BAYONNE

REPORT ON PROPOSED INTERCEPTING SEWERS AND SEWAGE TREATMENT PLANT

1946

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BAYONNE

REPORT ON PROPOSED INTERCEPTING

SEWERS AND SEWAGE TREATMENT PLANT

Existing Sewer System.

Bayonne is now served by a system of combined sewers, discharging into Upper New York Bay and the Kill Van Kull on the east and south, and into Newark Bay on the west. All flow is by gravity with the exception of one pumping station on Ave. F near 30th St. which boosts the flow from a small low area.

Objective of Proposed Works

To meet the requirements of the State Department of Health and the Interstate Sanitation Commission, sewage discharged to the waters adjacent to the City must be treated. The degree of treatment necessary is not as high as would be needed on an inland stream, and sedimentation only is sufficient to meet the requirement. This will remove the greater part of the settleable solids and thus reduce the oxygen demand of the sewage and also prevent the formation of sludge banks in the receiving waters. This deposition of sludge on the bottom has much to do with the depletion of oxygen from the waters of the harbor.

Location of Treatment Plant

Much study was given by city officials and their engineers to the selection of site for the sewage treatment plant and the final location is ideally situated for the sewage treatment plant and the final location is ideally situated for the purpose. It is east of Ingram Ave., south of Oak St., and adjacent to the Kill Van Kull where the rapid current will provide excellent dilution of the effluent. Land is included for a dock so sludge may be barged to sea if desirable, or transported by water to fertilizer plants. The plant site is in an industrial area adjacent to oil plants. This makes available a source of power in oil and refinery gas. The site is also favorably located with regard to collecting the sewage as it is in the approximate center of the system.

Intercepting Sewers

The intercepting sewers are planned to intercept all of the dry weather flow and a considerable portion of the storm water runoff. The northeasterly intercepting sewer starts at the Hudson Boulevard and the old Morris Canal and runs along the old canal adjacent to the Bayonne and Jersey City Line. This will intercept the flow from an area in Bayonne that now discharges into Newark Bay at 59th Street and will also serve a portion of Jersey City that is tributary to the old canal. Where the canal intersects the National Docks Railway it turns to the south and runs along the railway property to 31st Street where it continues on Ave. F to 19th St. where it traverses private and city property to the plant. This line intercepts all existing sewers north of the plant that now discharge into New York Bay and the Kill Van Kull. Intercepting Chambers for Bayonne are located at 59th St. and Hudson Blvd., 50th Street, 34th Street, 30th Street and 15th Street. Provision is also made for the addition of 1.5 mgd of sanitary sewage from the Navy Base near 33rd St. to provide for future development of the Base that will not be served by the existing Navy Treatment Plant. Capacity is also provided for the flow from the westerly area which will be collected by an intercepting sewer along Newark Bay that will intercept the sewers now discharging into the Bay and carry the intercepted flow to a Pumping Station located at 25th Street near the Bay. The force main will connect with the easterly intercepting sewer at 22nd Street.

The south-easterly intercepting sewer will start at South Ave. and 5th Street and run down South Street to 1st Ave. which it will follow as far as Lexington Ave. It will go up Lexington Ave. from First Ave. to East 2nd Street and thence along East 2nd Street and a continuation thereof past Ingram Ave. when it goes through private property to the Treatment Plant. This line will pick up existing sewers at West 5th St. and north of

West 3rd St. that discharge into Newark Bay, and sewers on Ave. C, Ave. D and Ingram Ave. that discharge into the Kill Van Kull. A portion of this intercepting sewer on First Ave. between the Boulevard and Ave. C is planned for immediate construction as the paving of this street is desired by the Navy.

Basis of Design of Intercepting Sewers.

There is no standard practice for the design of sewers to intercept the flow from combined sewers. This is no doubt because the number of combined sewer systems in this country is small compared to separate systems. It is sometimes said that the first flush should be taken in the interceptor. It is impossible to flush all of the system as the hydrographs to follow indicate. To completely flush the sewers will require a time sufficient for sewage from the furthest point to reach the interceptor. This time corresponds approximately to the time of concentration at which the maximum flow will occur. Obviously this maximum flow cannot be taken, so a complete flushing is not possible. Many assumptions for the amount of storm flow are arbitrary and empirical. Some municipalities provide only for the maximum dry weather flow, others use certain rates per capita, as 500 gallons, which provide for some increase over the dry weather flow. In Toledo, an allowance of run-off of rains not in excess of .02 inches per hour of rain was made.

As the purpose of the intercepting sewers and treatment plant is to reduce the amount of organic matter reaching the receiving waters, a study was made to determine the best size of intercepting sewers and treatment units to accomplish this end and to estimate the amount of organic matter that would pass out through overflows in the intercepting chambers compared to that in the plant effluent. There is a general misconception that a tremendous organic load is bypassed in combined systems with intercepting sewers. For example, Dr. Imhoff, when he visited this country shortly after the first World War, remarked that it seemed silly for one of the large American Cities to provide complete treatment by activated sludge when raw sewage was discharged directly from combined sewer overflows. Our studies show that the amount of sewage from overflows is surprisingly small.

To obtain a picture of actual conditions during runoff, studies were made of the flows during typical storms. Fig. 1 shows rainfall curves for various frequencies in the vicinity of New York. The 2 to 100 year curves were derived from data in U.S. Dep't. of Agriculture Miscellaneous publication No. 204. "Rainfall Intensity Frequency Data" by David L. Yarnall. The curves for greater frequency were obtained from a probability study of rainfall intensity frequency, correlated with the number and duration of storms in the Met-

