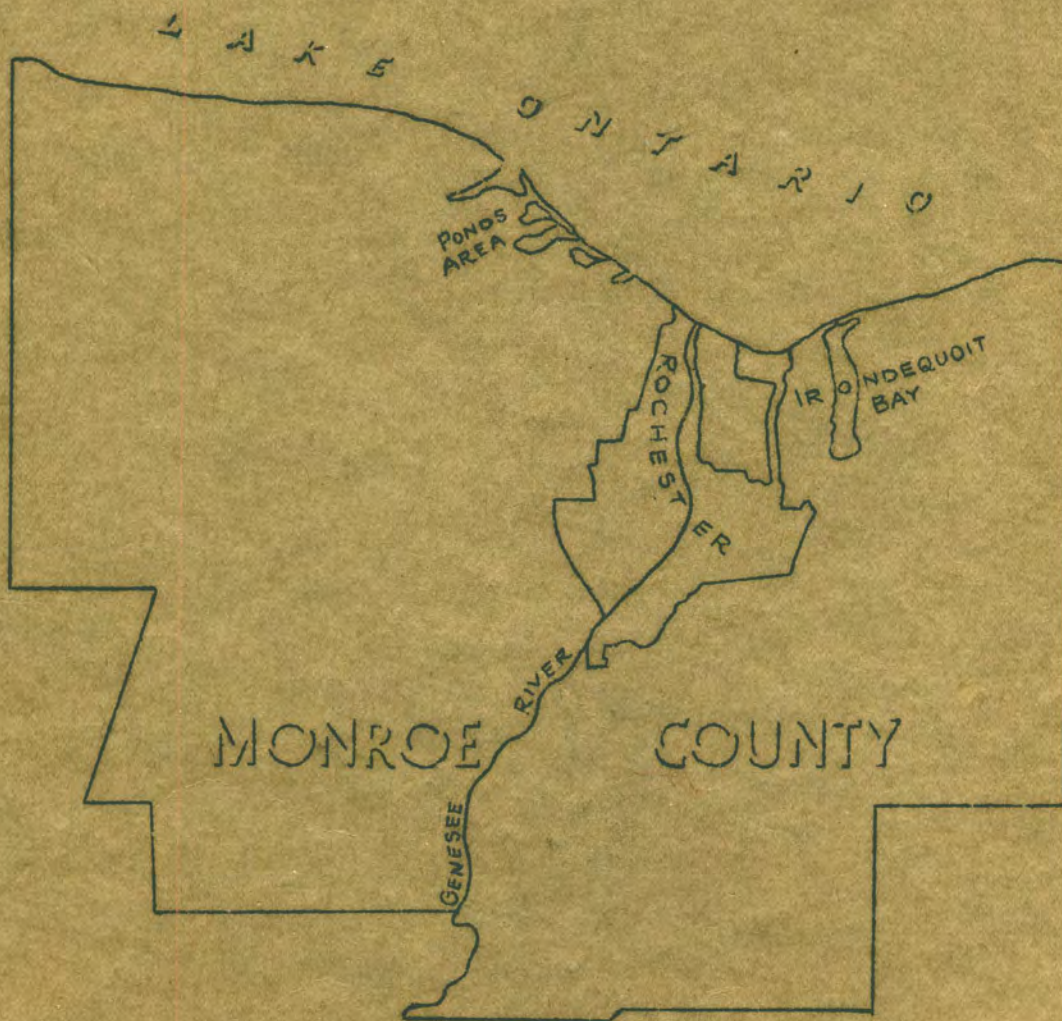


A SUMMARY OF THE
SURVEY AND PLANS FOR
PORT DEVELOPMENT IN
ROCHESTER AND MONROE COUNTY



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Made for

The Joint Harbor Survey Committee

by

Mac Elwee and Crandall, Inc.

Consulting Engineers

This Brief Prepared by

The Monroe County Regional Planning Board

Rochester, N. Y.

December 23, 1932

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INTRODUCTION

The Port of Rochester, Survey and Plan submitted by Mac Elwee and Crandall to the Joint Harbor Survey Committee, containing some six hundred pages and maps and plate illustrations, is not only a survey and plan, but also outlines the details for the successful accomplishment of the plan.

This brief summarizes the salient points of the comprehensive study and plan from three angles; the economic factors of the area; the relation of the port to markets and industries; and the recommendations for the physical development of the areas studied.

PORT HISTORY

Since the year 1829, interest of the City of Rochester and its surrounding territory has been centered on the concentrated effort to maintain and constantly improve a harbor on Lake Ontario. The interest centered primarily upon the mouth of the Genesee River at Lake Ontario which has been deepened and made navigable by a series of projects from 1829, until today.

From the beginning of harbor development at the mouth of the Genesee River until 1930 the City of Rochester and private interests have expended \$ 1,493,027.00 and the Federal government - \$ 1,123,532.00 a total of \$ 2,616,559.00.

Realizing even in those days the importance of a suitable harbor for Rochester and vicinity, Port Development Advocates enlisted the cooperation of the Federal government in a project to utilize and deepen the entrance from Lake Ontario into Irondequoit Bay, which lies 4 miles east of the City of Rochester. This group caused a survey to be authorized by the Army Engineers in 1890 to determine whether the facilities of Charlotte at the mouth of the Genesee River were overtaxed by the commerce already utilizing that port and whether Irondequoit Bay would not furnish a larger, safer, and generally more convenient location for the port.

Major Adams, for the government, reported that the investigation showed the facilities for shipping at Charlotte were not too restricted and that the volume of commerce on the lake did not show a necessity for such governmental expenditure.

The matter rested until 1895, when Captain Kingman made a formal investigation for the War Department. His report was to the effect that Irondequoit Bay would make a more suitable harbor from several angles but that in-as-much as money had been spent at Charlotte, it seemed unwise to abandon that port and spend additional monies at that time for the improvement of the Bay.

ORGANIZATION OF SURVEY

From then until 1930, there has been much controversy in regard to harbor plans with very little actual results. In December 1930 public sentiment so far crystalized in the direction of port development that a Joint Harbor Survey Committee was established, two of whose members were selected by the city, two by the County of Monroe, and a fifth member from either county or city. The Council of the City of Rochester appointed John W. Fulcader and the then City manager, Stephen B. Story. The Board of Supervisors of Monroe County appointed Leo. A. M. Sweeney and A. Herbert Dalzell. A fifth member and chairman, Harry C. Stevenson, was chosen by the other four members. J. Franklin Bonner was appointed secretary. The function of this body was to use money appropriated equally by the city and county and retain competent engineering ability to furnish a comprehensive, economic engineering survey of local harbor requirements.

In January 1931 the firm of Mac Elwee and Crandall, Inc., authorities on port and harbor developments was selected by the Joint Harbor Survey Committee. The economic and industrial survey and the port plans were under the personal direction of Dr. R. S. Mac Elwee and the field work of soundings, and core borings, comprising a total area of 100 square miles, were under the direct supervision of William Blanchard, C. E., resident engineer for Mac Elwee and Crandall, Inc. The Business arrangements and financial operations were organized and administered by the Monroe County Regional Planning Board with its secretary, J. Franklin Bonner in charge.

The full report was submitted in March 1932 and the salient points set forth in that report will be considered here. It comprises 588 pages and 100 illustrations, charts, drawings, graphs, photographs, etc.

ECONOMIC AND INDUSTRIAL SURVEY

INDUSTRIAL

To reasonably discuss a plan for a port, an impartial idea of the economic factors which will operate not only at this time but for some years to come in the area surrounding the proposed development must be secured. There must be ascertained what advantages or disadvantages industries will find to influence new wealth to be invested at the port. There must be determined if the territory which might be within the influence of a port will give sufficient market outlet to warrant the development. As a harbor must be a hub from which to re-ship, or manufacture cargoes in transit, there must also be investigated the transportation problem which is of vital importance to any harbor.

There are many features in the port region which recommend it to companies looking for a suitable site for the development of an industrial plant. The port at Rochester is fortunate in that there is available unlimited electric power which is manufactured at Niagara Falls and might later be augmented by the power plants of the St. Lawrence Development for power and ship navigation. The treaty with Canada for this development is now before the United States Senate. In addition to this, power can be manufactured cheaply by steam with Ohio steam coal carried economically to the port through the new Welland Canal. The same inexpensive coal gives this area a decided advantage, for with a port development, the manufacturer of iron and steel at a ship side plant near the source of power at Niagara and the St. Lawrence could bring ore and flux down the lakes and compete favorably with all the steel and electro-chemical plants of the Niagara area. With the opening of the St. Lawrence Ship Channel special foreign ores for various alloys could be brought in large, economical vessels along side a plant located in the Rochester Industrial Harbor.

The labor question in the Rochester area has never been acute. There is a plentiful supply of all kinds of labor and industry has never been hampered by stringent limitations by the State or Federal governments. Because of the types of industries already located here, there are a large number of technically trained workers living in and around Rochester. With these workers as a nucleus, labor will always follow when employment is offered. An abundance of labor has always been available at reasonable wages with a good latitude possible in the handling of such labor.

The nature of the climate of the section is not rigorous, the mean temperature for the three summer months is about 69 degrees and in the three winter months the average is about 26 degrees. The rain fall averages 3.6 inches per month at the maximum. Of particular interest is the fact that navigation in this part of the country is usually closed from December 1st. to March 31st. by ice on the navigable waterways. While this is the same as the Baltic ports it must be taken into consideration because of its effect on the storage space available at the port for cargoes which are to be distributed during the months when navigation is closed.

Other important aids to industry are the financial institutions of the section which are strong and sound. These institutions are keeping pace with industry and are in a position to render adequate financial support and assistance to manufacturing.

