

*Monitors Plants Branch*

# COMPLETION REPORT



YOUNGSTOWN - NEW YORK

JANUARY 1, 1942 - MARCH 15, 1943



OFFICE OF THE AREA ENGINEER

APRIL 1, 1943

VOL. I

COMPLETION REPORT  
LAKE ONTARIO ORDNANCE WORKS  
YOUNGSTOWN, NEW YORK

JOB NUMBERS

(Lake Ontario) M1-1; M1-2; M1-3

DIRECTIVES

Consecutive No. 15; No. 15, Supplement No. 1; M-249;  
No. 15, Supplement No. 2; M-249, Supplement No. 1;  
M-466; M-249 Supplement No. 2

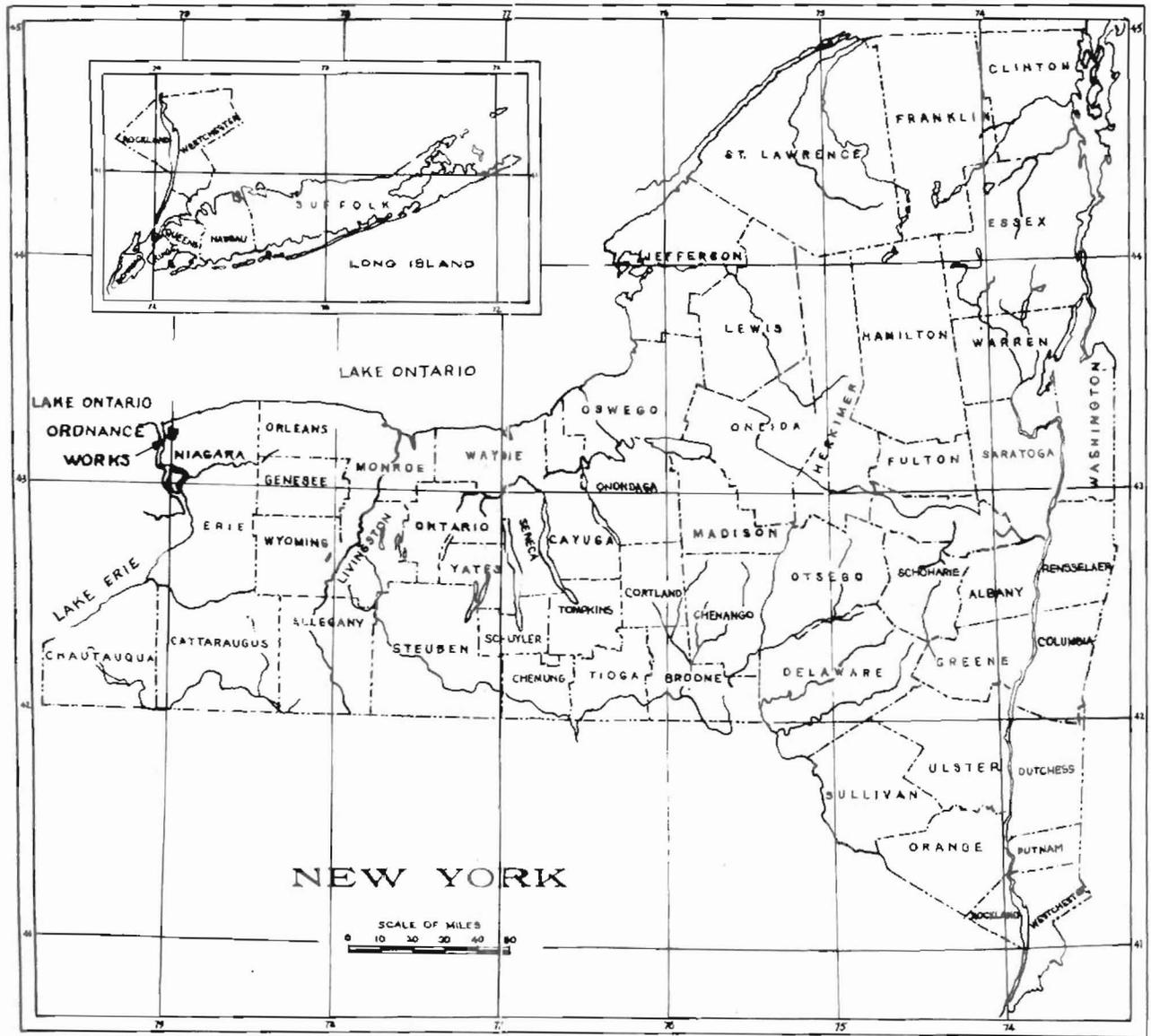
Submitted April 1, 1943

*Thomas R. Archibald*

Major, Corps of Engineers, U. S. Army

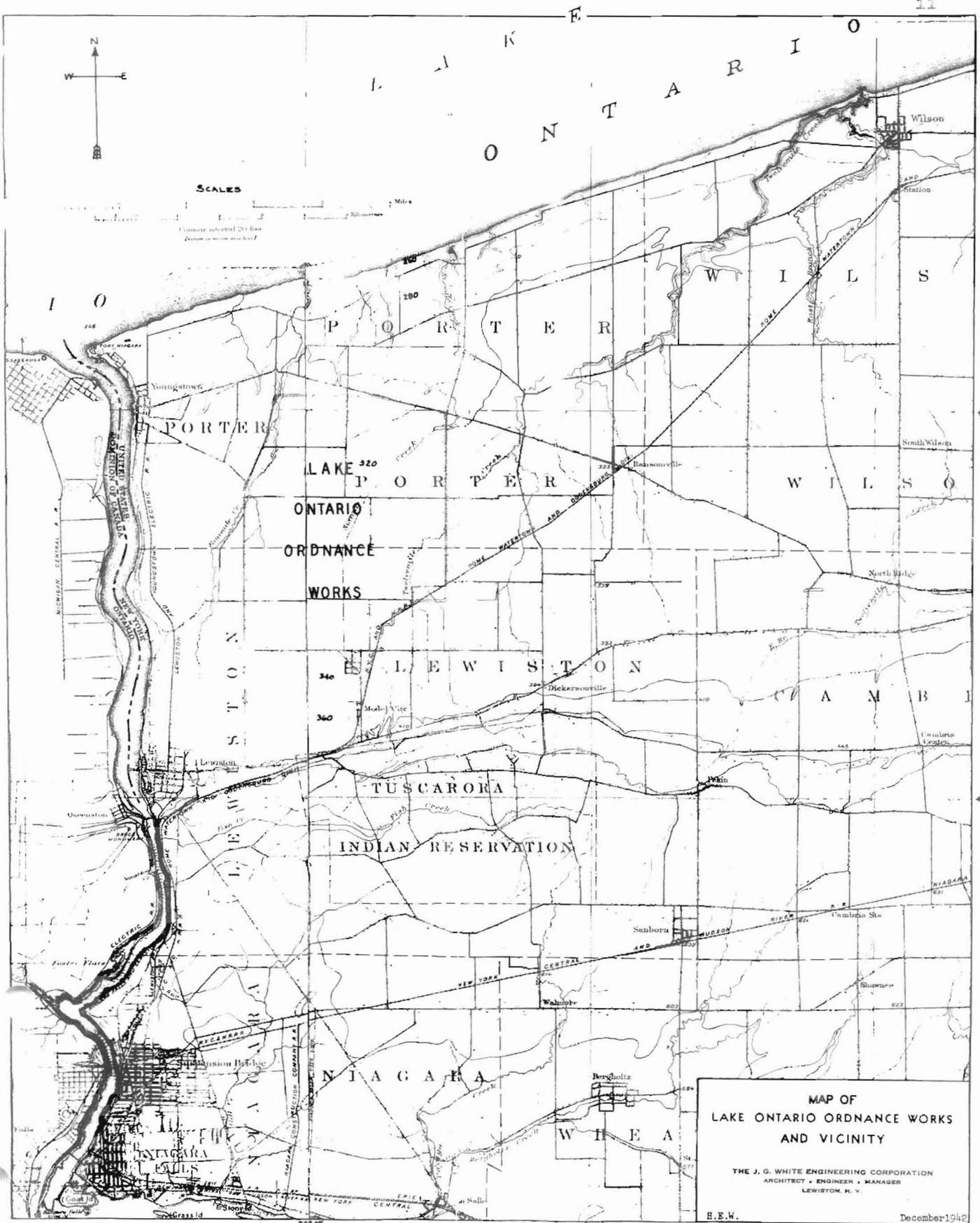
AREA ENGINEERS IN CHARGE OF THE PROJECT

Colonel Paul B. Parker, C. of E., Jan. 1, 1942 to May 1, 1942  
Lieutenant Colonel Harry R. Kadlec, C. of E., May 1, 1942 to Aug. 31, 1942  
Major Thomas R. Archibald, C. of E., Aug. 31, 1942 to April , 1943

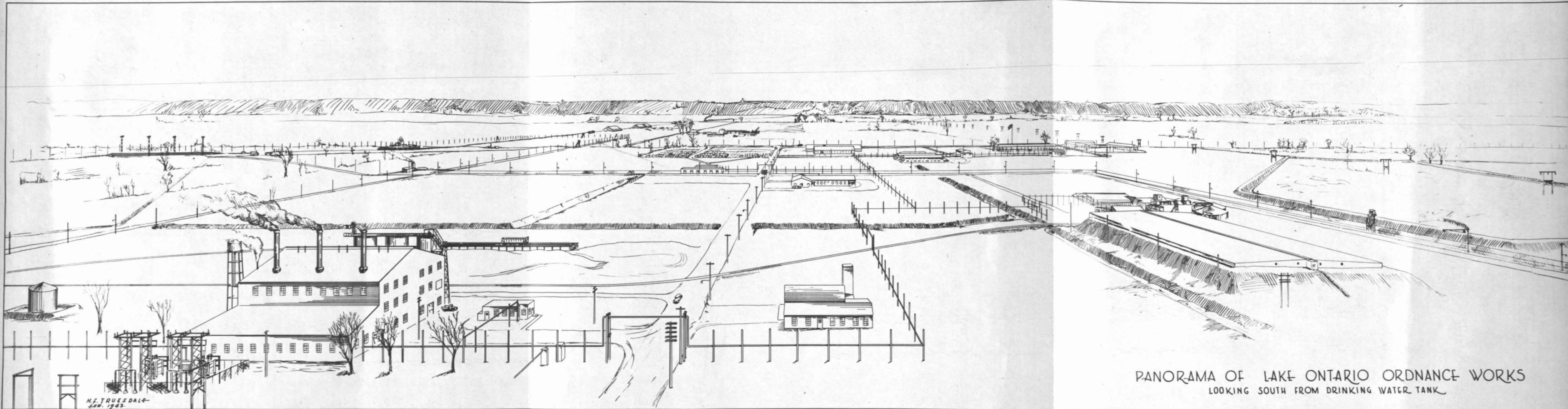


**MAP**  
**SHOWING LOCATION**  
**OF**  
**LAKE ONTARIO ORDNANCE WORKS**

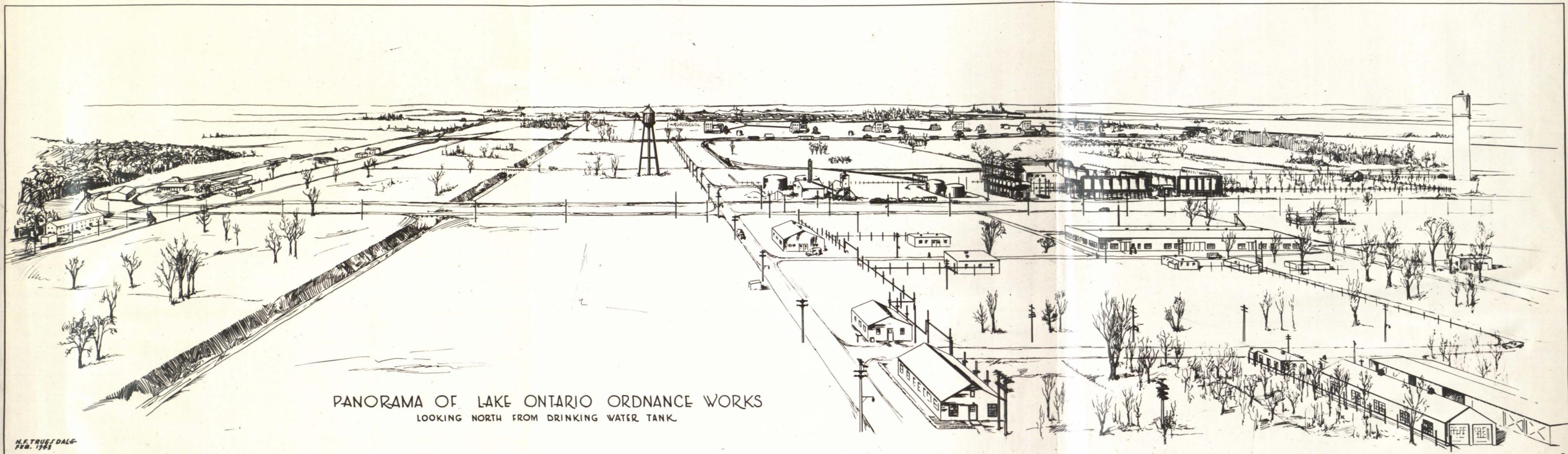
THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT • ENGINEER • MANAGER  
 LEWISTON, N. Y.



From UNITED STATES GEOLOGICAL SURVEY TOPOGRAPHIC MAPS; Niagara Falls, N.Y.-Tonawanda, N.Y.,-Wilson, N.Y. Quadrangles.



PANORAMA OF LAKE ONTARIO ORDNANCE WORKS  
LOOKING SOUTH FROM DRINKING WATER TANK



PANORAMA OF LAKE ONTARIO ORDNANCE WORKS  
LOOKING NORTH FROM DRINKING WATER TANK.

N. F. TRUESDALG  
FEB. 1943

COMPLETION REPORT  
LAKE ONTARIO ORDNANCE WORKS

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SUMMARY OF DIRECTIVES \*

Directive Consecutive No. 15, O. C. of E., January 15, 1942  
AUTHORIZATION TO PROCEED WITH CONSTRUCTION  
(\$15,061,500)

Supplement 1, Dir. Cons. No. 15, O. C. of E., March 21, 1942  
REVISION OF CONSTRUCTION AUTHORIZATION  
(Funds to A-E-M and A.E. reduced \$680,250)

Directive Consecutive No. M-249, O. C. of E., June 16, 1942  
AUTHORIZATION TO PROCEED WITH THE ADDITION TO WORKS  
(\$2,311,174)

Supp. No. 2, Dir. Cons. No. 15, O. C. of E., September 5, 1942  
ADDITIONAL FUNDS FOR CONSTRUCTION  
(\$3,000,000)

Supp. No. 1, Dir. Cons. No. 15, O. C. of E., September 28, 1942  
ADDITIONAL FUNDS FOR CONSTRUCTION  
(\$3,525,487)

Directive Consecutive No. M-466, O. C. of E., October 1, 1942  
AUTHORIZATION OF CONSTRUCTION OF STABLES FOR GUARD HORSES  
(\$9,000; covered by previous Authorizations)

Supp. No. 2, Dir. Cons. No. M-249, O. C. of E., January 20, 1943  
ADDITIONAL FUNDS FOR CONSTRUCTION  
(\$3,585,360)

\* A complete copy of each Directive and any other papers referred to by a Directive will be found in Section A of the Appendix.

PURPOSE

1

1. The Lake Ontario Ordnance Works is a new plant for the manufacture of trinitrotoluene (TNT) having an estimated average daily capacity, based on working 24 hours per day, of 390,000 pounds of TNT. The Using Service is the Ordnance Department, United States Army.

LOCATION

2. The Project is located  $78^{\circ} 59' 30''$  West Longitude and  $43^{\circ} 13' 10''$  North Latitude, in the Townships of Porter and Lewiston in the northwest corner of Niagara County, New York State.

3. The center of the Project is about 4 miles south of Lake Ontario and 3 miles east of the Niagara River. It is  $3\frac{1}{2}$  miles southeast of Youngstown,  $4\frac{1}{2}$  miles northeast of Lewiston,  $11\frac{1}{2}$  miles, by road, north-northeast of the main business section of Niagara Falls and 30 miles, by road, north by west from the main business section of Buffalo, ten miles, by road, north by west from the Niagara Falls Municipal Airport, and 30 miles, by road, northwest from the Buffalo Municipal Airport. It is about six miles, by road, southeast of Fort Niagara.

4. The area acquired for the Project includes 7,495.11 acres or 11.72 square miles of land which gently slopes towards Lake Ontario from an elevation of about 350 feet above sea level on the south, to about 310 feet on the north. The maximum width from Creek Road, on the west, to Porter Center Road on the east, is 3 miles. The length from the south boundary line to the north is 4.6 miles. It is fourteen miles around the perimeter of the boundaries.

5. The location and area are shown on the map of Lake Ontario Ordnance Works and Vicinity, page ii.

6. The nearest Post Office is Modeltown, at the southeast corner of the Project, however, the mailing address used by the Office of the Area Engineer and the Architect-Engineer-Manager was Lewiston.

7. The principal telephone number for the manually operated switchboard was Niagara Falls 7881 and the number for the automatic switchboard was Niagara Falls 6691. The telegraph address was Niagara Falls. Both Teleprinter and Teletype machines were used on the Project.

8. The nearest railroad station for freight and express service only, is Model City, at the southeast corner of the property, on the Rome, Watertown and Ogdensburg Division of the New York Central and Hudson River Railroad. The spurs connecting with the railroads in the Project, one



LOCATION

3

temporary for construction facilities, and the other permanent, are located about a mile north by east from the depot at Model City.

9. The nearest railroad station for general passenger use is the depot of the New York Central System at the corner of Falls Street and Second Street in Niagara Falls,  $11\frac{1}{2}$  miles by road from the main Administration Building, via the Indian Hill Road. Passenger connections with the Erie Railroad, the Lehigh Valley and the Michigan Central are available at this station. Freight connections with the Niagara Junction Railroad and the International Railway, in addition to the railroads already mentioned, may be made here.

10. Train connections for American points west of the Niagara River and locations in Canada may be made by passengers over the Michigan Central and the Canadian National Railways at the Suspension Bridge Station of the New York Central System, near Main and Ontario Streets in Niagara Falls. At this point freight connections are available over the New York Central, Erie, Wabash, Grand Trunk, Lehigh Valley, Michigan Central, Pierre Marquette and Canadian National Railways.

GENERAL DESCRIPTION OF THE COMPLETED JOB

11. The completed Job lies almost entirely within the easterly half of the Project site (except the water intake plant, outfall site and some roads, ditches, water and power lines) and consists of the following principal areas and facilities; (See Map Showing Areas Within the Project, page 2.)

(1) Administration Area, (53 acres, north of and adjoining Fletcher Road in the southwest corner of former Great Lot 21, Lewiston Township) including the main office building, employment office, medical service building (hospital), cafeteria, telephone building, staff garage, dormitories, change house, main parking area, gate house, clock alley and examination buildings. See Panorama on page 9, and Section Map 100-17, page 248.

(2) Power and Water Treatment Area, (46 acres, north of and adjoining the Administration Area, in the west side of former Great Lot 21, Lewiston Township) including boiler house, coal trestle, electric substation, water treatment plant, water storage reservoirs, guard headquarters, guard garage and the main fire headquarters. See Panorama on page iii, and Section Map 100-17, page 248, also Section Map 100-20, page 251.

GENERAL DESCRIPTION OF THE COMPLETED JOB

4

(3) Maintenance or Shops Area, (44 acres, north of and adjoining the Power and Water Treatment Area in the west side of former Great Lot 21, Lewiston Township) including laundry, combined shops, riggers' shop, millwrights' shop, change houses, general storehouse, material shed, parking garage, garage and repair shop, supervisor's office, oil and paint storage, acetylene storage, gasoline storage, locomotive house, fuel oil storage, service house. See Panorama on page 10, and Section Map 100-15, page 246.

(4) Acid Manufacturing Area, (362 acres, north of the Maintenance or Shops Area and extending east to the Guard Fence, using approximately the southerly quarter of former Great Lots 13 and 7 in Porter Township and northerly quarter of former Great Lots 21 and 14 in Lewiston Township) including a nitric acid manufacturing plant using anhydrous ammonia, a nitric acid concentrating plant, a sulphuric acid concentrating house, sellite manufacturing plant and auxiliary supervisor's offices, laboratories, shop, cooling water tower, change houses and many tanks. See Panoramas of Acid Area, pages 11 and 12 also Section Map 100-16, page 247.

(5) TNT Manufacturing Area, - Six Complete Lines (517 acres, north of and adjacent to the Acid Manufacturing Area, comprising approximately the northerly three quarters of former Great Lots 13 and 7 in Porter Township) including nitration houses, absorption towers, wash and flake houses, barricades, conveyors, nailing houses, box factory and shock storage, toluene storage tanks, oleum storage tanks, supervisors' offices, inspectors' offices, laboratories, shops, change houses, auxiliary fire headquarters, and comfort stations. See Section Map 100-15, page 246 ; Section Map 100-16, page 247; Section Map 100-13, page 244 ; and Section Map 100-14, page 245. See Panorama of TNT Area, looking South, page 13, and Panorama of TNT Area, looking North, page 14.

(6) Magazine or Storage Area, (845 acres, north of the TNT Manufacturing Area and adjoining it. Also immediately north of Balmer Road, between Lutts Road and the easterly guard fence, comprising all of former Great Lot 14 and most of former Great Lot 8 and the southerly fifth of former Great Lot 15 and of former Great Lot 9; all in Porter Township) including 58 igloos, loading docks, barricades, car bracing lumber sheds, supervisor's office, change house, service building and gasoline station. See Section Map 100-11, page 242; and Section Map 100-12, page 243.

GENERAL DESCRIPTION OF THE COMPLETED JOB

5

(7) Sewage Disposal Area, (8 acres, adjacent to the northwest corner of the Acid Manufacturing Area and near the southeast corner of former Great Lot 19 in Porter Township) including the sewage pumping station, Imhoff tank, sludge beds, venturi vault and chlorine tank, and the process waste disposal plant, including the acid neutralization building, mix tank and pumping station, and the collection tank. See Panorama, page 15; Section Map 100-19, page 250, and photographs on plate XV.

(8) Classification Yard Area, (approximately 40 acres bounded by a Cyclone wire Safety fence, running in a northeast-by-east direction from the southeast portion of former Great Lot 21 to the center of Great Lot 14, in Lewiston Township), including seven railroad tracks each averaging 1,600 feet in length, track scale, scale house, floodlight towers, service house and yardmaster's office. See photographs on plates VI, XVI and XXIII.

(9) Intake Works, Pumping Station and Gate House, (12 acres, west of junction of Pletcher Road and River Road, N. Y. Highway No. 18) at the Niagara River, for the raw water supply. See Plan 4-28, page 253, and photographs on plate XIV.

(10) Water Lines, inside and outside the Project Area, (requiring 11.49 acres outside, consisting of a 68 foot right of way along Pletcher Road, west of the Project, from Creek Road to the Intake Works) including (a) the 42" raw water line from the gate house at the intake pumping station, a distance of 3.43 miles to the surge tank at the water treatment plant, (b) 12.3 miles of drinking water lines including the 10" drinking water main tapped into the Niagara Falls Water System north of the Stella Niagara School in Lewiston and metered near that point, (c) 3.44 miles of process water lines, (d) 10.15 miles of fire protection water lines with 62 fire hydrants, (e) 4.72 miles of cooling water lines. See separate Progress Maps for each of these systems, pages 254 to 258 and photographs on plate XX.

(11) Outfall, (2.25 acres at the Niagara River and 16.13 acres consisting of a 75 foot right of way from the Creek Road to the River Road, New York Highway No. 18) including 3.40 miles of 30" discharge main from the Sewage Disposal Plant to the head tank, also the head tank and valve house for the discharge of the waste water at the Niagara River. See Section Map 100-21, page 252 and Progress Map, page 254.

GENERAL DESCRIPTION OF THE COMPLETED JOB

6

(12) Steam Lines, 7.85 miles of mains and pipes for manufacturing purposes and for heating. See Progress Map, page 259 and photographs on plate XXI.

(13) Main Air Compressor House, This is located in the TNT Area on "M" Street, east of Castle Garden Road. See Section Map 100-15, page 246 and photographs on plates V and XXXVII.

(14) Compressed Air Lines, 4.73 miles of mains and pipes, starting at the Main Air Compressor House. See Progress Map, page 260.

(15) Electric Lines, including (a) the single, 3-wire, 115 KV. 60 cycle, 3-phase high tension feeder, 5.49 miles long, supported on wooden "H" frames, from the Buffalo Niagara Electric Corporation System which is tapped off their "Gibson-Lockport-Tuscarora Tap", at the southwest corner of the Tuscarora Indian Reservation, 3.08 miles due south of the south property line of the Project, and (b) about 21 miles of high voltage distribution lines within (and without, i.e. along the water easement to the Intake Pumping Station) the Project area and 13 miles of low voltage distribution lines within the Project Area. See photographs on plates XXII and XXVIII.

(16) Telephone Lines and System, including about 13.5 miles of cables having a present capacity of 400 lines and 15 miles of service lines, and an automatic system having a present capacity of 350 working lines and space in the present telephone building for an ultimate capacity of 800 lines. See photograph of the telephone building on plate VI.

(17) Fire Alarm and Guard Alarm System, including about 50 fire alarm boxes and 60 guard telephone stations.

(18) Staff Residences, covering the improvements and repairs at existing dwelling houses to make them suitable quarters for Army officers and supervisory employees of the Chemical Construction Corporation or the Ordnance Department. See photographs of many of these on plates XXIX, XXX and XXXI.

(19) Railroad, including 15.7 miles of standard gauge track using 20½-85 pound rails and 80½-80 pound rails, many spurs and sidings and the tracks and buildings already listed as being in the Classification Yard Area (8), also Diesel locomotives and rolling stock. See Progress Map, page 261, and photographs on plates II, V, VIII, X, XII, XIII, XVI, XIX and XXI.

GENERAL DESCRIPTION OF THE COMPLETED JOB

7

(20) Roads, including 5.58 miles of resurfacing existing roads, and 33.5 miles of new roads and drives consisting of 16.5 miles of service roads, 7.7 miles of patrol roads, 7.0 miles of magazine roads and 2.3 miles of drives. See photographs plates XII, XIV, XVII, XIX and Map, page 262.

(21) Parking Areas, including Main Parking Area covering 27,893 square yards, the Office Parking Area, covering 4,048 square yards, see photograph plate X, and the Bus Parking Space covering 2,970 square yards in the Shops Area; and 2,503 square yards elsewhere.

(22) Sewers, 20.9 miles of storm, pipe drains, sanitary, acid and red and yellow water lines. See photographs, plate XX and Map, page 263.

(23) Drainage Ditches, 36.85 miles of open cut ditches. See photographs, plates XVIII and XIX and Map page 51.

(24) Guard Towers, 28 elevated structures with houses and stairways, spaced about every 1,500 feet along the safety guard fence. See photographs, plates XVII and XXVII.

(25) Fences, including (a) 8.94 miles of the Cyclone Safety wire guard fence, enclosing 2,205 acres in the Manufacturing Areas, Magazine Area, Sewage Disposal Area, Classification Yard Area, Maintenance or Shops Area and the Power and Water Supply Area, see Plan No. 605-101-001 on page 264, and photographs on plates XIX and XXII, and (b) the outside barbed wire boundary fence, running 11.32 miles from its junction with the northeast corner of the guard fence, thence north to the northeast corner of the Project, thence west along the north boundary line, south along the east boundary line, east along the south boundary line and then northerly and easterly to its southerly juncture with the guard fence. See Plan No. 605-101-008, page 265, and photographs, plates XIX and XXII.

(26) Exterior Lighting, including 24.8 miles of street lighting with 362 fixtures, 7.48 miles of fence lighting with 363 fixtures, and lighting including searchlights for the 28 guard towers, also approximately 53 spot and floodlighting fixtures for the classification yard, parking areas, etc. See Progress Map on page 266 and photographs on plate XXIII.

GENERAL DESCRIPTION OF THE COMPLETED JOB

8

(27) Burning Grounds and Incinerator, east of Castle Garden Road, opposite the Administration Area. The Incinerator has a capacity of 2 tons per day. See photograph, plate XI.

(28) Stables, remodelled existing barn on Balmer Road, 1,000 feet west of the junction with Lutts Road, for 40 horses used by mounted guards. See photograph plate X.

(29) Walks, including 14,542 square yards of cinder walks, 197 square yards of wooden walkways and 360 square yards of elevated wooden walks. See photographs, plates IV, VI and VII.

LANDOwnership

12. The rights to the area were originally embodied in the Holland purchase, which passed from the possession of the State of Massachusetts, by way of Robert Morris, in 1793.

13. After the extinction of the Indian title to the land, by agreement with the Seneca Indians in 1799, the land was rapidly surveyed and opened for settlement. From 1802 to 1812 settlement was comparatively active though at first chiefly on the land outside the area, along the Niagara River, the shore of Lake Ontario, along what is now Ridge Road, and on the escarpment to the south.

14. The Holland Land Company sold the land in this area to the settlers at prices ranging from \$2.00 to \$5.00 an acre.

15. With the outbreak of the War of 1812 there was a great exodus of the settlers, due to the exposed and dangerous position of the region and it was a number of years before the settlement again became active.

16. In December 1941, A Survey and Report by the Fraser Brace Company on the suitability of the site was submitted to the Office of the Chief of Engineers. This report was favorable.

17. The acquisition of the various parcels of land needed for the Project was accomplished under the direction of the War Department, Corps of Engineers, Real Estate Branch, Construction Division.

PLETCHER ROAD ( LOOKING WEST )

DORMITORIES ( IN REAR ) #735

PLETCHER ROAD ( LOOKING EAST )



AEM-1 AEM-3 AEM-2

MAIN OFFICE ( ADMINISTRATION ) BUILDING # 703

STAFF & ORDNANCE GARAGE #728

CAFETERIA #708

MEDICAL SERVICE BUILDING # 719

EMPLOYMENT BUILDING #705

No. 1500 Date 10-18-42  
 LAKE CHARLES ORDNANCE WORKS  
 The J. G. White Engineering Corporation  
 NEW YORK  
 Administration Area  
 Project No. 10-18-42-1

CHANGE HOUSE #707

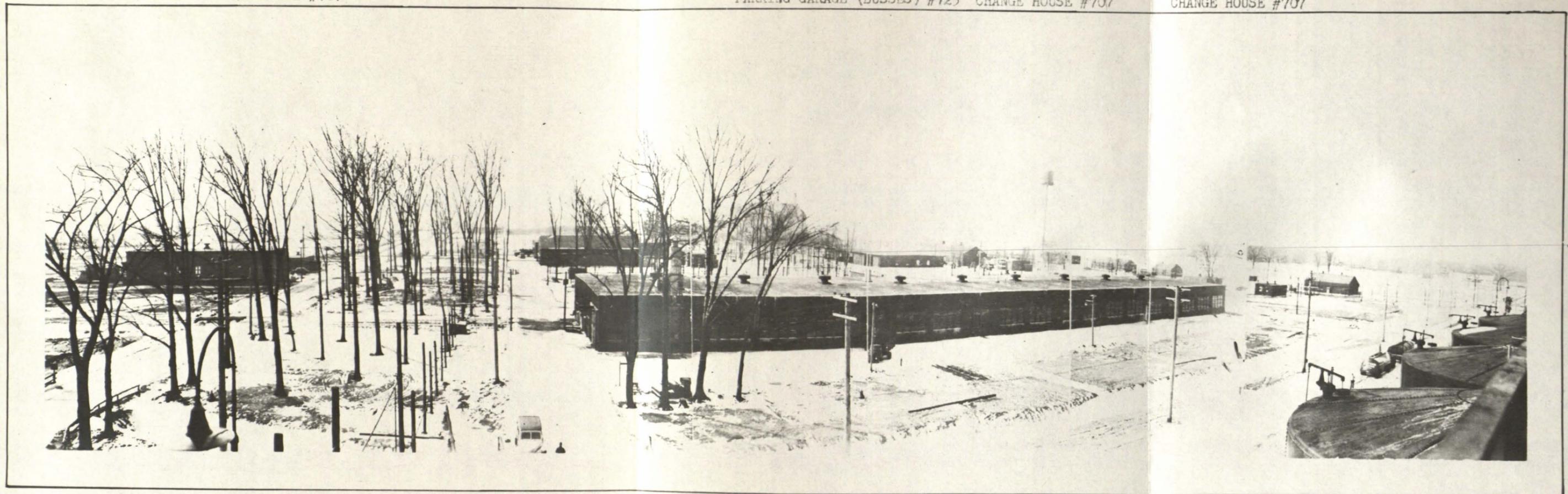
GENERAL STOREHOUSE #713  
MATERIAL SHED #714 CHANGE HOUSE #707

PARKING GARAGE (BUSES) #725 CHANGE HOUSE #707

GARAGE AND REPAIR SHOP #716

LAUNDRY BUILDING #723  
SUPERVISORS OFFICE #704

MEETING HOUSE #733 MILLWRIGHT'S SHOP #722  
RIGGERS SHOP #722  
CHANGE HOUSE #707



CASTLE  
GARDEN  
ROAD

LOCOMOTIVE HOUSE #718

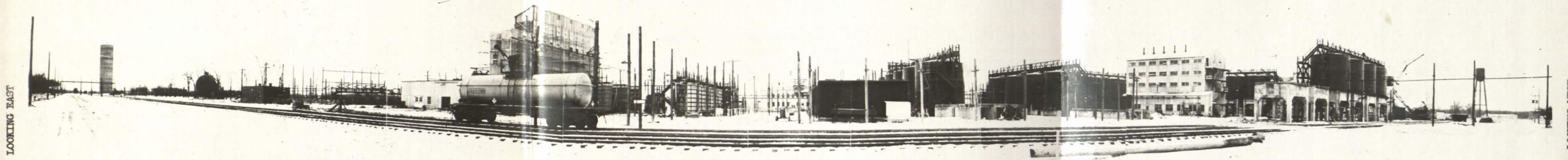
SIXTH STREET

COMBINED SHOPS #717

"O" STREET

PANORAMA OF SHOPS AREA  
LOOKING SOUTH FROM "O" STREET AT END OF SIXTH ST.

COOLING WATER TOWER      ANHYDROUS AMMONIA STORAGE L.P. BLDG. NO. 301 L.P.      AMMONIA OXIDATION PLANT COOLER CONDENSERS BLDG. NO. 302 NO. 302-16      LABORATORY & SUPERVISOR'S OFFICE BLDG. NO. 706      93.2% DARK SULPHURIC ACID STORAGE NO. 305-61      93.2% CLEAR S.A. SALES STORAGE NO. 305-81 (in rear)      SULPHURIC ACID CONC. HOUSE NO. 308 (in rear)      FIRE WATER TOWER RESIDUAL ACID LINE FROM TNT AREA

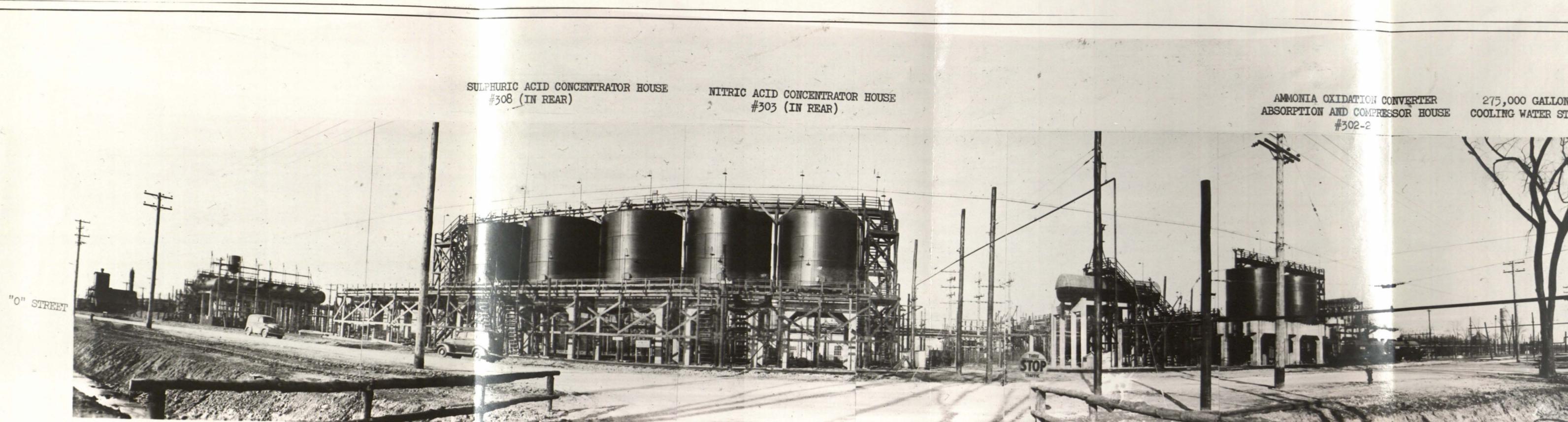


"N" ST. LOOKING EAST

"N" ST. LOOKING WEST

MAIN STEAM LINE TO TNT AREA      AREA SHOPS BLDG. NO. 722      ANHYDROUS AMMONIA STORAGE H.P. BLDG. NO. 301 H.P.      CAR LOADING SPOT FOR 62% NITRIC ACID      62% NITRIC ACID STORAGE TANKS NO. 302-24 CONDENSATE TANK - NO. 302-22 (in rear)      CONC. MIX CIRCULATORS & COOLERS NO. 305-4      CONCENTRATING MIX ACID STORAGE NO. 305-5      NITRIC ACID CONCENTRATOR HOUSE BLDG. NO. 303      RESIDUAL ACID STORAGE NO. 305-35      STRONG MIX ACID CIRCULATING TANKS & STRONG N.A. STORAGE NO. 305-10      N.A. CONC. & RESIDUAL S.A. STORAGE NO. 303-27      FUEL OIL STORAGE NO. 308-56

PANORAMA OF ACID AREA  
LOOKING SOUTH FROM "N" STREET



SULPHURIC ACID CONCENTRATOR HOUSE  
#308 (IN REAR)

NITRIC ACID CONCENTRATOR HOUSE  
#303 (IN REAR)

AMMONIA OXIDATION CONVERTER  
ABSORPTION AND COMPRESSOR HOUSE  
#302-2

275,000 GALLON CONCRETE  
COOLING WATER STORAGE TOWER

"O" STREET

"O" STREET

CASTLE GARDEN  
ROAD

SELLITE  
PLANT #307

TNT MIX STORAGE  
#305-31

93.2% CLEAR SULPHURIC ACID  
SALES STORAGE #305-81

ELECTRIC SUBSTATION

F 83 TANK STORAGE  
#305-37

OLEUM STORAGE  
#305-25

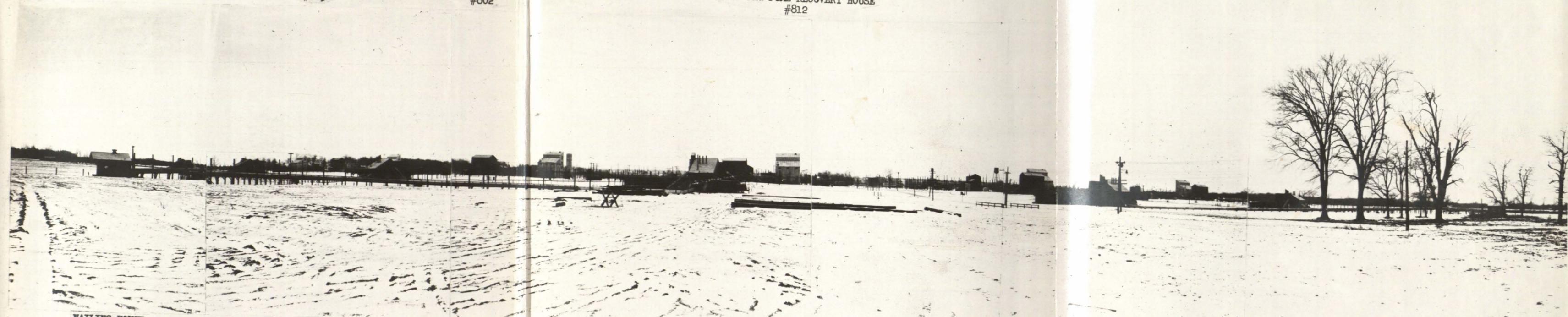
LOW PRESSURE ANHYDROUS AMMONIA  
COMPRESSOR HOUSE AND STORAGE TANK  
#301

PANORAMA OF ACID AREA

(LOOKING NORTH FROM "O" STREET AT END OF SIXTH STREET)

MONO NITRATING HOUSE #801  
FORTIFYING HOUSE #803  
BI and TRI NITRATE HOUSE #802

O. V. STORAGE #817  
ACID and FUME RECOVERY HOUSE #812



NAILING HOUSE #808

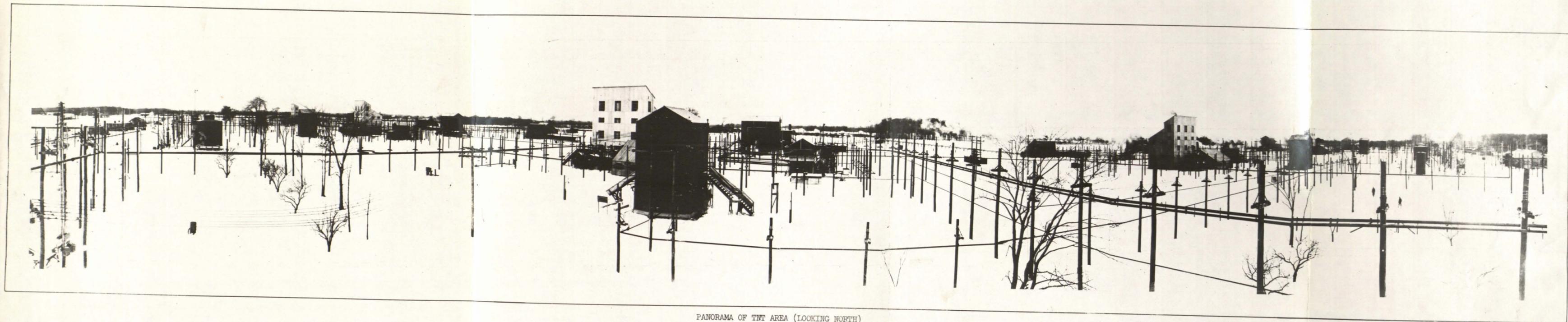
CONVEYOR #807

COMFORT STATION #827

CATCH BOXES #806  
BARRICADE #818

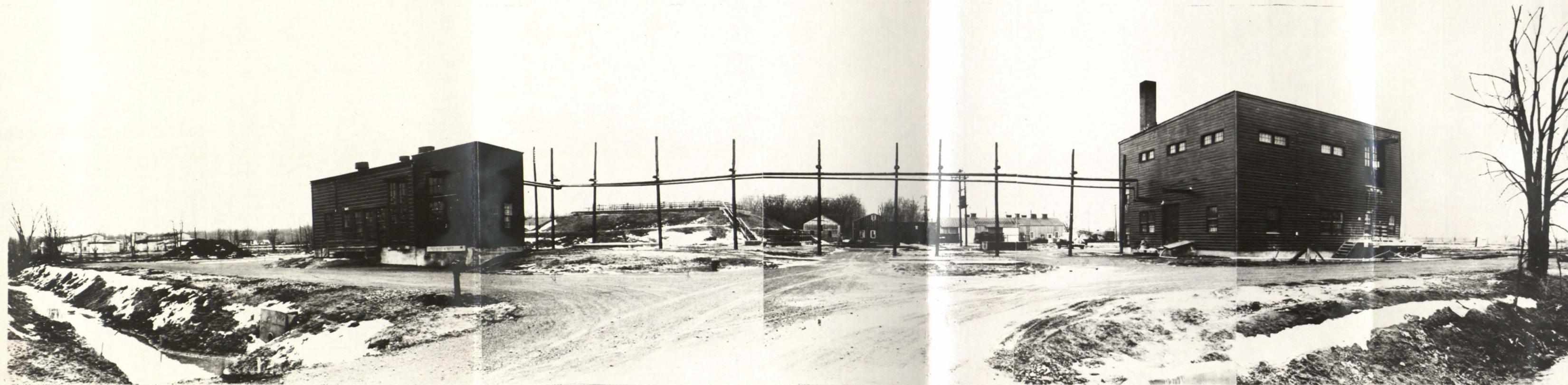
WASH HOUSE #806

PANORAMA OF T.N.T. AREA (LOOKING SOUTH ALONG 4th LINE)



PANORAMA OF TWT AREA (LOOKING NORTH)

TEMPORARY CONSTRUCTION SHOPS (in background)



SANITARY SEWERAGE PUMPING STATION

IMHOFF TANK

VENTURI VAULT

MIXING TANK & PUMPING STATION

NORTH SLUDGE BED

COLLECTION TANK

612 ACID NEUTRALIZATION PLANT

PANORAMA OF SEWERAGE DISPOSAL AREA  
(LOOKING WEST FROM LUTTS RD.)

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property; thence due west across Great Lot No. 26 to the northeast corner of the property now or formerly owned by J.W.H. Kelly, Inc., this corner being the beginning point of the northern boundary line of Great Lot No. 34; thence along the northern boundary line of Great Lot No. 34 to its intersection with the eastern right of way line of the Blairville Creek Road; and thence in a northerly direction along the east side of the Blairville Creek Road to the place of beginning; containing in all approximately seven thousand five hundred (7500) acres, more or less."

"Excepting thereout and therefrom the land and property of the Lutheran Church and Parsonage located in the northwest corner of Great Lot No. 24 and in the southwest corner of Great Lot No. 25, lying immediately north and south of the Belmer Road where it intersects with the Blairville Creek Road."

31. This land is part of the historic Niagara Frontier, termed by the Indians, "the land of the Basswood." It lies on the Ontario plain in a fertile section of Niagara County, with numerous farms, orchards and large wooded areas.

32. The very intensive cultivation at the time the area was acquired is clearly shown on the Aerial Photographic Mosaic taken in 1938. See page 18. Each white patch shows a plowed field, the lighter gray patches show growing crops and the darker gray areas, grass, pasture or grain. The stippled or dotted areas show orchards and the black areas, that look like piled up coal, indicate woods.

Orchards

33. A survey was made of all of the orchards and vineyards and a map was prepared locating and classifying 227, covering 923 acres, which were found outside the Manufacturing Area. Within the Manufacturing Area there were 25 more which were demolished or abandoned. Hence a total of 252 orchards and vineyards were acquired.

34. The orchards, located outside of the Manufacturing Area, which were turned over to the Operating Company for cultivation and control are as follows:

- Apples - 81 orchards, covering 478.5 acres, bearing McIntosh, Greening, Baldwin, Cortland, Delicious, Wealthy and Rome Beauty, as the principal varieties.
- Peaches - 44 orchards, covering 159.2 acres, bearing Alberta, Jubilee, South Haven, Hale Haven and Hale, as the principal varieties.
- Prunes - 46 orchards, covering 118.2 acres, bearing principally the Fellenberg variety.

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- Pears - 18 orchards, covering 60.7 acres, bearing Bartlett, Bosc, Sheldon, Dutchess, Seckel Clargan, Flemish Beauty as the principal varieties; also a few Kieffer and Clapp.
- Grapes - 9 vineyards, covering 31.7 acres, bearing Concord and Niagara varieties.
- Plums - 7 orchards, covering 13.9 acres, bearing Damson and Niagara varieties.
- Cherries - 5 orchards, covering 11.0 acres, bearing Montmorency, English Morello and Early Richmond, as the sour varieties; and Senecas, Red June, Windsor, Black Tartarian, Schmidt's Bigerau, Bing, and Lambert as the sweet varieties.
- Mixed - 17 orchards, covering 49.8 acres, bearing mixed fruit of the above mentioned varieties.

35. The majority of these orchards, ie. 141, covering 616 acres, were in Porter Township, and 86, covering 307 acres, were in Lewiston Township.

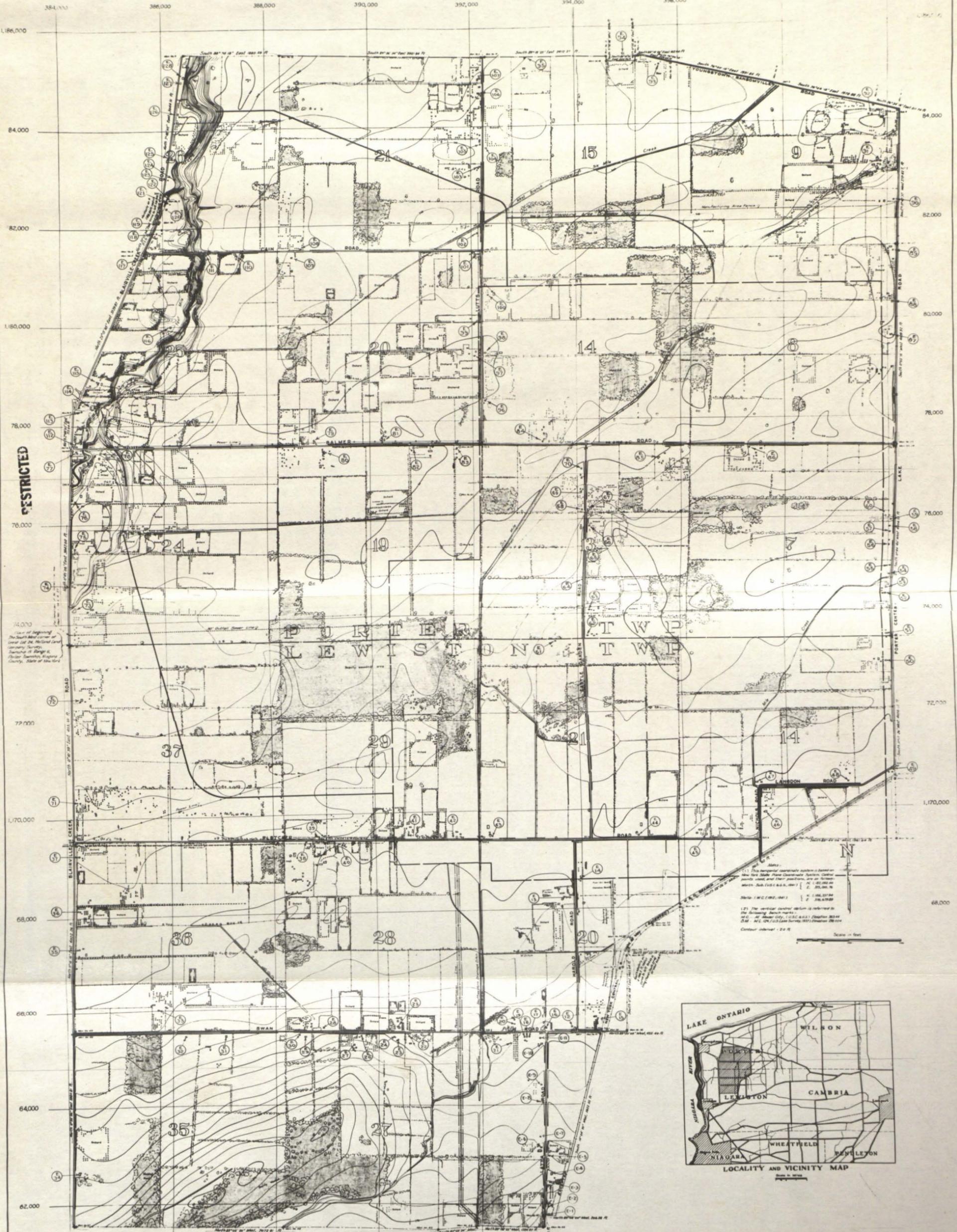
Woodlands

36. At the time the Project site was acquired there were forty patches of woods covering 654.38 acres within the boundaries. These were about equally distributed as to number between Lewiston and Porter Townships. However, the larger acreage was in Lewiston. See the Topographic map of the Entire Area, page 21.

37. In the area contained within the guard fence, ie. the Manufacturing Area, there were 284.24 acres of standing timber. This was reduced by clearing and grubbing in the Magazine and Storage area to make way for streets, ditches and igloos, wherever necessary. Extensive clearing and grubbing was also required in the TWT Area and also in the easterly and southerly portion of the Shops Area and at the Boiler House site. Here and there, swaths had to be cut through scattered wood lots for the railroad, for roads and for drainage ditches.

38. Outside the Manufacturing Area there were 370.14 acres of standing timber, most of which was in two very heavily wooded areas, the larger one to the west of the Acid Area and the smaller one on the highest land in the Project between Swan Road and the south boundary. A clearing for

RESTRICTED

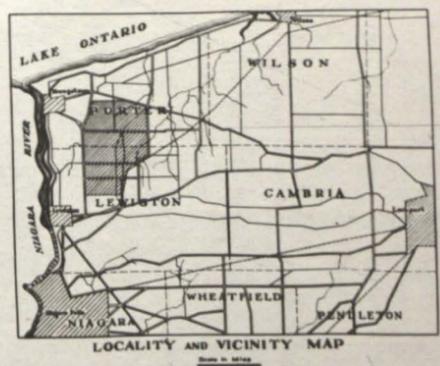


RESTRICTED

Plan of Beginning  
 The South West Corner of  
 Grant Lot 24, McLeod Land  
 Company, Seneca  
 Township, St. Albans  
 County, State of New York

1.1 This horizontal coordinate system is American  
 New York State Plane Coordinate System. Control  
 points used and their positions are as follows:  
 when used (USCGS, 1983) N 1, 102, 000 m  
 when used (USCGS, 1983) E 1, 300, 000 m  
 State Plane (NAD 83) N 1, 102, 000 m  
 State Plane (NAD 83) E 1, 300, 000 m  
 1.2 The vertical control datum is referred to  
 the following bench marks:  
 M.C. at New York City, U.S.C.G.S. (Height 30 m)  
 S.M. at New York City, U.S.C.G.S. (Height 30 m)  
 Contour interval - 20 ft

Scale in feet



LOCALITY AND VICINITY MAP

RESTRICTED

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECTS, ENGINEERS & SURVEYORS  
 LAKE ONTARIO ORDONANCE WORKS  
 YOUNGSTOWN, NEW YORK  
 TOPO MAP OF ENTIRE AREA  
 IN 1 SHEETS  
 U.S. ENGINEERING

DECLASSIFIED  
 Authority 745067  
 By DLNARA Date 2/27/09

RESTRICTED

LOOW-001

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the 30" Outfall Sewer Line had to be cut through parts of the larger wood, about 200 feet north of the Porter Township line.

39. Most of the standing timber is second growth. The predominating woods in the order named are elm, oak, maple, ash, walnut, beech and boxwood. Small growths of ironwood, hickory, butternut, gum and birch may be found scattered about. Tulip trees, poplars and chestnuts have nearly disappeared. Evergreens are practically nonexistent. Practically the whole area was formerly heavily timbered with hardwoods. Little lumbering has been done here in the last fifteen or twenty years.

40. A great deal of the lumber obtained from clearing and grubbing was used in making railings for the roads, along ditches, at bridges and at culverts.

Wheat

41. In January, 1942 field representatives of the Agricultural Adjustment Administration, United States Department of Agriculture, visited the farmers in the Project area and listed the fields planted in wheat.

42. Wheat had been sowed in 84 fields on 62 Tracts purchased by the Government. These plantings totalled 547.6 acres within the Project area, of which 290.8 acres were in Lewiston Township and 256.8 acres were in Porter Township. In addition, 57.8 acres of mixed grain had been sowed in 10 fields in Porter Township.

Other Land Uses

43. Appraiser H. L. Lantz, who was the Chief Reviewing Appraiser on the lands acquired for the Project, estimated that in an average 100 acres of these lands, 70.3 acres of the land is tillable and 6.5 acres is pasture. This would give a total of 5,269.1 acres of tillable land and 487.2 acres of pasture.

44. In addition to wheat, oats, rye, timothy and alfalfa were grown within the area in unknown acreages. Good crops of garden vegetables and hay were also raised.

45. There were numerous poultry farms and dairy farms also within the Project site, as shown by the 134 barns and 141 poultry houses which existed at the time the site was acquired.

Easements

46. Three perpetual easements were obtained by the Government for the rights of way and land areas in addition to the Project site. These are known as (1) the Water Intake Easement, (2) the Outfall Sewer Easement and (3) the Fourmile Creek Easement.

47. The Water Intake Easement consists of a 68 foot right-of-way from the west boundary of the Project contiguous to and along Pletcher Road, running west and southwest to the Lewiston-Youngstown State Highway, also known as the River Road, and thence into a wider area in Tract C-210, known as the Water Intake Area, between the River Road and the Niagara River. This right-of-way starts at the northwest corner of former Great Lot 36 in Lewiston Township, at the west boundary of the Project site south of Pletcher Road and extends west through part of Tracts C-200, C-201 and C-202; thence it crosses Pletcher Road taking part of Tract C-203 whence it continues in a southwesterly direction on the northerly side of Pletcher Road to the River Road, through Tracts C-204, C-205, C-206, C-207, C-208 and C-209. An area of .017 acres was acquired in Tract C-207 A on the south side of Pletcher Road just east of the River Road. The tract designations, names of vendors, acreage acquired, and locations are shown on the Real Estate Map on page 24. "The Description of Easement in Land Under the Waters of the Niagara River to be Acquired from the State of New York for Water Intake Line", dated October 29, 1942, is as follows:

"All that tract or parcel of land situated west of lot 14, Niagara River Mile Reserve, County of Niagara, State of New York, bounded and described as follows:

Beginning at a point on the easterly shore line of the Niagara River, and the westerly line of lot 14, marked with a concrete monument, said point of beginning being North  $89^{\circ} 54' 20''$  West 189.44 Ft. and North  $2^{\circ} 35' 40''$  East 622.19 Ft. from Stella I.W.C., U.S. Coast and Geodetic Survey Monument; said point of beginning also being North  $89^{\circ} 54' 20''$  West 1045.54 Ft. and South  $19^{\circ} 25' 20''$  East 35.95 Ft. from the intersection of the center lines of Pletcher Road and the Lewiston-Youngstown State Highway; thence from the point of beginning North  $89^{\circ} 54' 20''$  West 480.0 Ft.; thence North  $0^{\circ} 05' 40''$  East 175.0 Ft.; thence South  $89^{\circ} 54' 20''$  East 435.0 Ft. to the easterly shore line of the Niagara River; thence South  $15^{\circ} 33' 00''$  East 181.72 Ft. + along said shore line to the point of beginning and containing 1.84 acres of land more or less."

PROJECT OWNERSHIP

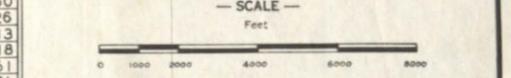
STATE NEW YORK  
COUNTY NIAGARA  
DIVISION MIDDLE ATLANTIC  
DISTRICT BUFFALO  
SERVICE COMMAND NO. 3  
USING AGENCY U. S. ORDNANCE  
3 MILES S. E. OF YOUNGSTOWN  
10 MILES N. OF NIAGARA FALLS

— TRANSPORTATION FACILITIES —  
N.Y.C. & L. & R. R.R. RAILROAD  
NOS. 18, 93 STATE ROAD  
ROUTE 104 FEDERAL ROAD  
AIRLINE

— LAND AREA —  
ACRES OWNED BY W.D.  
ACRES LEASED BY W.D.  
ACRES LEASED FROM W.D.  
ACRES TRANSFERRED TO W.D.  
ACRES DONATED TO W.D.

— DISPOSALS —  
ACRES SOLD  
ACRES TRANSFERRED  
ACRES EXCHANGED  
ACRES OTHERWISE

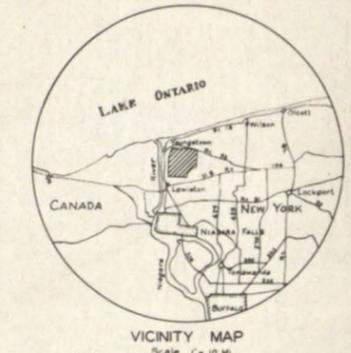
— LEGEND —  
RESERVATION LINE  
STATE OR PROVINCE LINE  
COUNTY LINE  
CIVIL DISTRICT PRECINCT  
LAND-GRANT LINE  
CITY, VILLAGE, OR BOROUGH  
CEMETERY, SMALL PARK, ETC.  
TOWNSHIP LINE  
SECTION LINE



WAR DEPARTMENT, O.C.E.  
CONSTRUCTION DIVISION  
REAL ESTATE  
LAKE ONTARIO ORDNANCE WORKS  
MILITARY RESERVATION

RECOMMENDED: DATE  
APPROVED: DATE

Table with columns: COMPILED, TRACED, CHECKED, DATE, BY, REVISIONS, APPROVED

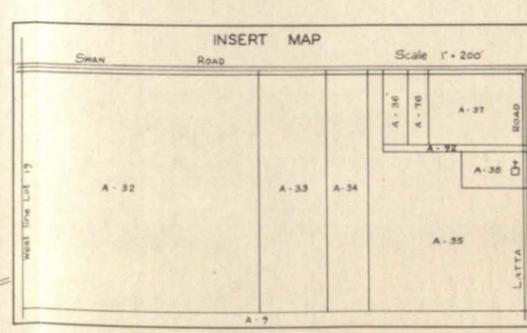


WATER INTAKE EASEMENT table with columns: TRACT NO., VENDOR, ACREAGE. Includes entries for FRANK H BUTTERY, WALTER SATTLEBERG, WILLIAM SATTLEBERG, etc.