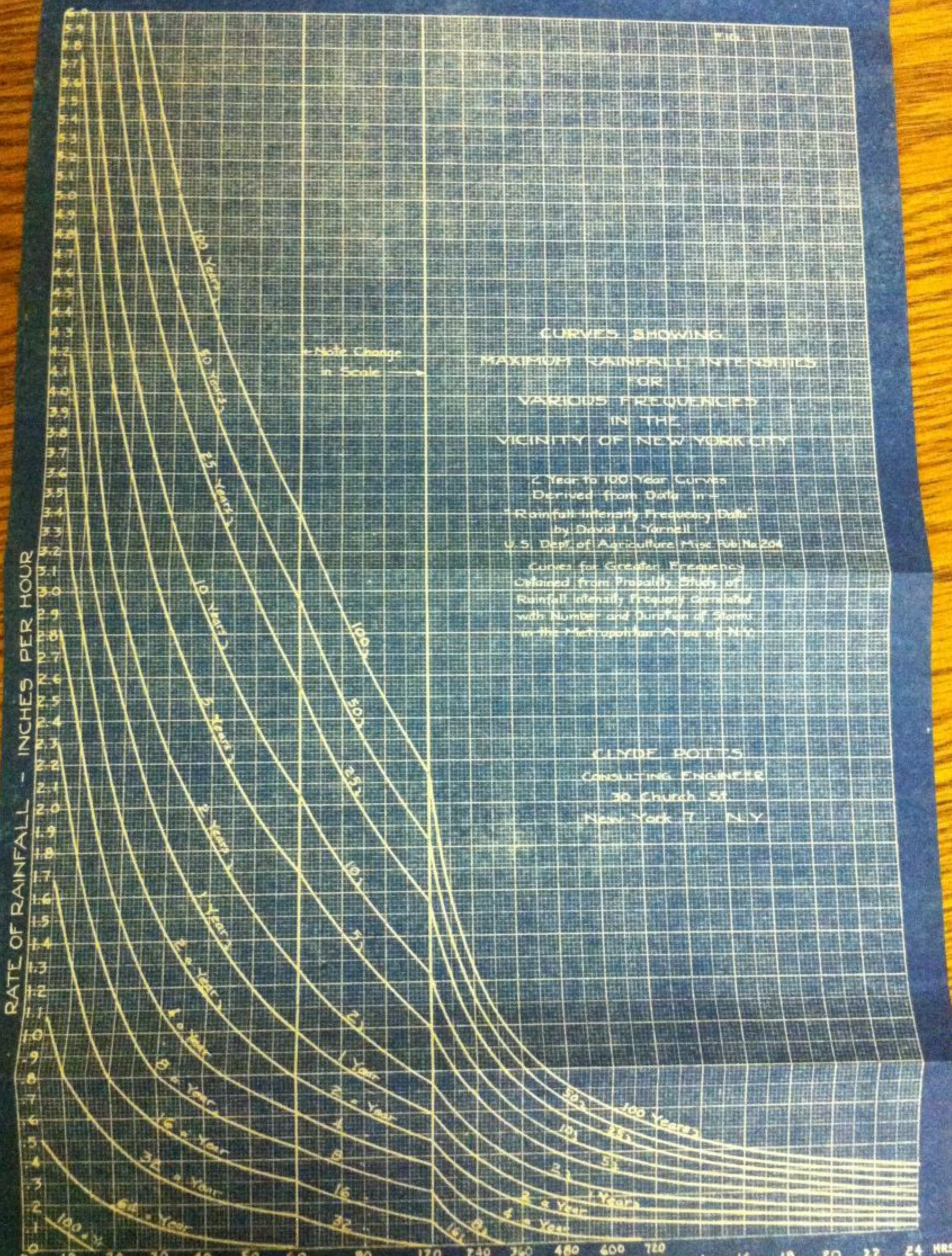
FIG.
CURVES SHOWING
MAXIMUM RAINFALL INTENSITIES
FOR
VARIOUS FREQUENCIES
IN THE
VICINITY OF NEW YORK CITY
2 Year to 100 Year Curves
Derived from Data in
"Rainfall Intensity Frequency Data"
by David L. Yarnell
U.S. Dept. of Agriculture Misc. Pub. No. 204
Curves for Greater Frequency
Obtained from Probability Study of
Rainfall Intensity Frequency Correlated
with Number and Duration of Storms
in the Metropolitan Area of N.Y.
CLYDE POTTS
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30 Church St.
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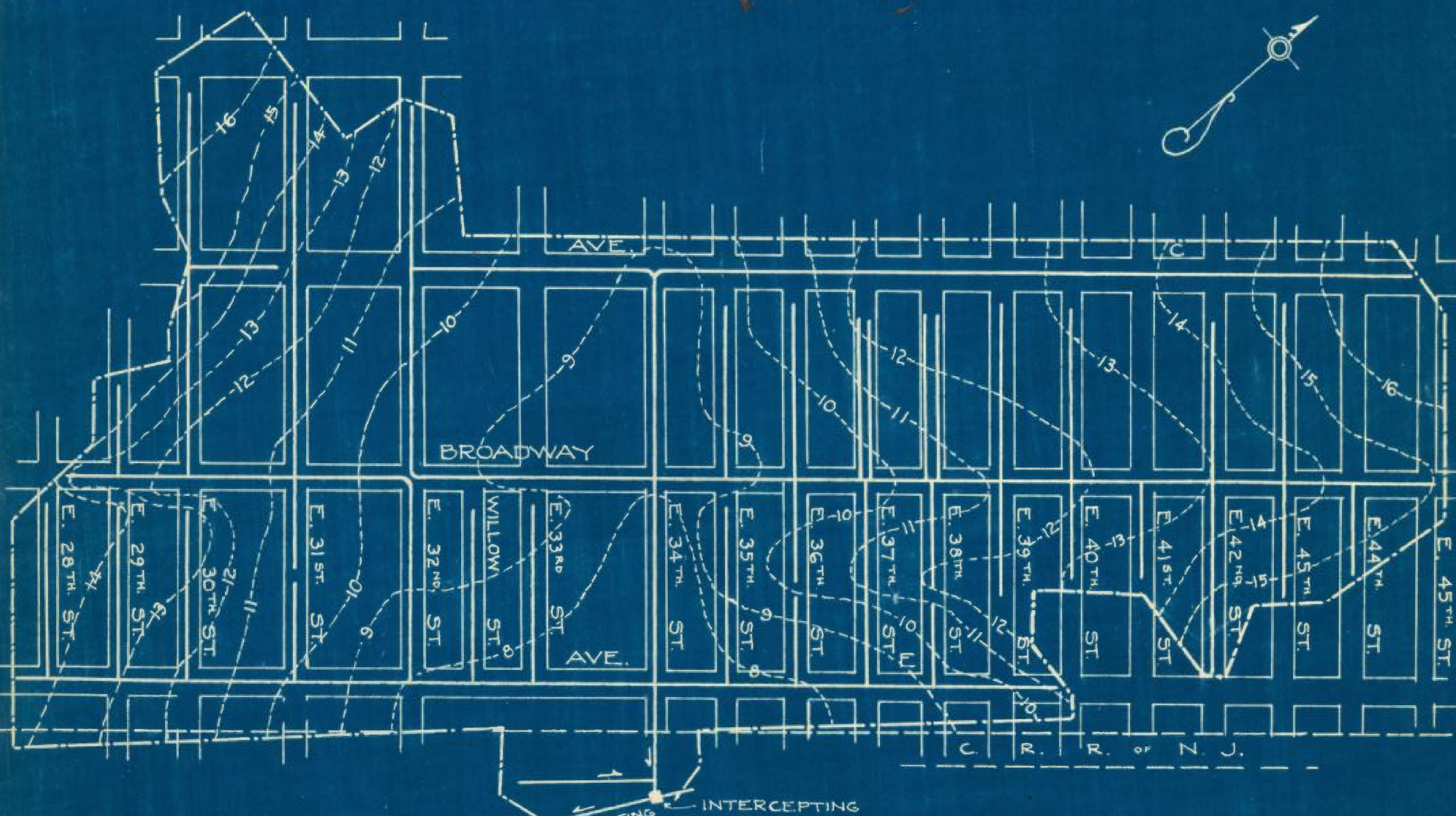
Note Change in Scale
100 Years
50 Years
25 Years
10 Years
5 Years
2 Years
1 Year
2 x Year
4 x Year
8 x Year
16 x Year
32 x Year
64 x Year
100 x Yr
RATE OF RAINFALL - INCHES PER HOUR
DURATION OF RAINFALL
MINUTES
HRS