Rochester as a place in which to live offers many advantages. It is a community of self owned homes and as such the interest of the family and the home owners are carefully looked after. Grammar schools, high schools, and schools of advanced learning provide education. Numerous parks, beaches, and clubs give opportunity for recreation for all.

A feature which is vital in the consideration of a plant location is the status of taxation. The survey gives special attention to this factor. It is difficult to compare tax rates because of the various methods which may be used to assess property but it is well to observe that 20% of all corporations paying Federal Income Tax are located in New York State and this group contributes 28% of all the corporation income tax collected in the entire country. It is proper to infer that if taxes in this region proved a burden on corporations there would not be such a preponderance of corporations doing business in the State of New York.

Taxes which affect the individual are of indirect concern to every corporation. Only 8.12% of the earned income of the State of New York each year is expended for taxes within the state. The per capita debt of Rochester is fifty per cent lower than other cities of its class. Some sections are burdened by bonded debt so that their taxes pay for very little beside interest. There are six other states having larger per capita bonded debts than New York. The bonded debt is about \$21.50 per capita which is one-half smaller than the state owing the maximum amount of money. An effort is being made to distribute the tax burden fairly throughout the section. Examples of this are the increase in inheritance taxes and the direct sales tax recently levied on gasoline, the resulting money to be used for highway maintenance.

If the factors which comprise the first part of the investigation with relation to an economical and suitable location for industries and proper conditions for accommodating ship-side industry were provided, then other industrial factors such as power, labor, taxes, rail and highway transportation inland, and exceptional operating and living conditions, would make it decidedly advantageous for industry to locate in the vicinity of Rochester.

MARKET SURVEY

It is important to ascertain the magnitude and extent of the market which could be expected to buy or sell the products trans-shipped at the port, or produced by its surrounding industries. The survey includes a study of population, its purchasing power and the annual production of goods in the area which will be better and more cheaply served by the port than they were served formerly by other transportation facilities.

Cities whose port development has been recent enough to trace a distinct trend have shown a decided acceleration in both industry and population after the completion of the port. Later on in this investigation, considering plans for the proposed port, this prospective expansion must be taken into account. Only the present status of the territory influenced is investigated here. It is reasonable to say that a port at Rochester would handle all the water borne traffic from the City of Rochester, and Monroe,

Livingston, Ontario, Yates, and Wayne Counties without successful competition from Buffalo, Oswego, or any Barge Canal terminal point. This area has a total population of more than 582,000 people, all of whom would be served by the port. Competition may be expected from the port of Buffalo in the counties of Orleans, Genesee, and Wyoming with a population of 100,000 people and by the Barge Canal through Seneca Lake in the counties of Allegany, Steuben, Schuyler, Chemung, and Seneca, whose population totals approximately 233,000 people. The port area in which no other harbor can compete is twice as large as the areas in which competition is possible. These competitive areas must be secured for the port by solicitation and rate adjustments to balance any slight advantage of competing ports.

1930 Census Figures show that a port at Rochester would serve 917,000 people, the value of whose real property is approximately \$1,800,000,000.00, whose factories produce goods to the value of \$500,000,000.00 and pay wages in excess of \$118,000,000.00 annually. In addition to this population and buying power there are \$300.00 in savings bank deposits for every man, woman and child and slightly more than half of the families in the region own their own homes. This area is far above the average in income and productivity for the United States and will tend to show that conditions within the area will furnish better markets and more satisfactory buying power than other port areas. Judged by the performance of other ports based on population and income, Dr. Mac Elwee predicts the value of potential traffic at the port of Rochester at some where around \$270,000,000.00. This does not include, new production, population, or wealth which will have as its starting point the ship side industry at the port or any increase in traffic and revenue which is bound to result from the construction of the St. Lawrence Seaway.

The industrial field having been reviewed in regard to its possible development, it is necessary to observe the influence of agriculture. The topography and soil of the region is fit for many different types of farming, the soil is fertile and the products of the farms are so diversified that a failure of one crop does not materially affect the production of the section. The country is so situated that advance production methods for the raising of fruit, grain, dairy products, and produce, yield an intensive production and make farming a profitable business. Not only would the port receive the benefit of the outgoing products from these farms but also the revenues from the incoming farm machinery from the upper lakes and fertilizer from Germany, Chile, and Argentina. The ideal economic structure shows a balance between agricultural and industrial workers.

BENIFITS OF WATER BORNE TRAFFIC

It is imperative that some idea be gained about the relative position of Rochester as a port in comparison with other seaports of the United States as to the distance from the major European ports. The distance from Rochester to Liverpool by way of the St. Lawrence is 95 nautical miles shorter than the distance from Liverpool to New York. Liverpool is typical of western European and Baltic ports. It is estimated that the time consumed in locking a boat through the St. Lawrence Canals would compensate for the time lost in entering or leaving the harbor in New York. Port delays and costs in New York should give a preference to the Port of Rochester and efficient port facilities should extend the range of the port into Pennsylvania through the savings in rail rates to Rochester. These adverse conditions at other ports should give Rochester a favorable position in all trade from the Seven Seas.

To obtain direct evidence on the general cargo tonnage which might be expected to move through a port in this section, interviews were arranged with a large number of the industries in this locality that would be prospective users of this harbor. These interviews tentatively assured 105,000 tons annually which includes autos, seeds, wood pulp, laundry machines, galvanized containers, spices, canned goods, etc.

Economic studies of the recently developed self-propelled canal and lake barges, via the Port of Oswego, show a large estimated available movement to the Port of Rochester by way of Oswego, on which the approximate saving through adequate port facilities will amount to about fifty cents to a dollar per ton. In addition to the commodities mentioned there is a possibility of a substantial movement of felspar, lumber, wood pulp, paper, cement, sugar, and bulk cargoes like coal, limestone, ore, and grain to be brought into this location.

The Baltimore and Ohio Railroad is, at the present time, shipping a large amount of coal to Canada by way of Charlotte, which moves across Lake Ontario in railroad cars by means of car ferries. This coal would be much more easily handled in bulk and as the coal facilities at the Genesee Docks are obsolete, the river too narrow to turn bulk carriers of economical size (600 feet long) the new equipment could economically serve not only central Canada but would also make Rochester the anthracite coal terminal for shipping to Quebec.

Some of the industries in the upper lake region which had for some years brought foreign goods to New York and trans-shipped them to Chicago or elsewhere by rail, have started shipping their cargoes direct in small draft vessels to points on the Great Lakes near their plants. The best example of this is the Kohler Company which, at the present is shipping china clay from Europe

through the St. Lawrence and the Great Lakes at a saving of \$4.00 per ton over the former method of ship and rail transportation. This clay was re-shipped from Milwaukee to the Kohler Plant and \$86,000.00 were saved in one year even with this trans-shipment. If the plant were located at shipside the saving would be \$2.00 greater, or \$6.00 in all. Likewise with a seaway accommodating 6000 ton carriers, in place of the present 1700 ton vessels, savings would be greater. The River Raison Paper Co. of Monroe, Wisconsin by investigation found that it could save \$8.00 per ton on direct shipment of paper pulp. Thus Monroe realized the saving through deep water transportation and at present extensive channel improvements are being made in the River Raison. There have been numerous inquiries from this country and abroad within the last few years which point to the fact that many concerns would be able to reduce the cost of distribution if satisfactory harbor facilities were available in Monroe County to accommodate through water movements.

Industry at the present time has found it advantageous to locate near the seaboard because of the ease and economy of manufacturing and shipping. These factors, coupled with the ever increasing rail rates have centralized industry in the far east and on the Pacific Coast and have tended to isolate and strangle inland industries. For example: The transcontinental rail rate on canned goods is \$1.25 per 100 lbs. compared with \$.35 by boat via the Panama Canal. Ports along the Great Lakes will give these industries of the central part of the country a chance to secure cheaper transportation rates to all parts of the world by water without the trans-shipment of their goods at seaboard, with the resulting handling charges. It is obvious that many industries could locate their plants at Rochester because of a saving effected in the importation of their raw materials not available domestically for manufacture or perhaps the cheaper shipping by water of their finished goods. This would be possible for manufacturers of linseed oil and varnish, whose raw material is now imported from the Argentine and which is one of the prominent port industries of Buffalo, to make their headquarters in Rochester as they would have lower transportation costs for their raw materials, a large local market and the lake distribution of the product.

POTENTIAL INDUSTRIES

The iron and steel industry has depended for many years for its iron ore upon the Massaba Range located near Lake Superior in Minnesota. It is reported that this iron ore deposit is fast being depleted and that within fifteen years all high grade ore will be exhausted. This situation will force the iron and steel manufacturing plants on the Great Lakes to seek the seaboard in order to secure high grade iron ore from foreign ports. The St. Lawrence Seaway would permit large economical carriers to bring this ore from abroad to Rochester and make iron and steel manufacturing profitable at this port. The rail connections will then bring coal from the south and flux from the upper lakes. Steel or iron

manufactured at Rochester could be sent to New York and New England at a saving of \$1.25 per ton over the existing rates from the present plant locations in Illinois and Ohio.

A survey on the possibility of importation of raw materials shows that any industry which uses copper, coal or coke, manganese, limestone, nitrates, rubber, or hides could effect a saving by locating in an industrial port in the vicinity of Rochester.

With the building of the St. Lawrence Seaway, rates may be established which will allow the manufacture of raw materials in transit, and will give transportation advantages to metal refining and the milling of grain in a harbor located at Rochester.

From the survey it is found that fundamental manufacturing conditions such as power, labor, climate, reasonable taxes, stable financial institutions and adequate available markets are favorable in the regions surrounding Rochester for the location of new industries. In view of the present economic trends it would seem probable that the time is not far distant when industry would be seeking transportation economies which could be furnished by a port here at Rochester with a great benefit to the surrounding territory and the people located therein.

