

HISTORIC SITE REVIEW

Burlington Wastewater Treatment Plant Project

Department of Public Works

Burlington, Vermont

Architectural Conservation & Education Service

Historic Preservation Program

Department of History

University of Vermont

May 4, 1990

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Submitted by

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TABLE OF CONTENTS

Introduction	
Description of Project	1
Scope of Work	1
Methodology	4
Existing Conditions	5
History	
The Site in Prehistory	11
Wharfing and Filling	13
Commercial Development	24
Sewer and Wastewater Treatment System	35
Archaeological Potential	39
Analysis of Boring Logs	44
Conclusions	48
Recommendations	49
Appendices	
Timelines	
Maps	
Summary of Boring Logs	
Bibliography	

ACKNOWLEDGEMENTS

We would like to thank Captain Merritt Capreuter, Arthur Cohn, Peter Barranco, and Lilian Baker Carlisle for their recollections and insights into the maritime history of the Burlington waterfront and Lake Champlain. Stearns Jenkins of the Vermont Transportation Agency provided information and maps detailing the history of the railroad's activities, and the staff of the Burlington Public Works Department and John Franco of the Burlington City Attorney's Office also greatly assisted us in our research.

INTRODUCTION

DESCRIPTION OF PROJECT

The City of Burlington, Vermont, is preparing to upgrade their Main Wastewater Treatment Plant facility during the summer of 1990. The project area is located along the shore of Lake Champlain on filled land near historic wharfing and commercial sites (Map 1). Since construction may have an impact on archaeological sites, the New England Division of the Army Corps of Engineers, in conjunction with the Vermont State Historic Preservation Office, has required a Historic Site Review.

The area affected by the project includes the entire Main Wastewater Treatment Plant property owned by the City of Burlington, which covers approximately 7 acres, bounded on the north by the city's Perkin's Pier parking lot, on the east and south by an access road which leads to the Vermont Railway roundhouse and office building directly south of the project area, and on the west by the shoreline of Lake Champlain (Map 2). Since construction work is planned along the shoreline, the adjacent underwater area is also included. The entire site was created by filling the lake in increments by the Rutland Railroad and the City of Burlington between the early 1850's and the late 1920's.

SCOPE OF WORK

This study was conducted between March 14, 1990 and May 4, 1990 by the University of Vermont Historic Preservation Program's Architectural Conservation & Education Service in conjunction with the University of Vermont Consulting Archaeology Program for the Burlington Department of Public Works. The project team included Thomas Visser, Project Coordinator, Elizabeth Rosin, Research Assistant, Dr. Peter Thomas, Director of UVM's Consulting Archaeology Program and Prudence Doherty, Archaeology Program Specialist.

The intent of this reconnaissance level survey is to provide a physical and cultural history of the Burlington Wastewater Treatment Plant parcel for preservation planning purposes in compliance with the National Historic Preservation Act of 1966 (PL 98-665) and amendments to it contained in the Archeological and Historic Preservation Act of 1974 (PL 94-422), the Advisory Council on Historic Preservation's Procedures of the Protection of Historic and Cultural Properties (36 CFR 800) and the draft guidelines for archaeological studies issued by the Vermont Division for Historic Preservation.

The object of the report is to provide sufficient information for the New England Division of the Army Corps of Engineers, in conjunction with the Vermont State Historic Preservation Office, to make determinations concerning the potential for this project to affect significant historical resources. This report also

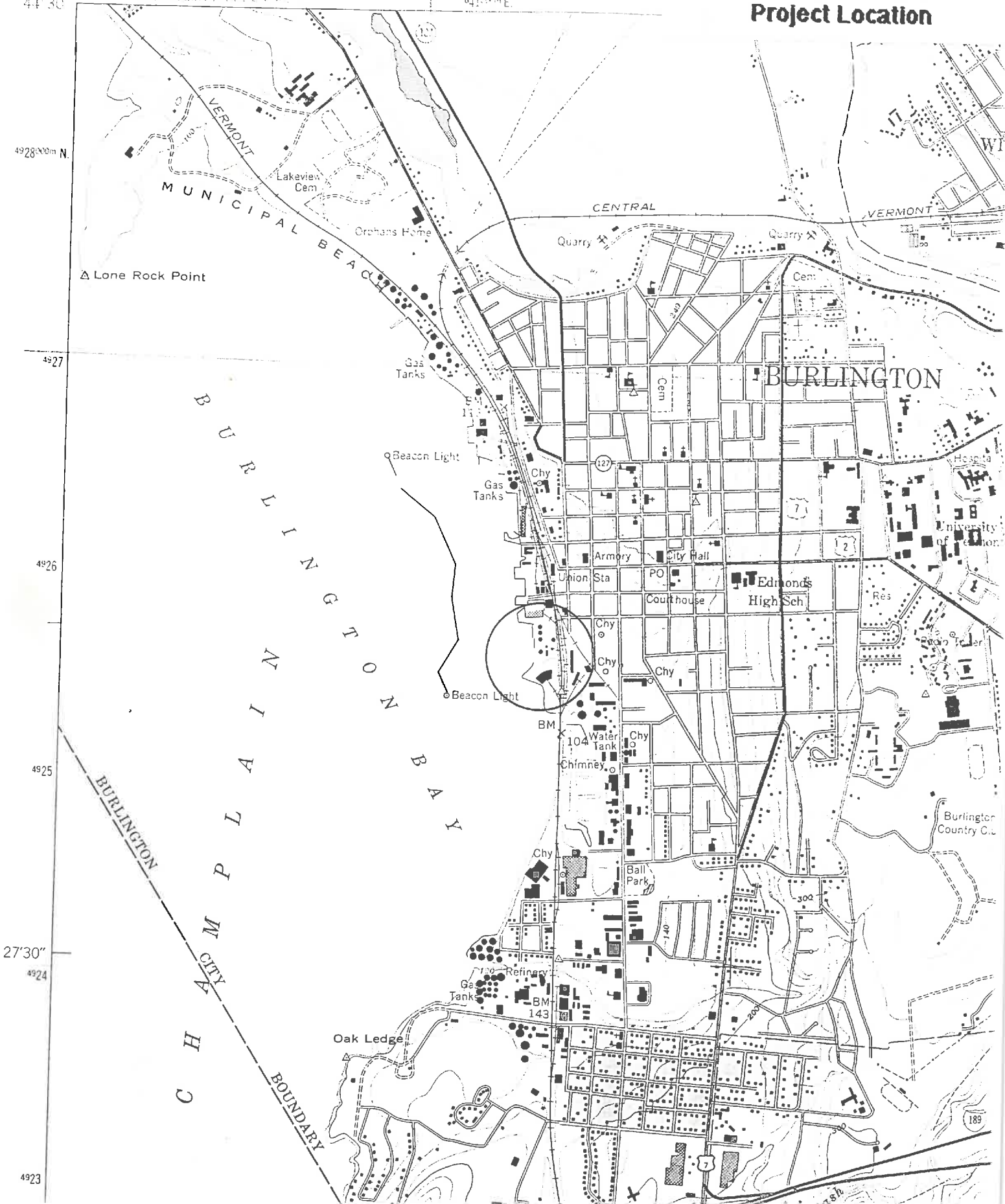
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Map 1.
**BURLINGTON WASTEWATER
TREATMENT PLANT
Project Location**

6373 (11 SE
COLCHESTER
POINT)

73°15'
44°30'
BAYSIDE CT. W.
ETHAN ALLEN PARK 2.4 MI.

641000 E.



4928
4927
4926
4925
27'30"
4924
4923

189

assesses the likelihood of encountering significant prehistoric or historic archaeological evidence during construction, including prehistoric, historic, and industrial sites.

METHODOLOGY

Walkover surveys were conducted on March 14, March 24 and April 12, 1990. Since the level of Lake Champlain was approaching the flood stage due to heavy spring runoff, the visual inspection of the shoreline was limited due to high water. This constrained our ability to identify the presence of any remnants of sunken ships which might lie along the shoreline. No sub-surface testing or underwater surveys were conducted for this report.

The primary sources of information for this reconnaissance level survey included interviews, deeds, surveys, historic maps, photographs, city reports, professional reports, newspaper articles and boring logs. The main repositories consulted included the Burlington City Clerk's Office archives (deeds and historic sewer maps) and Bailey-Howe Library at the University of Vermont in Burlington (local histories, historic maps, photographs and postcards, annual city reports, city directories, and newspapers). Proposed and existing site plans for the treatment plant parcel and the results of engineering borings were supplied by the Burlington Public Works Department. Staff at the Public Works Department and the City Attorney's Office provided information on the recent history, as did several local residents familiar with the site and the maritime history of the area.

Through analysis of the information gathered, timelines and overlay maps were constructed to interpret the development of the site. The history section included in this report traces the incremental transformation of the project area from a shallow lake bottom and seasonal beach to a filled site supporting wharfs, commercial and industrial activities and structures.

From an understanding of the history and types of activities carried out on the site, a list of historic themes and potential features was established. These themes provide the basis for an outline which identifies types of archaeological evidence, where significant resources might be encountered, applicable historic contexts included in the Vermont Historic Preservation Plan, and significant issues and research questions which the archaeological evidence could potentially answer.

The conclusions identify archaeologically sensitive areas, evaluate the probability for finding significant archaeological resources and offer general recommendations for proceeding with the proposed project.

EXISTING CONDITIONS

The site of the Burlington Waste Water Treatment Plant is located in an industrial area south of Maple Street and west of the Vermont Railway, Inc. railyard west of Battery Street (Map 1). The land occupied by the plant has been filled between 100 and 600 feet west from the original shoreline since the middle of the nineteenth century. The eastern boundary of the site may, in fact, correspond closely to the natural shoreline of the waterfront (Fig. 1).



Fig. 1 This photo looking south shows the track of the Vermont Railway running along the eastern boundary of the sewage treatment plant site. The road immediately west of the tracks may follow the original, pre-fill shoreline. (Photo: Thomas Visser, 1990)

Along the shoreline today, a low rise and an irregular barrier of riprap separate the land from the water (Fig. 2). Rocks line the shoreline from the northern terminus of the property to the sewer outfall at the southern boundary. The 1951 construction plans for the site indicate that a wooden bulkhead, filled with stone, ran the length of this shoreline. While there is no evidence of the bulkhead today, it may have rotted resulting in the collapse of the stone fill (Fig. 3).

The treatment plant's aeration tanks, digesters, clarifiers, and control building are located on a level area of filled land between the lake and the railroad tracks (Fig. 4). The structures are separated by narrow strips of mowed grass and a paved driveway, which runs from the north side of the control

Fig. 2 This photo shows the shoreline of the wastewater treatment plant site looking north from the outfall of the main trunkline sewer. One of the sludge storage tanks that sits over the old boat slip is visible on the left. (Photo: Thomas Visser, April, 1990).

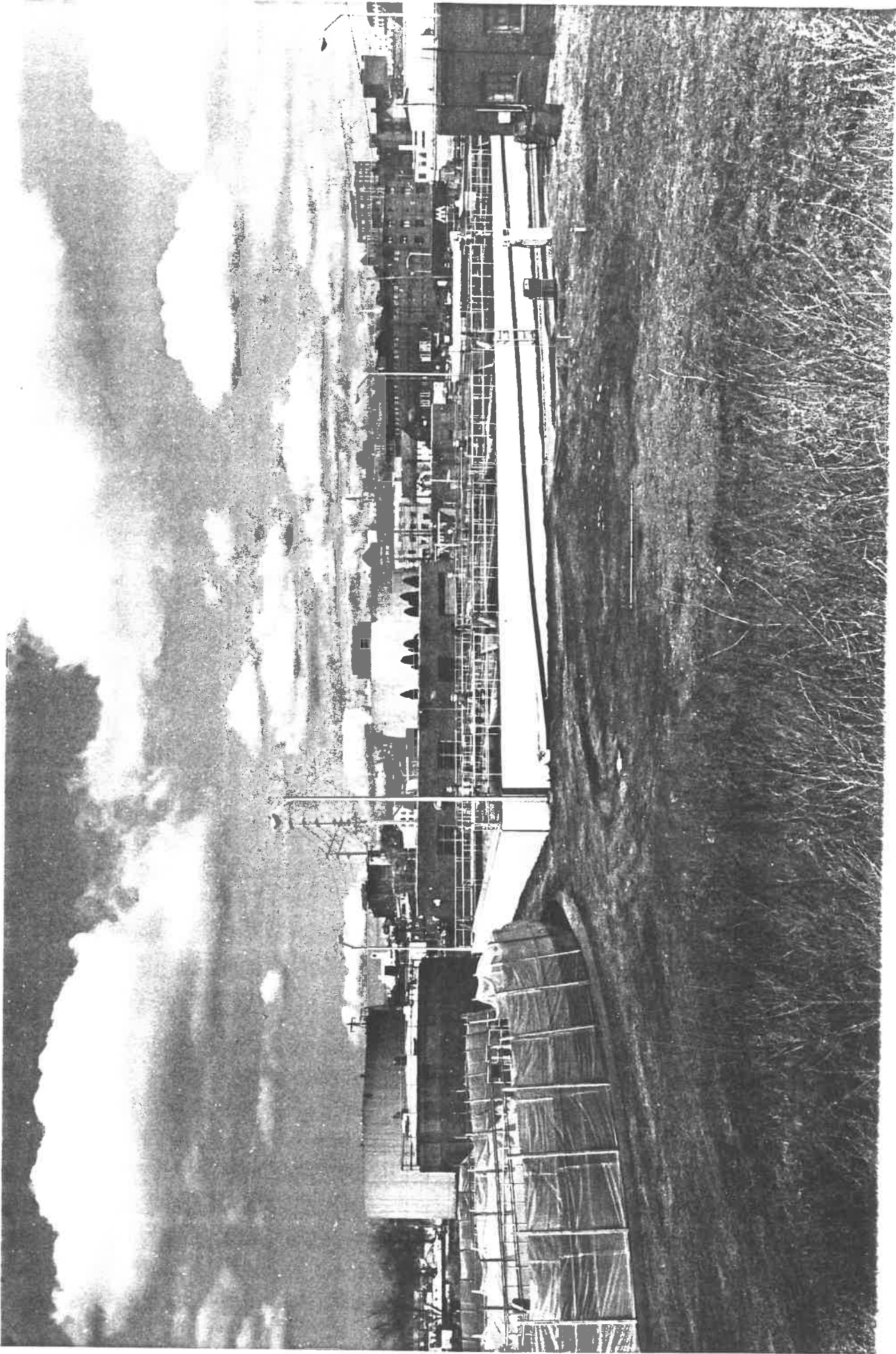
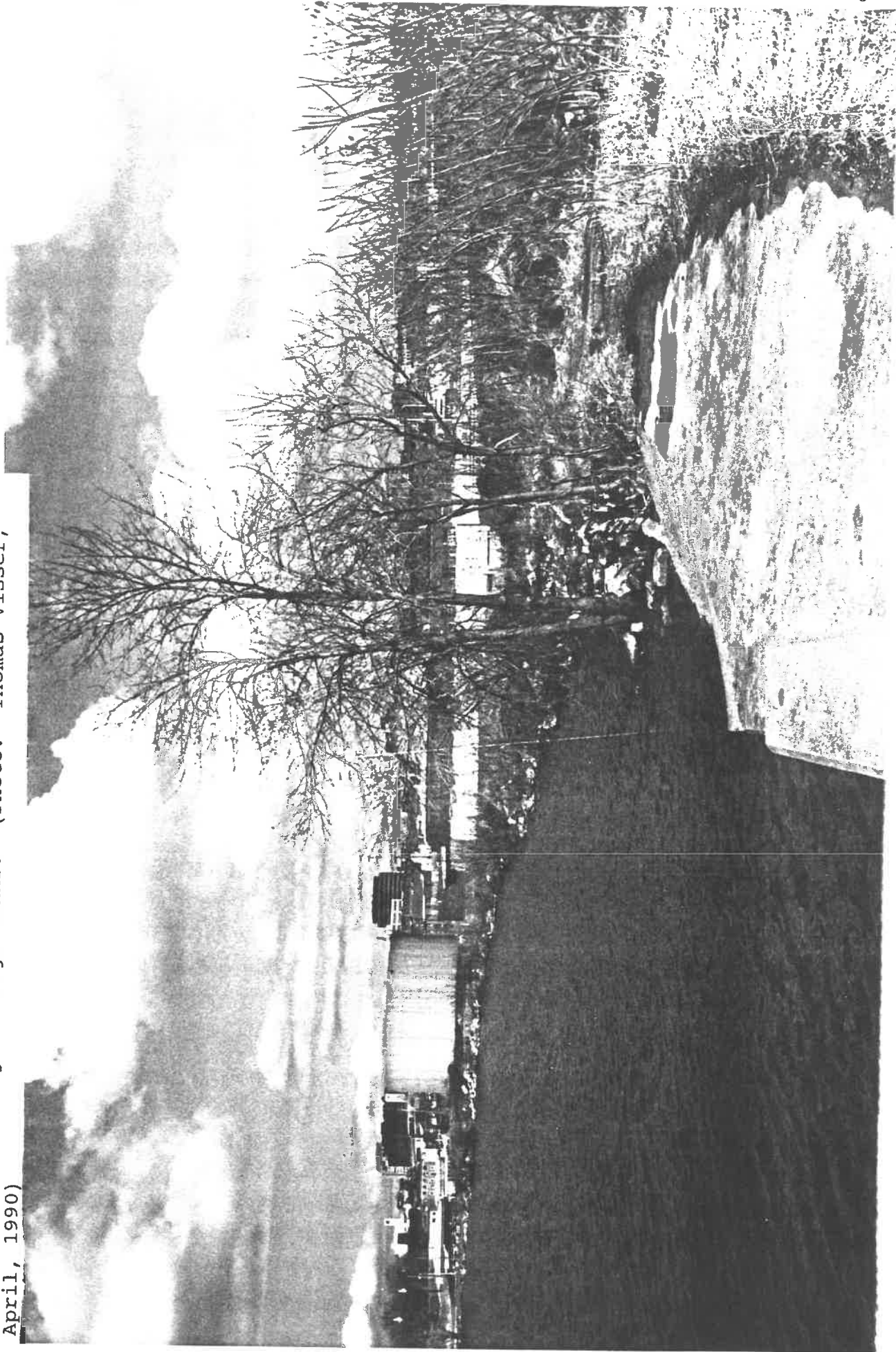




Fig. 3 This photo shows the shoreline of the wastewater treatment plant site looking south from near the northern terminus of the property. In the foreground, driftwood and other debris are visible intermingled with the crushed stone of the lake barrier. (Photo: Thomas Visser, April, 1990)

Fig. 4 This photo is a panoramic view of the Burlington Wastewater Treatment Facility looking northeast toward Battery Street. In the foreground the digesters and aeration tanks are visible. Behind them the control building and at the rear of the picture are the sludge storage tanks. (Photo: Thomas Visser, April, 1990)



building, located at the center of the site, around the front of the building and across the site to the south (Fig. 5).

Two sewer outfalls with concrete headers straddle the southern boundary of the site at the waterline (Fig. 6). The old, 1894-1914 sewer outfall is located south of the boundary line on the property of the Vermont Railway. The 1932 sewer outfall is immediately to the north.