To Accompany Report by
CLYDE POTTS
CONSULTING ENGINEER
30 CHURCH ST., N.Y. 7, N.Y.

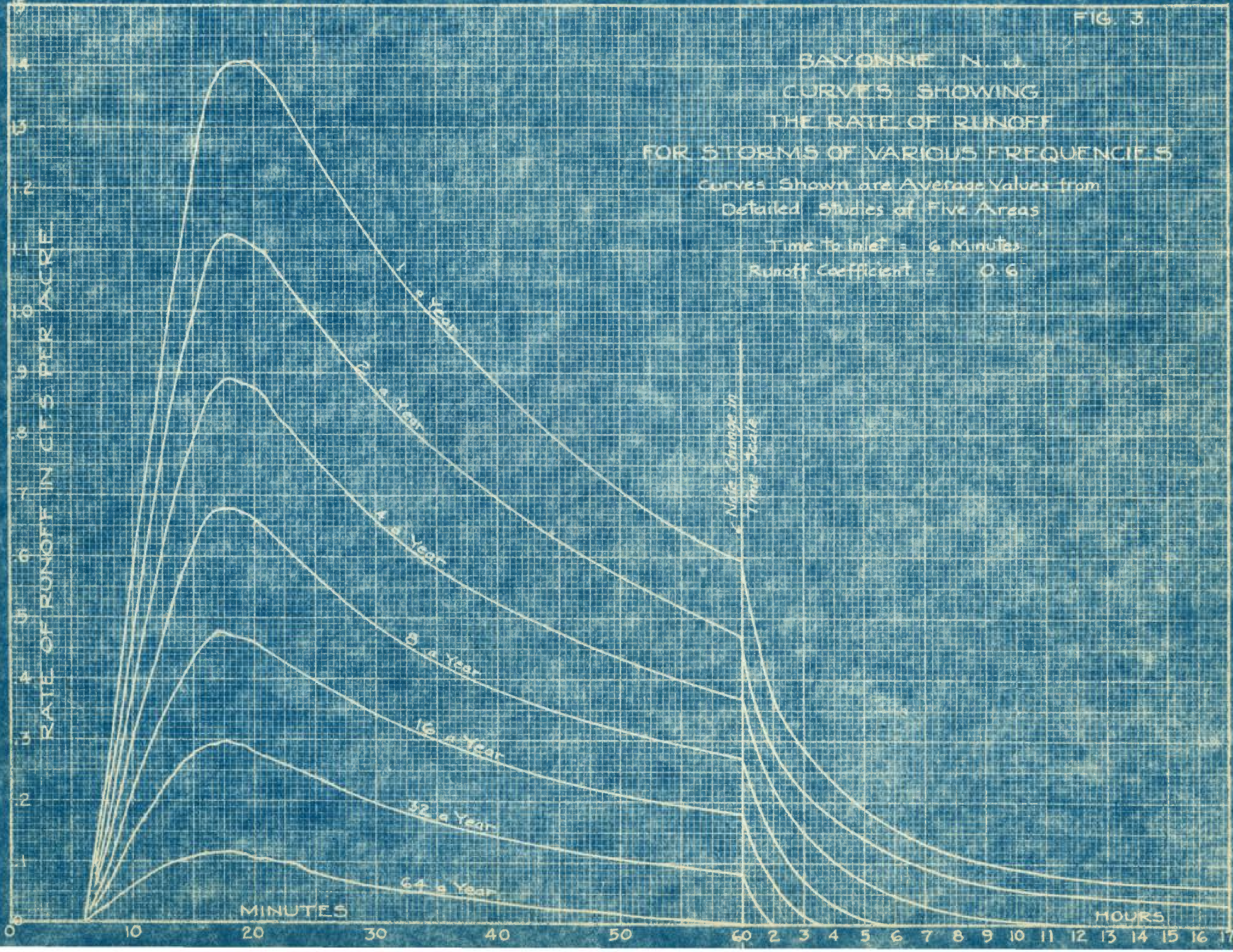
----10--- Dashed Lines Indicate Time in Minutes for Runoff to Reach Intercepting Chamber.

BAYONNE, N. J.
INTERCEPTING SEWER
MAP OF 34TH. STREET AREA

SCALE:-1" = 500'

FIG. 2

FIG. 3



BAYONNE N. J.
CURVES SHOWING
THE RATE OF RUNOFF
FOR STORMS OF VARIOUS FREQUENCIES
Curves Shown are Average Values from
Detailed Studies of Five Areas
Time to Inlet = 6 Minutes
Runoff Coefficient = 0.6
RATE OF RUNOFF IN C.F.S. PER ACRE
MINUTES
HOURS
1 a Year
2 a Year
4 a Year
8 a Year
16 a Year
32 a Year
64 a Year
Note Change in Time Scale

ropolitan area of New York. The U.S. Weather Bureau in New York give the average number of days when the precipitation was 0.01 inch or more as 116 in one year. A study of the rainfall records from 1914 through 1942 show that the rainfall exceeded 0.1 inch on 74.24 days.