OUTFALL SEWER EASEMENT table with columns: TRACT NO., VENDOR, ACREAGE. Includes entries for LEONARD TRUESDALE, JOHN CALKINS, JOHN W. PERSOHN, etc.

FOUR MILE CREEK EASEMENT table with columns: TRACT NO., VENDOR, ACREAGE. Includes entries for CLYDE KYLE, LEONARD J. ALLEN, JAMES L. ALLEN, etc.

Main table listing tracts and vendors with columns: TRACT NO., VENDOR, ACREAGE. Includes entries for S. HOPKINS, A. HILLMAN, A. DELANSKY, etc.



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48. The Judgment on the Declaration of Taking - Lake Ontario Ordnance Plant Intake Line was signed by the Honorable John Knight, the Judge presiding, United States District Court in and for the Western District of New York, at Buffalo, New York, August 1942.

49. The Outfall Sewer Easement acquired a perpetual right-of-way 75 feet wide from the west boundary of the Project site beginning near the southwest corner of former Great Lot 24 in Porter Township, slightly north of the Township Line, and runs in a westerly direction through Tract D-301 to a point west of Calkins Road, thence southwesterly through Tract D-302 to the New York State Reservation line where it bends and runs westerly through Tract D-304, to the Lewiston-Youngstown Railroad, where it goes through Tract D-307 and proceeds southwesterly through Tracts D-305, D-306 A, and D-306 B to the River Road. It crosses the River Road and extends into the Outfall Area in Tracts D-308 and D-309 lying between the River Road and the Niagara River. The Tract designations, names of vendors, acreages acquired and locations are shown on the Real Estate Map on page 24. The "Description of Easement in Land Under the Waters of the Niagara River to be Acquired from the State of New York for Outfall Sewer Line", dated October 29, 1942 is as follows:

"All that tract or parcel of land situated west of lots 10 and 11, Niagara River Mile Reserve, County of Niagara, State of New York, bounded and described as follows:

Beginning at a point on the easterly shore line of the Niagara River and the westerly line of lot 11 marked with a concrete monument, said point being north  $72^{\circ} 52' 42''$  West 306.29 Ft. and South  $87^{\circ} 18' 48''$  West 261.47 Ft. to a point in the center line of the Lewiston-Youngstown State Highway, said point being "A", and South  $6^{\circ} 04' 42''$  East 259.0 Ft. from the intersection of the North line of lot 11 and the center line of the Lewiston-Youngstown State Highway, and measured along the center line of said highway; said point "A" also being tied in with the Stella I.W.C. U.S. Coast and Geodetic Survey monument as follows:

Beginning at point "A", said point being N  $6^{\circ} 37' 20''$  West 2096.34 ft., and North  $39^{\circ} 26' 20''$  West 2151.84 ft.; and North  $16^{\circ} 58' 20''$  West 771.48 ft.; and North  $52^{\circ} 24' 26''$  East 1034.77 ft. from the Stella I.W.C. U.S. Coast and Geodetic Survey Monument; thence from the point of beginning North  $72^{\circ} 52' 42''$  West 350.0 ft.; thence North  $19^{\circ} 06' 11''$  East 405.0 ft.; thence South  $49^{\circ} 46' 12''$  East 420.0 ft.; to a

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concrete monument on the east shore line of the Niagara River; thence southerly along the shore line of the Niagara River 225.03 ft. \* to the place of beginning and containing 2.80 acres of land more or less."

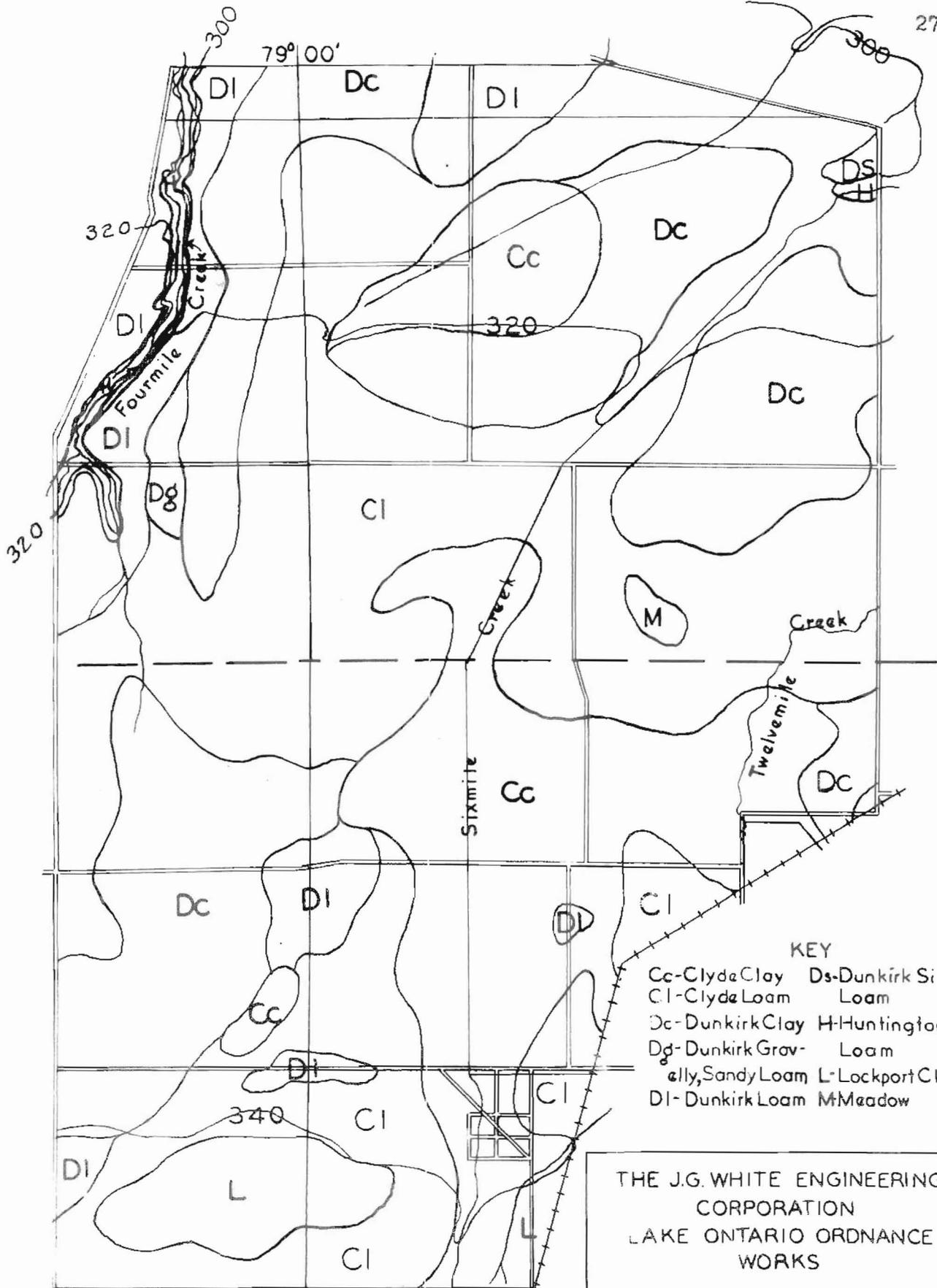
50. The Judgment on the Declaration of Taking - Lake Ontario Ordnance Plant Outfall Sewer was signed by the Honorable John Knight, the Judge presiding, United States District Court in and for the Western District of New York at Buffalo, New York, December 2nd, 1942. This "adjudged, ordered, and decreed that a perpetual easement for the location, construction, operation, maintenance and patrol of a sewer in, over, under and across the following described land situate in the County of Niagara, New York, to wit: Tract No. D-301, Tract No. D-303, Tract No. D-306 A, Tract No. D-306 B, Tract No. D-308, and Tract No. D-309" (each separately described) "is vested in the United States of America upon the filing of said declaration of taking and the deposit in the registry of the Court of the said sum of Two Thousand Three Hundred Dollars (\$2,300.00) ---."

51. The Fourmile Creek Easement covers a right-of-way extending almost due north from the northwest corner of the Project site to Lake Ontario, following the course of Fourmile Creek to the Lake.. Fourmile Creek now carries off the waters from the new Southwestern Drainage Ditch and the new Central Drainage Ditch which drain most of the Project Area. This easement is to obtain perpetual rights by the Government in connection with the use of this Creek for the purpose mentioned. This easement covers portions of land in Porter Township in Tracts 1, 2, 3, 4, 6, 8, 9, 10, 12, 13 and 14. The designations of the Tracts, names of the vendors, acreages acquired and locations are shown on the Real Estate Map on page 24.

52. The Judgment on the Declaration of Taking had not been made at the time this Report was prepared.

Licenses and Mineral Rights

53. The Amended Order for Immediate Possession for the land acquired reads "subject to the rights of the State of New York in all gold and silver mines as described in the original patent from the state, and subject also to existing easements, for public utilities, for railroads and for pipe lines."

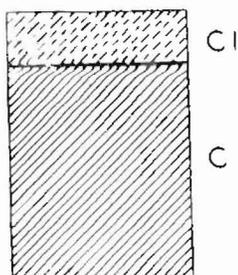


KEY

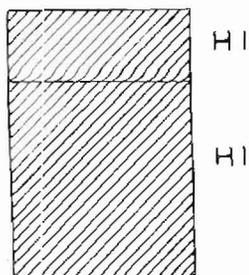
- Cc-Clyde Clay
- Cl-Clyde Loam
- Dc-Dunkirk Clay
- Dg-Dunkirk Gravely, Sandy Loam
- DI-Dunkirk Loam
- DS-Dunkirk Silt Loam
- H-Huntington Loam
- L-Lockport Clay
- M-Meadow

Enlarged from Soil Map of Niagara County, New York.  
 United States Department of Agriculture - Soil Bureau  
 1906

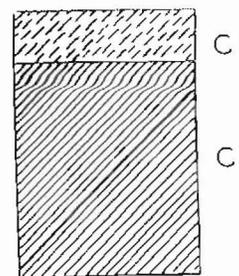
THE J.G. WHITE ENGINEERING CORPORATION  
 LAKE ONTARIO ORDNANCE WORKS  
 SOIL MAP



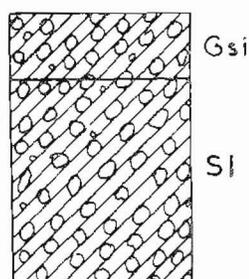
Clyde  
Clay



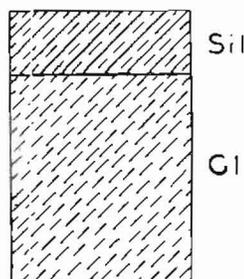
Clyde  
Loam



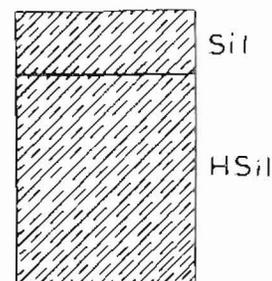
Dunkirk  
Clay



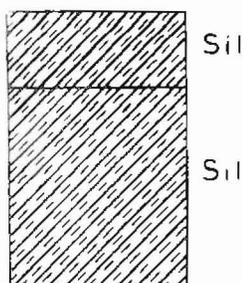
Dunkirk Gravelly,  
Sandy Loom



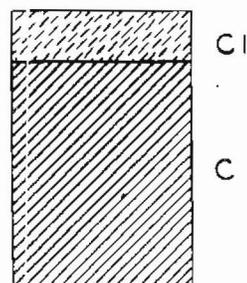
Dunkirk  
Loam



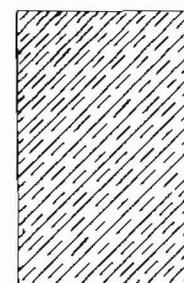
Dunkirk  
Silt Loom



Huntington  
Loom



Lockport  
Clay



Meadow  
[Similar to Huntington Loom,  
Poorly Drained]

**LEGEND**

- C - Clay
- Cl - Clay Loam
- Gsi - Gravelly Sandy Loom
- HI - Heavy Loam
- HSil - Heavy Silty Loom
- Sl - Sandy Loom
- Sil - Silty Loom

From Soil Map of Niagara County, New York.  
United States Department of Agriculture - Soil Bureau.  
1906

THE J.G. WHITE ENGINEERING  
CORPORATION  
LAKE ONTARIO ORDNANCE  
WORKS

TYPICAL SOIL SECTIONS  
[3 FEET DEEP]

M.J.R.

December, 1942

SCIL DATA

29

Types of Soil and Areal Distribution

54. Nine of the seventeen different types of soil existing in Niagara County are found within the boundaries of the Project. These soils and their distribution are as follows:

<u>TYPE</u>	<u>PERCENT</u>	<u>ACRES</u>
(1) Clyde Loam . . . . .	40.81	3,059
(2) Dunkirk Clay . . . . .	25.69	1,925
(3) Clyde Clay . . . . .	18.87	1,414
(4) Dunkirk Loam . . . . .	8.39	629
(5) Lockport Clay . . . . .	3.49	262
(6) Huntington Loam . . . . .	1.49	112
(7) Dunkirk Gravelly Sandy Loam . . . . .	0.64	48
(8) Meadow . . . . .	0.32	24
(9) Dunkirk Silt Loam . . . . .	0.30	22
	<hr/> 100.00%	<hr/> 7,495acres

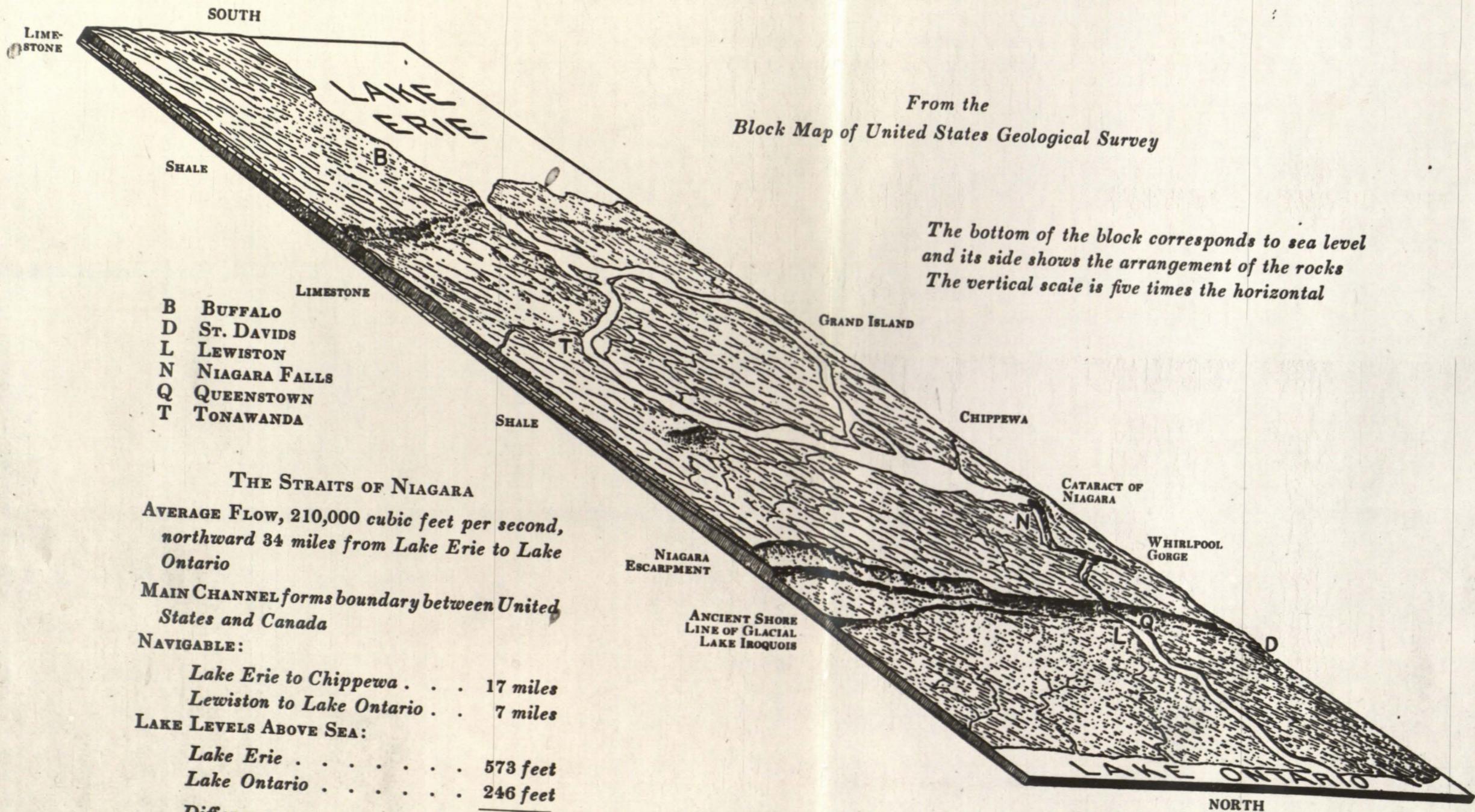
55. See Soil Map, page 27 and Typical Soil Sections, page 28.

Soil Conditions \*

56. All of these soils have been formed under the influence of glacial lakes. The basal formations consist of shales, sandstones and limestones, which have a dip of 25 feet to the mile to the south and have been eroded so that the edges of the successively older formations are exposed from south to north.

57. The advance of the glacial ice swept away all of the residual products, and the present soil materials were formed mainly in the lakes and drainage water that accompanied the northward retreat of the ice margin. The lake materials are generally fine textured, their continuity depending upon the uniformity of the lake conditions. With the retreat of the ice the lake levels dropped successively and, owing to the general northward slope of the country in this region, became more extensive until the different bodies of water were united and formed, first, glacial Lake Warren on the Erie plain, and, later, Lake Iroquois on the Ontario plain. See the relief map and section from the Block Map of the United States Geological Survey on page 30.

\* Abstracted, or quoted verbatim, from "SOIL SURVEY OF NIAGARA COUNTY, NEW YORK", by Elmer O. Fippin, Grove B. Jones, W. J. Geib, Orla L. Ayrs and C. W. Mann. U. S. Department of Agriculture, 1906.



From the  
Block Map of United States Geological Survey

The bottom of the block corresponds to sea level  
and its side shows the arrangement of the rocks  
The vertical scale is five times the horizontal

- B BUFFALO
- D ST. DAVIDS
- L LEWISTON
- N NIAGARA FALLS
- Q QUEENSTOWN
- T TONAWANDA

**THE STRAITS OF NIAGARA**  
AVERAGE FLOW, 210,000 cubic feet per second,  
northward 34 miles from Lake Erie to Lake  
Ontario

MAIN CHANNEL forms boundary between United  
States and Canada

NAVIGABLE:

- Lake Erie to Chippewa . . . 17 miles
- Lewiston to Lake Ontario . . . 7 miles

LAKE LEVELS ABOVE SEA:

- Lake Erie . . . . . 573 feet
- Lake Ontario . . . . . 246 feet
- Difference . . . . . 327 feet

SOIL DATA

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58. Many successive levels are recognized by the shore and terrace deposits. One of the most general materials found in these lakes was clay, another consisted of various textures of gravel. A further variation of the conditions was the presence of the melting ice masses containing more or less earthy material that had been picked up in its southward movement. Superglacial streams and ponds sorted and concentrated these materials, and upon the final disappearance of the ice they were deposited in a somewhat promiscuous manner. There is consequently a considerable variation in the present soil conditions.

59. All these phases of glacial conditions appear to have existed over the Project area, which was very completely subjected to lake conditions. Some soils were deposited in deep quiet water, while others formed by swift currents or by wave action, and between the extremes are ranged soils of intermediate fineness. All of the lighter colored sediments are classed in the Dunkirk series. Where the materials which would have given rise to Dunkirk soils have been subject to marshy or swampy conditions since glaciation and as a result of poor drainage have accumulated considerable amounts of organic matter that imparts a dark or black color, they are classed in the Clyde series. The type which has been most perfectly sorted and elevated above continuous overflow is the Huntington loam. Low, wet, variable land constitutes Meadow.

60. At a number of points on the Ontario plain the underlying red shale approaches very near the surface where it has decayed and become mixed with glacial materials to form Lockport clay. These areas were probably elevations when the ice advanced and served to hinder the underflow of the ice so that a great many boulders, often of large size, were stranded. Much of the surface of this type is now strewn with these boulders, most of which are crystalline in character.

Characteristics of each Type of Soil \*Clyde Loam

61. The surface soil of the Clyde loam to a depth of from 8 to 15 inches ranges from a dark-gray to black heavy sandy loam. The subsoil is a gray, or yellow and gray mottled loam or clay loam, somewhat silty and usually streaked with iron stains or the pink color derived from the red Medina shale. Clyde loam usually possesses decidedly clayey properties and occupies low, level, poorly drained positions. The phase of this soil found on the Project is generally free from stone and gravel. The soil is a heavy black loam and in some instances a clay loam, with an accumulation of organic matter upon the surface. The natural drainage is poor.

\* See Reference at foot of page 29.

SOIL DATA

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62. This soil occupies glacial lake beds and depressions and is composed of the finer grades of glacial material washed in from the higher land. This material remained for a long period in a swampy condition. Crops planted on this soil are frequently drowned out if the drainage is deficient. This type of soil is the best in the County for growing corn. It should be well drained.

Dunkirk Clay

63. This soil is lacustrine<sup>1</sup> in origin, consisting of uniform, fine particles derived from reworked glacial material deposited in quiet water near the close of the glacial period. The general level character of this type, together with its low lying position and heavy texture makes it a poorly drained soil.

64. It consists of a clay loam or clay from 5 to 8 inches deep, blue drab or gray, frequently mottled with iron stains. Owing to its fine texture care must be taken in working this soil as it clods easily if not dried out in the Spring.

65. The principal crops grown on this soil are wheat and timothy and either red or alsike clover. Thorough drainage is required.

Clyde Clay

66. This soil contains a relatively high percentage of organic matter which gives it a dark brown or black color. It consists of a heavy clay loam 4 to 8 inches deep. When dug, deep cracks are formed which extend into the subsoil for 2 or 3 feet, while the surface soil cracks into small cubical blocks from one-sixteenth to one-fourth inch in diameter. During the freezing weather of winter the soil heaves badly, causing considerable injury to the roots of growing wheat and grass. The subsoil to a depth of 36 inches or more is a heavy waxy clay. It varies in color from a blue-black to dark-gray or drab, and in some cases is a bluish-brown. Cultivation is extremely difficult because of the generally heavy character of this type. The areas within the Project are considered quite extensive and typical, but better drained than the majority of areas of this type, being cared for by the natural drainage of two branches of Sixmile Creek and by Twelvemile Creek.

67. The Clyde Clay is usually in the clay formations of depressions, shallow, flat bottomed or saucer shaped, with very poor natural drainage. Much of the land where this soil is found becomes flooded in Spring. Some of it remains in a semi-swampy condition, still covered with timber, especially elms. Owing to the lateness of its drying out in Spring, it is usually Fall plowed for oats.

1 - Lacustrine - pertaining to, or growing in, lakes

SOIL DATA

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68. It is a soil very good for hay and corn. In the North Central States it is a very good soil for sugar beets. On the Project pears and plums have been very successfully grown.

Dunkirk Loam

69. The soil of the Dunkirk loam consists of a dark to light-brown rather silty loam from 7 to 12 inches in depth. Silt and sand are present in varying amounts, forming on the average a mellow, easily cultivated soil. The subsoil is variable in texture, and is made up of lenticular<sup>2</sup> strata of clay or clay loam, silt, and sandy material, giving it the average texture of a loam. The relation of these is not uniform, but it is usual to find under the soil a heavy stratum of clay loam which gives way to silty or sandy material, and in the bottom of the 3-foot section appears another band of heavy material.

70. Borings near each other are frequently quite different in the order and thickness of the materials. This is apparent from the lenticular structure and cross bedding. Even thin strata of coarse sand and gravel may sometimes be encountered, but these are not common. Sometimes the clayey band may form the surface and give way to the lighter materials in the upper subsoil. The characteristic of the section is great variability in texture from point to point, but no single class of material is very extensive either in areal distribution or thickness. The sandy loam, clay or silt strata may occur at any horizon in the section and in any order.

71. Dunkirk loam is a soil of high natural productivity and good cultural qualities. It is the best general purpose soil in the Project Area, or in Niagara County. It gives good yields of all grain and hay crops and is especially well adapted to fruits of all kinds suited to the climate. The following trees thrive on this soil; hard maple, elm, basswood, tulip, poplar, black walnut, some oaks, chestnut, beech and hickory. It is also excellent for corn, beans and potatoes.

72. Apples grown on this soil are of superior flavor, color and keeping quality. The same results are obtained with peaches, pears, plums and cherries.

Lockport Clay

73. The Lockport clay is a heavy red to brown clay loam from 4 to 8 inches deep, underlain by a stiff Indian-red clay. The red Medina shale sometimes occurs within 3 feet of the surface. Where the shale is comparatively near the

2 - Lenticular - shaped like a double convex lens.

surface it has given rise to the Lockport Clay. The soil, therefore is largely residual, being the weathered product of the red shaly rock mixed with some glacial material near the surface. Under most of the type the bed rock occurs at a depth greater than 3 feet, but occasionally it is encountered within the third foot. The surface soil has undergone but little change, still possessing the characteristic red color of the parent rock. In depressions where organic matter has been incorporated with the soil it takes on a rusty-brown color.

74. This soil is located in the southern portion of the Project between the south boundary line and Swan Road and also in the southeast corner just west of the railroad track.

75. The larger area is on the highest ground in the Project at an elevation 350 feet above sea-level and extends roughly to the 340 foot contour. Most of this Lockport clay area is heavily wooded and presently not planned for use. This type of soil is usually thickly strewn with granitic boulders and owing to its stony nature is best adapted to pasture or wood lots.

#### Huntington Loam

76. The typical Huntington loam consists of a brown silty loam that rests upon a sandy loam. It has been formed from the deposits of streams at time of overflow.

77. Two areas occur within the Project boundaries, the larger along Fourmile Creek, in the northwestern section, and the smaller along Sixmile Creek, near Porter Center Road, at the northeast corner. Neither of the areas where this soil occurs are contemplated for construction purposes. Where it is found here it is subject to overflow and should probably be left to grass. It is a productive soil for grains and vegetables.

#### Dunkirk Gravelly Sandy Loam

78. The surface soil of the Dunkirk gravelly sandy loam is a dark or light-brown gravelly sandy loam from 10 to 15 inches deep. The soil contains a high percentage of small waterworn pebbles about the size of a pea. The subsoil is a light-brown or reddish-brown medium to coarse sand or sandy loam containing a considerable quantity of small gravel. The deep subsoil consists of stratified gravel and sand. Besides the small gravel some parts of the type contain from 30 to 60 percent of large cobblestones.

79. This soil is found on the Project in a narrow strip extending north and south of Balmer Road about  $\frac{1}{2}$  mile east of Creek Road, being sandwiched between Dunkirk clay on the

east and Dunkirk loam on the west. It is an excellent soil for growing fruits, especially cherries, melons and also for market garden crops. The subsoil makes an excellent road surfacing material.

Meadow

80. The Meadow soil is composed of poorly drained material similar to Huntington loam, except that it is usually much wetter. In the Project Area it was found between Six-mile Creek and Twelvemile Creek east of Castle Garden Road. It was in the TNT Area and has been covered with Clyde loam from the surrounding spaces when this whole section was extensively graded.

Dunkirk Silt Loam

81. The surface soil of the Dunkirk silt loam consists of a light-brown to yellow silt loam from 8 to 12 inches deep. The soil is usually free from stone and gravel and contains a considerable percentage of very fine sand. The subsoil is a brown, yellow, or pink silty or fine sandy loam usually grading into a heavy silty loam.

82. This soil is sedimentary in origin and consists of the finer grades of glacial material reworked and deposited by lakes and streams. It is a very good soil for fruit trees.

83. This soil is found on the Project at the northeast corner, just north of the Huntington Loam, at the juncture of Porter Center Road and Youngstown Road where no construction is contemplated.

SOIL DATA

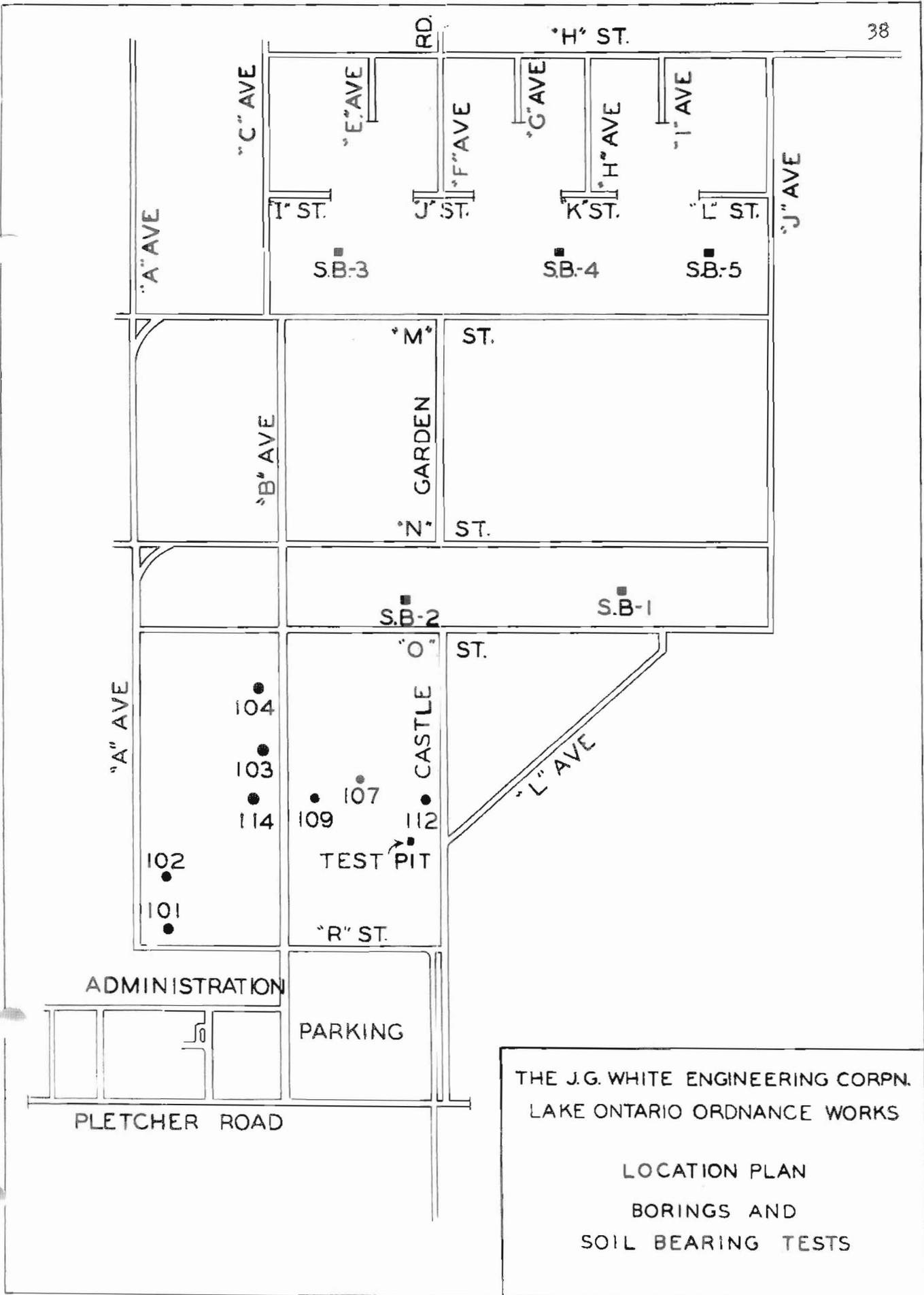
64. MECHANICAL ANALYSES AND ESTIMATED BEARING POWER OF SOILS WITHIN THE PROJECT \* \*

TYPE	DESCRIPTION	FINE GRAVEL %	COARSE SAND %	MEDIUM SAND %	FINE SAND %	VERY FINE SAND %	SILT %	CLAY %	ORGANIC MATTER	ESTIMATED BEARING POWER Tons
Clyde Loam	Soil	0.5	2.7	2.3	16.3	24.1	39.2	14.1	Sometimes on surface	Dry-2 Wet-1½
	Subsoil	0.3	1.9	1.7	12.8	21.4	47.8	14.1		
Dunkirk Clay	Soil	0.5	1.8	1.4	3.4	2.4	50.4	40.0	No	Soft-1 Ordinary-2
	Subsoil	0.1	0.8	.7	1.7	1.4	43.3	52.8		
Clyde Clay	Soil	0.1	1.5	2.1	4.8	3.7	46.2	41.4	Relatively High	1½
	Subsoil	0.0	0.3	0.4	1.2	3.5	48.0	45.7		
Dunkirk Loam	Soil	0.9	4.2	3.3	6.4	13.5	52.9	18.4	No	2
	Subsoil	0.0	1.7	1.4	5.5	4.3	54.9	32.1		
Lockport Clay	Soil	0.7	2.2	1.9	3.3	4.0	53.0	34.6	Sometimes in depressions	1½
	Subsoil	0.2	2.0	1.5	3.5	6.0	48.1	37.8		
Huntington Loam	Soil	0.2	0.3	0.2	1.5	9.1	67.8	20.5	No	½
	Subsoil	0.0	0.0	0.0	1.6	18.9	60.7	17.9		
Dunkirk Gravelly Sandy Loam	Soil	8.1	15.5	11.5	18.4	8.3	30.7	7.2	No	3½
	Subsoil	7.8	16.7	9.8	23.3	8.2	28.2	15.9		
Meadow	Soil Subsoil	Low lying areas partly covered by water most of the time. Not good for cultivation or buildings. Similar to Huntington Loam.								
Dunkirk Silt Loam	Soil	1.1	2.0	1.0	4.9	15.2	66.3	9.1	No	1
	Subsoil	0.6	1.4	.9	3.7	13.2	62.2	17.3		

\* \* The Analyses are taken from "SOIL SURVEY OF NIAGARA COUNTY, NEW YORK". See footnote, page 29 .

100-001





SOIL DATA

39

Soil Bearing Tests, Borings and Test PitSoil Bearing Tests

85. Five soil bearing tests within the Project area were made by the Field Engineering Department, two in the Acid Area and three in the TNT Area. The loads consisted of a varying number of 94 pound bags of cement placed on a 7'x7'x2" wood loading platform on a pedestal resting on a 1½"x12"x12" steel plate, leveled off in the center of a pit 4 feet below the surface. See sketch on page 37. The locations of these tests are shown on the Location Plan - Borings and Soil Bearing Tests, page 38.

86. Soil Bearing Test No. 1 was begun on March 4, 1942, about 260 feet north of "O" Street, and 1180 feet east of Castle Garden Road. The test lasted for 33 hours. Maximum settlement of .03 foot was obtained with 10,660 pounds and no further settlement was noticed during 20 hours application of this load.

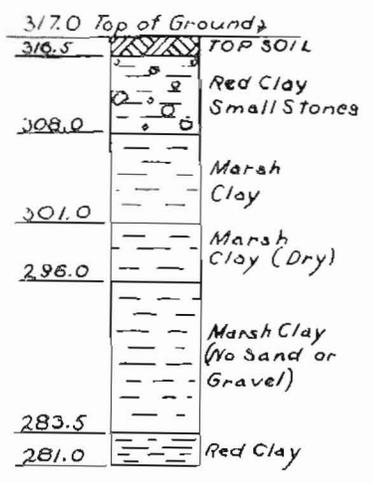
87. Soil Bearing Test No. 2 was begun on March 5, 1942, about 200 feet north of "O" Street, and 250 feet west of Castle Garden Road. The test lasted for 46 hours. Maximum settlement of .06 foot was obtained with 10,660 pounds and no further settlement was noticed during 27 hours application of this load.

88. Soil Bearing Test No. 3 was begun on April 8, 1942, about 440 feet north of "M" Street, and 470 feet east of "C" Avenue (now Wesson Street). The test lasted 48 hours. Maximum settlement of .025 foot was obtained with 10,660 pounds and no further settlement was observed during 25 hours application of this load.

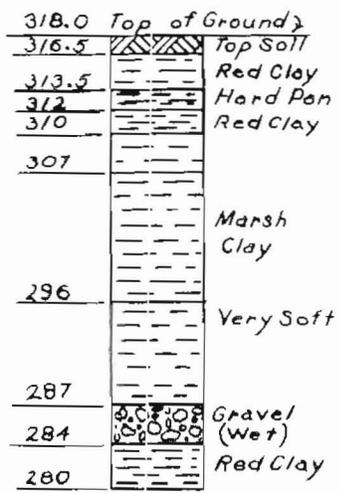
89. Soil Bearing Test No. 4 was begun on April 9, 1942, about 440 feet north of "M" Street, and 1,430 feet east of Soil Bearing Test No. 3. The test lasted 54 hours. The maximum settlement of .04 foot was obtained with 8,648 pounds and no further settlement was observed during 31 hours.

90. Soil Bearing Test No. 5 was begun on April 18, 1942, about 440 feet north of "M" Street, and 970 feet east of Soil Bearing Test No. 4. The test lasted 38½ hours. The maximum settlement of .04 foot was obtained after a load of 8,460 pounds had been applied for 21 hours. No further settlement was observed 3½ hours thereafter.

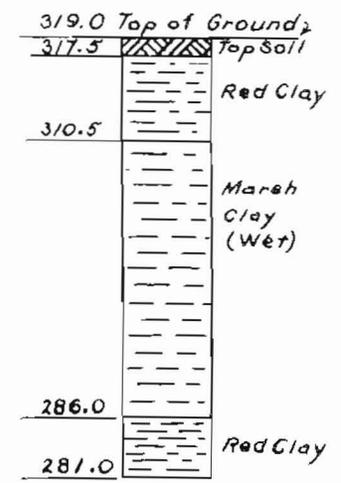
91. The Engineering Department of the A-E-M decided, after careful study of the results obtained from the above mentioned Soil Bearing Tests, the 8 Test Holes or Borings, (page 38), and the Test Pit, (page 38), to use a loading value of 3000 pounds per square foot in the Power and Water Treatment Area, the Sewage Disposal Plant Area and the Acid



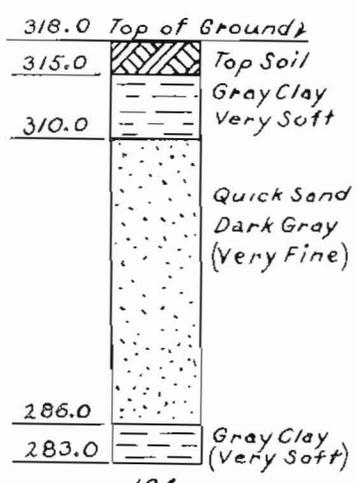
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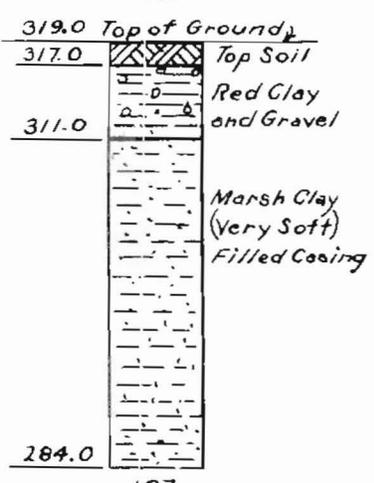
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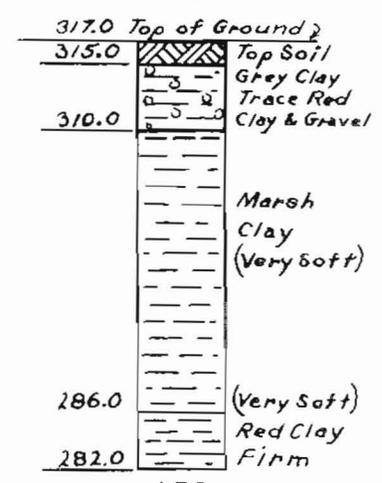
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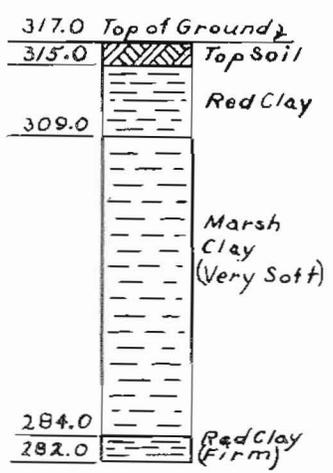
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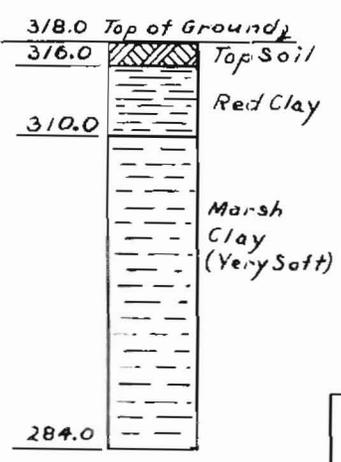
107



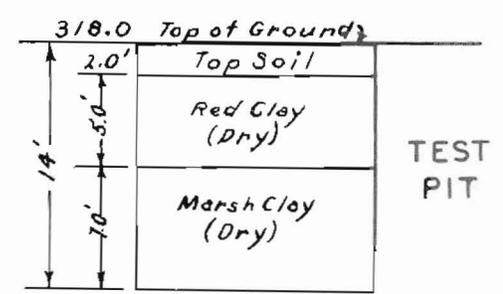
109



112



114



Note: Excavation Caved in From 3' Level Reduced Depth to 11 Feet Two Days After Excavation. Hole Dry.

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LAKE ONTARIO ORDNANCE WORKS

SECTIONS  
BORINGS  
AND TEST PIT

SOIL DATA

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Manufacturing Area, and to use 4000 pounds per square foot in the Administration Area, the TNT Manufacturing Area and all other Areas.

Borings

92. On March 18, 1942, subcontract No. 12 to the contract DA-W-138 Eng.-1, was awarded to William Strassburg and Son of Sanborn, New York, to cover test borings. A total of twenty-four test borings totalling 1,138 feet, were made at a unit price of \$3.00 per foot, in three different locations (a) within the Project Area, (b) at the site of the Water Intake and Pumping Station, and (c) at the Waste Disposal Outlet Site.

Within the Project Area ( 8 Test Holes )

93. Test Hole No. 101 was drilled on April 6, 1942 at the proposed site for the Water Treatment Plant. It ran from elevation 317.0 to 281.0, a depth of 36 feet.

94. Test Hole No. 102 was drilled on April 8, 1942 at the proposed location of the Ground Storage Reservoir for water. It ran from elevation 318.0 to 280.0, a depth of 38 feet.

95. Test Hole No. 103 was drilled on April 11, 1942 at the proposed site for the 75,000 gallon elevated Drinking Water Tower. It ran from elevation 319.0 to 281.0, a depth of 38 feet.

96. Test Hole No. 104 was drilled on April 1, 1942 at the proposed site for the Sewage Disposal Plant. It ran from elevation 318.0 to 283.0, a depth of 35 feet.

97. Test Holes originally designated as 105, 106, 108, 110, 111 and 113 were not drilled as they were cancelled by the Engineering Manager on April 10, 1942.

98. Test Hole No. 107 was drilled April 2, 1942, 320 feet east of "B" Avenue (now Campbell Street) and 17 feet south of the north side of the Boiler Plant. It ran from elevation 319.0 to 284.0, a depth of 35 feet.

99. Test Hole No. 109 was drilled April 3, 1942, 240 feet east of "B" Avenue and 25 feet north of the south side of the Boiler Plant. It ran from elevation 317.0 to 282.0, a depth of 35 feet.

100. Test Hole No. 112 was drilled April 3, 1942, due east of No. 109 and 165 feet west of Castle Garden Road in the Boiler Plant Area. It ran from elevation 317.0 to 282.0, a depth of 35 feet.

SOIL DATA

42

101. Test Hole No. 114 was drilled April 4, 1942, about 400 feet due west of Test Hole No. 109. It ran from elevation 318.0 to 284.0, a depth of 34 feet.

102. The locations of each of the above mentioned test holes are shown on page 38.

103. Soil sections of each of these test holes are shown on page 40 .

At the Site of the Water Intake and Pumping  
Station ( 12 Test Holes )

104. Test Hole No. 1 was drilled March 20, 1942 about 60 feet south of the intake line and 80 feet east of the east edge of the Niagara River. It ran from elevation 263.0 to 201.0, a depth of 62 feet.

105. Test Hole No. 2 was drilled March 23, 1942. It was located 135 feet north of the intake line and about 80 feet east of the east edge of the Niagara River. It ran from elevation 263.0 to 201.0, a depth of 62 feet.

106. Test Hole No. 3 was drilled March 24, 1942. It was located 135 feet north of the intake line and about 110 feet west-northwest of the northwest corner of the Pumping Station. It ran from elevation 265.0 to 188, a depth of 77 feet.

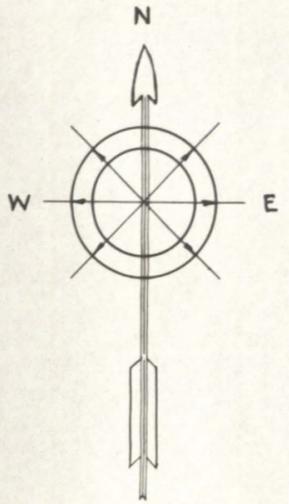
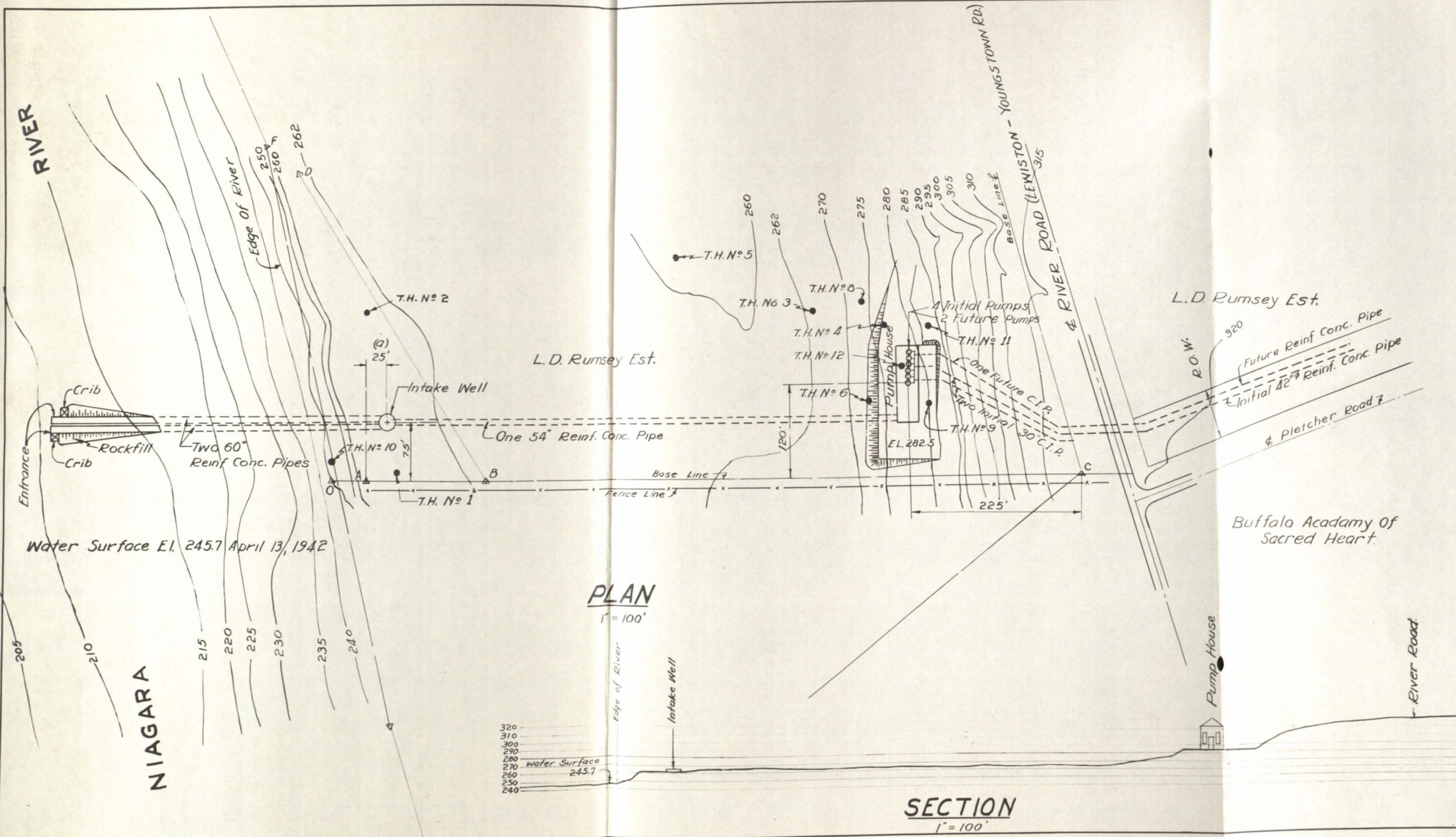
107. Test Hole No. 4 was drilled March 25, 1942. It was located 115 feet north of the intake line and about 30 feet north-northwest of the northwest corner of the Pumping Station. It ran from elevation 271.0 to 211.0, a depth of 60 feet.

108. Test Hole No. 5 was drilled March 30, 1942. It was located 200 feet north of the intake line and 180 feet west-northwest of Test Hole No. 3. It ran from elevation 262.0 to 200.0, a depth of 62 feet.

109. Test Hole No. 6 was drilled April 16, 1942. It was located 50 feet west of the center line of the Pumping Station and 20 feet north of the intake line. It ran from elevation 272.0 to 212.0, a depth of 60 feet, and required 11 hours and 20 minutes to drill.

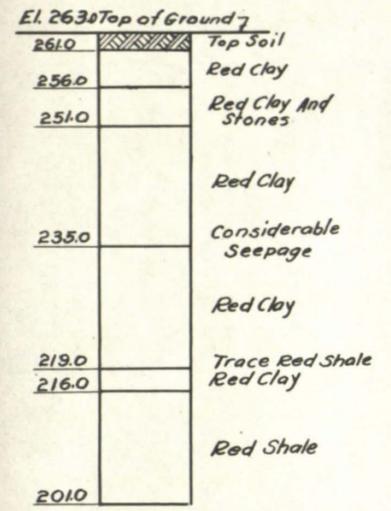
110. Test Hole No. 7 was drilled on April 15, 1942. It was located approximately 60 feet west of Test Hole No. 6. After it was bored for 3 feet the contractor was ordered to discontinue further drilling at that location. No other record of the location or section are here shown.

111. Test Hole No. 8 was drilled on April 14, 1942. It was located 145 feet north of the intake line and about 70 feet north-northwest of the northwest corner of the

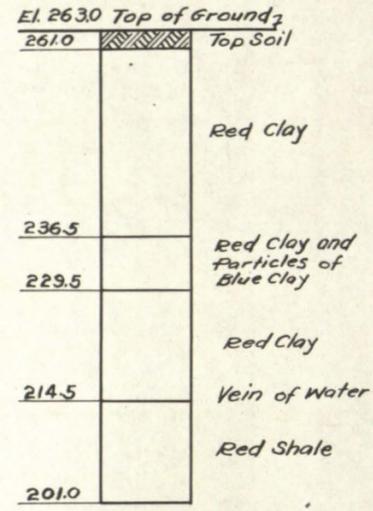


THE J.G. WHITE ENGINEERING CORPN.  
LAKE ONTARIO ORDNANCE WORKS

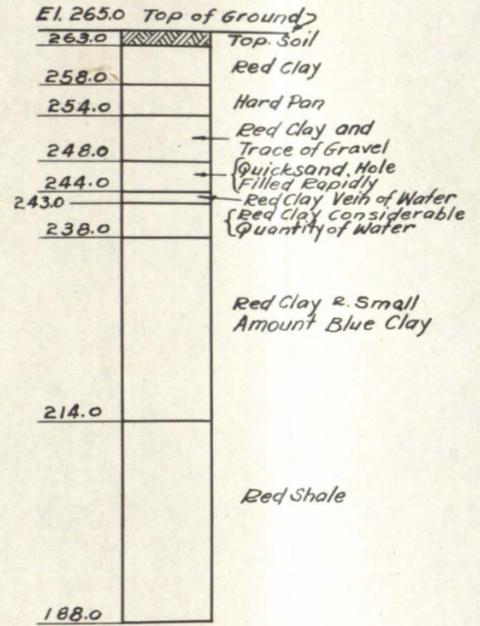
LOCATION PLAN  
TEST HOLES  
WATER INTAKE SITE



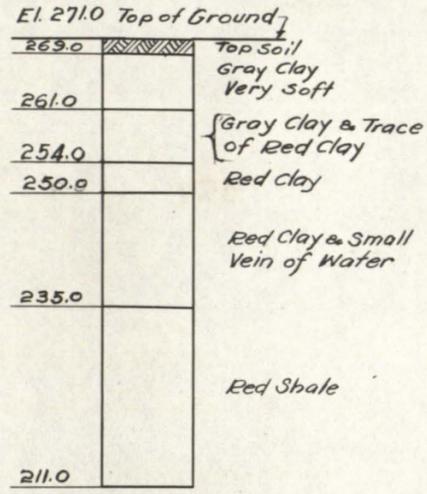
Test Hole No.1



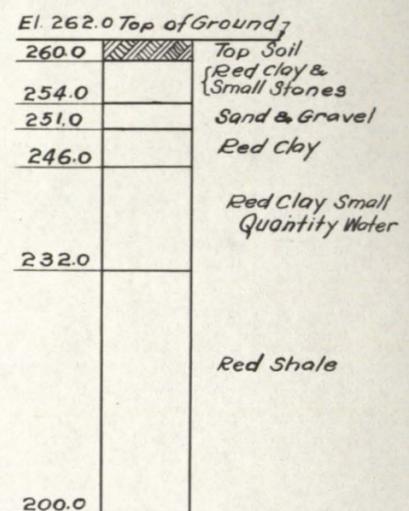
Test Hole No.2



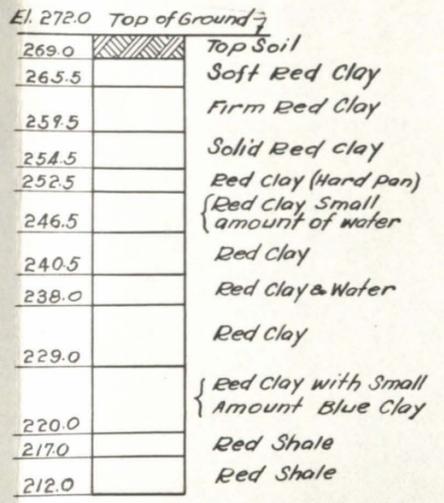
Test Hole No.3



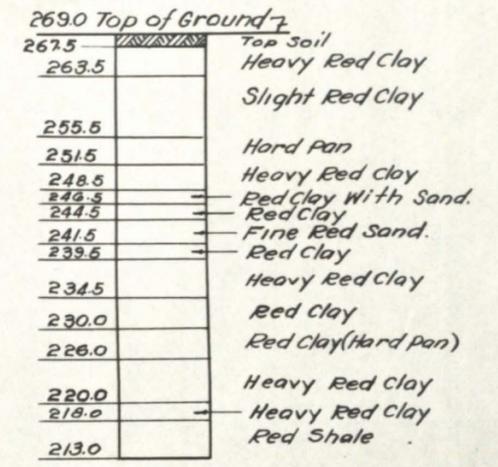
Test Hole No.4



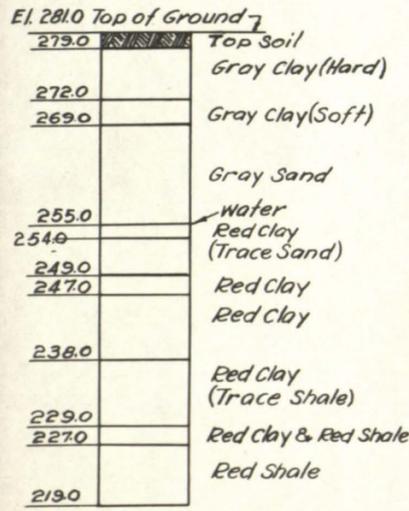
Test Hole No.5



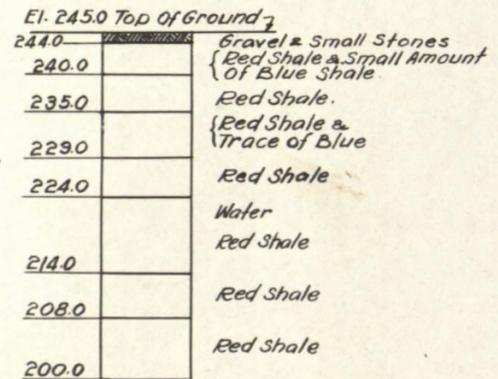
Test Hole No.6



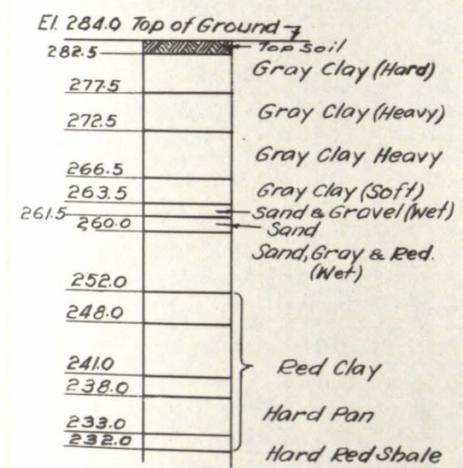
Test Hole No.8



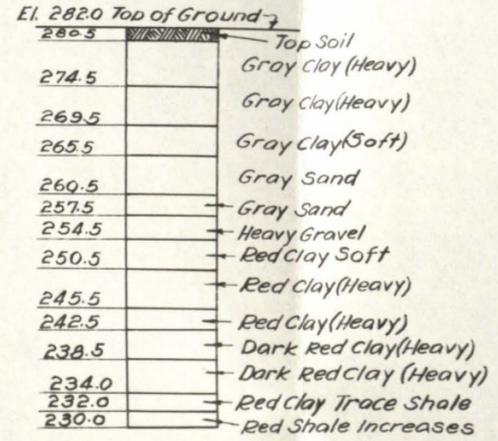
Test Hole No.9



Test Hole No.10



Test Hole No.11



Test Hole No.12

THE J.G.WHITE ENGINEERING CORPN.  
LAKE ONTARIO ORDNANCE WORKS  
  
TEST HOLES  
SOIL SECTIONS  
WATER INTAKE SITE  
  
A.L.D. DEC. 9, 1942

SOIL DATA

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Pumping Station. It ran from elevation 269.0 to 213.0, a depth of 56 feet, and required 11 hours and 35 minutes to drill.

112. Test Hole No. 9 was drilled on April 15, 1942. It was located about 28 feet east of the center line of the Pumping Station and 25 feet north-northeast of the southeast corner of that building. It ran from elevation 281.0 to 219.0, a depth of 72 feet, and required 10 hours and 35 minutes to drill.

113. Test Hole No. 10 was drilled on April 18, 1942. It was located about ten feet east of the east edge of the Niagara River and 48 feet south of the center line of the intake. It ran from elevation 245.0 to 200.0, a depth of 45 feet, and required 12 hours and 55 minutes to drill.

114. Test Hole No. 11 was drilled on April 20, 1942. It was located about 30 feet north-northeast of the northeast corner of the Pumping Station. It ran from elevation 284.0 to 232.0, a depth of 52 feet, and required 15 hours and 25 minutes to drill.

115. Test Hole No. 12 was drilled on April 21, 1942. It was located about 5 feet west of the center line of the Pumping Station and 60 feet north of the center line of the intake. It ran from elevation 282.0 to 230.0, a depth of 52 feet, and required 13 hours and 40 minutes to drill.

