

to adjust the survey geometry data to determine the corresponding tidal average condition. The procedure utilized in adjusting the data at each station is described as follows:

1. Obtain the mean tidal level along the river from the tidal table.
2. Determine the tidal level during the survey time, at each station.
3. Compute the difference between survey time tidal elevation and mean tidal level.
4. Calculate the correction factor for the cross-sectional area by multiplying the top width by the difference in elevation from step 3.
5. Obtain the adjusted cross-sectional area by subtracting the result of step 4 from the cross-sectional area obtained from the survey.
6. Calculate the mid-tide depth by dividing the adjusted cross-sectional area by the top width.
7. Compute the water volume by multiplying the adjusted cross-sectional area by the river length.

The results of this analysis are presented in the Data Summary Chapter.

Velocity measurements were taken in the field with a Cushing velocity meter. Because of the general difficulty of obtaining accurate velocity and flow measurements over irregular cross sections, the field results were adjusted to obtain velocity profiles along each reach; these profiles conform to the USGS gaging station flows for the survey dates. The velocities given in the data summary are the adjusted cross-sectional average velocities.

III. DATA SUMMARY

A. RIVER REFERENCE SYSTEM

A river reference system was devised to provide a rapid means of transferring field data to graphs on a scaled axis. This system consists merely of measuring the lengths of the various rivers and developing a simple coding system. The following points describe the methods used:

1. River lengths were taken from USGS quadrangles, 7.5 minute topographic maps, scale 1"=2000'.
2. River lengths are expressed in terms of miles, and locations as mile points (MP's).
3. Lengths were generally measured along the centerline of the rivers, and through the centerlines of lakes. In the Raritan and South River estuaries, lengths were measured along the centerline of the navigation channels.
4. For the Raritan Estuary and River, MP 0.0 was established at the Victory Bridge, to conform to the already established EPA system. For all tributary streams, MP 0.0 was established at the junction of the centerlines of the confluent streams (or estuaries).
5. Lengths were measured using straight paper edges, and "ticking" off the map to the paper. This method gave more consistent results on the meandering streams than a measuring wheel. Precision is judged to be within 5%.
6. The reference system was established for all main stem streams sampled, over the length sampled.

For a given stream, locations are expressed as a letter and number designation, the letter(s) identifying the stream and the mile point number, e.g., R-12 is on the Raritan River, 12 miles upstream of Victory Bridge. The following table shows the stream letter designation system:

<u>STREAM (OR ESTUARY)</u>	<u>LETTER DESIGNATION</u>
Raritan, Estuary and River	R
Millstone River, Upper and Lower	M

Green Brook	G
Bound Brook	B
South River	S
Matchaponix Brook	MT
Manalapan Brook	MN
Lawrence Brook	L

Figures 1-6 present the referencing systems on the above streams, including the identification of the streams referenced, and the integral mile points. The base map for these figures is not the USGS system, which was the one used in measuring the streams. Therefore since this base map does not show the same detail of meandering as the USGS sheets, the mile points appear to be unevenly spaced, whereas in fact they are not.

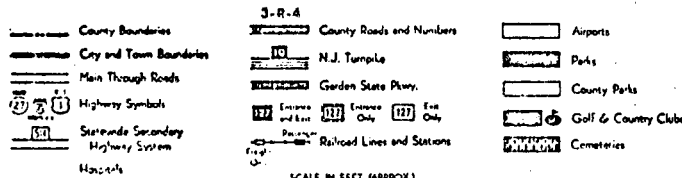
This reference system will be used in all the technical data reporting and modeling, in order to simplify presentation of results and the location identification.

B. FIELD DATA

The field data obtained during the geometry survey are presented, by stream, as Tables 1-8. The pertinent channel characteristic information has already been incorporated into the computer models for the Upper Millstone, Lower Millstone, and the Raritan River and Estuary.

STREET AND ROAD MAP OF MIDDLESEX COUNTY NEW JERSEY

WITH
County Highway System
John J. Reiser, Jr., County Engineer



SCALE IN FEET (APPROX.)
0 1000 2000 3000 4000 5000
Copyright © Mapleton Company, Inc., 450 West 33rd Street, New York, N.Y. 10001