To obtain a hydrograph of the flow from each area, isochrons or lines indicating the time required water to reach the intercepting chambers were plotted on the map. Fig. 2 shows such a map for the 34th St. area. The areas within these isochrons were planimetered and tabulated. A separate computation was made for each of several frequencies, including 1,2,4,8,16,32 and 64 storms a year. In the tabulations, the rainfall intensity or "I" was taken for each time in minutes. Six minutes was allowed for time to reach the inlets. The rainfall intensities were then multiplied by 0.6, the assumed runoff coefficient "C" to give "C.I." The areas planimetered from the isochrons were tabulated in line with their corresponding times and multiplied by "C.I". The results give the flow for each minute. The form of the graphs is shown in Fig. 3 indicating the mean values for several areas computed as described. For each frequency of storm, the flows at each intercepting chamber were plotted, spacing the hydrographs to allow for the time of flow in the intercepting sewer between intercepting chambers. Fig. 4 shows such a plotting for 8 storms a year. At each chamber a horizontal line is drawn indicating the amount of flow that will be carried in the intercepting sewer, which is approximately the capacity of the sewer. The area above this line indicates the amount of overflow and the area below the line, the flow that will pass down the sewer to the next chamber. By adding the flows from the upstream sections to the flow at any point, the total flow is obtained. These graphs also indicate the duration of overflow at each chamber. From these data the percentage of sewage that is diverted may be calculated. The charts also indicate the best size of intercepting sewer, that will allow a minimum overflow without excessive sizes.

→ based on present population @ 100,000 → 100 m.g.d. total max capacity

The design flow chosen was 1,000 gpd per capita. This is the total maximum flow that will be intercepted during storms and includes the normal sanitary flow and infiltration. From a sanitary standpoint the exact amount of infiltration has little significance provided the sewers have adequate capacity to include it, as infiltration carries no pollution. It does use up a portion of the sewer capacity and thus reduces the reserve capacity provided for storm water. For old sewer systems as in Bayonne, the best estimate of infiltration is on an area basis. A value of 1,000 gallons per acre is considered a fair value for infiltration.

Dry Weather Flow.

The April 1938 report of the National Board of Fire Underwriters give the water consumption in 1936 as 9,494,000 gallons per day, or a per capita consumption of 99 gallons per capita. They also state that about 60% of the consumption is used for manufacturing. This gives a domestic consumption of only 40 gallons per capita. The variation in consumption is largely due to an increase in industrial usage. For example in 1944 the water consumption averaged less than 13 mgd with a maximum month of 13.3 mgd. The domestic sales were 28% and factory sales 72%. 28% of 13 mgd is 3.64 mgd or for an estimated population of 91,000 the domestic per capita consumption was 40 gallons.

The following table lists the average water consumption of the larger consumers for the period of Oct. 1, 1944 to Sept. 30, 1945.

Consumer	Average Consumption.
	gpd
American Radiator Co.	113,200
Best Foods Co.	147,500
General Cable Co.	161,700
Pharma Chemical Co.	115,500
Solar Mfg. Co.	222,700
Standard Oil Co.	2,018,500
Texas Oil Co.	146,200
Tide Water Oil Co.	1,712,600
U.S. Naval Supply Dept.	847,800
	5,485,700

This list includes 847,800 gpd from the Naval Supply Depot which has a treatment plant so this flow will not go to the proposed sewer. Much of the water used by the large consumers is for cooling purposes and steam generation and will not be included in the flow to the sewers. The quantity of water used by industry varies with business conditions and was high during the past war period. For normal or average conditions it is estimated that the per capita flow will be made up as follows:

Domestic Sewage.	40 gallons per capita.
Industrial Waste to Sewer	50 " " "
Infiltration	20 " " "
T o t a l	110 gallons per capita per day.

The infiltration is based on 1,000 gallons per acre.

The allowance for industrial waste is believed adequate for the average quantity that will reach the plant. The margin of flow provided between the dry weather capacity and the storm flow capacity in the intercepting sewers is ample to care for any fluctuations of sanitary and industrial flows.

Quantity of Overflow:

Fig. 4 shows a typical plotting of the storm flow for the northeasterly intercepting sewer. The hydrographs represent the runoffs at the various chambers for a storm that would be expected 8 times a year. Similar studies were made for frequencies of 1,2,4,16,32 and 64 storms a year. No overflow occurs with a 64 a year storm. From these plottings the time of overflow is obtained at each chamber. The total time for any area is computed from the sum of the time for each frequency times the number of occurrences per year. The time of overflow expressed in percent of a year multiplied by the yearly sanitary flow gives the annual quantity of sanitary sewage that will overflow at times of storm. This quantity is conservative as it assumes all of the sanitary sewage will overflow. Actually much will go to the intercepting sewer, including all of the heavier solids that are carried along the bottom of the sewer. During a considerable part of the overflow period, the total flow does not greatly exceed the capacity of the interceptors, so most of the sanitary flow will be intercepted. Disregarding this refinement, and assuming that no sanitary sewage reaches the intercepting sewer when storm water is overflowing, the percentage of sanitary sewage that would not be treated computed for the northeasterly interceptor for a year is only 0.4%. As this interceptor serves a large portion of this city, this value is considered typical and representative of the total.

Intercepting Chambers

Intercepting Chambers are provided where the intercepting sewer intersects existing sewers. The design of each chamber is adapted to the conditions at each location such as sizes and relative elevations and alignment of existing and proposed sewers. In operation, all of the chambers are similar and function as follows:

1. The dry weather flow passes directly to the intercepting sewer. There are no weirs or obstructions and the invert slopes from the existing to the intercepting sewer so all transported solids will be intercepted.

2. A motor-operated automatically controlled sluice gate is provided between the existing and intercepting sewers. This is controlled by a float in the interceptor and will allow flow to pass until the flow in the interceptor reaches a predetermined depth. The gate will then close enough to throttle the flow so the desired flow in the intercepting sewer is maintained. The flow into the intercepting sewer is never completely stopped but continues throughout the storm. This feature is considered important in keeping the amount of organic matter that is by-passed to a minimum.