Two sludge storage tanks (installed as oil tanks in the 1950's) are built in a slight depression, surrounded by a berm, over what was formerly a boat slip at the northern edge of the site (Fig. 7). The slip was filled at some time between 1953 and 1972, and no surface evidence remains of the slip's bulkhead construction.

Paralleling the southern boundary of the site, west of the garages is a large mound of fill. Included in the fill are large pieces of rock and historic bottles. The fill may be from recent Public Works Department projects around the city.



Fig. 5 This photo is looking south from the old boat slip. On the left are the digesters and behind them the aeration tanks. In the distance the sewer outfalls are visible. (Photo: Thomas Visser, April, 1990).



Fig. 6 This 1932 photo shows the newly constructed sewer outfall with its dated, concrete header next to the old 1894/1914 sewer outfall. The asphalt plant is visible on the far left, and the roundhouse of the Rutland Railroad is on the far right. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1932.)



Fig. 7 This photo shows the sludge storage tanks located in the old boat slip looking east toward Battery Street. The building visible on the right is the control building. (Photo: Thomas Visser, April, 1990)

HISTORY

Research into the history of the Burlington Wastewater Treatment Plant site identified four significant themes. These include the prehistory of the site, the wharfing and filling activities that shaped the shoreline, the commercial development of the Burlington waterfront, specifically south of Maple Street, and the evolution of the sewer and wastewater treatment system in Burlington as it relates to the present sewage treatment plant property. It is very unlikely that any evidence will be discovered from the prehistoric period due to erosion from the lake. However, it is likely that evidence will be found from the site's historic uses. This evidence might include buried bulkheads, sunken boat hulls (possibly used as fill), and remains of the asphalt plant and stone crushers (including the foundations and materials used in their operations).

THE SITE IN PREHISTORY

The lakefront with its abundant supply of fresh water and aquatic flora and fauna would have been an ideal location for prehistoric settlement. The lakefront landscape probably consisted of a dry bluff top overlooking the marshy wetlands and beach adjacent to the water. The mean water level of Lake Champlain has risen approximately 20 feet over the past 8000 years moving the shoreline east, approximately, 1250-1500 feet¹. Occupation may have occurred on the, now submerged, lower ground as well as the drier, higher elevations.

Recorded evidence of prehistoric occupation in Burlington is limited. The documented site nearest to the waste water treatment plant was uncovered during construction at the Holloway Block on the northeast corner of Main and Battery Streets.² A scatter of stone flakes, the remnants of tool production, were found there. Because the site was partially destroyed and not subject to professional analysis, no positive date could be assigned to the remains.

Although random artifacts may be found, it is unlikely that any intact prehistoric sites remain buried in the vicinity of the Burlington waste water treatment plant. The area south of Maple

¹Coast Guard Survey, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1872; Champlain Army Corps of Engineers Map, 1928.

²Vermont Division for Historic Preservation, "Archaeological Site Survey Form," Site No. VT-CH-161.

Street is depicted on several historic maps as marshland.³ Any sites situated on the low-lying areas over which the facility was built were covered by water prior to being filled, and the action of the waves and erosion would preclude the possibility of finding any intact sites.

³Map of Dock Line, Lumber Yards and Breakwater, Burlington Harbor, surveyed by the Class of 1888, 1886.

WHARFING AND FILLING

A slight discrepancy exists regarding the location of the unaltered waterline of the Burlington waterfront between the 1833 Johnson Map and the 1853 map by Presdee & Edwards (Maps 3 & 4). While the lakefront south of Maple Street does not appear to have been filled on the Presdee & Edwards Map the disparity between the shoreline locations depicted on the two maps, an average distance of 500 feet, poses a problem. It is possible that Johnson's map presented the shoreline at its low-water level while the Presdee & Edwards map depicted the waterline at a mean lake level.

In either case, the gentle curve of the shoreline of Burlington Bay existed unmodified until the early nineteenth century (Map 3). Between the city and the shore was a steep bank that ran directly to the waterline, a distance of "about ten rods [165 feet] west of the west line of Water Street [now Battery Street]".⁴ Thomas H. Canfield, in the Vermont Historical Gazetteer, described, "at this time there were no wharves at Burlington, and the woods reached down to the shore from the Red Rocks to Rock Point. From Peterson's brewery [at Champlain Street and South/Maple Street] to the stone store were trees, and the water in the cove came up to them so that vessels could enter the cove and tie up to the trees, the beach where the depot stands forming a breakwater for them."⁵

The first undisputed, augmentation of the natural shoreline occurred in 1810 when Curtis Holgate built a dock, known as South Wharf, at the foot of South Street (now Maple Street).⁶ Later maps refer to it as "Madison Wharf" and "Old Wharf". Perkin's Pier, the ferry terminal for the Lake Champlain Transportation Company, currently occupies the site.

With the exception of South Wharf, the site was undeveloped until 1847 when the Rutland & Burlington Railroad Company acquired the rights to water lots 1-10 and began laying track along the

⁴History of Chittenden County, Vermont, ed. W.S. Rann (Syracuse: D. Mason and Co., 1886), 404; Austin v. Rutland Railroad Co. et als., 215 (Chittenden County 1873).

⁵Abby Maria Hemenway, ed., The Vermont Historical Gazetteer: A Magazine Embracing a History of Each Town, Civil, Ecclesiastical, Biographical and Military (Burlington, Vermont: Miss A.M. Hemenway, 1867), vol. 1, 669.

⁶Rann, p. 405.

shoreline.⁷ The testimony of Mr. Richard Daley, who grew up along the Burlington water front in the 1850's, describes the railroad tracks being laid on a fill of large pieces of gravel and marble.⁸ Another man who grew up in the area, Charles E. Allen, testified that "the filling was going on from [18]51 or 2 down and as fast as they would crib and then fill in up to the crib making a bulkhead".⁹ The 1853 map by Presdee and Edwards shows the water line approximately 50 feet from the west line of Water Street and the railroad tracks running along the shoreline. A similar scene is depicted on two engravings of Burlington Harbor dating to circa 1850 and 1858 (Figs. 8 & 9). South Wharf (or Madison Wharf as it was then called) stretches into Burlington Bay as a train chugs along the shoreline past the depot.

By 1866 a second dock was built south of Maple Street to which George Beckwith acquired the lease in September 1868.¹⁰ Beckwith's early coal docks extended approximately 130 feet into Lake Champlain with an additional 100 foot long pier extending off the west end (Map 5). (Both Beckwith's business and his lease were assumed by Elias Lyman in the 1880's.) The shoreline west of the coal wharf remained unaltered with the exception of two piers built in the South Cove inlet flanking the mouth of the barge canal. No additional modifications were made to the shoreline south of Maple Street through 1872.¹¹

⁷Guy B. Horton, "Burlington Lakefront Investigation: Report of Investigation of Rights in Streets at Lake Front in Burlington, Vermont," 1912, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 35.

⁸Ibid., 39.

⁹Ibid., 16.

¹⁰Burlington (VT), City Clerk's Office, Deed Book, (25 June 1957), vol. 151, 53.

¹¹Coast Guard Survey of Burlington Harbor, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1872.



Fig. 8 In this close-up of the a mid-19th century engraving of the Burlington waterfront Madison Wharf is seen on the left near today's Perkin's Pier. The train chugs along the shoreline to the south, which has not yet been noticeably filled. Of interest to note is the dry-docked boat on the right. This rendering may represent the "boat building establishment," mentioned by one source as located south of Madison Wharf before 1858. (Source: D.L. Glover, Burlington Photo Collection, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, [circa 1850].)

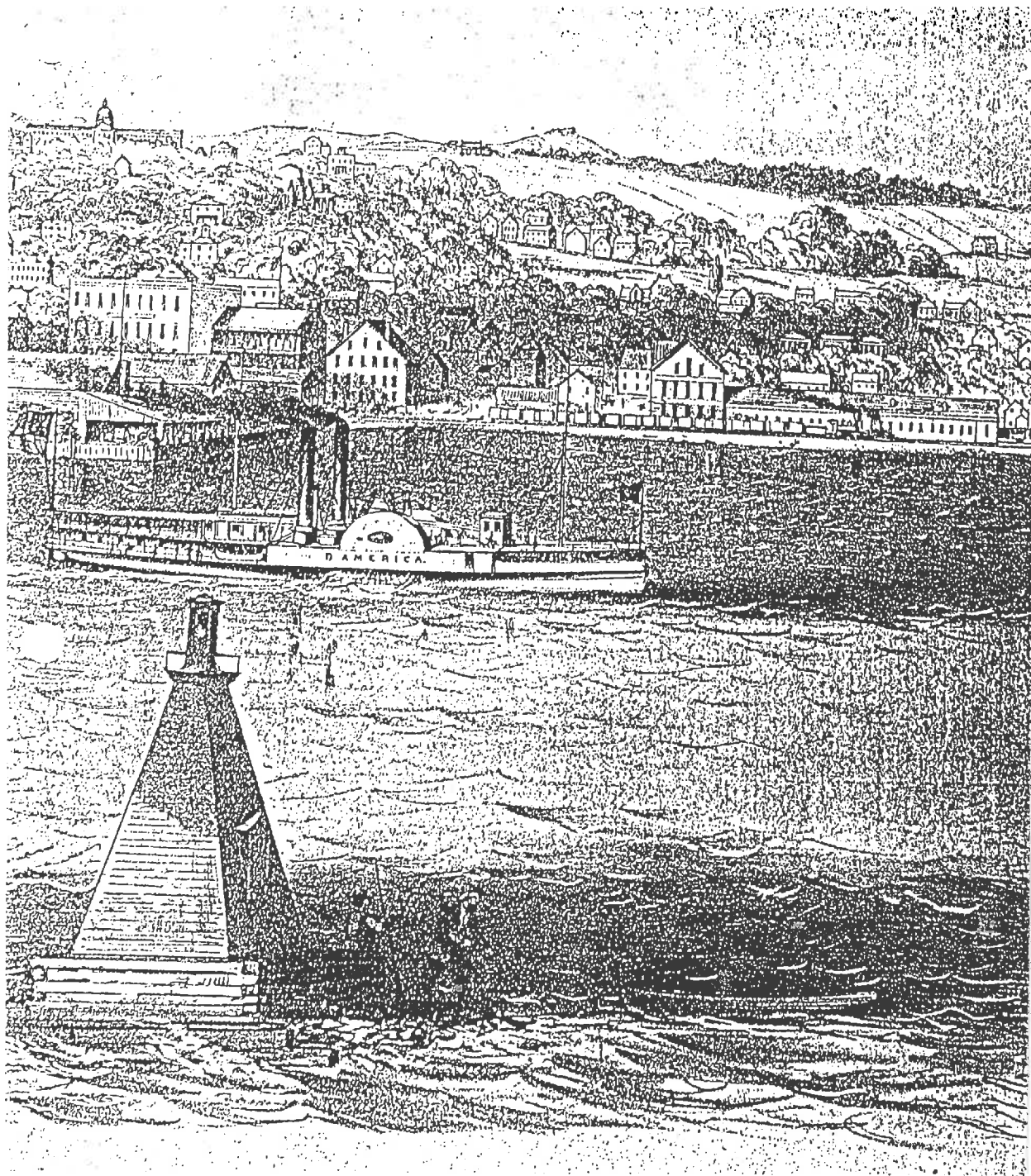


Fig. 9 This 1858 engraving depicts a scene similar to that in the Glover engraving. On the left Madison Wharf juts into the lake while to the right a train leaves Burlington on the Rutland and Burlington Railroad track along the shoreline. (Source: Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1858.)

By 1872, development of this portion of the shoreline had begun. A squared notch appeared in the water's edge immediately south of Beckwith's wharf on the Burlington City directory map of that year.¹² It is unclear from the map whether the area has been cut in or filled out, however, the 1877 Bird's Eye View shows the area shored up with cribbing (Fig. 10).

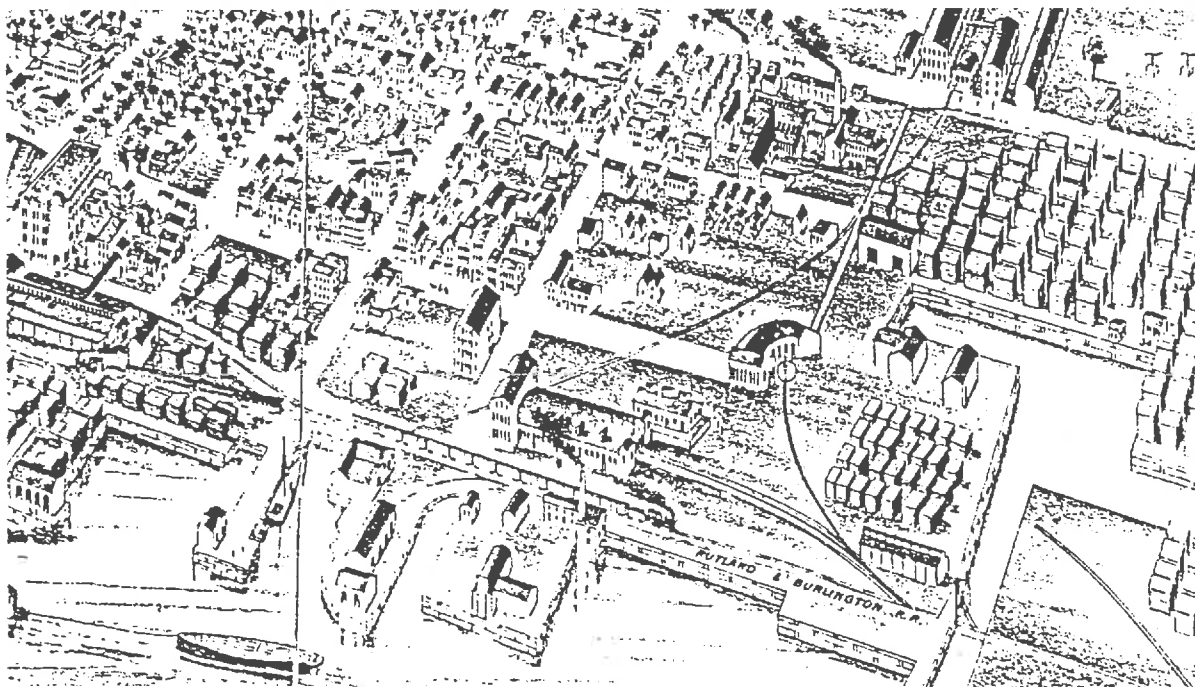


Fig. 10 In this 1877 Bird's Eye View of Burlington Harbor, Beckwith's Wharf has been built to the south of Madison Wharf, and the area south of Beckwith's Wharf has been cribbed and filled out slightly. The plaster mill is in operation behind the coal sheds on the southeast corner of the wharf. One wing of the mill appears to be built to the lake. (Source: Bird's Eye View of Burlington and Winooski, VT, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1877.)

In a 1984 report on the marine archaeology of Lake Champlain, Arthur Cohn described the typical cribbing built on Lake Champlain for breakwaters and docks during the late nineteenth century as being composed of "connected wooden chambers filled

¹²Burlington City Directory and Business Advertiser, July 1873 -to July 1874, (Burlington, Vermont: The Free Press Association, 1873), map.

with stone."¹³ Describing an actual section of cribbing located further north in Burlington Harbor, Cohn wrote, "nine inch square timbers [ran] horizontal to the lake bottom. The timbers were stacked on top of one another, creating vertical side walls which were fastened together with iron rods. Timber ends were staggered so as not to create straight seams which would present weak points in the structure. The timbers were notched at regular intervals to accept cross timber walls which separated the sections or compartments of the structure. These individual compartments were approximately 7 feet long, 32 feet wide, and 10 to 15 feet high. Individual stones visible in the crib's fill varied in volume from 1/2 to 2 cubic feet."¹⁴

In the following decade, the area south of the coal wharf was filled to create a boat slip.¹⁵ The slip bordered the coal wharf on the north and a pier formed the southern wall. A short breakwater extended south from the southern side of the slip. The 1886 Dock Survey shows the area enclosed by the southern breakwater and the northern pier of the barge canal inlet to be a marsh (Map 6). Indicated within this enclosed area, as a dimple in the shoreline, is the outfall of the city sewer, completed in 1888.¹⁶ It is likely that the marshy infill was the result of discharge from the sewer as well as natural lake deposits. In 1890 the breakwater was extended to the south to encompass the expanding marsh.¹⁷ As the marsh grew the two breakwaters (the southern extension of the boat slip and the northern pier from the barge canal inlet) were extended. In 1899 they formed an enclosed basin, and the filling process continued within the enclosure.¹⁸

Guy Horton, in his 1912 report Lakefront Investigations, claimed that "the entire lakefront [had] been filled in 100-600 feet west of the original low water mark by railroads or private

¹³Arthur Cohn, Phase I Underwater Archaeological Survey for the Proposed Burlington Waterfront Redevelopment Project, (Burlington: The Alden Waterfront Corporation, 1984), 20.

¹⁴Ibid.

¹⁵L.P. Waite, Burlington and Winooski, Vermont Directory, (Springfield, Mass.: H.A. Manning Co., 1914).

¹⁶Burlington (VT), City Clerk's Office, Sewer Plans, 1884.

¹⁷Hopkins Map, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1890.

¹⁸Burlington City Directory for 1899, Including Winooski and South Burlington, (Burlington, Vermont: L.P. Waite and Co., 1899/map 1894).

individuals."¹⁹ A comparison of the 1928 Champlain Army Corps of Engineers map with the 1836 Johnson map shows that this area has indeed been filled several hundred feet west of the original shoreline.²⁰ Unfortunately the Sanborn Maps from the early twentieth century do not show the shoreline for the project area and cannot be used to substantiate this information.²¹

In 1914 the Burlington Street Commissioner recommended to the city that "the territory adjacent to the outlet of the main sewer and west of the tracks of the Rutland Railroad be acquired by the city....and the basin between the cribbing and the railroad be used as a dumping ground for ashes and other suitable filling."²² This land was already being leased by the City from the railroad, and used by the Street Department to house the city's stone crusher and additional equipment. In 1918 the Rutland Railroad built a new roundhouse to the west of the existing freight yards on the filled land, now known as Roundhouse Point, and in 1924 the city built an asphalt plant on this section of fill near where the stone crusher had stood (Map 7).²³

The 1953 report of the Burlington Sewage Department describes the subsoil at the site consisting of "from 4 to 12 feet of fill ranging from tin cans and brick bats to granite chips."²⁴ A series of soil borings taken in 1969 and another recorded between 1986 and 1989 at the sewage treatment plant site support this. Examination of the boring logs revealed that the area has been filled an average of almost 10 feet.²⁵ Ash, brick fragments, and slag were the most common types of debris found in the fill. Also prevalent were crushed stone, glass fragments, and pieces of wood ranging in size from one foot thicknesses to saw dust.

¹⁹Horton, V.

²⁰John Johnson, Village of Burlington in Vermont from Actual Survey, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1833.

²¹Sanborn Insurance Map, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1894, 1900, 1906, 1912.

²²City of Burlington (VT), Annual Report (1914), 101.

