

THE J. G. WHITE ENGINEERING CORPORATION
ENGINEERS AND CONTRACTORS
45 EXCHANGE PLACE
NEW YORK

June 3, 1925.

Board of Hudson River Regulating District,
44 Howard Street,
Albany, N. Y.

Dear Sirs:

The Hudson River Regulating District exists by virtue of the Conservation Law of the State of New York and more specifically by Chapter 662, Laws of New York, 1915 entitled "An Act to amend the Conservation Law, relative to river regulation by storage reservoirs".

It was created on August 2, 1922, and came into active being on November 9, 1922 when Governor Miller appointed the Board of Hudson River Regulating District, consisting of Henry M. Sage of Albany for a five year term, Erskine C. Rogers of Hudson Falls for four years and Edgar H. Betts of Troy for three years.

The Hudson River Regulating District is a body corporate and was created to construct, maintain and operate reservoirs within the drainage area of the Hudson River above the Albany-Greene County line for the purpose of regulating the flow of the streams in the district. The drainage area of the Mohawk River is not included in the district.

GENERAL PLAN

The general plan of regulation by storage reservoirs was approved by the Water Control Commission on June 7, 1923.

This plan looking to the ultimate regulation of the Hudson River and its principal tributaries, consists of the development for storage of all or part of the reservoir sites listed below:

<u>Reservoir</u>	<u>River</u>	<u>Approx. Ht. of Dam</u>	<u>Water Shed Area</u>	<u>Proposed Capacity Billion cu.ft.</u>
Sacandaga	Sacandaga R.	100	1044	30.0
Piscop Lake	W.Br. Sacandaga R.	70	165	4.5
Lake Pleasant	Sacandaga R.	15	71	1.0
Elm Lake	Kunjenak Cr.	50	32	1.6
Ords Falls	Hudson R.	85	195	8.0
Chain Lakes	Cedar R.	100	160	6.4
Cedar River Flow	Cedar R.	45	45	1.6
Indian Lake	Indian R.	4	129	5.6
Goodenow	Goodenow R.	55	25	1.0
Cheney Pond	Boreas R.	70	46	1.2
Boreas Ponds	Boreas R.	40	16	0.7
Thirteenth Lake	Thirteenth Br.	36	11	0.5
Schroon Falls	Schroon R.	150	164	6.0
Trout Brook	Trout Br.	125	92	3.6
Warrensburg	Schroon R.	85	560	5.0
Shashen	Batten Kill	85	240	3.4

PRESENT PLAN

The regulation presently to be created will be due to the volume of water to be impounded in the Sacandaga Reservoir.

At Conklingville on the Sacandaga River about six miles west of Hadley, it is proposed to construct a dam about 100 feet in height. At the north bank of the river solid rock occurs very close to the surface. Through this a tunnel about 24 feet in diameter will be driven. This tunnel will serve to pass the stream flow during construction of the dam and afterwards, when fitted with gates, will act as an outlet to discharge the water from the reservoir for regulation purposes.

Above the tunnel will be constructed the permanent spillway which will have a capacity of about 50,000 cubic feet per second. This will be ample to take care of the largest floods even though they should occur when the reservoir is full.

The foundation of the dam other than on the north bank of the river will be on solid compact soil locally called hard pan. In this soil a cut-off trench of sufficient depth to get below the loose top soil, gravel and boulders in the bed of the stream will be excavated.

The dam will be of the semi-hydraulic fill type, about 1200 feet long and will have an upstream slope of 3 on 1 near the top and flattening to 4 on 1 near the base, a downstream slope of $2\frac{1}{2}$ on 1 and a top width of 40 feet at elevation 795 which is 24 feet above the elevation of full reservoir.

The upstream face will be paved from the top down to an elevation of 10 feet below low water in the reservoir and the downstream face will be provided with a toe of rock of a height sufficient to prevent back wash from the maximum spillway discharge.