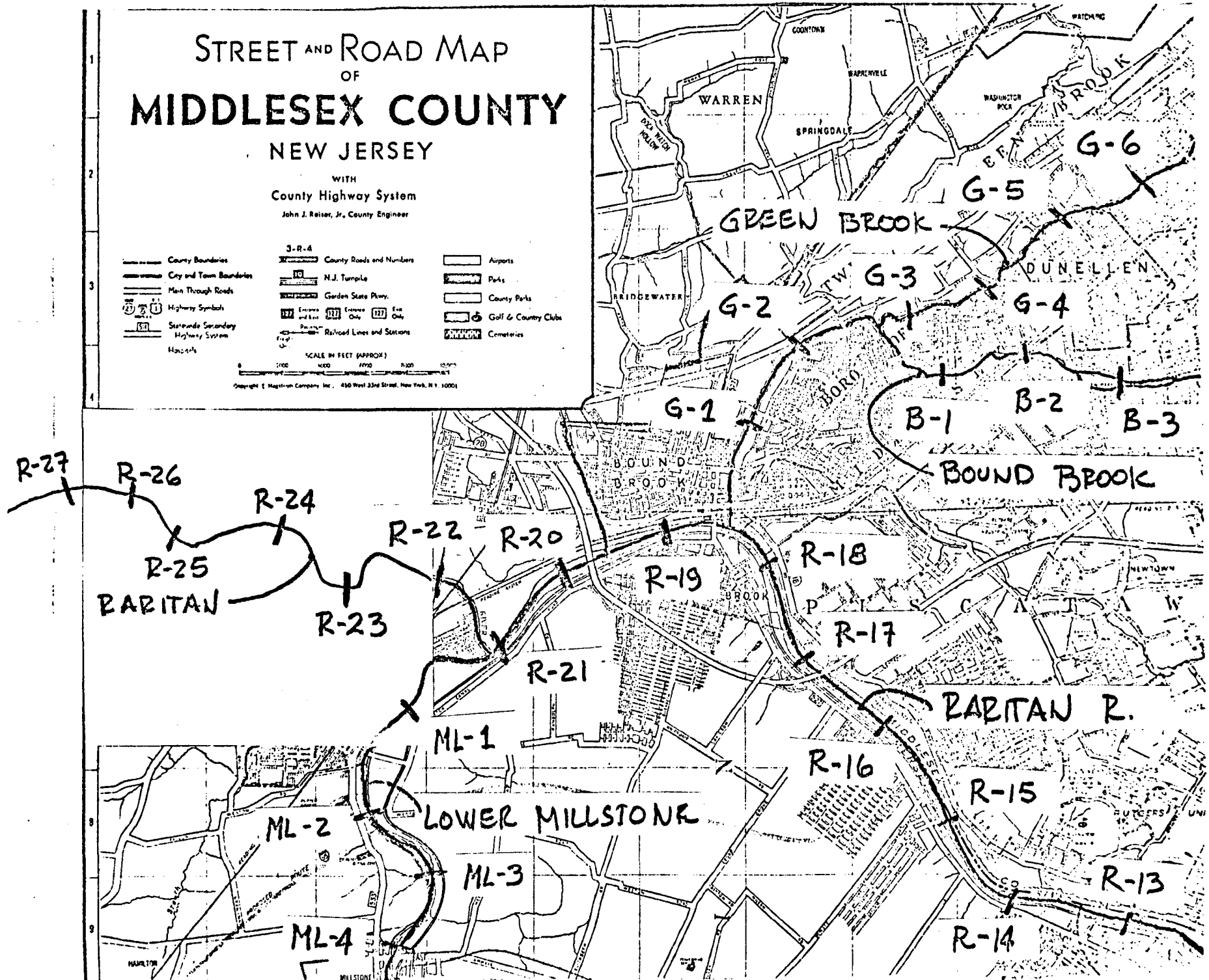


FIGURE 2

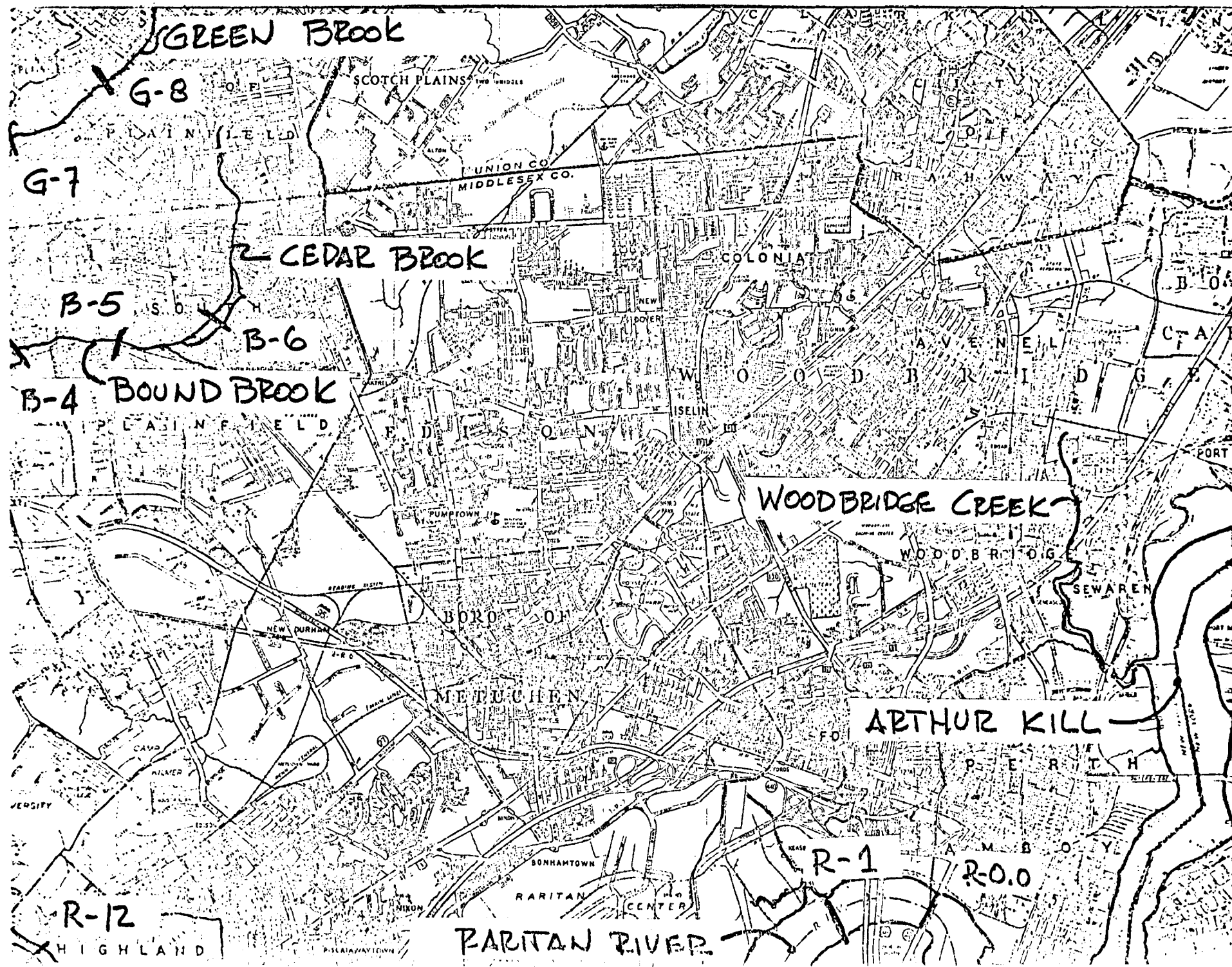


FIGURE 2.