116. The locations of the test holes at the Water Intake and Pumping Station site are shown on page 43.

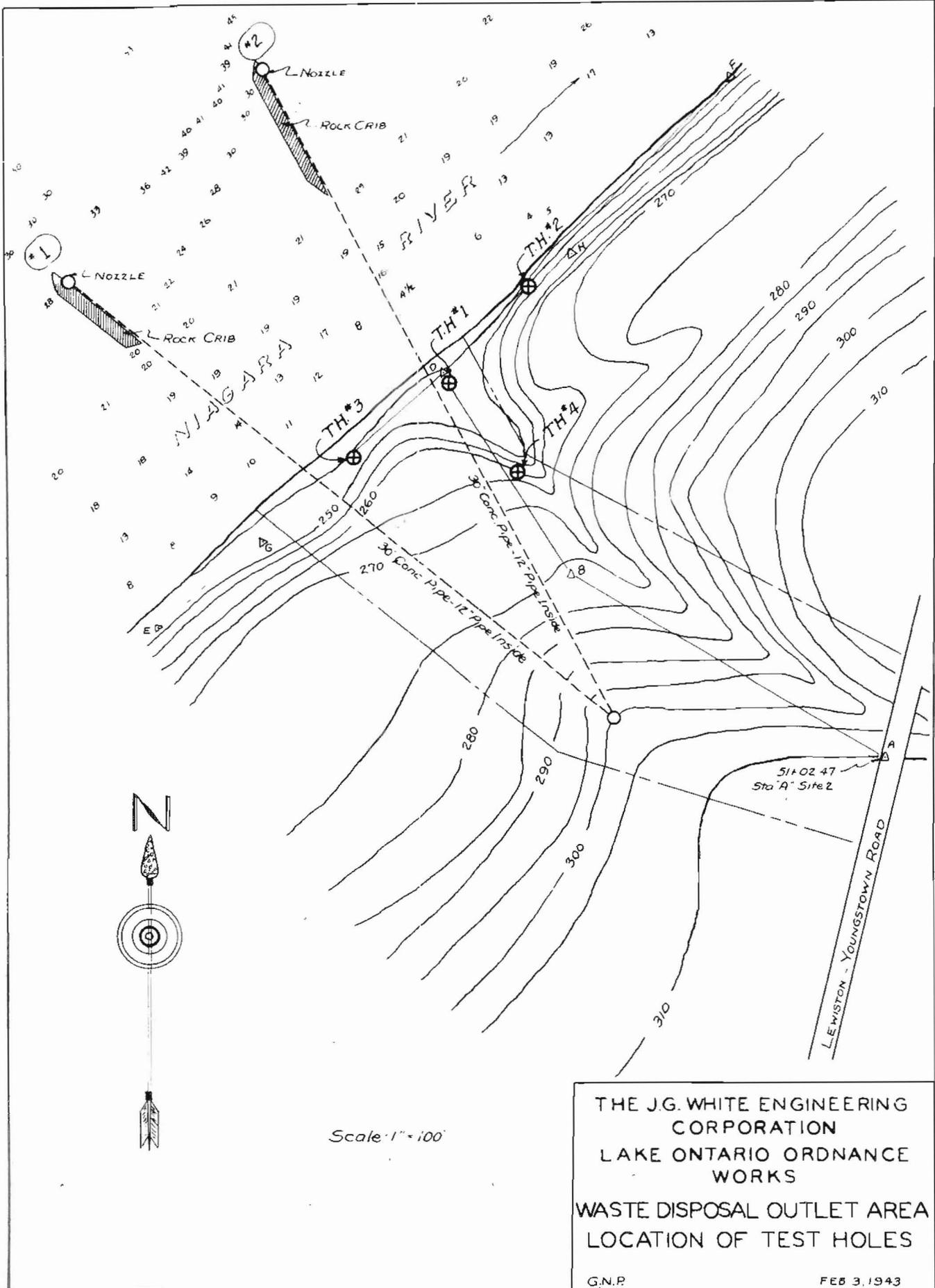
117. The sections of test holes at the Water Intake and Pumping Station are shown on page 44.

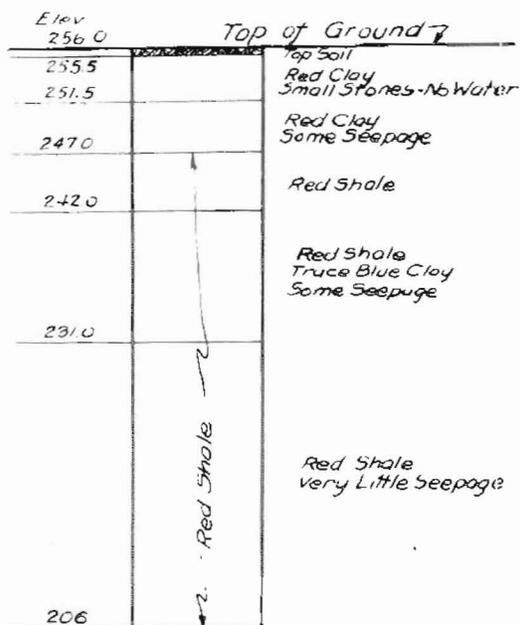
At the Waste Disposal Outlet Site (4 Test Holes)

118. Test Hole No. 1 was drilled April 27, 1942. It was located about 25 feet southeast of the water's edge of the Niagara River and 10 feet northeast of the northerly outfall line. It ran from elevation 256.0 to 206.0, a depth of 50 feet. It took 9 hours and 50 minutes to drill.

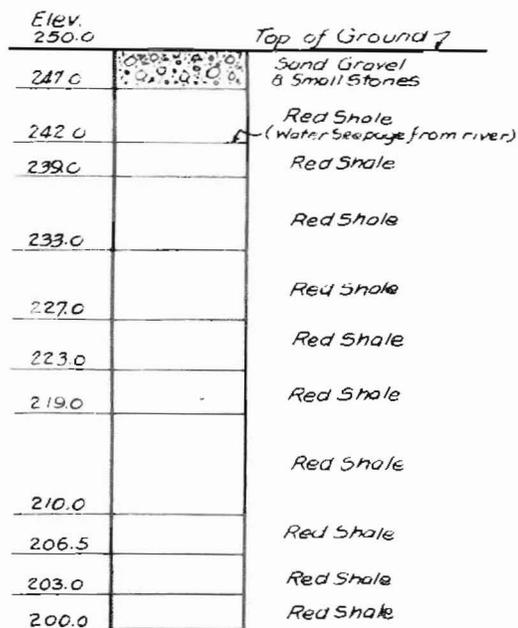
119. Test Hole No. 2 was drilled April 23, 1942. It was located approximately 100 feet northeast of Test Hole No. 1 and 12 feet from the river's edge. It ran from elevation 250.0 to 200.0, a depth of 50 feet. It required 12 hours and 50 minutes to drill.

120. Test Hole No. 3 was drilled April 25, 1942. It was located about 100 feet southwest of Test Hole No. 1 and 20 feet in from the river's edge. It ran from elevation 250.0 to 200.0, a depth of 50 feet. It required 13 hours and 50 minutes to drill.

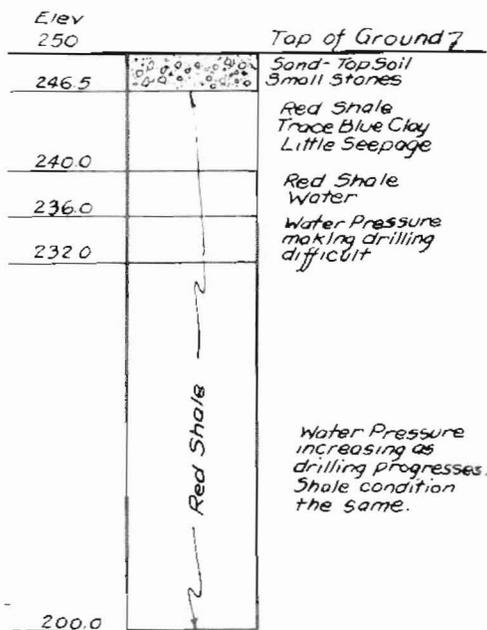




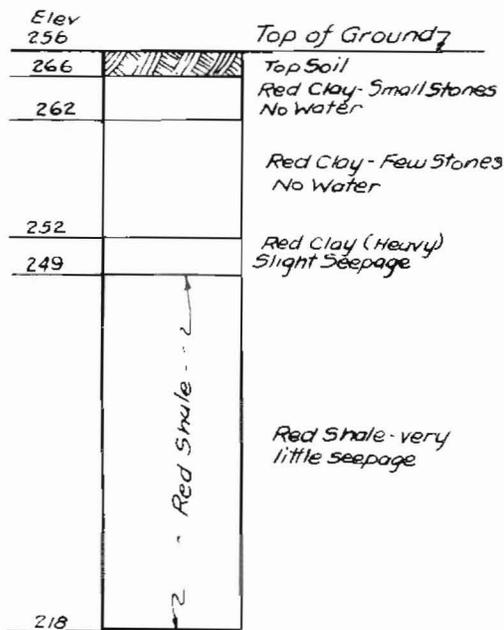
TEST HOLE NO. 1



TEST HOLE NO. 2



TEST HOLE NO. 3



TEST HOLE NO. 4

THE J.G. WHITE ENGINEERING  
CORPORATION  
LAKE ONTARIO ORDANCE  
WORKS  
WASTE DISPOSAL OUTLET AREA  
TEST HOLE SECTIONS

SOIL DATA

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121. Test Hole No. 4 was drilled April 28, 1942. It was located about 95 feet southeast and inshore from Test Hole No. 1. It ran from elevation 256.0 to 218.0, a depth of 38 feet and took ten and a half hours to drill.

122. The locations of the test holes at the Waste Disposal Outlet Area at the Niagara River are shown on page 46 .

123. The sections of the test holes at the Water Disposal Outlet Area at the Niagara River are shown on page 47.

Test Pit

124. A Test Pit was dug on April 4, 1942 by Poirier and McLane, southeast of the Boiler Plant location and about 200 feet west of Castle Garden Road where it is joined by "L" Avenue (now Vine Street). This pit was 14 feet deep, from a surface elevation of 318.0 feet. The location is shown on page 38, and the section is shown on sheet 40. . On April 6, 1942 the sides caved in from the 3 foot level reducing the depth to 11 feet. The hole was dry.

Ground Water ConditionsSurface Water

125. As over half of the Project area, 3,968 acres, is covered with Dunkirk clay, Clyde clay and Lockport clay, which soils and subsoils have a high proportion of clay in their analyses, (see page 36) and are consequently very impervious to water, it is easy to understand why rain or melted snow is not readily absorbed.

126. Even where there is a smaller proportion of clay, as in the case of the Clyde Loam, which covers 3,059 acres, the percentages of fine sand and very fine sand in this soil and its subsoil are so great that we find great compactness and a low effective size for the sand, retarding absorption and subsurface flow. (The effective size varies as the square of the diameter of the grains of sand.)

127. Further, the slope of the hydraulic grade line in the Project area from south to north, is comparatively small, being about 40/24,000 or less than 2 inches per 100 feet, which is exceedingly flat. In the Administration area the surface has practically no slope.

128. During the spring of 1942, many cellars in existing buildings, used for offices or storehouses, were flooded and had to be pumped out, again and again. Excavations for foundations were filled with water and muddy fields prevented or retarded grading and other earth movements.

SOIL DATA

129. The Project area is fortunate in having certain natural streams for run-off into Lake Ontario. These are Fourmile Creek, Sixmile Creek and Twelvemile Creek.

130. Fourmile Creek enters the Project from the west, just south of Balmer Road, and flows inside the northerly half of the west boundary.

131. There are two branches of Sixmile Creek. One branch, called the West Branch, starts between Balmer and Cain Roads, about half a mile west of Lutts Road and angles in an east-northeast direction towards the northeast corner of the Project but turns in a more northeasterly direction before reaching it and crosses the Youngstown-Ransomville Road about a third of a mile to the west of its junction with Porter Center Road.

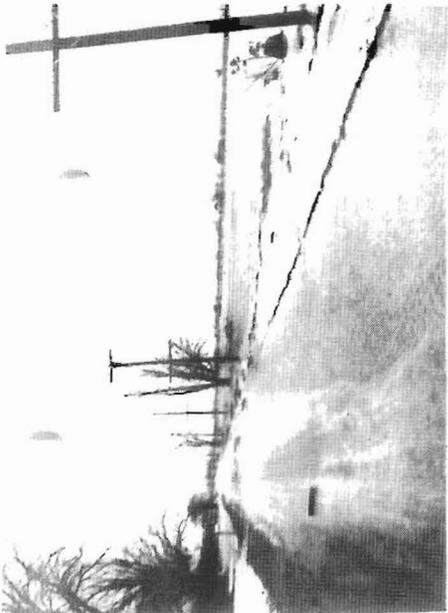
132. The other branch of Sixmile Creek starts outside the Project, south of Modeltown, at the foot of the escarpment and runs past the Tugwell Wiseman Canning Factory and then due north in a line paralleling the west Patrol Road until it reaches a point just north of "M" Street when it turns northeast and runs out of the Project at a point on the east boundary about 1,200 feet south of the northeast corner of the Project.

133. Twelvemile Creek enters the easterly portion of the Project from the south, near Nichols Road and Pletcher Avenue and arcs across the east-central portion to emerge about 4,000 feet north of the junction of Porter Center Road and Langdon Road.

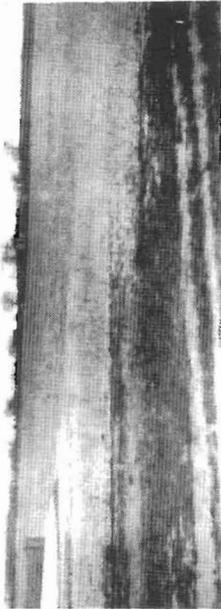
134. Several of these streams were deepened, enlarged and straightened, in places, during the early eighteen nineties, greatly increasing their drainage capacities.

135. Further modifications have been effected, such as diverting part of Sixmile Creek in the Magazine Area, and covering it by the use of culverts, wood stave pipe, back cover, and grading in the Administration Area, and diverting part of the Twelvemile Creek to the eastward in the vicinity of the Classification Yard.

136. Inasmuch as certain waste waters from the manufacturing processes are discharged after treatment into Fourmile Creek, careful studies were required to determine the best method of treatment and the effects of adding this water to probable flood waters from surface drainage, from the standpoint of high water levels, overflow, culvert and bridge levels and capacities and also the effects of the waste waters upon any water taken from this stream for any purpose, or the effects of the resultant waters in the Creek or drawn from the Creek upon animals or persons, vegetation, trees, fruits, grains, or other private or public property along the course of the Creek.



LOOKING EAST ON FLETCHER ROAD



LOOKING NORTHWEST TOWARD FLETCHER ROAD FROM HAROLD ROAD



FLETCHER ROAD



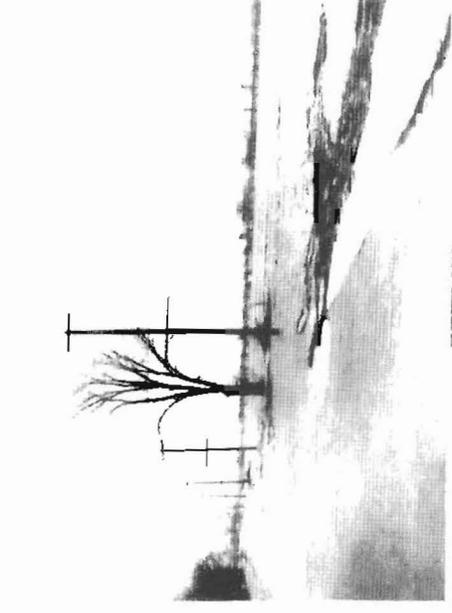
FLETCHER ROAD



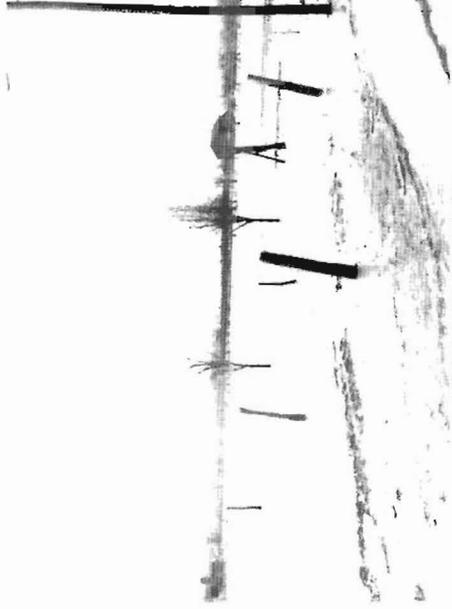
HIGH WATER ON SITE OF NEW ADMINISTRATION BUILDING



LOOKING WEST OF SWAN ROAD FROM LATA ROAD



FLETCHER ROAD

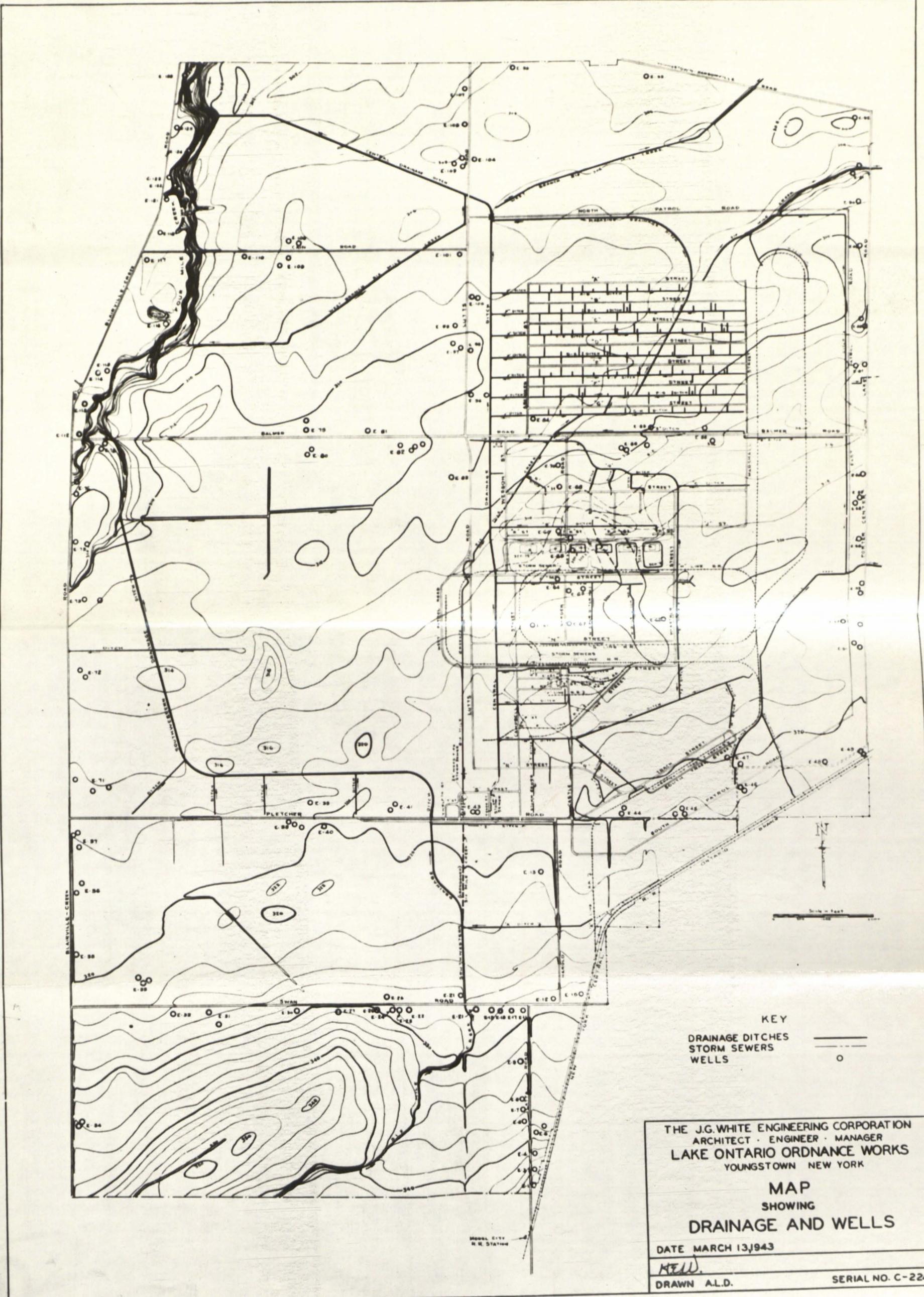


SWAN ROAD NEAR THE CREEK ROAD  
SURFACE WATER CONDITIONS  
MARCH 7, 1952



FLETCHER ROAD NEAR THE HAROLD FARM

100-0001



SOIL DATA

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137. In the past, during the winter months, these creeks would, as a rule, become frozen and snow and debris blown by the wind would assist in clogging these sources of drainage so that the surface water would not flow off, or if it did, it was over ice and snow in the creeks or ditches and at overflow levels.

138. Frozen ground also prevents water from being absorbed. According to farmers who have lived 40-50 years on the Project Area, the frost line within this area usually extends from one foot to one and a half feet below the surface and occasionally, during seasons with little snow, will extend to two feet or more. The deepest on record, near here, was  $5\frac{1}{2}$  feet in 1935, at Rochester. For design purposes four feet was taken as the frost line in laying out foundations.

139. See Page 50, for views of flood conditions on the Project on March 9, 1942.

Subsurface Conditions

140. All wells and water pumps, outlets and faucets had signs affixed to them, in January, 1942, condemning the water and prohibiting its use for drinking purposes. During March 1942, a field survey was made in order to locate all the wells on a map of the Project site; 131 wells were found. In April 1942, an inspection was made of the wells to ascertain the depth of water in each of them.

141. During the summer of 1942 many of these wells were dry. Some of the former inhabitants state that, for years, during the summer it has been necessary to truck water in tanks or barrels from the Niagara Falls water main in Youngstown, or Lewiston, to provide water for drinking and general service requirements, even for farm animals, for many of the farms.

142. Some of the wells have water with sulphur in it and one deep well at E-13 had sodium chloride in its water.

143. There are traces of natural gas escaping from the ground west of "Youngs Woods" which is the heavily wooded area near the center of the Project, in the northeast corner of former Great Lot 37, in Lewiston Township.

144. The locations of the wells are shown on the map showing Drainage and Wells, page 51.

145. The locations, depths and sizes of the wells, together with the depth of water found in them during the April inspection are shown in the following table.

145. WELLS ON PROJECT

<u>LOCATION</u>	<u>DRILLED</u>		<u>DUG</u>		<u>REMARKS</u>	
	<u>DEPTH IN FEET</u>	<u>WATER IN FEET</u>	<u>DIAM. IN FEET</u>	<u>DEPTH IN FEET</u>		<u>WATER IN FEET</u>
E-1	.	.	.	20	10	
E-2 - E-3	.	.	.	20	10	
E-4	.	.	.	10	5	
E-5	.	90	.	90	.	
E-5	.	.	.	20	15	
E-6	.	.	.	20	15	
E-7	.	.	.	12	6	
E-8	.	.	.	16	12	
E-9	.	.	.	20	20	
E-11	.	.	.	22	5	
E-12	.	.	.	18	3	
E-13	.	.	.	20	10	
E-13	.	60	.	20	.	Drilled well below 20' dug well
E-14	.	.	.	32	32	
E-14	.	.	.	27	14	
E-15	.	20	.	35	28	Drilled well below 35' dug well
E-16	.	.	.	19	3	
E-17	.	.	.	25	9	
E-18	.	.	.	19	4	
E-19	.	.	.	18	4	
E-20	.	50	.	.	.	
E-20	.	.	.	20	7	
E-21	.	.	.	20	16	
E-22	.	75	.	.	.	

145. WELLS ON PROJECT (Continued)

LOCATION	DRILLED		DUG		REMARKS	
	DEPTH IN FEET	WATER IN FEET	DIAM. IN FEET	DEPTH IN FEET		WATER IN FEET
E-23	40	.	.	20	.	Drilled well below 20' dug well
E-24	.	.	.	25	25	
E-25	.	.	.	35	10	
E-26	.	.	.	28	5	
E-27	.	.	.	28	2	
E-27	.	.	.	16	16	
E-28	.	.	.	18	7	
E-28	.	.	.	19	10	
E-29	.	.	.	20	20	
E-30	.	.	.	24	2	
E-31	.	.	.	20	10	
E-31	.	.	.	30	10	
E-32	46	.	.	.	.	
E-33	.	.	.	.	.	1 drilled well
E-33	.	.	.	28	12	
E-33	.	.	.	27	10	
E-34	.	.	.	20	5	
E-34	62	.	.	.	.	
E-35	.	.	.	.	.	1 drilled well
E-36	.	.	.	20	dry	
E-36	.	.	.	.	.	1 drilled well
E-37	.	.	.	40	5	
E-37	.	.	.	30	30	
E-37	.	.	.	40	40	
E-38 West of House	61	58	.	.	.	5' casing
E-38 Near log cabin	.	.	$4\frac{1}{2}$	17	16	
E-39 Between House and Barn	.	.	$3\frac{1}{2}$	18	16	

145. WELLS ON PROJECT (Continued)

LOCATION	DRILLED		DUG			REMARKS
	DEPTH IN FEET	WATER IN FEET	DIAM. IN FEET	DEPTH IN FEET	WATER IN FEET	
E-39 Southeast of Barn	.	.	3	17	17	
E-40 . . . . .	.	.	4 $\frac{1}{2}$	23	20	
E-40 (Across road from)	.	.	2 $\frac{1}{2}$	17	16	
E-41 Near Porch	.	.	3 $\frac{1}{2}$	60	40	
E-41 East of Barn	.	.	3 $\frac{1}{2}$	30	10	
E-42 . . . . .	.	.	4	28	8	
E-43 . . . . .	.	.	3	22	12	
E-44 . . . . .	50	40	.	.	.	. 6" casing
E-45 . . . . .	.	.	3	17	9	
E-45 East of Barn	.	.	3 $\frac{1}{2}$	22	12	
E-45 North of Barn	30	25	.	.	.	. 6" casing
E-46 . . . . .	.	.	3 $\frac{1}{2}$	26	20	
E-47 Front of House	.	.	3	22	20	
E-47 North of Barn	.	.	4	25	25	
E-48 . . . . .	.	.	3	22	20	
E-49 . . . . .	.	.	.	20	15	
E-50 . . . . .	.	.	3	12	12	
E-51 Front of House	.	.	4	25	10	
E-51 West of Barn	.	.	3	20	20	
E-52 West of Barn	.	.	.	20	20	
E-52A South of House	.	.	3	18	18	
E-53 East of Barn	.	.	5	24	24	. Bricked
E-53 East of House	.	.	4	16	8	
E-55 East of House	.	.	3	21	12	
E-55 North of House	.	.	3 $\frac{1}{2}$	20	20	
E-56 . . . . .	32	20	.	.	.	. 6" casing
E-57 In House	32	20	.	.	.	. 6" casing

145. WELLS ON PROJECT (Continued)

<u>LOCATION</u>	<u>DRILLED</u>		<u>DUG</u>			<u>REMARKS</u>
	<u>DEPTH IN FEET</u>	<u>WATER IN FEET</u>	<u>DIAM. IN FEET</u>	<u>DEPTH IN FEET</u>	<u>WATER IN FEET</u>	
E-58 . . . . .	52 .	42 .	. . . . .	. . . . .	. . . . .	. 6" casing
E-59 . . . . .	. . . . .	. . . . .	. 4 .	. 28 .	. 20 .	. Bricked
E-60 . . . . .	. . . . .	. . . . .	. 3 .	. 15 .	. 15 .	. Stone
E-60 . . . . .	. . . . .	. . . . .	. 3½ .	. 15 .	. 15 .	. Stone
E-61 East of House . . . . .	. . . . .	. . . . .	. 4 .	. 25 .	. 8 .	
E-61 Southwest of House . . . . .	. . . . .	. . . . .	. 3 .	. 18 .	. 18 .	
E-62 South of House . . . . .	. . . . .	. . . . .	. 3½ .	. 22 .	. 10 .	
E-62 South of Old House . . . . .	. . . . .	. . . . .	. 3 .	. 20 .	. 20 .	
E-63 North of House . . . . .	. . . . .	. . . . .	. 3½ .	. 28 .	. 20 .	
E-63 East of Barn . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 30 .	
E-64 . . . . .	. 25 .	. 20 .	. . . . .	. . . . .	. . . . .	. 6" casing
E-65 . . . . .	. 41 .	. 38 .	. . . . .	. . . . .	. . . . .	. 6" casing
E-66 Near House . . . . .	. . . . .	. . . . .	. 3½ .	. 31 .	. 25 .	
E-66 Near Barn . . . . .	. . . . .	. . . . .	. 3 .	. 25 .	. 22 .	
E-68 . . . . .	. 55 .	. 40 .	. . . . .	. . . . .	. . . . .	. 6" casing
E-70 . . . . .	. . . . .	. . . . .	. 3½ .	. 20 .	. 20 .	
E-71 North of House . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 28 .	
E-71 South of Barn . . . . .	. . . . .	. . . . .	. 3 .	. 22 .	. 22 .	
E-72 South of House . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 20 .	
E-72 West of Barn . . . . .	. . . . .	. . . . .	. 3½ .	. 25 .	. 20 .	
E-73 South of House . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 10 .	
E-73 South of Barn . . . . .	. . . . .	. . . . .	. 3 .	. 25 .	. 25 .	
E-73 East of Barn . . . . .	. . . . .	. . . . .	. 3 .	. 30 .	. 25 .	
E-75 East of House . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 20 .	
E-75 South of Barn . . . . .	. . . . .	. . . . .	. 3½ .	. 30 .	. 25 .	
E-76 South of House . . . . .	. . . . .	. . . . .	. 3½ .	. 20 .	. 10 .	

145. WELLS ON PROJECT (Continued)

LOCATION	DRILLED		DUG			REMARKS
	DEPTH IN FEET	WATER IN FEET	DIAM. IN FEET	DEPTH IN FEET	WATER IN FEET	
E-76 Near Creek	.	.	.	15	15	
E-78 . . . . .	.	.	3½	20	12	
E-79 . . . . .	.	.	3½	31	11	
E-80 Near House	.	.	4	31	20	Bricked
E-80 North of Barn	.	.	3½	20	20	
E-80 East of Barn	.	.	3½	32	32	
E-81 . . . . .	.	.	3½	30	20	
E-82 In Barn	.	.	3½	30	30	
E-82 In Shed	.	.	3½	25	25	
E-82 In Field near Road	.	.	3	31	12	
E-83 . . . . .	.	.	3½	22	15	
E-84 . . . . .	.	.	3½	25	12	
E-85 . . . . .	.	.	3½	25	12	
E-101 . . . . .	25	16	.	.	.	
E-101 . . . . .	.	.	4	20	15	. 6" casing
E-108 . . . . .	50	35	.	.	.	. 6" casing
E-109 S.E. Corner of House	.	.	4	20	12	
E-109 West of Barn	.	.	4	20	17	
E-110 . . . . .	.	.	5	20	16	
E-112 . . . . .	.	.	3½	20	8	
E-113 South of House	.	.	3½	20	10	
E-113 East of Barn	.	.	1½	20	10	. Tile Casing
E-114 In Cellar	.	.	1½	20	10	. Tile Casing
E-115 . . . . .	.	.	1½	25	15	. Tile Casing
E-116 . . . . .	.	.	3½	30	20	
E-117 . . . . .	.	.	3½	25	8	
S. W. Corner B-179 .4 mile west of Lutts Road	.	.	3	22	20	

BUILDINGS

58

146. Buildings and Structures on this Project may be divided into three classes: (1) those acquired with the site, (2) "Permanent" and (3) Temporary.

147. Acquired with the Site. A total of 874 were acquired by Government purchase. The classes and numbers of these are shown in detail on the following page. The location of these are shown on the Topographic Map of the Area, page 21, with the designations of the dwelling houses indicated with the prefix "E". Summaries of the dwelling houses and their facilities and condition are given on pages 61 and 62.

148. Many of these buildings and structures have been repaired and remodelled, demolished, or relocated by the A-E-M with the approval of the Ordnance Department. Others were sold and removed by the purchaser. Others have been demolished by the Chemical Construction Corporation. The disposition of all classes of buildings is shown on page 60. Photographs of some of these buildings are shown on Plates XXIV, XXIX, XXX, and XXI.

149. "Permanent". A total of 503 buildings and structures were constructed by the A-E-M and other Prime Contractors in accordance with their contracts and government directives, under the supervision of the Contracting Officer, the Area Engineer.

150. These buildings and structures together with their post numbers, unit numbers, locations, type of construction, capacity and size, and an index covering the contracts, specifications and drawings applying to them are listed on pages 63 through 69. Photographs of these buildings and structures are shown on Plates I - XIV, and XVII, and in the Panoramas.

151. Temporary. A total of 208 buildings of a temporary nature, constructed by the A-E-M or subcontractors, for necessary use during construction, such as general and engineering offices, time and pay offices, garages, shops, warehouses, loading platforms, sentry boxes, first-aid stations, latrines, canteens and other houses.

152. These are briefly summarized and described on page 70. Photographs of many of them are shown on Plates XXV, XXVI, XXVII and XXVIII.

BUILDINGSBuildings and Structures Acquired with the Site

153. The A-E-M established a Land Acquisition Section in the Auxiliary Features Department in February, 1942. This section numbered all of the buildings from E-1 to E-128 inclusive, adding sub-letters for barns and auxiliaries, acquired on the Project Site. Wood signs, painted white, with large red letters and numbers, were made and affixed to all buildings.

154. The following buildings and structures were on the site when it became Federal property:

<u>DWELLINGS</u>	<u>WELLS</u>	<u>HOG &amp; SHEEP HOUSES</u>
Houses . . . 121	Dug Wells . . 109	Hog or Pig Houses . 4
Cottage . . . 1	Drilled Wells 19	Hog Pens & Pigsties 7
Parsonage . . 1	Dug & Drilled 3	Sheep Pen . . . . . 1
123	131	12
<u>BARNs AND STABLES</u>	<u>POULTRY BUILDINGS</u>	<u>MISCELLANEOUS</u>
Barns & Stables 124	Henhouses . . . 121	Restaurants . . 2
Barn & Shed . . . 1	Henhouse & Barn 2	Playhouses . . 2
Stable & Shed . . 1	Henhouse & Shed 1	Summerhouse . . 1
Wagon Barn . . . 1	Poultry Houses . 2	R.R. Boxcars . 2
Wagon Sheds . . . 5	Brooder Houses . 11	Attached Cellar 1
Corn Barn . . . . 1	Brooder Coops . 3	Outside Cellar 1
Feed Storage Barn 1	Pigeon House . . 1	Foundation . . . 2
134	141	11
<u>GARAGES</u>	<u>SHEDS AND STORAGE BUILDINGS</u>	<u>SERVICE BUILDINGS</u>
Garages . . . 56	Sheds . . . . . 47	Outhouses . . . . 91
Garage & Barn 1	Lean-tos . . . . 3	Shops . . . . . 2
Garage & Shed 2	Wood Shed . . . . 9	Tool Houses . . . 3
Tractor Shed 1	Freight Car Shed 1	Tool Barn . . . . 1
60	Coal House . . . . 1	Tool Sheds . . . . 3
<u>PUBLIC BUILDINGS</u>	Fuel House . . . . 1	Spring Houses . . 2
Churches . . . 2	Log House . . . . 1	Pump Houses . . . 8
School House 1	Silos . . . . . 24	Milk & Pump House 1
3	Silo and Shed . . 1	Milk Houses . . . 15
	Granaries . . . . 2	Greenhouses . . . 3
	Corn Cribs . . . . 37	Smoke House . . . 1
	Storage Crib . . . 1	130
	Ice House . . . . 1	
	129	

Total Buildings and Structures - 874

155. Field measurements and sketches of floor plans were made of 128 buildings including 123 dwellings, 1 church, 2 restaurants and 2 sheds. Finished tracings and ozalid

Buildings and Structures Acquired with the Site

prints of the floor plans were made. Photographs from two different angles were made of the exterior of each house. A survey was made of the condition of each house and the data obtained assembled on mimeographed forms constituting, with the floor plans and photographs, an "Historical Record". A summary giving the findings as a result of this survey is shown on the next two pages.

DISPOSITION OF ALL CLASSES OF BUILDINGS

Left in Original State . . . . .	315
Demolished by A-E-M . . . . .	265
Cleaned by A-E-M . . . . .	85
Repairs or Improvements Made by A-E-M or Subcontractors	54
Used for Quarters for Officers or Civilians . . . . .	27
Used for Offices . . . . .	25
Used for Storage (In addition to Warehouses) . . . . .	13
Used for Shops (Carpenter, Blacksmith, Machine, Paint, etc)	9
Used for Dispensary . . . . .	1
Used for First Aid Stations . . . . .	2

DISPOSITION OF ALL CLASSES OF BUILDINGS

BY AUTHORITY OF ORDNANCE DEPARTMENT

Moved away from Site . . . . .	47
Moved within Site . . . . .	9
Sold . . . . .	48

156. Another building survey was made in August, 1942 and a fifty page tabulation compiled, which showed the building number, tract or parcel number, name of original owner, type of building, disposition or use of building, the nature of repairs and improvements, if made, and the date of inspection. This list was turned over to the Ordnance Department. See Map, page 21, to determine the location and designation of houses.

BUILDINGS

SUMMARY OF DWELLING HOUSE SURVEY

Total Houses - 123

Type of Construction - 117 Wood Frame, 4 Brick, 1 Brick & Wood, 1 Pebble & Stone

Basements - 85 Full, 31 Without, 1 Half, 4 Attached Cellars, 2 Outside Cellars

Number of Stories - 23 - 1 Story, 5-1½ Stories, 91 - 2 Stories, 1- 2½ Stories, 3-3 Stories

Number of Rooms

All Floors

6-1 Room	23-6 Rooms	4-11 Rooms
0-2 Rooms	28-7 Rooms	3-12 Rooms
7-3 Rooms	11-8 Rooms	1-13 Rooms
11-4 Rooms	8-9 Rooms	0-14 Rooms
10-5 Rooms	10-10 Rooms	1-15 Rooms

First Floors

Second Floors

6-1 Room	20-5 Rooms	9-1 Room	8-5 Rooms
5-2 Rooms	11-6 Rooms	20-2 Rooms	3-6 Rooms
27-3 Rooms	6-7 Rooms	32-3 Rooms	2-7 Rooms
47-4 Rooms	1-8 Rooms	23-4 Rooms	7 Attics

Roofs - 84 Wood Shingle, 27 Composition, 11 Tar Paper, 1 Asbestos Shingle

<u>Condition of Exterior</u>	Good	Fair	Poor	None
<u>Roofs</u> . . . . .	73	38	12	
<u>Wood Siding</u> . . . . .	84	22	11	
<u>Asbestos Shingles</u> . . . . .	2	1		
<u>Brick</u> . . . . .	2		1	
<u>Paint</u> . . . . .	56	26	27	14
<u>Porches</u> . . . . .	52	30	15	26
<u>Steps</u> . . . . .	52	29	19	23

Condition of Interior

<u>Plaster</u> . . . . .	69	30	12	
<u>Wall Board</u> . . . . .	2	3		

BUILDINGS

SUMMARY OF DWELLING HOUSE SURVEY (Cont.)

Condition of Interior-(Cont.)

	Good	Fair	Poor	None
<u>Unfinished</u> . . . 7 . . . . .				
<u>Woodwork</u> . . . . .	53	48	14 (8 Unfin.)	
<u>Floors</u> . . . . .	61	45	13 (4 Unfin.)	
<u>Wall Paper</u> . . . . .	42	37	29	
<u>Paint</u> . . . . .	3	1		11

Water Supply

<u>Type</u> 54 Hand Pumps
52 Electric Pumps
2 Bucket Wells
4 City Main
11 None

Condition-72 Good, 34 Fair, 6 Poor

Lighting

<u>Type</u> 111 Electric
12 Lamps
36 Wired for Electric Range

Condition-72 Good, 36 Fair, 3 Poor

Plumbing

<u>Kitchen Sink</u>
91 with sinks, 32 without
24 with Hot water, 99 without

<u>Bathrooms</u>
24 with stool, 25 with tub
20 with bowl, 2 with shower
22 with hot water, 101 without

Condition - 41 good, 8 fair

Heating

<u>Type</u> 63 Stoves
36 Hot Air
13 Hot Water
0 Steam
11 None
<u>Fuel</u> 105 Coal
6 Oil
1 Wood

Condition - 41 good, 8 fair

DWELLINGS SUITABLE FOR USE AS

<u>Residences</u> for Officers or Executives . . . . .	37
<u>Residences</u> for Workingmen . . . . .	84
<u>Field Offices</u> for Supervisor's . . . . .	87
<u>Field Offices</u> for Contractors . . . . .	79
<u>Demolition</u> . . . . .	8
<u>Suitable for Relocation</u> , by moving. . . . .	101 yes; 22 no.
<u>Located on Site of Proposed Building</u> , . . . . .	7 yes; 116 no.

POST NUMBER	UNIT NUMBER	NAME OF UNIT  BUILDINGS AND STRUCTURES FOR VARIOUS FACILITIES	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	INSIDE FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	INDEX TO PAGES LISTING DRAWINGS CONTRACTS SPECIFICATIONS
			ACID	POWER AND WATER SUPPLY	SEWERS	GENERAL FACILITIES	ADMINISTRATION	TWT	STORAGE					
		CHLORINATION STATION												
5644		Chlorination Station 10" Drinking Water Line		1					Reinf. Conc. Found, Fl, and Frame Insulated Superstructure	12' x 12' x 16' Entire Drinking Water System	132	2,132	145	
	617	SEWAGE TREATMENT PLANT											150-155	
5671		Sewage Disposal Pump Station				1			Reinf. Conc. Found, Fl, & Wls. to Grade Above Gr, Fr, Drop Siding, 1/2 Ply Roof	32' x 30' x 40' - 2 Stories below Grade & 1 above. (1 story add. 14' x 14' x 12')	2,885	38,064	150	
5672		Inhoff Tank				1			Reinf. Conc. Structure throughout All sides banked with earth Fill	62' x 57' x 28'	-	95,648	151	
5673		Sludge Bed (North)				1			Reinf. Conc. Structure throughout. Gravel & Sand Fill on Conc. Fl. Slab	81' x 33' x 5'	2,560	12,800	152	
5674		Sludge Bed (South)				1			Reinf. Conc. Structure throughout. Gravel & Sand Fill on Conc. Fl. Slab	81' x 33' x 5'	2,560	12,800	153	
5675		Venturi Vault				1			Reinf. Conc. Structure throughout. Conc. Closed Top Slab	25' x 14' x 10' Floor 9' - 6" below Grade	312	3,120	154	
5676		Chlorine Contact Tank				1			Reinf. Conc. Structure throughout. Wood Baffles, Open Top, Pipe Railing	22' x 14' x 11' Floor 9' - 0" below Grade	-	3,003	155	
	620	PROCESS WASTE DISPOSAL PLANT											146, 147, 156, 157	
5612		Acid Neutralization Building				1			Reinf. Conc. to Grade incl. all Fls. Fr. Exter. above Gr. Roof Wood & Comp	52' x 42' x 52' - 2 stories below grade & 2 above. (1 story ext. 34' x 12' x 26')	9,723	145,405	146	
5691		Red & Yellow Mix Tank & Pumping Station				1			Reinf. Conc. Constr. to Grade, Fr. above Drop Siding, Wood Roof, Comp. Roofing	Tk. 41' x 40' x 7'. Tk. House 34' x 12' x 32' Brick Lined. (Pump House 29' x 16' x 24')	912	11,158	156	
5613		Collection Tank				1			Reinf. Conc. Structure Open Top	11' x 9' x 7' 4' below & 3' above Grade	-	560	147	
5692		Outfall Head Chamber				1			Below Grade - Reinf. Conc. Struct. Above Grade House - Frame Structure	Below Grade - 29' x 17' x 18' House Above Grade - 14' x 6' x 8'	88	8,064 702	157	
	614	GUARD TOWERS											218	
No. 1, 2, 2A, 2B, & 3 to 26 incl.		Elevated Sentry House (Along Guard Fence)				28			Conc. Piers, Timber Stairs & Landing, Frame House, Platform & Bracing	7' x 7' x 7' House Elevated 24' above Grade, equipped with Search Light	49	343	218	

LAKE ONTARIO ORDNANCE WORKS  
 THE J. C. WHITE ENGINEERING CORPORATION  
 ARCHITECT • ENGINEER • MANAGER

COMPLETION REPORT  
 PART II - BUILDINGS AND STRUCTURES  
 BUILDINGS AND STRUCTURES FOR VARIOUS FACILITIES

SHEET 2 of 2

POST NUMBER	UNIT NUMBER	NAME OF UNIT	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	INSIDE FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	INDEX TO PAGES LISTING DRAWINGS CONTRACTS SPECIFICATIONS
			ACID	POWER AND WATER SUPPLY	SEWERS	GENERAL FACILITIES	ADMINISTRATION	TWT	STORAGE					
	404	INTAKE WORKS												142-144
5441		River Pumping Station				1				Reinf. Conc. to Grade, Brick above, Wood Trusses, Gypsum Plank, Shingles	91' x 31' x 58' below Grade	3,200	105,300	142
5442		River Gate and Valve House				1				Reinf. Conc. to Grade, Brick above, Wood Roof Rafters & Plank, Shingles	26' x 20' x 12' below Grade	2,464	59,136	143
5443		River Intake Well				1				Reinf. Conc. Structure	25' x 19' x 11' above Grade	404	4,848	144
										Entire Structure below Grade	21' x 21' x 21' base Section	-	13,071	
	413	WATER STORAGE (GROUND)												132, 148
5421		Cooling Water Reservoir				1				Reinf. Conc. Found, Fls, Walls and Interior Supports, Frame Superstr.	204' x 178' x 20' Reservoir	-	726,240	132
5421		Fire Protection Reservoir				1				Reinf. Conc. Found, Fls, Walls and Interior Supports, Frame Superstr.	204' x 178' Superstr. 4' to 12' high	-	290,496	148
											88' x 57' x 18' Reservoir	-	90,288	
											88' x 57' Superstr. 4' to 12' high	-	40,128	
	414	WATER STORAGE (ELEVATED)												122, 126, 133, 149
5421		Cooling Water Concrete Tower	1							Reinf. Conc. Circular Found. and Tank Structure 150' high	Structure 40' diam. x 150' high, Tank Within 39' diam. x 12' for 275,000 Gal.	-	36,716	122
5422		Drinking Water Tank		1						Reinf. Conc. Pier Found, Steel Tower Steel Luggage Beams, Wood Tank	75,000 Gallons, Tower Support 124' Tank 24' diam. x 24' high	-	10,013	133
5422		Fire Protection Water Tank	1							Reinf. Conc. Pier Found. 108' Steel Tower Support. Welded Steel Tank.	100,000 Gallons, Tower Support 108' Tank 24' diam. x 24' high.	-	13,352	149
										Reinf. Conc. Pier Found, 80' Steel Tower Support. Wood Tank	10,000 Gallons, Tower Support 80' Tank 14' diam. x 16' high.	-	1,335	126
	405	WATER TREATMENT PLANT												131, 134-140
5419		Pumping Station				1				Reinf. Conc. Found. & Fls. to Grade Conc. Block Walls & Fr. Inter. above	69' x 67' x 11' below Grade Superstr. 69' x 49' x 11' and 28' x 18' x 15'	6,808	101,084	131
5421		Surge Tank and Chamber				1				Reinf. Conc. Tank, Frame Pent House	18' diam. x 38' high Tank Tower Pent House 18' diam. x 8' high	-	11,705	134
5422		Accelerator (North)				1				Reinf. Conc. Found, Fls. and Walls, Wood Roof Framing and Passageways	62' diam. x 20' high	-	14,137	135
5423		Accelerator (West)				1				Reinf. Conc. Found, Fls. and Walls, Wood Roof Framing and Passageways	62' diam. x 20' high	-	14,137	136
5424		Accelerator (South)				1				Reinf. Conc. Found, Fls. and Walls, Wood Roof Framing and Passageways	62' diam. x 20' high	-	14,137	137
5425		Filter Building				1				Reinf. Conc. Found, Fls. & Walls also Conc. Block Walls	78' x 65' x 35' Main Bldg. Unloading Rooms - 34' x 11' x 25'	5,174	160,504	138
5426		Chemical Storage Building				1				Reinf. Conc. Struct. 33' high, Conc. Block & Fireproof Wood above for 26'	78' x 17' x 33' Conc. Section, Block and Fr. 48' x 17', 30' x 17' x 18', 14' x 14' x 8', 51' x 40' x 19'	1,024	51,204	139
5427		Recarbonation Basin				1				Reinf. Conc. Found, Fl. and Walls. Open Top. Pipe Railing	Fl. 7'-0" below Normal Grade	-	35,378	140
5428	512	Slurry Pool				1				Earth Dike enclosed area with Ditch along perimeter of Pool	Ditch Invert 10' wide and 4' below Grade, Dike enclosed area 2.75 Acres	-	-	141

LAKE ONTARIO URBAN WORKS  
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COMPLETION REPORT  
PART II - BUILDINGS AND STRUCTURES  
BUILDINGS AND STRUCTURES  
FOR VARIOUS FACILITIES

SHEET 1 of 2

POST NUMBER	UNIT NUMBER	NAME OF UNIT	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	OTHER TO BE DRAWN IN CONNECTION WITH THIS REPORT																									
			ACID	POWER AND WATER SUPPLY	SHOPS	GENERAL FACILITIES	ADMINISTRATION	TIFF	STORAGE						TOTAL																								
<b>MANUFACTURING BUILDINGS &amp; STRUCTURES</b>																																							
8011-8012-8013 8014-8015-8016	801	Mono Nitrating House						6	6	Conc. Found. & Fl, Steel & Frame Struct, Drop Siding, Shingle Roof.	21' x 21' x 50'	841	15,877	178 thru 180																									
8021-8022-8023 8024-8025-8026	802	Bi and Tri Nitrating House						6	6	Conc. Footings, Elevated Steel and Frame Struct, Drop Siding, Shingle Roof	Open First Story 36' x 19' x 12' Closed Elev. Struct. 37' x 20' x 21'	684	12,996	181 thru 183																									
8031-8032-8033 8034-8035-8036	803	Fortifying House						6	6	Conc. Found. & Fl, Steel & Frame Struct, Drop Siding, Shingle Roof	Main Bldg. 20' x 15' x 18' Lean-To 15' x 8' x 15'	648	6,734	184 & 195																									
8041-8043-8045	804	Toluene (Working) Storage						3	3	Reinf. Conc. Found. Steel Welded Tank	10' diam. x 20' 11,216 Gallons	-	1,591	186																									
8046-8047-8048	804	Toluene (Bulk) Storage						3	3	Ballast Stone, Sand and Stone Dust Found. Steel Welded Tank.	36' diam. x 35' 4" 270,000 Gallons.	-	3,605	187																									
8061-8062-8063 8064-8065-8066	806	Wash House						6	6	Conc. Found. & Fl, Steel & Frame Struct, Drop Siding, Shingle Roof	21' x 25' x 28' - 3 Stories 21' x 25' x 18' to 28' - 2 Stories	3,005	30,630	188 thru 190																									
	807	Covered Conveyor Lines						6	6	Conc. Pier Footings, Steel & Frame Structure, Galv. Iron Housing.	Approximately 460' long	-	-	188 thru 190																									
8082-8084-8086	808	Nailing House						3	3	Conc. Pier Footings, Frame Struct, Drop Siding, Asbestos Shingle Roof	20' x 18' x 10'	298	4,023	191																									
8121-8122-8123 8124-8125-8126	812	Acid and Fume Recovery Bldg.						6	6	Conc. Found. & Cinder Fl, Steel Struct, Corr. Asbestos Siding and Roof.	41' x 13' x 47' to 54' - Five Stories 41' x 22' x 31' to 42' - Three Stories	8,141	55,586	192 thru 194																									
8141	814	Box Factory and Shook Storage						1	1	Conc. Found. & Fl, Frame, "B" Roof, Corr. Steel Siding, Brick Fire Walls.	Box Fact. 120' x 45' x 16' & 120' x 25' x 12' Shook Storage 121' x 106' x 13'	20,622	369,434	195																									
	817	O. V. Storage Tank						6	6	Conc. Found. and Piers, Steel Grillage, Riveted Steel Tank.	24' diam. x 20'	-	9,048	207																									
	818	Wash House Barricade						6	6	Conc. Found, Timber Struct, Steel Rods, Earth Filled Type D Roof	Base 15' wide, Top 5' wide, 30' high, 46' long	-	-	208																									
4011	401	Boiler House		1					1	Conc. Found. & Fl, Steel Structure, Corr. Steel Siding and Roof.	Main Sect. 136' x 82' x 16' one Story Sects. 112' x 30' and 136' x 30' Average Ht. 24'	21,948	892,288	126 thru 129																									
8451	415	Main Air Compressor House						1	1	Conc. Found. & Fl, Conc. Block Walls, Wood Truss, Gyp. Plank, Asbestos Shingles.	96' x 41' x 12'	3,742	56,130	200																									
8581-8583-8585	508	Start-up Mixed Acid Storage Tank						3	3	Conc. Found. and Pier Saddles, Welded Steel Tank	6' diam. x 20' 4,400 Gallons	-	565	201																									
	601	Coal Trestle		1					1	Conc. Footings, Timber Structure, 25 Bents. Guard Rails	Single Track, 12' High, 16' Wide, 267' Long			229																									
<b>STORAGE BUILDINGS</b>																																							
East to West "A" St. 9001 to 9058	811	Igloo							58	58	Reinf. Conc. Constr. Throughout. Protective Earth Blanket.	13'-5" Radius Arch Roof, 26'-6" Wide 60'-8" Long. 1600 Sq. Ft. Fl. Space	1,628	17,134	209																								
			<table border="1"> <tr> <td>TOTAL BUILDINGS</td> <td>18</td> <td>6</td> <td>16</td> <td>44</td> <td>15</td> <td>57</td> <td>64</td> <td>220</td> </tr> <tr> <td>TOTAL STRUCTURES</td> <td>146</td> <td>3</td> <td>1</td> <td>18</td> <td>1</td> <td>105</td> <td>9</td> <td>283</td> </tr> <tr> <td>TOTAL BUILDINGS AND STRUCTURES</td> <td>164</td> <td>9</td> <td>17</td> <td>62</td> <td>16</td> <td>162</td> <td>73</td> <td>503</td> </tr> </table>							TOTAL BUILDINGS	18	6	16	44	15	57	64	220	TOTAL STRUCTURES	146	3	1	18	1	105	9	283	TOTAL BUILDINGS AND STRUCTURES	164	9	17	62	16	162	73	503	<p style="text-align: center;">LAKE ONTARIO ORDNANCE WORKS THE J. G. WHITE ENGINEERING CORPORATION PROJECT ENGINEER - MANAGER</p> <p style="text-align: center;"><b>COMPLETION REPORT</b> <b>PART II - BUILDINGS AND STRUCTURES</b> MANUFACTURING BUILDINGS AND STRUCTURES SHEET 3 of 3</p>		
TOTAL BUILDINGS	18	6	16	44	15	57	64	220																															
TOTAL STRUCTURES	146	3	1	18	1	105	9	283																															
TOTAL BUILDINGS AND STRUCTURES	164	9	17	62	16	162	73	503																															



POST NUMBER	UNIT NUMBER	NAME OF UNIT  MANUFACTURING BUILDINGS & STRUCTURES	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	INSIDE FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	INDEX TO PAGES LISTING DRAWINGS CONTRACTS SPECIFICATIONS
			ACID	POWER AND WATER SUPPLY	SHOPS	GENERAL FACILITIES	ADMINISTRATION	TWT	STORAGE					
3011	301	Low Pressure Anhydrous Ammonia Storage												87
3011	301	Compressor House	1						Conc. Found, Cinder Fl, Frame, Barn Bd. Siding, Type B Roof	22' x 18' x 10'	346	3,633	87	
3011	301-5	Hemisphere Storage Tank	1						Welded Steel Tank, Conc. Found. Steel Frame Support	38' diam. Spherical 5000 Barrels	-	12,033	87	
3012	301	High Pressure Anhydrous Ammonia Storage												88
3012	301	Compressor House	1						Conc. Found, Cinder Fl, Frame, Barn Bd. Siding, Type B Roof	21' x 14' x 10'	260	2,730	88	
3012	301-2	Ammonia Storage Tanks	12						Welded Steel Tanks, Insulated, Reinf. Conc. Saddle Bridge	8' diam. x 39' Horizontal 14,000 Gallons Each	-	1,869	88	
3021	302	Ammonia Oxidation Plant							Reinf. Conc. Found, Steel Frame, Corr. Asbestos Siding and High Roof, Low Roof Type A Roof	96' x 84' x 17' - One Story 112' x 13' x 59' - Four Stories	16,063	215,379	89 thru 94	
3021	302	Converter, Absorption & Compressor House	1						Conc. Found. & Fl, Frame, Barn Bd. Siding, Type B Roof	30' x 21' x 12'	532	5,586	95	
3022	302	Pump House and Office	1						High Chrome Iron, Conc. Found. and Slab, Steel Frame	36' x 12' x 18'	-	-	89 thru 94	
3021	302-16	Cooler Condensers	4						Stainless Steel, Reinf. Conc. Found. & Wall, Steel Grillage	10' diam. x 14'	-	1,100	96	
3023	302-24	62% N.A. Storage Tanks	8						Steel Tank Welded, Reinf. Conc., Found. & Wall, Wood Grillage	14' diam. x 12'	-	1,847	96	
3023	302-22	62% N.A. Condensate Tank	1											97 thru 100
3031	303	Nitric Acid Concentrator Plant							Conc. Found. & Fls, Steel Frame, Corr. Asbestos Siding & Roof	84' x 27' x 43' - 5 Story Bldg. 100' x 6' x 18' - Lean to Bldg.	10,146	146,412	97 thru 100	
3031	303	N.A. Concentrating House & Office	1						Stainless Steel Tanks, Conc. Found. and Wall, Steel Grillage	8' diam. x 6'	-	302	97 thru 100	
	303-12	55% N. A. Storage Tanks	2						Welded Steel Tank, Lead and Brick Lining, Conc. Pad Found.	19' diam. x 6'	-	1,701	97 thru 100	
	303-25	Residual Acid Cooling Tanks	2						Riv. Steel Tank, Reinf. Conc. Found. and Elev. Structure, Wood Grillage	24' diam. x 20'	-	9,048	101	
3032	303-27	N. A. Conc. Residual S. A. Storage Tanks	6											102 thru 110
	305	Acid Area Tank Farm												
3051	305-2	Concentrating Mix Circulator Tanks on Scales	6						Welded Steel Tank, Conc. Found, Steel Bridge Saddle Support.	8' diam. x 20' Horizontal	-	1,005	102	
3051	305-4	Concentrating Mix Circulator Coolers	6						Conc. Found. and Slab, Wood Frame Structure	32' x 8' x 13' 4" Acid Cooler	-	-	102	
3051	305-2	55 Ton Tank Scale Houses	3						Conc. Found, Cinder Fl, Frame, Barn Bd. Siding, Type A Roof	15' x 9' x 8'	138	1,102	102	
3053	305-5	Concentrating Mix Acid Storage Tanks	6						Riv. Steel Tank, Reinf. Conc. Found. & Elev. Structure, Wood Grillage	24' diam. x 20'	-	9,048	104	
3054	305-7	Strong Nitric Acid Storage Tanks	1						High Chrome Iron Tank, Conc. Found. and Bridge Saddle Support	8' diam. x 20' Horizontal	-	1,005	105	
3054	305-8	Strong Nitric Acid Batch Tanks	2						High Chrome Iron Tank, Conc. Found. and Bridge Saddle Support	8' diam. x 20' Horizontal	-	1,005	105	
3054	305-10	Strong Mixed Acid Circulating Tank on Scales	2						Welded Steel Tank, Conc. Found, Steel Bridge Saddle Support	8' diam. x 20' Horizontal	-	1,005	105	
3054	305-12	Strong Nitric Acid Coolers	2						Conc. Found. and Fl. Slab, Wood Frame Structure	32' x 8' x 13' 4" Acid Cooler	-	-	105	

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COMPLETION REPORT  
PART II- BUILDINGS AND STRUCTURES  
MANUFACTURING BUILDINGS AND STRUCTURES