²³Stearns Jenkins, Vermont Transportation Agency, Montpelier, Vermont, personal conversation with Elizabeth Rosin, 4 April 1990; City of Burlington (VT), Annual Report (1924), 16.

²⁴City of Burlington (VT), Annual Report (1953), 153.

²⁵Laboratory Test Results, (Bedford, New Hampshire: Haley and Aldrich, Inc., 1989).

Concrete, tar and asphalt were recovered, and a few fragments of "porcelain" were found in the eastern-most boring nearest the original shoreline (Fig. 11).



Fig. 11 This 1932 photo, taken during the construction of the main trunkline sewer, looking northeast, gives an idea of the amounts and types of debris found in the fill on the site. On the far left, a heap of old tin cans is visible along with pieces of wood and piles of sewer pipe. (Source: McAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1932.)

Cohn's report as well as an interview with former ferry captain Merritt Carpenter revealed that hulls of ships were sunk around Burlington Bay and were often incorporated into fill. Cohn identified the skeletons of five different boats submerged in an area he studied in the northern part of the harbor.²⁶ In an interview given to the Consulting Archaeology Program of the University of Vermont, Captain Carpenter recounted, "As was the custom of the times [on Lake Champlain], when they wanted to make a new pier they usually sank a barge and filled it with stone."²⁷

²⁶Cohn, 26-32.

²⁷Peter A. Thomas, Prudence Doherty and Arthur B. Cohn, Archaeological Reconnaissance Survey, Grand Isle Fish Hatchery, Grand Isle, Vermont, (Burlington: Consulting Archaeology Program, Department of Anthropology, University of Vermont, Report No.

An undated photo of the Burlington waterfront shows boats scuttled in the bay between College Street and Main Street (Fig. 12). Captain Carpenter believed the wreck of the "Hildegarde," a sixty foot sailing yacht, to be located along the shore of the Sewage Treatment Plant site. According to Carpenter, by the 1920's the yacht had been converted into a tow boat for pulling stone barges (Fig. 13). Carpenter recalled that the boat had sunk in the 1940's with one side leaning against the bulkhead, approximately fifteen feet north of the sewer outfall.²⁸ Carpenter also reported that repair work on the breakwater south of Roundhouse Point during the same period uncovered the remnants of several wrecks.

Minor alterations of the shoreline occurred during the construction of the 1953 sewage treatment plant and during the 1972 upgrade of the facility (Map 2).

104, 1989), 35.

²⁸ Captain Merritt Carpenter, telephone interview by Thomas Visser, 2 April 1990.



Fig. 12 In the center of this 1930's picture are one (and possibly more) scuttled boats, beached in the cove between College and Main Streets. (Source: Burlington Photo Collection, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, n.d.)



Fig. 13 This undated photo of the crew was taken on the deck of the "Hildegarde," reputedly sunk along the shore of the site. The caption on the slide reads, "This boat ran from Arnold's Bay to Westport, NY from 1925 to 1929 when bridge was put in at Chimney Point, Vt. (Source: Lake Champlain Maritime Museum, Basin Harbor, Vermont, n.d. Courtesy of: Arthur Cohn.)

COMMERCIAL DEVELOPMENT

When Burlington was platted in 1794 the lots along the waterfront were designated the Seventh Division of the town.²⁹ The site of the sewage treatment plant is in the vicinity of the original lots 1-10. Each of these lots was two rods (33 feet) wide and extended from the edge of Water Street (now Battery Street) to the lake, a distance of approximately 165 feet (Map 3).

The town's earliest harbor facilities consisted of a log pier located where Perkin's Pier is today.³⁰ The usefulness of the pier was limited due to shallow water which prohibited all but the lightest boats from tying up to it.³¹ Instead of using the pier, accounts from the period describe how larger boats would tie up to trees in the south cove, employ smaller, flat bottomed, unpowered barges to transport the goods to the pier, or even throw barrels of goods over board and let them float in to shore.³²

The log pier was replaced by the first wharf, South Wharf, built by Curtis Holgate in 1810.³³ For many years the shallow grade of the hill at the foot of Maple Street made South Wharf the most accessible pier in Burlington for commerce. In addition to freight, passengers arrived at South Wharf by steamboat.

The wharf was operated by Henry Mayo and Timothy Follett who ran a freight forwarding business importing goods by boat and shipping them to locations inland.³⁴ Materials such as iron and nails from Keeseville and Ausable Forks, New York, and iron from Port Henry, New York were received by Mayo and Follett at South Wharf.³⁵ The construction of canals linking Lake Champlain with the Great Lakes, the St. Lawrence River, and the Hudson River put shipping into the forefront of industry in Burlington during this period. Through the middle of the century new docks were constructed in Burlington Bay and existing facilities were

²⁹Horton, I, XII.

³⁰Hemenway, 499.

³¹H. Nicholas Muller III and Marshall M. True, "Burlington Ponders the Past and Future of Its Shoreline," Vermont Life Magazine, Summer 1985, 14.

³²Cohn, 9.

³³Rann, 405.

³⁴Cohn, 6.

³⁵Horton, 29.

expanded to accept the increasing volume of trade.

The arrival of the railroad to Burlington stimulated the already busy economy of the waterfront. In 1847 Timothy Follett, president of the Rutland and Burlington Railroad Company (formerly the Champlain & Connecticut River Railroad Company), acquired land along the lakefront for the railroad.³⁶ Included in the purchase were lots 1-10. The railroad laid a spur of track along the northern edge of South Wharf enabling the transfer of boxcars across the lake to connecting rail lines through the use of barges and steamboats (Map 4).³⁷ A mid-nineteenth century engraving, shows a train chugging along the shore and boats tied up to Madison Wharf (Fig. 8, see above). It is interesting to note the boat dry-docked on the shore. This follows testimony recorded by Guy Horton in his "Lake Front Investigations." Under questioning, Richard Daley recalled the presence of a "boat building establishment" south of Madison Wharf where they "built boats of considerable size and launched them into the lake."³⁸ The Vermont Historical Gazetteer also contains an account of early boat building activity in the southern portion of the harbor on the site presently occupied by the stone store.³⁹

As the presence of the railroad encouraged industrial growth in Burlington, harbor front industries boomed. In 1868 the Rutland Railroad leased a section of land south of the south line of Maple Street to George W. Beckwith. Beckwith built a wharf on this parcel and established a coal and lumber yard (Map 5).⁴⁰ The coal sheds flourished through the century. In the 1880's the business was taken over by Elias Lyman who received title to the land from the Rutland Railroad in 1957.⁴¹

On the southern corner of the wharf Beckwith built a plaster and phosphate mill in 1871. The 1877 Bird's Eye View map shows the mill with one corner of its southern wing built over the edge of the water (Fig. 11, see above). A post-1869 engraving of the Kilburn & Gates factory shows the stack of the phosphate mill chimney along the waterfront and the masts of two ships, which

³⁶Ibid., 35.

³⁷Muller and True, 15.

³⁸Horton, 48.

³⁹Hemenway, 699.

⁴⁰Burlington (VT), City Clerk's Office, Deed Book, (25 June 1957) vol. 151, 53.

⁴¹Ibid.

appear to be tied up to the wharf just south of the mill (Figs. 14 & 15).

A photo taken at approximately the same time shows the view from the other direction. Taken from the breakwater, the photo shows the chimney of the plaster mill with a boat anchored along the shore to the south; another boat is tied up to the end of the Beckwith Wharf (Figs. 16 & 17). According to an article from the Burlington Free Press dated April 13, 1872, Beckwith's docks contained "an area of two acres, with 800 feet of water front."⁴² The mill, "for the grinding of Nova Scotia plaster," used a steam engine built in 1865, acquired from the Burlington Manufacturing Company in its rolling mill. According to Sanborn insurance maps, the plaster mill had ceased operation by 1894, and the structure was not present on the 1912 map.⁴³

By 1881 the shoreline adjacent to Beckwith's wharf had been developed to create a boat slip to the south with a breakwater extending south from the south side of the slip. It is unclear who built this slip, but it was most likely built by the railroad. The 1886 Dock survey, as well as subsequent maps, show a rail spur running along the southern edge of the slip to the water (Map 6). The rail spur and boat slip are visible in a 1929 photo taken of the asphalt plant (Fig. 18).

The slip, the tracks, and the property south of Beckwith's docks were leased by the City of Burlington Street Department at least as early as 1894 when the city's Annual Report first details shipments of stone received by boat at this dock.⁴⁴ In 1895 a stone crusher was moved to the dock site from the city's old site at Willard's Ledge in order to facilitate the processing of the imported stone for use in paving the streets of the city.⁴⁵ Materials received at this dock included limestone from Isle La Motte and gravel from Mallets Bay.⁴⁶ An undated photo of the

⁴²The Burlington Free Press (Burlington, Vermont) 13 April 1872; Hamilton Child, ed., Gazetteer and Business Directory of Chittenden County, Vermont for 1882-1883 (Syracuse: Hamilton Child Publisher, 1882), 105.

⁴³Sanborn Fire Insurance Maps, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont (1894, 1912).

⁴⁴City of Burlington (VT), Annual Report, 1894, 175.

⁴⁵City of Burlington (VT), Annual Report, 1895, 145.

⁴⁶City of Burlington (VT), Annual Report, 1903, 138.

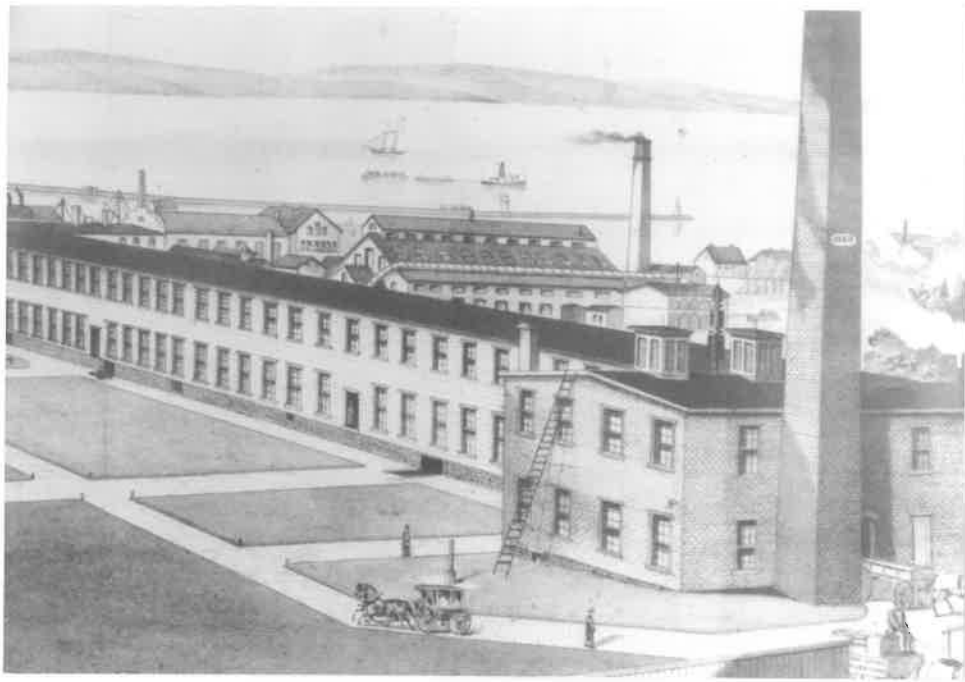


Fig. 14

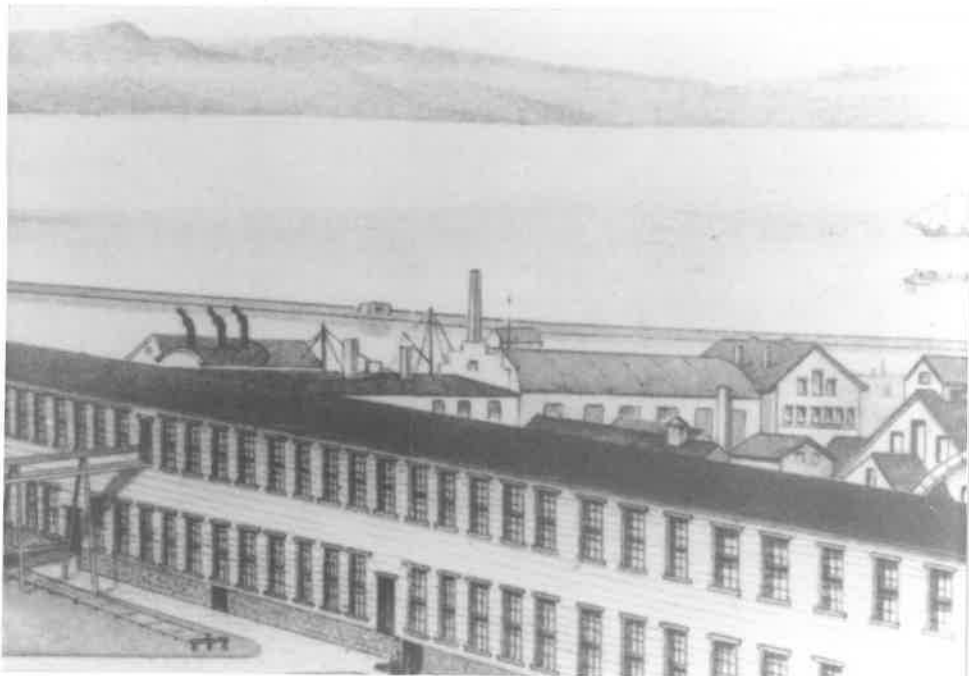


Fig. 15 (Close-up) In this engraving of the Kilburn & Gates factory, the smokestack of George Beckwith's plaster mill is illustrated directly behind the arched roof of the Rutland Railroad freight depot. To the left (south) of the chimney are the masts of a boat anchored just off shore. (Source: Kilburn & Gates Factory, [1872]. In the collection of: Architectural Conservation and Education Service, University of Vermont, Burlington, Vermont.)



Fig. 16



Fig. 17 (Close-up) This 1906 postcard presents a scene similar to that in the Kilburn & Gates engraving but is shown from the opposite angle looking southeast. At the center of the close-up image, boats are tied up at the Beckwith Dock. Behind them, the smokestack of the plaster mill is visible. To the right (south), a schooner is tied up along the cribbing near the entrance of the barge canal. (Source: Don Baker, Burlington Photo Collection, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1906).



Fig. 18 This 1929 photo, looking west, taken after the construction of the asphalt plant, shows the rail spur and, behind the horse, the boat slip. The rail spur ran along the edge of the slip to the dog leg derricks behind the pole, which transferred stone and other goods between the boats at the dock and the waiting train cars. (Source: McAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1929.)

harbor appears to show the derricks next to the boat slip and large piles of stone, evidence of the stone crushing operations (Figs. 19 & 20). The stone crusher remained at the dock until 1904.⁴⁷

After the stone crusher was moved, the Burlington Street Department maintained tenancy of the land south of the slip. In 1924 an asphalt plant was built on "the Street Department dock near the Elias Lyman coal sheds" (Figs. 21 - 24).⁴⁸ This plant was the principle source of paving asphalt for the city, producing 1800 tons of cold patch and 3704 tons of hot plant mix material in 1948 alone (a 45% increase from 1947), until it burned in the fall of that year.⁴⁹

The city officially acquired title to the land from the railroad in 1951 following which the first Burlington Sewage Disposal Plant was built on the site in 1953.⁵⁰

By the mid-twentieth century Burlington's waterfront boom was long over, and many of the once busy docks were developed into storage facilities for fuel oil.⁵¹ The Lyman coal sheds were among the converted areas. Lyman sold his title to the docks south of Maple Street to Robinson Fuels, Inc. in 1972. Robinson Fuels subsequently sold the property to other fuel oil companies.⁵² The oil tanks built during this period still stand on the property today in use as sludge storage tanks.

⁴⁷City of Burlington (VT), Annual Report, 1904, 125.

⁴⁸City of Burlington (VT), Annual Report, 1924, 125.

⁴⁹City of Burlington (VT), Annual Report, 1948, 165; City of Burlington (VT), Annual Report, 1949, 156.

⁵⁰Burlington (VT), City Clerk's Office, Deed Book, (31 October 1951), vol. 130, 352.

⁵¹Cohn, 15.

⁵²Burlington (VT), City Clerk's Office, Deed Book, (15 June 1972), vol. 210, 750.



Fig. 19



Fig. 20 (Close-up) In the center of the close-up of this early 20th century photograph, taken from Red Rocks, an image is visible in the slip south of Beckwith's Wharf that may be the dog leg derricks and a boat. To the right (south) are large piles of stone or debris. (Source: Burlington Photo Collection, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, [1910-1912]).

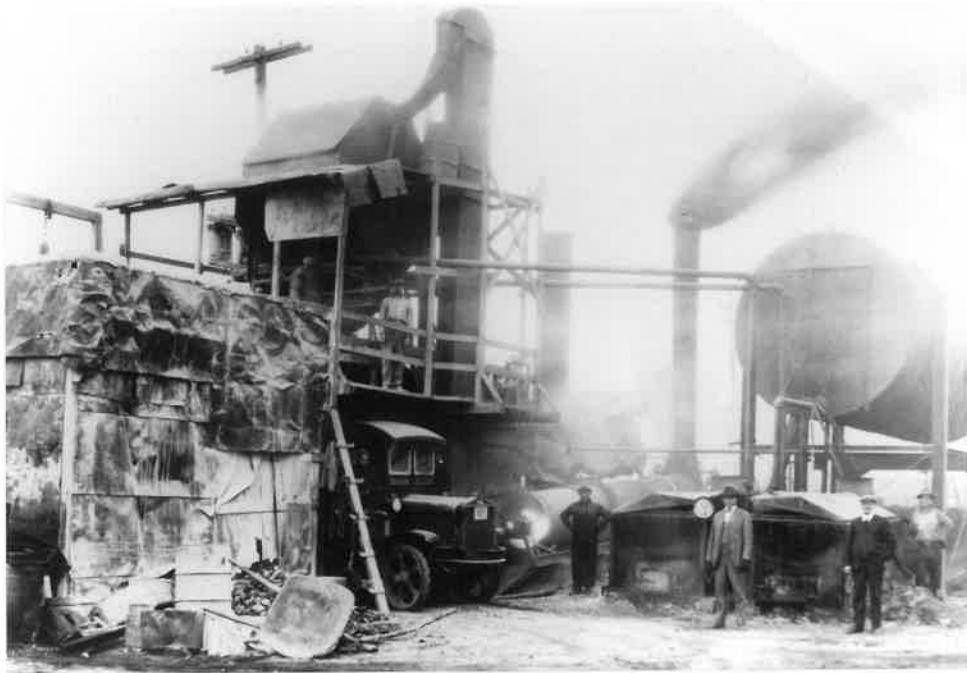


Fig. 21 This 1929 photo shows the Burlington Street Department's asphalt plant looking west. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1929.)