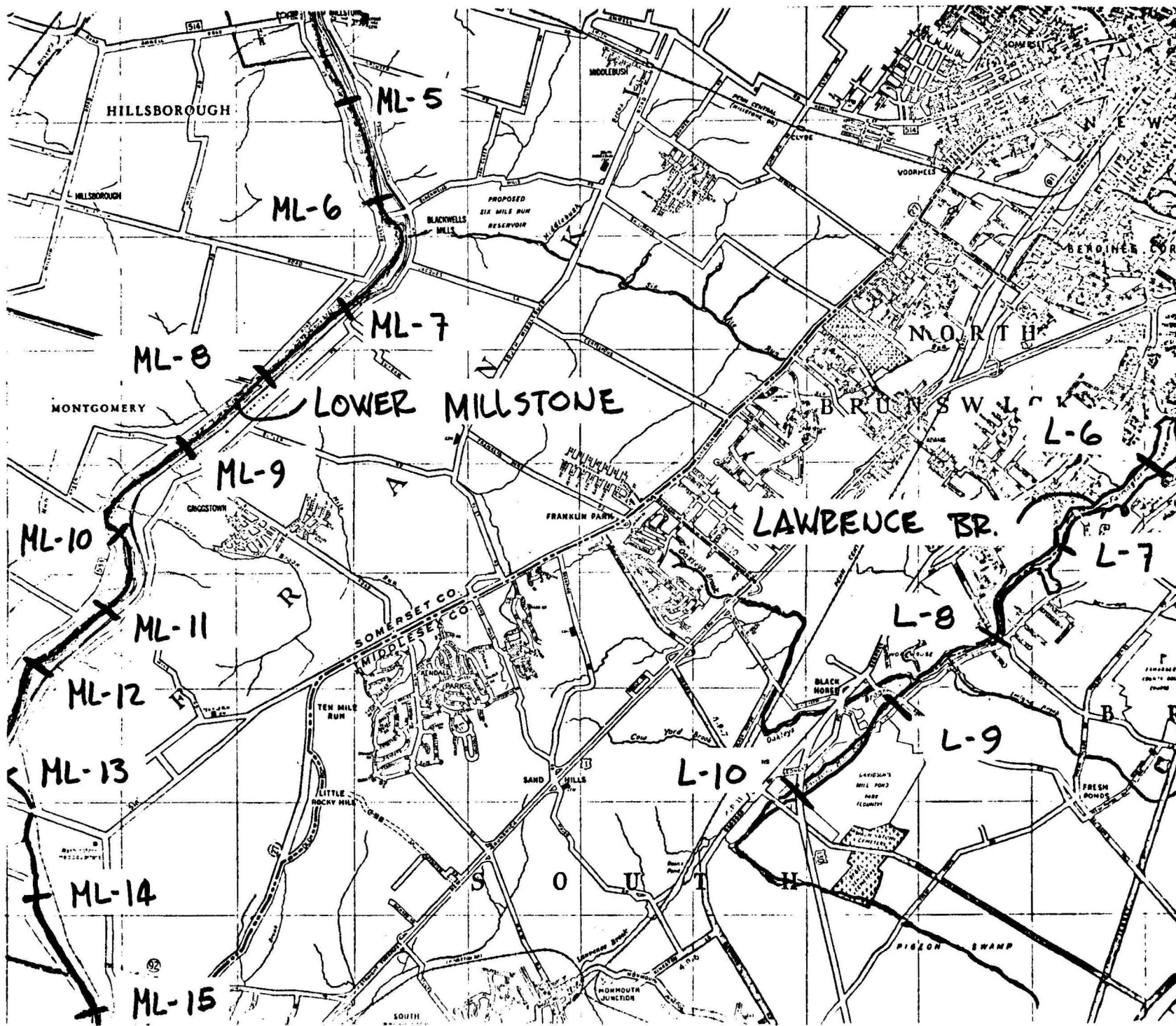


FIGURE 3

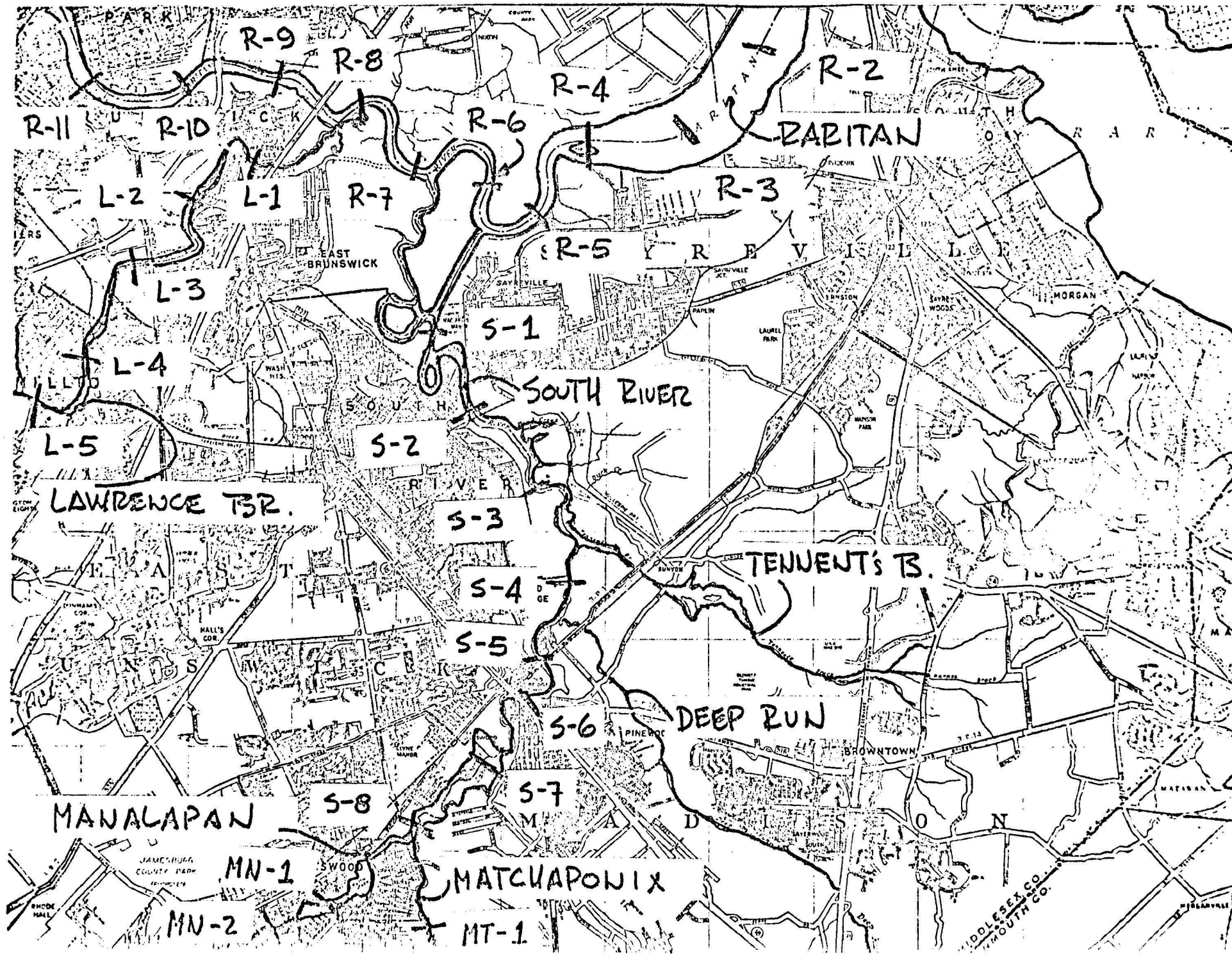


FIGURE 4

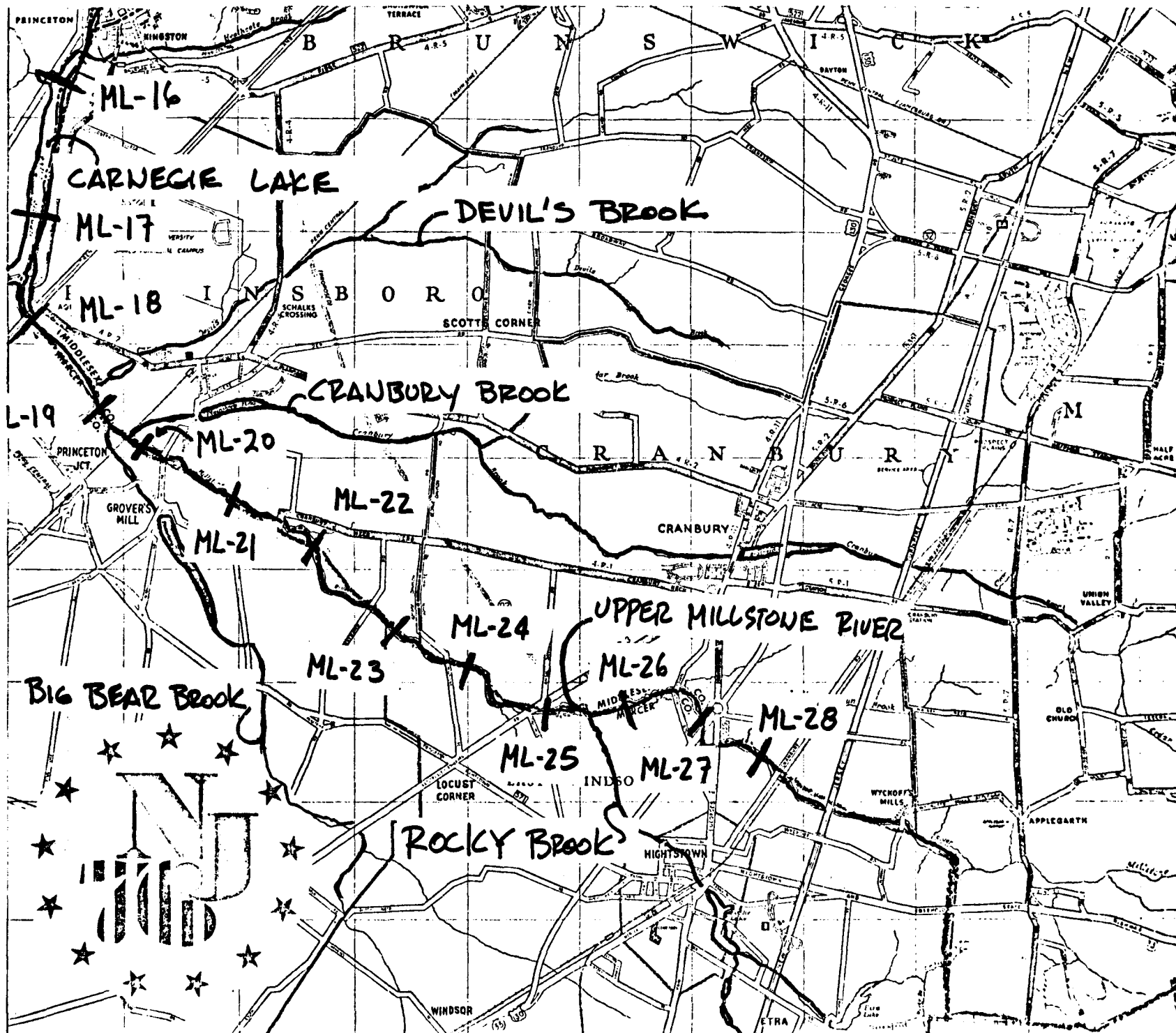


FIGURE 5

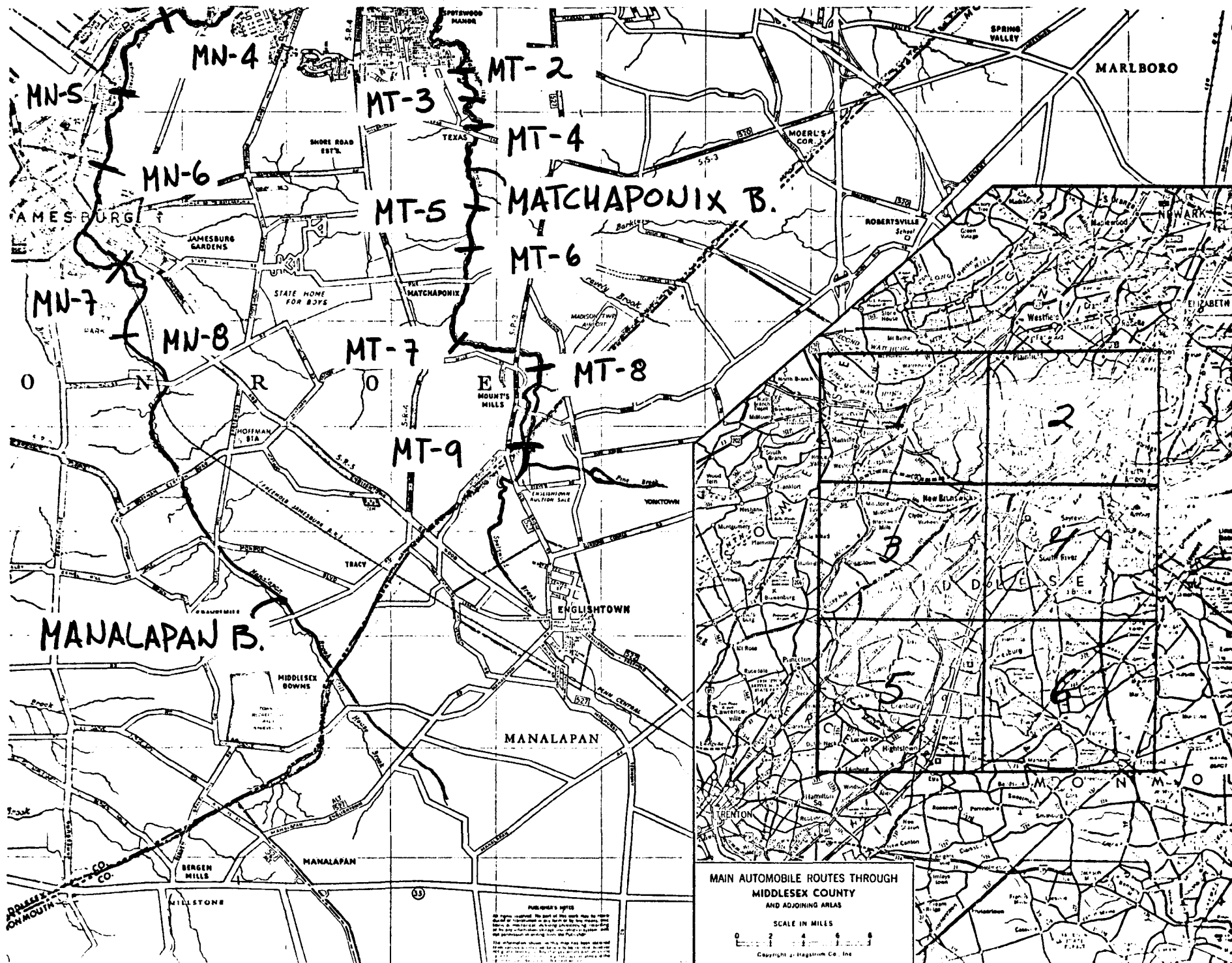


FIGURE 6

1975

[illegible]

TABLE-1
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Upper Millstone	31 OCT	0915	6	23.3	40	3.0	120	0.45	54	-	10.0	small dam sighted; shade cover light on No.; none on So.
	31 OCT	1005	7	22.6	32.5	2.2	71.5	0.77	55	7.4	10.5	low banks; light shade; emergent aquatic vegetation
	31 OCT	1055	8	21.85	25	3.2	80	0.7	56	-	10.5	1 ft banks; little shade cover; discharge pipe sighted; secchi disc=42"
	31 OCT	1140	9	21.35	35	3.6	126	0.45	57	-	11.0	shade cover=40%; 1 ft high banks; secchi disc=49"
	31 OCT	1220	10	20.75	37.5	3.2	120	0.48	58	8.0	11.0	aquatic vegetation; shade cover=20-30%; secchi disc=42"