TRANSPORTATION

The main service which a port development should render to a community is that of centralization of goods for shipment and the distribution of incoming goods. Experience has shown that ships will seek the best and cheapest transportation connections to the terminal which serves the greatest amount of territory, and is able to collect or distribute sizeable cargoes, even if it should be a little farther distant or consume a little more time in transit. A few additional miles after the cargo is loaded makes very little difference in transportation costs. This means that not only must adequate loading, unloading, and warehousing facilities be provided but the port must be located where all possible transportation connections such as railroads, highways, and secondary waterways can give speedy and economical transportation to the territory inland from the port.

RAIL

Rochester is an important railroad center. Serving it are five important railroad systems, the largest of which is the New York Central, The others: The Buffalo, Rochester, and Pittsburg, now a part of the Baltimore and Ohio System; The Pennsylvania; The Erie; and the Lehigh Valley railroads. These railroads have a lineal track mileage of 32,159 miles and located around Rochester they have plentiful trackage in yards for classification and car storage. The port plans provide for a complete coordination of all these

roads and all wharves, warehouses and industries in the port plan, through a harbor railroad and belt line.

Rochester is located only a short distance from many of the large and important commercial cities of the east. It is eight hours from New York and over night by train from Philadelphia, Baltimore, Washington, and Boston, with good rail connections on the west to Chicago, Cincinnati, and Kansas City. The various railroads have found it to their advantage to give Rochester an exceptional package and less-than-carload-lot service which would be of great value in the speedy distribution of finished products from the port. The character of the products now manufactured in Rochester made fast express shipments imperative. For this reason Rochester is one of the most important Express Depots on a main line railroad. This will be important to shipside warehouses and enable them to deliver to a large area in the shortest time.

In order that trunk line railroads may be of greatest service to a port development it is necessary that a universal flat rate for all switching from the port to the main trunk lines be established and that a general switching agreement be entered into by the railroads and the shippers to make their shipping costs as low as is consistent with the necessary service, through a proposed terminal railway.

Rail rates have been increasing every year. This would indicate that the central portion of the country must look to navigable water for an economical outlet to the seas. The Panama Canal has served to more thoroughly isolate the middle western part of this country and if there is any possible chance for this area to be served by ocean going ships, any project to accomplish this should receive hearty support from that part of the country.

Foundry sand which at the present time is being shipped from Sandusky, Ohio to Rochester is a practical example of the difference in water and rail transportation costs. The sand comes by water carrier to Buffalo at a cost of \$.60 a ton, it is then transferred to rail at a rate of \$1.10 from Buffalo to Rochester. It is not difficult to see that a substantial saving could be effected on that one commodity alone by a complete water route from Sandusky to Rochester without trans-shipment. At the present time in order to give the railroads, which must compete with lake carriers, a chance to continue their service the Inter-state Commerce Commission has set the rate for lake-rail transportation at not less than 90% of the rates charged by all-rail connections. This is an example of the problems that will constantly demand the militant activity of the corporate Port Authority recommended in the report. Rochester is well situated with regard to rail shipping connections.

TRUCK

From an investigation of the port it is obvious that the highway transportation problem of the port area has been worked out to offer shippers from the port speedy and economical truck and bus services. There are broad highways in all directions and suitable arrangements have been carried out in the port and regional plans to allow highway traffic convenient routes by which they may bypass the city traffic. At the present time trucking rates around Rochester are decidedly unstable and there is much destructive competition among some trucking companies, however, many sound companies operate in this area with good equipment which furnish satisfactory and responsible bonded service. These companies are striving for uniform rates. Reliable truck service allows quick pick-up and delivery for port shipments and keeps goods moving rapidly, this should help solve the problem of warehousing. Cargoes may be brought in during the navigation season, warehoused at ship-side at a minimum cost for handling, and distributed in less than carload lots by trucks as needed.

AIR

The air transportation companies on the lakes have so far done very little to develop flying boat services for the eastern lakes although Kohler and others have developed active flying boat services across Lake Michigan and between Detroit and Cleveland. While Rochester has good direct service by land-plane from fields located on the outskirts of the city, it would be necessary to have a separate water-field for the flying boat service. This trans-lake service would be of great advantage not only for passengers but in speedily handling small shipments to and from the port. The port plan provides special layout plans for a flying boat and land-plane airport of most modern design at Long Pond.

BARGE CANAL

The New York Barge Canal which forms an inland connection between the Hudson River and the Great Lakes has a canal terminal at Rochester. This terminal is of first class construction and mechanical equipment, however the modern self-propelled barges find it more advantageous to come out into Lake Ontario by the way of the Port of Oswego which is connected to the main East-West Barge Canal by the Oswego branch canal. The traffic on the canal has been steadily gaining during the last few years and the inland manufacturers look to this lake and canal connection for shipment to the seaboard, without extra handling, to reduce their transportation costs to a minimum. Barges call at the Rochester canal terminal or larger barges, constructed to navigate the open lakes, partially loaded will come through the canal to Oswego and into Lake Ontario and load to capacity at Rochester for the trip up the Great Lakes through the new Welland Canal. The Barge canal will not permit these large barges to come through fully loaded because the Barge Canal will not accommodate boats

having more than 10 foot draft. The bridge clearances of $15\frac{1}{2}$ ft. are also a severe restriction. From the trend of water borne traffic in the section it would seem that this tonnage would be a great source of revenue to a suitable port at Rochester. The initial terminal unit constructed at Charlotte is most adaptable to the terminal servicing of canal-lake barges.

FEDERAL DEVELOPMENT IN THE

GREAT LAKES

At the present time the harbor at Charlotte which is now designated by the United States Engineers as the Port of Rochester, has been maintained at a lower cost per ton of shipping handled than a great number of the seaports of the United States. According to governmental figures there are located on the Great Lakes 13 of the first 25 most important ports in the country rated according to the tonnage handled. A small percentage of Federal funds has been expended upon the Great Lake ports in proportion to the tonnage carried. Other harbors have secured a greater proportion of the river and harbors funds. Although improved channels of the Great Lakes carry 91% of the total ton miles upon waterways improved by Federal funds, only 11% of the total expenditure has been made upon these Great Lake projects. In view of the growing lake and foreign tonnage accelerated through the completion of the Welland Canal and the possibility of a deeper St. Lawrence Waterway, the Great Lake Ports are worthy of greater Federal assistance in their improvement.

DISTRIBUTION BY TON MILES ON FREIGHT CARRIED UPON WATERWAYS

IMPROVED BY THE UNITED STATES GOVERNMENT

SYSTEM	TON MILES	PERCENT OF TOTAL
Atlantic Coast rivers Entrance channels to ports	1,345,198,863	1.27%
Gulf Coast Rivers (do.)	475,569,107	0.45%
Pacific Coast Rivers (do.)	776,745,040	0.73%
Mississippi-Ohio Rivers	<u>4,982,630,693</u>	<u>4.70%</u>
Total of these Systems	7,580,143,703	7.15%
Great Lakes (Exclusive purely Canadian traffic)	97,322,360,000	92.85%
Total all Systems	104,902,503,703 T. M.	100.00%

DISTRIBUTION OF EXPENDITURES BY THE UNITED STATES TREASURY

UPON RIVERS AND HARBORS FROM THE BEGINNING TO JUNE 30, 1930

PROJECTS	EXPENDITURES	PERCENT. OF TOTAL
Sea Coast Harbors	\$ 535,694,516.	32.3%
Mississippi River and Tributaries	426,330,492.	25.7%
Mississippi Flood Control	228,968,264.	13.8%
Operation and Maintenance Canals	103,093,354.	6.2%
All others (exclusive of Great Lakes)	<u>182,433,338.</u>	<u>10.9%</u>
	\$1,476,519,964.	88.9%
Great Lakes Harbors and channels	<u>183,816,262.</u>	<u>11.1%</u>
Grand Total	\$1,660,336,226.00	100.00%

ECONOMIES OF DEEP CHANNELS

The history of transportation has been that economies are achieved through larger units, trucks, box cars, barges, and ships.

Suez, Manchester, the Soo, and other canals demonstrate at each deepening that larger ships use the improved waterway. By taking the figures of the Lake Carriers Association, it is found that the estimated average ships time of the 600 feet Great Lakes type is worth \$100.00 per hour. It is not hard to see that a great amount of money can be lost by transferring cargoes to smaller ships or by the stranding of these ships in narrow, crooked, or shallow channels. The savings which may be effected by being able to increase the draft of vessels in the lake trade was estimated by the Lake Carriers Association to be as much as \$.03 per ton per voyage for every foot increase in the draft of vessels.

The United States Engineers estimated a saving of \$.09 for three feet of deeper loading in the very large bulk carriers. This fact is back of the present 25 foot channel project now under construction. This would point out that it would be of great assistance to economical transportation if the waterways connecting the lake with the sea via the St. Lawrence be of uniform depth with lake channels. The lake channels in fact are being deepened to 27 feet in anticipation of a 27 foot St. Lawrence Waterway.

It is well not to overlook the fact that the traffic of the Great Lakes, exclusive of that of Canada constitutes 92% of all the traffic carried on the publicly improved waterways in the United States. However, there is allotted only 11% of the total Federal funds for Rivers and Harbors and for harbor and connecting channel maintenance on the Great Lakes. Each season the Federal funds expended on the Great Lakes return 100% in public savings.