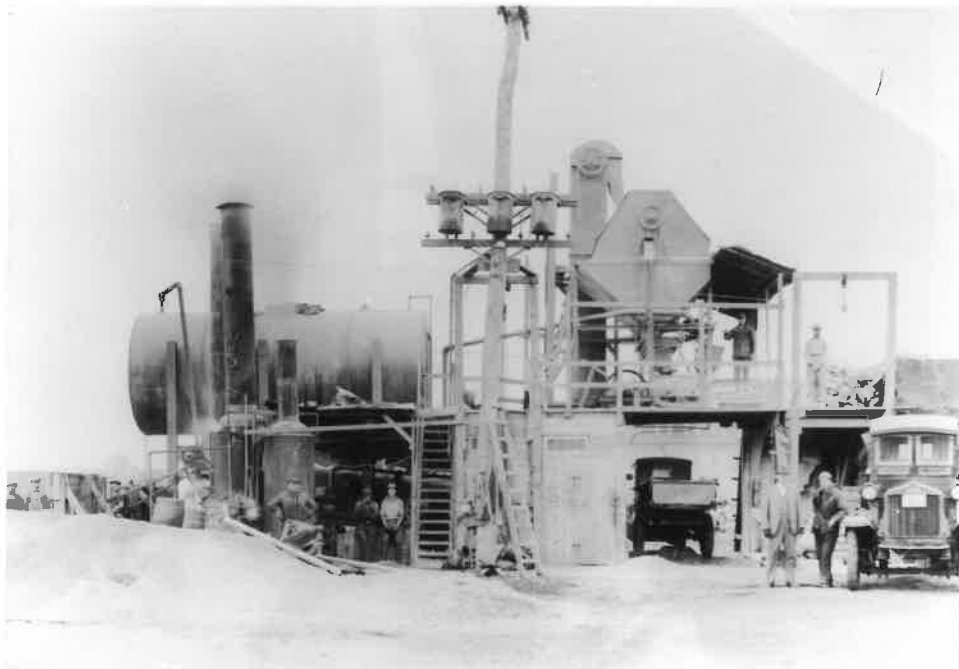


Fig. 22 This 1929 photo shows the Burlington Street Department's asphalt plant looking north. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1929.)

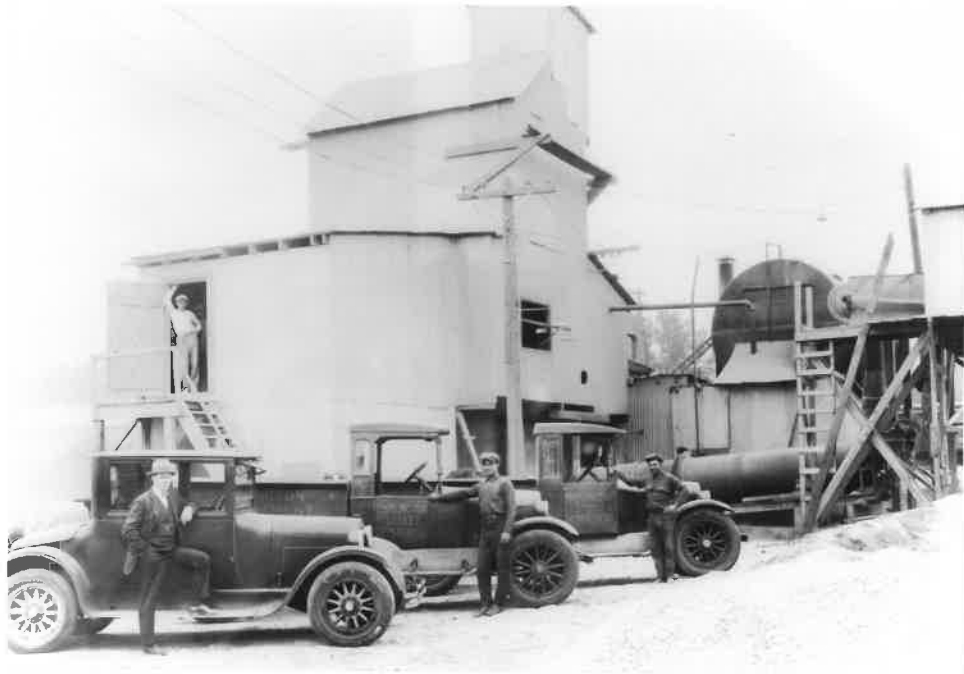


Fig. 23 This 1929 photo shows the Burlington Street Department's asphalt plant looking east. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1929.)



Fig. 24 This 1937 photo shows the Burlington Street Department's asphalt plant, looking west, after construction of sheds where concrete sewer pipe was cast. The original photo caption reads: "The long wing at the right has a platform through the center from which the concrete is poured from two-wheeled buggies into the steel form placed on both sides. The wing at left is the curing room where the tiles were stored for a period of 48 hours before being taken onto the job. Both buildings were equipped with steam heat." (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1932.)

SEWER & WASTE WATER TREATMENT SYSTEM

Prior to 1870 no modern sewers serviced Burlington. According to the city's Annual Report, only one "ancient" sewer line ran from Pearl and White streets to the foot of Pine Street.⁵³ Not only was this existing sewer line inefficient but the most densely built portion of the city (the area around Church Street) was not serviced by it.

Construction began on a mainline sewer in the ravine "east of the market" in 1869.⁵⁴ In 1871, the Burlington Street commissioners wrote in their annual report that the city sewer "commences in Maiden Lane and empties into the south cove."⁵⁵ City sewer plans show that the sewer outfall was completed in 1874 including the segment from the lake to Champlain Street which connected the old sewer line with the new (Map 7).⁵⁶ On the 1886 Dock Survey, the outfall, located south of the Street Department Dock and north of the barge canal piers, appears similar to a stream inlet on the shoreline (Map 6).

Improvements to the sewer system were started in the early 1880's with the construction of the Battery Street Extension, a sewer line running down Battery Street to connect with the main trunk line ravine sewer.⁵⁷ The completed Burlington sewer system in this form is shown on the 1890 Hopkins map.⁵⁸ The sewer line runs from Battery Street through the freight yards of the Rutland Railroad to connect with the main trunk of the sewer just east of the outfall.

In 1894 the breakwater at the southern end of the Burlington Street Department dock and the northern barge canal pier were extended and joined by the Rutland Railroad to form an enclosed basin.⁵⁹ "The work of extending the ravine trunk sewer across the basin to the face of the crib" commenced the same year and

⁵³City of Burlington (VT), Annual Report, 1870, 121.

⁵⁴City of Burlington (VT), Annual Report, 1873, 42.

⁵⁵City of Burlington (VT), Annual Report, 1871, 92.

⁵⁶City of Burlington (VT), Annual Report, 1874, 42.

⁵⁷Burlington (VT), City Clerk's Office, Sewer Plans, 1884.

⁵⁸Hopkins Map, Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1890.

⁵⁹City of Burlington (VT), Annual Report, 1894, map.

was completed in 1895.⁶⁰ The temporary sewer extension was built of "three inch pine plank supported by piles and coated outside with coal tar. The length [was] five hundred sixty-five feet....This wooden conduit [was] only designed to last until the basin [was] filled in sufficiently to allow the proper and economical construction of a brick or stone sewer."⁶¹

By 1904 the permanent sewer outfall had not been constructed and the existing outlet was falling into disrepair. The Street Commissioners wrote in the annual report that year, "the present outlet of our sewer system, which is a temporary structure, built of timber and not of a sanitary character, will in the near future have to be replaced by something of a more permanent nature. The crib work south of the outlet, which formerly protected this structure, has gradually gone to pieces and exposed the outlet box to the force of the waves and ice."⁶² No immediate action was taken to correct the problem. According to city sewer plans the plank outfall was not replaced by brick until 1914.⁶³

In the early teens work was begun on extending the sewer system to serve the residents of Burlington's burgeoning south end. The first survey for a south end sewer extending "through the ravine to Shelburne Street to the lake" was completed in 1910.⁶⁴ The Burlington Annual Report for 1911 recounts that the trunk line of the south end sewer was 250 feet offshore opposite the Lumiere North America property, south of the outlet of the Englesby Ravine.⁶⁵

That same year the city discussed purchasing property for the construction of a "sewage purification" system.⁶⁶ City Engineer H.M. MacIntosh blasted the "shortsightedness and ignorance" of the voters who turned down the purchase of a piece of property for the construction of a sewage disposal plant.

The issue of building a sewage treatment facility returned in

⁶⁰City of Burlington (VT), Annual Report, 1894, 175-6; City of Burlington (VT), Annual Report, 1895, 25.

⁶¹Ibid. (1894).

⁶²City of Burlington (VT), Annual Report, 1904, 127.

⁶³Burlington (VT), Sewer Plans, City Clerk's Office, 1932.

⁶⁴City of Burlington (VT), Annual Report, 1910, 137.

⁶⁵City of Burlington (VT), Annual Report, 1911, 127.

⁶⁶Ibid.

1914 when the Street Commissioners recommended, "that the title to the territory adjacent to the outlet of the main sewer and west of the tracks of the Rutland Railroad be acquired by the city" for this purpose.⁶⁷ "The old cribbing could be repaired without great expense," they stated, "and the basin between the cribbing and the railroad be used as a dumping ground for ashes and other suitable filling. This filling would protect the outlet to the main sewer and provide a place for disposal works in the future."⁶⁸ The parcel of land being discussed was, at that time, immediately south of the Street Department dock where the stone crusher was located and where the asphalt plant would be built a decade later.

No further action was taken towards constructing a sewage treatment facility or modernizing the sewer outlet until 1923 when an overflow sewer was built on Maple Street from Battery Street to Lake Champlain. This line was 367 feet long "with a stone header constructed at its outlet."⁶⁹ On the 1928 U.S.G.S. map the sewer extension runs under the new Rutland Railroad round house to the edge of the basin cribbing (Map 7).

In 1931 the engineering firm of Baker and Wheeler was hired to design the new Maple Street trunk line sewer.⁷⁰ Built in 1932, the new, reinforced-concrete sewer line ran down Maple Street from Church Street to Battery Street and from there through the yards of the Rutland Railroad to the lake.⁷¹ The 1932 sewer encompassed the 1923 construction, and its outfall is pictured side by side with the old, 1894/1914 sewer outfall (Fig. 6).

In March 1947, after 37 years of discussion, a bond issue was passed that enabled the city to begin plans for a sewage treatment plant.⁷² In spite of ongoing efforts to upgrade the city's sewer system, some areas were still using sewer pipes from the 1870 and 1896 systems.⁷³ Problems arose as these pipes began to disintegrate. In 1948 the city council approved the parcel of land identified by the Street Commissioners in 1914 adjacent to the Rutland Railroad yards for the site of the sewage treatment

⁶⁷City of Burlington (VT), Annual Report, 1914, 101.

⁶⁸Ibid.

⁶⁹City of Burlington (VT), Annual Report, 1923, 147.

⁷⁰City of Burlington (VT), Annual Report, 1931, 239.

⁷¹City of Burlington (VT), Annual Report, 1932, 231.

⁷²City of Burlington (VT), Annual Report, 1947, 173.

⁷³City of Burlington (VT), Annual Report, 1949, 158.

plant.⁷⁴ Title to the property was transferred from the Rutland Railroad Company to the City of Burlington in October 1951, and the new plant was built alongside the two existing sewer outfalls in 1953.⁷⁵

Since then, the Burlington Sewage and Waste Water Treatment Facilities were upgraded once, in 1972. The designs for this plant were engineered by Whitman and Howard, Inc. of Boston and constructed by the Pizzagalli company.⁷⁶

⁷⁴City of Burlington (VT), Annual Report, 1948, 156.

⁷⁵Burlington (VT), City Clerk's Office, Deed Book, (31 October 1951), vol. 130, 352.

⁷⁶City of Burlington (VT), Annual Report, 1972, 45.

ARCHAEOLOGICAL POTENTIAL

Based on the historical information gathered, the wastewater treatment plant site could potentially yield information relevant to the following contexts from the Vermont Historic Preservation Plan:⁷⁷

- * Prehistory
- * Commercial Development in Urban Areas
- * Water Transportation and Commerce
- * Railroad (1830-1940)
- * Growth of Government
- * Public and Private Utilities
- * Other Industry

PREHISTORY

EVIDENCE of prehistoric occupation could include stone tools and flakes (the remnants of tool production).

POSSIBILITY: The chance of finding prehistoric artifacts is slim due to erosion and filling. Any recovered resources will probably be insignificant because their original context has been destroyed.

WHERE: The eastern extremes of the site along the original shoreline would be the area with the greatest probability of yielding information about prehistoric occupation (this area includes the area of discrepancy between the Johnson and Presdee & Edwards shorelines)

CONTEXT: * Prehistory

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

EARLY SETTLEMENT

EVIDENCE of early settlement could include random deposits and single artifacts, such as tableware, glass, etc. There could also be a slight possibility of buried boat hulls and other evidence of early historic lake activities.

POSSIBILITY: The chance of a significant find is slim. Most recovered resources from this period will be insignificant because their context has been destroyed through lake erosion and filling.

WHERE: The eastern extremes of the site which were along the original shoreline would have the greatest probability of yielding evidence from this period.

CONTEXT: Commercial Development in Urban Areas (pre-industrial development, selective development of the lakefront)

ISSUES OF POTENTIAL SIGNIFICANCE:

None identified unless a buried boat hull is discovered.

⁷⁷Vermont, Vermont Historic Preservation Plan: Planning for the Future of Vermont's Heritage, (1989).

FILLING & WHARFING

EVIDENCE of filling and wharfing could include remnants of stone-filled log chambers and fill.

POSSIBILITY: Any evidence is probably buried under subsequent fill; boring logs indicated the presence of buried sections of wood that may be cribbing.

WHERE: Cribbing would be found along shoreline and boat slip; fill would be found throughout site.

CONTEXT: * Commercial Development of Urban Areas (expansion & development of Burlington's lakefront to accommodate commercial and industrial growth)

* Water Transportation and Commerce (the role of Burlington and Lake Champlain in the exchange of goods especially between New York, Vermont and Canada via the lake)

ISSUES OF POTENTIAL SIGNIFICANCE:

- * What types of construction methods and materials were used?
- * Do these change through time?
- * Will the separate periods of shoreline expansion be evident in the methods of construction and materials used?

RAILROAD

EVIDENCE could include tracks, ties, spikes, ballast, railbeds, and evidence of the original shoreline.

POSSIBILITY: The tracks and ties were not removed from the slip when it was filled; they still exist, although now are buried.

WHERE: The railroad crossed the site at east and north ends near the present railroad tracks and a spur was present parallel to the old boat slip where the driveway is today.

CONTEXT: * Railroads (impact of railroad on the growth and development of the waterfront, use of ships to link rail line on opposite sides of the lake)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

PLASTER MILL

EVIDENCE of the plaster mill could include foundation, pipes, parts of machinery, and gypsum.

POSSIBILITY: It is unlikely that evidence of the mill would be found in the project area since most of plant was off project site and no physical evidence of the mill is visible above ground today. However, the portion of the mill that was on site housed the engine, and evidence of the water intake for the steam engine may be present.

WHERE: The mill was located at the northeast corner of the site, directly east of the boat slip.

CONTEXT: * Commercial Development in Urban Areas (growth of industry along lakefront)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

STONE CRUSHERS

EVIDENCE of the stone crushers could include stone or concrete foundations, piers and crushed stone.

POSSIBILITY: It is unlikely that any evidence of the stone crushers remains on the site. The stone crushers were removed in 1904 and replaced with a storage shed for paving equipment.

WHERE: the crushers were located next to water to the south of the railroad tracks in the vicinity of the digesters.

CONTEXT: * Growth of Government (expansion of street department to meet modern standards)
 * Public and Private Utilities (city street department - stone used for paving - upgrading quality of streets/community)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

ASPHALT PLANT

EVIDENCE of the asphalt plant would include: stone or concrete foundations, building materials, machinery, asphalt, gravel and other manufacturing by-products.

POSSIBILITY: It is probable that there are remains of the asphalt plant buried on the site because the plant burned and the area was cleared prior to construction of the sewage treatment plant. It is unknown what type of foundation the plant had. However, the footprint of the plant is still shown on the 1951 construction plans and nothing was built directly over the site. Because the plant burned there is a possibility that asphalt and other petroleum by-products are present.

WHERE: The asphalt plant was located to the south of the boat slip, west of the railroad tracks.

CONTEXT: * Growth of Government (expansion of street department to meet modern standards)
 * Public and Private Utilities (street department plant - for paving streets)
 * Other Industry

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

OTHER STREET DEPARTMENT STRUCTURES

EVIDENCE could include stone or concrete foundations.

POSSIBILITY: There is a slim possibility of finding evidence of other structures because these structures were mainly garages, etc., and were not built to be permanent. Any evidence that is present is probably very limited.

WHERE: Evidence would be scattered around the northwest corner of site, south of boat slip.

CONTEXT: * Growth of Government (evolution of street department facilities)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

BOAT SLIP

EVIDENCE of the boat slip could include remnants of the wooden bulkhead, spikes, and stone.

POSSIBILITY: Physical evidence may still exist under the fill and the oil tanks. 1951 construction plans show the slip unfilled with a wooden bulkhead along south side.

WHERE: The boat slip was located along the northern edge of the site.

CONTEXT: * Water Transportation and Commerce (importance of Lake Champlain as a transportation corridor, linking of shipping and railroad in transportation system - especially its effect on growth of lakefront industry)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

BURIED VESSELS

EVIDENCE of buried hulls could include: ribs, keel, keelson, planking of hewn or sawn wood, fasteners, fittings, etc., representing portions of or complete sunken hulls.

POSSIBILITY: There is a first hand report of the "Hildegarde" being sunk adjacent to the project area. It is very possible that other boats were sunk in the vicinity prior to or during various stages of filling.

WHERE: Hulls might be found throughout the filled area, but especially along the southern length of the waterfront buried at depths below 96 feet above sea level (see Analysis of Boring Logs).

CONTEXT: * Water Transportation and Commerce (types of boats used in lake commerce, boat types especially for lake-canal traffic)

ISSUES OF POTENTIAL SIGNIFICANCE:

- * What types of boats were used historically on Lake Champlain - known vs. new types of vessels, esp. pre-1850)?
- * How were they constructed?

SEWER SYSTEM

EVIDENCE of the sewer system could include concrete, brick, or steel pipes and shoring from the various stages of construction.

POSSIBILITY: There is a possibility of finding evidence of old sewer lines as well as pipe fragments from storage at the asphalt plant, however, most of the existing system incorporated pre-existing lines within the new lines.

WHERE: Sewer pipe would be found within the vicinity of the major trunk lines along the southern edge of the site.

CONTEXT: * Public and Private Utilities (development of the Burlington sewer system)

- * Growth of Government (development and expansion of a sewer and wastewater treatment system in Burlington)

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

OTHER

EVIDENCE could include: random deposits and single artifacts,
such as shoes, tableware, bottles, etc.

POSSIBILITY: Due to nature of filling, it is probable that stray
items will turn up in the fill.

WHERE: Random objects could appear throughout site.

CONTEXT: No specific contexts

ISSUES OF POTENTIAL SIGNIFICANCE: none identified

ANALYSIS OF BORING LOGS

Thirty-two soil borings were taken between 1969 and 1989 on the site of the Burlington Waste Water Treatment Plant (Appendix C).⁷⁸ The first series of ten (A-J) was recorded by Fred C. Koerner, C.E. prior to the 1972 upgrade of the sewage treatment plant and was used to identify subsurface conditions in central site locations where construction was designated to occur. The remaining twenty-two borings, taken since 1986, by Green Mountain Boring Co., Inc. and Haley and Aldrich, Inc. recorded subsurface conditions along the perimeter of the site.