SHEET 1 of 3

POST NUMBER	UNIT NUMBER	NAME OF UNIT AUXILIARY BUILDINGS	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	INSIDE FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	INDEX TO PAGES LISTING DRAWINGS CONTRACTS SPECIFICATIONS	
			ACID	POWER AND WATER SUPPLY	SEWERS	GENERAL FACILITIES	ADMINISTRATION	TWT	STORAGE						TOTAL
7181	718	Locomotive House			1					1	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type B Roof	(106'x31'x21') 4 Small or 2 Large Locomotives	3,372	76,393	170
719	719	Medical Service Bldg. (Hospital)						1		1	Conc. Fts, Block Found. & Piers Frame, Shingle Roof & Siding	79'x40' & 144'x40'x10' (2 Doctors) 10 to 30 Beds, 5 to 15 Nurses	8,639	120,946	81
720	720	Guard Headquarters		1						1	Conc. Piers, Conc. Block Found, Frame, Asbestos Siding, D Roof	88'x41'x10' and 84'x41'x10' 2 Cells, 294 Lockers for 275 Guards	6,795	95,130	82
8214	721	Inspector's Laboratory							1	1	Conc. Found. & Fl, Frame, Drop Siding, Type B Roof	34' x 20' x 10'	627	6,584	197
8212	721	Inspector's Office							1	1	Conc. Found. & Fl, Frame, Drop Siding, Type D Roof	40' x 31' x 10'	1,170	16,380	196
7222	722	Millwright Shop			1					1	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type D Roof	60' x 40' x 12'	2,419	38,704	172
9221-9222	722	Chocking Lumber Shed								2	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type A Roof	31' x 19' x 11'	589	7,068	212
7221	722	Riggers Shop			1					1	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type A Roof	40' x 20' x 10'	741	7,410	171
3221 8222-8224-8226	722	Area Shops	1						3	4	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type A Roof	40' x 20' x 10'	741	7,410	121 & 198
7231	723	Laundry Bldg.			1					1	Conc. Found. & Fl, Frame, Barn Bd. Siding, Type A Roof	40' x 20' x 10' 61' x 21' x 12' 65 lbs. Dry Weight Per Load	1,195	15,236	173
7241-9241	724	Gasoline Station			1					1	Steel Welded Conc. Saddle Anchorage	1000 Gal. Storage Area (4'x10') 12000 Gal. Shop Area (9'x24')	-	1 - 134 1 - 1,608	174 & 213
7251	725	Parking Garage (Busses)			1					1	Conc. Piers, Earth Fl, Frame Corr. Steel Siding, Type A Roof	30 Trucks 124'x92'x14'	11,547	158,258	175
7261	726	Acetylene Storage Bldg.			1					1	Conc. Found, Cinder Fl, Frame Barn Bd. Siding, Type A Roof	33' x 21' x 8' Live and Dead Storage	666	5,328	176
7261	726	Acetylene (Working) Storage Bldg.			2					2	Conc. Found, Cinder Fl, Frame Barn Bd. Siding, Type A Roof	16'x8'x8' Working Storage Hydrogen - Oxygen	115	920	176
8272-8274-8276	727	Comfort Station							3	3	Wood Sills, Frame Structure Barn Bd. Siding, Type B Roof	2 Stalls 7'x6'x7' Badger Chem-O-Let Bowl	36	252	199
728	728	Garage for Staff & Ordnance						1		1	Conc. Found, Cinder Fl, Frame, Barn Bd. Siding, Type B Roof	20 Automobiles 80' x 32' x 9'	2,473	29,676	83
730	730	Garage for Guard Headquarters		1						1	Conc. Found, Cinder Fl, Frame, Drop Siding, Type D Roof	6 Cars 64' x 23' x 8'	1,418	19,852	84
6331-9331	733	Service House (Coat Room)				1				1	Conc. Found. & Floor, Frame, Drop Siding, Type B Roof	36'x16'x10' (2 Coat Rooms)	561	6,171	161 & 214
7331	733	Meeting House			1					1	Conc. Found. & Floor, Frame, Drop Siding, Type D Roof	32' x 30' x 10' Meeting Room for 50 Persons	899	12,586	177
751 - North 752 - South	735	Dormitories						2		2	Conc. Block Piers, Frame, Drop Siding, Asphalt Shingle Roof	2 Stories 153'x30' (57 Beds) 129'x8' One Side Double Deck Porch	10,745	104,884	85 & 86
6111	736	Garbage and Rubbish Incinerator				1				1	Brick, Conc. and Cast Iron (Conc. Fl. & Frame House)	House - 21'x15' Incin. 17'x11' Overhead Charge - 2 Ton	Bldg. 300 Burner 205	3,000 1,748	160
6012-6011	601	Scale House and Track Scales	1			1				2	Conc. Found, Frame Bldg. Barn Bd. Siding, Type B Roof	14'x14'x8' House 67'x10'x6' Reinf. Conc. Scale Pit	163	1,517	159 & 158
9211-9212-9213 9214-9215-9216	821	Loading Docks Transfer Platform								6	Bolted Timber Structure Treated Wood Plank Fl.	18' x 12' x 4'	216	-	210
9217-9218		Barricades for Transfer Platform								2	Conc. Found, Wood & Steel Rod Structure, Earth Filled	254' x 10' x 16' Barricade for 3 Platforms	-	-	211
3841 8841	804	Foamite House (Mixing Station)	1						1	2	Conc. Block Found. & Walls, Conc. Fl. & Roof Slab. Comp. Roof	(12'x12'x8') Foamite Mixer & Storage	114	988	125 & 206
	605	Gate House (Campbell St. Entrance)						1		1	Conc. Found, Wood Fl, Frame Structure, Rolled Roof	13' x 6'-6" x 7'	78	546	212

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AUXILIARY BUILDINGS

SHEET 2 of 2

POST NUMBER	UNIT NUMBER	NAME OF UNIT	LOCATION AREA AND NUMBER OF UNITS							TYPE OF CONSTRUCTION	CAPACITY AND SIZE OF UNIT	INSIDE FLOOR AREA SQUARE FEET	CUBICAL SPACE CUBIC FEET	INDEX TO PAGES LISTING DRAWINGS CONTRACTS SPECIFICATIONS		
			ACTS	POWER AND WATER SUPPLY	SEWER	GENERAL FACILITIES	ADMINISTRATION	YRT	STORAGE						TOTAL	
701	701	Gate House & Clock Alleys								1	1	Conc. Found. & Fl. Frame Drop Siding, Type A Roof	48' x 33' x 10' 3 Gates	1,360	17,160	73
701	701	Examination Bldg.								1	1	Conc. Found. & Fl. Frame Drop Siding, Type A Roof	96' x 20' x 10' 6 Units	1,824	20,064	73
702	702	Telephone Bldg.								1	1	Conc. Found. & Fl. Brick Walls Conc. Roof, Type A Roof, Insul.	800 Automatic Telephones 48' x 21' x 10' high	995	10,840	74
703	703	Administration (Office) Bldg.								1	1	Conc. Block Found. Wood Frame Asb. Shingle Siding, Type "DD" Roof	2 Stories - 2 Bldgs. - 299' x 40' 400 Office Workers	39,954	478,164	75
	703	(Administration Bldg.) Fireproof Vault								1	1	Conc. Found. Floor & Roof Brick Walls, Type C Roof	28' x 16' x 9'	405	3,645	75
7041	704	Supervisor's Office (Shop Area)			1						1	Conc. Found. & Fl. Frame, Drop Siding, Type D Roof	63' x 32' x 10' 16 Office Workers	2,000	26,000	163
8742-8744-8746	704	Supervisor's Office (T.N.T. Area)									3	Conc. Found. & Fl. Frame, Drop Siding, Type D Roof	40' x 31' x 10' 6 Office Workers	1,187	16,622	202 & 215
9741	704	Supervisor's Office (Mag. Area)									1	Conc. Found. & Fl. Frame, Drop Siding, Type D Roof	35' x 15' x 10'	684	7,476	162
6741	704	Supervisor's Office (Yardmaster)				1					1	Conc. Found. & Fl. Frame, Drop Siding, Type D Roof	220' x 40' x 10' 44 Office Workers	8,821	122,374	76
705	705	Employment Office								1	1	Cinder Block Found. & Piers Frame, Shingle Roof & Siding	60' x 33' x 10' - one story 72' x 39' - two stories	7,927	103,213	123
3761	706	Laboratory and Supervisor's Office	1								1	Conc. Found. Wood Frame, Drop Siding, Type D Roof	51' x 20' x 10'	969	10,175	203
8762-8764-8766	706	Laboratories								3	3	Conc. Found. & Fl. Frame, Drop Siding, Type B Roof	28' x 16' x 11' 28 Lockers	466	4,950	77
707	707	Change House (Adm. Area)								1	1	Conc. Found. & Fl. Frame, Drop Siding, Type A Roof	48' x 39' x 11' 200 Lockers	2,173	22,971	124
3771	707	Change House	1								1	Conc. Found. & Fl. Frame, Drop Siding, Type A Roof	28' x 19' x 11' 50 Lockers	616	6,413	130
4771	707	Change House		1							1	Conc. Found. & Fl. Frame, Drop Siding, Type A Roof	35' x 29' x 11' 108 Lockers	5 - 1,066 1 - 1,078	11,370 11,462	164 & 216
7071-7072-7073 7074-7075-9771	707	Change House (Shop Area)				5					1	Conc. Found. & Fl. Frame, Drop Siding, Type A Roof	81' x 30' x 11' 220 Lockers	2,507	27,088	204
8772-8774-8776	707	Change House								3	3	Conc. Found. & Fl. Frame, Drop Siding, Type A Roof	(105' x 24' x 10') 300 Seating	9,384	110,197	78
708	708	Cafeteria Building								1	1	Conc. Piers & Block Found. Frame, Conc. & Wood Fls, Shingle Siding, B&D Roof	(25' x 10' x 8') (49' x 45' x 14') House 2 Trucks	2,255	31,405	79
709	709	Main Fire Headquarters Bldg.		1							1	Conc. Found. & Fl. Frame Asbestos shingles, Built-up Roof	52' x 50' x 11' - 24' x 20' x 8'	3,077	39,240	205
8791	709-B	Auxiliary Fire House									1	Conc. Found. & Fl. Frame Asbestos Shingle, Type D Roof	12' x 7' x 7' Flag Pole 100' above Grade for 12' x 20' Flag	72	502	217
	709-C	Hose Reel Shed	2		1	1	2	3	1	10	10	Conc. Fl. Frame, Drop Siding Reinf. Conc. Base Tube Steel Pole Welded	141' x 73' x 13'	-	-	80
712	712	Flags and Flag Pole								1	1	Conc. Found. & Fl. Frame, Barn Bd. Siding, Type B Roof	90' x 44' x 14'	10,340	175,780	165
7131	713	General Storehouse			1						1	Conc. Found. Cinder Fl. Frame, Barn Bd. Siding, Type D Roof	(41' x 13' x 9') Interior Cinder Block Fire Wall	3,955	94,920	166
7141	714	Material Shed			1						1	Conc. Found. & Fl. Frame, Corr. Steel Siding & Roof	4,093	73,674	168	
7151	715	Oil and Paint Storage			1						1	Conc. Found. & Fl. Frame, Corr. Steel Siding & Roof	400' x 75' x 14'	31,679	665,259	169
7161	716	Garage and Repair Shop			1						1	Conc. Found. & Fl. Frame, Barn Bd. Siding, Type A Roof				
7171	717	Combined Shops			1						1					

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**COMPLETION REPORT**  
**PART II - BUILDINGS AND STRUCTURES**  
AUXILIARY BUILDINGS

SHEET 1 of 2

TEMPORARY BUILDINGS

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FIELD OFFICES

1 - A-E-M #1 - Area Engineer's Office - 2 story	31' x 111'
1 - A-E-M #2 - J.G. White Corpn. Admin. & Engineering - 2 story	31' x 111'
1 - A-E-M #3 - J.G. White Corpn. Gen'l, Purch., & Acctg. - 2 story	31' x 111'
1 - A-E-M #4 - J.G. White Corpn. Construction - 2 story	31' x 111'
1 - Baker-Smith	24' x 60'
1 - Stebbins	15' x 20'
27 - Portable	20' x 24'
37 - Portable	16' x 20'
3 - Receiving	20' x 50'

WAREHOUSES

1 - Warehouse #1	60' x 150'
1 - Warehouse #2	60' x 150'
1 - Warehouse #3	60' x 150'
1 - Warehouse #4 (A-100)	16' x 50'
1 - Warehouse #5 (A-101)	16' x 50'
1 - Warehouse #6 (Baker-Smith)	60' x 150'
1 - Warehouse (Lord Electric) Electrical	29' x 120'
1 - Warehouse (Chemical Construction)	40' x 60'
1 - Cement House	20' x 33'

SHOPS

1 - Carpenter Shop Mill	29' x 55'
1 - Carpenter Shop Extension	12' x 12' - 6"
1 - Paint	29' x 83'
1 - Welding, Blacksmith & Fabricating	58' x 100'
1 - Lead Burner	30' x 60'
1 - Pipe (Baker-Smith)	60' x 150'
1 - Welding (Baker-Smith)	40' x 100'
1 - Machine (Baker-Smith)	60' x 150'
1 - Ornamental Iron	58' x 101'
1 - Heavy Equipment	60' x 100'
1 - Truck Repair	30' x 160'

SHEDS

21 - Tool Sheds	12' x 16'
27 - Sheds	10' x 12'
12 - Guard Sheds	6' x 6'
1 - Oil Storage	24' x 36'

TEMPORARY BUILDINGS

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SHEDS (Continued)

1 - Boiler Shed	12' x 28'
1 - Boiler Shed	14' x 19'
1 - Bricklayer's Shed (Stebbins)	18' x 46'

LOADING PLATFORMS

2 - Pipe Storage (Baker-Smith)	50' x 204'
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SERVICE BUILDINGS (Not otherwise listed)

1 - Cafeteria made of 5 buildings, each	20' x 24'
3 - Canteens, each	20' x 24'
40 - Field Toilets	4' x 6'
1 - Pump House	10' x 12'
1 - Small Car Garage and Tire Shed	50' x 100'
1 - Reproduction House and Brick Vault	48' x 31'

MISCELLANEOUS STRUCTURES

2 - Water Tower Supports	
110- Tool Boxes	3' x 4' x 6' long
1 - Corridor to Receiving Offices	15' x 20'
1 - Corridor bet. A-E-M #2 and A-E-M #3	144'-0" x 6'-6"
1 - Corridor joining above to A-E-M #1	42'-0" x 6'-6"

FACILITIES PROVIDED BY RENOVATIONS OR ADDITIONS  
TO EXISTING BUILDINGS

Initial A-E-M and Area Engineers' Offices - Tugwell Wiseman  
Canning Plant

Initial Ordnance Department Offices - E-11, E-40

Initial Chemical Construction Corporation Offices - E-20, E-21

Initial du Pont Offices - E-1, E-5

Interim Area Engineers Engineering and Safety Office - E-25

Interim A-E-M Engineering Offices - E-10, E-16, E-18, E-19

Interim A-E-M Construction, Cost Control, and Transportation  
Offices - E-13

A-E-M Central Receiving Office - House and Barn - E-15

Interim A-E-M Auxiliary Features and Safety Office - E-28

A-E-M Transportation and Fuel Dispensing Center - Steel Barn -  
E-13

Initial A-E-M Maintenance and Shops Center - Barns - E-38

A-E-M Field Construction Office, Magazine Area - E-85

A-E-M Field Construction Office, T.N.T. Area - E-66

A-E-M Field Construction Office, Acid Area - E-62

A-E-M Field Construction Office, Railroad - E-44

A-E-M Interim Time Offices, - E-64, E-83

Interim Storage, A-E-M Houses or Barns - E-2, E-3, E-51,  
E-53, E-84, E-89, E-91

TEMPORARY BUILDINGS

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FACILITIES PROVIDED BY RENOVATIONS OR ADDITIONS

TO EXISTING BUILDINGS

(Continued)

Interim Storage - du Pont - House E-4, Barns E-41, E-48, E-51,  
E-63, E-66, E-70

A-E-M Infirmary and First-Aid Station E1 - E-40

A-E-M First-Aid Station E2 - E-65

A-E-M First-Aid Station #3 - E-85

Assigned as Field Offices to other Contractors than A-E-M -  
E-37, E-43, E-47, E-48, E-86, E-96, E-100

































## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 6

BUILDING, STRUCTURE OR UTILITY AMMONIA OXIDATION PLANT Specifications: 1,26,58,96,119,120,128.  
 UNIT NO. 302 POST NO. 3021 Contracts: PC 1,26,58,96,119,120,128. SC: 20,25,41,52,59. AREA ACID

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plot Plans, Plans, Steam	W58754	4/17/42	5/18/42
Plot Plans, Elev. Steam	W58755	4/17/42	6/18/42
Plot Plans, Plans, Water	W58752	4/17/42	5/18/42
Plot Plans, Elev. Water	W58753	4/17/42	5/18/42
Plot Plans, Plans, Air & Process	W58750	4/17/42	9/9/42
Plot Plans, Elev. Air & Process	W58751	4/15/42	5/18/42
Conv. & Absorp. Ho. Plans	W58034	4/18/42	9/9/42
Conv. & Absorp. Ho. Sects. Sh. #1	W58036	2/6/42	5/24/42
Conv. & Absorp. Ho. Sects. Sh. #2	W58037	4/18/42	11/19/42
Diag. Piping Arrgt. A.O.P.	W57328	3/24/42	9/8/42
Diag. Piping Arrgt. Ammo.	W58894	5/23/42	6/30/42
Ammo. Valves & Fittings	D56600	3/27/42	5/26/42
H.C.I. Valves & Fittings	D56511	4/6/42	8/3/42
Air Comp. Ho. Plans	W58038	3/17/42	8/10/42
Air Comp. Ho. Sects. Sh. #1	W58039	3/17/42	8/10/42
Air Comp. Ho. Sects. Sh. #2	W58040	3/18/42	8/10/42
64" Absorp. Column (Type "A").	W32813	3/26/42	
Brace	D25673	3/26/42	
Bubbler Plates	D32605	3/12/42	
Bubbler Cap. Sleeve & Studs	D32606X1	3/12/42	
Overflow Pipe & Cup	D32607	3/12/42	
Bubbler Plate Leg & Nut	D32608X2	3/12/42	
Column Support	D32778	4/7/42	
Cooling Coils	D35556	3/12/42	
Tray Supporting Ring Etc.	D38000	3/12/42	
Head Upper Intern - Lower Shell	D38018	3/21/42	
Water Return Manifold	D48696		
Welding Neck	D49435		
Welding Neck	D38146		
Ring Gasket	D32763		

## LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 6

BUILDING, STRUCTURE OR UTILITY AMMONIA OXIDATION PLANT (CONTD.) Specifications: 1,26,58,96,119,120,128.  
 UNIT NO. 302 POST NO. 3021 AREA ACID  
 Contracts: FC 1,26,58,96,119,120,128. SC: 20,25,41,52,59.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Pump House Arrgt.	W58758	3/30/42	8/27/42
Mist Catcher Arrgt.	W59345	4/21/42	4/23/42
Air Heater & Heat Exch. Arrgt.	W43695	3/14/42	
Air Heater & Arrgt.	W43510	4/11/42	
Shell	D32723X1		
Tube Sheet & Baffle	D32724X3		
Bleaching Column Arrgt. Type "B"	W32793	2/25/42	9/23/42
Air Inlet Pipe & Grillage	D30968X1	7/25/42	9/23/42
Column Support Arrgt.	W37935		
Spring Guide & Etc.	D42304	2/25/42	
Cooler Cond. Arrgt.	W57591	4/11/42	
Water Manifold	D56265		
8" Return Bend	D56212	4/11/42	
Steel Support	D56300	2/25/42	4/17/42
Water Distributor	D56266		
Coil	D56211	4/11/42	
Acid Separator	D56297	2/25/42	
Condensate Water Cooler	D53997	3/31/42	
Cooler Condenser Support - Steel Framing	D56374	4/11/42	
Orifice Plate for Acid Separator	D56759	4/7/42	
Condensate Tank	D56877	4/17/42	
Converter Arrgt. Short-Body	W40312	4/16/42	
Screen, Gauze & Etc.	D32633	4/15/42	
Stud Bolts	D32759	4/16/42	
Heating Element	D32850	4/16/42	
Thermocouple Well	D53885	4/16/42	
Elbow	D45752	4/16/42	
Body - Short Type	D51915	4/16/42	
Water Jacketed Cover	D47844	4/16/42	
Water Jacketed Cover	D48268X1	4/16/42	
Converter Insert Ring	D56436	4/16/42	

## LIST OF MAPS AND DRAWINGS

Sheet No. 3 of 6

BUILDING, STRUCTURE OR UTILITY UNIT NO. 302 POST NO. 3021	AMMONIA OXIDATION PLANT (CONTE.)	Specifications: 1,26,58,96,119,120,128.		
		AREA ACID		
		Contracts: PC 1,26,58,96,119,120,128. SC: 20,25,41,52,59.		
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION	
Converter Insert Ring	D56416	4/16/42		
Gasifier Body	D48430	4/16/42		
Coils	D54367	4/16/42		
Steel Support	D48366			
Gas Mixer Arrgt.	W45477	4/16/42		
Flange Nozzle & Etc.	D32797	4/16/42		
Gas Mixer Tee	D56214	4/16/42		
Flange & Pipe	D33082	4/16/42		
Screen & Baffle	D45754X1	4/16/42		
Shell	D45780X1			
Gas Regulating Valve Arrgt.	W26622			
Body	D32768			
Guide, Stem, Lever & Etc.	D32769	2/28/42		
Yoke, Cap & Nut	D32851			
Hand Wheel	D32852			
6" Discharge Pipe	D48596X1			
Welding Flange	D42219			
Ring Flange	D32762			
Bolts	D33100			
Std. Expanded Pipe Flanges	D24784			
Gauge Board	D46369X1			
Control Board	D48811	2/15/42		
Heat Exch. Arrgt.	W38536	4/17/42		
Shell	D43004	4/17/42		
Tube Sheets	D43005			
Baffles	D43010	4/20/42		
Gland	D43011	4/17/42		
Spool Piece	D45874	4/17/42		
Air Filter Arrgt.	W26739	3/12/42		
Ammonia Filter Arrgt.	W26740	3/24/42		

## LIST OF MAPS AND DRAWINGS

Sheet No. 4 of 6

BUILDING, STRUCTURE OR UTILITY AMMONIA OXIDATION PLANT (CONTD) Specifications: 1,26,58,96,119,120,128.  
 UNIT NO. 302 POST NO. 3021 AREA ACID  
 Contracts: FC 1,26,58,96,119,120,128. SC: 20,25,41,52,59

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT -			
Sight Glass Arrgt.	W26693	2-25-42	
Body Cap & Nut	D32874	2-25-42	
Platinum Rec. Filter Arrgt.	W57124	4-4-42	6-16-42
Top & Bottom Shell	D56151	4-9-42	
Flange, Bearing Plate & Etc.	D53674	4-9-42	
Support	D53675X1	7-22-42	
Screen	D53676		
Grillage	D53677		
Orifice Plate	D56750		
Orifice Plate	D54670	2-25-42	
Pulsation Eliminator	D50089	2-25-42	
Temperature Switch	D50154	2-25-42	
Air Cylinder	D55164	2-28-42	10-24-42
Circulating Tank	D35645	2-25-42	
HCl Flanges	D32840X1	9-8-42	
Pump Drip Pan	D50758X1	3-6-42	
8" HCl Pipe Details	D56208		
6" HCl Pipe Details	D56209	5-11-42	
6" HCl Pipe Details	D48601	3-4-42	
3" HCl Pipe Details	D48600	3-4-42	
2" HCl Pipe Details	D56210	3-4-42	
HCl Bolt List	D56588		
HCl Ring Gasket List	D56589		
HCl Flange List	D56590		
HCl Pipe	D57014	5-15-42	

LIST OF MAPS AND DRAWINGS

Sheet No. 5 of 6

BUILDING, STRUCTURE OR UTILITY		Specifications: 1,26,58,96,119,120,122.	
UNIT NO.	POST NO.	AREA	ACIF
302	3021	Contracts: FC 1,26,58,96,119,120,122.	SC: 20,25,41,52,59
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
<b>MACHINERY</b>			
Platinum Recovery Filter - Spring Support	W61194	6-7-42	7-21-42
Platinum Recovery Filter - Bearing Washer & Support	D57320	6-17-42	7-21-42
Compressor House - Water Spray System	W16039	6-18-42	10-3-42
H.C.I. Pipe, Flange & Bolt List	D56651	4-21-42	9-22-42
H.C.I. Valves & Fittings	D56652	4-9-42	
<b>ARCHITECTURAL</b>			
Converter Abs. Air Comp. Ho. Floor Plans	W57296	2-17-42	6-26-42
Converter Abs. Air Comp. Ho. Elev. Sect. & Dets.	W57277	2-17-42	6-23-42
<b>STEEL</b>			
Absor. & Air Comp. Ho. Plans & Elevs.	W57153	1-27-42	6-8-42
Elev. & Sect.	W57154	1-28-42	7-24-42
<b>CONCRETE</b>			
Rec. Comp. Fnd. Det.	W57294	2-21-42	5-29-42
<b>ELECTRICAL</b>			
Light	W58740	3-26-42	6-3-42
Valve Control	W58409	3-26-42	6-23-42
Power Sheet #1	W61286	6-24-42	9-10-42
Power Sheet #2	W61263	6-24-42	9-10-42
Heating	302-302-504		
Miscellaneous Pump Foundations	302-302-211		
Pump House & Office Architectural & Concrete	302-302-210		
Absorption Tower Foundations	302-302-219		
Wall Foundations	302-302-220		
Revised Concrete Foundation Plan & Details	302-302-207		
Absorption Tower Enclosure	302-302-218		

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## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 4

BUILDING, STRUCTURE OR UTILITY NITRIC ACID CONCENTRATOR PLANT  
UNIT NO. 303 POST NO. 3031

Specifications: 1,26,58,77,96,120,125,128.

AREA ACID

Contracts: PC 1,26,58,77,96,120,125,128. SC: 20,25,41.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plot Plan (NA)	W57224	2/4/42	5/19/42
1st & 2nd Floor Plans, 2nd Mezz & 3rd Floor Plans	W57225		
Longitudinal Section	W57226	2/24/42	
Cross Section Sh. #1	W57227	2/24/42	
Acid Header - Plans	W57246	2/14/42	5/18/42
Acid Header - Sections	W57247	2/14/42	5/18/42
Air Steam & Cond. Headers - Arrgt. Plan	W57339	3/29/42	5/19/42
Air Steam & Cond. Headers - Arrgt. Sects.	W57340	3/29/42	5/19/42
Water Supply & Drain Headers - Arrgt. Plan	W57337	3/27/42	5/19/42
Water Supply & Drain Headers - Arrgt. Sects.	W57338	3/29/42	
Equipment List	W58734	3/18/42	5/25/42
NA Conc. Resid. SA Sto. Tk. Arrgt.	W57251	2/18/42	5/21/42
55% NA Sto. Tks.	W57248	2/18/42	
Drawing Mat. List Sh. #1	W58597	3/24/42	5/25/42
Drawing Mat. List Sh. #2	W58598	3/24/42	7/30/42
Gauge Board	D52551		
Steam Manifold	D46576X1	2/24/42	
Preheater - Arrgt.	W57306	2/26/42	
Distributing Tube Spring	D30481	2/25/42	
Distributing Tube Eye Bolt & Retainer	D30483	2/25/42	
Thermometer Well	D56305	2/25/42	
Casing & Gland	D30466X1	3/5/42	
Tubes	D45720	3/5/42	
Therm. Well Support & Nut	D56304	2/25/42	
Pauling Type Tower - Arrgt.	W57192	1/28/42	3/24/42
Tower Section Support	D26550	2/24/42	
Tower Support	D26559	2/24/42	
Surge Pot	D51500	3/6/42	
Surge Pot Pan	D56386	2/18/42	
Bleacher Arrgt.	W57326	2/17/42	3/28/42
95% NA Cooling Tank	D48232	2/25/42	

## LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 4

NITRIC ACID CONCENTRATOR PLANT (CONT'D)			
BUILDING, STRUCTURE OR UTILITY UNIT NO. 303 POST NO. 3031	AREA ACID Contracts: PC 1,26,58,77,96,120,125,128.	96,120,125,128 SC: 20,25,41	Specs: 1,26,58,77,
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - HCI Pipe	D56326	2/25/42	7/16/42
"S" Bend Condenser Arrgt.	W57113	1/29/42	4/16/42
Distributing Trough	D26401	3/3/42	
Bracket	D54978	2/24/42	
Condenser	D26560	2/25/42	
Drip Plates	D26601	2/24/42	
Drip Pan & Coil	D55165	2/24/42	5/13/42
Hood & Stack	D56388	2/18/42	
"S" Bend Condenser Water Shield	D54437	2/27/42	
Condensate Water Tank	D49196	2/24/42	5/13/42
Duriron Ring	D55461	2/24/42	
Fume Absorption Col. Arrgt.	W37187	2/25/42	5/13/42
Fume Pipe 18-8 CB	D56307	2/24/42	5/21/42
Bubbler Plate	D32605	3/12/42	
Bubbler Cap, Sleeve & Stud	D32606X1	3/12/42	
Overflow Pipe, Cup & Support	D32607	3/12/42	
Bubbler Plate, Leg & Nut	D32608X2	3/12/42	
Cooling Coil	D35556	3/12/42	
Overflow Pipe	D38000	3/12/42	
Welding Nozzles	D38146		
Welding Nozzles	D49435		
Water Manifold	D46648	2/27/42	5/13/42
Fume Abs. Col. Muffler	D43430	2/25/42	5/13/42
Residual Acid Cooling Tank - Arrgt.	W43544	2/23/42	
Residual Acid Cooling Tank -	D48245	2/24/42	
Brick & Lead Lining	D48246	2/27/42	
Cooling Coils	D48629X2	10/15/42	
Catch Box	D55316	2/24/42	
Duriron Pipe, Fittings & Valve List	D56311	2/26/42	5/16/42
HCI Valves & Fittings List	D56312	2/16/42	5/16/42
Flanges for Lead Pipe	37135	3/5/42	







LIST OF MAPS AND DRAWINGS

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BUILDING, STRUCTURE OR UTILITY CONC. MIX CIRCULATORS & COOLERS			
UNIT NO. 305 POST NO. 3051		AREA ACIE	ACIE
Contracts: PC 1,26,119 SC: 20,25,32,41 Specifications: 1,26,119			
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
FOUNDATIONS & ARCHITECTURAL: -	305-305-218		
STEEL - Framing Saddle Bridge	W57305		
ELECTRICAL -	W58337	3-27-42	9-23-42
"	W61698	6-12-42	
ARRANGEMENT: -	W57195	2-19-42	5-28-42
Horizontal Steel Tank Welded	D36871X2	2-24-42	
4" Acid Cooler Arrgt.	D35711	3-3-42	
Water Distributor	D26401	3-3-42	
Tank Plug Valve Arrgt.	W25345	3-3-42	7-21-42
Return Bends	D1524	3-3-42	
Mix Acid Circ. Pipe	D35742	3-3-42	
Pipe Sleeve	D54694	3-4-42	
HCl Seal Pipe	D56216	2-24-42	
Plug Valve Body (6")	D31586	3-3-42	4-25-42
Stem & Jaw	D31587	3-3-42	
Lever & Stop	D31589		
Stuffing Box & Gland	D31588	3-3-42	
Stand & Support	D40137	2-3-42	
Handle	D31590	3-3-42	
Pump Drip Pan	D50758X1	3-6-42	
Alloy Valve & Fitting	D56650	4-9-42	6-8-42
HCl Valve & Fitting List	D56652	4-9-42	9-22-42
HCl Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42
HCl Red Flanges	D22796X1	9-8-42	12-19-42
Location of Safety Showers	305-305-002		
Miscellaneous Pump Foundations	302-302-211		
Guards for Pumps, Valves & Fittings	D56601		
Concentrating Mix Circulators Electrical	W61698	6-12-42	

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BUILDING, STRUCTURE OR UTILITY UNIT NO. 305 POST NO. 3052		93.2% DARK S.A. STORAGE Contracts PG 1,26,40,119,125,148	AREA SC 20,25	ACID Specifications 1,26,40,119,125,148
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION	
<b>FOUNDATIONS &amp; ARCHITECTURAL</b>				
93.2% Clear S.A. Sales Storage - Walls & Additions	305-305-219			
93.2% Clear S.A. Sales Storage	305-305-207			
<b>WOOD DUNNAGE</b>				
	W58023	3-5-42	6-6-42	
<b>ELECTRICAL</b>				
	W58326	3-27-42	6-8-42	
<b>APP. APPURTENANCE</b>				
Vertical Steel Tank (Riveted)	D35804X1	2-25-42	6-25-42	
Guards for Pumps, Valves and Fittings	D56601	2-24-42	5-29-42	
Tank Plug Valve Arrgt.	W25325	3-3-42	7-21-42	
Sampling & Rodding Drip Pan	D56610	3-3-42	4-13-42	
HCl Seal Pipe	D56216	2-22-42		
Plug Valve Body (6")	D31586	3-3-42	4-25-42	
Stem & Jaw	D31587	3-3-42		
Lever & Stop	D31589			
Stuffing Box & Gland	D31588	3-3-42		
Stand & Support	D40137	2-3-42		
Handle	D31590	3-3-42		
Alloy Valve & Fitting	D56650	4-9-42	6-8-42	
HCl Valve & Fitting List	D56652	4-9-42	9-22-42	
HCl Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42	
HCl Red Flanges	D24796X1	9-8-42	12-19-42	
Location of Safety Showers	305-305-002			
Miscellaneous Pump Foundations	302-302-211			



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BUILDING, STRUCTURE OR UTILITY STRONG N.A. STORAGE & CIRC. AREA ACID  
 UNIT NO. 305 POST NO. 3054 Contracts: PC 1,26,119,125. SC: 20,25,32,41. Specifications: 1,26,119,125.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
FOUNDATIONS & ARCHITECTURAL	305-305-215		
STEEL - Framing Saddle Bridge	W57305		
ELECTRICAL - Strong NA Sto. & Strong M.A. Circ.	W58324		
ARRANGEMENT	W57035	2-19-42	
Welding Nozzles	D49435		
Horizontal Steel Tank Welded	D36871X2	2-24-42	
Horizontal HCI Tank Welded	D38467X1	2-19-42	
Guards for Pumps, Valves & Fittings	D56601		
4" Acid Cooler Arrgt.	D35711	3-3-42	
Water Distributor	D26401	3-3-42	
Tank Plug Valve Arrgt.	W25345	3-3-42	7-21-42
Return Bends	D1524	3-3-42	
Pipe Sleeve	D54694	3-4-42	
Sampling & Rodding Drip Pan	D56010	3-3-42	4-13-42
HCI Seal Pipe	D56216	2-24-42	
Plug Valve Body (6")	D31586	3-3-42	4-25-42
Stem & Jaw	D31587	3-3-42	
Lever & Stop	D31589		
Stuffing Box & Gland	D31588	3-3-42	
Stand & Support	D40137	2-3-42	
Handle	D31590	3-3-42	
Pump Drip Pan	D50758X1	3-6-42	
Alloy Valve & Fitting	D56650	4-9-42	5-8-42
HCI Valve & Fitting List	D56652	4-9-42	9-22-42
HCI Pressed Manhole	D38567	2-14-42	
HCI Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42
HCI Red Flanges	D24796X1	9-8-42	12-19-42
Location of Safety Showers	305-305-002		
Foundations - F 83 & TNT Mix Storage	302-302-211		

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BUILDING, STRUCTURE OR UTILITY	109% OLEUM STORAGE	AREA	125,148
UNIT NO. 305	POST NO. 3055 (Part 1)	Contracts PG 1,26,70,119,125,148 SC 20,25 Specifications 1,26,70,119	
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
FOUNDATIONS -	305-305-212		
CONCRETE -	W58111	3-14-42	5-27-42
ARCHITECTURAL -	W58097	3-3-42	6-19-42
STEEL - Framing Car Spot	W57148		
WOOD DUNNAGE -	W58043	3-5-42	6-6-42
ELECTRICAL -	W58736	3-27-42	6-11-42
ARRANGEMENT -	W57231	2-18-42	5-21-42
Support Lever & Bolt 3" Pipe	D56007	3-4-42	
Tank Car Loading & unl- Intra Plant O. Cars	W57258	3-5-42	6-1-42
Vertical Steel Tank (Riveted)	D35804X1	2-4-42	5-29-42
Guards for Pumps, Valves & Fittings	D56601		
Tank Plug Valve Arrgt.	W25345	3-3-42	7-21-42
Sampling & Rodding Drip Pan	D56010	3-3-42	4-13-42
HCI Seal Pipe	D56216	2-24-42	
Plug Valve Body (6")	D31586	3-3-42	4-25-42
Stem & Jaw	D31587	3-3-42	
Lever & Stop	D31589		
Stand & Support	D40137	2-3-42	
Handle	D31590	3-3-42	
Pump Drip Pan	D50758X1	3-6-42	
Alloy Valve & Fitting	D56650	4-9-42	6-8-42
HCI Valve & Fitting List	D56652	4-9-42	9-22-42
HCI Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42
HCI Red Flanges	D24796X1	9-8-42	12-19-42
Framing Car Spot	W57148		
Wood Dunnage	W58043	3-5-42	6-6-42
Concentrating Mix Circulators Electrical	W61698	6-12-42	
Location of Safety Showers	305-305-002		
Miscellaneous Pump Foundations	302-302-211		
Stuffing Box & Gland	D31588	3-3-42	

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BUILDING, STRUCTURE OR UTILITY F-83 STORAGE		AREA ACID	
UNIT NO. 305	POST NO. 3055 (Part 2)	Contracts PG 1, 26, 58, 96, 125 SG 20, 25 Specifications 1, 26, 58, 96, 125	
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
FOUNDATIONS	305-305-211		
CONCRETE	W58098	3-11-42	5-27-42
ARCHITECTURAL	W58097	3-3-42	6-19-42
STEEL - Framing Car Spot	W57148		
ELECTRICAL	W58737	3-27-42	6-9-42
ARRANGEMENT	W57201	2-18-42	7-28-42
Support Lever & Bolt 3" Pipe	D56007	3-4-42	
Tank Car Loading & Unl. Intra Plant O. Cars	W57258	3-5-42	6-1-42
Horizontal Steel Tank Welded	D36871X2	2-24-42	
Tank Plug Valve Arrgt.	W25345	3-3-42	7-21-42
Pipe Sleeve	D54694	3-4-42	
Sampling & Rodding Drip Pan	D56010	3-3-42	4-13-42
HCl Seal Pipe	D56216	2-24-42	
Plug Valve Body (6")	D31586	3-3-42	4-25-42
Stem & Jaw	D31587	3-3-42	
Lever & Stop	D31589		
Stand & Support	D40137	2-3-42	
Handle	D31590	3-3-42	
Alloy Valve & Fitting	D56650	4-9-42	6-8-42
HCl Valve & Fitting List	D56652	4-9-42	9-22-42
Gauge Rod & Lifting Hook	D49009	3-3-42	
HCl Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42
HCl Red Flanges	D24796X1	9-8-42	12-19-42
Framing Car Spot	W57148		
Location of Safety Showers	305-305-002		
Foundations - F 83 & TNT Mix Storage	302-302-211		
Stuffing Box and Gland	D31588	3-3-42	



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BUILDING, STRUCTURE OR UTILITY 93.2% CLEAR S.A. SALES STORAGE AREA ACID			
UNIT NO. 305 POST NO. 3057 Contracts PG 1,26,40,119,125,148 SC 20,25 Specifications 1,26,40,119,125,148			
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
FOUNDATIONS	305-305-219		
FOUNDATIONS	305-305-207		
CONCRETE	W58407	3-14-42	5-27-42
ARCHITECTURAL	W58096	3-5-42	6-19-42
STEEL - Framing Car Spot	W57148		
WOOD DUNNAGE	W58043	3-5-42	6-6-42
ELECTRICAL	W58607		
ARRANGEMENT	W57232	2-18-42	5-25-42
Tk. Car Loading & Unl.- Intra Plant O. Cars	W57258	3-5-42	6-1-42
Vertical Steel tank ( Riveted)	D35804X1	2-24-42	5-29-42
Guards for Pumps, Valves & Fittings	D56601		
Tank Plug Valve Arrgt.	W25345	3-3-42	7-21-42
Sampling & Rodding Drip Pan	D56010	3-3-42	4-13-42
HCI Seal Pipe	D56216	2-24-42	
Plug Valve Body (6")	D31586	3-3-42	4-25-42
Stem & Jaw	D31587	3-3-42	
Lever & Stop	D31589		
Stand & Support	D40137	2-3-42	
Handle	D31590	3-3-42	
Alloy Valve & Fitting	D56650	4-9-42	6-8-42
HCI Valve & Fitting List	D56652	4-9-42	6-22-42
HCI Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42
Overflow & Vent Piping Arrangement	305-305-916		
Location of Safety Showers	305-305-002		
Miscellaneous Pump Foundations	302-302-211		
Stuffing Box & Gland	D31588	3-3-42	

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BUILDING, STRUCTURE OR UTILITY UNIT NO. 305 POST NO. 3058		TNT MIX STORAGE Contracts FC 1,26,125	AREA SC 20.25	ACID Specifications 1,26,125
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION	
FOUNDATIONS	305-305-211			
CONCRETE	W58098	3-14-42	5-27-42	
ARCHITECTURAL	W58091	3-3-42	6-19-42	
STEEL - Framing Car Spot	W57148			
ELECTRICAL	W58115	3-27-42	6-10-42	
ARRANGEMENT	W57200	2-18-42	7-15-42	
Support Lever & Bolt 2" Pipe	D55075	3-14-42		
Tk. Car Loading & Unl. - Intra Plant Cars	W57260			
Horizontal Steel Tank Welded	D36871X2	2-24-42		
Condenser Drip Plates	D56601	2-24-42		
Plug Valve Arrgt. (6")	W25345	3-3-42	7-21-42	
Pipe Sleeve	D54694	3-4-42		
Sampling & Rodding Drip Pan	D56010	3-3-42	4-13-42	
HCl Seal Pipe	D56216	2-24-42		
Plug Valve Body (6")	D31586	3-3-42	4-25-42	
Stem & Jaw	D31587	3-3-42		
Lever & Stop	D31589			
Stand & Support	D40137	2-3-42		
Stuffing Box & Gland	D31588	3-3-42		
Handle	D31590	3-3-42		
Alloy Valve & Fitting	D56650	4-9-42	6-8-42	
HCl Valve & Fitting List	D56652	4-9-42	9-22-42	
Gauge Rod & Lifting Hook	D49009	3-3-42		
HCl Pipe Flanges & Bolt List	D56651	4-21-42	9-22-42	
HCl Red Flanges	D24796X1	9-8-42	12-19-42	
Location of Safety Showers	305-305-002			
Miscellaneous Pump Foundations	302-302-211			

## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY UNIT NO. 307 POST NO. 3071	SELLITE PLANT Contracts: PC 78.	AREA Specifications: 78.	ACID			
TITLE OF MAP OR DRAWING				PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Sulphur Furnace Detail				1273	11-21-36	4-7-42
Sulphur Furnace Assembly				1274	11-21-36	1-4-42
Reich Test. Equipment, Assembly and Details				1342	3-31-37	3-1-40
Sulphur Gun				1425	11-30-37	2-14-38
Sulphur Pump				1434	3-16-38	9-4-40
Standard Wiring Trough Details				2551		
Standard Lighting Details				2552	3-9-42	
Flow Diagram				2661	6-10-42	10-12-42
C.I. Gas Piping Details				2671	4-27-42	
Storage Tank Details				2680	5-22-42	11-23-42
Building Details, Sheet #2				2688		
General Arrangement, Plan and Elevation				2700	5-7-42	12-4-42
General Arrangement, Elevators				2702	5-20-42	12-4-42
Power and Pyrometer Layout and Details				2703	6-8-42	10-24-42
Light Wiring Layout				2704	6-26-42	10-21-42
Sulphur Pit Assembly and Detail				2705	4-29-42	
Power and Pyrometer Layout				2706	6-26-42	10-13-42
Saturating Tower Assembly				2707	5-12-42	11-17-42
Saturating Tower Details				2708	3-27-42	5-7-42
Absorption Tower Assembly				2709	5-11-42	
Absorption Tower Details				2710	5-7-42	
Liquor Circulating Lines				2713	5-29-42	12-8-42
Batch Tank Details				2715	5-18-42	
Batch Tank Assembly				2716	7-9-42	11-11-42
Screw Conveyor Assembly and Details				2717	4-8-42	
Pneumatic Conveyor Assembly and Details				2718	6-22-42	
Building and Apparatus Foundation Detail				2721	6-2-42	10-22-42
Building and Apparatus Foundation Detail				2722	6-2-42	10-22-42
Building and Apparatus Foundation Detail				2723	6-7-42	7-21-42
Building Process Plans and Elevation				2726	6-10-42	
Building Process Plans and Elevation				2727	6-10-42	









## LIST OF MAPS AND DRAWINGS

Sheet No. 4 of 7

DARK SULPHURIC ACID CONCENTRATING			
BUILDING, STRUCTURE OR UTILITY	HOUSE	AREA	ACID
UNIT NO. 308	POST NO. 3081	Contracts: PC 1,62,96,119,125,131,150.	SC: 20,25,41,59. Specs: 1,62,96,119,
125,131,150.			
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
<b>Mechanical</b>			
C.I. Corner Angles	CCC 142		
General Arrangement - Plan	501-1	6/24/42	
General Arrangement - Elevation	501-2	7/27/42	
4" Lead Washout Valve	1168	8/27/36	2/27/42
16" Damper	1483		
Flow Diagram	2061	5/8/42	6/24/42
Miscellaneous Steel Details	2062	4/20/42	
Substation Assembly - Sheet #1	2063	5/21/42	
Miscellaneous Piping Diagram	2064	5/19/42	6/9/42
Acid Tanks - Steel Detail & Assembly	2065	3/16/42	3/19/42
Substation Assembly - Sheet #2	2066	5/21/42	
C.I. Acid Piping Arrangement and Assembly	2072	3/25/42	3/27/42
Gas Piping - Steel Details and Assembly	2073	4/27/42	
Acid Cooler - Assembly and Detail	2203	3/19/41	3/30/42
Corner Castings - Precipitator Tie Rods	2425	9/30/42	
General Arrangement - Plan	2590	8/27/42	8/29/42
General Arrangement - Elevation	2591	8/27/42	8/29/42
4" Lead Washout Valve	2597	5/21/42	
Detail of Lead Gas Pipe and Supports	2649		7/10/42
Burner Holder	2668	5/11/42	
Substation Assembly - Sheet #1	2698	10/27/42	11/11/42
Substation Assembly - Sheet #2	2699	10/27/42	
Flow Diagram	2751	12/18/42	
Miscellaneous Piping Diagram	2752	1/4/43	
117 Tube Precipitator Steel Details (Carbon)	2855	3/6/42	3/10/42
C.I. Acid Piping and Arrangement	2866	9/29/42	
11'-0" concentrator Drum & Gas Cooler - Steel Details	2974	2/27/42	4/2/42
11'-0" Concentrator Drum & Gas Cooler Assembly	2975	6/26/42	11/19/42
Furnace Steel Details	2976		

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LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 4

BUILDING, STRUCTURE OR UTILITY		BOILER HOUSE		Specifications: 1,26,58,92,93,96,109,120,127,128.	
UNIT NO.	POST NO.	Contracts:	PC	AREA	POWER
401	4011	PC 1,26,58,92,93,96,109,120,127,128.	SC:	20,25,36,37,43,47,55,56,	57
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION		
Revised Concrete Foundations	401-400-315	4-16-42			
Revised Concrete Foundations	401-400-316	4-1-42			
Revised Concrete Foundations	401-400-317	5/7/42			
Revised Concrete Foundations	401-400-318	7-9-42			
Shed over Coal Cars at Unloading Hopper	401-400-323	8-10-42	9-30-42		
Foundations Details for Recarbonation Equipment in Boiler House and Transformers	401-400-325	7-7-42			
Pipe Sleeves - Operating Floor	401-400-327	7-9-42	8-27-42		
Stair Tower at Coal Silo	401-400-329	7-24-42			
Foundations - Column Line No. 12	401-400-332	7-27-42			
Coal Chute Enclosure Details	401-400-333	8-12-42			
Wood Platforms at Coal Chutes	401-400-341	12-28-42			
Office and Toilet Layout	401-400-401	8-1-42			
Heating, Ventilating and Plumbing	401-400-501	11-24-42			
Coal Silo Arrangement	401-400-502	1-14-42			
Boiler Control System - Electrical	401-400-604		2-6-43		
Elevated Tank for Boiler Feed	401-400-901	6-26-42			
Elevated Tank for Boiler Feed	401-400-902	7-3-42			
Chemical Feed System for Water Treatment	401-400-903		7-25-42		
Recarbonation Equipment in Boiler House	401-400-904	7-15-42			
Piping Connections to Boiler Feed Water Heater	401-400-905	7-15-42	1-1-43		
Piping from Boiler Feed Water Tank to Boiler House	401-400-906	8-31-42			
Hopper Extension Riley Coal Feeders	401-400-910	9-12-42			
Fuel Oil Storage Filler Line - Tank Truck to Tanks	401-400-913	10-28-42			
Boiler Plant Layout	401-400-915	1-27-42			
Revised Coal Chutes from Silos to Coal Feeders	401-400-916	2-12-42			

LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 4

BUILDING, STRUCTURE OR UTILITY BOILER HOUSE Specifications: 1,26,58,92,93,96,109,120,127,128.  
 UNIT NO. 401 POST NO. 4011 AREA POWER 57  
 Contracts: PC 1,26,58,92,93,96,109,120,127,128. SC: 20,25,36,37,43,47,55,56,

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Mechanical Equipment	RQ 1420	2-18-42	4-16-42
Electrical Equipment	RQ 1572	3-19-42	5-16-42
Fuel Oil Tank Outline	RQ 2101	3-19-42	
Piping System	RQ 2187	4-2-42	
Mechanical Equipment	RQ 2300	4-25-42	
Electrical Equipment	RQ 2858	4-21-42	6-16-42
Combustion System	RQ 2913	4-21-42	6-16-42
Electrical Equipment	RQ 3069	4-21-42	5-16-42
Electrical Equipment	RQ 3302	5-2-42	5-16-42
Electrical Equipment	RQ 3305	5-5-42	5-18-42
Electrical Equipment	RQ 3307	4-28-42	10-28-42
Electrical Equipment	RQ 3309	4-25-42	5-16-42
Piping System	RQ 3561	5-4-42	5-15-42
Piping System	RQ 3648	5-8-42	
Superstructure	RQ 5940	3-4-42	5-18-42
Superstructure	RQ 5941	3-21-42	7-6-42
Superstructure	RQ 5942	3-4-42	7-6-42
Superstructure	RQ 5951	4-24-42	7-30-42
Coal Handling Equipment	RQ 5954	4-17-42	7-16-42
Superstructure	RQ 5959	4-25-42	7-16-42
Steel Structure	RQ 7090	2-14-42	7-10-42
Steel Structure	RQ 7091	4-16-42	7-13-42
Steel Structure	RQ 7093	2-14-42	7-9-42
Steel Structure	RQ 7115	2-14-42	5-16-42
Steel Structure	RQ 7116	2-4-42	5-5-42
Steel Structure	RQ 7117	2-4-42	7-9-42
Steel Structure	RQ 7143	2-14-42	7-9-42
Steel Structure	RQ 7165	4-16-42	9-10-42
Steel Structure	RQ 7241	4-9-42	7-11-42
Steel Structure	RQ 7242	4-9-42	7-11-42
Piping System	RQ 7451	5-2-42	8-11-42

LIST OF MAPS AND DRAWINGS

Sheet No. 3 of 4

BUILDING, STRUCTURE OR UTILITY  
UNIT NO. 401 POST NO. 4011

BOILER HOUSE

Specifications: 1,26,58,92,93,96,109,120,127,128.

AREA POWER

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Contracts: PC 1,26,58,92,93,96,109,120,127,128. SC: 20,25,36,37,43,47,55,56,

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Piping System	RQ 7454	5-2-42	8-11-42
Piping System	RQ 7455	5-4-42	8-11-42
Piping System	RQ 7457	3-4-42	8-7-42
Piping System	RQ 7458	3-4-42	8-7-42
Piping System	RQ 7459	5-4-42	8-11-42
Piping System	RQ 7460	5-4-42	8-11-42
Piping System	RQ 7461	4-23-42	8-11-42
Piping System	RQ 7462	4-21-42	8-7-42
Piping System	RQ 7463	4-21-42	8-7-42
Piping System	RQ 7464	4-22-42	8-7-42
Piping System	RQ 7465	4-8-42	8-11-42
Piping System	RQ 7467	2-19-42	8-4-42
Piping System	RQ 7468	5-15-42	8-4-42
Piping System	RQ 7469	2-19-42	8-4-42
Combustion System	RQ 7470	4-13-42	8-4-42
Mechanical Equipment	RQ 7544	2-19-42	8-7-42
Piping System	RQ 7552	4-8-42	8-11-42
Piping System	RQ 7601	4-24-42	8-11-42
Piping System	RQ 7602	4-24-42	8-7-42
Piping System	RQ 7603	4-28-42	8-11-42
Mechanical Equipment	RQ 7604	2-19-42	8-7-42
Electrical Equipment	RQ 8314	4-28-42	10-24-42
Electrical Equipment	RQ 8315	5-2-42	10-24-42
Electrical Equipment	RQ 8316	5-2-42	10-24-42
Electrical Equipment	RQ 8317	4-28-42	10-24-42
Electrical Equipment	RQ 8319	5-4-42	9-16-42
Electrical Equipment	RQ 8321	5-11-42	10-24-42
Electrical Equipment	RQ 8322	5-5-42	10-24-42
Electrical Equipment	RQ 8323	15-15-42	10-24-42
Electrical Equipment	RQ 8324	5-18-42	10-24-42
Electrical Equipment	RQ 8325	5-11-42	9-16-42

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LIST OF MAPS AND DRAWINGS

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BUILDING, STRUCTURE OR UTILITY UNIT NO. 723 POST NO. 7231	LAUNDRY BUILDING	AREA GROUP	CONTRACT NO. 1, 60, 74, 86, 128, 80, 20, 25, 1, 60, 74, 86, 128.	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
TITLE OF MAP OR DRAWING				723-71-201	2-25-42	
Plumbing, Drainage, Service, Flange & Det.				723-71-201	2-25-42	
Architectural & Concrete Plan, Elev. Sect.				723-71-601	3-1-42	
Electrical				723-71-202	11-17-48	
Heating						









## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 3

BUILDING, STRUCTURE OR UTILITY MONO NITRATING HOUSE

Specifications: 1,26,58,62,86,96,120,128.

UNIT NO. 801 POST NO. 8011 thru 8016

AREA T.N.T.

Contracts: PC 1,26,58,62,86,96,120,128. SC: 20,25,31,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plans	W57163	2/19/42	10/10/42
Sections	W57164	2/19/42	10/26/42
Piping at Nitrator	W60717	5/24/42	10/6/42
Direct Reading Therm. Lighting	W51840	2/7/42	
Sight Box Lighting	W51852	2/18/42	
H.C.I. Stud Bolts	D51191		
11050# Nitrator Arrgt.	W53124	2/18/42	8/21/42
11050# Nitrator Tank	D51274	2/13/42	
11050# Nitrator Cover	D25840	2/13/42	
11050# Nitrator Removal Cover	D51106	2/7/42	
11050# Nitrator Draft Tube	D45984	2/7/42	
11050# Nitrator Deflector	D52556	2/7/42	
11050# Nitrator 2'-10" D. Pipe Coil	D45845	2/7/42	
11050# Nitrator 3'-7" D. Pipe Coil	D54187	2/7/42	
11050# Nitrator 4'-4" D. Pipe Coil	D45842	2/7/42	
11050# Nitrator 5'-1" D. Pipe Coil	D54186	2/7/42	
11050# Nitrator 5'-10" D. Pipe Coil	D54185	2/7/42	
11050# Nitrator Coil Supports	D45848	2/7/42	
11050# Nitrator Steel Frame	D45557	2/13/42	4/11/42
11050# Nitrator Agitator & Dr. Shafts	D45962	2/7/42	5/28/42
11050# Nitrator 24" Propellor	D28895	2/7/42	
Bevel Gear, Pinion, Brg. & Cap.	D26411	2/7/42	
Bearing Cap	D4311	2/7/42	
Direct Reading Thermom. Wells	D46086	2/7/42	8/12/42
Toluene Stand Pipe	D51203	2/7/42	
Handle for Dip Bottle	D52545	2/7/42	7/15/42
Safety Rod Support For Scale )	W53223		
Tanks - Gen. Dwg. 800 Area )			
Pull Cords For Q.O. Valves	W51648	2/7/42	
Sight Box	D54027	2/7/42	5/28/42
Pig	D53977	2/7/42	

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LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 3

BUILDING, STRUCTURE OR UTILITY MONO-NITRATING HOUSE (CONT'D)

Specifications: 1,26,58,62,86,96,120,128

UNIT NO. 801 POST NO. 8011 thru 8016.

AREA T.N.T.

Contracts: FC 1,26,58,62,86,96,120,128 SC: 20,25,31,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Mono Receiving Tank 3'-0" x 6'-0"	D49933	2/7/42	6/1/42
Mono Receiving Tank Cradle	D50042	2/7/42	
Mono Oil Pump Supports	D50609	2/7/42	6/1/42
M.A. Scale Tank 4'6" x 8'0"	D45571	2/7/42	
Cycle Acid Tank 4'6" x 8'0"	D45573	2/7/42	
Toulene Scale Tank 3'0" x 5'0"	D45574	2/7/42	
Lifting Device for Safety Discs	D51666	2/18/42	
Bevelled Fillers	D52772		
Fume & Vent Piping	D54257	2/24/42	6/6/42
Scale Tank Support Rods - Plates	D54412		
Gauge Board	D51728	2/28/42	6/23/42
Desk	D52685	2/20/42	
Sample Bottle Carrier	D52700	2/20/42	
Acid Sample Lead Tray	D52720		
Supply Cabinet	D52721		
Bulletin Board Frame	D52741		
Hose Rack	D52754	2/7/42	
Pipe Flanges - Reducing HCI - 800 Area (Gen.) D24	D24796		
Agitator Paddle	D52650	2/7/42	
1 1/2" Cycle Acid Vent Piping 18-8CB	D55006	2/8/42	
Fume Recovery Piping Set	D54169	1/27/42	
Flapper for Vent Lines	D56389	3/5/42	
Thermometer Guard	D54000	7/21/42	
ARCHITECTURAL	W57189	2/7/42	9/11/42
STEEL - Framing	W57143	2/6/42	5/27/42



## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 3

BUILDING, STRUCTURE OR UTILITY  
UNIT NO. 802 POST NO. 8021

BI &amp; TRI NITRATING HOUSE

Specifications: 1,26,58,62,86,96,120,128.

AREA T.N.T.

Contracts: PC 1,26,58,62,86,96,120,128. SC : 20,25,31,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plans	W61454	6/1/42	10/21/42
Cross Sections	W61455	6/1/42	10/21/42
Long. Sections	W61456	6/1/42	10/21/42
Piping at Nitrator	W60717	5/24/42	10/6/42
Direct Reading Therm. Lighting	W54840	2/7/42	
Sight Box Lighting	W54852	2/18/42	
10700# Nitrator Arrgt.	W59088	2/13/42	7/25/42
10700# Nitrator Tank	D51474	2/13/42	
10700# Nitrator Cover	D45558	2/13/42	5/29/42
10700# Nitrator Removable Cover	D51471	2/7/42	5/29/42
10700# Nitrator 3'6" $\phi$ Pipe Coil	D54191	2/7/42	
10700# Nitrator 4'3" $\phi$ Pipe Coil	D54190	2/7/42	
10700# Nitrator 5'0" $\phi$ Pipe Coil	D54189	2/7/42	
10700# Nitrator 5'9" $\phi$ Pipe Coil	D54188	2/7/42	
10700# Nitrator 3'6" $\phi$ Pipe Coil Supp.	D45563	2/13/42	
10700# Nitrator 4'3" $\phi$ Pipe Coil Supp.	D45564		
10700# Nitrator 5'0" $\phi$ Pipe Coil Supp.	D45565	2/7/42	
10700# Nitrator 5'9" $\phi$ Pipe Coil Supp.	D45566	6/2/42	
10700# Nitrator	D45567	2/7/42	
10700# Nitrator	D45567	2/7/42	
10700# Nitrator	D45567	2/7/42	
10700# Nitrator	D45567	2/7/42	
10700# Nitrator	D45567	2/7/42	
Bevel Gear Pinion Bearing & Cap	D45562	2/7/42	4/11/42
Bearing Cap	D45562	2/7/42	5/28/42
Direct Reading Therm. Wells	D26411	2/7/42	
Scale Tank Support Rods - Plates	D4311	2/7/42	
Safety Rod Support (Scale Tank)	D46086	2/7/42	8/12/42
Pull Cords (Q.O.Valves)	D54112		
M.A. & O.V. Sto. Tanks	W53423		
M.A. Scale Tank	W51648	2/7/42	
Lifting Device (Safety Discs, Scale Tks.)	D45576	2/14/42	
M.A. Scale Tank Stand Pipe	D45575	2/7/42	
	D51666	2/18/42	2/18/42
	D52789	2/7/42	

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LIST OF MAPS AND DRAWINGS

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Specifications: 1,26,58,62,86,96,120,128.

BUILDING, STRUCTURE OR UTILITY BI & TRI NITRATING HOUSE (CONT'D) AREA T.N.T.

UNIT NO. 802 POST NO. 8021 thru 8026 Contracts: FC 1,26,58,62,86,96,120,128. SC: 20,25,31,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Mono. Oil Receiving Tank	D49933	2/7/42	6/1/42
Mono. Oil Pump Support	D50609	2/7/42	6/1/42
Sight Box	D54027	2/7/42	5/28/42
Special "Y" Branch	D50318	2/7/42	6/6/42
Piping 18-8 Cb	D54366	2/7/42	4/3/42
Fume Line Vent Conn.	D54169	1/27/42	
Flapper for Vent Line	D56389	3/5/42	
Bevelled Fillers	D52772		
Gauge Board	D51728	2/28/42	6/23/42
Desk	D52700	2/20/42	
Sample Bottle Carriers	D52700	2/20/42	
Supply Cabinet	D52721		
Hose Racks	D52754	2/7/42	
2" Std. Sight Glass Bullseye Type	D51867	3/4/42	
Lever for 2" Quick Opening Valve	D56606	3/17/42	
Gauge Rods, Pans & Covers - Steel	D54280	2/7/42	
Davit & Gauge Rod - Arrgt.	W53472	2/7/42	
Handle for Dip Bottle	D52545	2/7/42	7/15/42
Bulletin Board Frame	D52741		
H.C.I. Stud Bolts	D54491		
Thermometer Guard	D54000	2/7/42	6/17/42
ARCHITECTURAL - Plans, Elev. & Dets.	W57162	2/27/42	8/7/42
STEEL - Framing	W57144	1/27/42	10/14/42
Framing - Nitrator Platform	W57282	2/12/42	
HEATING -	801-801-503	4/16/42	5/9/42



## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY FORTIFYING HOUSE  
UNIT NO. 803 POST NO. 8031 thru 8036Specifications: 1,26,58,62,86,96,119,120,128.  
AREA T.N.T.