	31 OCT	1310	11	20.1	75	5.3	397.5	0.15	59	-	11.0	discharge pipe sighted; aquatic vegetation; Cranbury Brook-15' wide x 3' deep-0.2 fps; Big Bear -15-20' wide x 5' deep-0.1-0.2 fps

1975

[illegible]

TABLE- 2

RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	GROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Lower Millstone	28 OCT	0845	1	15.3	100	2.7	270	0.84	224	9.5	14.7	reddish clay banks 1-2 ft high; 3-5" rocks along side; 4 tributaries sighted; hood plain about 4 ft above water level; shade ~35%
	28 OCT	0930	2	15.0	86	4.4	378	0.60	227	-	14.7	1-2 ft banks along river; rapids sighted; small island also sighted; shade ~ 80-100%; secchi disc = 12"
	28 OCT	0955	3	14.0	110	5.7	627	0.36	228	-	15.0	8-12' high river banks; rocky; storm-drain sighted; also stream sighted; shade ~10-25%; quarry observed; secchi disc=13"
	28 OCT	1013	4	13.6	138	7.5	1038	0.22	229	9.1	14.9	banks muddy; small outfall sighted; shade ~80%; secchi disc=14"

TABLE- 2
(Continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Lower Millstone	28 OCT	1045	5	13.15	87	5.7	496	0.47	232	-	15.1	rapids noted; mud island sighted; secchi disc=14"
	28 OCT	1105	6	12.8	86	5.2	447	0.52	233	-	15.2	banks relatively flat-2-4 ft high on S.E. side; sewer pipe sighted; tree cover ~25%; back-water area with no outlet sighted; also stream inlet sited; secchi disc = 14"
	28 OCT	1120	7	12.5	90	5.4	486	0.48	235	-	15.5	mud banks 3-5' high; small stream sighted; tree cover; ~30% secchi disc=14"
	28 OCT	1145	8	12.0	64	5.4	346	0.68	237	8.2	15.2	banks flat - 6 ft high; grassy fields on each side; large stream sighted; tree cover ~60%; secchi disc = 15"
	28 OCT	1210	9	11.4	88	4.6	405	0.73	297	-	15.0	50% shade cover; secchi disc=16"
	28 OCT	1235	10	11.1	96	5.7	547	0.54	298	-	14.9	4-5' high mud banks; stream enters river; shade cover ~20%; secchi disc= 15"

TABLE- 2
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS- SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Lower Millstone	28 OCT	1250	11	10.8	100	6.2	620	0.48	299	-	15.0	three inlets entering in area; shade cover ~40%; secchi disc=15"
	28 OCT	1320	12	10.25	80	4.9	392	0.76	300	-	15.1	bank on W.- soft shale, 8 ft high; 3 storm discharges noted; aquatic plants present
	28 OCT	1340	13	9.55	90	5.0	450	0.66	301	-	15.0	shade ~30-50%; secchi disc=15"
	28 OCT	1355	14	9.0	110	4.7	517	0.59	302	8.2	15.0	tree cover ~30%; backwater area sighted; secchi disc=16"
	28 OCT	1415	15	8.5	94	4.1	385	0.79	303	-	15.0	tree cover ~40%; small stream sighted; secchi disc = 14"
	28 OCT	1435	16	8.1	98	5.4	529	0.57	304	-	15.2	tree cover ~30%; stream inlet and storm sewer sighted; secchi disc=15"

RIVER GEOMETRY SURVEY DATA

1975

[illegible]