It would seem that lake ports merit the authorized deepening by the Federal government of their connecting channels to accommodate vessels of twenty-four feet draft. This deepening would increase the size of the ships and decrease the transportation cost per ton of all freight. Each successive deepening that has taken place in connecting channels of the lake ports has been followed by a substantial decrease in rates. Here it is well to compare this subsequent decrease in rates of water borne traffic with the ever increasing railroad freight rates. The savings to the public amount annually to the entire investment of the Federal Government since the beginning of Federal improvements.

FEDERAL POLICY

It has been extremely difficult to enlist the aid of the government in inner harbor channel projects, at ports on the Great Lakes. At salt-water ports the United States maintains the main harbor channels providing the community builds and maintains terminal facilities and berths along side. The same policy will henceforth be followed at lake ports according to the recent testimony before the Senate Committee considering the St. Lawrence Treaty. The only way to enlist this aid is for the people of all the states affected by the Great Lakes to put sufficient pressure upon their representatives in Congress so that those men will do all in their power to present the case forcibly to government officials.

The task of presenting the case to the proper authorities is the first and most difficult one of any proposed development. The peoples representatives must have inserted in the Rivers and Harbors Bill, authorization for a survey. Under this authorization the United States District Engineer conducts a local hearing at which the community has the opportunity to present its case to show that the project merits federal money to be spent upon it based upon the public benefit in savings to be attained and the terminal equipment plan which the community is ready to build. In order to successfully solicit federal assistance in the channel and harbor work, the local community must stand ready not only to provide suitable port terminal facilities according to a well developed port development plan administered by a modern port authority organization but must show reasonable proofs of a proportionate public benefit to the taxpayers using it.

From many points of view this would be an ideal time to start port construction as the work could be done at 35% to 45% under 1928 costs and the work furnished by this construction would provide relief to the present unemployment. It is estimated that

for every man directly employed on construction of this kind there must be at least four men at work to provide the necessary supplies for the construction. In order to furnish this employment the local government must stand ready to provide the necessary terminals before the Federal government can be persuaded to deepen the channels and build the protecting entrance jetties and breakwaters.

ST. LAWRENCE SEAWAY

It is pertinent at this time to consider a harbor for Rochester in view of the progress being made on the St. Lawrence Seaway. Within the very near future there must be accommodation for vessels up to 7,000 tons displacement having a maximum draft of 25 feet, which includes 2/3 of all merchant vessels over 1,000 tons, as it is for vessels of this size that the St. Lawrence ship canal project is being urged.

In order for Rochester to maintain its rightful place as the largest city on the American side of Lake Ontario and the richest manufacturing and agricultural area there must be in this section, not only a harbor with its accommodations for berths and warehouses but also terminal facilities to trans-ship cargoes of the magnitude of those which can be expected to come through the St. Lawrence. There must be sufficient warehousing capacity to take care of goods during the 130 days of closed navigation in order to have the Rochester port take its place with ports having a similar problem, such as Montreal or the Baltic Sea ports.

PROGRESS MADE

There exists at the present time a waterway having a 35 foot depth from the ocean, 1000 miles inland to Montreal. From Montreal to Ogdensburg the St. Lawrence River for a distance of 116 miles is not navigable because of rapids. A little over half of this stretch is now being developed by private initiative and private funds. The largest project is Beauharnois, between Lake St. Francis and Lake St. Louis, - 15 miles now nearing completion. The remaining portion of the 116 miles includes 26 miles of Lake St. Francis which will need very little dredging and blasting in order to secure the necessary depth. The work remaining to be done on this project is a length of about 9 miles of artificial canals and 3 locks in the 48 miles of the International Section between Prescott and Cornwall. In other words, counting the new Welland, Beauharnois and upper lake channel deepening, the development of deep water navigation from the Great Lakes to the sea is more than half way completed.

On October 1, 1932 the Joint Board of Engineers (Reconvened) submitted a revised report upon the costs of the St. Lawrence Seaway Project, excerpts from which are included here.

Based on the assignment of tasks provided in the treaty, the United State's share is \$ 215,492,000.00. This gross expenditure of \$ 215,492,000.00 includes construction of the United States portion of the navigation works and all facilities and all machinery for developing the United States half of the Hydro-electric energy-one million one hundred thousand horse-power.

The detailed estimates are set up under three main divisions

- A- Works Solely for Navigation
- B- Works Primarily for Power
- C- Works Common to Navigation and Power

A- Works Solely for Navigation. Under this heading are included the locks, entrance piers, channel or canal excavation and all other works required solely for the purposes of navigation.

B- Works Primarily for Power. The items included under this heading are subdivided into:

(A) Substructures, Head and Tailrace Excavation. Under this heading are included all earth and rock excavation, ice sluices, railway connections, etc. required primarily for power.

(B) Machinery and Superstructures. Under this heading are included turbines, governors, generators, and all other power house equipment.

C Works Common to Navigation and Power. Under this heading are included all channel excavation required for river enlargement, all dams, and dykes required to retain the levels in the pools created for navigation and power purposes, all land and property damages resulting from the raised water levels, all rehabilitation works, and all other works not included under "A" and "B".

SUMMARY OF ESTIMATES

A - Works solely for Navigation	\$ 34,188,000.
B - Works Primarily for Power	132,452,000.
C - Works Common to Navigation and Power	108,102,000.
Grand Total - - - - -	\$ 274,742,000.00

The cost to complete the waterway will be in the neighborhood of \$215,492,000.00 to the United States including foundations for power houses, but not super-structures, wheels and dynamos, which will open the Great Lakes from Lake Superior to the sea. In as much as both Canada and the United States will use the waterway and divide the power generated, there is the feeling that the cost should be divided equally.

Canada has spent practically two dollars to one by the United States on work already done and the two countries have agreed by the treaty now before the United States Senate that United States will do the greater part of construction in the International Rapids and Thousand Island Sections from Lake Ontario to Cornwall. Of this distance, 67 miles have been widened at a cost of about \$ 1,000,000.00, leaving the International Rapids, 48 miles, between Ogdensburg and Cornwall, the total cost of which will be \$ 275,000,000.00 for the completion of the necessary power and navigation construction. This will make the amounts spent by the two countries, on the entire project from Lake Erie to the Sea, about equal and complete a waterway 27 feet deep all the way to the sea. The power production for the United States of about 1,100,000 horse-power, whose value at \$.04 per kilowatt hour would be worth \$ 287,500,000.00. per year.

The Canadians have had a controversy for some time over the proposed power rights developed on the Canadian side of the canal. However, these power rights have been given to the Province of Ontario subject to the rights of international relations and navigation vested in the Canadian government. It is thought probable that a similar distribution of the power rights on the American side will be made which will give the State of New York the distribution and use of boundless power possibilities. However, a treaty must be ratified between the United States and Canada before New York and Ontario may develop the power.

INTENDED PROGRESS

The Great Lakes to the sea project is somewhere near half completed. The Welland Canal is constructed at a cost of \$ 128,000,000.00 with suitable locks for deep draft vessels, this is the greatest single link in the Great Lakes to the sea project. In the upper region of this development there remains, several deepening projects in the Detroit and St. Mary's Rivers, and the addition of the new lock of Welland dimensions to the four locks at the Soo. The United States must spend - \$60,000,000.00 for this work, one-half of which is already appropriated and expended in the St. Mary's, St. Clair, and Detroit Rivers.

ST. LAWRENCE TREATY

The St. Lawrence seaway project has been planned for many years. The immediate step necessary toward the complete plan is the ratification of the treaty between the two nations by the United States Senate. Since the writing of Dr. Mac Elwee's report a St. Lawrence Deep-Waterway treaty has been drafted and signed by the Prime Minister of Canada and the President of the United States. Hearings before a sub-committee of the Senate Committee of Foreign Relations have been held. (This Committee with Senator Borah as chairman consisted of Senators, Walsh of Montana, Vandenberg of Michigan, Quinn of Illinois, Wagner of New York, and La Follette of Wisconsin. Dr. Mac Elwee was technical advisor and a principle witness.) In the treaty Canada agrees to construct and maintain; the necessary navigable works in the Thousand Island Section east of Oak Point, a side canal and lock at Crysler Island in the International Section, and also to assume responsibility for the rehabilitation made necessary by the effects of the channel expansion on the Canadian side of the boundary. Also install a flight of ship locks at Beauharnois and a dam and locks to drown out the La Chine rapids just above Montreal.

The United States agrees to construct and maintain; the channel west of Oak Point in the Thousand Island Section, a side canal with locks at Barnhart's Island in the International Rapids Section and also to be responsible for the rehabilitation made necessary by the construction of the waterway on the American side of the boundary. The raising of the water levels in this section of the river would inundate two towns on the Canadian side but no extensive rehabilitation is necessary on the American side of the river. When the navigation construction shall have been completed each country will maintain and operate the section of the canal which lies within its boundaries.

The construction in the International Rapids Section shall be administered by a temporary commission of ten men, five appointed by each government, to act upon the recommendations of the Joint Board of Engineers who made the survey and conceived the plan for the development of the St. Lawrence Waterway. The money to complete the construction in this area is to be furnished by the United States. The labor and material employed on the project to be secured in the country in which the construction areas lie.

The balance of the treaty deals with the rights of the two countries with regard to the use of the water for power and the maintaining of the water levels in the Great Lakes to secure navigation and drainage. It is provided that the present levels be maintained and that only one-half of the water available for power be used. Disputes over the diversion of water from the Great Lakes System by either country shall be settled by a judicial board of three members, one each, from Canada and the United States, and one member selected at large.

After carefully reading the treaty it would seem that the Canadians have offered the United States a very fair proposition. This country will pay for and maintain 116 miles of channels and locks in the Thousand Island and International Rapids Sections while Canada will build and maintain the 68 miles from the end of the International Rapids Section to Montreal and from there a channel 1000 miles to the Atlantic. The super-structures and equipment for the manufacture of power will be paid for by the country to benefit by power. The section of the work which will be controlled by the United States will furnish about 1,100,000 horsepower and the Canadian part of the canal down to Montreal will furnish approximately the same amount.