The level of Lake Champlain varies annually between approximately 102 feet and 93 feet above sea level.⁷⁹ The average lake level is 95 feet, with the high mark reached in April and the low mark occurring in October. This creates a sensitivity zone for the presence of archaeological remains between the level of the average water table (95 feet) and the lake bottom beneath the fill. The constant saturation of this zone would limit the rate of decay suffered by buried cultural remains (especially wood) and would be the area most likely to yield the best preserved historic artifacts. It is highly unlikely that cultural deposits would be found below the lake bed.

The upper strata of lacustrine soils range in color from gray to gray-brown to yellow brown and are generally fine silty sand or fine sand. The borings register the depth of the lake floor at the base of the fill ranging from 85.6 feet above sea level in the old boat slip (B109) to approximately 97.9 feet above sea level at the inside of the "L" formed by the wings of the control building (H), as the natural, pre-fill ground level slopes gently to the west, showing that the eastern portion of the site was a floodzone and the boat slip was possibly dredged to a depth about ten feet below average lake level.

The site is covered by an average of 10 feet of fill, and the surface has an average elevation of approximately 104 feet above sea level or nine feet above average lake level. Photos from the 1932 sewer construction illustrate the amounts of debris accumulated on the site and buried in the soil (Fig. 4, see above). Although no significant prehistoric archaeological deposits were noted in the boring logs, evidence of the site's historic uses were recorded. The dominant fill materials included ash, brick fragments and slag, in addition to crushed stone, wood and glass fragments, concrete, tar, and asphalt. The

⁷⁸"Laboratory Test Results," (Bedford, New Hampshire: Haley and Aldrich, Inc., 1989).

⁷⁹Harold Meeks, Vermont: Land and Resources, (Stowe, Vermont: The New England Press, 1986), 195-198.

prevalence of ash and broken bricks supports the description of the fill in the 1953 annual report.⁸⁰ An earlier annual report also mentions proposals to fill the basin area with "ash and other suitable materials."⁸¹ While the various fill materials are found throughout the site, a few patterns are apparent.

Borings SB1 and SB2 contained layers of wood at the base of the fill of up to one foot in thickness. Nearby tests C, D, and E yielded quantities of crushed stone suggesting that the wood in SB1 and SB2 may be the remnants of sea wall cribbing or possibly the remains of a scuttled boat hull.

The cores taken near the site of the asphalt plant, which stood between 1924 and 1948, contained evidence of the plant's operations. Borings B4 and B105 listed tar and tests B108 and B109 contained asphalt and "blackened wood," evidence of the fire that destroyed the plant.

Brick was found on the east side of the site closest to the original shoreline in tests B101, B102, B103, B104, B106, B107, B108, and B109. It is interesting to note that only the most recent borings yielded brick fragments. It is possible that earlier logs did not record the presence of brick in the tests.

"Porcelain" fragments were found in one soil core, B101, from the eastern perimeter of the site nearest the original shoreline. Since fill was brought in to this site from unknown locations, no significance can be attributed to the presence of ceramic fragments in the fill.

Because of the distinct episodes of different uses of the site, it is possible that the types of material contained in the fill can be used to provide relative dates for the stratigraphy of the site (Fig. 19). For instance, the stone crusher was located at the site from 1894 - 1904. The high presence of crushed stone debris could be associated with this period. Similarly, the asphalt plant, in operation on the site between 1924 - 1948 used large quantities of stone and gravel in its operations (Fig. 20). Evidence of the plant's fire (charred wood, asphalt and tar byproducts) might also be particularly apparent and helpful in dating the stratigraphy of the site. Variations in the stratigraphy might also be apparent moving from east to west representing the various breakwaters and bulkheads that buffeted the filled land as it was built out into the lake. Traces of wooden cribbing and stone banks may be buried in the fill as evidenced by the wood and crushed stone included in several

⁸⁰City of Burlington (VT), Annual Report, 1953, 153.

⁸¹City of Burlington (VT), Annual Report, 1914, 101.

borings. Any of these remains would, most likely, be located within the sensitivity zone identified above.



Fig. 19 In this 1932 photo, the sidewalls of the trench for the main trunkline sewer reveal the layering of fill deposits. This is especially noticeable along the left wall next to the man looking at the camera. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1932.)



Fig. 20 This 1937 photo shows the types of possible evidence that may be found on the site remaining from the operation of the asphalt plant. The mounds on the left appear to be sand, and the pile on the right appears to be crushed stone. (Source: MacAllister Photo Collection, Wilbur Special Collections, Bailey-Howe Library, Burlington, Vermont, 1937.)

CONCLUSIONS

Based on the proposed construction plans and the research conducted for this historic site review, there is a potential for significant archaeological features, as described above, to be found at the Burlington Wastewater Treatment Plant site. Of particular importance are the hulls of vessels and buried bulkheads. The possibility of finding buried features is greatest in the sensitivity zone between the mean lake level (95 feet above sea level) and the natural lake bottom. Because this zone is water saturated year round, cultural features, such as wooden timbers and planks, retaining the greatest integrity would be found buried between these depths.

Throughout the site in the zone of sensitivity there is the possibility of finding evidence of filling and wharfing activities and of sunken boats. Filling and wharfing augmented the shoreline in stages over time. Evidence of the progression of the cribbing and filling should be present within the sensitivity zone. Boats may have been sunk at various times during this process, as well. As a result, across the site there is the potential to uncover evidence of sunken hulls.

According to construction plans submitted, during the proposed upgrade of the wastewater treatment facility, various areas of the site will be affected by ground disturbing activities (Map 2). Excavation will occur in the eastern and northern sections of the site plus along the waterfront. Minor excavations are planned in the south when the underground gas tanks next to the garage are to be removed. The new administration building will be constructed in the vicinity of the borings that yielded wood. However, this ground was previously disturbed by the construction of the old sewer outfalls. Locations of planned construction elsewhere around the site may also have been disrupted by previous treatment plant construction activities.

For example, the western flocculating clarifier will be located over the old boat slip. However, the sludge storage tanks are presently situated at this location, and their construction may have disturbed any buried cultural evidence.

Similarly, the site proposed for the new grit building does overlap with the northern wing of the asphalt plant and has the potential to yield evidence of the asphalt plant and its operations. However, the site has been paved over since the plant burned and evidence of the structure may have been removed.

The foundation of the plaster mill appears to be distant enough from the new construction to protect any remains from disturbance. However, any evidence that does exist might be encountered in the extreme northeast corner of the property to the north of the proposed grit building.

Evidence of the stone crushers and various other equipment storage sheds could be encountered during construction of the proposed final clarifiers.

Although it is unlikely that there is extant evidence of prehistoric occupation and early historic settlement, such finds would most likely appear along the eastern edge of the property in the vicinity of the proposed screening building, vortex separator, and eastern flocculating clarifier.

RECOMMENDATIONS

Based on the information gleaned during the research for this project, two main recommendations can be made to ensure the recognition of buried cultural resources during construction of the waste water treatment facility upgrade.

1) Because at least one boat is believed to be sunk adjacent to the shore of the site, an underwater archaeological survey should be performed to determine the presence and potential significance of any sunken vessels that might be affected by proposed construction activities. This survey should take place prior to any construction activities which will disturb the existing shoreline and should be performed by an underwater archaeologist considered qualified by the Division for Historic Preservation. Of particular importance when conducting an underwater survey is the report of the yacht, "Hildegarde," sunk along the water line just north of the sewer outfalls.

2) Any excavations that extend into the sensitivity zone of the site (identified as the area between the historic lake bed and the average water table where wood could be preserved - approximately 95 - 85.6 feet above sea level) should be carefully monitored for evidence of past activities on the site. If intact portions of cribbing or identifiable portions of hulks are discovered construction activities should be stopped in that area of the site until the feature can be fully documented in situ by someone qualified according to the standards of the Vermont Division for Historic Preservation. While several of the most sensitive areas have been identified in this study, additional boat hulls may have been buried in the fill without any record.

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APPENDIX A

TIMELINES

**Burlington Wastewater Treatment Plant
Landfill Timeline**

- 1810 - Low water line/ edge of water lots was appx. "10 rods west of the west line of Water Street"
- 1833 - South Wharf built; natural shoreline along Lots 1-10 (1833 map)
- 1853 - Railroad runs along shoreline, shoreline has been straightened/filled approximatley 110 feet (1853 map)
- 1860's - Main track 50-60 feet east of shoreline; filled with large pieces of gravel and marble
- 1866 - Area west of depot has been filled (1866 map)
- 1869 - Barge canal shown with 2 piers built (inner/northern pier is short); shoreline has been filled more
- 1873 - both piers extend into bay; shoreline appears filled west of track north of barge basin
- 1877 - Filled area is shown as cribbing
- 1881 - Area south of Beckwith's pier has been filled to create a slip; breakwater extends south from south side of slip
- 1886 - Area inside breakwater is stippled i.e. beach or marsh; dimple in shoreline south of breakwater is ravine/sewer outlet
- 1890 - Breakwater has been extended south past shorline of marsh
- 1899 - Breakwater extends southwest ot meet inner/northern breakwater to from enclosed pool; more land appears filled in within enclosed area
- 1912 - Lakefront has been filled 100-600 feet west of original low water by railroad and industry
- 1914 - City proposes to fill basin with ashes, etc. to protect sewer outlet
- 1928 - enclosed basin is completelly filled in
- 1940's - Hulk of the Hildegard is sunk along bulkhead

Burlington Wastewater Treatment Plant Development Timeline

- 1794 - Land part of 7th Division of land in Burlington City Charter
- 1833 - South Wharf constructed
- 1847 - Rutland Railroad company acquires land from Follett & Bradley
- 1849 - Quit Claim to keep Maple Street slip open in perpetuity
- 1868 - Rutland RR leases land to George W. Beckwith
- 1869 - Coal wharf has been constructed
- 1871 - Plaster and phosphate mill constructed
- 1877 - Plaster mill is shown with 1 wing along edge of cribbing in water
- 1886 - Railroad spur runs along south side of slip
- 1894 - Palster mill is no longer in operation (off map in 1912)
- 1894 - 1904 - Street Department receives stone by boat at dock
- 1895 - 1904 Stone crusher at city dock
- 1900 - Waterfront boom was over; area used as "storage depot for coal and fuel oil"
- 1907 - Street Department accounts include "rent of wharf"
- 1918 - Railroad round house built
- 1924 - Asphalt plant built on Street Department dock
- 1948 - Asphalt plant lost to fire
- 1951 - Land purchased by City from Rutland RR
- 1957 - Elias Lyman Coal Company purchases Beckwith wharf from Rutland Railroad
- 1972 - Robinson Fuel Oil Co. purchases property from Lyman Coal Co.

Burlington Wastewater Treatment Plant Sewer History

- 1868 - No modern sewer; sewage empties directly into lake at South Cove
- 1869 - Begin construction of new sewer; main line in ravine "east of market" from lake east to Champlain Street to connect with old sewer
- 1890 - Sewer shown on map
- 1894 - Sewer trunk extended across "basin to the face of the crib" built by the Rutland RR; to last until basin is filled in for a brick or stone sewer
 - . 3" Pine planks on piles
 - . 565 feet long
- 1895 - Sewer extended into "deep water"
- 1904 - Sewer outlet falling into disrepair
- 1910 - First survey for south end sewer extending from the ravine to Shelburne Street to the lake
- 1911 - Trunk of sewer is 250 feet offshore opposite the Lumiere North American property south of the Englesby Ravine outlet; city discusses purchasing "Stearns Property" for the construction of sewage treatment plant (turned down by voters)
- 1914 - City wants to acquire land next to existing sewer outlet and west of Rutland RR tracks for sewage plant; area will be filled to protect outlet
- 1923 - Sewer built on Maple Street from Battery Street to the lake (367 feet); stone header at outlet
- 1928 - Sewer line runs to front of cribbing
- 1932 - Sewer from Maple Street to lake completed
- 1948 - Ground allocated for construction of Sewage Treatment Plant
- 1953 - Sewage Treatment Plant built
- 1972 - Sewage Treatment Plant upgraded

APPENDIX B
HISTORIC MAPS

WILLIAMSBURY
 BATTERY
 HAKKI

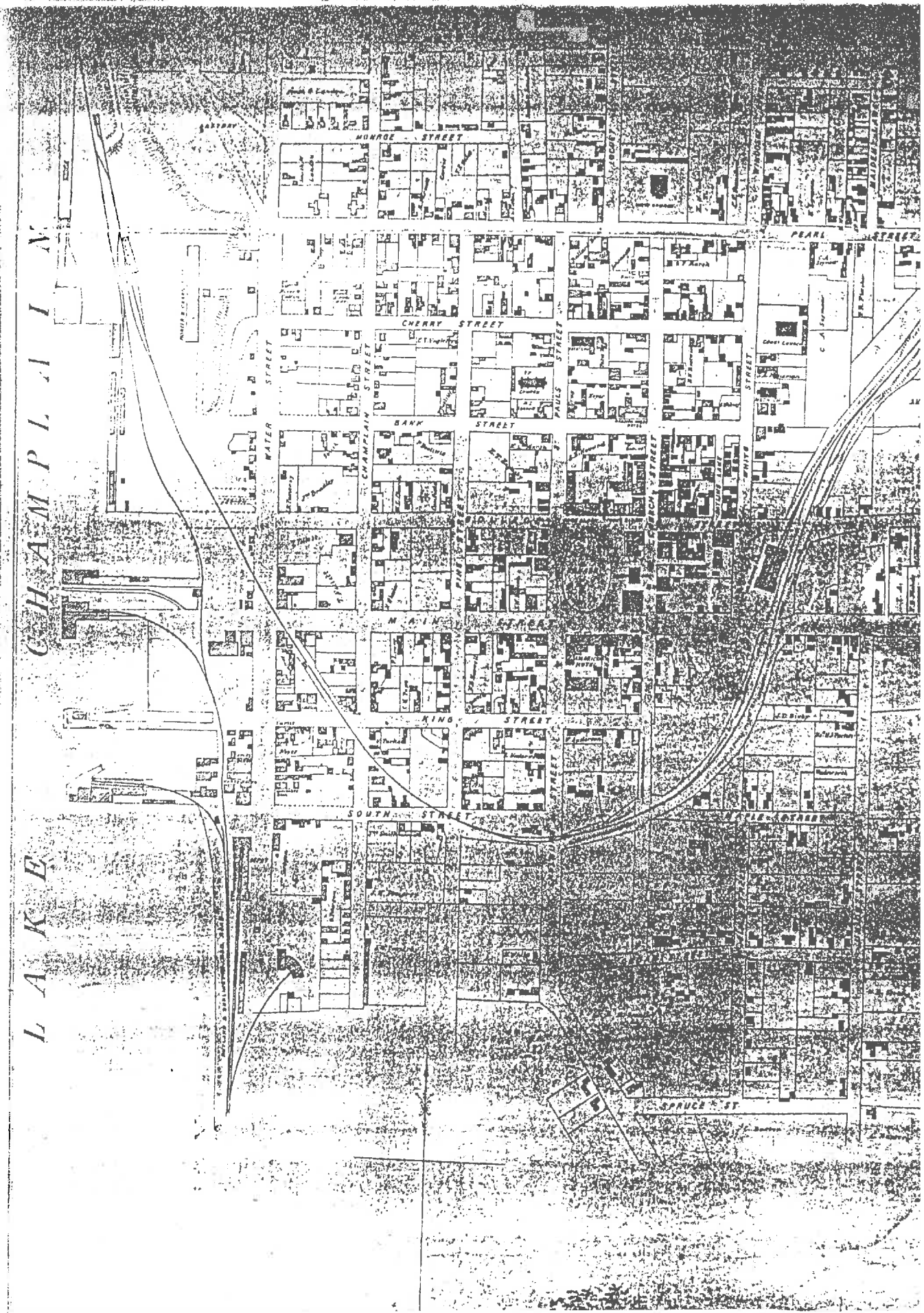


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- Unitarian Church A
- Presbyterian B
- Methodist C
- Episcopal D
- Burlington Bank E
- Us. Branch F
- Court House G
- Academy H
- University of Vermont K
- Medical College L

Drawn by a scale of 6 chains, or 396 feet, to an inch.