Contracts: 1,26,58,62,86,96,119,120,128. SC: 20,25,31,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT -			
Nitrator Arrgt. - 10700# Cap.	W53088	2-13-42	7-25-42
Direct Reading Therm. Lighting	W54840	2-7-42	
N. A. Stand Pipes	D55313	2-7-42	8-14-42
Gauge Rod Pan & Cover	D54281	2-7-42	10-5-42
N. A. Scale Tank 3'0" x 5'0"	D45649	2-7-42	
N. A. Scale Tank Support	D50104	2-7-42	
Safety Rods	W53423		
Flapper for Vent Line	D56389	3-5-42	
Davit & Gauge Rod = Arrgt.	W53172	2-7-42	
Gauge Board	D51728	2-28-42	6-23-42
Tank	D51474	2-13-42	
Cover	D45558	2-13-42	5-29-42
Steel Framing	D45557	2-13-42	4-11-42
3'6" $\phi$ Pipe Coil	D54191	2-7-42	
Coil Support	D45563	2-13-42	
Agitator Shaft & Drive	D45962	2-7-42	5-28-42
Thermo-Wall	D46086	2-7-42	8-12-42
Bearing for Agitator Shaft	D4311	2-7-42	
Removable Cover	D51641	2-7-42	5-29-42
Bevel Gear & Pinion	D26411	2-7-42	
Fortifier Drip Pan	D50337	2-7-42	
Blowcase	D42793X1B	2-7-42	
Safety Disc Adapter	W52309	2-7-42	3-25-42
HCI Stud Bolts	D54491		
HCI Piping	D54342	2-7-42	6-14-42
18-8 Cb Piping	D54343	2-13-42	6-6-42
Scale tank support rods plates	D54412		
Desk	D52685	2-20-42	
Carrier for 12 oz. Sample Bottles	D52700	2-20-42	
Supply Cabinet	D52721		







LIST OF MAPS AND DRAWING

Sheet No. 1 of 3

BUILDING, STRUCTURE OR UTILITY WASH HOUSE		Specifications: 1,26,58,62,82,86,96,119,120,128.	
UNIT NO. 806 POST NO. 8061 thru 8066		AREA N.T.	
		Contracts: PC: 1,26,58,62,82,86,96,119,120,128. SC: 20,25,31,42,58	
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plans	W57170	2/19/42	6/10/42
Sections	W57171	6/19/42	6/12/42
Flaker Room - Arrgt.	W57172	2/24/42	7/10/42
Steam, Air & Water Piping Sections	W57177	2/19/42	7/27/42
Direct Reading Therm. Lighting	W54840	2/7/42	
Outside Catch Box Arrgt.	W57173	3/12/42	7/10/42
Sellite Unloading Arrgt.	W57174	3/11/42	5/16/42
Sight Box Lighting	W54852	2/18/42	
Oil Discharge Pipe & Spool Piece	D54823	2/7/42	6/15/42
Steam, Air & Water Piping Plans	W57176	2/19/42	7/11/42
Flaker - Vent Stack	D55111	2/7/42	
Wash Tank	W47542	2/24/42	3/27/42
Water Heater Assembly	W58128	2/7/42	3/12/42
Thermometer Well	D46355	2/7/42	
Wash Tank Propeller	D46066	2/7/42	
Direct Reading Ther. Guard	D54000	2/7/42	6/17/42
Filter Tank	W49601	3/23/42	
Filter Tank Vent	D54597	2/7/42	
Expelling Screen Hopper & Chutes	D54583	2/7/42	3/24/42
Blast Nozzle Support	D50879	2/7/42	
Inlet Strainer	D54691	2/7/42	
Blast Nozzle Bracket	D54675	2/7/42	
Melt Tank	W52804	2/7/42	6/24/42
Stacks Melt and F. & D. Tanks	D54676	2/7/42	6/6/42
Sight Box	D50209	2/7/42	
Bevelled Filler Piece	D52772		
Feed & Dryer Tank	W40640	2/18/42	8/12/42
Air Heater - F & D Tanks	W48182	2/7/42	
Thermometer Well	D46086	2/7/42	8/12/42

## LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 3

BUILDING, STRUCTURE OR UTILITY WASH HOUSE (CONT'D.) Specifications: 1,26,58,62,82,86,96,119,120,128.  
 UNIT NO. 806 POST NO. 8061 thru 8066 Contracts: PC 1,26,58,62,82,86,96,119,120,128 SC: 20,25,31,42,58  
 AREA T.N.T.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
<b>ARRANGEMENT.</b>			
Sellite Sto. Tks. 6'0" x 20'0"	D45578	2/24/42	
Sellite Sto. Tks. Heater Coils	W40751	2/7/42	5/5/42
Sellite Measuring Tank	D45746	2/7/42	
Flaker Ducts	D54854	2/26/42	
Flaker Drip Pan	D54855	2/7/42	6/3/42
Gauge Board	D51728	2/28/42	6/23/42
Drive for Stirrer	D52023	2/7/42	
Desk	D52683	2/20/42	
Carrier For 12- 8 oz. Sample Bottles	D52700	2/20/42	
Lead Tray for Acid Samples	D52720		
Supply Cabinet	D52721		
Bulletin Board Frame	D52741		
Hose Rack	D52754	2/7/42	
Guard For Pistol Grip Switches	D54306		
Table For Stirring Machine	D52034	2/7/42	
Handle For Dip Bottle	D52545	2/7/42	7/15/42
Sample Dipper	D52550	2/7/42	
Carrier For 2- 2 1/2 Liter Bottles	D52559	2/7/42	
Gauge Rods, Pins & Covers - Steel	D54280		
Flng Valve Operating Lever & Brackets	D54278	2/18/42	
Davit & Gauge Rod - Arrgt.	D54472	2/7/42	
HCI Stud Bolts	D54491		
Dryer & Feed Tnk. Outlet - Adapter Flg.	D54810	2/7/42	
Flaker Inlet Screen	D54856	2/7/42	
Flaker Hopper & Obnoxious Vapor Piping	D54854	2/26/42	
Clean Out Cover	D54884	2/7/42	
Wash Ho. Decant. Piping	D54988	2/7/42	7/10/42
Sellite Storage Tank	D55322		

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## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 3

Specifications: 1,26,58,62,96,119,120,125,128.  
 BUILDING, STRUCTURE OR UTILITY ACID & FUME RECOVERY BUILDING AREA T.N.T.  
 UNIT NO. 812 POST NO. 8121 thru 8126. Contracts: PC 1,26,58,62,96,119,120,125,128. SC: 20,25,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT - Plot Plan	W58044	3/11/42	5/26/42
1st Floor Plan	W58045	3/11/42	7/22/42
2nd, 3rd, 4th & 5th Floor Plan	W58046	3/11/42	8/17/42
Long. Section, Sheet #1	W58047	3/11/42	8/17/42
Long. Section, Sheet #2	W58048	3/11/42	5/26/42
Gross Section	W58049	3/11/42	6/20/42
Waste Acid Sto. Tank	D45576	2/14/42	
Gauge Rod, Hook, Cover & Pan	D51177	2/24/42	
Pump Drip Pan	D50758X1	3/6/42	
H.C.I. Pipe	D56539	3/5/42	7/22/42
TNT Separator Tank	D39561	2/28/42	
Expander Pipe Flanges	D24796		
Gauge Board	D52551		
WA Pre-Heater - Arrgt.	W58197	3/3/42	
Casings & Gland	D48633	3/5/42	
Eye Bolt	D30483	2/25/42	
Spring	D30481	2/25/42	
H.C.I. Pipe	D54452	3/5/42	4/1/42
Denitrating Tower Arrgt.	W47634	2/28/42	
Support	D26550	2/24/42	
Support	D26559	2/24/42	
Duriron Special Ell & Pipe	D54535	3/9/42	
Duriron Pipe & Fittings	D54584	2/24/42	
Gas Pressure Sys. Cooler, Type #2	D22566	2/28/42	
H.C.I. Tubing	D54451X1	4/30/42	
Pump Support	D55102	2/24/42	
Oxidation Tank	D51625	2/24/42	

LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 3

BUILDING, STRUCTURE OR UTILITY ACID & FUME RECOVERY BUILDING Specifications: 1,26,58,62,96,119,120,125,128.  
 UNIT NO. 812 POST NO. 8121 thru 8126 AREA T.N.T.  
 Contracts: PC 1,26,58,62,96,119,120,128. SC: 20,25,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ARRANGEMENT			
Manifold	D51954	2/28/42	8/21/42
Water Scrubber Arrgt.	W69040	2/28/42	
Intermediate Bottom Cover Section	14435	2/28/42	
Distributor	D2145	2/24/42	
Spiral Packing Ring	D9743	2/24/42	
Muffler & Grillage	D51489	2/28/42	8/17/42
Fan	D51868	2/28/42	
Standard Weld Flanges for Tubing - Acid & Fume Rec. Houses (L.O.O.W., L.O.W., W.V.O.W. only)	D54552	2/14/42	4/7/42
Thermometer Well	D57884	7/30/42	
Thermometer Well Supports, Nut & Flange	D57883	7/30/42	
Bleacher	D51639	2/24/42	
H.A. Storage Tank	D29781	2/28/42	
Welding Nozzle - or Neck	D49435		
Devit & Gauge Rod	W47239	2/28/42	
Horiz. H.C.I. Tank - Plug Valve	W40242	2/28/42	
Lever Stand	D45647	2/24/42	
Valve	D45648	2/28/42	
Absorption Tower	W47751	2/28/42	
"U" Bend	D51168	2/24/42	
Cover	D619	2/24/42	
Fan	D51869	2/28/42	
90° Elbow Pipe	14482	2/28/42	
Glass & "U" Bend	D52002	2/28/42	
Exhauster & Muffler	D56406	2/24/42	
Steam Jet Exhauster	D56407	2/24/42	
Overflow Pot Covers & Pot	14469	2/28/42	
Spigot	D8465	2/28/42	
Rulerometer	D8978	2/24/42	
Denitrated SA Cooler	W53400	2/24/42	

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LIST OF MAPS AND DRAWINGS

Sheet No. 3 of 3

BUILDING, STRUCTURE OR UTILITY ACID & FUME RECOVERY BUILDING Specifications: 1,26,58,62,96,119,120,125,128.  
 UNIT NO. 812 POST NO. 8121 thru 8126 AREA T.N.T. Contracts: PC 1,26,58,62,96,119,120,125,128. SC: 20,25,42.

TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
<b>ARRANGEMENT</b>			
Cover & Baffle Box	D52262	2-28-42	
Condensate Water Tank & Coil	D29196	2-24-42	5-13-42
N.A. Storage Tank Cover & Float	D52522	2-24-42	4-1-42
Desk (Operating Equip.)	D52685	2-20-42	
Carrier	D52700	2-20-42	
Supply Cabinet	D52721		
Bulletin Board Frame	D52741		
HCl Valve & Fittings List	D52585	2-28-42	7-23-42
Pioneer Alloy Valve & Fitting List	D52586	2-28-42	
Wooden Clamps (Typical)	D6904	2-24-42	
Arrangement of Acid Joints (Typical)	D3071045	2-24-42	
Denitrated S.A. Coolers - Cooling Water Arrangement	812-809-903		
<b>ARCHITECTURAL - Plans &amp; Details</b>			
Elevations & Details	W57334	2-21-42	3-13-42
Outside Platforms & Walkways	W57335	2-20-42	
Tank Enclosure	W57336	2-29-42	3-13-42
	812-809-205	6-6-42	9-30-42
<b>STEEL - Floor Plans - Sections &amp; Details</b>			
Elevations	W57149	1-28-42	2-12-42
	W57150	1-28-42	
<b>CONCRETE - Foundation Plans &amp; Details</b>			
	W57287	2-18-42	3-18-42
<b>ELECTRICAL - Plans, Sh. #1</b>			
Sections & Notes, Sh. #2	W58415	4-4-42	6-12-42
	W58416	4-4-42	2-12-42
<b>HEATING</b>			
	812-809-501	6-16-42	





















































LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY UNIT NO. 505 POST NO. 511	OPEN DRAINAGE DITCHES & STORM SEWERS Contracts: PC 1,13,16,24.	AREA UTILITIES & FACILITIES Specifications: 1,13,16,24.	
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
General Drainage Plan	511-100-001	3-18-42	6-23-42
12-Mile Creek Diversion Ditch)	511-501-001	3-20-42	12-21-42
12-Mile Creek Connecting Ditch)			
Central Drainage Ditch	511-502-001	3-30-42	10-12-42
Central Drainage Ditch	511-502-002	4-8-42	10-12-42
Central Drainage Ditch	511-502-003	4-17-42	10-12-42
Central Ditch Crossing at M, N, & O Streets	511-502-004	5-16-42	10-12-42
Southwestern Drainage Ditch	511-503-001	4-4-42	10-12-42
Southwestern Drainage Ditch	511-503-002	4-5-42	10-12-42
Southwestern Drainage Ditch	511-503-003	4-5-42	10-12-42
Southwestern Drainage Ditch	511-503-004	4-7-42	
Plan of 4-Mile Creek (Lake Ontario to Southwestern Drainage Ditch)	511-513-001	3-19-42	
"A" Ditch)	511-504-001	5-19-42	12-15-42
"B" Ditch)			
"C" Ditch)	511-512-001	7-19-42	12-19-42
"Y" Ditch)			
"D" Ditch )			
"U" Ditch )	511-518-001	8-10-42	12-22-42
6-Mile Creek Diversion Ditch)			
"E" Ditch )			
North of Balmer Road )	511-517-001	8-7-42	10-12-42
South of Balmer Road )			
"H" Ditch)	511-5109-001	7-16-42	10-12-42
"I" Ditch)			
"N" Street Sewer Outlet)			
"H" Spur #1)	511-511-001	6-16-42	12-12-42
"H" Spur #2)			
"K" Ditch)	511-510-001	5-21-42	10-12-42
"L" Ditch)			
"N" Ditch)	511-505-001	5-7-42	10-12-42
"N" Spur )			



## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY UNIT NO. 501 POST NO.	PRIMARY & SECONDARY ELECTRICAL DISTRIBUTION LINES	AREA UTILITIES & FACILITIES		
		Contracts: PC 1,72,84. SC: 25. Specifications: 1,72,84.		
TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION	
Right-of-Way Incoming 115 K.V. Line	501-603-013			
Substation - 115 K.V. to 6.9 K.V.	401-400-601		2-23-43	
Wiring Diagram Primary Feeders & Transformer Details	501-603-205		3-5-43	
Underground Primary Distribution Lines At Main Substation	501-603-009A	3-3-43	3-1-43	
Primary Distribution Lines - Sheet #1	501-603-001		11-25-42	
Primary Distribution Lines - Sheet #2	501-603-002		3-4-43	
Primary Distribution Lines - Sheet #3	501-603-003		3-3-43	
Primary Distribution Lines to Sewer & Industrial Waste	505A-500-603		9-9-42	
Primary Distribution Lines to River Pumps	501-601-014		1-5-43	
Secondary Power & Light Distribution Lines - Admin. Area	501-603-004		3-4-43	
Secondary Power & Light Distribution Lines - Shop Area	501-603-005		3-4-43	
Secondary Power & Light Distribution Lines - Acid Area	501-603-006		3-4-43	
Secondary Power & Light Distribution Lines - Acid Area	501-603-007		3-4-43	
Secondary Power & Light Distribution Lines - TNT Area	501-603-008		3-4-43	
Electrical - Telephone & Fire Alarm Distribution Poles, Sh. 1	501-603-010		10-1-42	
Electrical - Telephone & Fire Alarm Distribution Poles, Sh. 2	501-603-011		10-12-42	
Electrical - Telephone & Fire Alarm Distribution Poles, Sh. 3	501-603-012		11-3-42	
Pole Assembly Details	501-603-204			
Pole Top Arrangements	501-603-203		8-29-42	
Pothead Mounting on Poles & Selector Switch Arrangement	501-603-207		3-3-43	
Electric Pole Assemblies	501-602-201		8-28-42	
Arrangement of Pole Hung Transformers	501-603-206		3-3-43	
Arrangement of Transformer Substations on Concrete Pads	501-603-208		3-3-43	
Floodlighting - Classification Yard	601-100-601		3-1-43	
Fence Lighting - Sentry Houses, etc.	605-101-005		10-9-42	
Fence Around 115 K.V. Substation	401-400-337	8-28-42		
Connection of Lines Acquired from Niagara Hudson to New 6.9 K.V. Lines	501-603-015	11-23-42	3-4-43	
Connection of Lines Acquired from Niagara Hudson to New 6.9 K.V. Lines	501-603-016	11-23-42	3-4-43	
Street Lighting - Series Loop - Sheet #1	603-100-601		12-15-42	
Street Lighting - Series Loop - Sheet #2	603-100-602		3-4-43	







## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY		OUTSIDE PROCESS LINES	AREA	ACID & T.N.T.
UNIT NO. 508	POST NO.	Contracts: PC 1,96. SC: 20,25.	Specifications: 1,96.	
TITLE OF MAP OR DRAWING		PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
ITEM -				
N.A. Tank Car Unloading		W58603	3-24-42	
Toluene Car Unloading		W58604	3-24-42	
O.V. Car Unloading		W58605	3-24-42	
Tank Unloading		W58606	3-24-42	
Pipe Conn. Tank (602)		D56104	3-14-42	
N.A. Tank Car (602)		W58583	3-19-42	
N.A. Tank Car (Safety Valve Cover) (602)		D56114	3-26-42	
Start Up M.A. Storage		W57182	2-29-42	6-9-42
O.S.L. Pipe Anchors		D52061		
O.S.L. Supports		D52310		
18-8 CB Fume Pipe O.S.L.		D54693	3-7-42	4-27-42
N.A. & Air Pipe O.S.L.		D54740	3-5-42	6-17-42
Brackets, Levers, Etc. O.S.L.		D55075		
Dip Tube Crane		D55121	3-12-42	
N.A. Tank Car Flange Bolts		D55116		
Guy Rods		D55108		
Tank Anchors		D42870X1	4-9-42	
Suction Pipe, Guide Flanges		D52135	4-9-42	
Profiles				
Tri-Oil Lines (802 to 806)		Pro. 2659		
Car Unloading (802 to 803) Sh. #1		Pro. 2672		
Car Unloading (802 to 803) Sh. #2		Pro. 2673		
Car Unloading Between Bldgs. 801-2-3 & 812 Sh. #1		Pro. 2657		
Car Unloading Between Bldgs. 801-2-3 & 812 Sh. #2		Pro. 2658		
Toluene, Start N.A. (804-508-801-803)		W58741		
Anhydrous Ammonia H.P. & L.P. Storage		508-300-001	5-11-42	7-9-42
Car Spots and Building No. 30		508-300-002	5-11-42	9-16-42
H. P. Storage to Gasifier		508-300-003	5-11-42	7-10-42
N. A. Car Spot & Storage Tanks		508-300-004	5-22-42	8-3-42
T.N.T. Storage & Dark S.A. Conc. House		508-300-008	5-22-42	9-21-42





## LIST OF MAPS AND DRAWINGS

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BUILDING, STRUCTURE OR UTILITY		ROADS, DRIVES, WALKS AND PARKING LOTS AREA		UTILITIES AND FACILITIES	
UNIT NO.	POST NO.	Contracts:	PC	Specifications:	
603		1,24		1,24	
613					
TITLE OF MAP OR DRAWING					
PLAN NUMBER					
DATE OF DRAWING					
DATE OF LAST REVISION					
Pump House Road					
503B-100-004					
10/27/42					
10/6/42					
Typical Section of Roads					
603 -100-003					
3/27/42					
General Road Plan					
603 -100-004					
9/24/42					
"O" Street					
603A-100-001					
3/30/42					
7/27/42					
Fletcher Road, Sheet #1					
603A-101-001					
4/3/42					
Fletcher Road, Sheet #2					
603A-101-002					
5/8/42					
9/4/42					
Fletcher Road, Sheet #3					
603A-101-003					
5/8/42					
9/15/42					
Conc. Box Culvert Extension at Fletcher & Creek Rds.					
603A-101-005					
6/13/42					
Drop Inlet on Quad. Pipe - Fletcher Rd.					
603A-101-006					
4/28/42					
Outlet Ditches - Sta. 10 + 50 + 30 + 25					
603A-101-007					
7/1/42					
Outlet Ditches - Sta. 40 + 68 + 57 + 00					
603A-101-008					
8/11/42					
Plan and Profile of Harold Road					
603A-102-001					
4/18/42					
"N" Street					
603A-103-001					
4/20/42					
6/11/42					
"B" Avenue					
603A-104-001					
5/2/42					
9/12/42					
Plan of Portion of "B" Ave. - Gate and Gatehouse					
603A-104-002					
8/31/42					
"M" Street					
603A-105-001					
4/20/42					
9/24/42					
"C" Avenue					
603A-107-001					
5/4/42					
6/7/42					
"J" Avenue					
603A-108-001					
5/6/42					
5/12/42					
"H" Street					
603A-109-001					
5/11/42					
6/3/42					
"K" Ave. Extension					
603A-110-001					
6/2/42					
6/4/42					
"N", "O", "P" Aves. and "S" Street					
603A-111-001					
6/3/42					
"I" Avenue, "K" and "L" Streets					
603A-112-001					
6/1/42					
6/19/42					
"F", "G" and "H" Avenues					
603A-113-801					
6/4/42					
7/6/42					
"E" Avenue, "I" and "J" Streets					
603A-114-001					
6/22/42					
8/17/42					
"R" Avenue					
603A-116-001					
6/17/42					
7/7/42					
"R" Street Extension					
603A-117-001					
6/17/42					
7/7/42					
Castle Garden Rd. - Fletcher to "O" Street					
603A-118-001					
7/18/42					
7/30/42					
"L" Avenue					
603A-119-001					
7/30/42					
8/7/42					
Castle Garden Rd. - "N" St. to "M" St., "H" St. to Balmer Rd.					
603A-120-001					
8/1/42					
Swan Road - Sheet #1					
603A-121-001					
7/30/42					
Swan Road - Sheet #2					
603A-121-002					
7/30/42					

## LIST OF MAPS AND DRAWINGS

Sheet No. 2 of 3

BUILDING, STRUCTURE OR UTILITY ROADS, DRIVES, WALKS AND PARKING LOTS UNIT NO. 603 POST NO. 613		AREA (CONTD.)	UTILITIES AND FACILITIES Contracts: PC 1,24 Specifications: 1,24	
TITLE OF MAP OR DRAWING		PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Roads & Walks - Acid Area (Sheet #1)		603A-122-001	8/14/42	1/12/43
Roads & Walks - Acid Area (Sheet #2)		603A-122-002	8/14/42	
Roads & Walks - Nitration Area		603A-123-001	8/15/42	1/10/43
Shop Area		603A-124-001	9/12/42	9/16/42
Toluene Bulk Storage		603A-125-001	9/22/42	
Sewage Disposal Area		603A-126-001	9/28/42	
"P" Street - Pavt. & Drainage		603A-127-001	10/14/42	
"Q" Street		603B-900-001	4/13/42	7/13/42
"K" Street		603B-901-001	5/8/42	
"D" Avenue		603B-902-001	4/23/42	4/28/42
"F" Street		603B-903-001	5/8/42	7/31/42
"E" Street		603B-904-001	5/8/42	
"B" Street		603B-905-001	5/8/42	
"C" Street		603B-906-001	5/8/42	
"D" Street		603B-907-001	4/25/42	
"A" Street		603B-908-001	5/8/42	7/14/42
Typical Igloo Driveway		603B-909-001	6/9/42	
Drive to Loading Docks - Sta. 2.9 / 61.3		603B-910-001	8/5/42	
Drive to Loading Docks - Sta. 7 / 61.3		603B-910-002	8/4/42	
"A" Avenue Patrol Road - Sheet #1		603C-100-001	6/2/42	6/15/42
"A" Avenue Patrol Road - Sheet #2		603C-100-002		
"R" Street Patrol Road		603C-101-001	6/3/42	9/12/42
Lutts Patrol Road		603C-102-001	5/20/42	7/24/42
South Patrol Road - Sheet #1		603C-103-001	6/29/42	7/10/42
South Patrol Road - Sheet #2		603C-103-002	7/14/42	7/14/42
East Patrol Road - Sheet #1		603C-104-001	6/17/42	8/26/42
East Patrol Road - Sheet #2		603C-104-002	6/17/42	9/7/42
North Patrol Road - Sheet #1		603C-105-001	8/21/42	
North Patrol Road - Sheet #2		603C-105-002	7/4/42	
Balmer Road Bridge over Central Drainage Ditch		603D-103-301	6/29/42	
North Patrol Road Bridge over Central Drainage Ditch		603D-104-301	7/14/42	

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## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY UNIT NO. 505 POST NO.	SEWERAGE SYSTEM Contracts: PC 88,99,125,153.	AREA Specifications: 88,99,125,153.	GENERAL UTILITY
TITLE OF MAP OR DRAWING			
	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
Sanitary Sewers, Cooling Water (Acid) Sewers			
Sanitary Sewers, Acid Sewers and Trade Waste Sewers in TNT, Acid and Sewage Disposal Plant Areas			
	505A-500-009	7-15-42	2-3-43
Profile of Sanitary and Acid Sewers, TNT Area			
	505A-500-019	2-8-43	.
Profile of Acid Sewers of Acid Area			
	505A-500-020	2-9-43	
Profile of Sanitary Sewers, Acid & TNT Areas			
	505A-500-021	2-9-43	
Sanitary and Acid Sewers in Acid, Administration and Shop areas			
	505A-500-026	7-8-42	1-18-43
Sewers to Buildings Nos. 704, 707, 709 - 733 and 814			
	505A-500-030	8-13-42	
Sewers at Classification Yard Buildings			
	505A-500-033	10-30-42	
Profile Acid Sewer in Acid Area and Sanitary Sewer in Power Area			
	505A-500-108	2-9-43	
Manhole details			
	505A-500-215	6-3-42	
Sewer Pipe and Trench Details			
	505A-500-216		
Special Manhole "I" near Neutralization Plant			
	505A-500-227	7-21-42	
Sewers and Piping Arrangement for Safety Showers, Acid Area			
	505A-500-239		
Sewers and Piping Arrangement for Safety Showers, TNT Area			
	505A-500-240	2-14-42	
COLLECTION SEWERS			
Profile of Sewers, TNT Area to Pumping Plant			
	505A-500-018	5-30-42	7-2-42
Sewage and Surface Drainage at Bldgs. #806.			
	505A-500-029	7-28-42	
18" Trade Waste Sewer			
	505A-500-255	1-7-43	
Flume and Floor Trench Changes in Bldgs. #806			
	505A-500-256	2-16-42	2-16-42
OUTFALL SEWER TO NIAGARA RIVER			
Plan and Profile, Mixing Tank to Sta. 70			
	505A-500-012	7-12-42	
Plan and Profile, Sta. 70 to Sta. 100			
	505A-500-013	5-29-42	
Plan and Profile Sta. 100 to Sta. 160			
	505A-500-014	5-29-42	
Plan and Profile Sta. 160 to Head Tank			
	505A-500-016		
Right-of-Way Project to River Road			
	505A-500-017	5-29-42	
Profile of Pressure Outfalls and Details of Cribs			
	505A-500-023	8-12-42	8-14-42
Profile of Pressure Outfalls Showing Depths to Invert			
	505A-500-024	8-12-42	
Manholes, Subaqueous Pipe and Nozzle Details			
	505A-500-225	11-2-42	







## LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

BUILDING, STRUCTURE OR UTILITY UNIT NO.	TEMPORARY BUILDINGS POST NO.	AREA Contracts: PC 1. SC: 4,10,11,15,16,20,22,25,29.	GENERAL Specifications: 1	TITLE OF MAP OR DRAWING	PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
				A.E.M. No. 2 - Floor Plan	T-31-1		
				A.E.M. No. 3	T-32-1		
				A.E.M. No. 4 - Floor Plan	T-22-1		
				Connecting Corridors, A.E.M. Buildings	T-11-1		
				Main Time Office	T-2-1		
				Standard Details for Construction Field Offices (Portable)	T-5-1		
				Standard Details for Constr. Field Offices, 16' x 20'	T-34-1		
				Standard Details for Constr. Field Offices, 20' x 24'	T-35-1		
				Check Offices	T-85-2		
				Ornamental Iron Shop - Shop Area	T-79-1		
				Lead Burners Shop - Acid Area	T-80-1		
				Addition to Ornamental Iron Shop	T-79-1		
				Baker Smith - Job Office	T-16-1		
				Baker Smith - Pipe Shop	T-25-1		
				Baker Smith - Machine Shop	T-26-1		
				Baker Smith - Welding Shop	T-27-1		
				Baker Smith - Loading & Storage Platforms	T-28-1		
				Baker Smith - Building Location Plan	T-29-1		
				Shelter for Welding Equipment	T-33-1		
				Lord Electric Office and Storage	T-54-2		
				Welding, Blacksmith, Fabrication Shops, Sheet 1	T-59-2		
				Welding, Blacksmith, Fabrication Shops, Sheet 2	T-59-2		
				Tool House and Stock Room	T-63-1		
				Paint and Sign Shop	T-65-1		
				Addition to Riggers Shop	T-73-1		
				Loading and Storage Platforms	T-74-1		
				Central Pay Office - White, Lord Electric, Baker Smith	T-85-2		
				Transportation Center - Grease Pit	T-17-1		
				Transportation Center - Garage	T-24-1		
				Transportation Center - Heavy Equipment Repair Shops	T-39-2		

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LIST OF MAPS AND DRAWINGS

Sheet No. 1 of 2

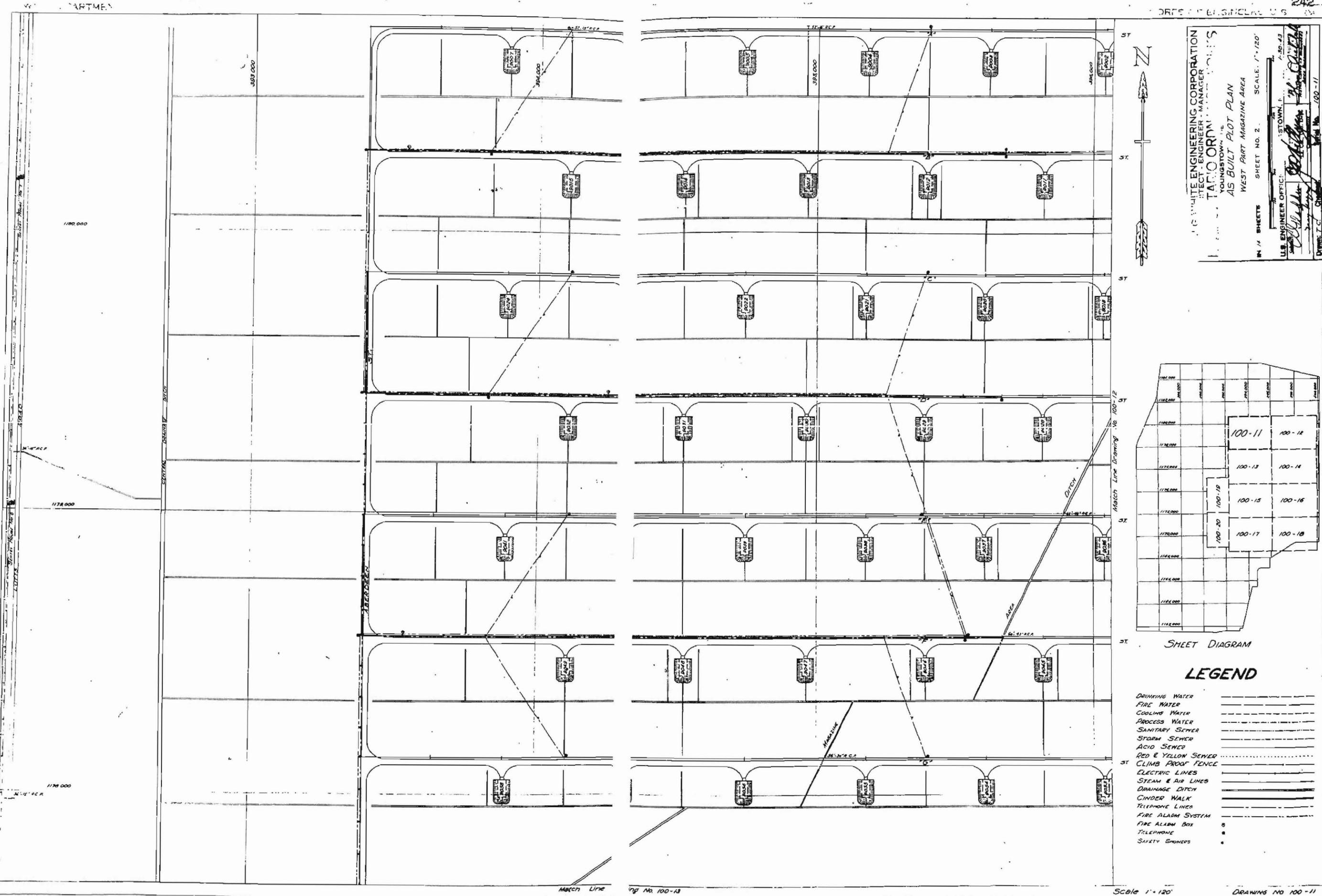
BUILDING, STRUCTURE OR UTILITY		WATER DISTRIBUTION		AREA UTILITIES & FACILITIES		
UNIT NO.	503	POST NO.	Contracts: FC 1,23,79,83.	SC: 20.	Specifications: 1,23,79,83.	
TITLE OF MAP OR DRAWING				PLAN NUMBER	DATE OF DRAWING	DATE OF LATEST REVISION
First Part of Drinking Water Supply & Distrib. System				503A-500-001	3-20-42	
First Part of Drinking Water Supply & Distrib. System				503A-500-002	3-22-42	
First Part of Drinking Water Supply & Distrib. System				503A-500-003	3-21-42	4-1-42
Water Distribution System - General Location Plans				503-500-004	4-4-42	8-24-42
Water Distribution System - General Location Plans				503-500-005	4-4-42	7-31-42
Water Distribution System - General Location Plans				503-500-006	4-4-42	7-31-42
Water Distribution System - General Location Plans				503-500-007	4-24-42	8-27-42
Water Distribution System - General Location Plans				503-500-008	4-4-42	7-31-42
Water Distribution System - General Location Plans				503-500-009	4-4-42	8-15-42
Water Distribution System - Profiles				503-500-014		
Water Distribution System - Profiles				503-500-015		
Water Distribution System - Profiles				503-500-016		
Water Distribution System - Profiles				503-500-017		
Water Distribution System - Typical Connections, Details				503-500-018		
Water Distribution System - Final Drawing - Shop Area				503-500-024	9-28-42	
Water Distribution System - Final Drawing TNT Area, C-D Lines				503-500-025	9-24-42	
Water Distribution System - Final Drawing TNT Area, A-B Lines				503-500-026	9-25-42	
Water Distribution System - Final Drawing TNT Area, E-F Lines				503-500-027	11-30-42	
Water Distribution System - Final Drawing Acid Area (East)				503-500-028E	11-30-42	
Water Distribution System - Final Drawing Acid Area (West)				503-500-028W	11-30-42	
Water Distribution System - Final Drawing Classification Yard				503-500-029	11-30-42	
Water Distribution System - Final Drawing Admin. Area				503-500-030	11-30-42	
Water Distribution System - Final Drawing Sew. Disp. Area				503-500-031	11-30-42	
Water Distribution System - Final Drawing Power & Water Treatment Areas				503-500-032	11-30-42	
Water Distribution System -				503-500-034	10-22-42	
Water Distribution System - Final Drawing, Water Line to A-E-M 4				503-500-035	11-30-42	
Water Distribution System - Final Drawing, Toluene, Box & Shock Magazine						
AREAS				503-500-036	11-30-42	
Water Distribution System - 2" Drinking Water Line to Transportation Center				503-500-037	1-9-43	
Connection for Booster Pump for Drinking and Service Water				503A-500-202	3-21-42	
Meter Pit for Service and Drinking Water				503A-500-203	3-22-42	



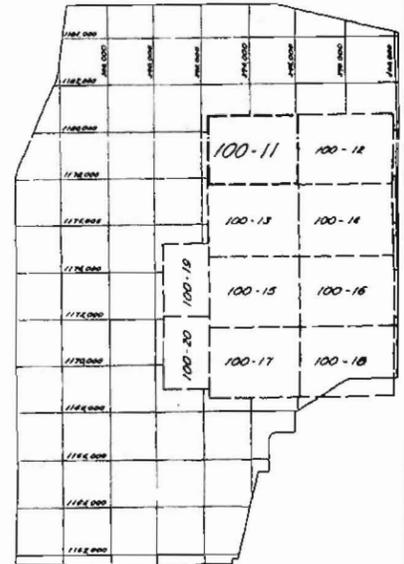
# AS BUILT PLOT PLANS

## TABULATION OF DUPONT AND L. K. O. BUILDING NUMBERS

ADMINISTRATION AREA		DUPONT NUMBER	L. K. O. NUMBER	ACID AREA		DUPONT NUMBER	L. K. O. NUMBER	NITRATION AREA		DUPONT NUMBER	L. K. O. NUMBER	WATER SUPPLY		COST ACC NUMBER	L. K. O. NUMBER
GATE HOUSE AND CLOCK ALLEYS		701	701	ANHYDROUS AMM STORAGE - L.P.		301	3011	MONO-NITRATING HOUSE - A		801A	8011	PUMPING PLANT		403F	5412
TELEPHONE BUILDING		702	702	H.P.		301	3012	B		801B	8012	COOLING WATER RESERVOIR		413A	5421
MAIN OFFICE BUILDING		703	703	AMMONIA OXIDATION PLANT		302	3021	C		801C	8013	ELEVATED DRINKING WATER STORAGE		414B	5423
EMPLOYMENT BUILDING		703	705	PUMP HOUSE AND OFFICE		302	3022	D		801D	8014	SURGE TANK		403A	5431
CHANGE HOUSE		707	707	62% NITRIC ACID STORAGE		302	3023	E		801E	8015	ACCELERATOR - NORTH		403B	5432
CAFETERIA		708	708	NITRIC ACID CONCENTRATOR PLANT		303	3031	F		801F	8016	WEST		403B	5433
MAIN FIRE HEADQUARTERS		709	709	N & S STORAGE TANKS		303	3032	G & TRI NITRATING HOUSE - A		802A	8021	SOUTH		403B	5434
FLAG POLE		712	712	CONCENTRATING MIX CIRCULATORS		305	3051	B		802B	8022	FILTER BUILDING		403D	5435
MEDICAL SERVICE BUILDING		719	719	93% DARK SA STORAGE TANKS		305	3052	C		802C	8023	CHEMICAL STORAGE BUILDING		403E	5436
GUARD HEADQUARTERS		720	720	CONCENTRATING MIX STORAGE		305	3053	D		802D	8024	DECARBONATION BASIN		403C	5437
GARAGE FOR STAFF & ORDNANCE		728	728	STRONG NITRIC ACID STORAGE		305	3054	E		802E	8025	SLURRY POOL			
GARAGE FOR GUARD HOTS		730	730	FB & DLEUM STORAGE		305	3055	F		802F	8026	RIVER PUMPING STATION		404A	5441
DORMITORY (NORTH)			751	TNT RESIDUAL S.A. STORAGE		305	3056	FORTIFYING HOUSE - A		803A	8031	RIVER GATE HOUSE		404B	5442
DORMITORY (SOUTH)			752	93% CLEAR SA STORAGE		305	3057	B		803B	8032	RIVER INTAKE WELL		404C	5443
				TNT MIX STORAGE TANKS		305	3058	C		803C	8033	CHLORINATION STATION		414C	5444
				SELLITE PLANT		307	3071	D		803D	8034	FIRE STORAGE RESERVOIR			
				B & A CONCENTRATOR HOUSE		308	3081	E		803E	8035	ELEVATED FIRE STORAGE TANK		414C	5422
				FUEL OIL STORAGE TANKS		308	3082	F		803F	8036	ELEVATED COOLING WATER TANK		303	3331
								WORKING TOLUENE STORAGE TANKS - A		804A	8041				
								B		804B	8042				
								C		804C	8043				
								D		804D	8044				
								E		804E	8045				
								F		804F	8046				
								G		804G	8047				
								H		804H	8048				
								I		804I	8049				
								J		804J	8050				
								K		804K	8051				
								L		804L	8052				
								M		804M	8053				
								N		804N	8054				
								O		804O	8055				
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								AV		804AV	8088				
								AW		804AW	8089				
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								AZ		804AZ	8092				
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								BB		804BB	8094				
								BC		804BC	8095				
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								BE		804BE	8097				
								BF		804BF	8098				
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								BK		804BK	8103				
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								BM		804BM	8105				
								BN		804BN	8106				
								BO		804BO	8107				
								BP		804BP	8108				
								BQ		804BQ	8109				
								BR		804BR	8110				
								BS		804BS	8111				
								BT		804BT	8112				
								BU		804BU	8113				
								BV		804BV	8114				
								BW		804BW	8115				
								BX		804BX	8116				
								BY		804BY	8117				
								BZ		804BZ	8118				
								CA		804CA	8119				
								CB		804CB	8120				
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								CE		804CE	8123				
								CF		804CF	8124				
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								CV		804CV	8140				
								CW		804CW	8141				
								CX		804CX	8142				
								CY		804CY	8143				
								CZ		804CZ	8144				



WHITE ENGINEERING CORPORATION  
 ARCHT. - ENGINEER - MANAGER  
 TAYLOR  
 YOUNGSTOWN, OHIO  
 AS BUILT PLOT PLAN  
 WEST PART MAGAZINE AREA  
 SHEET NO. 2  
 SCALE: 1" = 120'  
 U.S. ENGINEER OFFICE  
 STOWN, OHIO  
 190-11  
 190-11



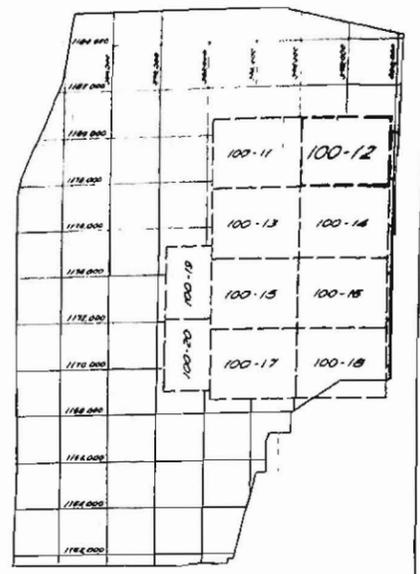
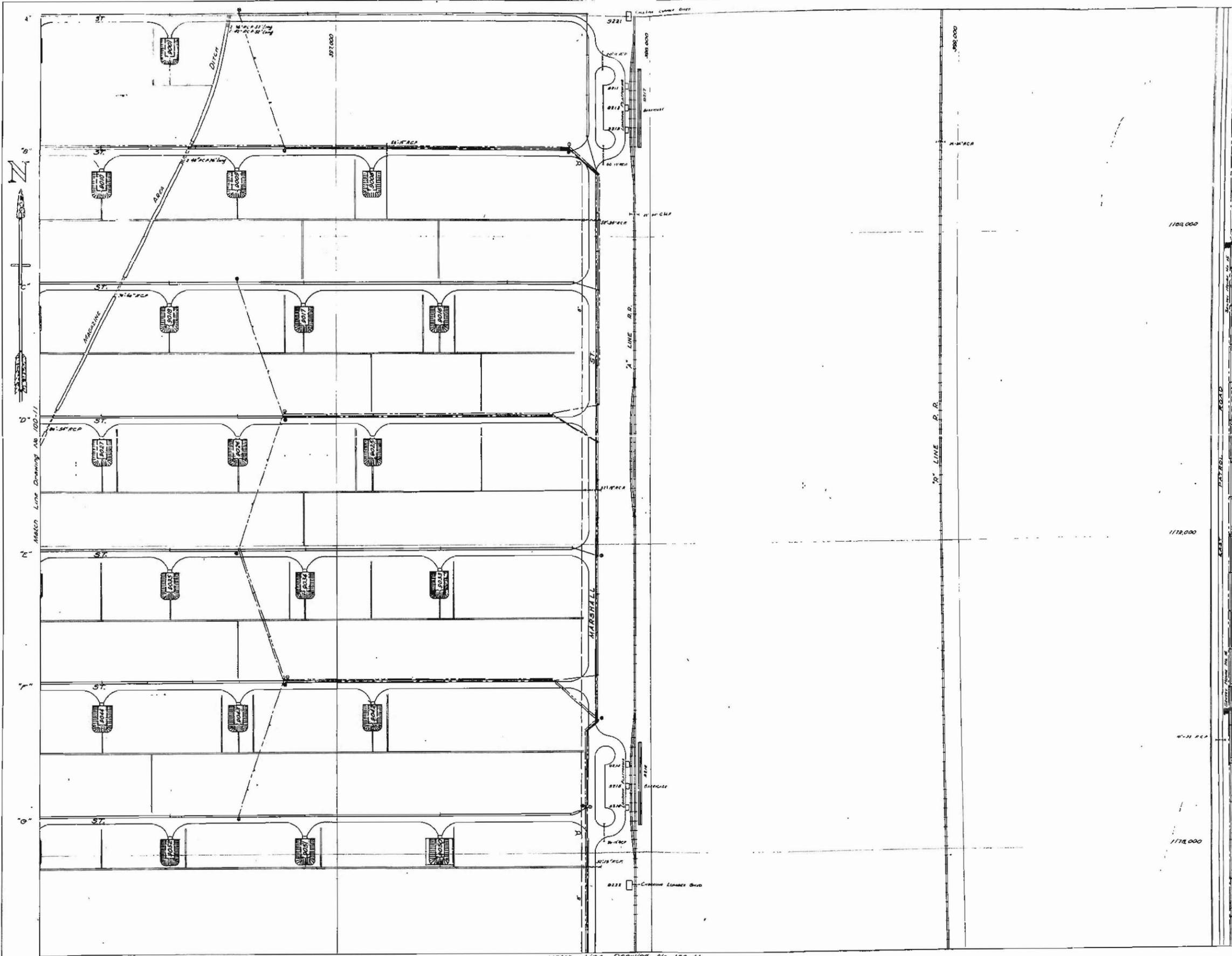
SHEET DIAGRAM

LEGEND

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINES
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SPRINGS

Scale 1" = 120'

DRAWING NO 100-11



SHEET DIAGRAM

THE WHITE ENGINEERING CORPORATION  
 LICENSED PROFESSIONAL ENGINEERS  
 100-11  
 YOUNGSTOWN, OHIO  
 AS BUILT PLOT PLAN  
 EAST PART MAGAZINE AREA

IN 14 SHEETS SHEET No. 12 SCALE 1" = 120'

U.S. PATENT OFFICE REGISTERED  
 7-31-43  
 T.C. CROFT  
 Drawn: T.C. CROFT  
 Serial No. 100-12

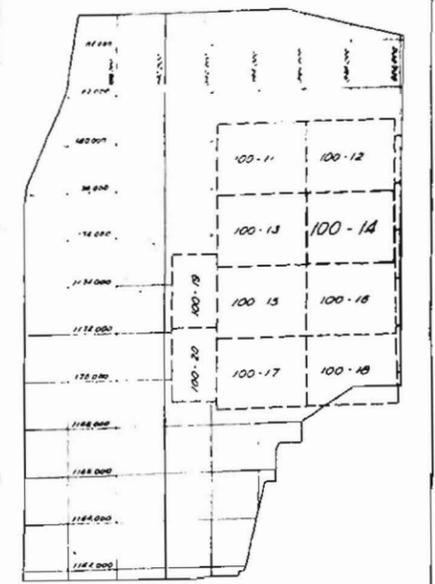
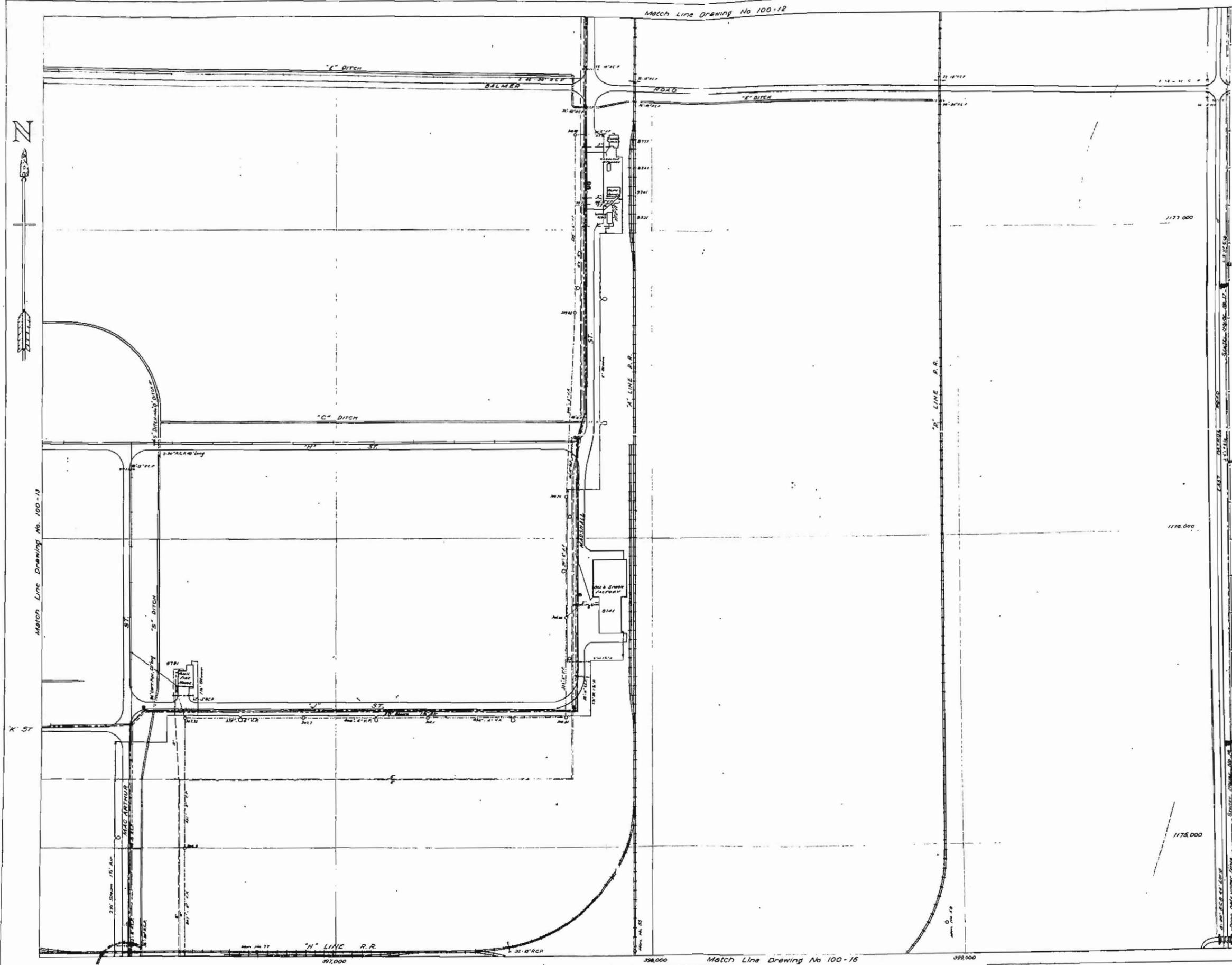
LEGEND

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINES
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS



DEPARTMENT

Match Line Drawing No 100-12



SHEET DIAGRAM

THE J. G. WHITE ENGINEERING CORPORATION  
 LARRY E. WHITE, ENGINEER  
 YOUNGSTOWN, OHIO  
 AS BUILT PLOT PLAN  
 AREA EAST T N T AREA

SCALE 1" = 120'  
 SHEET NO. 5  
 1" = 120'

U.S. GEOLOGICAL SURVEY  
 DISTRICT OFFICE  
 CLEVELAND, OHIO

Drawn: J. G. White  
 Checked: J. G. White  
 Date: 10-14-14

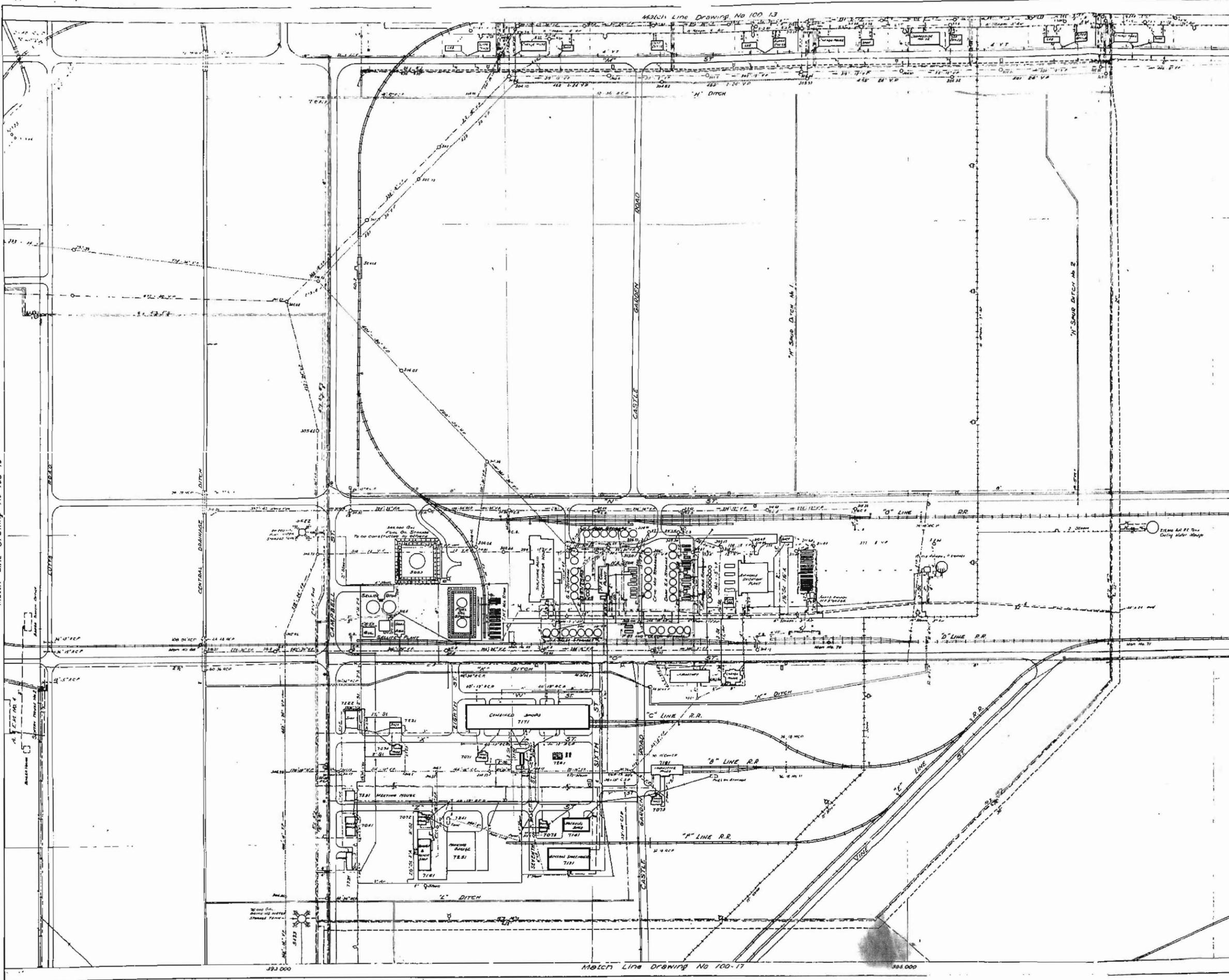
LEGEND

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINE
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS

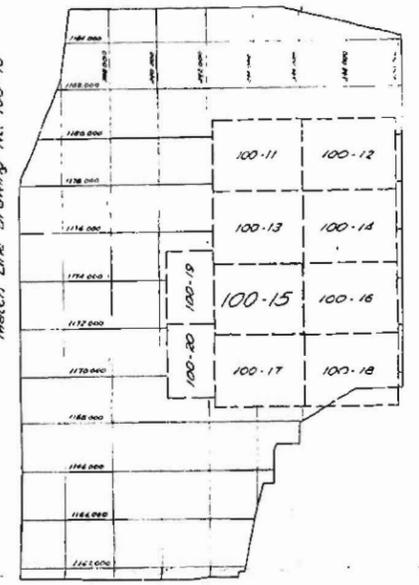
Match Line Drawing No 100-19

Match Line Drawing No 100-13

Match Line Drawing No 100-17



THE J.G.V. ENGINEERING CORPORATION  
 PROJECT ENGINEER - MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN, NEW YORK  
 AS BUILT PLOT PLAN  
 A.C.P. & S.H.C. J.E.C.S.  
 IN 11 SHEETS SHEET No. 6  
 U.S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE 2-1-72  
 Checked by [Signature]  
 Drawn: T.C. [Signature]  
 Serial No. 100-15



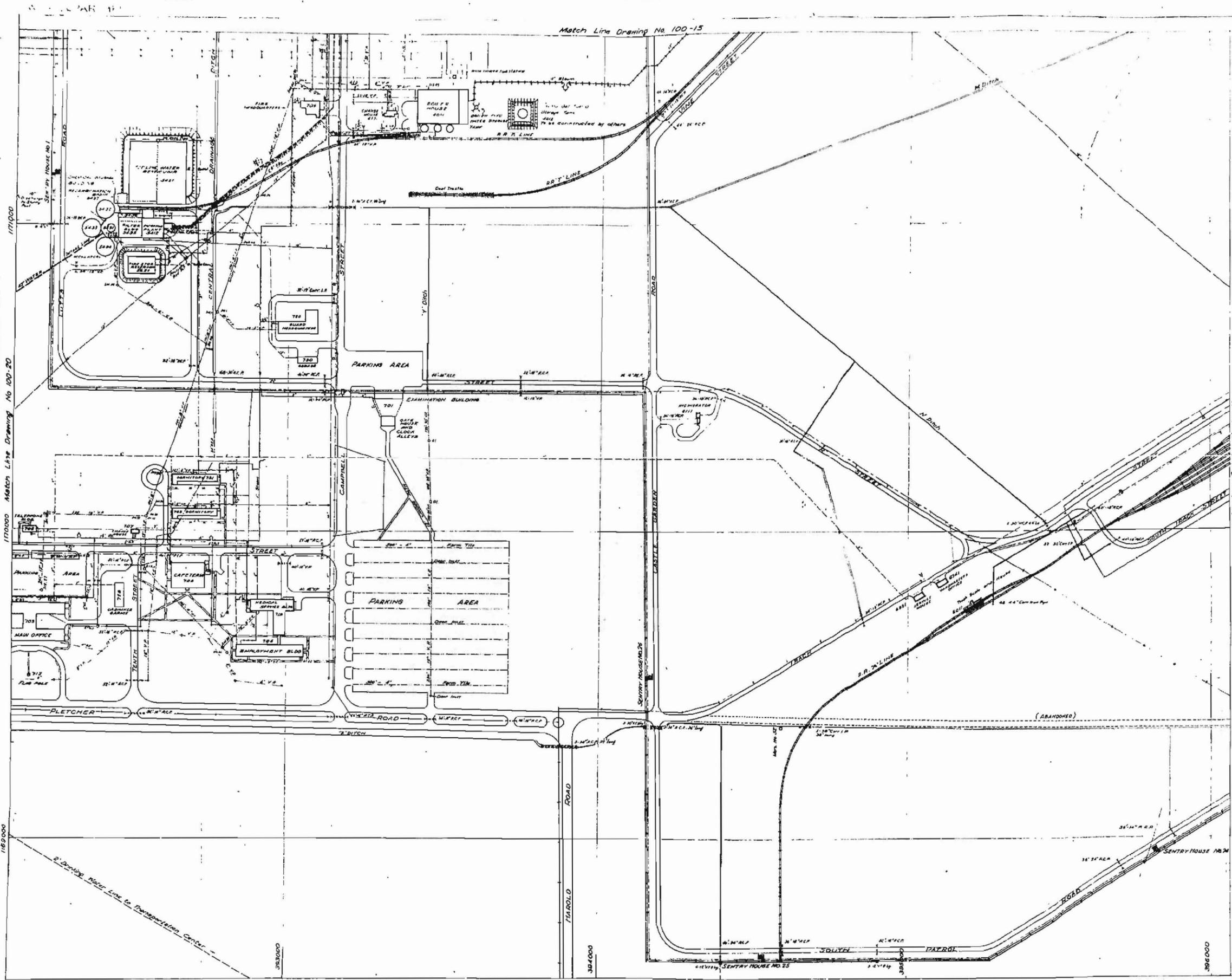
SHEET DIAGRAM

÷LEGEND÷

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINE
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS

Scale 1" = 120' DRAWING No 100-15

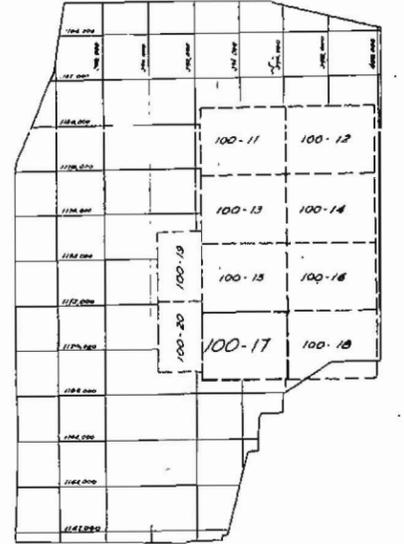




Match Line Drawing No. 100-15

**THE J. G. WHITE ENGINEERING CORPORATION**  
 ARCHITECT-ENGINEER-MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK  
 AS BUILT P.L.C.T. PLAN

POWER, ADMINISTRATION & WATER TREATMENT AREAS  
 SHEET No. 6  
 SCALE: 1" = 120'  
 U.S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE: 7.30.45

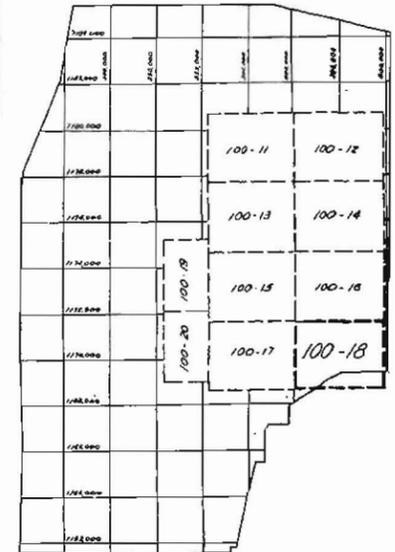
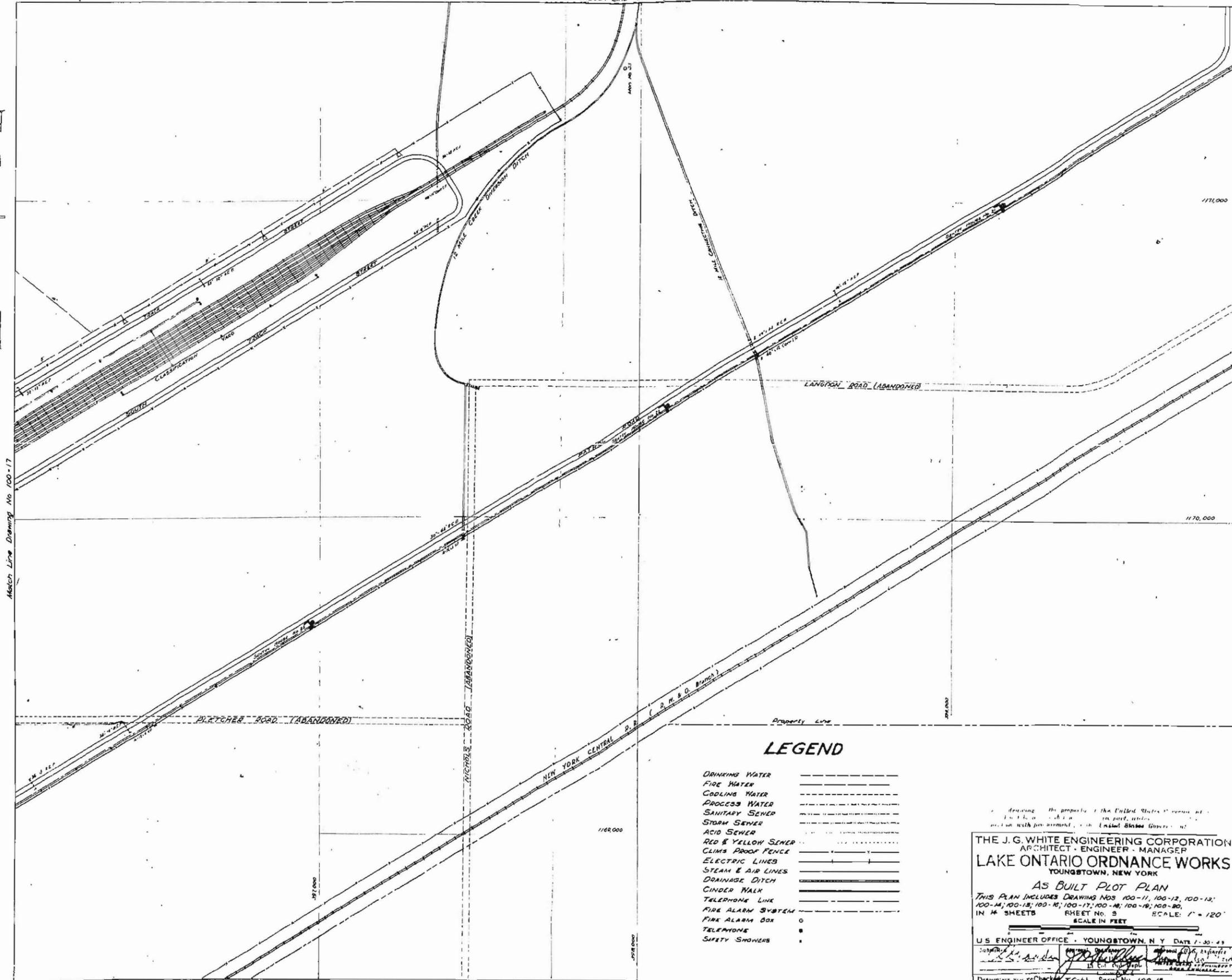


SHEET DIAGRAM

**LEGEND**

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STEAM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINE
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS

Match Line Drawing No 100-16



SHEET DIAGRAM

### LEGEND

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK
- TELEPHONE LINE
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK

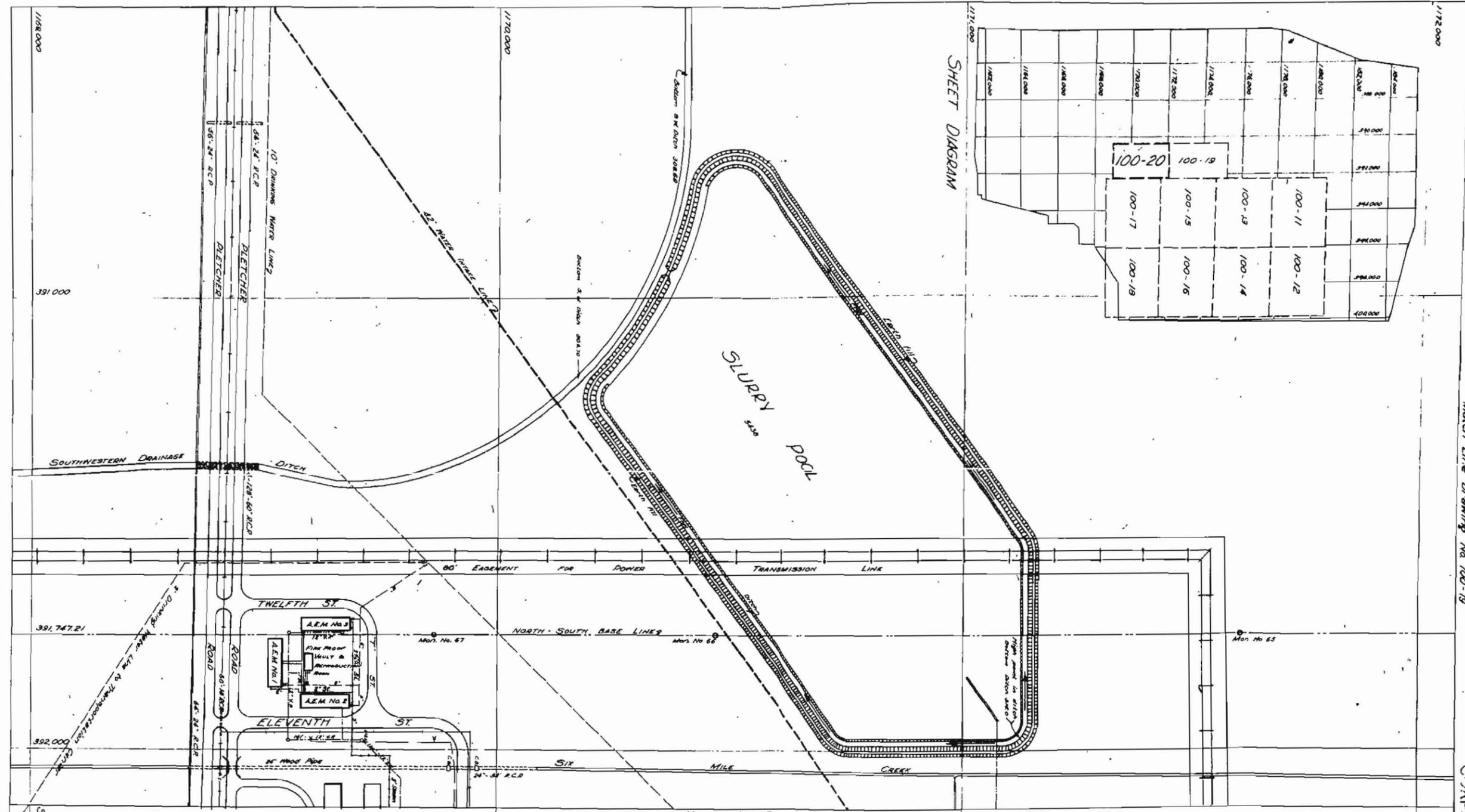
**AS BUILT PLOT PLAN**  
 THIS PLAN INCLUDES DRAWINGS NOS 100-11, 100-12, 100-13,  
 100-14, 100-15, 100-16, 100-17, 100-18, 100-19, 100-20,  
 IN 4 SHEETS SHEET No. 3 SCALE: 1" = 120'

U.S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE 7-30-43  
 Drawn: W. H. F. C. Checked: T. Cobb. Serial No. 100-18

TITLE FOR COMPLETE ASSEMBLED MAP

This section (Drawing No 100-18) is an as built plan of the Classification Yard area





SHEET DIAGRAM

Match Line Drawing No. 100-17

### LEGEND

- DRINKING WATER
- FIRE WATER
- COOLING WATER
- PROCESS WATER
- SANITARY SEWER
- STORM SEWER
- ACID SEWER
- RED & YELLOW SEWER
- CLIMB PROOF FENCE
- ELECTRIC LINES
- STEAM & AIR LINES
- DRAINAGE DITCH
- CINDER WALK

- TELEPHONE LINE
- FIRE ALARM SYSTEM
- FIRE ALARM BOX
- TELEPHONE
- SAFETY SHOWERS

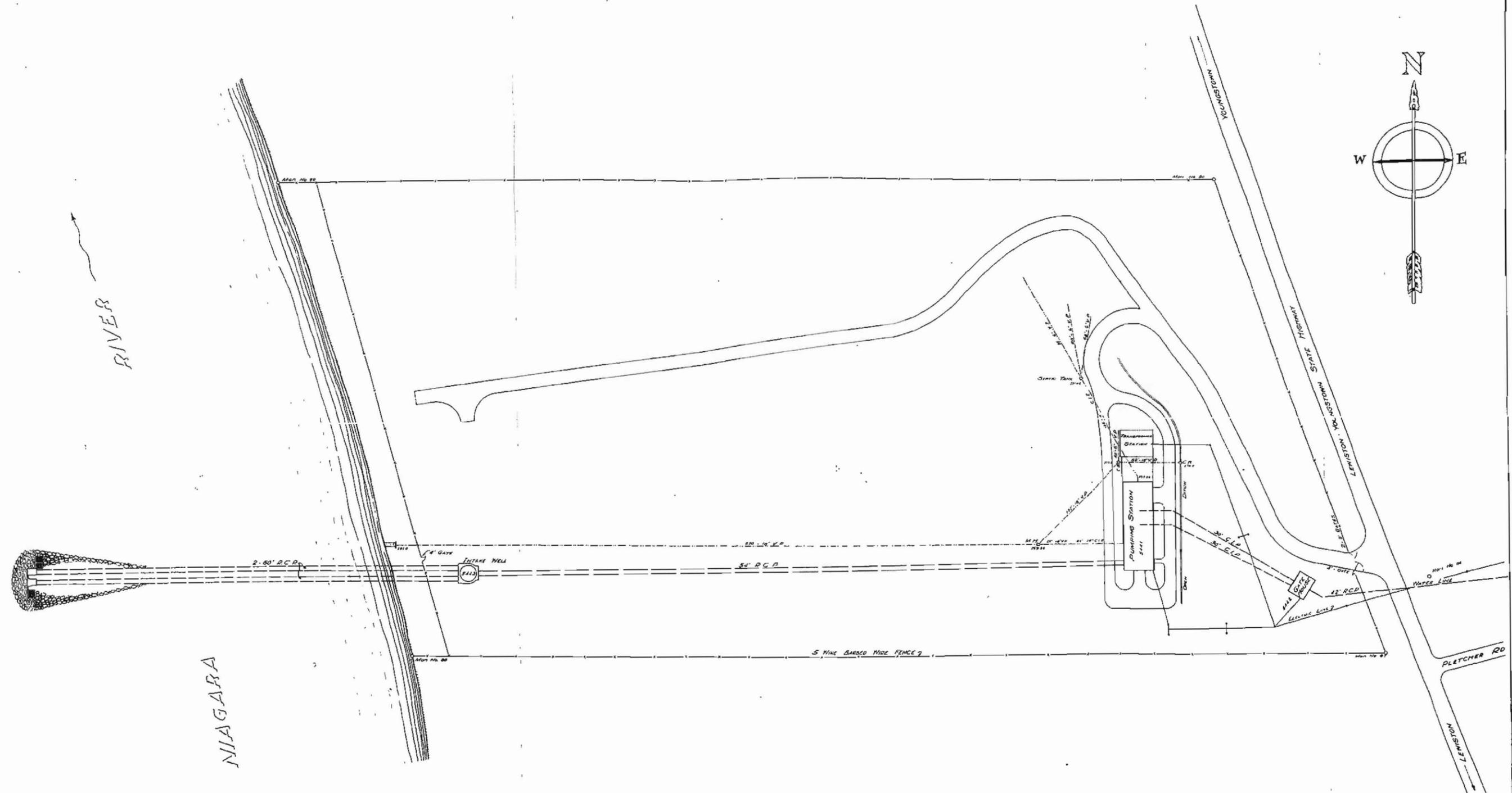


THE J. C. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK  
 AS BUILT PLOT PLAN  
 SLURRY POOL

IN 4 SHEETS SHEET NO. 11 1" = 120'  
 U.S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE 1-30-43

Drawn: W.H. Checked: T.C. Serial No. 100-20

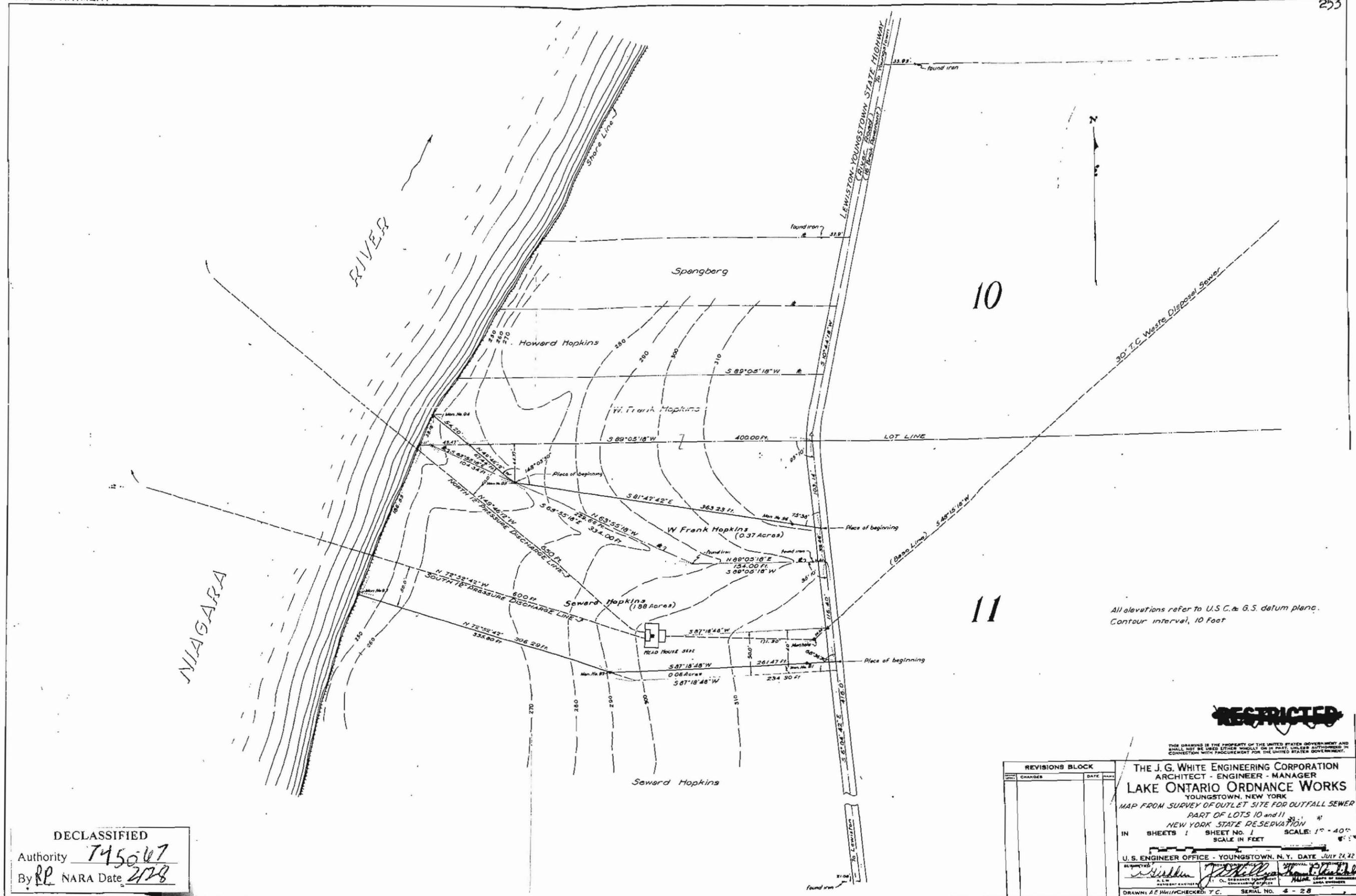
Scale 1" = 120' DRAWING NO. 100-20



THE J.G. WHITE ENGINEERING CORPORATION  
 CIVIL ENGINEER - LICENSED  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK  
 AS BUILT PLAN  
 INTAKE PUMPING PLANT SITE

IN 4 SHEETS NO. 12 SCALE: 1" = 40'  
 FEET

U.S. ENGINEER OFFICE YOUNGSTOWN, N.Y. DATE: 1-3-43  
 Drawn: Cobb Checked: Serial No. 100-21



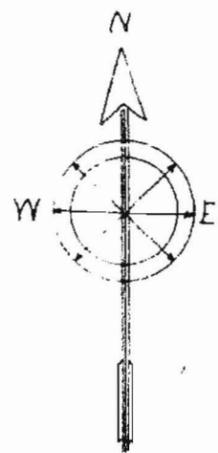
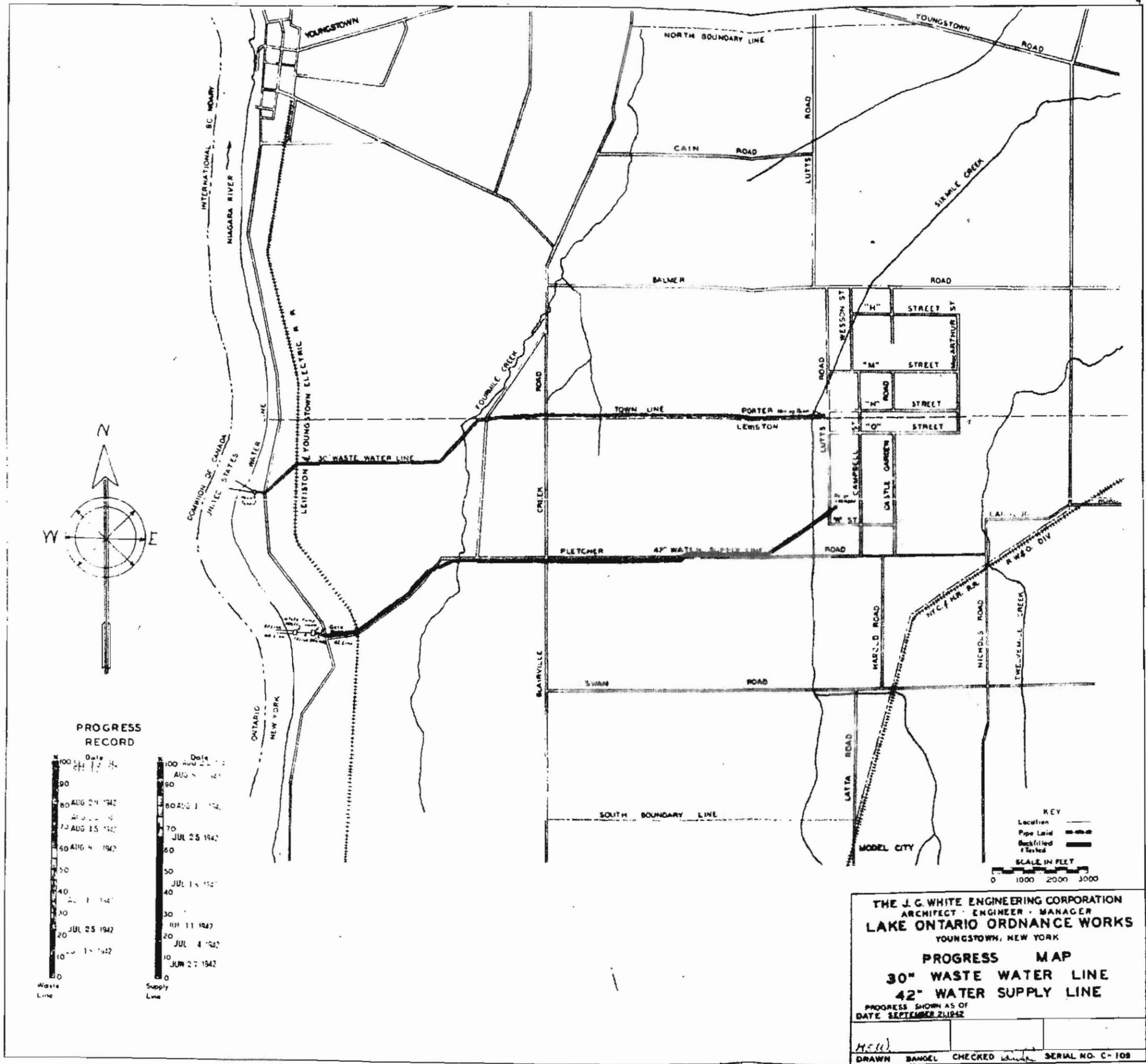
DECLASSIFIED  
 Authority 745067  
 By RP NARA Date 2/28

All elevations refer to U.S.C. & G.S. datum plane.  
 Contour interval, 10 feet

**RESTRICTED**

REVISIONS BLOCK			
NO.	CHANGES	DATE	BY

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK  
 MAP FROM SURVEY OF OUTLET SITE FOR OUTFALL SEWER  
 PART OF LOTS 10 and 11  
 NEW YORK STATE RESERVATION  
 IN SHEETS 1 SHEET NO. 1 SCALE: 1" = 40'  
 SCALE IN FEET  
 U.S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE JULY 24, 42  
 DRAWN: A.E. White CHECKED: T.C. SERIAL NO. 4-28



**PROGRESS RECORD**

Waste Line	Date	Supply Line	Date
100	AUG 24 1942	100	AUG 24 1942
90	AUG 24 1942	90	AUG 24 1942
80	AUG 24 1942	80	AUG 24 1942
70	AUG 15 1942	70	JUL 25 1942
60	AUG 4 1942	60	JUL 25 1942
50		50	JUL 15 1942
40		40	JUL 15 1942
30	JUL 25 1942	30	JUL 11 1942
20	JUL 25 1942	20	JUL 4 1942
10	JUL 25 1942	10	JUN 27 1942
0		0	

**KEY**

- Location
- Pipe Laid
- Backfilled
- Tested

**SCALE IN FEET**

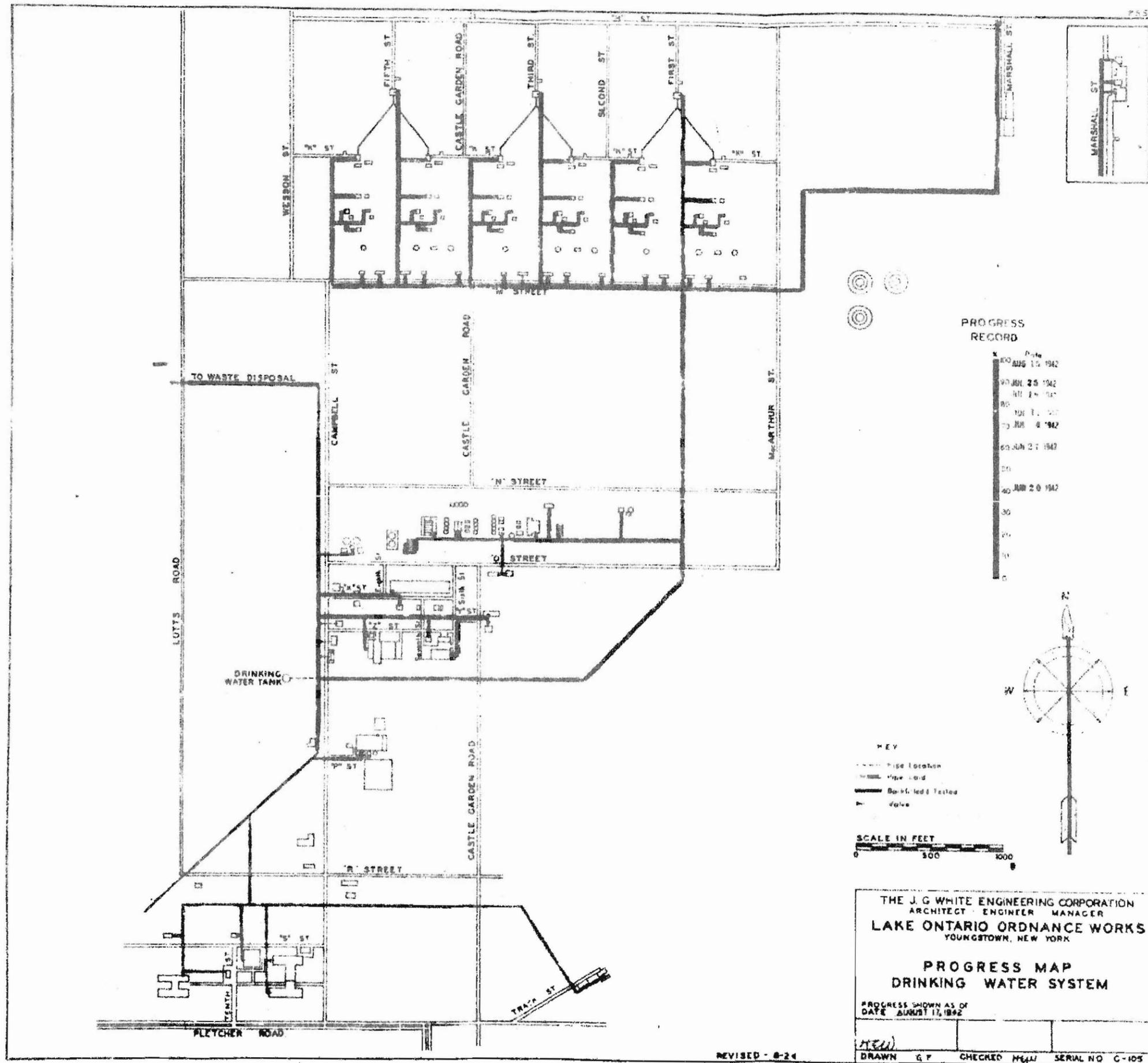
0 1000 2000 3000

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDINANCE WORKS**  
 YOUNGSTOWN, NEW YORK

**PROGRESS MAP**  
**30" WASTE WATER LINE**  
**42" WATER SUPPLY LINE**

PROGRESS SHOWN AS OF  
 DATE SEPTEMBER 21, 1942

MEW  
 DRAWN BANGEL CHECKED [Signature] SERIAL NO. C-108



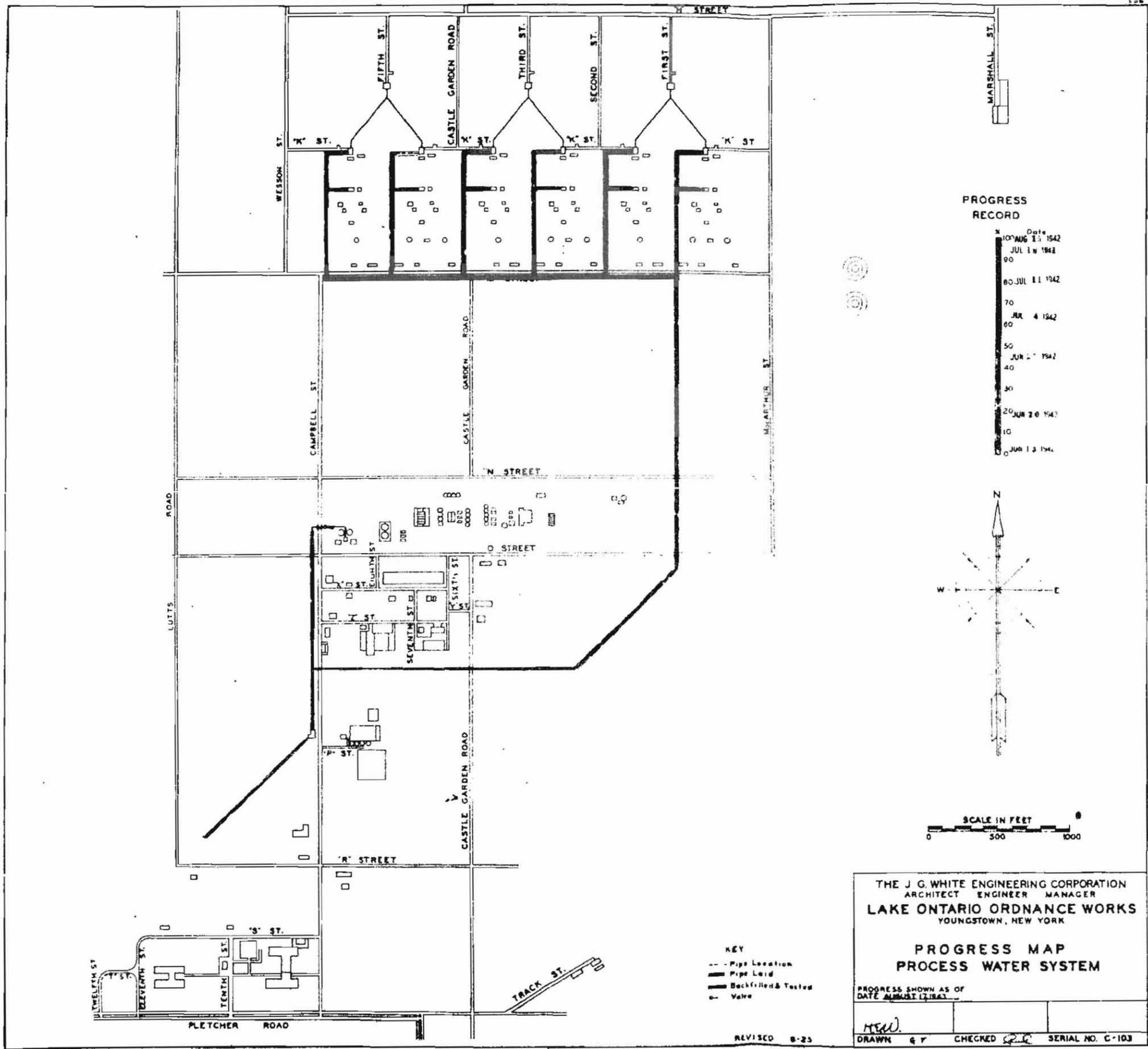
THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN, NEW YORK

**PROGRESS MAP**  
**DRINKING WATER SYSTEM**

PROGRESS SHOWN AS OF  
 DATE AUGUST 17, 1942

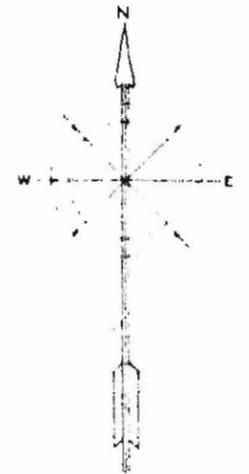
DRAWN G.P. CHECKED M.W. SERIAL NO. C-105

REVISED - 8-24



PROGRESS RECORD

Date	Progress
10 AUG 13 1942	100
JUL 1 1942	90
60 JUL 11 1942	80
JUN 4 1942	70
JUN 27 1942	60
JUN 20 1942	50
JUN 13 1942	40
JUN 6 1942	30
JUN 28 1942	20
JUN 15 1942	10
JUN 8 1942	0



THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT ENGINEER MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN, NEW YORK

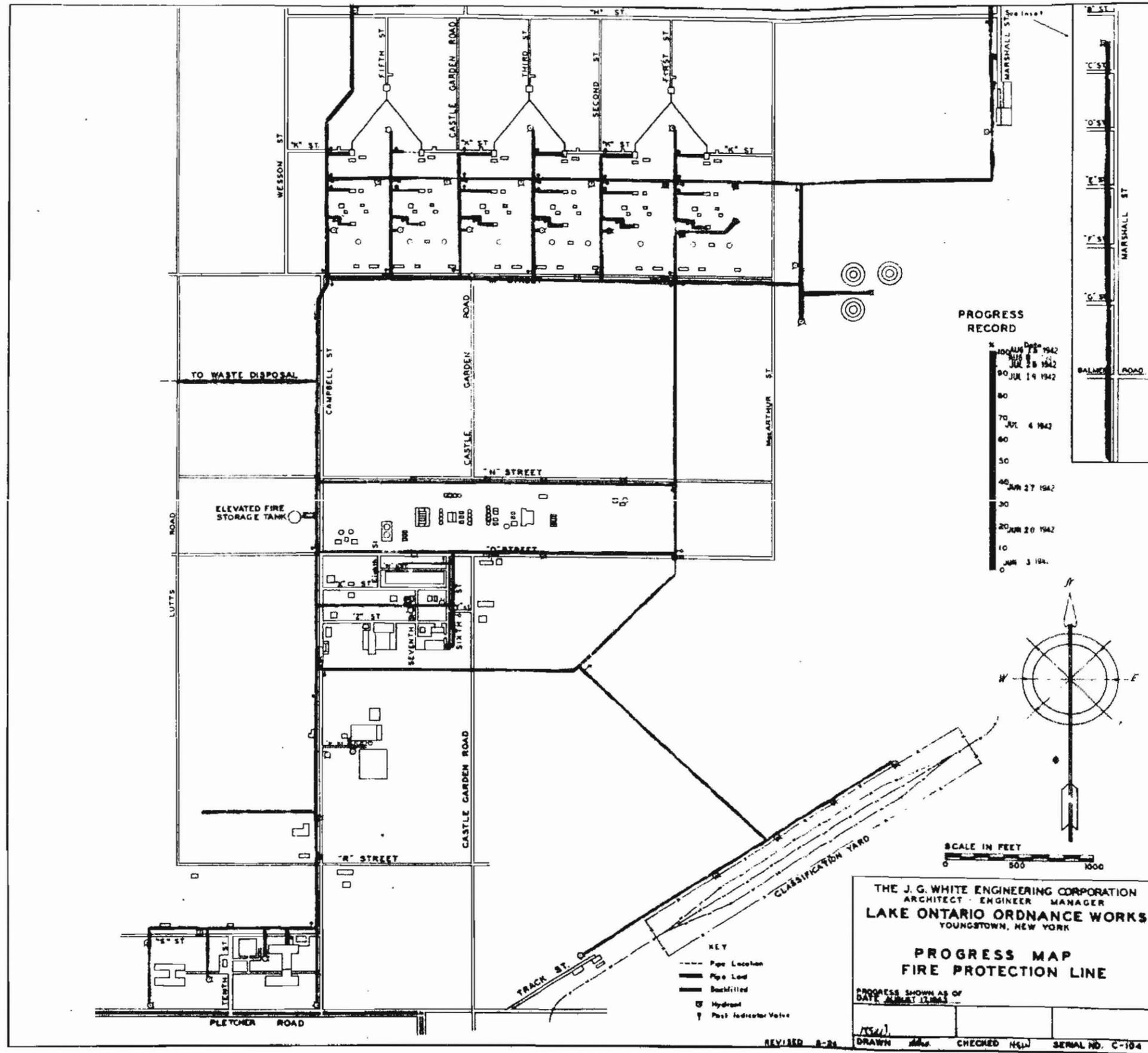
**PROGRESS MAP**  
**PROCESS WATER SYSTEM**

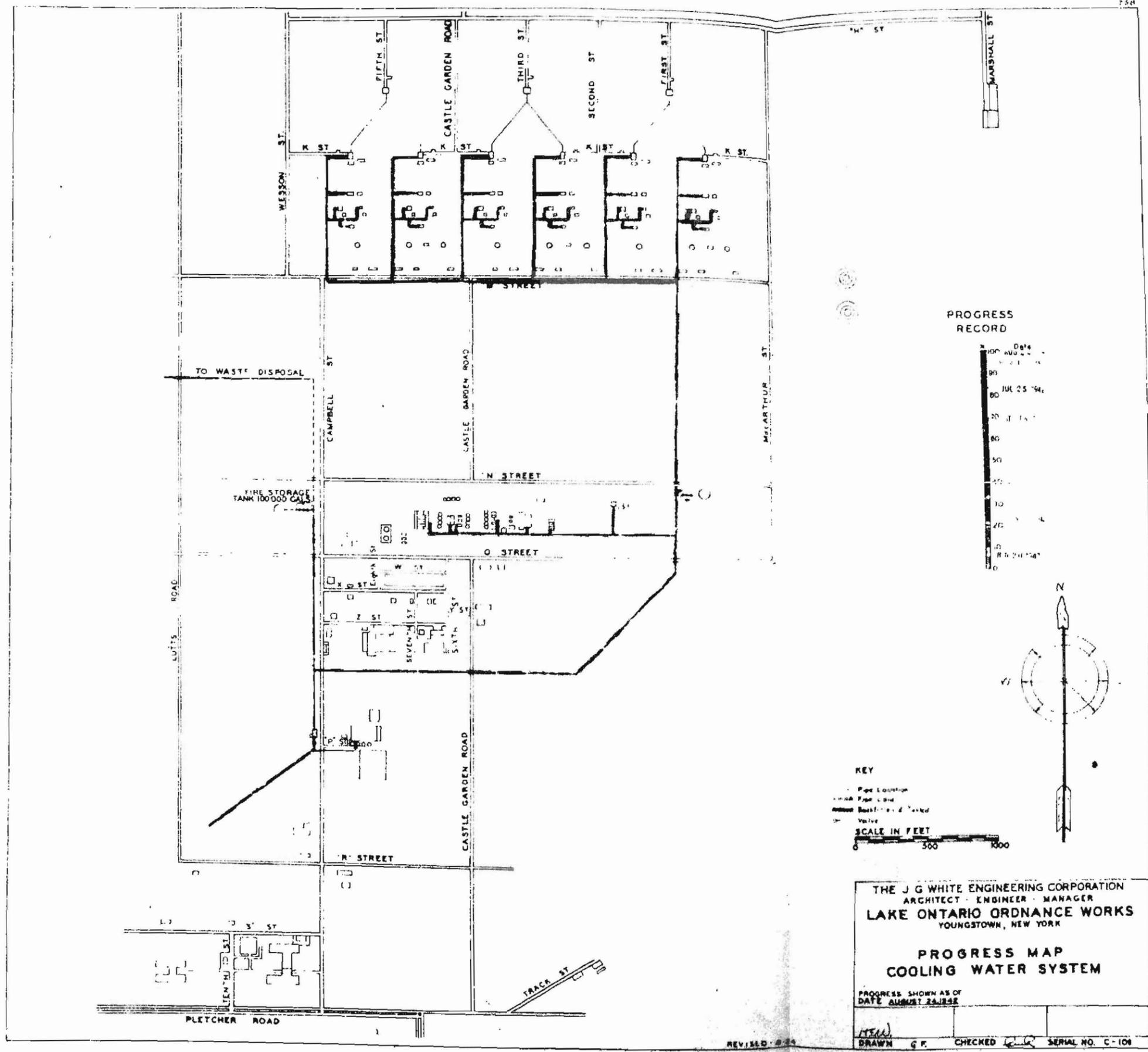
PROGRESS SHOWN AS OF  
 DATE AUGUST 17 1942

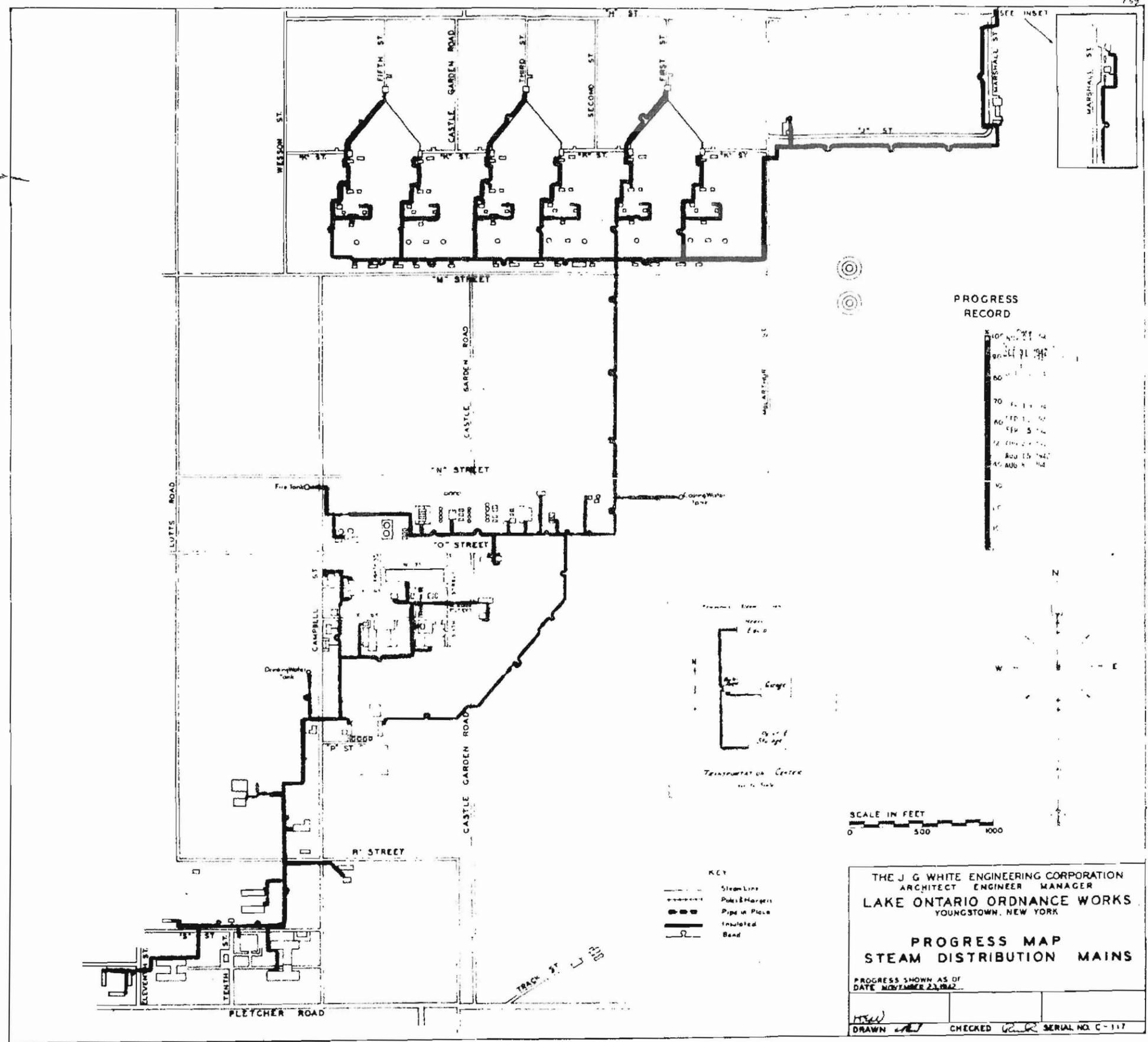
- KEY
- - - Pipe Location
  - Pipe Lead
  - ▬ Backfilled & Tested
  - Valve

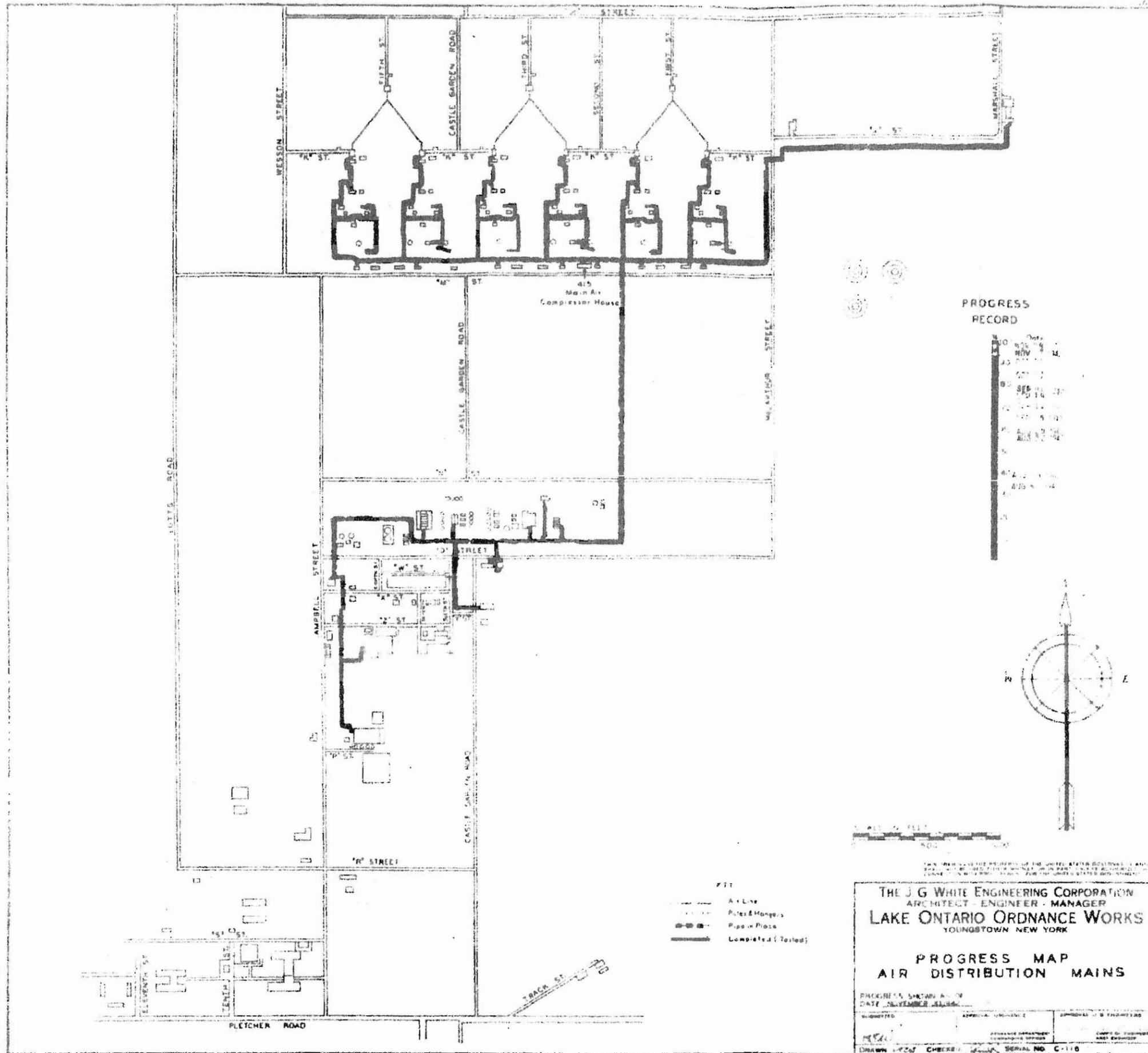
REVISED 8-25

DRAWN *H.E.W.* CHECKED *R.C.* SERIAL NO. C-103



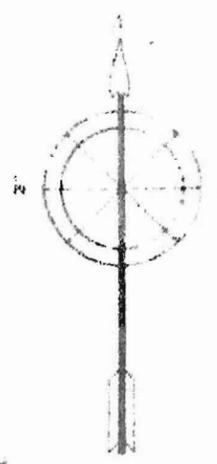






**PROGRESS RECORD**

LINE	DATE	REMARKS
10	NOV 14 1944	...
11	NOV 14 1944	...
12	NOV 14 1944	...
13	NOV 14 1944	...
14	NOV 14 1944	...
15	NOV 14 1944	...
16	NOV 14 1944	...
17	NOV 14 1944	...
18	NOV 14 1944	...
19	NOV 14 1944	...
20	NOV 14 1944	...
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22	NOV 14 1944	...
23	NOV 14 1944	...
24	NOV 14 1944	...
25	NOV 14 1944	...
26	NOV 14 1944	...
27	NOV 14 1944	...
28	NOV 14 1944	...
29	NOV 14 1944	...
30	NOV 14 1944	...
31	NOV 14 1944	...
32	NOV 14 1944	...
33	NOV 14 1944	...
34	NOV 14 1944	...
35	NOV 14 1944	...
36	NOV 14 1944	...
37	NOV 14 1944	...
38	NOV 14 1944	...
39	NOV 14 1944	...
40	NOV 14 1944	...
41	NOV 14 1944	...
42	NOV 14 1944	...
43	NOV 14 1944	...
44	NOV 14 1944	...
45	NOV 14 1944	...
46	NOV 14 1944	...
47	NOV 14 1944	...
48	NOV 14 1944	...
49	NOV 14 1944	...
50	NOV 14 1944	...
51	NOV 14 1944	...
52	NOV 14 1944	...
53	NOV 14 1944	...
54	NOV 14 1944	...
55	NOV 14 1944	...
56	NOV 14 1944	...
57	NOV 14 1944	...
58	NOV 14 1944	...
59	NOV 14 1944	...
60	NOV 14 1944	...
61	NOV 14 1944	...
62	NOV 14 1944	...
63	NOV 14 1944	...
64	NOV 14 1944	...
65	NOV 14 1944	...
66	NOV 14 1944	...
67	NOV 14 1944	...
68	NOV 14 1944	...
69	NOV 14 1944	...
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72	NOV 14 1944	...
73	NOV 14 1944	...
74	NOV 14 1944	...
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77	NOV 14 1944	...
78	NOV 14 1944	...
79	NOV 14 1944	...
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85	NOV 14 1944	...
86	NOV 14 1944	...
87	NOV 14 1944	...
88	NOV 14 1944	...
89	NOV 14 1944	...
90	NOV 14 1944	...
91	NOV 14 1944	...
92	NOV 14 1944	...
93	NOV 14 1944	...
94	NOV 14 1944	...
95	NOV 14 1944	...
96	NOV 14 1944	...
97	NOV 14 1944	...
98	NOV 14 1944	...
99	NOV 14 1944	...
100	NOV 14 1944	...



- A+ Line
- - - Pipes & Manholes
- ▣ Pipes in Place
- ▬ Completed (Tested)

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK

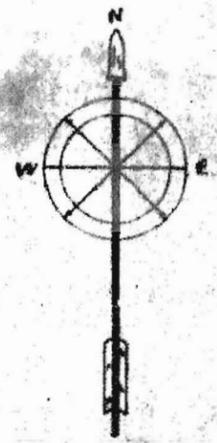
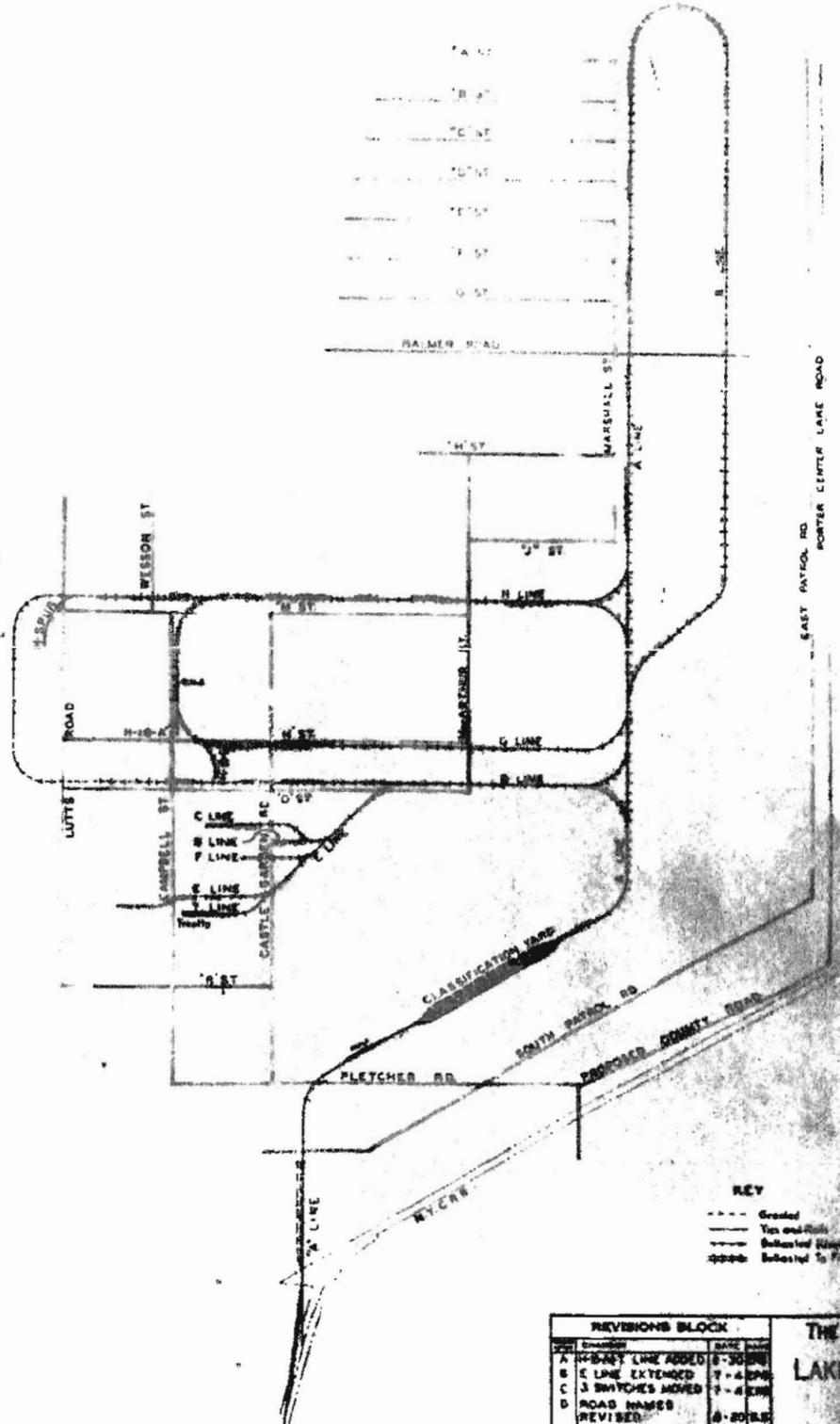
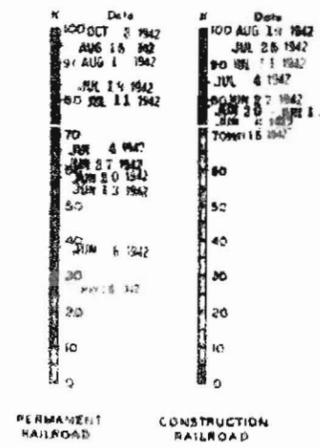
**PROGRESS MAP**  
**AIR DISTRIBUTION MAINS**

PROJECT NO. 100-100  
 DATE: NOVEMBER 1944

DESIGNED BY	CHECKED BY	APPROVED BY
DATE	DATE	DATE

DRAWN BY: [Signature] CHECKED BY: [Signature] SERIAL NO. C-110

PROGRESS RECORD



KEY  
 - - - Graded  
 --- Tin and Rails  
 - - - Substantially Complete  
 - - - Subject to Final Grade

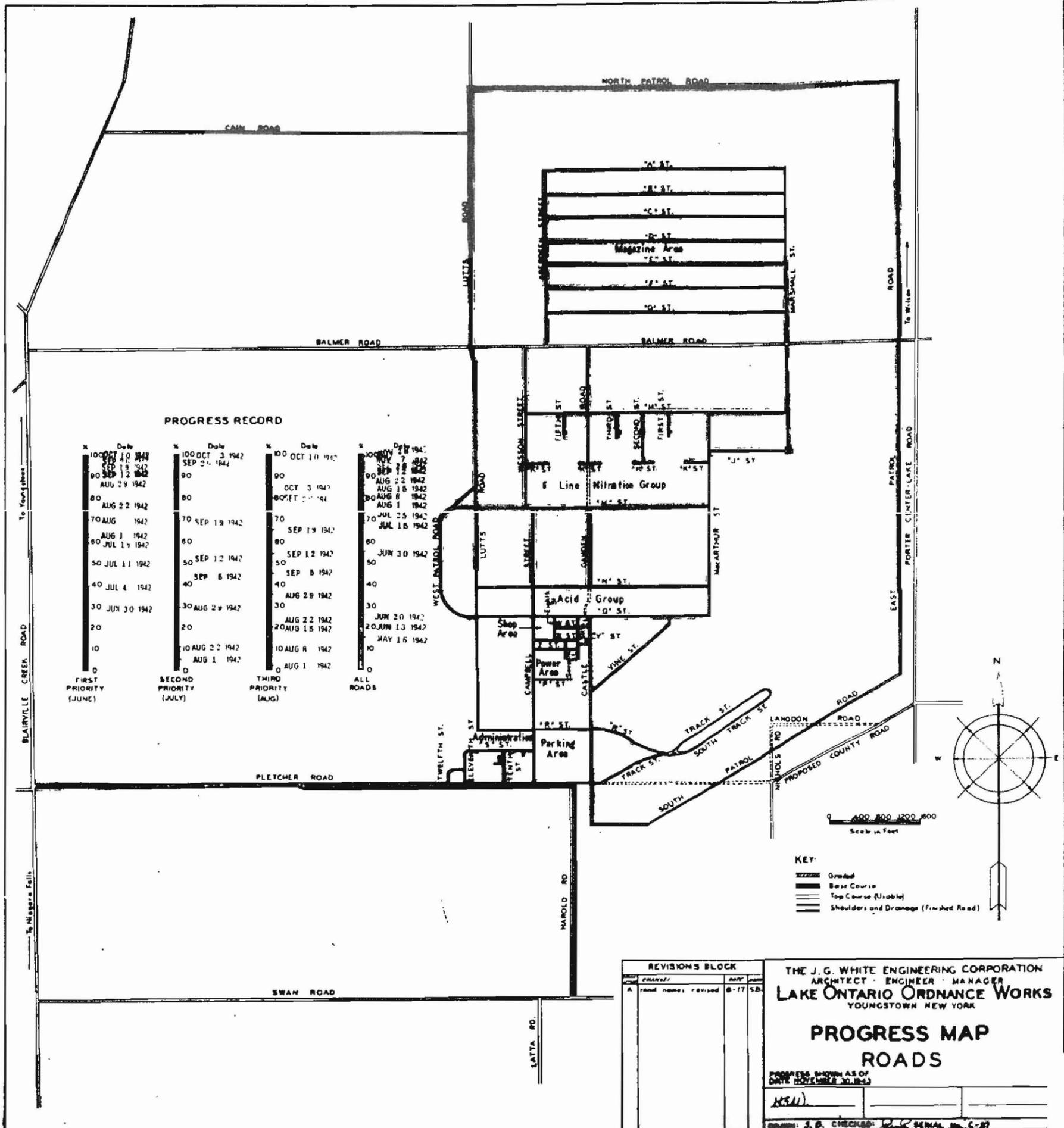
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 Scale in Feet

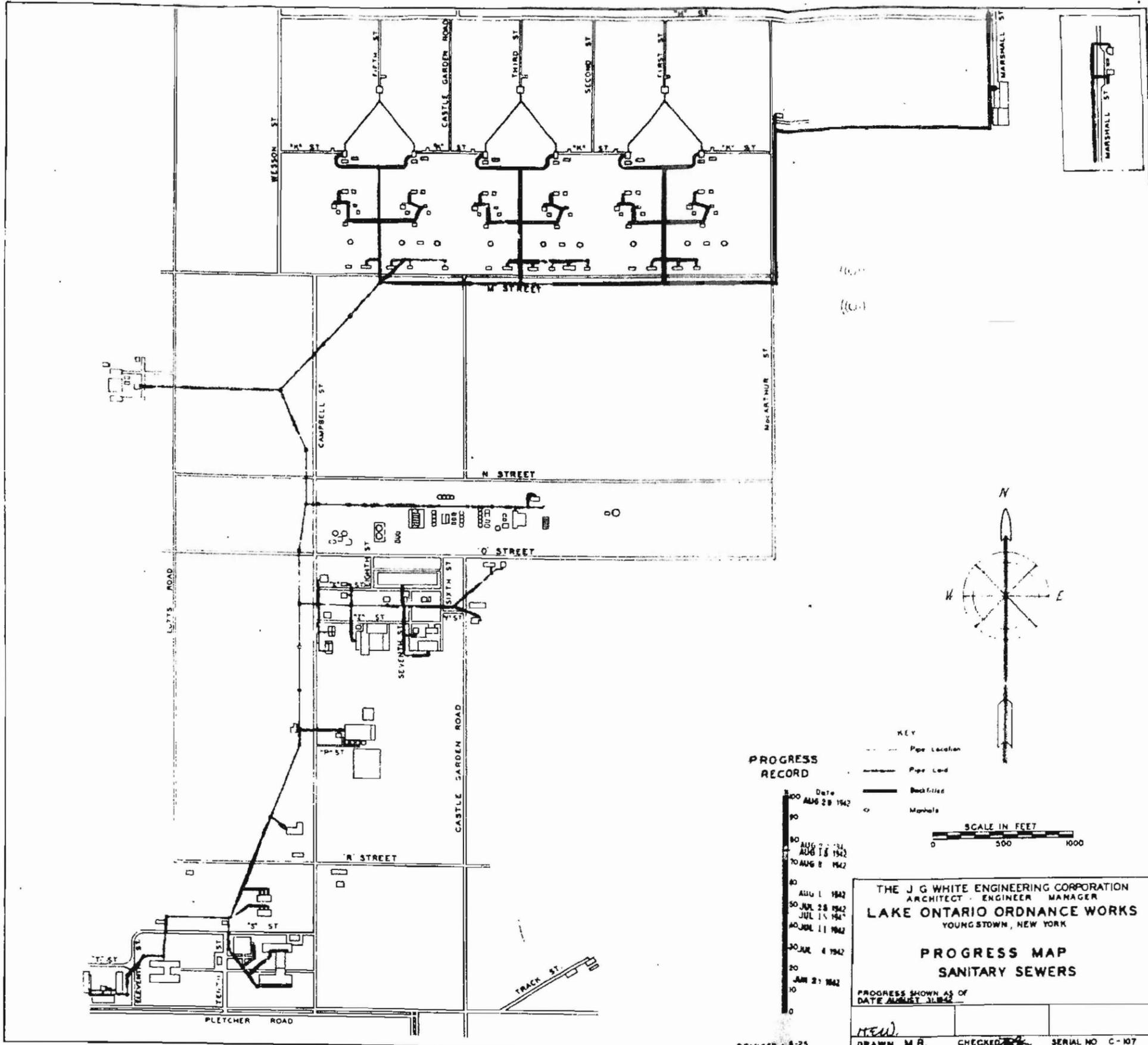
REVISIONS BLOCK	
No.	Description
A	H-BAY LINE ADDED 7-30-42
B	C LINE EXTENDED 7-4-42
C	3 SWITCHES MOVED 7-4-42
D	ROAD NAMES REVISED 8-20-42

**THE J. G. WHITE ENGINEERING CORPORATION**  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK

**PROGRESS MAP**  
**RAILROADS**

DATE: 10/2/42  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]





**PROGRESS RECORD**

Date	Progress
AUG 28 1942	100
AUG 21 1942	90
AUG 18 1942	80
AUG 8 1942	70
AUG 1 1942	60
JUL 28 1942	50
JUL 15 1942	40
JUL 11 1942	30
JUL 4 1942	20
JUN 21 1942	10
	0

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK

**PROGRESS MAP  
 SANITARY SEWERS**

PROGRESS SHOWN AS OF  
 DATE AUGUST 31, 1942

DRAWN M.R. CHECKED [signature] SERIAL NO. C-107

REVISED 8-23

RESTRICTED

RESTRICTED



NOTE  
■ Includes Sentry house

RESTRICTED

THE J. G. WHITE ENGINEERING CORPORATION  
PROJECT ENGINEER - MANAGER  
LAKE ONTARIO ORDNANCE WORKS

INNER FENCE LOCATION

REVISIONS BLOCK	
CHANGES	DATE
Added 14 openings	1-3-52
Patrol Extension to	
Classification yard	7-27
18 gate for Railroad	
to Neutralization Plant	7-27
Relocated Fence	
between O & M Sts	
West of Magazine Area	
Sentry Houses - 24	
28 sentry	
Locations of Sentry	
Houses #1-26	8-20
shown on	8-20
20 Gate added at	
Sturry Pool	10-24

DECLASSIFIED  
Authority 745067  
By RR NARA Date 2/28

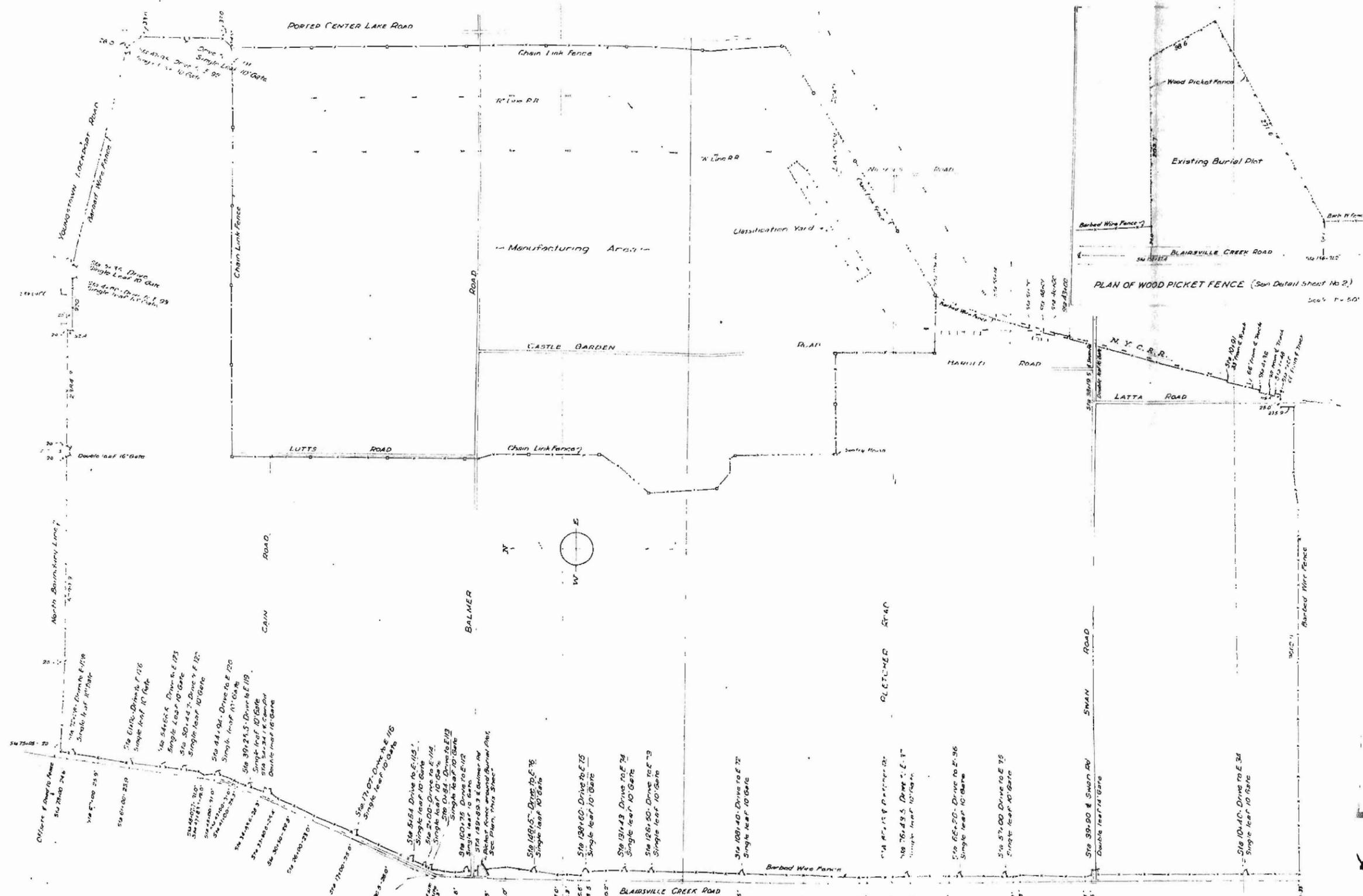
SCALE: 1" = 100'

YOUNGSTOWN, N.Y. 44615

ENGINEERING MANAGER

DATE: 10-24-52

PROJECT NO. 605-101-001



PLAN OF WOOD PICKET FENCE (See Detail Sheet No. 2.)