TABLE- 2
(Continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Lower Millstone	29 OCT	1020	21	5.9	101	4.7	475	0.72	344	-	15.1	tree cover ~40%; flood plain wider than before; inlet sighted; emergent aquatic plants noted; secchi disc=20"
	29 OCT	1040	22	5.5	106	4.2	445	0.78	345	-	15.1	tree cover ~40%; inlet sighted; emergent aquatic plants present; secchi disc=20"
	29 OCT	1100	23	5.15	120	3.0	360	0.96	346	-	15.2	tree cover ~30%; influents and 2 creeks sighted; secchi disc = 19"
	29 OCT	1115	24	4.4	95	5.1	485	0.71	346	-	15.2	shade cover ~30%; 3 small and 1 large inlet sighted; secchi disc=19"
	29 OCT	1145	25	4.2	112	4.7	526	0.66	347	8.1	15.3	shade cover ~30%; river banks sandstone; W. bank 20-30' high; 6' wide stream sighted; secchi disc=19"

TABLE-2
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Lower Millstone	29 OCT	1220	26	3.9	106	4.6	488	0.71	348	-	15.3	mud banks 2-3 ft high; shade cover ~30%; 2 streams enter; secchi disc=20"
	29 OCT	1230	27	3.4	100	5.1	510	0.68	348	-	15.2	large stream and inlet sighted; tree cover ~ 30%; secchi disc=20"
	29 OCT	1250	28	3.05	100	5.8	580	0.60	349	-	15.3	shade cover ~20%; 2 small inlets sighted; secchi disc=19"
	29 OCT	1310	29	2.6	149	5.4	805	0.43	349	8.1	15.1	tree cover ~ 20%; small inlet sighted; secchi disc=20"
	29 OCT	1330	30	2.4	114	6.0	684	0.51	350	-	15.2	tree cover ~20%; inlet, discharge pipe and stream sighted; secchi disc=20"
	29 OCT	1345	31	2.0	118	6.0	708	0.49	350	-	15.1	tree cover ~20%; 4-5 ft high dam and inlet sighted; secchi disc=20.5"

RIVER GEOMETRY SURVEY DATA

1975

[illegible]

TABLE- 3
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Raritan	30 OCT	0900	1	21.0	178	3.16	563.2	1.67	941	9.1	13.5	sewage outfall located near station; secchi disc = 35"
	30 OCT	0940	2	20.6	199	3.98	792.0	1.19	942	-	13.2	island sighted near station; stream sighted; tree cover ~ 10%
	30 OCT	1000	3	20.2	198	5.14	1017.6	0.93	942	-	13.4	1 ft high dam; sewage outfall below dam; stream sighted; shade cover 10-20%; secchi disc = 36"
	30 OCT	1030	4	19.7	175	3.66	640	1.48	944	8.9	13.4	riffle area below bridge; Middle Brook enters on S.W. shore; secchi disc = 25"
	30 OCT	1100	5	19.1	210	2.92	612.8	1.58	968	-	13.4	adjacent to river is dry river bed; secchi disc = 18"; shade covers 10-20%; rapids, riffle area near bridge; inlet sighted - Ambrose and Green Brook; sewer sighted.

TABLE-3
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS- SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Raritan	30 OCT	1125	6	18.4	275	5.02	1379.2	0.74	1023	-	13.9	shade cover ~ 15%; storm sewer sighted; secchi disc=20"
	30 OCT	1145	7	17.8	305	4.55	1388.0	0.74	1026	9.0	13.9	Influent 6-8' wide enters river; secchi disc=25"
	30 OCT	1225	8	17.2	~300	6.13	1839	0.56	1030	-	14.5	2-3 ft high dam sighted; secchi disc=16"; width estimated from field notes and topo- graphical maps

TABLE-3
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Raritan Estuary	30 OCT	1315	8A	16.8	~210	3.44	723			-	13.9	Tree cover 10%; secchi disc = 18"; width estimated from topographical maps
	30 OCT	1340	9	16.5	~200	3.47	694			-	14.0	small stream enters on S.E. bank; small inlet also sighted; width estimated from topo maps
	30 OCT	1410	10	15.9	250	3.72	930			8.8	14.0	shade cover ~10%; secchi disc=19"; overall average river depth shallower from stations 6-10 than sampling indicates
	30 OCT	1435	11	14.9	~300	1.29	388			9.3	14.5	high river bank on canal side; secchi disc=25"; width estimated
	30 OCT	1500	12	14.1	~330	0.71	235			8.8	14.0	shade ~10%; stream inlet sighted; storm sewers sighted; secchi disc=22"

TABLE- 3
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Raritan Estuary	30 OCT	1515	13	13.2	380	2.53	961			9.0	13.9	width estimated from maps
	30 OCT	1545	14	12.5	530	2.36	1249			9.4	14.0	creek influent sighted; secchi disc=27"; width estimated from topo maps
	30 OCT	1600	15	11.9	440	4.85	2134			8.9	14.0	secchi disc=25"; width estimated from topo maps
	30 OCT	1610	16	11.5	640	6.21	3974			8.4	13.9	secchi disc=23"; width estimated from topo maps