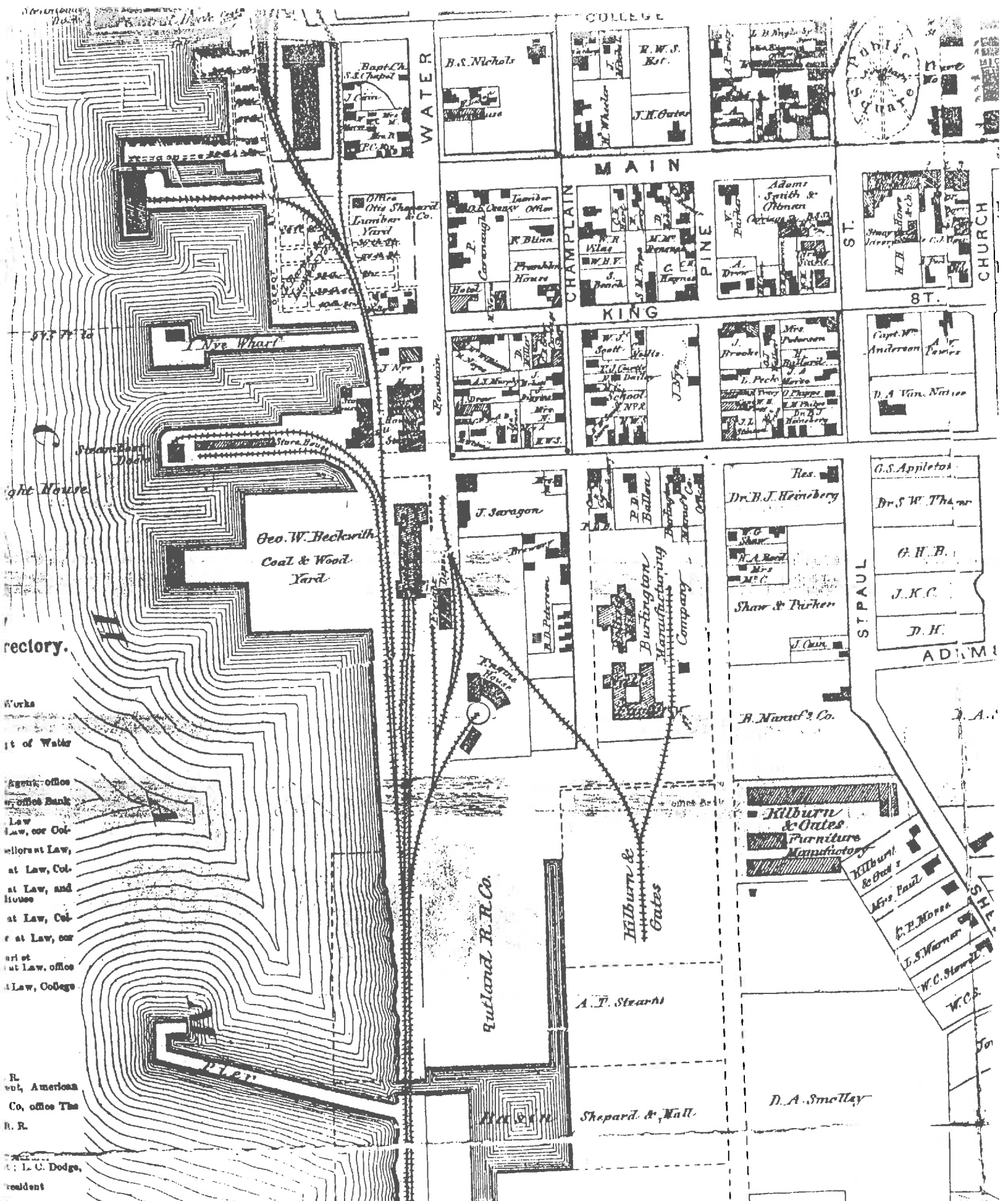
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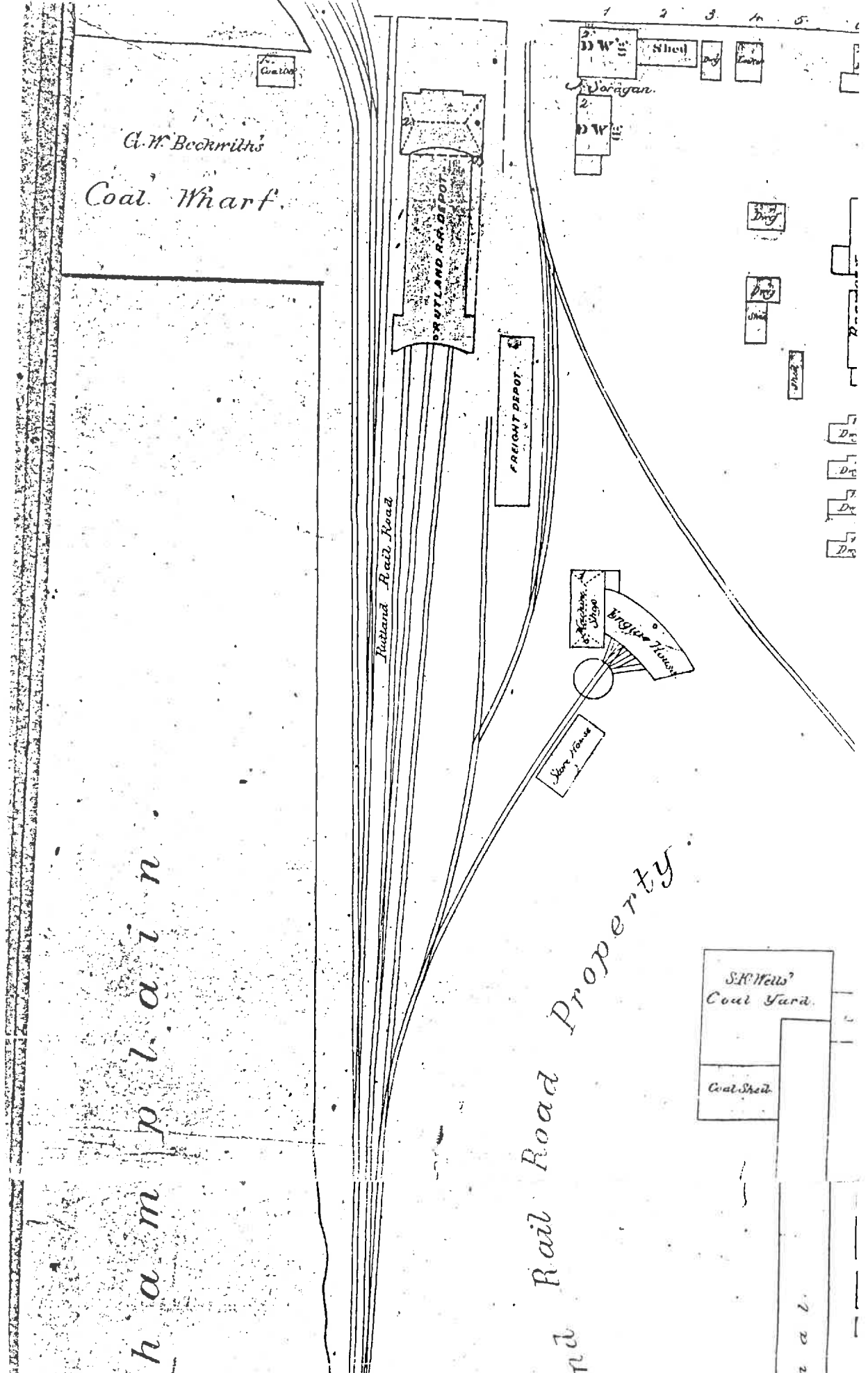
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Cl. W. Beckwith's
Coal Wharf

STUTLAND R.R. DEPOT

FREIGHT DEPOT

Stutland Rail Road

Wagon

Engine House

Store House

S.K. News?
Coal Yard
Coal Shed

Hamplatin

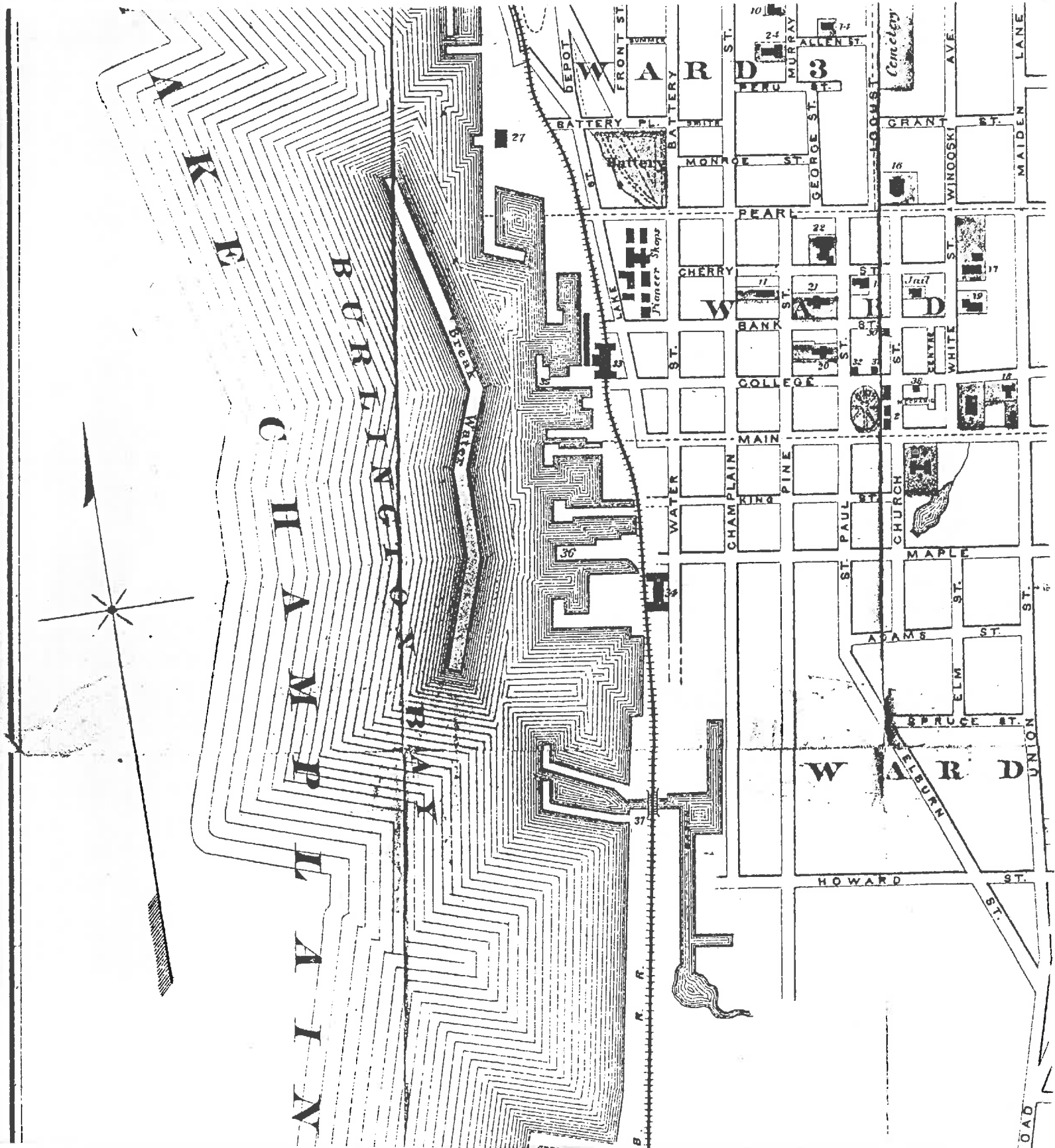
Rail Road Property

Sanborn Fire Insurance Maps. Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1869

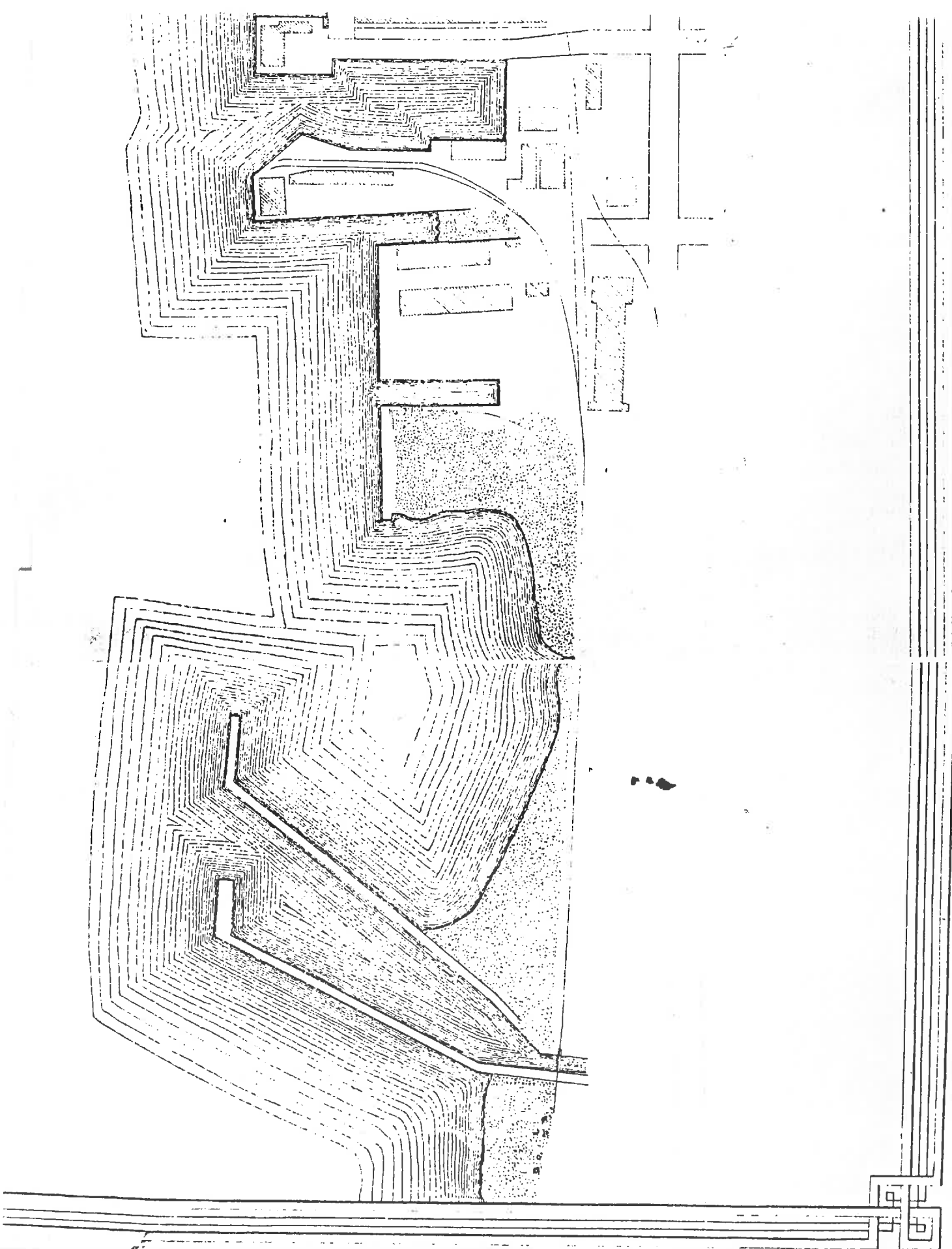
1872
Coast Guard
Survey



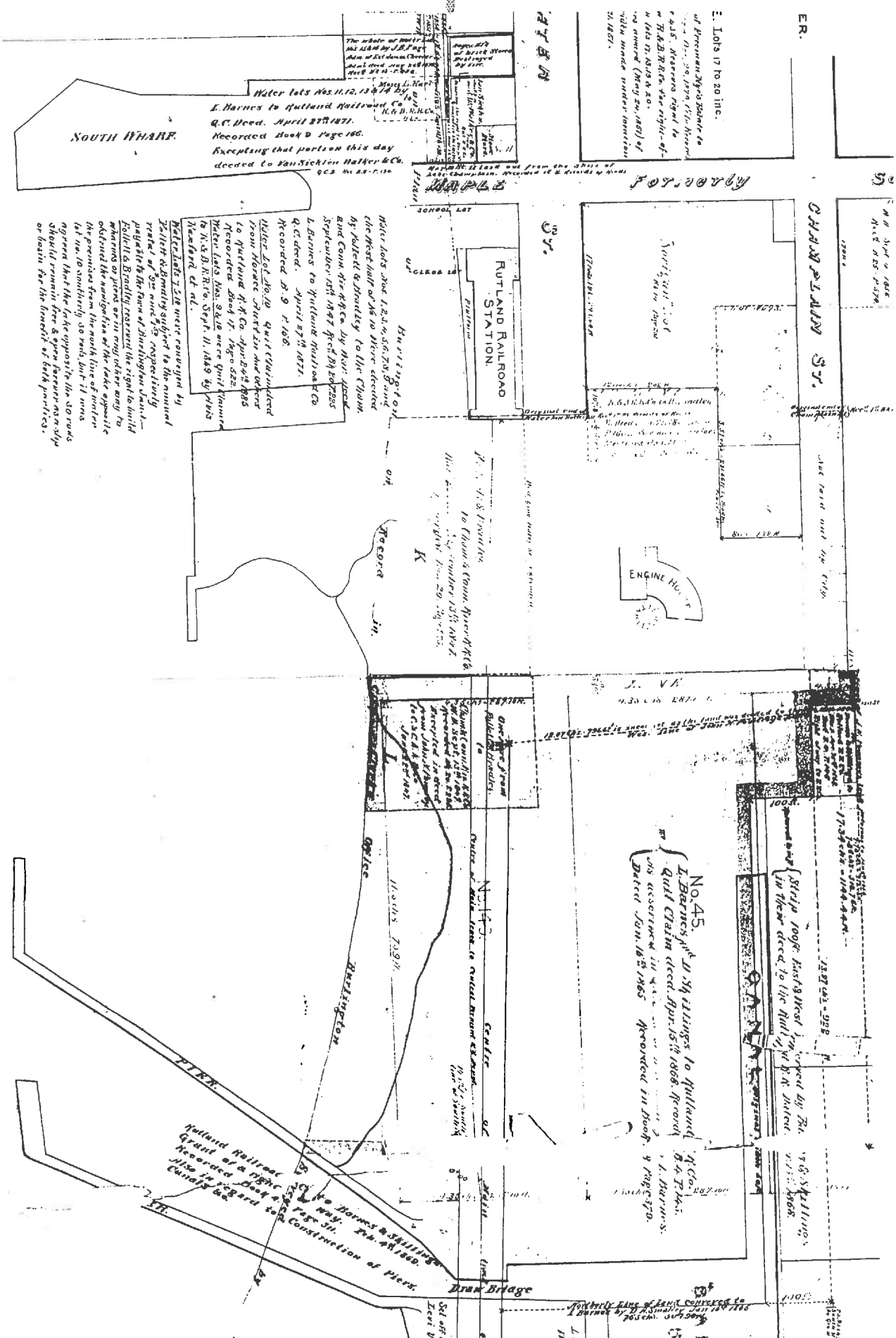
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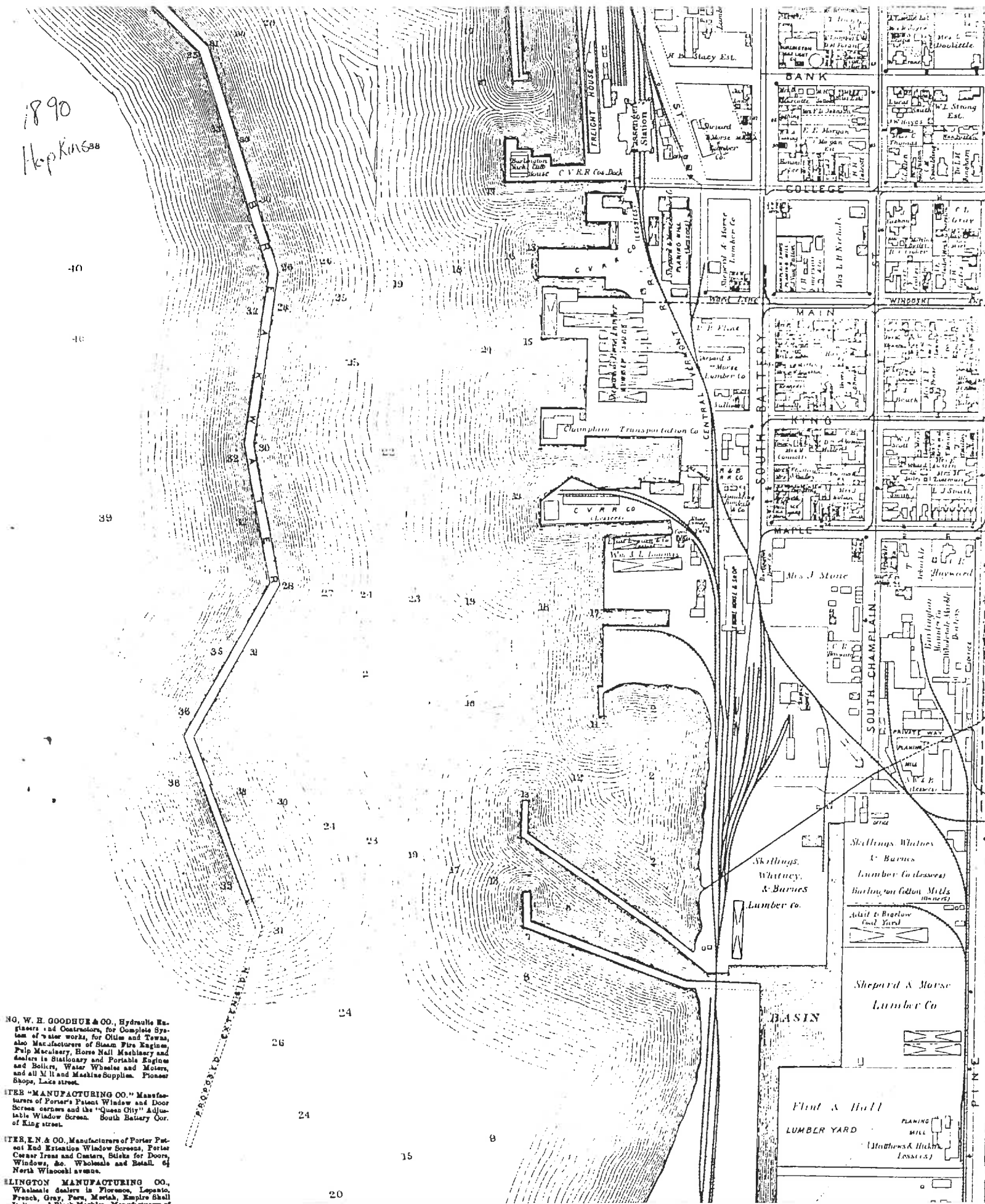