3. Provision is made for the overflow of excess storm water by means of weirs or channels as shown on plans. Overflow devices are planned so that there will be no appreciate backing up of the existing sewer when it is at full capacity.

4. The existing sewer down-stream of the intercepting chamber will be used for overflow only. Where the sewer is low enough to be affected by high tides, tide gates are provided to prevent access of tide water into the interceptors.

The application of the basic functions of the intercepting chambers to different local conditions is shown on typical designs. At 50th Street, a 48 inch combined sewer is intercepted by a 48 inch sewer. In this case the two sewers are practically at the same elevation. In the chamber, a channel with side weirs diverts the flow to the motor-operated sluice gate and to the intercepting sewer. Storm water overflows the weirs and passes under the intercepting sewer through tide gates to tidewater.

At 34th St., two 48 inch pipes are intercepted and the flow drops into a channel which is connected by sluice gate to the interceptor. Storm water overflows the bench.

At 30th St., the existing sewer and intercepting sewer are parallel with flows in opposite directions. A sump provided in the existing sewer is connected to the interceptor which is lower than the existing line.

A similar plan but of different arrangement is used at the large chamber where the 54 inch sewer from Ave. E and 15th Street is intercepted. Here the lines cross with the intercepting sewer below the existing line.

Sewage Treatment Works

The plant is designed to serve the whole city. The estimated population in 1962 is 110,000 as shown on Fig. 5. Fig. 6 shows the population per acre.