TABLE-4
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Matchaponix	30 OCT	1330	A	9.3	27.5	2.31	63.64	0.60	38	-	14.5	STP discharge noted; narrow channel noted
	30 OCT	1400	B	8.5	32.5	1.40	45.44	0.90	41	-	14.5	woods on banks; shade ~70%; concrete abutment noted
	30 OCT	1420	1	7.6	25	3.24	81.04	0.53	43	-	14.5	island in center about 1/2 acre; shade ~75%; secchi disc= 26"; small stream sighted
	29 OCT	0845	1	7.6	25	3.29	82.22	0.56	46.0	8.2	14.0	same as above
	29 OCT	0915	2	6.95	27.5	2.21	60.78	0.79	48.0	-	14.0	few trees on east side of river; water very turbid; banks 2 ft and sandy; 50% shade cover
	29 OCT	1025	3	6.4	35	1.85	64.91	0.77	50.0	8.8	14.5	secchi disc=27"; W. bank ~10' high; algae on rocks; 3 streams sighted

4

1975

[illegible]

TABLE- 4
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Matchaponix	29 OCT	1445	9	2.25	43	3.31	142.21	0.47	67.0	8.6	15.0	banks 2-3 ft high; shade cover ~50%; secchi disc=25"; large brook and storm drain sighted
	29 OCT	1535	10	1.8	32.5	2.0	64.91	1.05	68.0	-	15.0	banks clay - 2 ft high; drainage ditch sighted; fallen trees noted
	29 OCT	1620	11	1.3	32.5	3.16	102.87	0.68	70.0	8.4	15.0	dam or weir located below station - not entirely across brook
	29 OCT	1650	12	0.9	40	3.35	133.95	0.54	72.0	-	15.0	large fork sighted; 3 drainage ditches sighted
	29 OCT	1720	13	0.25	47	4.57	215	0.34	74	-	15.0	located below Greystone Ave. Bridge

TABLE- 5

RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Manalapan	28 OCT	0915	1	6.5	30	1.93	57.8	0.95	55	9.4	15.0	dam sighted; discharge pipe sighted; bottom-coarse gravel with steep banks; shade ~20%; STP discharge pipe downstream-banks-mud 2-3 ft; secchi disc= 36"
	28 OCT	1015	2	6.1	27.5	2.47	67.9	0.82	56	9.1	15.0	bottom sandy with silt; shade ~75%; river banks 2-3 ft and mud; secchi disc = 36"; downstream-gravel bottom; banks 2-3 ft and muddy; 2 streams sighted as well as rapids
	28 OCT	1106	3	5.5	25	2.2	67.9	0.85	57.5	-	15.2	muddy banks; sandy bottom; shade ~75%; three small streams sighted
	28 OCT	1250	4	5.0	25	1.79	44.8	1.29	58.0	-	15.0	sandy bottom; 3-4' banks composed of mud & clay; shade ~75%; secchi disc= 33"; 3 drainage ditches sighted

TABLE- 5

RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS-SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Manalapan	28 OCT	0915	1	6.5	30	1.93	57.8	0.95	55	9.4	15.0	dam sighted; discharge pipe sighted; bottom-coarse gravel with steep banks; shade ~20%; STP discharge pipe downstream-banks-mud 2-3 ft; secchi disc= 36"
	28 OCT	1015	2	6.1	27.5	2.47	67.9	0.82	56	9.1	15.0	bottom sandy with silt; shade ~75%; river banks 2-3 ft and mud; secchi disc = 36"; downstream-gravel bottom; banks 2-3 ft and muddy; 2 streams sighted as well as rapids
	28 OCT	1106	3	5.5	25	2.2	67.9	0.85	57.5	-	15.2	muddy banks; sandy bottom; shade ~75%; three small streams sighted
	28 OCT	1250	4	5.0	25	1.79	44.8	1.29	58.0	-	15.0	sandy bottom; 3-4' banks composed of mud & clay; shade ~75%; secchi disc= 33"; 3 drainage ditches sighted

TABLE- 5
(continued)
RIVER GEOMETRY SURVEY DATA

1975

RIVER	SAMPLING DATE	SAMPLING TIME	SAMPLING STATION NUMBER	MILE POINT	WIDTH (ft)	AVERAGE DEPTH (ft)	CROSS- SECTIONAL AREA, (ft ²)	VELOCITY (fps)	FLOW (cfs)	D.O. (mg/l)	TEMP. (°C)	OBSERVATIONS
Manalapan	28 OCT	1410	5	4.2	25	1.55	38.8	1.55	60.0	-	15.0	aquatic vegetation; 80% shade cover; sand silt bottom with mud banks; 3 ft high; 2 dis- charges sighted; storm drain
	28 OCT	1445	6	3.3	30	2.64	79.2	0.78	62.0	-	15.0	3 ft clay banks; with sandy bottom; secchi disc=32"; large brook sighted, dis- charge outfall and soapy stream sighted
	28 OCT	1830	7	2.5	25	2.94	73.5	0.86	63.5	-	15.0	left bank steep, 2 ft high; right bank 1 ft high; secchi disc=32"; shade=75-80%; 3 storm drains sighted small brook

1975

[illegible]

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[illegible]

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[illegible]

TABLE-8

1975

[illegible]

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[illegible]

DEMCO NO. 38-298

Middlesex County (N.J.)		State
Planning Board.		M62/1
Lower Raritan/		P71
AUTHOR	Middlesex County 208	.5/Ge
Water Quality Management		
TITLE	Planning Program. Geometry	
Survey. Oct. 1975 Task 4.7.		0753
DATE DUE	BORROWER'S NAME	ROOM NUMBER
10/1		1

Government Publications