The reservoir will flood 27,000 acres, about 42 sq. miles or an area about that of Lake George. It is proposed to draw down the water from elevation 771 to 740, at which elevation the reservoir will have an area of 26 square miles. The volume of water between elevations 771 and 740 is 30 billion cubic feet and below 740 it is about 8 billion cubic feet additional.

The drainage area tributary to the reservoir is 1044 sq. miles and the average river discharge is about 65 billion cubic feet per annum. This is about 2.17 times the amount of water required to fill the reservoir between elevations 740 and 771.

30 Billion cubic feet of water released per annum from Sacandaga Reservoir will regulate the discharge of the Hudson so that the minimum flow at Spier Falls will be 3,000 cu. ft. per second and the average flow during the dry months will be about 4,000 cu. ft. per second. During the period from 1909 to 1916 inclusive, the average flow for 14 months or 7% of the time was less than 1,000 cu. ft. per second for 47 months or 23% of the time was less than 2,000 cu. ft. per second, and for 80 months or 40% of the time, was less than 3,000 cu. ft. per second.

The following table shows some of the benefits to be gained by the companies developing power.

	<u>Drainage Area</u>	<u>Present Installation H.P.</u>	<u>Minimum Flow</u>		<u>Firm 24 hr. H.P.</u>	
			<u>Present</u>	<u>After Regulation by Sacandaga Reservoir</u>	<u>Present</u>	<u>After Regulation by Sacandaga Reservoir</u>
*Sacandaga	1060	undeveloped	150	1,200	2,460	22,700
Corinth	2760	8,000	800	3,000	1,920	7,220
Palmer Falls	2760	24,000	800	3,000	6,350	24,000
Spier Falls	2777	45,000	800	3,000	5,890	22,100
Sherman Island	2782	40,000	800	3,000	4,910	18,420
†Feeder Dam	2790	8,400	600	2,800	920	4,330
Glens Falls-I.P.Co.	2800	9,300	300	1,400	1,220	5,680
" " -F.P.Co.	2800	15,000	300	1,400	1,220	5,680
Hudson Falls	2810	16,020	600	2,800	4,340	20,470
Fort Edward	2815	5,800	600	2,800	1,120	5,340
Fort Miller-F.M. P.&P.Co.	2980	1,925	310	1,450	320	1,500
" "(undeveloped)	2980	-	310	1,450	320	1,500
Thompson	2997	4,875	620	2,900	860	3,990
Stillwater-W.F.Co.	3760	370	170	1,450	120	530
" -H.V.R.R.	3760	575	520	1,450	390	1,680
Mechanicville-W.Va.P & P Co.	4517	9,500	690	2,950	1,270	5,600
Mechanicville-A.P.&L.	4587	7,000	700	2,950	1,230	5,150
Troy	8100	<u>8,800</u>	1,400	3,600	<u>1,780</u>	<u>4,600</u>
		206,990			36,640	160,490

* The low water months only are considered

† At Feeder Dam about 200 cubic feet per second are withdrawn for canal purposes

COST OF THE DEVELOPMENT

The estimated cost of the Sacandaga reservoir including real estate, lands, and land damages and outlet works ready to operate is as follows:

Real Estate, including property damages	\$2,350,000
Clearing of Reservoir Basin	710,000
Conklingville dam and appurtenances	2,200,000
Railroad relocation	400,000
New Highways	950,000
Removing cemeteries	100,000
New Bridges	360,000
Perry at Northampton	<u>50,000</u>
	\$7,120,000
Engineering, General Overhead & Contingencies	<u>1,068,000</u>
	\$8,188,000
Interest on certificates of indebtedness	30,000
Preliminary expenses	182,000
Interest during construction and Contingent Fund	<u>600,000</u>
Total Cost of Development	\$9,000,000

THE ANNUAL COST

The total annual cost of the Sacandaga reservoir will depend largely upon the terms of the bonds as to rate and maturities, but assuming 45 year serial bonds at a $4\frac{1}{2}$ per cent rate, the average annual cost will be about as follows:

Interest and retirement	\$500,000
Depreciation and repairs to structures	30,000
Taxes on taxable real estate	15,000
Operating expenses, including main office, engineering and legal expenses, superin- tendence, ferry, labor, rent and supplies	<u>50,000</u>
TOTAL	\$595,000

This will be reduced by whatever amount is received from the sale of power at Conklingville dam, which is estimated to be approximately \$100,000. per annum.