This treaty while it has been signed by the representatives of both countries has yet to be ratified. There is a determined opposition by selfish interests including the railroads and the ports of Buffalo, Albany, Baltimore, New York, and Philadelphia.

From the forgoing facts on the economic situation it can be seen that there are powerful forces in operation which point to the necessity of an adequate port development within the next few years. This port can be made to support itself and be a great boon to industry in Rochester and the surrounding counties.

PHYSICAL SURVEYS

After surveying the possibilities of a port at Rochester from the economic point of view, the next step in any comprehensive report is to determine where, on Lake Ontario, in this vicinity, the terrain will best and most economically adapt itself to the developments of a port. To thoroughly investigate the possibilities, a region of 100 square miles in the vicinity of Rochester was surveyed and three locations were tentatively selected as the possible sites of a recommended port development.

The locations which were tentatively selected were the ponds to the west of Rochester, the mouth of the Genesee River, and Irondequoit Bay, to the east of the Genesee River and the City of Rochester. The field parties then started to make a minute physical study of each of these locations. The engineers were particularly fortunate to be able to use a new topographic map made by the United States Geological Survey and a controlled aerial mosaic paid for by Monroe County so that a great amount of time and approximately \$6,000.00 were saved. Borings were taken to determine the depth to which the proposed harbor could be dredged and whether the sub-soil surrounding this water was of such hardness as to support the foundations of necessary docks and warehouses at the least possible expense.

LONG POND

In the Ponds area, located west of Rochester off Lake Ontario, which at first seemed ideal, rock was found as near surface as 8 or 10 feet and at only an area too small for any ambitious port plan, could a depth of 32 feet be obtained in Long Pond. The area of rock depths of 32 feet was less in other ponds. Long Pond was selected to be the most likely pond of the group. The borings in this region showed that the hogbacks between these ponds were composed of solid rock and that the ponds could not be connected except at great expense for the blasting of this rock. The expense of a separate development in each of the ponds was out of the question because of the expensive channel and protecting piers or jetties which would be necessary for each entrance, compared with the small usable area inside.

This section which was at first thought so well suited to the needs of a port was found to be actually inadequate for the developments which are important around a new port, namely; there was not sufficient depth without expensive rock drilling and blasting to accommodate the longer and deeper ships of a generation hence which must have at least 32 feet depth of channels. The tendency of ship transportation is to develop the maximum size ships which channels will permit.

CHARLOTTE

The next possible site considered was that of the mouth of the Genesee River which at present is known as the Port of Rochester. The borings at this location showed that there was no bed rock coming near the surface and that the available sub-soil while not ideally satisfactory for foundations could be used without undue expenditures.

There were several features in this region which deterred the engineers from recommending it as a site for a large port development program. In the first place the banks on either side of the river were very high and would necessitate expensive elevating equipment from the wharves to the level of possible transportation as there is no practical way to build roads or rail connections from water level to the present rights of way upstream from the Charlotte development. Secondly, there is very little land which could be bought at the level of the Genesee River within the territory where the port should normally stand. The only available land of any consequence in this immediate vicinity is owned and controlled by a railroad which undoubtedly would not look with favor upon selling its land to a competitor. Thirdly, the Genesee River at whose mouth this prospective site is located flows through many miles of inland territory and at all times but more especially during the time of high water in the Spring and Fall brings with it a large amount of silt. Wherever the channel allows it to spread out over a greater width much of this silt is deposited and the current is not sufficiently strong

to carry it along out of the channel. Thus if the river were widened for a harbor basin this silt would tend to drop into it and each year costly dredging would be needed to maintain the depth within the harbor. It is necessary at the present time to dredge the channel every year in order to maintain the depth for the operation of shipping now using the port.

The entrance channel of the present port has been dredged to a width of 150 feet and a depth of only 20 feet. The jetties inclosing this harbor are 550 feet apart with shallow foundations. In order to construct an adequate entrance to a port at this location there must be a channel of 300 feet or more in width and a depth of 27 feet with the possibility in a generation or more of going to 32 feet. The dredging to such a depth inside the jetties would undoubtedly cause them to slip into the channel. The cost of developing what little land is available, the yearly cost of maintaining suitable depth in the channels, the high banks, and the cost of building new entrance jetties led to the conclusion that a major port in this location would be expensive and would not serve the needs of future growth.

IRONDEQUOIT BAY

The third prospective location, at Irondequoit Bay was carefully examined and the physical properties of the terrain noted. The water was too deep and the banks were too high with very little foreshore over most of the area, however two portions of the Bay were considered, one situated at the north end and the other at the extreme southerly end. That of the north shallow area was abandoned because the area was too small and farther away from Rochester than the south end, and was local to only one railroad which rendered it hopeless as all points in a port must have switching to all rail systems. The borings and soundings showed that there was about one square mile of shallow water at the south end where plenty of depth of channels can be dredged at any place located in an ideal efficient plan and that the upland necessary for a considerable amount of terminal space can be made by filling to grade the swampy land behind retaining walls.

Irondequoit Bay was at one time connected with Lake Ontario for a distance of about a mile and a quarter. By the action of the storms on the lake this entrance was gradually closed by sand drifted in from the lake. The Bay is navigable for a distance of about three and one-half miles from its mouth with a maximum width of 1500 feet and a depth of from 30 to 70 feet in the middle. At the present time the entrance from the lake is very shallow and narrow and crossed by the tracks of the New York Central branch and a highway bridge. The waters of Irondequoit Bay have been designated by the government as navigable waters. It would therefore be constitutionally right to request the New York Central Railroad to desist from blocking navigable waters and to provide

adequate draw bridge facilities if the Bay were to be used by the public for a harbor. It has been suggested that it might be less expensive for the railroad to connect the east end of this line beyond the entrance of the bay to the main line of the New York Central at some point to the east of the southern end of the Bay.

The port area as planned for the south end of Irondequoit Bay can be connected by a terminal belt railway with all grades separated with no curvature greater than 8 degrees and no gradient greater than .9%. This harbor belt line would connect with and become an integral part of the Subway System of Rochester which serves all trunk line railroads and many industrial plants. A truck highway could easily be constructed over the old Glen Haven trolley right of way which would connect with a modern highway east and west with adequate by-passes to avoid city traffic. Empire Boulevard would connect directly with the south end of the terminals. From the standpoint of economical installation the south end of Irondequoit Bay can be developed as a complete modern port.

The physical fitness of these three locations has been investigated and further discussion should deal with the plans which have been recommended for each area and the cost of each plan in proportion to the eventual good which will be done this region by each of the projects. Each development is divided into two stages and it is important to study the plans, bearing in mind that the port would be built for posterity as well as to meet the demands of the present. It is essential that these plans be carried out with all possible dispatch in order to reap the greatest benefits for this generation as ports can not be built in one year.

PORT PLANS

LONG POND

The plan which has been advanced for port terminal facilities at Long Pond was discarded by the Engineers because of inadequate areas of easy dredging. The study plan may be of interest as a careful study of possible use. The port area would be entered by a new channel between jetties 850 feet apart at the outer end and widening out to 3800 feet between the jetties of the typical arrow-head plan at the shore end. The channel 500 feet wide and 27 feet deep is to be dredged between the jetties to the widening part where a turning basin with a 600 foot radius will be dredged. A main ship canal 4800 feet long and 400 feet wide with a depth of 25 feet towards the southern end where the rock is met, would give water frontage to industrial sites of about 328 acres. Further industrial sites may be developed on the southern end of Long Pond at no great distance from the harbor basins when future expansion creates a demand for them.

Near the entrance of the harbor the jetty to the east would form the back wall of a dry dock and from that location on the east side of the main ship canal are located three basins with wide quay piers between, two of which have warehouses and one a grain elevator down the center between the transit sheds. On the opposite side of the main canal, i. e. the west side, there are two basins, one being for the use of coal transportation, which pier has appropriate coal tipples and railroad yards for car storage and the other pier being equipped to handle building materials or other materials in bulk. Railroad and highway connections from the piers and industrial sites run to the south and thence to a connection with trunk highways and railway terminals. There is plenty of space available for railway storage and classification yards in this plan, five basins with wharf facilities for loading and unloading ships, and storage for petroleum products at the main canal entrance which is included in 328 acres available for industrial sites. The entire project as outlined herewith is estimated to cost, including the breakwaters and dredging at the harbor entrance, which would be done by the government, about \$ 14,000,000.00.

The initial stage, i. e. the amount of money that would be needed to open the harbor entrance, build and equip one basin with quays and furnish rail and highway connections is estimated to be about \$ 7,500,000.00. The work to be done and paid for by the government will amount to slightly over \$ 3,000,000.00. This cost was included in the former total cost figure.

While making this survey for the port development the particular aptitude of this area for a county airport was noted. With a small expenditure there could be established an airport rated among the best in the country with accommodations for the largest land and sea planes. This would not require any entrance channel jetties, as boats larger than small pleasure craft are not allowed to enter a first class sea plane basin. The only money which would be expended would be for bulk heads, fill, drainage, runways, hangers, lights, and field equipment. Within the next few years it may be important for the section to have an airport for flying boats and land planes in order to keep pace with the rapid strides in aviation, especially trans-lake traffic in the Great Lakes areas.