DECLASSIFIED  
 Authority 745067  
 By RP NARA Date 2/28

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REVISIONS BLOCK	
CHANGES	DATE
This Plan traced from Plan # 10-19	11/23/41

THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN, NEW YORK

SITE BOUNDARY FENCE  
 GENERAL PLAN

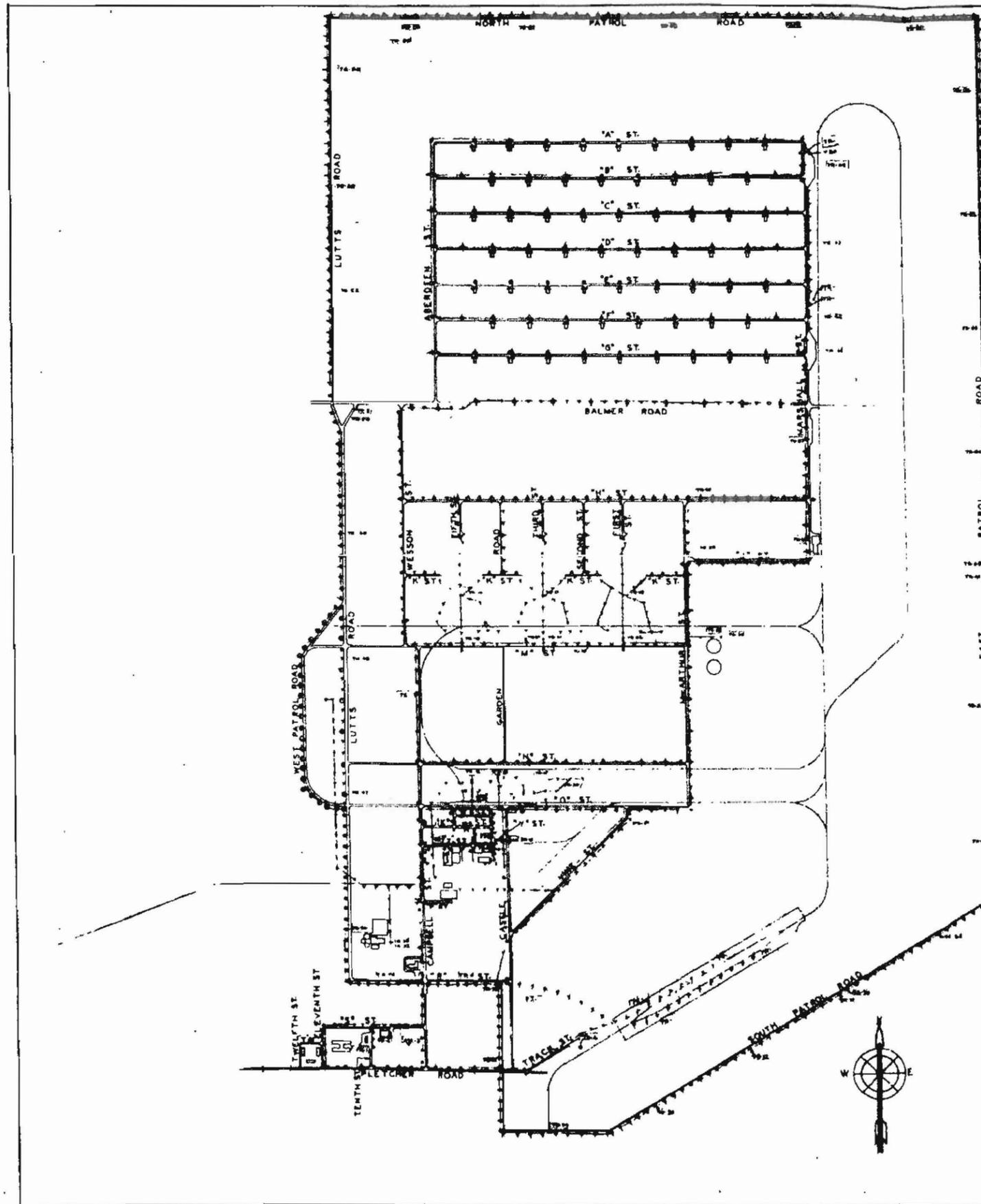
IN 4 SHEETS SHEET NO. 1 SCALE: 1"=80'

U. S. ENGINEER OFFICE - YOUNGSTOWN, N. Y. DATE 11-23-41

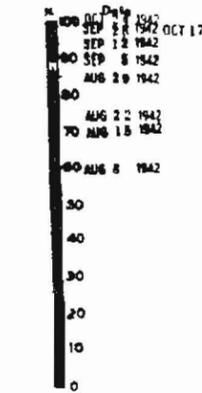
APPROVAL U. S. ENGINEER  
 [Signature]  
 CORPS OF ENGINEERS  
 U. S. ARMY

DRAWN J. J. IV CHECKED [Signature] SERIAL NO. 17-005

Field Note Reference Book No. 10, pages 571-606  
 All Stations Measured Along Farm Line

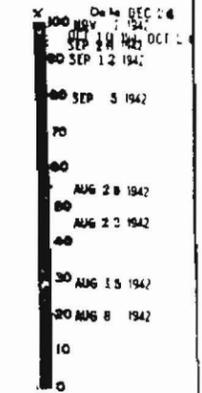


PROGRESS RECORD



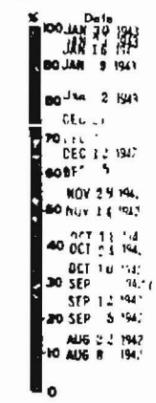
PRIMARY ELECTRIC

PROGRESS RECORD



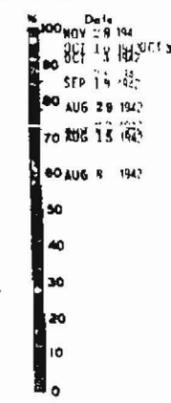
SECONDARY ELECTRIC

PROGRESS RECORD



STREET LIGHTING

PROGRESS RECORD



FENCE LIGHTING

KEY

- T = Pole
- TR = Pole with Transformer
- O = Pole and Lights
- = Poles Set
- = Wires Strung
- = Lights Installed
- TR = Transformer Installed

SCALE IN FEET

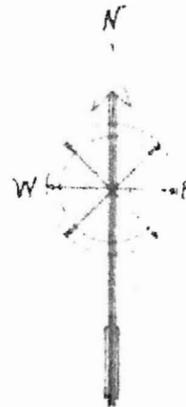
THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN NEW YORK  
 PROGRESS MAP  
 ELECTRIC DISTRIBUTION  
 PRIMARY - SECONDARY  
 STREET LIGHTING - FENCE LIGHTING

PROGRESS SHOWN AS OF  
 FEBRUARY 1, 1943

DRAWN M.J.R. CHECKED [Signature] SERIAL NO. C 113

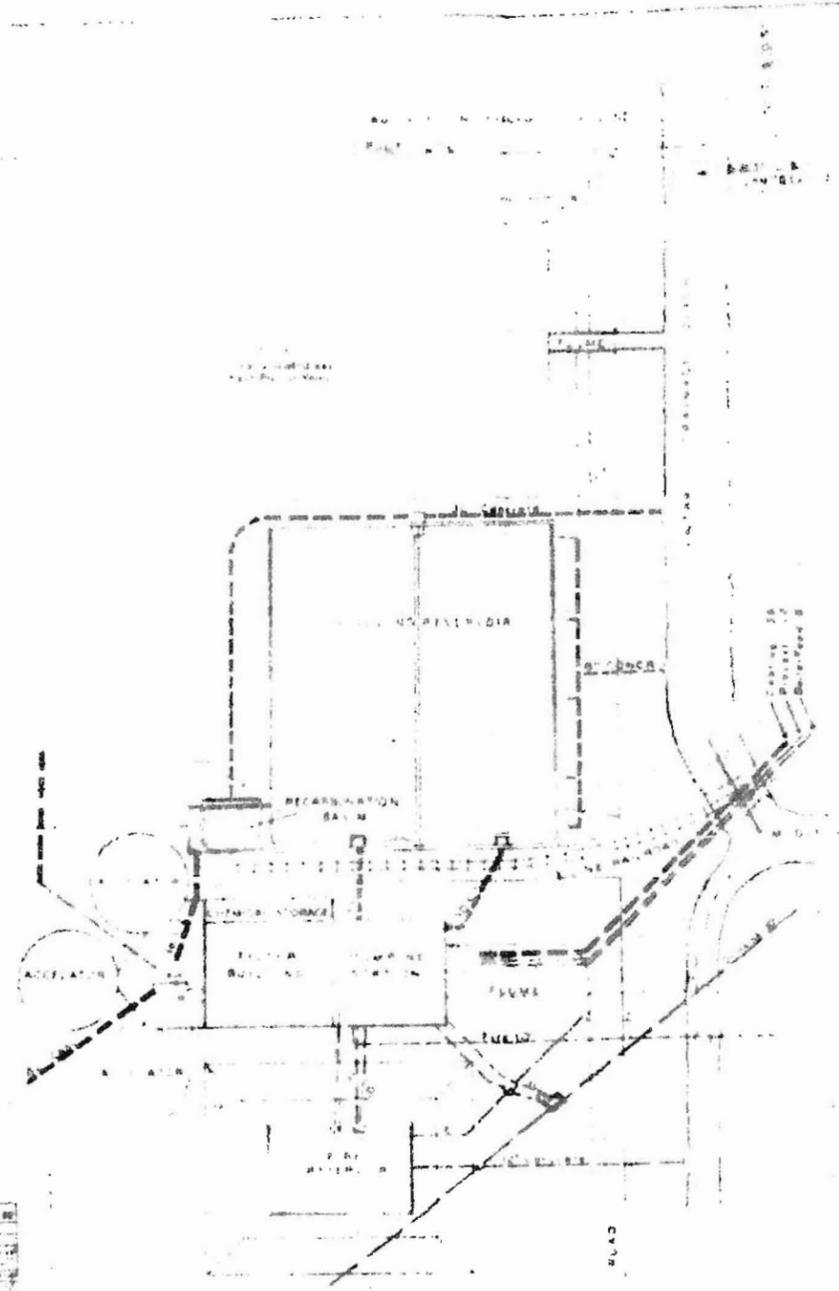






PROGRESS RECORD

NO.	DATE	BY	REMARKS
1			
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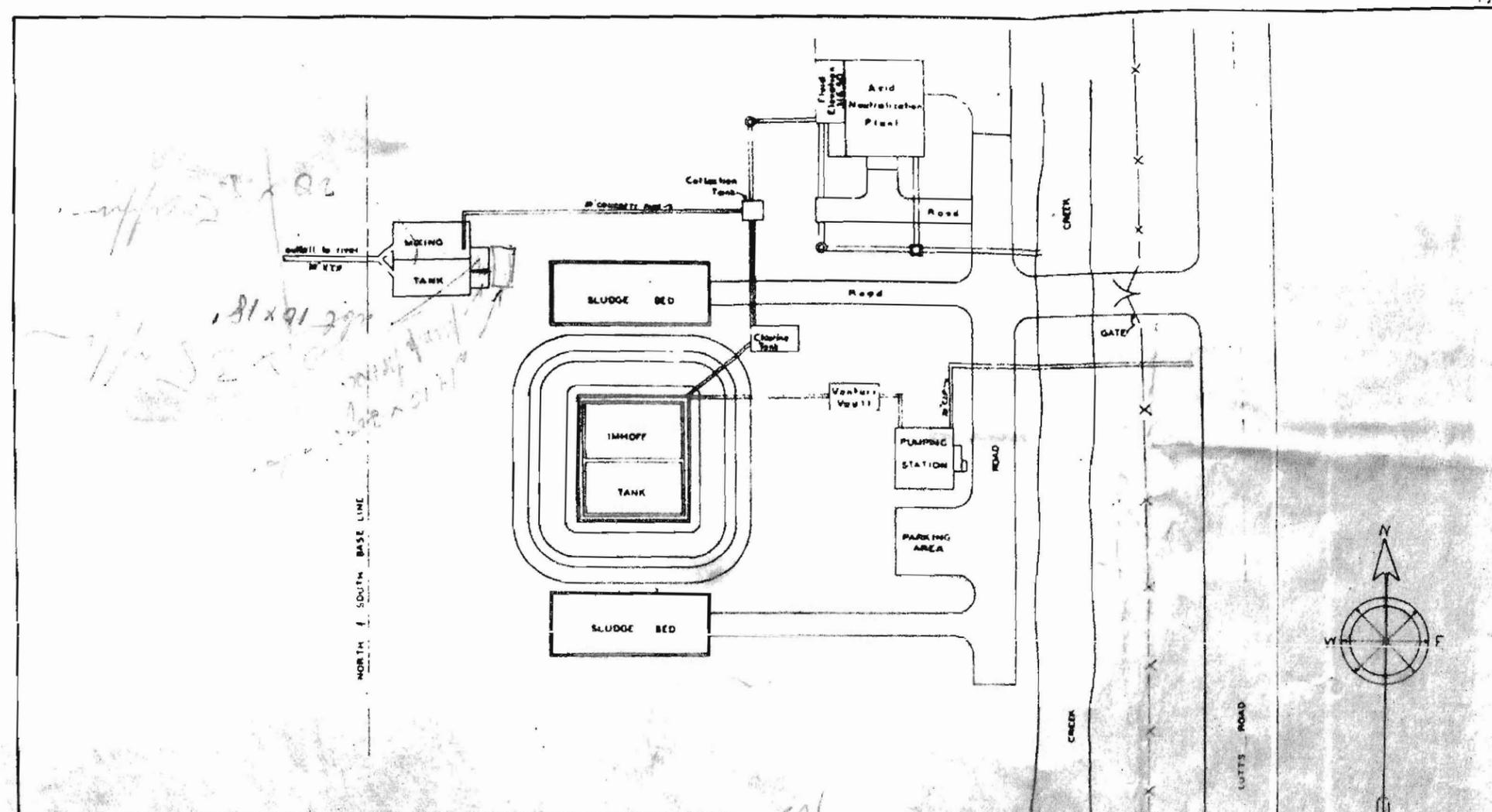



THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT ENGINEER MANAGER  
 LAKE ONTARIO ORDNANCE WORKS  
 YOUNGSTOWN, NEW YORK

PROGRESS MAP  
 WATER TREATMENT PLANT

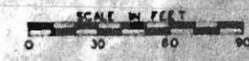
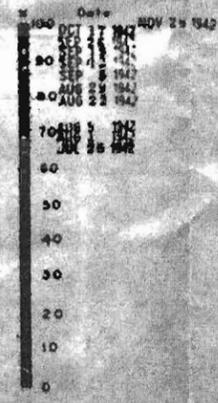
PROGRESS SHOWN AS OF  
 DATE \_\_\_\_\_

DRAWN H.E.D. CHECKED [Signature] SERIAL NO. C-112



NO.	DESCRIPTION	PERCENT COMPLETED	START DATE	END DATE
1	MIXING TANK	100	7/2/42	7/2/42
2	SLUDGE BED (NORTH)	100	7/2/42	7/2/42
3	SLUDGE BED (SOUTH)	100	7/2/42	7/2/42
4	IMHOFF TANK	100	7/2/42	7/2/42
5	ACID NEUTRALIZATION PLANT	100	7/2/42	7/2/42
6	COLLECTOR TANK	100	7/2/42	7/2/42
7	CLARIFIER TANK	100	7/2/42	7/2/42
8	VENTURI TANK	100	7/2/42	7/2/42
9	PUMPING STATION	100	7/2/42	7/2/42
10	PARKING AREA	100	7/2/42	7/2/42
11	ENCLOSURE	100	7/2/42	7/2/42
12	ROADS	100	7/2/42	7/2/42
13	CRACKS	100	7/2/42	7/2/42
14	GATE	100	7/2/42	7/2/42

**PROGRESS RECORD**

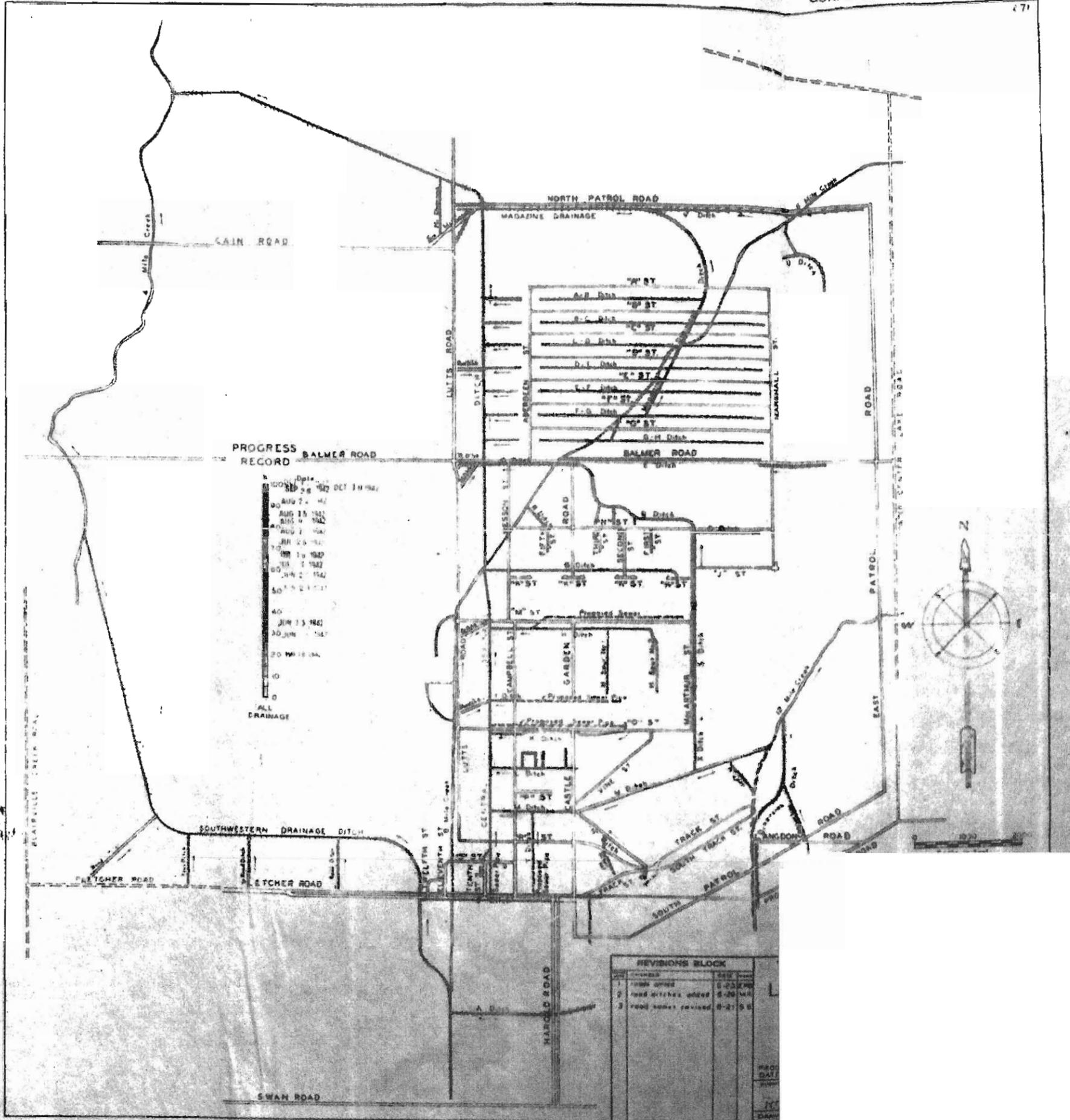


THE J. G. WHITE ENGINEERING CORPORATION  
 ARCHITECT - ENGINEER - MANAGER  
**LAKE ONTARIO ORDNANCE WORKS**  
 YOUNGSTOWN, NEW YORK

**PROGRESS MAP**  
**SEWERAGE DISPOSAL PLANT**

PROGRESS SHOWN AS OF  
 DATE - NOVEMBER 21, 1942

DRAWN: [Signature] CHECKED: [Signature] SERIAL NO. C-110

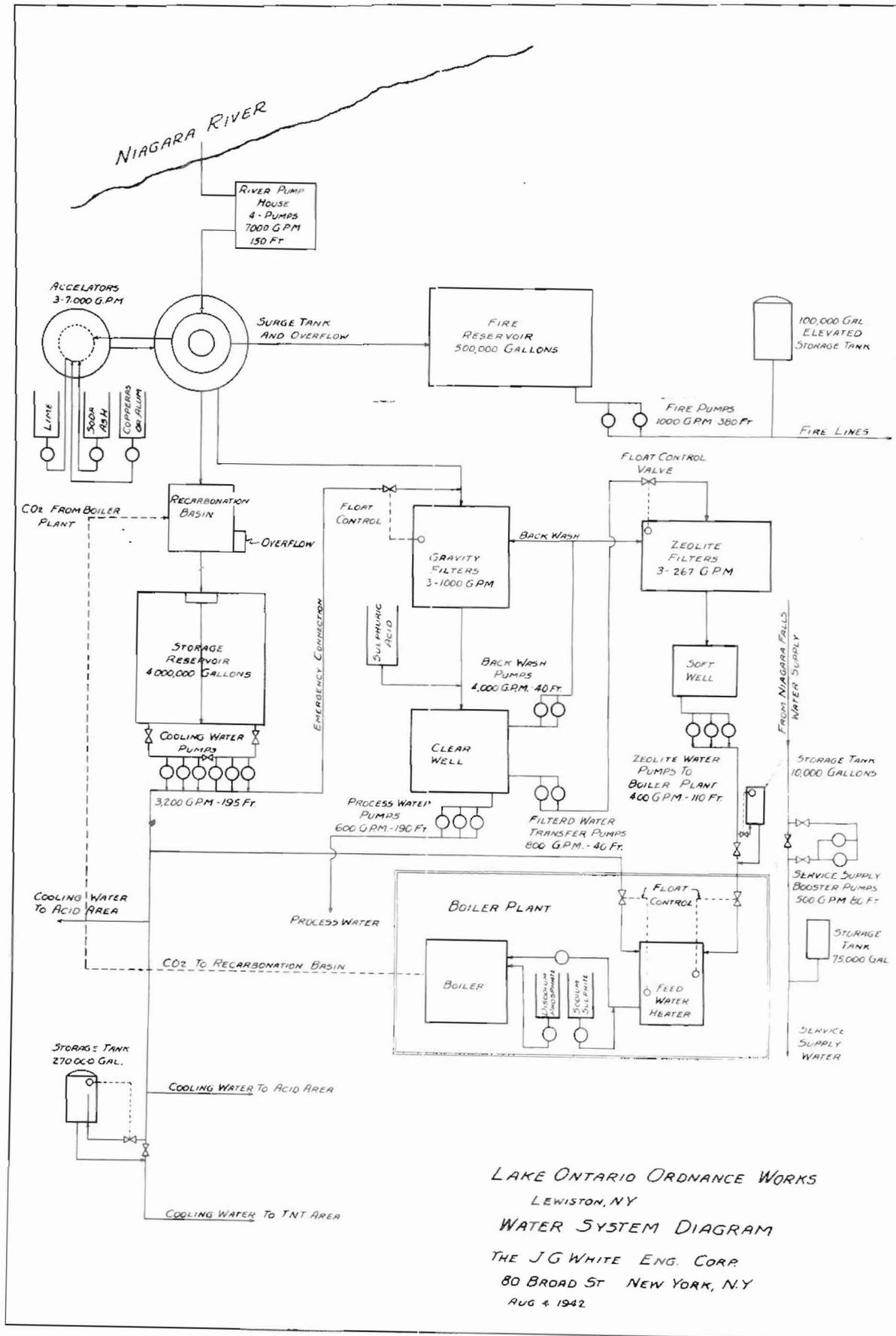


UTILITIES

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UTILITIES

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WaterWater Intake and River Pumping Station

159. The Water Intake Plant and Pumping Station is located on the site known as the "Five Mile Meadow", west of the intersection of Pletcher and River Roads, covered by the Water Intake Easement, extending to the shore line of the Niagara River, including the under water rights of an area approximately 175' wide and 485' into the river beyond the shore line, a distance of 100' beyond the end of rock crib at the intake. The under water section of the intake consists of two 60" reinforced concrete pipes laid in a trench in the bed of the river and backfilled. The water intake section is laid in a rock crib. These pipes extend inshore to the circular concrete intake well on the river bank, top of which is 16' above the normal water level of the river, and effects the transition between the two river intake pipes and the single 54" reinforced concrete pipe line to the pump pit in the Pumping Station substructure. See Dwg. 100-21 page 252.

160. The Pumping Station is equipped with four 7,000 G.P.M. motor driven pumps at 150' head, one of which is a spare, making the initial rated capacity of the Pumping Station 21,000 G.P.M. as compared with the initial maximum demand of 17,500 G.P.M. for a 6-Line T.N.T. Plant. The substructure, however, has been constructed large enough to house six 7,000 G.P.M. pumps, sufficient for a 12-Line T.N.T. Plant. These pumps are vertical, deep well type, due to a variation of more than 30' in the water level in the lower Niagara River, caused by ice jams. The pump manifold in the Pumping Station connects through two 30" cast iron force mains to the manifold at the Gate House. See photographs of the Pumping Station and Intake Site on Plate XIV.

161. In the Gate House the connection is made to the single 42" diam. reinforced concrete pipe, which extends approximately 8,538' eastward, along Pletcher Road, to its junction with the 42" diam. wood stave pipe, encased in a concrete envelope, which runs 7,687' to a concrete circular ring surge chamber, at the Water Treatment Plant. Manholes have been provided the full length of the 42" supply main. In order to prevent reverse flow in this main, a hinged, double, horizontal type check valve is installed at the supply main connection with the surge chamber. See photograph of the Gate House on Plate XIV.

162. The Fraser-Brace Report on the site for the Lake Ontario Ordnance Works, submitted on December 16, 1941, in Section 6, "Water Supply", states: "The water supply for a plant at the site under consideration will be unusually good and unusually easy and cheap to install."

UTILITIES

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WaterWater Intake and River Pumping Station (Continued)

163. The Subsurface conditions at the intake were so shaly that the deep excavation required was difficult, slow and expensive. The intake well for the pumps under the River Pumping Station required extensive steel piling. A hairpin loop type of road had to be built for construction and maintenance purposes to afford access from the River Road above.

164. Further, the Fraser-Brace Report read: "The general surface of the manufacturing area is less than fifty feet above the level of the water in Niagara River and Lake Ontario which will reduce the pumping costs below what it frequently is in similar plants".

165. As already stated, it was necessary to provide pumps at the River Pumping Station suitable for a 150 ft. head. The elevation of the invert of the intake in the Niagara River is 211.3. The normal river level is 245.0. The pump floor level is 283.0. The level of the surge chamber overflow crest within the Project is 340.5. The difference in levels between the intake invert and the overflow crest in the surge tank is 129.2 feet.

166. The sizes and lengths of the pipes in the Water Supply line from the Niagara River to the Surge Tank are:

60" diam. reinforced concrete Intake Pipes from the Niagara River to Intake Well	864'
54" diam. reinforced concrete pipe from Intake Well to the Pumping Station	675'
30" diameter cast iron force mains from Pumping Station to the Gate House	360' ✓
42" diameter main (part reinforced concrete and part wood stave) from Gate House to Surge Tank	<u>16,225'</u>
	18,124'

UTILITIES

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WaterWater Treatment Plant

167. The Fraser-Brace Report, Section 6, "Water Supply", stated: "The quality of the water obtained at these points" (ie. the Niagara River or Lake Ontario) "will be so good that it will not require treatment for the process uses. The hardness is about 5 parts per million, which means that a slight and inexpensive treatment will be required for the small amount of water which will be required for the boiler feed."

168. On March 13, 1942 the hardness of the water in the Niagara River was between 112-114 parts per million. During January and February 1943 the hardness of the raw water in the intake line was from 130 - 140 parts per million. The present low reading, for hardness varies from 115-125 p.p.m. and the high reading for hardness varies from 135-145 p.p.m. Hence it became imperative to treat the water for process and other uses and to install the extensive water treatment plant which was constructed to provide separate handling, storing and pumping for five different types of water.

169. At the Water Treatment Plant site the foundations had to be designed for 3,000 pounds per square foot loading. This and the necessity for storing and handling large quantities of chemicals for treatment purposes, the necessity of filters, recarbonation, and large storage reservoirs, increased the size and cost of the plant many times over the original estimated size and cost.

170. The Water Treatment Plant is located on the west side of the Power and Water Treatment Area and consists of the following fifteen buildings and structures:

- 1 - Surge Tank (or chamber), concrete 26'-0" in diam. with one story frame building over area around tank
- 3 - Accelerators (or cold process lime softeners) each 62'-6" diam. by 18' deep, of 5,600 G.P.M. capacity, concrete with wood roofs.
- 1 - Recarbonation Basin, 34'-9" x 48'-11" with open concrete basin
- 1 - Cooling Water Storage Reservoir, 178'-4" x 204'-8", concrete with wood roof, 4,000,000 gallons capacity
- 1 - Fire Water Reservoir, 57'-10" x 87'-10", concrete with wood roof, 500,000 gallons capacity

UTILITIES

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WaterWater Treatment Plant (Continued)

- 1 - Clear Well, for process or filtered water, 38'-5" x 76'-0" x 7'-6" with total capacity of 136,300 gallons.
  - 1 - Soft Well, for Zeolite treated water, 16'-8" x 32'-0" x 9'-0" with total capacity of 29,000 gallons
  - 1 - Chemical Storage Building, 16'-0" x 78'-0", 3 story and basement, concrete, concrete block and frame building
  - 1 - Filter and Water Treatment Building, 67'-4" x 78'-0", 2 story and basement, concrete, concrete block and frame building
  - 1 - Pumping Station, 67'-4" x 68'-10", one story concrete, concrete block and frame building, containing 26 pumps, 25 electrically driven (totalling 1,700 H.P. connected load) and 1 steam driven, for drinking water, cooling water, fire service, process water, boiler feed water, lime slurry pumping and back wash, and wet pits.
  - 1 - Venturi Vault, 17'-1" x 23'-0", concrete vault below grade
  - 1 - Overflow Flume from Surge Chamber, 4'-0" x 11'-0", concrete section in Filter Building and Pumping Station basements, and 4 - 24" reinforced concrete pipes to drainage ditch
- Reservoir blow off, 30" and 12" reinforced concrete pipe lines to drainage ditch
- 1 - Slurry Pool and spillways, earth dykes

171. The plot plan of the Water Treatment Plant is shown on page 248 and the slurry pool is shown on page 251. Photographs of the plant are shown on plates XIII and XIV.

WATER

<u>USE</u>	<u>SOURCE</u>	<u>REQUIREMENTS</u> (5-Line Plant for 24 Hrs.)	<u>INSTALLED</u> <u>CAPACITY</u>	<u>STORAGE</u> <u>CAPACITY</u>
Drinking Water and Service Water	Metered and purchased from Niagara Falls water supply	187,200 gallons per day 130 G. P. M. -Av. 500 G.P.M. -Peak	10" Main at 100# Pressure 2 Service Supply Booster Pumps 500 G.P.M. -80 Ft. Head	75,000 gallons Wood Ele- vated Tank on steel supports
Fire Protection Water	Raw water from Niagara River	1,450 G. P. M. when fire engines are pumping	750 G.P.M. Fire Engine 500 G.P.M. Fire Engine 2 Fire Pumps 1,000 G.P.M. -380 Ft. Head	100,000 gallons Steel Elevated Tank 500,000 gallons Ground Storage Reservoir
Cooling Water	Water from Niagara River treated	23,364,400 gallons per day 16,225 G. P. M.	28,000 G.P.M. at Intake Pumping Plant 6-Cooling Water Pumps 3,200 G.P.M. -195 Ft. Head	4,000,000 gallons Ground Storage Reservoir 275,000 gallon concrete Water Tower
Boiler Feed Water	Water from Niagara River treated and filtered and again treated	300 G. P. M.	3 Filtered Water Transfer Pumps 800 G.P.M. -40 Ft. Head 3 Zeolite Water Pumps to Boiler Plant 600 G.P.M. -110 Ft. Head	10,000 gallons wooden Elevated Storage Tank on steel supports 29,000 gallons concrete Soft Well at Treatment Plant
Process Water to TNT Area	Water from Niagara River treated and filtered	1,635,600 gallons per day 1,136 G. P. M.	28,000 G.P.M. at Intake Pumping Plant 3 Process Water Pumps 600 G.P.M. -190 Ft. 2 Backwash Pumps 4,000 G.P.M. -40 Ft.	Clear Well 136,300 gallons

UTILITIES

Water

Drinking and Service Water

173. The drinking and service water supply is obtained from the City of Niagara Falls 12" water main supplying Youngstown and Fort Niagara. The connection to the city main is made adjacent to the Pletcher Road crossing over the Lewiston and Youngstown Frontier Railroad, by connecting a 12" x 10" reducer section and 10" valve to the existing 12" tee controlled by a 12" valve at this point. The 10" class "C" cast iron bell and spigot pipe line crosses under Pletcher Road to the north side into the meter pit where all water used on the project is metered. The service pressure is 100 lbs. per square inch. See photograph of the pipe line on Plate XX.

174. The 10" pipe line continues from the meter pit in an easterly direction on the Government right of way, to the chlorination station at the east side of Blairville Creek Road at the intersection of and on the south side of Pletcher Road, where chlorination in small quantities up to 15 pounds per 24 hours, and a certain amount of anhydrous ammonia is added, to counteract the chlorine taste in the water, thence to all parts of the plant where water is required for drinking, lavatories, laboratories, showers, hospital and cafeteria.

175. Where this line passes the pumping station a by-pass is made to duplicate booster pumps so that, should the pressure in the city main be too low, sufficient pump capacity will be available to maintain the required pressure service for the plant. About 1110 feet north of the pumping station an elevated wood tank supported on a steel tower is used as a reserve storage of 75,000 gallons for the water supply. See photograph Plate XII.

LENGTHS OF DRINKING AND SERVICE WATER DISTRIBUTION LINES

Size	Supply Main	Adm. Area	Trans- portation	Power & Shop	Acid Area	TMT Area	Total
10" P.I.	16273'	--	--	5568'	--	2391'	24,232'
8" P.I.	--	1237'	--	--	1579'	4727'	7,543'
6" P.I.	--	1433'	--	960'	212'	3467'	6,072'
4" C.	--	122'	--	3063'	287'	3868'	7,340'
2"	--	--	3663'	--	960'	--	4,623'
3"	--	825'	--	1074'	718'	669'	3,286'
2 1/2" P.I.	--	--	--	1496'	--	166'	1,662'
2" P.I.	--	767'	1977'	1034'	958'	5802'	10,518'
1 1/2" P.I.	--	182'	--	--	--	132'	314'
1" C.	--	193'	--	85'	--	--	278'
3/4"	--	--	--	29'	--	--	29'
	16273'	4759'	5610'	13309'	4714'	21202'	65,897'

UTILITIES

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WaterFire Protection

176. The water for fire protection purposes goes into the fire protection mains having fire hydrants and into the Sprinkler Systems of various buildings.

177. Raw water from the Niagara River is pumped into the surge tank at the Water Treatment Plant and the overflow goes through a circular concrete spillway into the 500,000 gallon ground storage reservoir, overflow from this goes into the drainage ditch.

178. From the reservoir connections are made to two stationary 1,000 G.P.M., 380 ft. head, fire pumps, one steam driven and one electrically driven, in the Pumping station, from which a 10" - Class "D", bell and spigot cast iron pipe laid underground with caulked lead joints constitutes the fire protection main. Two hydrants were installed so that a fire engine pumper could be connected to pump water from the Storage Reservoir into the fire protection main.

179. The 10" main reduces to 8" and again to 6" and finally to 4" in the Shop Area.

180. An elevated cylindrical steel tank of 100,000 gallons capacity for fire protection water storage was installed 2,370 feet northeast of the Project Pumping Station. The upper water elevation governed by a float valve, is 450 ft., the top of the stand pipe is at 417.5 ft. elevation.

181. The sizes and lengths of pipe for the fire-protection system are:

FIRE PROTECTION SYSTEM PIPING

(Length in Feet)

Size	Adm. Area	Classification	Power & Shop	Acid Area	TNT & Magazine	Total Feet
10"	1,328	1,826	4,040	--	--	7,194
8"	824	1,002	3,500	5,316	15,393	31,035
6"	841	1,678	1,291	48	11,495	15,353
4"	--	--	45	--	--	45
	2,993	4,506	13,876	5,364	26,888	53,627

WaterCooling Water

182. The cooling water is used for cooling chemical processes through, or over, coils, condensers, closed or open heat exchangers or in water jackets.

183. This water is taken from the Niagara River and forced by the River Pumping Station into the surge tank at the Water Treatment Plant, here it goes into the accelerators where it is softened and treated, then through the recarbonation basin into the 4,000,000 gallon (which is sufficient for  $4\frac{1}{2}$  hours normal requirements) ground storage reservoir on the north side of the Water Treatment Plant.

184. This reservoir is connected to six rotary, electrically driven, cooling water pumps, each of 3,200 G.P.M. capacity, which discharge into a 36" diam. Venturi meter and a 36" diam. Class "C" cast iron bell and spigot underground main with leadite joints.

185. Cooling water is carried to the Power, Acid and T.N.T. Areas. In the Acid Area the main reduces to 24" diam. pipe and is connected to the 275,000 gallon concrete water tower, which is in the east end of this Area.

186. This elevated cooling water storage is required so that, in case of pump failure, 165,000 gallons of cooling water would be available for the T.N.T. Area and from 68,000 to 110,000 gallons would be available for the Acid Area. These quantities are considered sufficient to complete the manufacturing cycles of the product in process at a time when a failure of water supply might occur due to current failure, breakage of water line, or otherwise.

187. The water stored in the concrete cooling tower between elevations 456.0 and 468.0 is available for use in the Acid Area. After this has been utilized the water between elevations 432.0 and 456.0 is available for the T.N.T. Area.

188. This tank is equipped with an electric water-level recording device and signal system, by which the operator at the Pumping Station of the Water Treatment Plant can determine the level of water in the concrete tower, which is 4,460 feet distant, at any time. When the water reaches the 468.0 foot level, which is six inches below the top of the overflow pipe, the high-water alarm is given by a bell and repeated at 3-minute intervals until the operator reduces the pumping capacity.

UTILITIES

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WaterCooling Water (Continued)

189. When the water recedes to four feet below the high-alarm level, a low-water alarm signal of a different tone is given at 3-minute intervals until the operator increases the pumping capacity. Should the water continue to recede until the minimum low level is reached, 12 feet below the top level, which is the outlet of the pipe to the T.N.T. Area, a siren signal is given which will continue at 3-minute intervals until the pump operator has corrected the pumping condition. At this elevation the Acid Area reserve has been entirely used and the T.N.T. Area begins to draw on the 165,000 gallon reserve.

190. The sizes and lengths of pipe in the cooling water system are:

COOLING WATER SYSTEM PIPING

(Length in Feet)

Pipe Size	Power Area	Acid Area	T.N.T.		Total Feet
			"M" Street	Branches	
36"	4,287	50	--	--	4,337
24"	1,920	1,215	2,396	--	5,531
18"	--	423	--	--	423
16"	--	37	--	--	37
14"	--	183	--	--	183
12"	--	--	--	2,598	2,598
10"	340	70	--	--	410
8"	1,300	42	--	3,010	4,352
6"	1,590	110	--	4,050	5,750
4"	--	111	--	980	1,091
3"	--	44	--	--	44
2½"	314	--	--	--	314
	9,751	2,285	2,396	10,638	25,070

Boiler Feed Water

191. The boiler feed water comes from the Niagara River as raw water to the surge tank at the Water Treatment Plant. Then it goes through the softening and treatment processes in the accelerators to the gravity filters and the clear well, undergoing further treatment, then the water goes through the 800 G.P.M. filtered water transfer pumps to the 3 Zeolite Filters, each of 267 G.P.M. capacity to the soft well. Three 400 G.P.M.

UTILITIES

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WaterBoiler Feed Water (Continued)

Zeolite water pumps force the boiler feed water from the Water Treatment Plant to the feed water heater in the Boiler House through an 8" cast iron bell and spigot underground pipe line, 937 feet long.

192. In the Boiler House the water is again treated with disodium phosphate and sodium sulphite in its flow between the feed water heater and the boilers.

193. At the Boiler House an outdoor, elevated, 10,000 gallon capacity, wood storage tank provides emergency storage for boiler feed water. An automatic float valve in the tank and level indicator for the boiler operators within the Boiler Plant are provided.

Process Water

194. The process water is used in manufacturing T.N.T. as part of the chemical process and comes into direct contact with the product.

195. Raw water from the Niagara River is pumped by the River Pumping Station into the surge tank at the Water Treatment Plant, is softened and treated in the accelerators and then goes through the gravity filters, is again treated and goes into the 136,300 gallon clear well, which contains two hours' normal capacity supply for six T.N.T. Lines, from which it goes to 3-600 G.P.M. Process Water Pumps in the Project Pumping Station and thence through a 14" diam. Class "C", bell and spigot cast iron pipe main into the underground process water system having leadite joints.

196. The sizes and lengths of the pipe for the process water system are:

PROCESS WATER SYSTEM PIPING  
(Lengths in Feet)

Pipe Size	Power Area	Acid Area	T.N.T.		Total Feet
			"M" Street	Branches	
14"	598	--	--	--	598
12"	5,299	--	--	--	5,299
10"	--	--	2,394	--	2,394
8"	--	--	--	4,221	4,221
6"	964	--	206	2,102	3,272
4"	--	--	--	1,133	1,133
2"	--	332	--	--	332
	6,861	332	2,600	7,456	17,249

UTILITIES

Gas

197. Gas is not used as a fuel or illuminant on the Project, nor was any known commercial supply available within the Project area at the time it was acquired.

198. The A-E-M and its subcontractors used tanks of compressed Pyrofax, Oxygen, Carbogen, and Acetylene for various purposes during construction, as follows:

<u>GAS</u>	<u>CYLINDERS</u>	<u>CU. FT.</u>	<u>USE</u>
Pyrofax	85	76,500	Heating driers in reproduction building
Oxygen (Commercial)	3,083	752,252	Welding and Burning
Carbogen (93% O, 7% CO <sub>2</sub> )	6	1,464	Medical
Acetylene	1,502	434,048	Welding and Burning

UTILITIES

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Electric System

Estimated maximum demand 7,200 KW.  
 Specified capacity 8000 KVA at 90% Power Factor.  
 Installed capacity 10,000 KVA.

High Tension Transmission Line

199. The Buffalo Niagara Electric Corporation acquired a sixty foot right of way, starting from the southwest corner of the Tuscarora Indian Reservation, across the road from their Gibson-Lockport feeders #103 and #104 and extending due north 3.08 miles to the south boundary of the Project. The U. S. Government granted the Corporation an 80 foot easement through the Project Area to the Electric Substation. See pages 21, 248 and 251. This easement and the transmission line within the Project Area will revert to the Electric Corporation in 1951.

200. Prime Contract DA-W-138-Eng. 72 for the construction of the line was awarded to the Buffalo Niagara Electric Corporation on July 2, 1942 and construction was begun July 6, and completed September 11, 1942.

201. This is a 115 KV, 3 phase, 60 cycle, single circuit line, mounted on two pole wood bents, having a 22 ft. double cross-arm at the top and double knee bracing at the center. These bents are spaced approximately 500 feet apart, except where the line bends toward the northwest and then proceeds north, just within the south boundary of the Project. The line runs north until it reaches a point west of the Main Electric Substation where it turns east and continues to the switchyard just north of the Boiler House.

202. The conductors are #2/0 medium hard drawn, stranded, bare copper wire, suspended from strings of seven unit suspension insulators. The conductors are spaced ten feet apart, horizontally, the middle one being centered on the bent. The average clearance above ground is 30 feet, at the low point of the span. The present line is so placed on the right of way that another similar line could be erected beside it, if found necessary. The line is 5.49 miles long. It can be connected through 3 P., D.T., pole-top, ground operated, disconnect switches, to either Gibson-Lockport feeder #103, or Gibson-Lockport feeder #104. See plate XXII for views of this transmission line.

Main Electric Substation

203. The 115 KV switchyard is a wooden structure consisting of poles with cross-arms, with concrete slabs on the ground for the outdoor transformers and is enclosed by a chain-link, non-climbable fence.

204. The transformer equipment at the substation is as follows:

2 - main transformers, 10,000 KVA, 115 Kv to 6900 V,  
 3 phase, 60 cycle, furnished by Westinghouse Electric  
 & Mfg. Co., arranged

UTILITIES

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Electric System (Continued)Main Electric Substation (Continued)

for delta/delta connection to give 6900 V. on the secondary side. They may in future be reconnected to give 12,000 V. on the secondary side with "Y" connection of the secondary transformer coils. Secondary connections are provided to permit operation of either transformer. The transformers, by addition of forced air cooling, will permit a 33-1/2% increase in capacity with moderate expenditure for additional equipment.

- 2 - Primary disconnect switches, 115 KV, pole top mounted.
- 6 - Primary lightning arresters, 115 KV.
- 6 - Primary 80 Amp. S & C fuses; characteristics to give interruption on short circuit to clear in 33 cycles.
- 6 - Secondary lightning arresters, 6900 V.

205. Metering equipment is on the secondary side, housed in a brick building constructed by the A-E-M. This metering equipment was furnished and installed by the Buffalo-Niagara Electric Corporation.

206. The main switchboard for the 6900 volt distribution system is located near the northeast corner on the ground floor of the Boiler House.

207. An underground duct system of 12 fibre conduits laid in concrete was built from the Substation to the Boiler House. Each conduit contains one 1,000,000 C M cable. Two of these cables were installed for each phase from each transformer. A pit was built at the main switchboard for both incoming cables and outgoing feeders.

208. The secondary leads from one transformer go through an oil circuit breaker to one side of a bus (sectionalized by knife switches in the center) while the secondary leads from the other transformer go through another oil circuit breaker to the other side of the bus.

209. These two oil circuit breakers are controlled from the switchboard by hand control switches which are electrically interlocked so that the second switch cannot be closed electrically with the first switch closed. Both transformers cannot be operated in parallel. This provision by Stone & Webster is retained, as the feeder switches are not of sufficient interrupting capacity to clear a short circuit close to the bus with both transformers serving simultaneously.

UTILITIES

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Electric System (Continued)Main Electric Substation (Continued)

210. Ten three phase feeder circuits are provided, five on either side of the sectionalized bus. These are controlled by oil circuit breakers which can be operated by hand control switches on the main switchboard. One of these feeders is used to supply electricity for power and light for the Boiler House. Eight circuits become primary distribution feeders supplying power and light for various areas of the Project. One circuit at present is a spare for future use.

211. The outgoing feeders were installed underground from the 6900 V. switchboard to the poles in the switchyard, using fibre duct in concrete. These are 3-conductor, 500 M C M, 7500 V, PILC cables, which were bought to facilitate delivery and simplify the field work. All cables are pot-headed at both ends to protect them against moisture. See the photographs on plates XI and XXXIV.

Primary Distribution - 6900 Volts

212. This system was completely designed by the A-E-M, including determination of wire sizes, pole classes and lengths, type of hardware, length of spans, direction of runs, location and sizes of 92 transformer stations, etc. All wire used was bare wire for 6900 V, 3 phase, 60 cycle current. The sizes of copper used on the system were calculated in accordance with the assigned power loads in each case. All classes of wooden poles from 1 to 5, inclusive, were used in lengths from 25 ft. to 55 ft., inclusive. All insulators used to support the wires were of 23 KV capacity, to permit a change from 6900 V. to 13.2 KV, if necessary. Each circuit is protected at the Boiler House switchboard by an oil switch with overload trip protection. Nine feeders are provided from the switchboard, with one spare switch for the possible 10th feeder. See map on page 266. See photographs on plates XXII and XXIII.

PRIMARY FEEDERS

Cubicle No.	Feeder No.	Supply to	Estimated Max. K.W.
1	Spare		
2	2	(Guard fence lighting, Fire Hdqts. (Guard Hdqts. & Hospital	216
3	3	T. N. T. Area	1550
4	4	Building lighting	924
5	5	Process water	2027
12	6	Acid Area	2027

UTILITIES

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Electric System (Continued)Primary Distribution - 6900 Volts (Continued)

Cubicle No.	Feeder No.	Supply to	Estimated Max. K.W.
13	7	Yard lighting (Series)	140
14	8	T. N. T. Area	Alternate to #3
15	9	Process water	Alternate to #5
16	10	Station, lighting & power	650

213. A double primary line is used for serving the water-supply system. One line will carry the main intake pumps at the River Pumping Station. The other line will carry all of the pumping load normally operating in the Pump House of the Water Treatment Plant, pumps in Sewage Area, and River Pumping Station auxiliary power and lighting and will be maintained in service in case of emergency.

214. In general, the arrangement of feeders at the switchboard is in accordance with the one-line diagram as furnished by the Stone & Webster Engineering Corp. Feeder assignment of loads has been modified only in respect to the handling of emergency power loads, and changes incidental to type of substation and omission of one emergency generator.

215. Layout plans were made, giving the pole number of every pole in addition to its location. Standard detail sheets of letter size were made up with notation thereon of the pole numbers to which each standard pole-top construction applied. Small standard sheets were also made up for the street lighting. Prints of these standard sheets and of the general layout drawings were supplied to the electrical field crews for erection use.

216. The distribution lines of the Buffalo Niagara Electric Corp. within the property boundaries were acquired by purchase. Arrangements to feed these existing primaries from the 6900 V. plant distribution system have been made at two points so that all primary distribution lines so acquired will be utilized, except where these old primary lines are to be removed.

217. Ninety-two transformer banks have been located throughout the area, exclusive of those used purely for residential lighting. These transformer installations total 11,543 KVA, consisting of 1,649.5 KVA for lighting and small motors and 9,893.5 KVA for power. Our drawing shows the distribution of transformer stations in relation to supply feeders. These transformers are delta/delta connected for 6900 V secondary for primary distribution, but they can be "Y" connected to furnish 12,000 V. on the secondary side if found advisable in the future.

UTILITIES

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Electric System (Continued)Primary Distribution - 6900 Volts (Continued)

218. Prime Contract DA-W-138-Eng. 84 for the construction of primary distribution lines from the initial pole adjacent to the power house to the secondaries of the distribution transformers and for the guard fence lighting was awarded to O'Connell Electric Co. of Rochester, N. Y. on May 21, 1942. Work began June 16 and was completed December 9, 1942. The power house and cable work was done by the Lord Electric Co. as Sub-contractor to the A-E-M.

Secondary Distribution - Mostly 440 Volts

219. The A-E-M prepared the complete design of this system, including wire sizes, both classes and lengths, type of hardware, length of spans, direction of runs, etc. Weather proof wire was used throughout. From the various substation transformer banks, secondary distribution lines were specified in accordance with load requirements.

220. Secondary voltages for all power needs consisted of 440V, 3-phase circuits except for the laundry (Bldg. #723) and part of the River Pumping Station, which required 220 V, 3-phase circuits, because the vendors could not deliver the 440 V. equipment in time to start operation of this plant. Also, in buildings housing the ammonia compressor units for nitric acid, the blowers for the precipitators in the sulphuric acid concentrating plant, the air compressors in the Plant Compressor House and the water pumps in River Pumping Station, 2300 V, 3-phase power was used for these larger motors. All lighting circuits were 115/230 V, single phase, run from separate transformers.

221. Secondary power distribution lines were carried on wooden poles with racks used, in general, for one, two or three wire circuits. Cross-arms were used when 440 V service was carried on secondary distribution poles.

222. The majority of transformer banks are on pole structures or cross-arm mounted. Where the load is in excess of two tons, a double-pole transformer structure was used. On transformer banks exceeding 300 KVA capacity, concrete pads were installed at ground level and all equipment enclosed by a fence. Lightning arresters and fused cutouts are used with every transformer installation. See photographs on plate XXIII.

223. Contracts for buildings erected as a group included the electrical lighting work. A prime contract DA-W-138-Eng. 71, for the electric lighting in 27 buildings erected by the force account, was awarded to Rohrer Electric Co., Inc., of Niagara Falls, N. Y., on May 9, 1942. Work began May 19, 1942 and was completed November 10, 1942.

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Electric System (Continued)Secondary Distribution - Mostly 440 Volts (Continued)

224. All other work was done by Lord Electric Co., Inc., as Sub-contractor for the A-E-M, on a fixed fee basis. This work included the secondary lines for distribution of load from the secondary side of the distribution transformers to the various power-load consuming devices and the erection of all pole structures for the steam and process pipe lines.

Outdoor Lighting

225. The entire outdoor illumination system was designed by the A-E-M, consisting of 15 circuits, each containing one constant current transformer with controller, protector, electric time switch and  $1\frac{1}{2}$  KVA transformer to operate the time switch. A total of approximately 700 - 300 W, 6.6A series luminaires was used on these 15 circuits. Mast arms used for fence lights are 8'-9" long as the primary distribution line was located 6'-9" inside the fence. Brackets 4'-0" long were used for the street lights.