FIG. 5

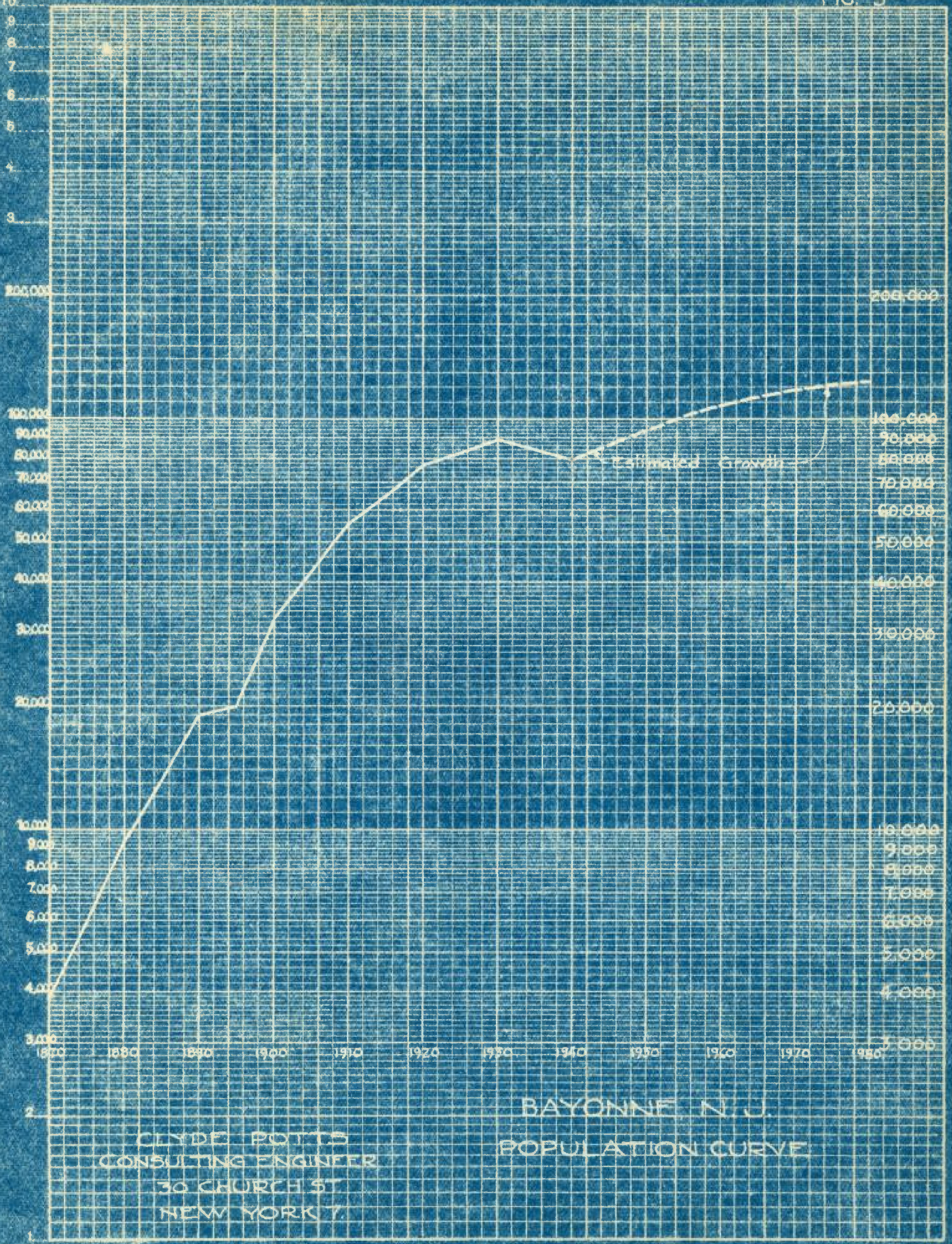
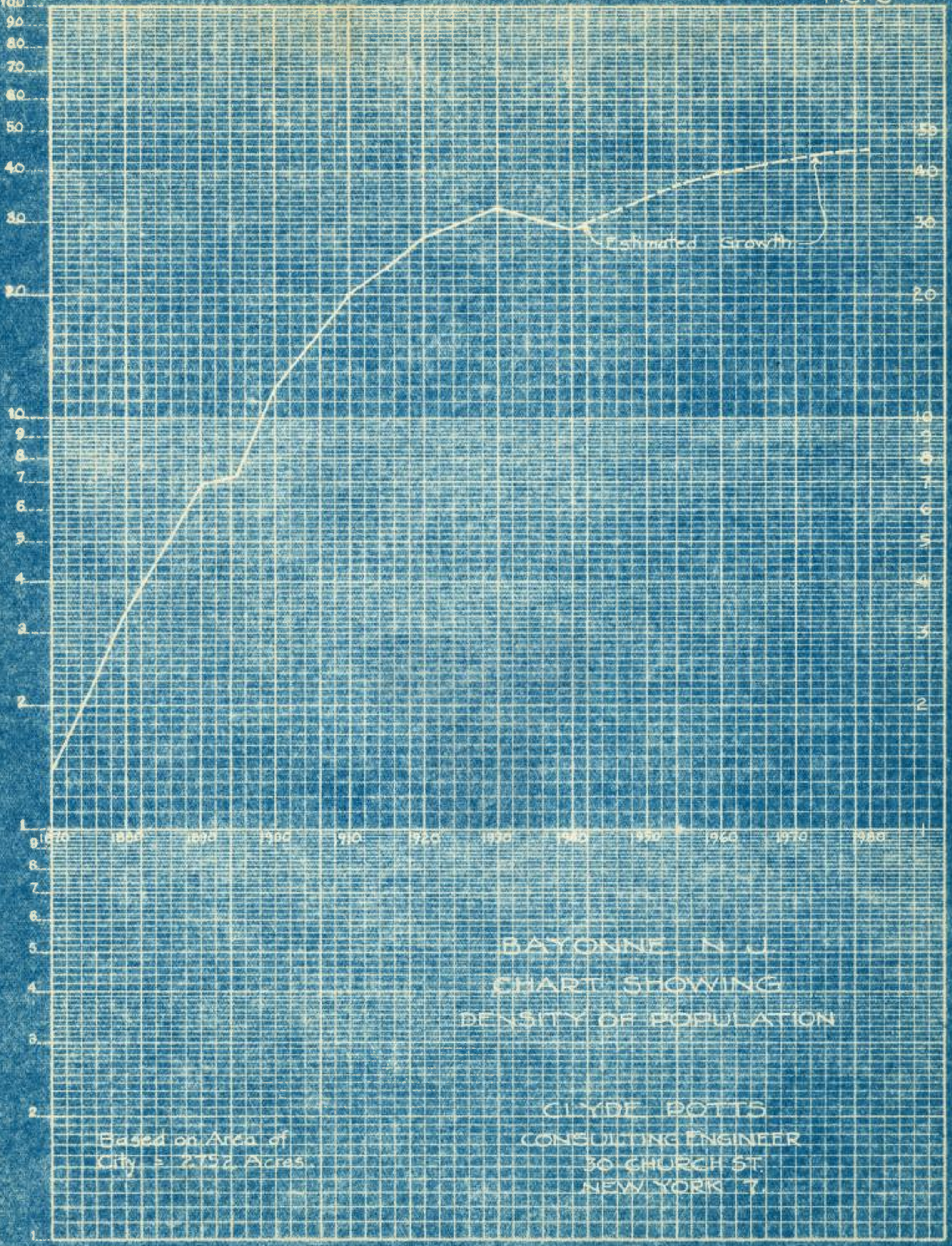
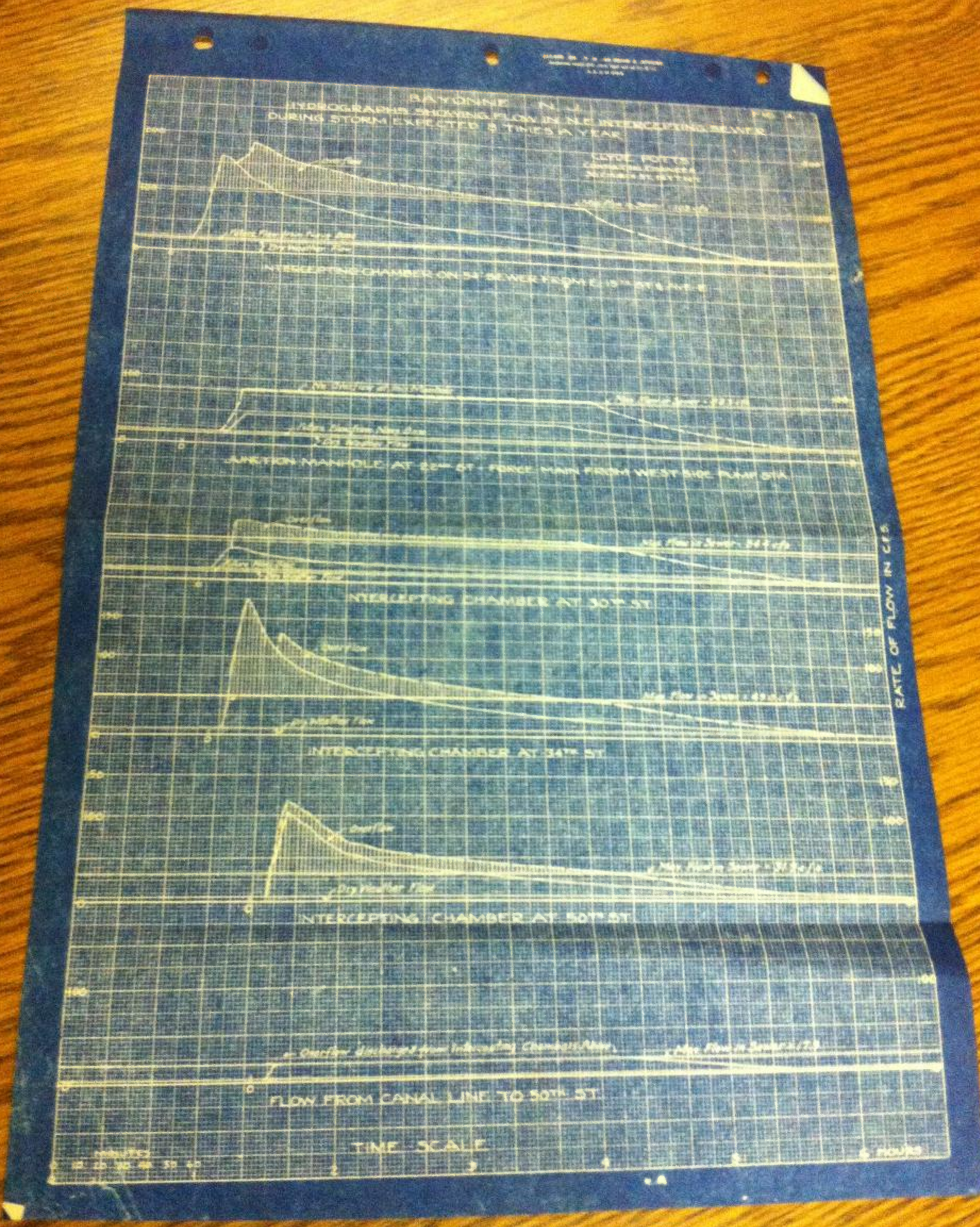