CHARLOTTE

The port of Rochester at Charlotte has for a long time been used to a limited extent as a port for this section. The problem therefore was to try to improve the existing harbor already located at Charlotte to the immediate needs of a port for Rochester and vicinity. In order to do this in the least expensive manner a site was selected on the west side of the river near the mouth which site had formerly been occupied by a blast furnace. In view of the anticipated immediate need for the handling of a large amount of package freight offered to the

Port of Rochester the consulting engineers made a preliminary study and plans for a package freight and passenger terminal to meet this immediate demand. This report was submitted and the city council retained the engineers to make working drawings and specifications for a terminal at Charlotte.

The present Charlotte terminal unit was constructed as the initial terminal unit to the development of the Port of Rochester as a going concern. The blast furnace site has a frontage of about 1400 feet on the Genesee River between Beach Avenue and the embankment of the Ontario branch of the New York Central Railroad and an upland depth of about 800 feet to Lake Avenue.

The development consists of a ferro-concrete quay wall 1200 feet long placed 70 feet back from the existing shore line. This location provided ships berths away from the main channel, widened the turning area and permitted the construction of the quay wall in the "dry". The type of construction is the high foundation relieving platform type in which a sheet piling containing wall, with three rows of timber bearing piles support a horizontal reinforced concrete slab $2\frac{1}{2}$ feet thick and 16 feet wide. The lower edge of this slab is located at an elevation 6 inches below record low water. Upon this platform is erected a concrete quay wall with strengthening counter forts and the entire area back filled to wharf level. The wharf apron is 30 feet wide and carries a gantry rail and two railroad tracks for the greater portion of the wharf or two berths, or about 800 feet planned for the use of lake-canal barges and ocean vessels using top-hatch discharge.

Three transit sheds were designed to protect cargo being assembled for loading or sorted for delivery after being returned from a vessel. Shed #1 has a floor area of 261 feet 6 inches by 120 feet or 33,080 square feet. This is on the assumption that a vessel 300 feet long will discharge or load about 3000 tons, and 10 square feet of floor space for each ton is necessary to handle cargo without congestion. Shed #2 and #3 were designed as single story sheds 241.5 feet by 120 feet or a floor area of 28,910 square feet. Shed #2 was designed for lake-canal barge traffic; Shed #3 and 4 adjustable drop gangways for lake package freighters. The modern development of these freighters provide the uniform distance from center to center of the side ports of 48 feet.

Shed #1 is designed to accommodate top hatch loading and especially passenger vessels. As the passenger traffic of the Port of Rochester has reached as high as 90,000 a year and mostly international, a second floor was provided, 120 feet by 140 feet, as a passenger station, provided with offices for customs and immigration, port managers offices, waiting rooms, detention rooms for the immigration service, women's and men's rooms, and a full passenger equipment according to the best modern practice at Atlantic and European ports.

All three sheds have 6 truck loading platforms at each end and two railroad tracks with a earloading platform (20 feet wide) along the inshore side - space for a row of warehouse units 100 feet by 160 feet each between fire walls is provided inshore from the transit sheds and roadway and reached from the wharf via the ramp and 50 feet wide court between the transit sheds. The transit sheds are of steel frame with hollow tile walls, and tapestry brick veneer with cast stone trim so that very little maintenance of structures should be necessary.

The engineer's estimate of the cost for the completed terminal with three transit sheds, mechanical handling equipment and dredging of the berths was \$570,000.00. The City Council appropriated \$500,000.00 to build the terminal omitting for the present transit sheds #2 and #3 at a cost of about \$45,000.00 each.

The open area at the south end of the wharf is designed for bulky and unpacked merchandise such as sand and gravel, stone, brick, steel, lumber, rails, timber, or unboxed automobiles on their own wheels. It may be used for soft coal from Lake Erie ports discharged from self unloading carriers.

The terminal is modern in every detail and was ready for use late in the 1932 season, a notably bad depression year. However, the Port of Rochester now has a modern port terminal unit for which to solicit traffic and build a commerce movement through that gateway. Changing avenues of traffic is slow work with the best of facilities. Without terminal facilities it is impossible. The complete terminals should handle 500,000 to 800,000 tons of general cargo a navigation season.

IRONDEQUOIT BAY

The plan for Irondequoit Bay which is located on Lake Ontario east of the City of Rochester, was next considered in the search for a suitable site for a large scale harbor development. This location has been designated for a great number of years as navigable waters and with the exception of a slight drift along its shores and across the mouth of the Bay, from the shores of Lake Ontario, it has maintained a depth of from 30 to 70 feet throughout its length.

Utilizing this depth the site at the south end of Irondequoit Bay near Float Bridge was selected. The main entrance channel and the jetty works for both Long Pond and this location was identical and the same plan for the style of jetties and their size was suggested here as for the proposed entrance development to Long Pond, i. e. the jetties were to be built 350 feet apart at the outer end, widening to 3800 feet between the jetties at the shore end, the channel between the jetties to be 500 feet wide and 27 feet deep with possibility of an eventual 32 feet depth and to be dredged through the strip of land which

separates the western side of the present water in the Bay from Lake Ontario. A suitable highway and railroad bridge is to cross at this point. The cost of the work on these jetties, however, in the case of Irondequoit would be less than at Long Pond because of existing conditions.

The site under consideration, on Irondequoit Bay is located at the south end of the bay in a region embracing that part from Snyder's Island south. The bay at this point is about 2500 feet wide. The water in this section at the present time is extremely shallow, and the material under water is of a nature which lends itself to the dredge and fill method. The plan is to dredge a main ship canal having a width of 500 feet directly down the middle of this area for a length of 4300 feet.

Extending from the west side of the main ship canal at an angle of 60 degrees will be dredged four basins, 1200 feet in length and 400 feet wide having the necessary depth. Between these basins will be four quay piers, the first, whose northerly side faces the open water of the bay will be arranged for the dumping of coal with the required coal tipples. The second pier between Basin #1 and basin #2 will have general cargo, passenger, and warehouse facilities. Pier #3 will be likewise arranged while pier #4 facing, on the north, basin #3, and on the south, basin #4, will be arranged for grain elevators and mills. The area between basin #4 and the highway crossing at Float Bridge, having water frontage on basin #4, will be used for the storage of bulk cargoes such as lumber, cement, fertilizer, etc.

On the east side of the main ship canal facing the open water of the bay there is located a shipyard with the railway drydock and fitting out quay. Directly to the south of this there are five industrial sites with a water frontage of 1000 feet or more per site. The 500 foot main ship canal at the end of 4300 feet narrows to 250 feet wide in a minimum length of 900 feet from the west end line of the main ship canal, Empire Boulevard or the highway commonly known as Route #3 will cross this 250 foot channel by means of a bascule bridge. Beyond this crossing the canal may eventually be extended 2100 feet entering into a turning basin 1000 feet square. On both sides of this 250 foot channel which leads from the bridge into the turning basin there are six industrial sites with a water front of 700 feet each and a total area of about 85 acres.

At first it was thought that because of the uneven country surrounding this end of the bay that railroad and highway transportation would be difficult, however, after careful survey of the region it was found that the best possible railroad and highway connection could be made available to the port. The railroad which would have its beginning behind pier #1 with yards for coal car storage, will run directly past the shore ends of the piers and basins across under the highway #3, beyond which will be

located a classification and car storage yard. From the end of this yard the railroad will follow a more or less winding path at a grade of not more than .9% and no curvature shorter than 8 degrees to join the abandoned right of way of the Rochester, Syracuse, and Eastern Electric Railway. This connects with the Rochester Industrial and Rapid Transit Railroad serving the main trunk line terminals as well as many industrial plants. All crossing grades will be separated. The cost is estimated at \$1,450,000.00 for the harbor belt line and yards including bridges. Thus the fundamental principle of complete switching flexibility between every berth and every railroad system will be realized.

The highway connection, for the south port development on Irondequoit Bay, is to follow the right of way now occupied by the Glen Haven trolley line up to Empire Boulevard giving a very level highway with plenty of turning radius. This highway connection with Route #3 gives easy access by the Ridge Road east and west, and by the further development of Winton Road, a bypass may be affected to avoid the city traffic.

Thus conditions at the south end of Irondequoit Bay are found to be entirely satisfactory for an extensive port development with adequate rail and highway transportation possibilities. The estimated cost of this entire completed project is \$18,000,000.00. These costs are computed with material and labor at the price in December 1931. But the entire plan could not be completed for several decades. The initial units necessary to begin operations of a complete commercial and industrial port would cost about \$6,000,000.00. Of this sum, about half would be Federal expense for jetties and entrance channel. This initial investment would include the complete fitting out of the section north of Float Bridge as outlined in the port plan, with the exception of piers #3 and #4 and include pier #1 with its coal tipple, a slip for ferry boats and one unit of general cargo pier with transit sheds and warehouses. The opposite side of the canal which includes the industrial sites would have its bulk head frontage on the canal. Additional units of the plan would be built as increased business warrants.

RECOMMENDATIONS

A careful study of all three locations proves that Irondequoit Bay has more advantages than the possible limited development at Long Pond and will furnish the most satisfactory area for the economical construction and operation of a first class commercial and industrial port. Comparative costs of initiating either of the two projects, the facilities offered by either of these two proposed sites to navigation, manufacturing areas, and ease of handling cargoes dealt with in the foregoing chapters are interesting for final decision.