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1890
Hopkins



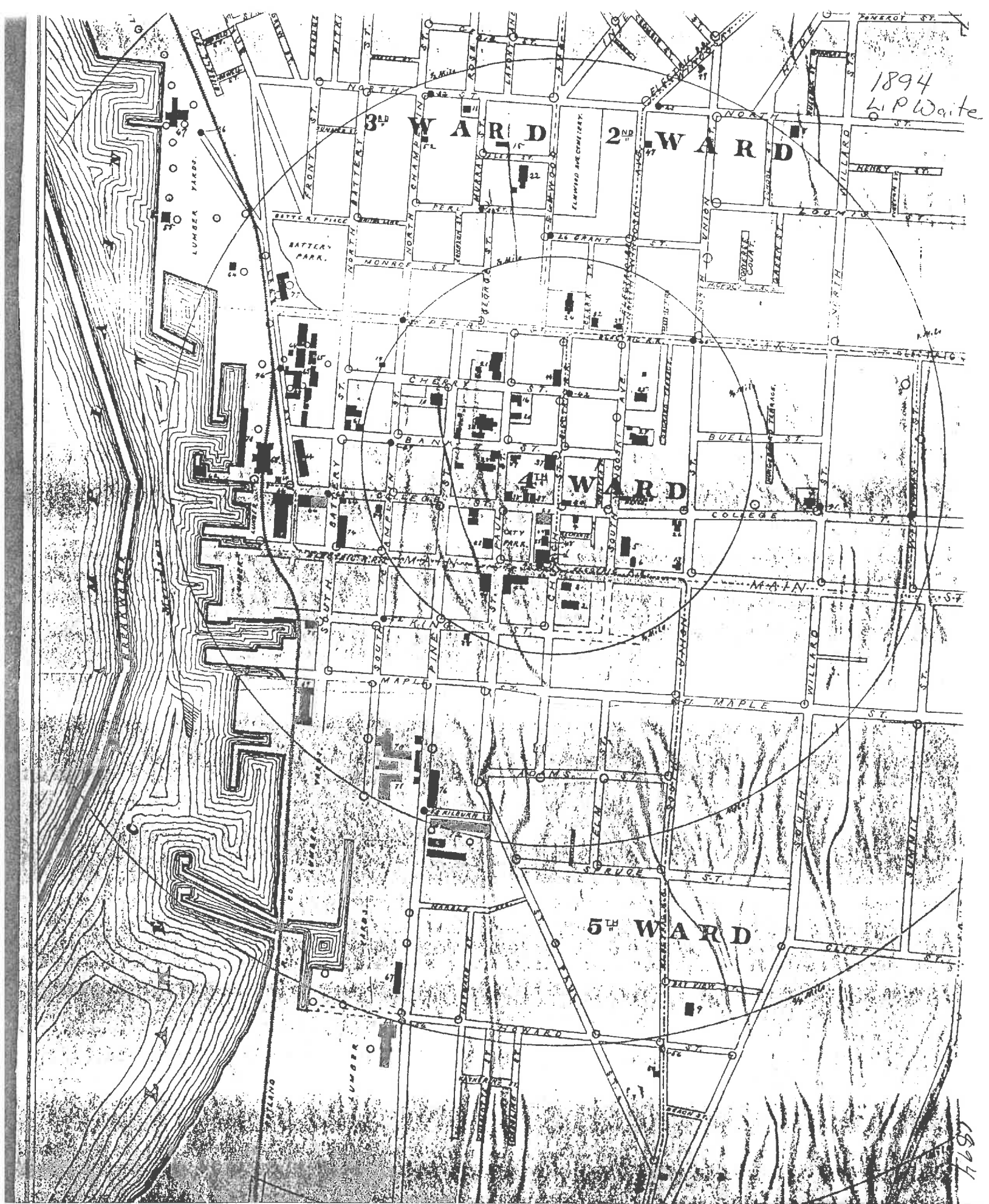
NG, W. E. GOODHUE & CO., Hydraulic Engineers and Contractors, for Complete System of water works, for Oils and Tannin, also Manufacturers of Steam Fire Engines, Pulp Machinery, Horse Mill Machinery and Dealers in Stationary and Portable Engines and Boilers, Water Wheels and Motors, and all Mill and Machine Supplies. Pioneer Shops, Lake street.

TER-MANUFACTURING CO., Manufacturers of Porter's Patent Window and Door Screens and the "Queen City" Adjustable Window Screen. South Battery Cor. of King street.

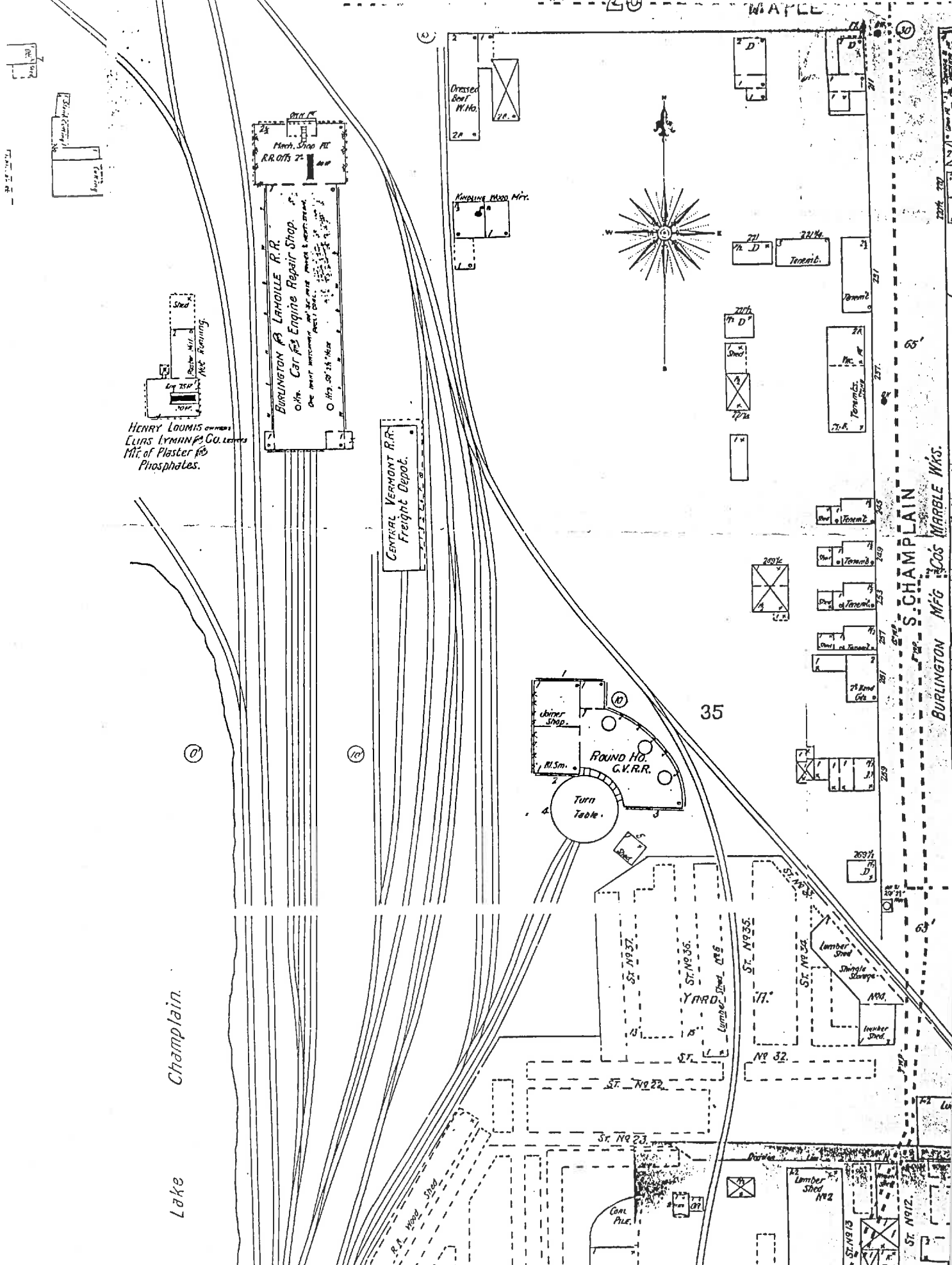
TER, E. N. & CO., Manufacturers of Porter Patent and Extension Window Screens, Porter Coaster Irons and Casters, Blanks for Doors, Windows, &c. Wholesale and Retail. 63 North Water street.

BURLINGTON MANUFACTURING CO., Wholesale dealers in Florence, Lepanto, French, Gray, Pass, Mariah, Empire Shell

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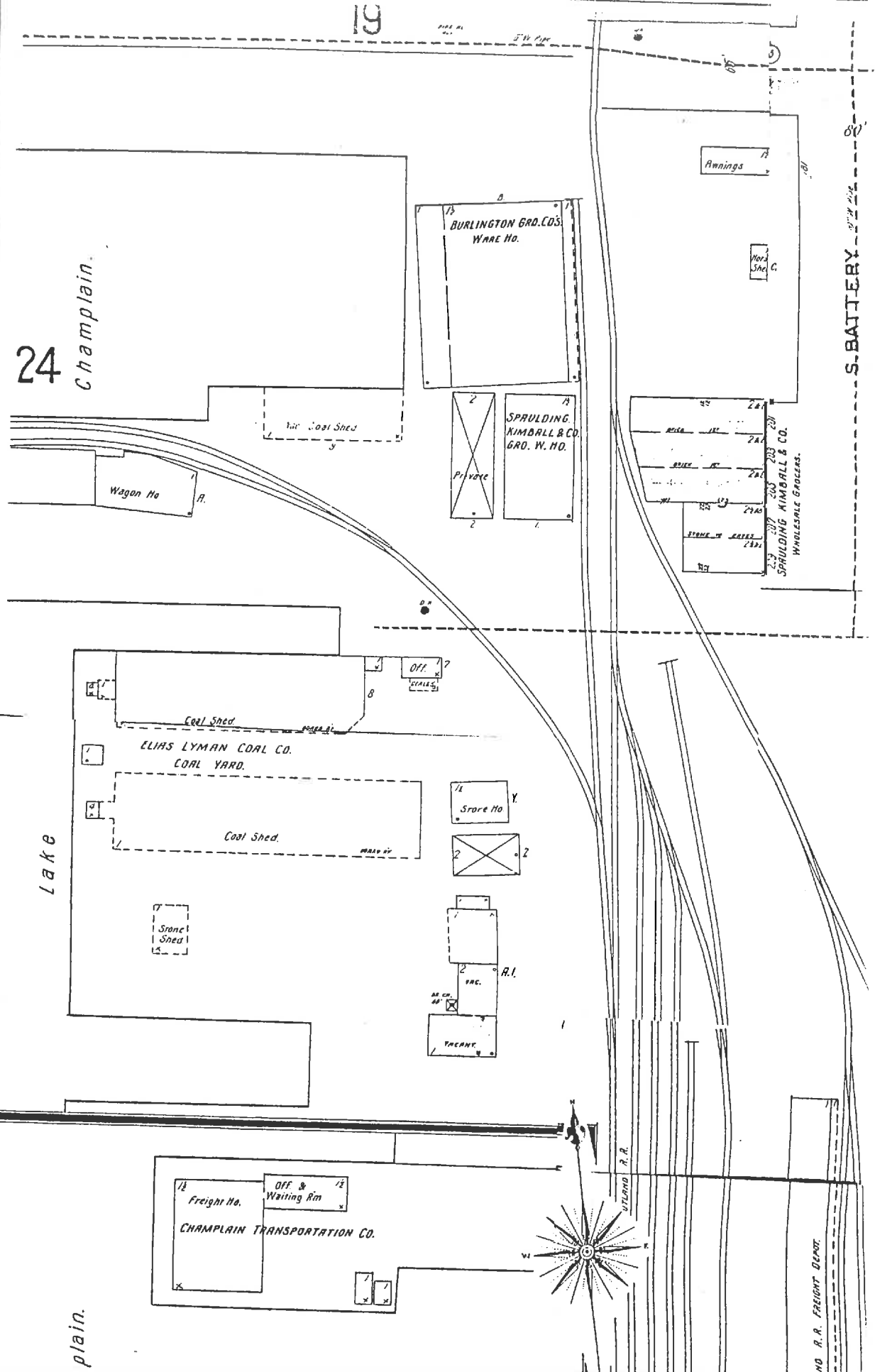
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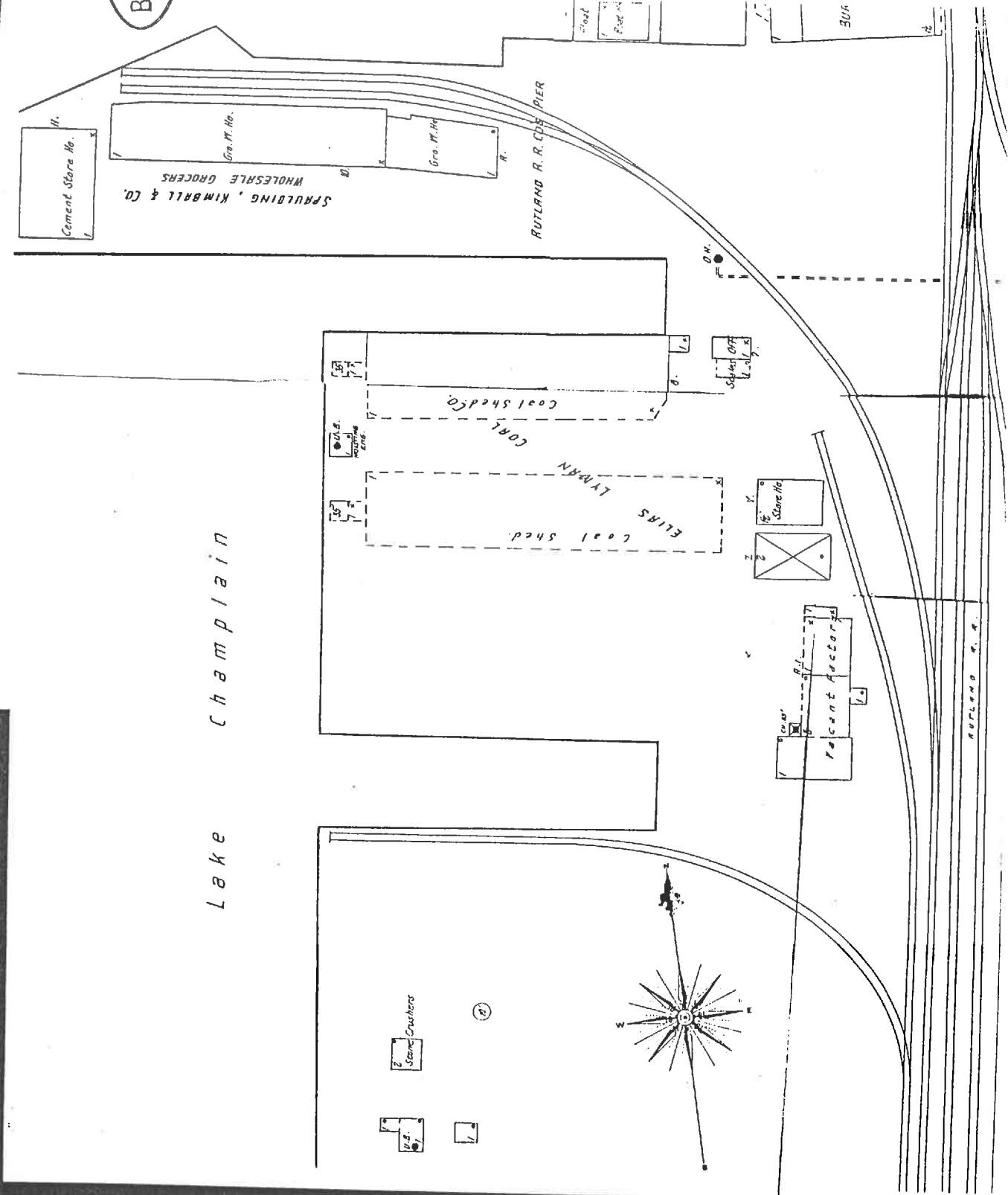


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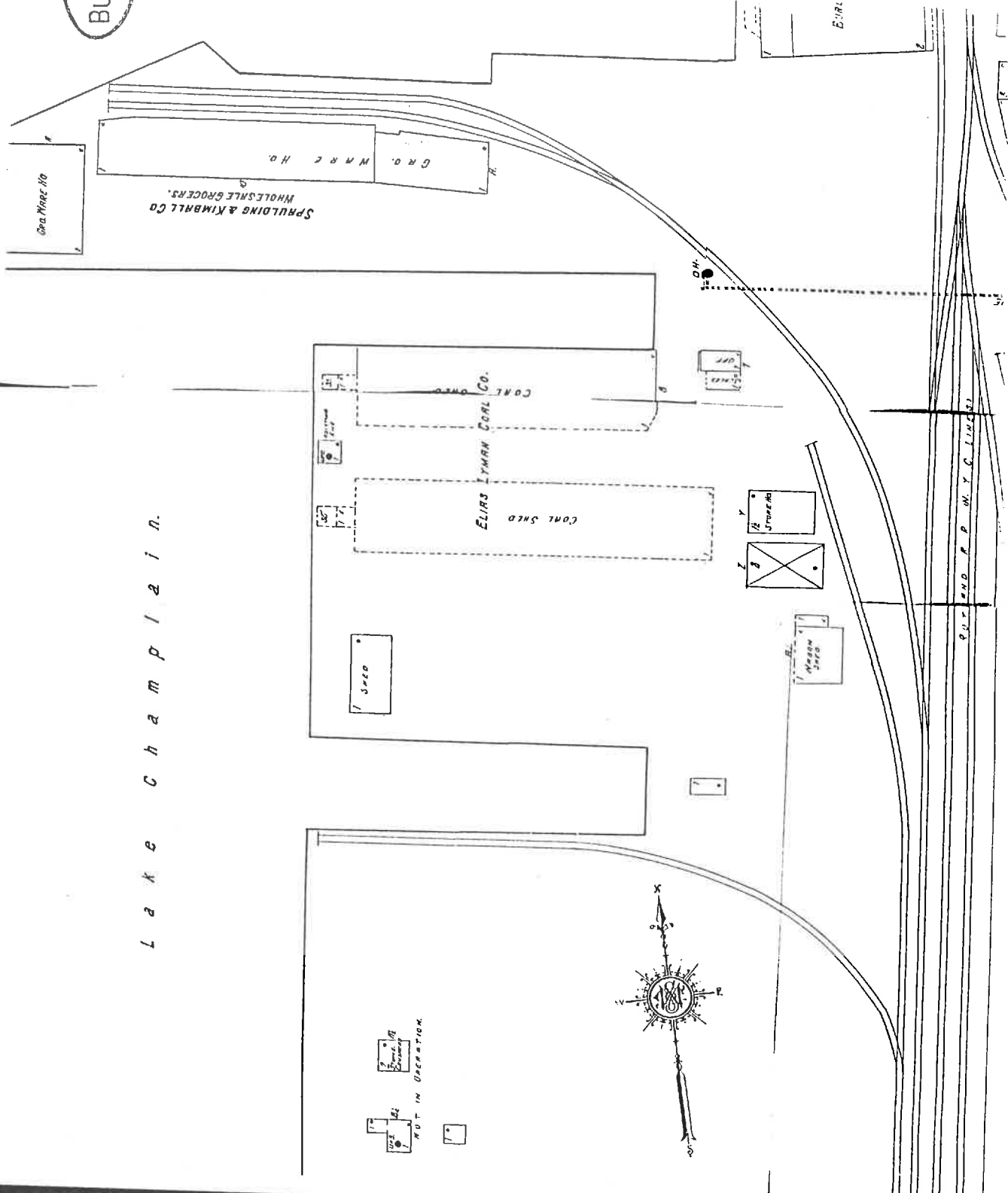
24 Champlain.