200,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
Estimated Growth
BAYONNE N.J.
POPULATION CURVE
CLYDE POTTS
CONSULTING ENGINEER
30 CHURCH ST
NEW YORK 7

FIG. 6



Estimated Growth
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
BAYONNE N. J.
CHART SHOWING
DENSITY OF POPULATION
CLYDE POTTS
CONSULTING ENGINEER
30 CHURCH ST.
NEW YORK 7
Based on Area of
City = 2752 Acres


BAYONNE N.J.
HYDROGRAPHS SHOWING FLOW IN N.E. INTERCEPTING SEWER
DURING STORM EXPECTED 8 TIMES A YEAR
CLYDE POTTS
INTERCEPTING CHAMBER ON 5th ST SEWER FROM E 15th ST & AVE E
JUNCTION MANHOLE AT 22nd ST - FORCE MAIN FROM WEST SIDE PUMP STA
INTERCEPTING CHAMBER AT 30th ST
INTERCEPTING CHAMBER AT 34th ST
INTERCEPTING CHAMBER AT 50th ST
FLOW FROM CANAL LINE TO 50th ST
TIME SCALE
MINUTES
6 HOURS
RATE OF FLOW IN C.F.S.

Both curves indicate that the rate of growth is decreasing, and a great increase in population is not to be expected.

The estimated per capita dry weather flow is 110 gallons, including infiltration and trade waste. The maximum rate of flow is estimated as 50% greater than the average, giving 165 gallons per capita per day. Adding 10% for the additional amount to be taken during storms makes the flow for design capacities 181.5 gallons per capita per day. With this per capita flow and a population of 110,000 a total flow of 19,965,000 gallons per day results. An allowance of 1.5 mgd is made in the sewer for future development of the Navy base. As this is a future development it is not included in the design flow for present plant construction. The plant design capacity is 20 mgd and sedimentation tanks are designed with a retention period of 4 hours for 20 mgd.

The total capacity of the intercepting sewers entering the plant is 100 mgd. To maintain a free flow in the sewers, pump capacity is planned for this maximum rate. Rather than discharge flows in excess of 20 mgd directly to tidewater without treatment it is considered that much better overall removal of organic matter will result from passing the total flow through the plant. The rate will be 100/20 or 5 times the normal design rate, giving a period of detention of 4/5 hours or 48 minutes. With this period together with the large surface area provided in the sedimentation tanks, good removal of suspended matter will be obtained. The hydraulics of the plant design provide for handling the maximum storm flows of 100 mgd. The sequence of treatment provided is as follows:

Rack with 3 inch clear openings.

Grit chamber of spiral flow type with air used for circulation, 12'x12' in cross section and 50' long.

36" Comminutor or equivalent with capacity of 20 mgd.

Mechanically cleaned bar screen with 1½ inch clear openings for flows in excess of 20 mgd.

Suction well.

Centrifugal pumps - vertical type with angle gears and Diesel and gas engine drives. 6 units with capacities as follows:

2 @ 10 mgd
2 @ 20 mgd
2 @ 40 mgd

Flow variation will be obtained by speed variation.

Pumps discharge to 9' x 9' conduit with air agitation to prevent sedimentation.

Raw sewage conduit supplies the 8 units of sedimentation tanks. Flow will be divided in equal portions to the units used by means of synchronized motor-operated sluice gates. These gates will be automatically opened or closed as required to maintain a constant loss of head of about 0.1 foot between the conduit and tanks. Each of the 8 sedimentation tanks will be 30'6" wide, 162'6" long with 12' water depth. Tanks will be mechanically cleaned by sludge and scum removal apparatus. The collected raw sludge will be raised to two sludge concentration tanks by pneumatic ejectors. The two concentration tanks will be used alternately so fresh sludge may be pumped into one tank while sludge is concentrating in the other. The supernatant liquor from these tanks will be returned to the raw sewage and the concentrated sludge transferred to the sludge digestion tanks.

There will be 8 units of sludge digestion tanks with total capacity of 3 cubic feet per capita, and provision for heating, and gas collection. Vacuum filters are included for dewatering digested sludge. The economics of further drying of the sludge cake is being studied. The sludge cake from vacuum filters may be used for soil dressing or fertilizer base. With the dock facilities included in the plant site, the dried sludge may be transported by water to other than local markets.

The final effluent from the sedimentation tanks will be discharged to the Kill Van Kull at the pier head line. This point of discharge is faverable in providing good water depth and strong tidal currents resulting in good dilution and dispersion of the effluent.

Clyde Potts.
February 1946.

SUPPLEMENTARY REPORT

on

PROPOSED INTERCEPTING SEWERS
AND SEWAGE TREATMENT PLANT

for

BAYONNE, N. J.

Change of Route - Southeasterly Intercepting Sewer.

Plans submitted February 21st showed the southeasterly intercepting sewer on East 2nd Street and a continuation thereof running past Ingram Avenue and thence on private property to the Treatment Plant. Since that time, this property has been sold and is being so developed as to make the former line impractical. A new route has been surveyed and planned, and is shown on Sheets 1 and 2 of profiles of the southeasterly section, prints of which are being sent under separate cover.

Dry Weather Flow for Plant Capacity.

In previous report the dry weather flow was estimated at 110 gallons per capita. To check this value gagings were made on three of the sewer districts:

East 50th Street
East 34th Street
Ingram Avenue

These districts are larger and are representative of the City. The flows were obtained by observing the depths and velocities in the sewers. Puffed rice was used as a float material and times were recorded by stop watch. A tabulation of observations and computations is enclosed.

BAYONNE, N. J.