ANALYSIS OF COSTS OF THE SEVERAL SITES
AND RESULTS TO BE OBTAINED BY THEIR EXECUTION

	IRONDEQUOIT	LONG POND
First stage - - - - -	\$ 8,376,800.00	\$ 7,455,600.00
Second stage - - - - -	2,784,100.00	3,870,000.00
Third stage - - - - -	4,112,450.00	2,399,800.00
Fourth stage - - - - -	<u>2,759,250.00</u>	<u>300,000.00</u>
	\$18,032,600.00	\$14,025,400.00

The Federal portion of the first stage development would be:

\$ 2,360,000.00 \$ 3,300,000.00

TOTAL POSSIBLE QUAY AND BULKHEAD (RESULTS)

LINEAL FEET OF DEEP WATER FRONTAGE CREATED

<u>PROJECT</u>	<u>COMMERCIAL QUAYS</u>	<u>INDUSTRIAL BULKHEADS</u>	<u>TOTAL</u>
1. Irondequoit	16,100 feet	14,400 feet	30,500 ft.
2. Long Pond	14,900 feet	13,000 feet	27,900 ft.

From the foregoing tabulation it can be seen that although the cost of the Irondequoit site is somewhat higher, it furnishes more frontage on deep water. The entrance jetties for both sites are identical in design, the difference in cost being in overcoming the physical features of the region. From the standpoint of navigation it is about as easy to negotiate the Ponds development as Irondequoit Bay. When it is noted that there is no dry dock on Lake Ontario below the Welland Canal, it can be plainly seen why a location like Irondequoit Bay would have an added advantage over the other locations considered. Irondequoit Bay has plenty of deep water outside of the proposed terminal to furnish a fine place for winter harborage to a great number of ships, not only is it important to note that there is plenty of space for tie-up in the bay during the winter and the level of the water at this point does not fluctuate to any great degree when there are storms on the lake. This has a very far reaching effect on ships tied up for the winter as they are subjected to terrific strains from the constant breaking up and moving of the ice which surrounds their hulls. At Buffalo and Toledo the water level during a storm may fluctuate many feet while in Irondequoit Bay the water level has never been known to vary more than a few inches. When the Irondequoit Bay project becomes a fact many

lake boats can be expected to tie up here for the winter and experience proves that a great deal of money is spent during this time refitting ships as well as the normal cost of up-keep. This periodic overhauling and refitting will produce business for a shipyard and dry dock.

After carefully reviewing the facts which have been marshalled concerning the three proposed locations it has been decided that a harbor development at the south end of Irondequoit Bay is by far the best. The main reasons, why this decision was reached, are that this site will have more industrial acreage on deep water, it is more suitably arranged for economical transportation to the territory which will offer the prospective market for the port, and the initial costs of opening this site will be less than that of the other sites.

The ease with which a terminal railroad belt line can be arranged for the port completely justifies the plan of the early exponents of both the port and the subway. The subway operating in conjunction with the port at Irondequoit Bay will prove invaluable to speedy and economical transportation and will more than pay back the cost of the subway. At the time the port is built the subway will then fulfill its original purpose.

From the investigation which has been made, it is concluded that there is practically no chance to expand the facilities of the harbor at Charlotte to the proportions which will be necessary to compete as the various port developments now planned are accomplished in other ports of the Great Lakes. A port properly planned and carried out becomes a permanent investment which rightly handled should show enough returns from wharfage, storage fees, leases on industrial sites, and handling charges to cover maintenance, and operation, as well as interest and sinking fund on the money invested. The returns derived from increased taxable values and greater payrolls while they cannot be estimated have been found by many cities to be sufficient to warrant the construction and operation of the port at a bookkeeping loss. The Engineers feel that the result of the survey of economic factors insures that the port development will be self-supporting and that the public benefits will be a clear gain. The St. Lawrence Seaway, when it becomes a reality, will undoubtedly make it decidedly advantageous for the vicinity of Rochester to have an adequate harbor and equipment to serve it.

A greater number of people in this region every day are coming to realize that the time is not far distant when the territory surrounding Rochester must have a suitable harbor in order to continue to grow and keep its present enviable financial and industrial position. In order to more speedily develop sufficient data and to more thoroughly put these facts before the people in this area, an independent board of commissioners must be appointed which will constitute a legal corporate body generally termed a Port Authority, independent of city, county, or state governments.

This Port Authority must have legally constituted powers to adopt a definite plan for port development and must expend all its energies in the execution of that plan so that when the realization of the necessity of this project shall be brought to a sufficient number of people there will be some authorized body with the facts of the situation available to immediately proceed with the plan.

It will be the duty of this Port Authority to procure necessary Federal legislation so that appropriations may be secured from the United States government to cover the portion of the work to be done by the United States. They must then authorize the issuance of the necessary bonds to provide the funds to carry out the port terminal work considered by Congress as a task of the community. The next step is for them to prepare working drawings and plans with which to secure the permission of the government to proceed with the project. It will be necessary, after this has been accomplished, to review the survey and revise it to date. With all of these things accomplished the Port Authority is then in a position to present the case of the people of the territory surrounding the port to the United States Engineers. It is for them to recommend the project to Washington so that port development can be started. All of this preliminary work is necessary before money and men can be mobilized to accomplish the terminal plans.

After a careful and deliberate consideration of Doctor Mac Elwee's report and comprehensive plan, the conviction is strengthened that the initial steps in a port development near Rochester must begin to take form in order to consolidate the gains made and be ready to proceed rapidly when the preliminary steps of port authority organization and assured Federal aid are completed. With so many convincing facts presented there can be little doubt that the proposed expenditures will place the vicinity of Rochester in a sound position to receive the benefits of the ever increasing lake trade and the traffic which will result from the completion of the St. Lawrence, Lakes to the Sea, Ship Canal Development.

S T A T E M E N T O F A C C O U N T S

JOINT HARBOR SURVEY COMMITTEE

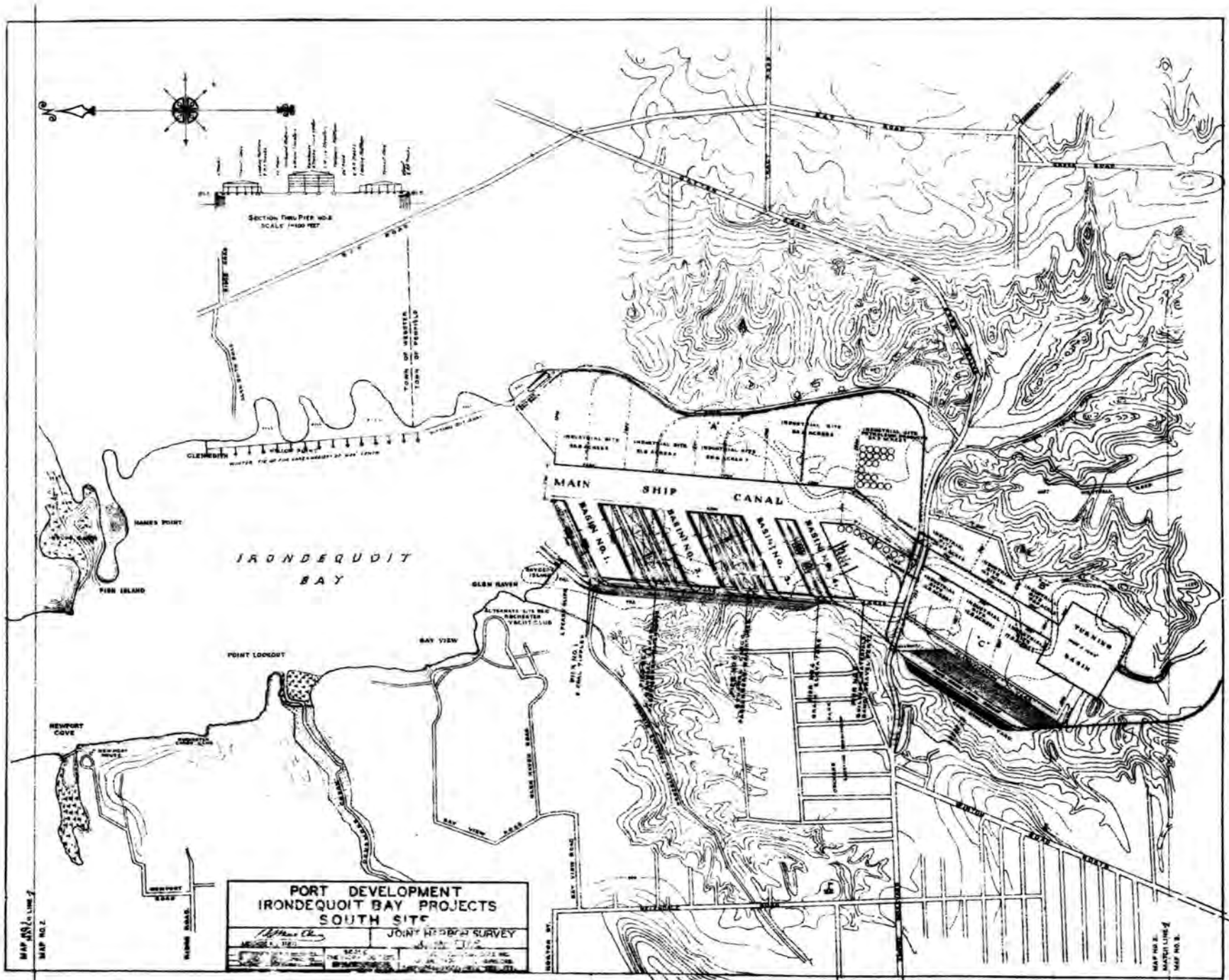
<u>CITY OF ROCHESTER</u>	Appropriations \$17,500.00
Expenditures:-	
Physical Surveys, Borings, & Supplies -	\$ 6,387.38
Mac Elwee & Crandall, Inc. - - - - -	8,500.00
	\$14,887.38
Balance - - - - -	2,612.62
	\$17,500.00

<u>COUNTY OF MONROE</u>	Appropriations \$ 17,500.00
Expenditures:-	
Supplies, Surveys, & Materials - - - -	\$ 6,387.38
Mac Elwee & Crandall, Inc. - - - - -	3,500.00
	\$14,887.38
Balance - - - - -	2,612.62
	\$17,500.00

S U M M A R Y

Total Appropriations - - - - -	\$ 35,000.00
Total Expenditures - - - - -	29,774.76
Balance - - - - -	\$ 5,225.24

Note: A balance of \$ 4,592.09 of County funds reverted to the County General Fund on December 31, 1931, and was not re-appropriated for use of the Joint Harbor Survey Committee. Expenditures made during 1932 were charged against and paid from the account of the Monroe County Regional Planning Board.