BENEFICIARIES

The benefits coming from the river regulation are principally of two kinds, viz: those due to increasing the low water flow, such as increasing the amount of water power available and greater dilution of sewage discharged into the river and those due to decreasing the floods which have both a property and a sanitary value. Over 95 per cent of the annual cost has been allocated to the properties which have fall or head on the river between Troy and Conklingville and which derive all the benefit of increased power and about 5 per cent to various cities along the river which will receive sanitary benefits and relief from flood damages.

The table following contains data which will be used in determining the annual assessment.

<u>Location</u>		<u>Gross Head</u>	<u>Proportion of Annual Cost</u>
Conklingville Dam (undeveloped)		15.0	.02115
Conklingville to Hadley (undeveloped)		152.0	.21433
Corinth		27.5	.03877
Palmer Falls - International Paper		87.0	.12268
Spier Falls - Adirondack P. & L. Corp.		81.0	.11422
Sherman Island - International Paper		67.5	.09518
Feeder Dam - Moreau Mfg. Co.		17.0	.02397
Glens Falls - Finch, Pruyn Co.	1/2 of	44.6	.03144
Glens Falls - International Paper	1/2 of	44.6	.03144
Hudson Falls - Union Bag & Paper		15.2	.02143
Hudson Falls - Union Bag & Paper		21.0	.02961
Fort Miller - Fort Miller Pulp & Paper Co.	1/2 of	11.4	.00804
Fort Miller - (undeveloped)	1/2 of	11.4	.00804
Thomson - United Paper Board	1/2 of	18.5	.01304
Stillwater - Wood Plong Corp.	1/4 of	8.3	.00292
Stillwater - Hudson Valley R.R.	3/4 of	8.3	.00878
Mechanicville - West Virginia P. & P. Co.		20.9	.02947
Mechanicville - Adirondack P. & L.		19.1	.02693
Troy - Henry Ford		14.0	.01974
Village of Green Island		-	.00090
City of Watervliet		-	.00220
City of Rensselaer		-	.00260
City of Troy		-	.01429
City of Albany		-	.02670
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Total		676.15	1.00000

The proportions which will be paid may be summarized under three main headings:

Power Generating Companies	52.43 per cent
Pulp and Paper Manufacture	42.91 " "
Municipalities	<u>4.66</u> " "
Total	100.00 per cent

VALUE OF PROPERTY TO BE ASSESSED

In the table on page 5, it has been shown that the firm 24 hour power that can be developed by the beneficiaries will amount to 160,490.H.P. This amounts to 1,050,000,000 K.W.H. of primary power. In addition to this about 700,000,000 K.W.H. of secondary power can be developed, a large part of which will be made primary power when further storage is created.

Already the installed capacity is 206,990 H.P. Taking this, its future possibilities, its location and its industries into consideration, a value of \$60,000,000 for the property, to be assessed for 95.34 per cent of the annual cost of the development, is a very low one.

The remaining 4.66 per cent is to be paid by the following municipalities:

City of Albany assessed at	\$152,714,152
City of Troy " "	65,338,781
City of Rensselaer " "	9,315,775
City of Watervliet " "	9,726,800
Village of Green Island "	<u>6,732,575</u>
Total	\$243,828,083

CONCLUSION

The project of regulating the flow of the Hudson River by creating the Sacandaga storage reservoir is a good one and of great economic value. The plans are sound and the quality of work provided for is of the best.

The benefits to be derived are many times their cost and are sought after by all parties who will be assessed.

The power and industrial companies will have the power which they now use increased more than fourfold in the low water months, and the Municipalities will receive great sanitary benefits as well as alleviation of flood damages.

Very truly yours,

Albert S. Crane
Vice-President.