Sewer Gagings

SUMMARY

District	Max. Observed Flow	Area Acres	Population	Population per Acre	Flow per Acre	Flow per Capita
50th Street	762,000	180	8,050	44.7	4,233	94.7
34th Street	1,105,000	221	12,375	56	5,000	89.3
Ingram Ave.	388,000	230	6,790	29.5	1,687	57.1
Totals and Averages	2,255,000	631	27,215	43.1	3,574	82.9

BAYONNE, N. J.

SEWER GAGINGS
Observed Data and Computations

DATE	TIME	DEPTH IN MH. Upper Feet	DEPTH IN MH. Lower Feet	AREA OF FLOW Upper Sq.ft.	AREA OF FLOW Lower Sq.ft.	AREA OF FLOW Mean "A" Sq.Ft.	Time Sec.	VELOCITY fps Surface	VELOCITY fps Mean x.82 "V"	Q cfs AV	Q mgd.
50th St. - 48" Pipe - Dist. between Mhs. - 606'											
Aug. 6	10.25 A	1.05	1.80	2.63	5.49	4.06	1710	.354	.29	1.18	0.762
Aug. 9	12.15 P	1.10	1.76	2.81	5.32	4.07	2520	.24	.20	0.81	0.523
34th St. - 68" Flat Bottom - Dist. between MHs. - 367'											
Aug. 6	10.10 A	0.30	0.20	1.40	0.90	1.15	202	1.82	1.49	1.71	1.105
	11.35 A	0.30	0.20	1.40	0.90	1.15	206	1.78	1.46	1.68	1.085
Aug. 9	12.05A	0.31	0.20	1.45	0.90	1.175	208	1.76	1.44	1.69	1.092
	1.40 P	0.31	0.20	1.45	0.90	1.175	211	1.74	1.43	1.68	1.085
Ingram Ave. - 60" Pipe - Dist. between Mhs. - 395'											
Aug. 6	9.30 A	0.45	0.45	0.87	0.87	0.87	470	0.84	0.69	0.60	0.388
	11.10 A	0.27	0.32	0.41	0.53	0.47	440	0.90	0.74	0.35	0.226
	12.20 P	0.30	0.37	0.48	0.66	0.57	610	0.65	0.53	0.30	0.194
Aug. 9	11.45 A	0.34	0.30	0.58	0.48	0.53	432	0.91	0.75	0.40	0.258
	1.20 P	0.30	0.30	0.48	0.48	0.48	453	0.87	0.71	0.34	0.220

To obtain the flow per capita, the houses were counted from an aeroplane map. The attached summary lists the maximum flow observed in each district with the tributary area and population. The per capita flows range from 57.1 for the Ingram Avenue district to 94.7 for the 50th Street district and average 82.9 for the three districts. As the gagings were taken at times when maximum flows would be expected, the values should be closer to the maximum rate than to the average daily flows. The usual value of 100 gallons per capita per day for the dry weather flow is in excess of the measured flows and should be a conservative figure as a basis for plant design.

With the customary allowance for maximum rate of flow and storm water flow, the per capita flow for plant design is:

Dry weather flow	= 100 gals. per capita
Maximum rate (150%)	= 150 " " "
Plus 10% storm water	= 15 " " "
Total	165 gals. per capita

In previous report, a design flow of 181.5 gallons per capita was obtained from the estimated average dry weather flow of 110 gallons per capita, by the same procedure.

For the estimated future population of 110,000, the per capita rate of 165 gallons gives a design capacity of 18,150,000 gallons per day, for the whole City.

Sewer Design Data.

The enclosed tables show the locations of intercepting chambers, the tributary areas, the amount of flow to be intercepted, and the sizes, grades and capacities of the intercepting sewers for the northeasterly and southeasterly section.

Contribution from Jersey City.

On plan previously submitted, the intercepting sewer was shown continued northerly along the canal from 59th Street to the Hudson Boulevard. This was planned to serve a portion of Jersey City, which together with the area in Jersey City along the canal could drain to the Bayonne interceptor. As noted in the table, capacity is provided in the intercepting sewer for the area in Jersey City tributary to it. It is possible that Jersey City may desire to include part or all of this area in its own system, so the branch is not shown on plans and pfofiles (print enclosed). It seems wise, however, to include capacity for this possible contribution.

BAYONNE, N. J.

Table showing Contribution to Intercepting Sewers

N. E. INTERCEPTING SEWER

Station	Contribution	Tributary Area Acres	Flow Intercepted mgd.	Total Flow	Intercepting Sewer Size	Intercepting Sewer Grade	Intercepting Sewer Capacity mgd.
159+47	59th & Hudson Boulevard	100	5.0	5.0			
					36"	0.06	10.5
*	Canal Area Jersey City	156	7.8	12.8			
					42"	0.065	16.5
118+55	50th Street	180	9.0	21.8			
					48"	0.065	23
76+73	34th Street	221	11.05	32.85			
					54"	0.066	33
73+30	Navy Base	---	1.5	34.35			
					60"	0.05	38
59+49	30th Street	40	2.0	36.35			
					60"	0.05%	38
32+63	Main from West 22nd St-Force	345	17.25	53.60			
					72"	0.04%	55
9+26	On 54" from 15th Street	289	14.45	68.05			
					84"	0.03%	70

B31

* NOTE: Area shown is tributary to Bayonne sewer but may be included in Jersey City system. Capacity is reserved for this possible future contribution.

1331
482
1813

BAYONNE, N. J.

Table showing Contribution to Intercepting Sewers

S. E. INTERCEPTING SEWER

Station	Contribution	Tributary Area Acres	Flow Intercepted mgd.	Total Flow	Intercepting Sewer Size	Grade	Capacity mgd.
104+61	Ave. A-S. of W. 5th St.	41	2.05	2.05			
					24"	0.115%	5.00
93+78	Ave. A-N. of W. 3rd Stb.	35	1.75	3.80			
					27"	0.115%	6.80
*	1st Street	66	3.30	7.10			
					27"	0.134%	7.30
52+56	Ave. 6 & W. 1st	67	3.35	10.45			
					33"	0.11 %	11.50
45+67	Broadway & E. First St.	43	2.15	12.60			
					36"	0.10 %	13.7
					42"	0.08 %	18.0
2+78	Ingram Ave.	230	11.5	24.10			
					54"	0.055%	30.0
		482					

* NOTE: Separate sanitary sewers connect into intercepting sewer in First Street area.