**PORT DEVELOPMENT
 IRONDEQUOIT BAY PROJECTS
 SOUTH SITE**
 JOINT HYDROGRAPHIC SURVEY
 1911

MAP NO. 1
 MAP NO. 2

MAP NO. 3
 MAP NO. 4

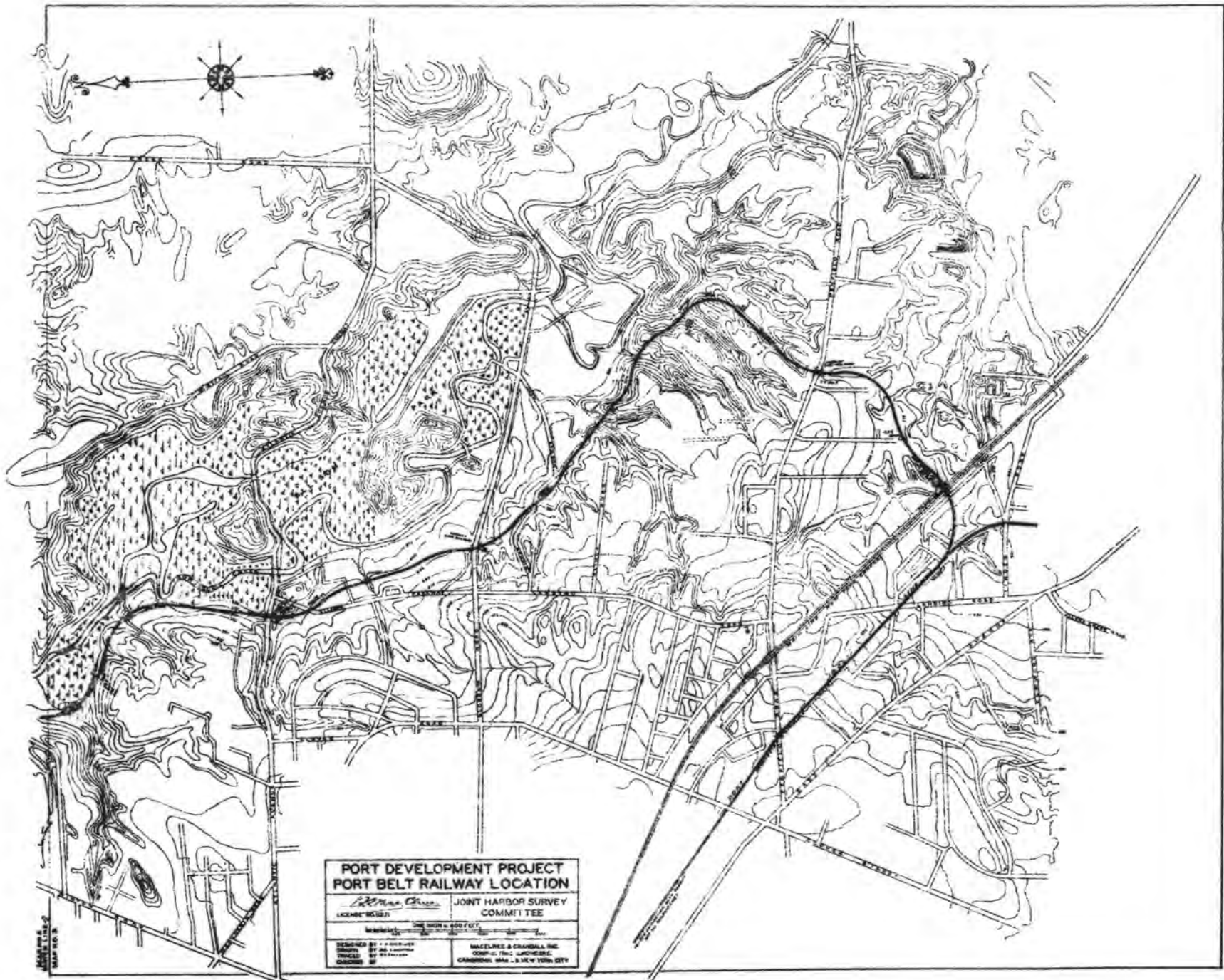


IRONDEQUOIT BAY

MAIN SHIP CANAL

TURNING BASIN

MAP NO. 1
 MAP NO. 2
 MAP NO. 3
 MAP NO. 4



**PORT DEVELOPMENT PROJECT
PORT BELT RAILWAY LOCATION**

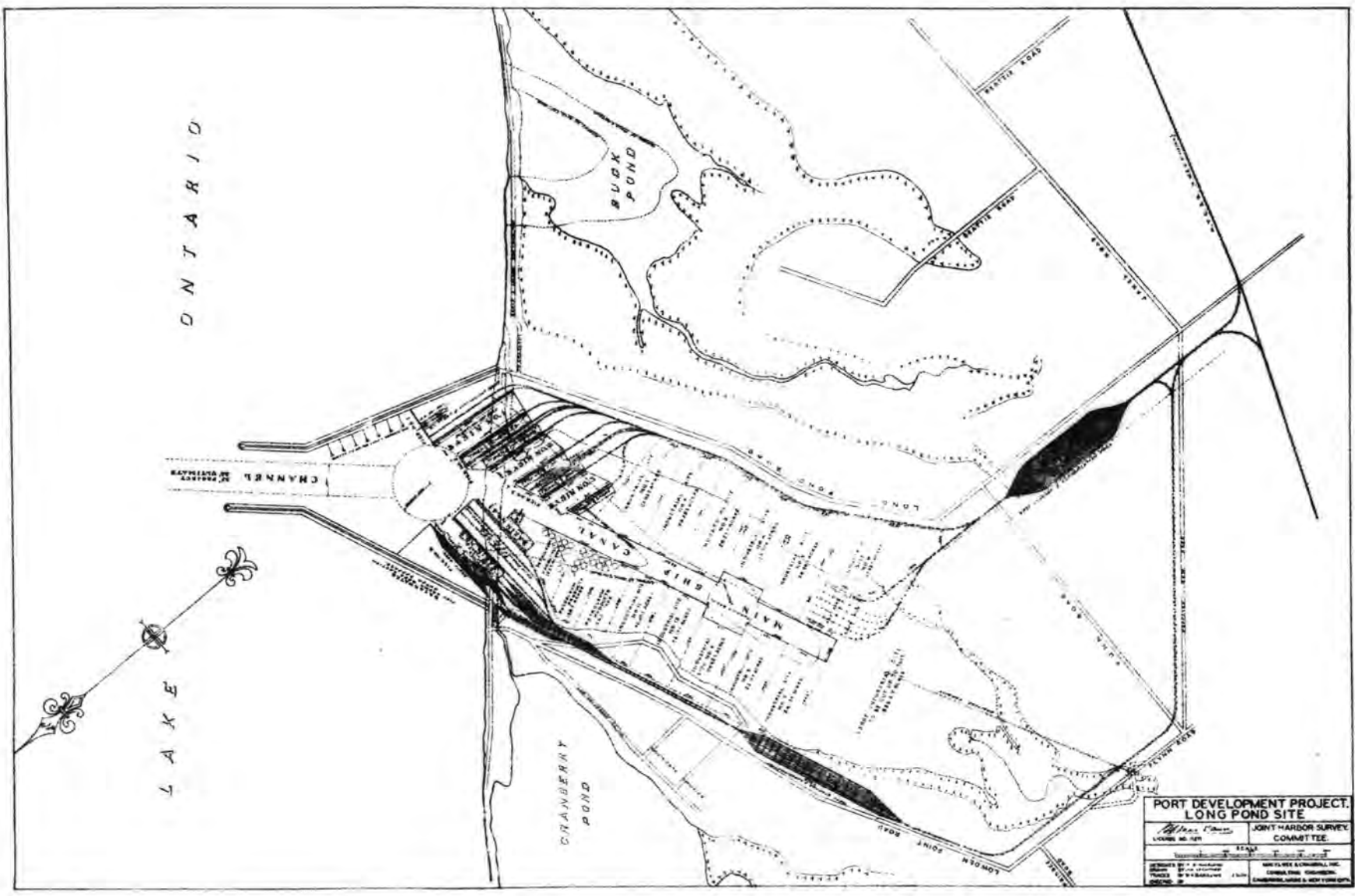
W. H. C. Co. JOINT HARBOR SURVEY
COMMITTEE

SCALE: 1" = 100 FEET

DESIGNED BY: W. H. C. Co.
DRAWN BY: W. H. C. Co.
CHECKED BY: W. H. C. Co.

MACLEOD & CRANDALL, INC.
CORP. - 1701 J. W. WALKER
CAMBRIDGE, MASS. - 3 NEW YORK CITY

MAP NO. 2



**PORT DEVELOPMENT PROJECT.
LONG POND SITE**

Prepared by License No. 1271	JOINT HARBOR SURVEY COMMITTEE.
Drawn by Checked by Project No. 1271	SCALE 1" = 100'
Prepared by License No. 1271	MCFARLANE & COMPANY, INC. CONSULTING ENGINEERS 100 WEST 42ND STREET NEW YORK 36, N.Y.