Fence Lighting

226. Fence or guard lighting consisted of six circuits with an average of 56 lamps per circuit, spaced 125 ft. apart. The luminaires were so located that the light source was two feet outside of the guard fence at an elevation of 23 ft. above grade, with light distribution such that a well-illuminated band 100 ft. wide outside of the fence was provided, with comparatively slight illumination inside of the fence.

227. Guard towers were so located that they were above the light source and were equipped with searchlights which could be used for spot illumination of any questionable detail. These sentry houses were spaced at approximately 1,500 feet intervals, so that the intervening area was normally visible from two stations. Each tower is also equipped with electric heating and guard telephone connection to the central guard house.

228. The primary feeder energizing the six constant-current 20 KVA transformers for the lighting circuits was also used to energize 28 - 5 KVA, single-phase transformers which were used to operate a 1,960,000 beam c.p. searchlight mounted on the roof of each guard tower, and also to light and heat these guard towers.

229. The fence and guard-tower lighting system was supplied through a primary distribution line direct from the main switch-board at the power house. All series lighting circuits were controlled through time switches located at each constant-current transformer, with a control circuit to the nearest sentry house.

UTILITIES

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Electric System (Continued)Street Lighting

230. Street lighting comprised nine series loop circuits of approximately 375 total lights, with transformers from 5 to 30 KVA capacity. In addition to lighting the streets within the guard fenced area, street lighting was placed on three main roads leading to this area within the Project site. In general, street lights were placed on every third pole or 450 ft. apart, except where higher illumination was necessary on roads used for transportation of explosives, where a light was located on every pole. Poles were set six feet from the shoulder of the road.

231. All series lighting circuits are controlled through time switches located at each constant-current transformer.

232. General lighting was also furnished by multiple flood lights installed in the Classification Yard, Main Parking Area, Transportation Center and some other isolated places not reached by series lighting. See photographs on plate XXIII.

Telephone System

233. Two separate systems were designed. One was used for general intercommunication and connected to the New York Telephone Co. system and of the automatic type; the other was the guard telephone system with a manual board in the Guard Headquarters building. A common cable was used for both systems where practical.

234. The central automatic telephone exchange was purchased from and installed by the American Automatic Telephone Co. in the brick telephone building, #702, designed for this purpose, and was initially equipped for 350 extensions with provision to extend to an 800 line capacity, sufficient for a 12-line plant. This board is wired and equipped for 20 trunk lines to Niagara Falls and 5 trunks to Lewiston, N. Y.

235. Telephones throughout the manufacturing area and the Administration buildings were laid out as called for by the schedule of telephone service indicated by DuPont and drawings were prepared showing the distribution by multiple lead-covered cable throughout the area. A 400 pair cable is brought out from the telephone bldg. and run overhead on electrical distribution system poles. A 200 pair cable is installed in underground circuit to the Administration Bldg., for present and future needs. The cable size diminishes from 400 pair in successive steps, as pairs are utilized, until it becomes an 11 pair minimum cable. Telephone service is also furnished to many

UTILITIES

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Electric System (Continued)Telephone System (Continued)

residences on the site. Operators are required to handle outgoing calls only, as the intercommunication phone sets are all automatic.

236. The Guard telephones are located outdoors, with an operator constantly on duty at Guard Headquarters to check reporting calls by the guards. The DuPont Manual specified a magnetic-type telephone system for the guards but inability to get delivery required the use of a standard non-dialling telephone system. Each sentry tower along the guard fence is connected to the guard central and there are also connections from various strategic locations throughout the area within the guard fence where watchmen's telephones are located.

Fire Alarm System

237. The A-E-M designed the fire-alarm system, consisting of 47 alarm stations divided into two alarm circuits and one circuit for recorders and alarm bells located in two fire houses and the Boiler House, and gongs only in the water pumping plant, the main office building, the combined shops and Guard Headquarters. The wires to the alarm boxes are strung on poles used for the primary distribution system and street lighting. The complete system was installed by the A-E-M.

Heating

238. Careful study of the heating requirements for all new buildings resulted in the installation of 127,739 sq. ft. of radiation, or 38,559 sq. ft. increase over the original amount recommended in the DuPont Specifications for Utility Requirements for this Project.
239. Steam from the Boiler Plant is distributed, as described under Steam Lines, and takes care of 126,171 sq. feet of steam radiation in the buildings.
240. Electric heaters account for 1,370 sq. feet of radiation in the office of Building #701 (Gate House) and 198 sq. feet in Buildings #601 (Scale Houses).
241. Hot Air is used at the River Pumping Station and exhaust steam is used in the Filter Building of the Water Treatment Plant.
242. The great increase in heating is due to the fact that the original designs were for installations in localities with a warmer climate than that found on the Niagara Frontier and the south shore of Lake Ontario.
243. Temporary buildings were heated with oil, burned in large stationary burners or portable stoves.
244. Most of the existing buildings, used for quarters or offices, were heated with coal. A few were heated with oil. See page 62.
245. Steamlines and heaters were also installed at all the elevated water storage tanks and the fire storage reservoir, to provide heating.
246. Twenty-eight sheds were built for steam traps and reducing valves.

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Boiler House

247. The Stone and Webster Engineering Corporation of Boston, Mass. and the U. S. Government entered into a contract, W-175 Eng. 1297, whereby the Corporation was to furnish designs, specifications and engineering and procurement services in connection with seven boiler plants for T.N.T. Projects. This contract included the design and procurement of the boiler house and its equipment for the Lake Ontario Ordnance Works, with the exception of the boiler feed, water treatment, fuel handling facilities and miscellaneous details which were taken care of by the A-E-M.

248. The original Boiler House design called for the initial installation of four boilers. This was later changed to three but not until after foundations had been poured for four boilers and for their auxiliaries.

249. The main building is 136', east to west, and 82' north to south, of structural-steel framing on concrete foundations, with asbestos-protected metal siding and roofing supported on wood girts and purlins. Steel sash is used, and the roof is fitted with an open-ridge ventilator to its full length. The original design for the Boiler House foundations allowed for 4,000 lbs. per sq. foot soil pressure. All foundations had to be redesigned, 3,000 lbs. per sq. ft. pressure to suit the load-bearing qualities of the relatively soft underlying clay at this location. See photographs on plate XI.

250. The main building houses three Riley pulverized-coal-fired steam generators, each having a capacity of 100,000<sup>000</sup> per hour of saturated steam at 185 lbs. gauge pressure. Each unit is complete with steam-turbine-driven induced and forced draft fans, motor-driven pulverizers and coal feeders, and is complete with automatic combustion control. The building also houses auxiliaries, including boiler-feed pumps, fuel-oil pumps, deaerating open-feed water heater, chemical feeding equipment, and air compressors for the control system.

251. Attached to the north side of the main section is the electrical bay, 136' x 30', in which is installed an emergency 500 KW turbo-generator with provision for a future duplicate unit, switchboards, battery room, and motor-generator set. This bay also houses the office, locker and toilet rooms. On the east end of the main section is a bay, 112' x 30' housing scrubbers and pumps for the purpose of delivering clean flue gas from the uptakes to the Water Treatment Plant, 1/3 of a mile distant.

252. Fuel and ashes are handled with facilities located in the area south of the Boiler House.

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Boiler House (Continued)Boilers

253. The three coal and oil-fired steam generating units, including pulverizers, feeders and connecting ductwork, were furnished by the Riley Stoker Corp. of 109 Neponset St., Worcester, Mass. These units each have a continuous capacity of 100,000 lbs. of steam per hour at 185 p.s.i. with feed water at 210 deg. F. when burning coal having a heat content as fired of 10,500 BTU per pound.

254. Each Riley type R.P. boiler is of two-drum design, the upper being 60" and the lower 36" in diameter and 18'-1" long. The upper steam drum is equipped with a steam separator for collecting dry steam for exit from the boiler, and a collector for the continuous blow-down system. 9,440 sq. ft. of heating surface is provided by  $3\frac{1}{4}$ " and  $2\frac{1}{2}$ " tubes in the boiler proper, and 2,735 sq. ft. are provided by  $3\frac{1}{4}$ " tubes, making up water walls and floor screen. The furnace has 6,400 cu. ft. of volume, being 18'-3" wide by 14'-10" long by 23'-9" mean height, providing a heat release of 20,600 BTU per cu. foot per hour.

255. The whole boiler is encased in a #10 gauge steel casing lined with mineral wool, insulating block and interlocking firebrick, and is equipped with 12 valve-in-head Diamond soot blowers, five 4" safety valves, one Reliance high- and low-alarm water column, vent and feed valves continuous blow-down valve, and five blow-off valves.

256. Performance data is contained in the A-E-M's Historical Report.

Pulverizers

257. Two #4 Double Riley Atrita Unit Pulverizers serve each boiler, each pulverizer having a capacity to generate 70,000 lbs. of steam per hour when pulverizing coal with 18% moisture. Coal is fed from the silos through chutes by gravity to the hoppers of the dual coal feeders which are located on the operating floor. Each feeder is driven through a common variable-speed drive from a  $1\frac{1}{2}$  H.P., 1,150 r.p.m., constant-speed motor. The variable speed drive is automatically regulated by the pneumatic control system according to the steam demands of the boiler. The feeders are equipped with magnetic separators for removing tramp iron from the coal. Metered coal drops from the feeders and, together with preheated primary air, enters the pulverizers. Air preheating is accomplished by mixing hot furnace gas, taken through the furnace front wall, with air through adjustable dampers at the boiler front.

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Boiler House (Continued)Pulverizers (Continued)

258. The pulverizers reduce the coal to its final size in two stages, first in a hammer mill, by impact, and then in an attrition mill, by rubbing. Powdered coal in suspension then passes through the pulverizer primary air fan, and is discharged through round ducts to the burners located on the operating floor. It is noteworthy that these pulverizers are extremely quiet in operation and have little vibration.

Burners

259. Each boiler is equipped with two Riley flare-type coal burners with Enco (the Engineer Co.) fuel-oil burners at its center. Intimate mixing of coal, oil, and air, and the shape of the flame, is accomplished in the burners by arrangement of sets of adjustable vanes.

260. The oil burners are arranged so that either mechanical or steam atomizing units can be used, according to requirements. Both types are furnished. Oil-burner capacities range from 10 to 300 G.P.H., which will generate from 1,200 to 36,000 lbs., of steam per hour. The oil burners are used for initial operation when warming up a boiler, and it has been found necessary to use fuel oil to supplement coal at ratings below 30,000 lbs. per hour. At low steaming rates the furnace temperature becomes sufficiently low so that ignition of coal alone is slow, making combustion somewhat unstable, with some puffing. Addition of small amounts of fuel oil correct this condition.

Forced Draft

261. The forced-draft equipment consists of one steam-turbine-driven forced-draft fan, and one steam-turbine-driven induced-draft fan for each unit.

262. The forced-draft fans were furnished by the Green Fuel Economizer Co., Inc. The units are double inlet, with ring-oiled bearings on independent pedestals, and are driven by Terry turbines through Folk flexible couplings. The performance data is as follows:

Pounds of air per hour	165,000	125,000
Temperature of air (deg. F.)	100	80
Cu. ft. per minute	39,000	28,400
Static pressure (in. H <sub>2</sub> O)	7	4

Boiler House (Continued)Forced Draft (Continued)

Rev. per min.	1,860	1,490
Brake h.p.	66	27
Static efficiency (%)	65	66.2
Pounds of steam per hr.	5,550	2,800

Induced Draft

263. The induced draft fans were furnished by the American Blower Corp. The units are double-inlet "Sirocco" type, complete with inlet boxes and discharge scroll housings. The wheels are provided with wearing pads on the blades. Ring oiling water-jacketed bearings are supported with independent pedestals. The variable speed adjustment of draft is further controlled by louvre dampers. The units are driven by Worthington-Moore turbines through herring-bone reduction gears; all assembled on a common bed plate. The performance data of these units are specified to be as follows:

Pounds of gas per hour	180,000	140,000
Temperature (deg. F.)	625	570
Cu. ft. per minute	82,300	60,700
Static pressure (in. H <sub>2</sub> O)	9.0	5.0
Rev. per minute	935	680
Brake h.p.	164	67.5
Static efficiency (%)	71.0	71.0
Pounds of steam per hr.	6,960	4,540

Combustion Control

264. The combustion-control system, furnished by the Bailey Meter Co., was designed and purchased by Stone & Webster. The control is effected by a complete system of Bailey air-operated automatic-control equipment which automatically maintains constant steam-header pressure, proper fuel-air ration, and furnace draft in each boiler. It includes means for obtaining automatic control of pulverized coal feed, forced and induced draft-fan speeds, and forced draft and induced draft fan damper positions. In addition, a system of electrical interlocks are provided to prevent the starting of the pulverizers or feeders until air flow through the boilers has been established, and to stop fuel-oil and coal supply on loss of air flow.

265. A control panel for each boiler is located on the operating floor in front of each boiler, on which are installed the Bailey steam-flow air-flow recorder controller, selector switches for manual and automatic operation of air and fuel.

UTILITIES

Boiler House (Continued)

Combustion Control (Continued)

speed controls, furnace draft control, and start-stop switches for pulverizers, coal feeders, and boiler-feed pumps. In addition, on these panels are mounted Bailey multipointer Draft Gauges, indicating forced draft, wind box, furnace, uptake and I. D. Fan intake draft; gauges indicating boiler feed water pressure and fuel-oil pressure; and pulverizer ammeters. Thus the complete control of the boiler unit is effected, and indication of conditions of operation are before the operator at this one location.

266. Air for the control system is furnished by two Worthington two-stage, three-cylinder air compressors of 60 c.f.m. capacity driven by 15 H.P. motors. Air is delivered to a 152-cubic-foot receiver, and from the receiver to the various units of the control system. One compressor is of sufficient capacity to meet the requirements of three boiler units, so that a stand-by compressor is always available.

Boiler Feed Water System

267. The boiler feed water system was designed by the A-E-M from point of entry to the Power Area, to the suction header for the boiler feed pumps. From this point to the boilers the layout is by Stone & Webster.

268. Water (Zeolite softened) is delivered to the Boiler House through an 8" main, and is fed through an 8" air-operated Clayton float valve, furnished by the Crane Co., to a 10,000-gallon wood stave tank located on a steel tower 80 ft. high at the east end of the Boiler House.

269. Water is fed by gravity through the float feed valve of the Cochrane open-tray-type deaerating heater, purchased from the Cochrane Corp. of Philadelphia. This is a #6066 heater having a capacity of 400,000# per hr., and is equipped with a vent condenser, and water inlet regulating valve as standard equipment. A second water inlet regulating valve was installed as a special feature for this job, 3'-5" below the standard valve to provide an emergency supply of treated cooling water to the heater in event of failure of the regular Zeolite-softened water. Steam is furnished from the auxiliary exhaust header to the heater at 3 p.s.i., water enters at from 35 deg. F. to 65 deg. F., and is discharged to the suction header of the boiler-feed pumps at 220 deg. F. A valved by-pass piping is provided around the storage tank and feed water heater direct to the pumps.

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Boiler House (Continued)Boiler Feed Water System (Continued)

270. Three 2-stage DeLaval centrifugal boiler-feed pumps with 4" suction and 3" discharge openings, specified to deliver 450 g.p.m. at 625 ft. head of water at 220 deg. F. with suction head of 22 ft., discharge the heated feed water to a 6" header manifolding the three boilers. Each pump has an excess of 35 per cent capacity to meet the maximum steam-output demand of the plant. Each of two pumps is direct coupled to a DeLaval single stage, non-condensing steam turbine equipped with constant-speed governor and separate over-speed trip, the third pump is driven by a 100 H.P., 3,600 r.p.m., 3 phase, 440 V. squirrel-cage induction-type, splashproof motor.

271. At each boiler the feed water passes through a Fisher Governor Co.'s 4" differential pressure-regulating valve and a Swartwout feed water regulator to the upper drum of the boiler.

272. Paralleling the feed water header is a duplicate auxiliary header receiving feed water from individual pump-discharge connections and supplying each boiler through a separate connection having a manual regulating valve. This auxiliary piping system insures the boilers a supply of water in the event of failure of any of the feed water regulating or piping equipment.

Continuous Boiler Blow-down System

273. The blow-down system for the boilers is of Stone and Webster design, and the principal equipment was purchased by them.

274. The water from the 3/4" continuous blow-down metering valves, furnished by the boiler manufacturer, is discharged through a 3" collecting header to a 4'-0" diam. x 7'-10" flash tank furnished by the Cochrane Corp. This flash tank is built for 50 lbs. working pressure, and is equipped with a relief valve, high-water alarm, and float valve.

275. About 16% of the water entering the tank passes as steam to the low-pressure main, while the balance passes through the float valve to the blow-off tank, furnished by the Pennsylvania Furnace & Iron Co. of Warren, Pa., and is located on the south side of the Boiler House. This blow-off tank is 7'-0" x 5'-0" diam., and is furnished with a vent and overflow connection to waste. Blow-offs from the water columns, water-wall headers and mud drums of the boilers discharge directly to the outside blow-off tank.

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Boiler House (Continued)Chemical Treatment of Boiler Feed Water

276. Consulting advice concerning the problem of chemical treatment of the boiler water was rendered by W.H. & L.D. Betz, Philadelphia, Pa.

277. The boilers receive soft, deaerated water, having received Zeolite treatment before entering the Boiler House, and deaeration in the Cochrane Deaerating Heater. A chemical feed system introduces an estimated requirement of one gallon of 5% disodium phosphate and 1/6 gallon of 5% sodium sulfite solutions per 100,000 lbs. of steam directly to the upper drums of the boilers. Sodium phosphate solutions of 5% concentration are mixed in a 100 gal. tank, and sodium sulphite solutions of from 2% to 5% concentrations are mixed in a 52 gal. tank fitted with a floating cover to keep exposure to the air at a minimum. The disodium phosphate solution is fed to the boilers by either of two variable-stroke chemical proportioning pumps, Hills-McCanna Co., Chicago, Ill., type RM-1F. The sodium sulphite solution is fed into the suction header of the boiler feed pumps by a third variable-stroke chemical-proportioning pump.

278. Ahead of the continuous blow-down metering valve at each boiler, a sampling connection has been made and equipped with a sampling cooler. From the chemical analysis of water taken periodically, the rate of blow-down and rate of disodium phosphate and sodium sulphite feed is determined.

Coal Handling Equipment

279. The coal-handling equipment was purchased by Stone & Webster from the Jeffrey Mfg. Co. of Columbus, Ohio, and comprised the following:

- 1 - 10,000 lb. capacity car puller
- 1 - Track hopper with supporting girders and grating
- 1 - Apron feeder
- 1 - Rotary ring crusher
- 1 - Continuous bucket elevator
- 1 - Magnetic separator
- 1 - Scraper Conveyor

280. The operation of these units is as follows: The car puller is used for moving empty and loaded cars. The coal from the railroad cars is received into the track hopper, which is provided with a 6" mesh grating and track

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Boiler House . (Continued)Coal Handling Equipment (Continued)

From the hopper, the apron feeder feeds to the rotary ring crusher. The chute to the crusher is provided with a 3/4" mesh bar grating so that fines will bypass the crusher and pass directly to the continuous bucket elevator, while the coal over 3/4" will pass to the crusher to be reduced to 3/4", or finer, and discharge to the continuous bucket elevator. The continuous bucket elevator carries coal up and discharges it to the magnetic separator, located atop the easterly silo, which removes tramp iron and then discharges the coal to the scraper conveyor. The scraper conveyor then conveys coal to openings in the top of each silo. This entire equipment has a rated capacity of 70 tons per hour with continuous feed.

281. The reclaiming conveyor was purchased by the A-E-M from W.B. Neill Co. of New York City and was built by the Link Belt Co. of Chicago, Ill. This is a belt conveyor designed to receive coal from the three silo dead storage discharge valves and discharge it into the chute feeding the continuous bucket elevator, at the rate of 70 tons per hour.

Coal Silos

282. The outline drawings and specifications for three coal silos were furnished by Stone & Webster, and the silos were constructed under Contract DA-W-138-Eng.93, by W.B. Neill of New York City. The original design called for silo structures 21 ft. in diameter and 78 ft. high, located axially in front of each boiler and having a floor sloped toward the Boiler House at an angle of 47 deg. and with a mean elevation of 45 ft. above grade. This provided for a live storage of 250 tons of coal for each boiler. Climatic conditions warranted a small additional expenditure to provide an inside dead storage of about 270 tons in the lower portion of each of the silos. An overflow chute from the live storage, and an inclined floor and valve in the bottom of the silos feed a reclaiming conveyor, which in turn discharges to the live-storage conveying system, was erected. This provides a total, sheltered, dead storage capacity of 800 tons, which may be delivered into any of the three silos.

Coal Storage

283. An outside yard coal-storage space is provided, covering approximately 3½ acres, allowing for storage of 40,000 tons of bituminous coal, when graded to a depth of 14 feet, thus

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Boiler House (Continued)Coal Storage (Continued)

providing facilities for storing about a 6-months supply of fuel for the Boiler House. This storage is served by a separate railroad spur on a coal trestle 262 ft. long and elevated 15 ft. above grade. A deisel engine-driven tractor and scraper-bucket truck ("Carrymore") distributes coal over the storage space. This method of distribution was favored, because it lends itself most readily to evenly depositing and compacting the coal in thin layers and for maintenance of uniform consistency throughout the pile. This lessens the probabilities of spontaneous combustion. See photographs on plate XI.

284. Coal is moved from dead storage to the track hopper, located at grade, serving the coal silos by means of the scraper bucket and tractor, or by means of a bulldozer tractor. This arrangement for dead coal storage is all of A-E-M design.

Fuel-Oil System

285. The fuel-oil system serving the oil burners was designed by Stone & Webster, and the fuel-oil pumps, tanks and specialties were purchased by them.

286. The fuel-oil storage facilities consist of two 12,000 gallon horizontal tanks, 10'-0" diam. x 24'-0" long, with dished heads and tested to 15 p.s.i. The tanks were furnished by the Buffalo Tank Co. Each tank is equipped with a 6" fill pipe extending to within 6 inches of the bottom of the tank, and located so as to receive fuel from either tank car or tank wagon, a 1" water-removal line, liquid level gauge and 24" manhole. The 3" oil suction lines supply two fuel-oil pumps, through a twin strainer, from either or both tanks. One pump, driven by a 10 H.P., 875 r.p.m., 3 phase, induction-type splash-proof motor, is a double-helical-gear rotary pump, supplied by Worthington Pump & Machinery Corp. The second pump is a 7½" x 4" x 10" horizontal, standard-pattern piston pump suitable for working pressures up to 350 p.s.i., and is equipped with visible-feed lubricator and steam governor valve. This pump was furnished by the Union Steam Pump Co. A pulsation chamber, 18" diam. x 7'-0" long, with gauge cocks and glass, is located in the steam pump discharge piping. The fuel oil discharged from these pumps is delivered to the boilers at 250 p.s.i., charge. A Ruggles & Klingeman electric solenoid valve is located at each boiler to shut off the fuel-oil supply, in the event of failure of draft in the boilers.

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Boiler House (Continued)Fuel-Oil System (Continued)

287. The Chemical Construction Corporation under a directive received from the Ordnance Dept., purchased a supplementary oil-storage tank to be erected above ground, having a capacity of 132,000 gallons. Oil will be pumped from oil-tank cars into this storage by means of two 75 g.p.m. Viking oil pumps, and reclamation may be accomplished by either discharging directly into the fuel pump suction or into either of the under-ground oil-storage tanks. Piping is arranged for both methods of reclamation. See panorama on page iii.

Ash Handling

288. The ash-disposal system was designed and purchased by Stone & Webster from the United Conveyor Corporation, Chicago, Ill. The system includes ash hoppers, pneumatic conveyor, radial brick storage bin, and unloader.

289. Ashes are collected in refractory-lined hoppers below the boiler furnaces. Fly ash from the cyclone separator located in the induced fan discharge and from the last pass hopper to the stacks is pneumatically conveyed through a system of piping to the receiver and separator located above the ash-storage bin. Air passes through the 8" steam exhauster, through a dust separator and silencer to the atmosphere. Ash and dust drop into the bin below. The glazed radial tile ash bin is located on a steel supporting structure allowing truck clearance below. The bin is approximately 23 ft. high and has a 14 ft. inside diameter, and is equipped with a dustless unloader on the underside for discharging ashes into trucks.

290. The ash system is designed to handle 15 tons of dry ash per hour, using an average of 225 lbs. of steam per ton of ash. Ash can be unloaded from the bin at the rate of 25 tons per hour.

Stacks and Flues

291. The flue gas discharged from the upper rear of each boiler is carried down to each induced draft fan, located on the basement floor, through a split duct fabricated of 3/16 steel. From the fan outlet the gases then pass upward to the base of each stack. These ducts are provided with bellows-type expansion joints.

292. The three steel stacks are 6'-6" in diameter at the base, and 5'-0" at the top. They rest on the steel framing of the building, with the bases 42 ft. above the basement operating floor, extending 37 ft. above the

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Boiler House (Continued)Stacks and Flues (Continued)

roof, and are unlined. Suspended from the base of the stack is a soot hopper with valved connection to the ash-collecting system.

293. The stacks and ducts were designed and purchased by Stone & Webster Corp. from the United Boiler Heating & Foundry Co., Inc., of Hammond, Indiana. The flues were purchased by the A-E-M from the Dover Boiler Works, Jersey City, N. J.

Steam Piping

294. Steam at 185 lbs. p.s.i. from the three boilers drops into a 16" header, located about three feet above the operating floor on the north side of the Boiler House. Steam for distribution for the T.W.T. Area and Acid Area is taken from the east end of this header, and for the Administration Area and Shops Area from the west end. A Republic Flow Meter records the amount of steam distributed through each take-off. An auxiliary steam line serves the auxiliaries of the Boiler House. This line completely loops the Boiler House, and takes its steam from two connections to the main steam header and is equipped with sectionalizing valves so that repairs can readily be made with the plant under steam.

295. A low-pressure steam line receives steam from the auxiliary turbine exhausts, and from the blow-off flash tank, and supplies steam to the deaerating heater and Boiler House heating. The low-pressure steam line is equipped with a Cochrane Multiport Relief Valve sized to pass the full volume of auxiliary turbine exhausts at 6 p.s.i. A 4" Masoniron, pilot operated, Pressure Reducing Valve furnishes steam to the low-pressure lines, when auxiliary exhausts are insufficient to meet low-pressure steam demands. Condensate from steam line drip traps is collected in an 18" dia. x 36" receiver and is raised to the feed water heater by means of a lift trap, furnished by W. M. Acker Organization, Inc., of Cleveland, Ohio.

296. All steam piping in the Boiler Plant is insulated with double-thick 85% Magnesia covering. The exhaust piping is insulated with single thickness, 85% Magnesia covering.

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Boiler House (Continued)Emergency Turbo Generator

297. Two 500 KW turbo generators, specified and purchased by Stone & Webster, were to have been installed to pick up the emergency lighting load in the event of electric power failure. However, due to Government reallocation, only one unit has been erected. The Terry Steam Turbine Co. furnished this unit complete as follows:

- 1 - 500 KW Type C-2 Terry two stage reaction turbine complete with constant-speed governor valve, separate quick-opening valve and sentinel type relief valve.
- 1 - Weston Electric Co. electric indicating tachometer.
- 1 - 8" Ruggles & Klingeman, Fig. 229L. solenoid operated trip valve complete with auxiliary switch and adjustable oil dash pot.

298. On power failure, the solenoid-operated steam valve opens at a rate established by the oil dash pot setting, admitting steam to the turbine. On restoration of outside power supply, the steam valve is automatically closed. The turbine exhausts directly to the atmosphere.

299. Furnished by the same vendor and direct driven by the above turbine, through a flexible coupling, is

- 1 - General Electric 500 KW, 625 KVA, 6,900 V, 3 phase 60 cycle General Electric Co. generator with direct connected 125 V, D-C exciter.

300. In case of power failure requiring automatic starting of the turbine, the emergency generator is connected through its switchboard to the emergency station power transformer to the Boiler House units necessary to maintain operation. This generator may also be connected by the operator through the switchboard to the main 6,900 volt switchboard to supply a limited amount of power to outgoing feeders to supply selected emergency power and lighting needs.

301. In case of interruption of the A-C supply, emergency lighting in the Boiler House is provided by an automatic throwover switch which transfers the supply to the emergency lights from the normal A.C. source to the D.C. 125 V. storage battery.

UTILITIES

302. BOILER HOUSE CONTRACTS

<u>DESCRIPTION OF WORK</u>	<u>PRIME CONTRACTS</u>	<u>WORK STARTED</u> 1942	<u>WORK COMPLETED</u> 1942
Concrete foundations	Poirier & McLane Corp.	April 6	June 24
Steel erection	Schieve Construction Co.	June 15	July 22
Siding and roofing	American Steel Band Co.	July 18	October 10
Glass and glazing	Pittsburgh Plate Glass Co.	June 30	September 12
Plumbing and heating	H. C. Mapes Corp.	July 8	November 16
Erecting boilers	Champion Construction & Eng. Co.	June 12	September 30
Coal silos	W. F. Neill, Inc.	June 17	October 14
Ash bin and equipment	United Conveyor Corp.	July 13	October 29
Pipe covering	Paul J. Krcz Company	September 29	January 16, 1943

SUB-CONTRACTS

Steam piping	Baker, Smith & Co., Inc.	July 13	January 15, 1943
Electrical work	Lord Electric Co., Inc.	July 18	January 16, 1943
Supervising Eng.	Bailey Meter Company	August 27	February 8, 1943
Supervising Eng.	Jeffrey Manufacturing Co.	August 17	August 29
Supervising Eng.	Westinghouse Electric & Mfg. Co.	December 4	March 18, 1943
Operator's services	Riley Stoker Corporation	September 14	October 10
Boiler inspections	Hartford Steam Boiler Inspection & Insurance Co.	July 6	December 12
Cons. Eng. services	W. H. & L. D. Betz	September 14	January 9, 1943

FORCE ACCOUNT WORK

Erection of steel sash	Erection of interior partitions
Erection of steel stacks	Concrete floors and finish
Erection of stairs & misc. steel & iron	Painting
Erection of wood girts, purlins, etc.	Grading around building, walks & roads
Installation of equipment except as covered by contracts.	

UTILITIES

307

Steam Lines

303. Steam is provided from the Boiler House through outside, overhead, insulated steam lines for process, water heating and building heating purposes.

304. The General Data and Utility Requirements Report prepared by the duPont Company required that process steam be furnished to the various buildings of the Acid Area at not less than 150 lbs. pressure, and to the T.N.T. Area at 125 lbs. pressure.

305. Starting with saturated steam at 185 lbs. pressure at the Boiler House, the lines were sized to deliver steam at the required pressures at the various buildings. In general, the velocity does not exceed 6,000 ft. per minute.

306. The total peak demand for Acid and T.N.T. Areas after applying a diversity factor is approximately 100,000 lbs. per hour. Steam is carried in a 12" main a distance of about 2,500 ft. to the point where the lines to these areas branch off, and the steam to each area is metered.

307. Steam leaves the Boiler House in the other direction through an 8" main with a metered branch to the Shops Area, and continues on through a meter to the Water Treatment Plant and the Administration Area. The total peak demand of these areas, after correcting for diversity, is 34,000 lbs. per hour.

308. The mains are carried on wood poles which, in some areas, also carry the compressed air lines. In general a pitch of  $2\frac{1}{2}$ " per 100 ft. has been maintained, and poles are spaced generally from 14 ft. apart for  $1\frac{1}{2}$ " pipe to 20 ft. for 12" pipe. Clearances of approximately 5 ft. are maintained in unoccupied areas, 8 ft. in T.N.T. Area, 12 ft. in Acid Area, 15 ft. over roads, and 22 ft. over railroads.

309. The mains are dripped at all low points, and at intermediate points in long runs, comparatively small sized traps being used to provide frequent operation to prevent freezing in extremely cold weather. Traps are protected by small shelter houses and discharge to adjacent drainage ditches.

310. Expansion of lines is taken care of by means of double offset expansion U Bends, together with changes in direction of pipe. The vertical loops required at road and railroad crossings were also utilized to take up expansion. In general, expansion loops were spaced about 400 ft. apart on the long runs.

UTILITIES

308

Steam Lines (Continued)

311. The piping is Schedule 40 standard black steel pipe with welding fittings and welded construction throughout, with the exception of the valve connections, which are flanged for sizes 2" and larger, and the trap connections, which are screwed. Valves are provided where branches are taken from the mains, and also at various points in the main where it is desired to segregate certain areas. Pressure-reducing valves are provided at buildings where low-pressure steam is required for heating or domestic hot-water heating.

312. All outside steam piping is covered with fibre glass insulation with a waterproof covering of roofing paper wired on. A thickness of 2" was used for lines 4" and over, and standard thicknesses for smaller lines.

See progress map for steam lines page 259 and photographs, Plate XXI.

313. LENGTHS OF STEAM LINES

<u>SIZE</u>	<u>LENGTH</u>	<u>SIZE</u>	<u>LENGTH</u>
12"	2,450 ft.	3"	5,050 ft.
10"	2,440	2½"	2,700
8"	1,660	2"	6,380
6"	1,760	1½"	1,540
5"	5,010	1¼"	3,210
4"	5,657	Total (all sizes)	37,817 ft.

Compressed Air Lines

314. Demand indicated the estimated total requirement at 4,750 cubic feet per minute for a 6-line plant producing 65,000 pounds per line per day at a pressure of 80 to 100 lbs. per square inch.

315. Compressed air distribution mains are in general carried on the same poles which carry the steam lines. Air leaves the Compressor House at 85 lbs. per square inch pressure, and is required to be delivered at the various buildings at not less than 50 lbs. per square inch. Piping was sized to maintain these delivery pressures. At low points in the line, separator tanks 2'-6" x 4'-0" are installed to remove condensation. These tanks are piped with by-pass connections, and are housed with the steam main drip traps.

UTILITIES

309

Compressed Air Lines (Continued)316. LENGTHS OF AIR LINES

SIZE	LENGTH	SIZE	LENGTH
5"	960 ft.	2"	8,612 ft.
4"	475	1½"	260
3"	6,464	1¼"	4,540
2½"	2,380	1"	260

Total (all sizes) 23,951 ft.

Air Compressor House

317. The data furnished by duPont in the Utility Requirements Report listed the requirements for compressed air by buildings. Selection of the equipment and the design of the compressor station, as well as its location, was to be done by the A-E-M. It was decided to locate it in the T.N.T. Area on "M" Street, east of Castle Garden Road, to reduce the length of the air lines.

318. The Air Compressor House, 41' x 96' x 13' high, was erected by force account from plans prepared by the A-E-M. The construction is of concrete foundations and floor on ground, concrete block walls, fireproofed wood roof framing, Gypsteel plank roof with roll roofing, standard wood D. H. windows and doors, steam heating, roof ventilators, and electrical work. See photograph on plate V.

Equipment

319. Four Worthington 2-stage compressors, 2 3/14 x 14", Type DC-2, rated at 1,600 c.f.m., with intercoolers, 5 step variable capacity control, and automatic unloaders connected by a common header through two aftercoolers, each of 5,450 c.f.m. capacity, and through two receivers to the outgoing air supply lines. Valves were located in the piping system so that any compressor, or aftercooler with its receiver, can be cut out of service without interrupting the air supply. The aftercoolers are proportioned to give cooling at 4,800 c.f.m. from 100 deg. F. free air to a final temperature of 90 deg. F. at the receivers. Each of the two receivers is 5'-6" diameter by 18'-0" high, arranged for vertical mounting outside of the compressor station. Four #40 C H American air filters were installed, one on the intake to each compressor.

UTILITIES

310

Air Compressor House (Continued.)Equipment (Continued)

320. Each compressor is driven by a 300 H.P., 2,300 volt, 3 phase, 60 cycle, 80% leading power factor, synchronous engine type motor, with a  $7\frac{1}{2}$  KW, 125 V, D.C. exciter direct connected and driven by a 10 H.P., 440 V, 3 phase, 60 cycle, induction motor. Each unit is supplied with General Electric Co. C.R. 7065-M 7 C magnetic full voltage synchronous motor starter with overload, single phase, and under-voltage protection. The exciter motor starter is a G. E. C. R. 7006-D-30B magnetic switch with thermal overload protection.

321. The starting and stopping push button station mounted on the synchronous motor starting panel controls the exciter as well as the synchronous motor operation. An exciter field rheostat mounted on the panel controls the synchronous motor field current and the power factor, which is to be maintained at 80% leading. Low voltage control at 115 V, 60 cycle, is supplied by one  $1\frac{1}{2}$  KVA transformer for each unit from the 2,300 volt supply to the main motor starter.

322. Each unit is fed from the 6,900 V, 3 phase, 60 cycle, primary distribution line through a 300 KVA, 3 phase, 6,900 V primary to 2,300 volt secondary delta/delta connected transformer. Power for the exciter motor generator set at 440 volt, 3 phase, 60 cycle, is taken through three single phase, 10 KVA transformers from the 6,900 volt primary lines, this source being common to all four units.

See photograph on plate XXXVIII, for the interior of the Air Compressor House.

Process Pipe Lines

323. These are outside, overhead lines of steel, high chrome iron, and stainless steel duct, used for carrying acids, other fluid chemicals and chemical mixtures from railroad unloading points, storage facilities to and between manufacturing buildings and tanks and from the same to railroad loading points.

324. This piping is supported on wood poles and cross-arms, with a minimum distance above grade of 12 feet. Where required, steam tracers of seamless copper tubing were wired to the pipes and the whole covered with 1" thick 85% magnesia insulation, weatherproofed with tarpaper wired on.

325. The Acid Area is furnished with a main pole line extending the length of the Area, forming a distribution trunk with branch lines serving manufacturing buildings and storage tanks.

UTILITIESProcess Pipe Lines (Continued)

326. The six lines of the T.N.T. Manufacturing Area were divided into three pairs of lines, the process piping for each pair being identical except for constant difference in elevation between pairs caused by topography of the areas.

327. In accordance with a request from the Chemical Construction Corporation, the operating company, a 4" diam. extra heavy pipe line was installed connecting the Acid and Fume Recovery Residual Acid storage tanks of the six T.N.T. lines to the Residual S. A. storage tanks in the Acid Area. This eliminates the necessity of operating one tank car on continuous shuttle service between these areas to transport this acid. Railroad facilities were retained for loading and unloading Residual Sulphuric Acid for use when maintenance requires the outage of the pipe line.

328. LENGTHS OF PROCESS PIPE LINES

SIZE	STEEL	HIGH CHROME IRON	STAINLESS STEEL DUCT
8"	--	--	492 ft.
5"	--	--	726
4"	3,678 ft.	1,450 ft.	1,254
3"	26,217	435	--
2"	6,070	4,985	--
1½"	40	--	--
1¼"	120	60	--
Total	36,125 ft.	6,930 ft.	2,472 ft.
Grand total	45,527 ft.		

UTILITIES

Sanitary Sewers

329. Analysis of the DuPont Utility Requirements Report and other available data determined an average flow of 635 G P M and maximum flow of 1430 G. P. M. for the sanitary sewage disposal system.

330. The pipe sewers were designed to flow 70% full using Kutters Formula with "n" equals 0.015. Vitrified tile pipe was used throughout the collection system and ranges from 4" or 6" pipe at the outlying buildings to 30" pipe from the junction manhole to the disposal plant.

331. The sewer from the T. N. T. Area is an 18" pipe and from the other areas 24" pipe, reducing to 18" to the Administration Area to provide for future housing development.

SANITARY SEWERS

332. TILE PIPE SIZES AND LENGTHS IN FEET

<u>SANITARY SEWERS</u>												
<u>TILE PIPE SIZES AND LENGTHS IN FEET</u>												
Pipe Sizes	Administration Area	Administration Area Force Acct.	Shop & Power	Acid Area	Acid Area Force Acct.	T. N. T. to Disposal Plant	T. N. T. Area			T. N. T. to Magazines	T. N. T. to Magazines Force Acct.	Total of Sizes
							A-B Line	C-D Line	E-F Line			
30"						982						982
24"			443	1113								1556
18"	1820		768			1010						3598
15"						1251						1251
12"	699	545		1537		960	135	140	135			4151
10"			1100				275	270	275			1920
8"	368	383	952				1653	1491	1566	1821		8234
6"	210	1670	2266	265	390		1200	1708	2270	3654	2190	15823
4"		158	161	1166	395				680		1761	4321
Total Lin. Ft.	3097	2756	5690	4081	785	4203	3263	3609	4926	5475	3951	41836

UTILITIES

313

Sewage Disposal Plant

333. The Sewage Disposal Plant is located northwest of the Acid Area and adjoining it. See the map on page 250, the panorama on page 15 and the photographs on plates XV and XXXV. It has a capacity of 5,760 gallons per day.

334. The Sewage Pumping Plant is of ample size to rapidly relieve any unusual peak flows, so very little, if any, pressure can develop on the trunk sewers. It consists of a concrete sewage well and pump pit with frame superstructure housing four Yeoman Brothers Company non-clogging sewage pumps. This group contains one 500 GPM, two 1,000 GPM, and one 1,500 GPM pumps, arranged in sequence to give pump capacities increasing by 500 GPM stages up to the maximum of 2,000 GPM. A sump pump is installed in the pump pit. Incoming sewage passes through a bar screen and screenings are sent to the Project incinerator in cans.

335. The concrete Imhoff tank is divided into two tanks for primary treatment of raw sewage. There are four flowing-through chambers with adjustable weirs at each end over which treated effluent passes to the collection channel, from which a 24" wood pipe sewer carries it away.

336. Sludge from the Imhoff tanks flows to two sludge beds constructed of concrete with 18" of sand fill.

337. Chlorine is piped from the chlorine house which is part of the superstructure building over the pump well, to a concrete chlorine contact tank which holds the effluent long enough for chlorination. The chlorine control equipment is in the Pumping Station and consists of two Wallace & Tiernan Co., Inc., converters with capacities of 400 lbs./24 hours each. Storage for cylinders is provided here also, but a separate frame building houses the large tank storage for chlorine.

338. There is a concrete Venturi vault where the sewage flow is measured ahead of the Imhoff tank, and the Venturi tube regulates the chlorination. Chlorinated effluent flows through an 18" steel pipe to the Collection Tank included under the Trade Waste Water System.

339. An underdrain system of tile pipe around the plant empties any sewage leakage into a manhole on the incoming collection sewer.

UTILITIES

314

Trade Waste Water Disposal and Outfall

340 "Trade Wastes", consist of red and yellow acid waters from the purification of T.N.T. The average amount of red and yellow acid waste water from a 6-line T.N.T plant would be about 323,700 gallons per day according to a report by W. A. Peters, Jr, dated March 16, 1942.

341. The purification process occurs in the wash houses and the red and yellow waste water is carried from these buildings in a wooden flume and also in half tile to the trade waste sewer. A 10" vitrified tile sewer takes care of the easterly operating line and the remainder of the lines empty into an 18" vitrified tile sewer. Both these sewers have acid resisting joint compound and are encased in concrete

342. These two sewers are 110 and 125 ft. north of the wash houses, respectively and run westerly across Wesson St. thence southwesterly to the deep well in the Collection Tank. This deep well is lined with 4" acid resisting brick. Two 600 G.P.M., 30 ft. head pumps and two 300 G.P.M., 15 ft. head pumps alternate in pumping the red and yellow waste water into a mixing tank where it is diluted at least ten parts with neutralized and cooling water

343. This diluted mixture then flows into a 30" vitrified tile outfall sewer with acid resisting joint compound and encased in concrete and runs into a head chamber on the bank of the Niagara River. See map on page 253 and photographs on plates XV and XX.

344. From the head chamber the red and yellow waste water flows into the Niagara River through two 12" acid resisting pressure lines where it is diluted about one part in 200,000. These pressure lines diverge about 30 degrees and are laid out into the river to a depth of 35 feet. They are protected by cribbing.

UTILITIESAcid and Alkaline Water Sewer System

345. The collection system for acid and alkaline waste was laid out from a typical DuPont design and their Utility Requirements Report. Pipe sizes were determined for peak capacities when flowing one half full.

346. The bulk of the waste comes from the Acid Area and the balance from the T.N.T. Area. The collection sewers from the T.N.T. and all acid areas were laid out to angle across the Safety Area and flow into the Acid Neutralization Plant. These sewers also connect with drains from the safety showers. The total amount of waste collected at this plant amounts to 24,000,000 G.P.D.

Acid Neutralization Building

347 In the Acid Neutralization building, see panorama on page 15 and photographs on plates XV and XXXV, the waste waters are neutralized with lime and discharged through a 36" cast iron pipe into the drainage system at Sixmile Creek near the building. As much of the neutralized water as is needed is also run through a 24" wood stave pipe to the mixing tank where it is used to dilute the red and yellow acid waste water.

COOLING WATER & ACID SEWER SYSTEMTILE PIPE SIZES AND LENGTHS IN FEET

SIZE	T.N.T. AREA			T.N.T. TO DISPOSAL PLANT	ACID AREA	ALL FORCE ACCOUNT	TOTAL OF SIZES
	A-B LINE	C-D LINE	E-F LINE				
36"				1117			1117
30"				863	1986		2849
24"	440	442	440	2824			4146
18"	549	314	327			136	1326
15"	518	382	377		1394		2671
12"						228	228
10"	661	706	698		1071		3136
8"					670	1482	2152
6"	436	413	556		496	220	2121
4"					115	265	380
Total lin.ft. in Area	2604	2257	2398	4804	5732	2331	20126

UTILITIES

316

Drainage

349. The flatness of the terrain and the natural sources of drainage have been mentioned in the section on Ground Water Conditions, under Soil Data. See pages 48 - 52.

350. It was necessary to provide two new principal open cut drainage ditches, known as the Southwestern Drainage Ditch and the Central Drainage Ditch, laid out with a view of possible expansion of the present manufacturing plant to the West and diverting storm waters from a generally northeasterly flow to a generally northwesterly flow into Fourmile Creek.

351. A third primary ditch, to carry off the waters in the Magazine Area, was also constructed paralleling the existing Sixmile Creek in this Area and connecting with the Central Drainage Ditch whence its waters flow into Fourmile Creek.

352. Secondary and tertiary ditches drain the Areas and conduct the waters into the aforementioned main ditches or, in a few instances, into the existing creeks.

353. Storm sewers were installed in the Areas where open ditches would have been unsuitable. These were the Acid, Shop, Administration, and Parking Areas.

354. Sixmile Creek was diverted in two places, south of Pletcher Road into the Southwestern Drainage Ditch and in the Magazine Area into the new main ditch which connects with the Central Drainage Ditch. Twelvemile Creek was diverted and re-located near the northeast end of the Classification Area.

See the Drainage Map on page 51, and also the panoramas on pages III and IV, and the photographs on plate XVIII and XIX.

355. Southwestern Drainage Ditch, whose section has an area of 89 square feet, has a bottom width of 15 feet, with side slopes of 1 on  $1\frac{1}{2}$ . During maximum rainfall, estimated at 2.75 inches per hour, it would contain about 4.3 feet of water flowing at 4 feet per second. This would deliver 350 c.f.s. into Fourmile Creek.

356. Central Drainage Ditch has a varying bottom width with a maximum of 20 feet. During the period of flood, water would be 6 feet deep and flowing with a velocity of 5.4 feet per second, adding 1,030 c.f.s. (including water from the Magazine Drainage Ditch) into Fourmile Creek.

357. The Magazine Drainage Ditch has a bottom width of 10 feet and at flood would have 5.4 feet of water, flowing with a velocity of 4.6 feet per second and delivering 451 c.f.s. into the Central Drainage Ditch.

UTILITIES

317

Drainage (continued)

358. The prime contract, DA-W-138-Eng. 16, for the open drainage ditches, was awarded to Dump Truck Service, Inc. of Buffalo, New York, on March 21, 1942. The drainage ditches in the Magazine Area were part of the Concrete Magazines contract DA-W-138-Eng. 13 with Poirier and McLane of New York, N. Y. The drainage ditches for roads were part of the road contract, DA-W-138-Eng. 24 with William J. Gallagher, Inc. of Medina, New York. The A-E-M force account built many drainage ditches and road ditches.

359. The quantities of earth moved were:

General Drainage	794,095 cu. yards
Magazine Drainage	73,640
Road Drainage	<u>26,650</u>
Total	894,385 cu. yards

360. The lengths of the various ditches were:

Primary	46,563.53 ft. or	8.82 miles
Secondary	73,418.78	13.91
Tertiary	34,593.79	6.55
By Force Account		<u>7.57</u>

Total open ditches - 36.85 miles

361. Storm sewers 10,300 ft. 1.95 miles

362. The excavation was accomplished in the following manner: 46% by draglines, 26% by carry all pans, 16% by backhoes, 10% by clam shells and 2% by shovels.

UTILITIES

318

Roads

363. The roads in the Project may be divided into three classes, (1) Existing when the area was acquired, (2) New or "Permanent" and (3) Temporary or Construction Roads.

Existing (13.96 miles within the Project)

364. The existing town and county roads were very useful, though not entirely adequate for the construction of the Project. For access purposes the north and south roads, also forming the boundaries, were particularly advantageous; these were the Blairville Creek Road on the west and the Porter Center Road on the east. Latta Road, also a north and south road, was used as the principal access road and the main entrance was on this road at the southeast corner of the site. Other north and south-roads within the Project are Harold Road, Lutts Road and Castle Garden Road. Part of Nichols Road was used but later abandoned between the New York Central Railroad and Langdon Road.

365. The east and west roads were Swan Road, Fletcher Road, Balmer Road and Cain Road. Part of the northern boundary is formed by the Youngstown-Lockport Road. These Roads are shown on the General Road Plan, Dwg. 603-100-004 on page

366. EXISTING ROADS

NAME	TYPE	WIDTH	LENGTH WITHIN PROJECT	DISPOSITION
Latta Road	Bituminous Macadam	20'	3,690'	Left as found
Harold Road	Gravel	16'	3,850'	Abandoned after new parallel road was built
Castle Garden Road	Gravel	16'	8,110'	Part rebuilt. Part abandoned
Lutts Road	Gravel	16'	7,920'	Part rebuilt as Patrol Rd. Remainder abandoned

366. EXISTING ROADS  
(Continued)

NAME	TYPE	WIDTH	LENGTH WITHIN PROJECT	DISPOSITION
Cain Road	Gravel	14'	6,675'	Left as found
Balmer Road	Bituminous Macadam	18'	15,700'	Left as found
Pletcher Road	Stabilized Gravel	16'	13,520'	Westerly 5826 Ft. widened to 40 Ft. bituminous macadam rd. Remainder widened to 22' & a new second lane built
Swan Road	Stabilized Gravel	16'	10,100'	Widened to 20'
Nichols Road	Bituminous Macadam	20'	1,400'	Abandoned
Langdon Road	Bituminous Macadam	20'	2,750'	Westerly 1500' abandoned
			73,715'	

New Roads

367. The authorized new or "permanent" roads are of four classes, (1) Service Roads, (2) Magazine Roads, (3) Patrol Roads and (4) Drives.

368. The layout of these roads was based upon the du Pont plan for a U. S. Special 6-Line T.N.T. Plant.

369. The typical section, which was adopted, consisted of a 10" bottom course of run of bank gravel or chemical slag with a 3" penetration top course for all roads except the Patrol Roads, which were built with an 8" subbase and a 3" penetration top course. All of the subgrade was properly drained and the finished road elevation was made higher than the surrounding terrair.. Where swampy conditions were found, all of the topsoil was first removed and a suitable subbase was built. These roads are shown on the General Road Plan. A record plan and profile was prepared for each road, at a horizontal scale of 1" = 100' and a vertical scale of 1" = 5'.

UTILITIES

320

RoadsNew Roads370. SERVICE ROADS

NAME	TYPE	WIDTH	LENGTH
		(In Ft.)	(In Ft.)
"H" Street	Bituminous Macadam	20	4754
"J" St.		20	1425
"K" St.	Bituminous Macadam	12	403
"K" St.		12	356
"K" St.		12	356
"K" St.		12	405
"M" St.		20	4530
"N" St.		20	4022
"O" St.		20	3949
"P" St. (North)		16	220
"P" St. (South)		16	280
"R" St.		14	1088
"S" St.		20	1258
"T" St.	Stabilized Gravel	20	250
"W" St.	Bituminous Macadam	20	430
"X" St.		20	812
"Y" St.	Bituminous Macadam	16	130
"Z" St.		20	810
First St.		20	454
Second St.		12	900
Third St.		20	454
Fifth St.		20	455
Sixth St.		20	680
Seventh St.		20	420
Eighth St.		20	230
Tenth St.		20	483
Eleventh St.		20	413
Twelfth St.		Stabilized Gravel	20
Wesson St.	Bituminous Macadam	20	2955
Campbell St.		20	4023
Campbell St.		30	1075
Castle Garden Rd.	Bituminous Macadam		
"R" to "O" Sts.		20	2104
"M" to "N" Sts.		20	1406
"K" to "H" Sts.		20	900
"H" to Balmer Rd.		20	1178
Vine St.		20	1843
MacArthur St.		20	3732
Marshall St.		20	1968
Pump House Rd.		16	1030

UTILITIES

Roads (Continued)

New Roads (Continued)

371. MAGAZINE ROADS

NAME	TYPE	WIDTH	LENGTH
		(In Ft.)	(In Ft.)
"A" St.	Bituminous Macadam	20	4225
"B" St.		20	4375
"C" St.	Bituminous Macadam	20	4375
"D" St.		20	4375
"E" St.		20	4375
"F" St.		20	4375
"G" St.		20	4375
Aberdeen St.		20	3251
Marshall St.		20	4718

372. PATROL ROADS

NAME	TYPE	WIDTH	LENGTH
		(In Ft.)	(In Ft.)
North Patrol Rd.	Bituminous Macadam	14	7741
"R" St.		14	1900
Track St.	Bituminous Macadam	14	3655
South Track St.		14	2250
South Patrol Rd.		14	6449
West Patrol Rd.		14	3200
Lutte Rd.		14	11584
Castle Garden Rd.		14	1805
East Patrol Rd.		14	10619
Pump House Rd. to River	Stabilized Gravel	14	800

374. The prime contract for the new roads, DA-W-138 Eng. 24, was awarded to W. J. Gallagher, Inc., Medina, N. Y. on March 31, 1942. The contractor began work on April 2 and the contract was deemed completed on November 5, 1942, although the final trim for the shoulders and road ditches was not finished. Arrangements were made to deduct the amount to be paid for uncompleted work which will be finished under the supervision of the Operating Company when weather and other conditions permit.

UTILITIES

322

Roads (Continued)New Roads (Continued)

374. Clearing and grubbing was done where required and the earth moved and materials used were as follows:

Earth moved	274,468 Cu. Yds.
Earth manipulated only	9,989 Cu. Yds.
Chemical slag	77,917 Cu. Yds.
Slag and stone	190,567 Tons
Sand and stone dust filler	40,266 Tons
Asphalt emulsion	547,663 Gallons
Hot asphalt	287,053 Gallons

375. Reinf. Conc. Pipe Culverts

<u>Diameter</u>	<u>Lin. Ft.</u>
15"	2204
18"	936
24"	632
30"	1308
36"	564
42"	500
48"	708
54"	256
60"	560

Drives

376. The A-E-M force account built 2.3 miles of "permanent" drives. These included all turnouts from old or new roads to buildings, especially, garages, warehouses, office buildings, dormitories, parking areas, the burning area, and the approach from River Road to the Intake Pumping Station. In addition, guard fences along ditches and at bridges and culverts and railings, and bumpers were built along all classes of roads by the A-E-M force account.

Temporary Roads

377. Temporary roads, bypasses, approaches and service roads for construction purposes were also built by the A-E-M force account. These totalled over sixty in number and many of them required the installation of culverts, drains and ditches, guard rails and bumpers.

UTILITIES

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Railroads

378. There were 15.7 miles of standard gauge railroad constructed on the Project, with the general location of all tracks governed by the U.S. Special Six-line T.N.T. Plant Layout furnished by the duPont Company and adapted to this Project.

379. It was found necessary to strip the topsoil from the full width of the railroad bed and leave a subgrade which sloped 2 inches in 11 feet each side of the center line. On this subgrade the following track section was placed: 6 inches of cinder subballast, 10 feet each side of the center line of track, then 12 inches of slag ballast under the ties, extending 7 feet each side of the center line of track into a slope width of 2' - 9".

380. Approximately 80% of the track was made with 80 lb. A.S.C.E. rails and 20% with 85 lb. A.S.C.E. rails which were used in special places. Creosoted ties Nos. 1, 2 and 3 - 6" x 8" x 8'-0" were used. All switches are complete with frogs, switch stands and guard rails. No. 8 turnouts were used for all crossovers.

381. The maximum curve is 14 degrees and 40 minutes and the grades are generally much less than 1%, with the exception of the approach to the coal trestle, which grade is 3.44%.

382. Wooden whistle posts and clearance markers were placed 1320 feet from all crossings and at the clearance point on all turnouts which do not have a derail.

383. The various tracks and sidings were given letter and number designations, which appear on the General Track Layout, Dwg. 601-100-001, page . Record drawings for each line are shown in plan and profile at a horizontal scale of 1" = 100' and a vertical scale of 1" = 20'.

384. A heavy, timbered, single track, coal trestle, 262 feet long, was built on the "T" line, south of the Power House. Between this trestle and the Power House, a coal apron was provided on the ground level "E" line for dumping hopper-bottom coal cars.

385. Two track scales, each of 240 tons capacity, were installed, having an effective length of 60 feet for the weighing rails. One scale is located on the "A" line southwest of the classification yard and the other is on the "H-16" line between "M" Street and "N" Street.

386. The construction of the railroad was covered by Contract DA-W-138 Eng.-14, dated March 19, 1942, which was placed with A. S. Wikstrom, Bound Brook, New Jersey on a Unit Price Basis. Work started April 1, 1942 and was considered complete and acceptable on September 12, 1942.

387. The A-E-M force constructed 630 feet of the "A" track outside the Project Area, 479 feet of "E" track and 287.6 feet of "H-18" track, the track scale foundations and installation, several culverts and the coal trestle, also all road crossings.

388. The New York Central Railroad constructed the service tracks and connections to its railroad outside the Project Area, amounting to 2847.2 feet, and tracks within the Project Area amounting to 4540.8 feet, which is included in the total length previously given.

389. The work included the necessary clearing and grubbing for the right of way and the following quantities of earth and other materials handled or used:

Stripping topsoil	657,818 S.F.
Subgrade excavation	1,423 C.Y.
Ditch and culvert excavation	675 C.Y.
Embankment and grading	146,564 C.Y.
Slag ballast	62,247 C.Y.
Cinder ballast	34,648 C.Y.
Railroad trackage	75,658 L.F.
Culvert pipe	2,269 L.F.
Turnouts or crossovers	67
Bumpers	26
Derailers	3

390. Standard gauge rolling stock purchased by the A-E-M was as follows:

- 2 - 45 tons, Porter Diesel electric locomotives
- 1 - 65 tons, Porter Diesel electric locomotive
- 2 - 30 feet flat cars, 15 tons capacity.

391. Standard gauge tank cars were purchased by the E.I. duPont de Nemours Co. from the General Transportation Corporation as follows:

- 6 - Steel tank cars of 7,000 gallons capacity each
- 1 - Steel tank cars of 10,000 gallons capacity.

GUARANTEES

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392. All of the prime contracts negotiated by the A-E-M for the Government, the "Specifications for General Utilities" and the "Specifications for Building Materials", contain the following:

"Guarantees

When all work is completed and accepted, the Contractor shall furnish to the Contracting Officer written and signed statements guaranteeing all materials and workmanship for a period of one (1) year from date of acceptance.

The Contractor will also be required to furnish manufacturer's guarantees covering certain equipment.

Upon receipt of written notice the Contractor shall, at no expense to the United States, promptly make good all defective workmanship and replace all defective materials, and make such adjustments as are necessary."

393. Purchase Orders placed by the A-E-M for material to which the above mentioned specifications apply, and to which the vendors were referred, would cause such material to be guaranteed for a period of one year from date of acceptance.

394. Equipment or material, ordered by the Stone and Webster Engineering Corporation for the Boiler Plant, which was installed by the A-E-M or other prime contractors is covered by Stone and Webster purchase orders and specifications concerning which that corporation stated by letter to the General Manager of the A-E-M, dated December 16, 1942, "We advise that it was our intention to hold the vendors to their respective guarantees, which were given in the specifications and again on the back of their copy of the purchase orders by means of their acceptance copy of the orders, and we did not intend to require them to furnish written guarantees."

395. Equipment or material, ordered by the E. I. du Pont de Nemours & Company for the Project, which was installed by the A-E-M or other prime contractors, under Contract DA-W 138-Eng. 1, is covered by du Pont purchase orders and specifications. The du Pont Company notified the A-E-M that guarantees applied to three of their purchase orders for this Project as follows:

GUARANTEES

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<u>PURCHASE ORDER</u>	<u>EQUIPMENT OR MATERIAL</u>	<u>VENDOR</u>
TWC 1	Sulphuric Acid Concentrating Plant	Chemical Construction Corporation, New York, N. Y.
TWC 235	Alco RD2H Valve, 1600 pound pressure with 5 pound pressure drop	Alco Valve Company St. Louis, Mo.
TWC 3014	Shaft sleeves and seal ring housings for B-Wilfley Model A.C. Pumps	A.R. Wilfley & Sons Co. New York, N. Y.