S. BATTERY

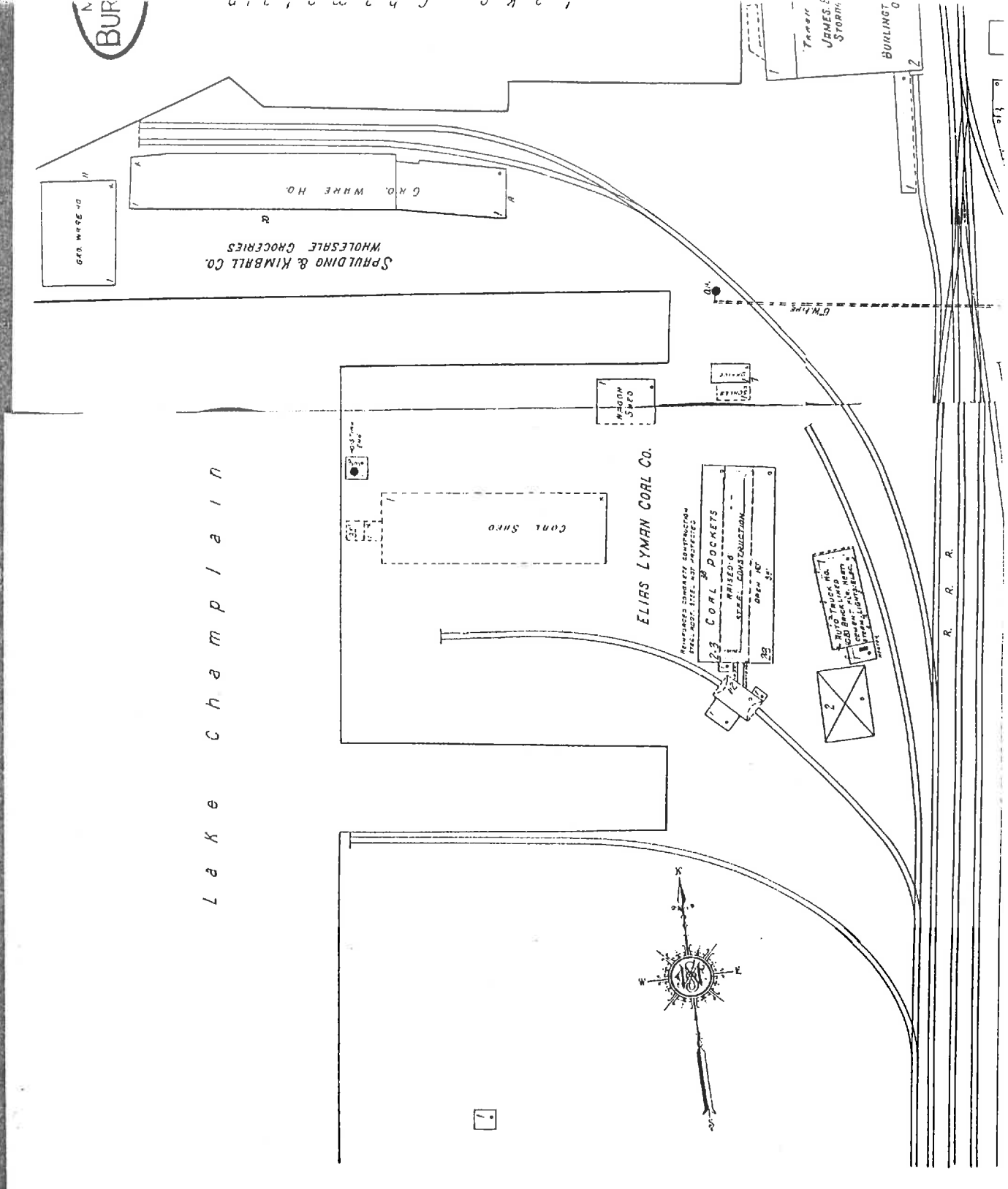




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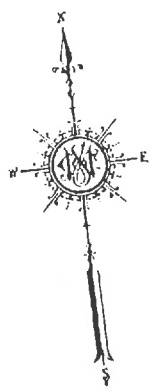


L a k e C h a m p l a i n .



Sanborn Fire Insurance Maps. Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1919

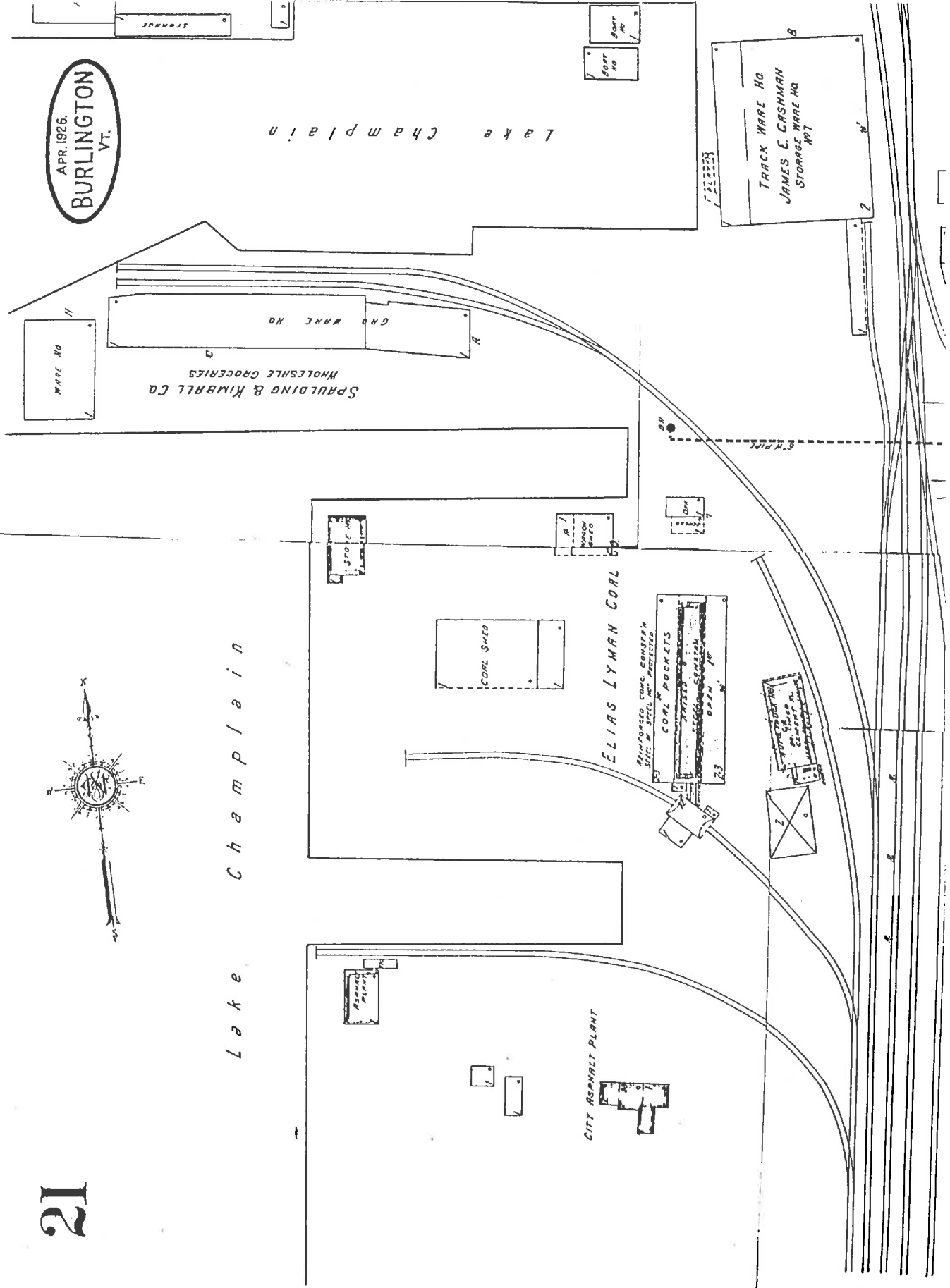
21



APR. 1926.
BURLINGTON
VT.

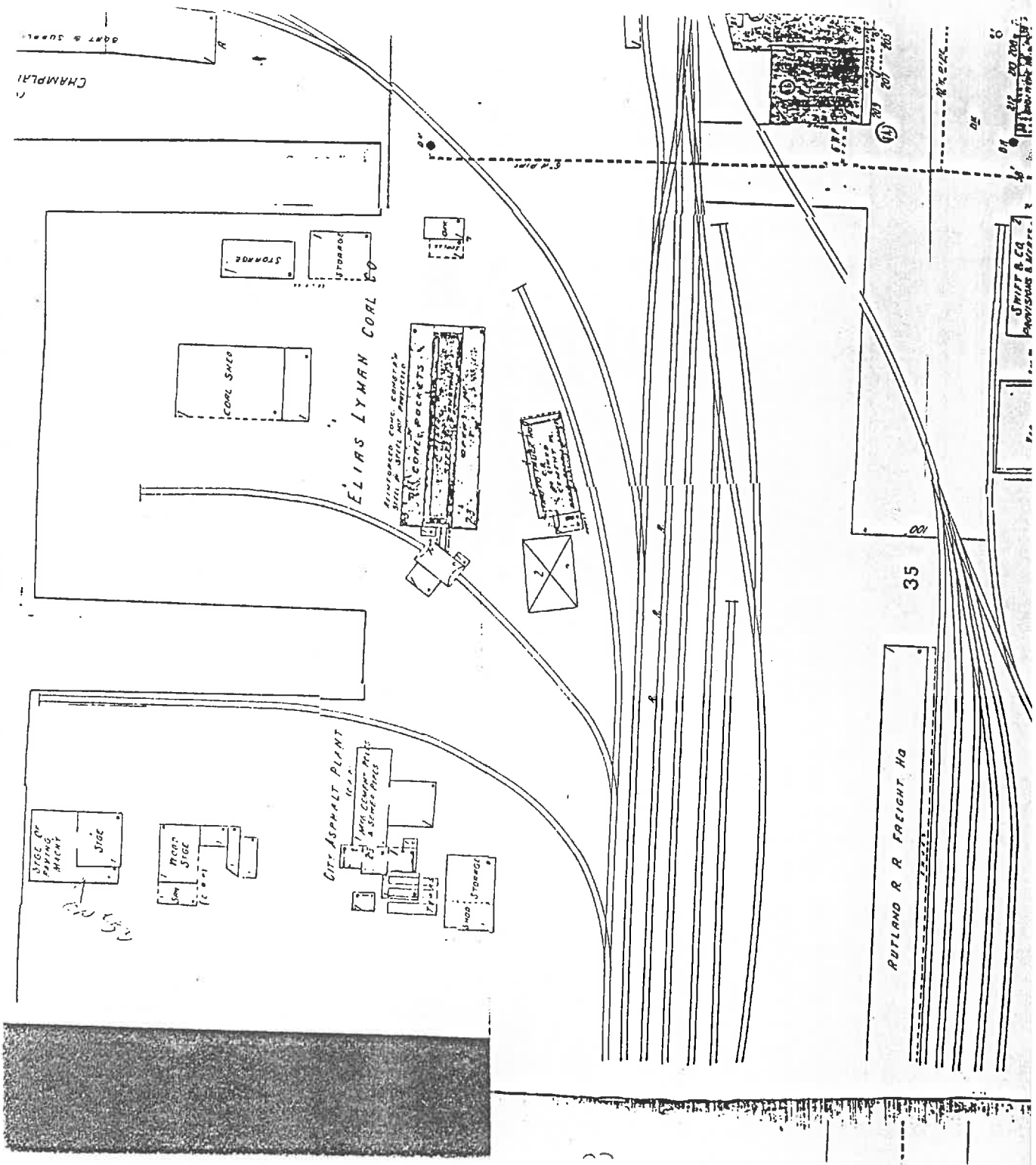
Lake Champlain

Lake Champlain





U.S. Army Corps of Engineers. Lake Champlain. 1928.



Sanborn Fire Insurance Maps. Wilbur Special Collections, Bailey-Howe Library, University of Vermont, Burlington, Vermont, 1938

APPENDIX C

SUMMARY OF BORING LOGS

SUMMARY OF BORING LOGS

TEST NO.
BASE OF FILL
MATERIALS

DEPTH AT
CULTURAL

(feet below sea level)

FRED C. KOERNER, C.E. - NOVEMBER 1969

A	appx. 88.8	Ash, Wood
B	appx. 93.0	Ash
C	appx. 90.6	Ash, Crushed stone
D	appx. 89.0	Ash, Brick, Crushed stone
E	appx. 94.45	Ash, Crushed stone
F	appx. 95.7	Ash
G	appx. 95.2	Ash
H	appx. 97.9	Ash
I	appx. 93.55	Ash
J	appx. 93.3	Ash

HALEY & ALDRICH, INC. - DECEMBER 1988

B1	appx. 94.5	n/a
B2	appx. 89.94	Wood chips
B4	appx. 93.9	Concrete, Tar

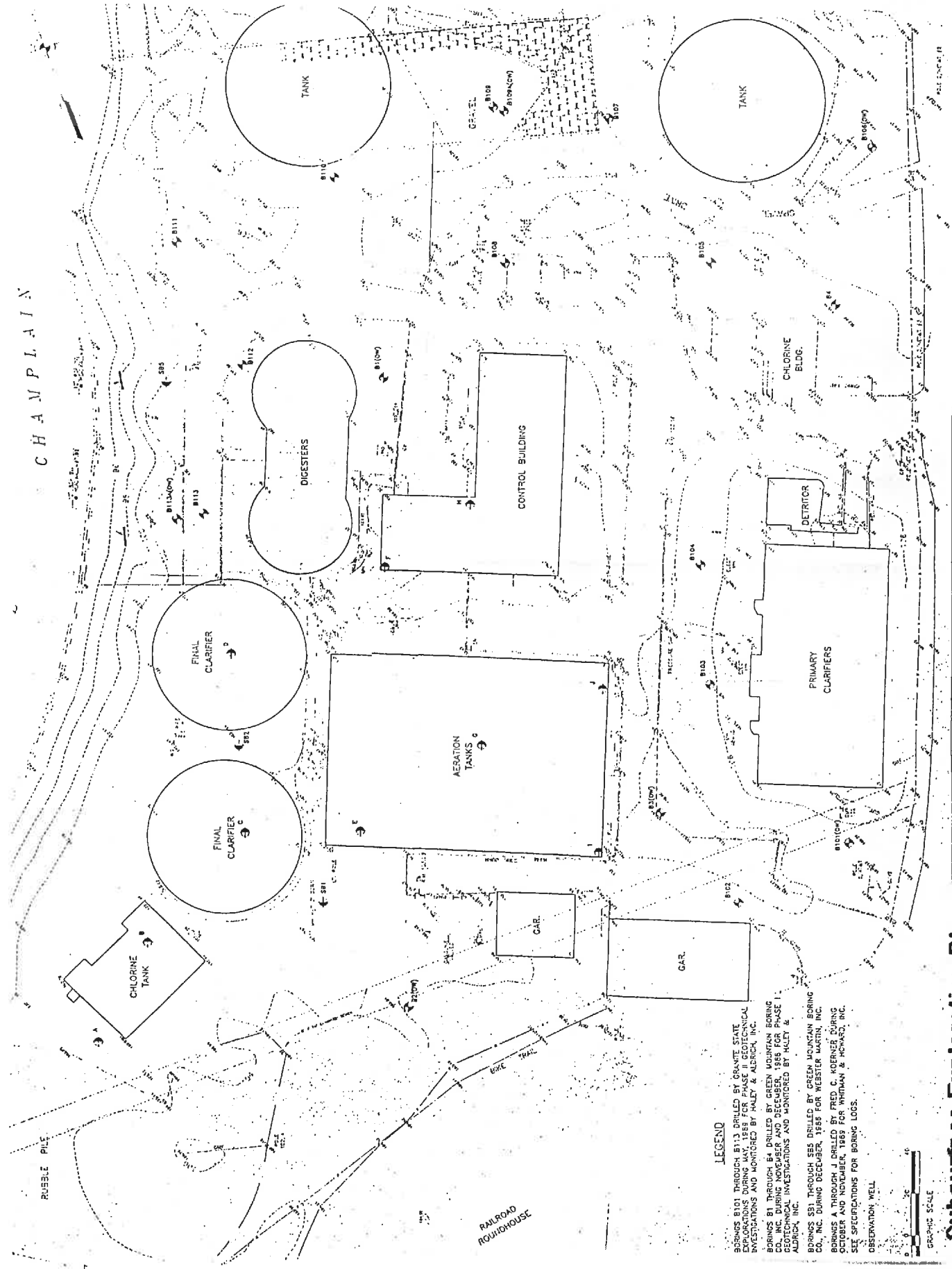
HALEY & ALDRICH, INC. - MAY 1989

B101	96.4	Brick, "Porcelain" fragments, Slag
B102	95.8	Brick, Concrete, Slag
B103	97.8	Brick, Glass, Slag
B104	97.7	Ash, Brick, Glass, Slag
B105	95.7	Tar, Slag
B106	91.8	Ash, Brick, Cinders, Glass, Slag
B107	87.0	Asphalt, Brick, Glass, Marble, Wood
B108	94.0	Asphalt, Brick
B109	85.6	Ash, Brick, Glass, Slag
B109A	86.8	n/a
B110	91.7	Slag
B111	90.0	Slag
B112	93.0	Brick, Slag
B113	95.0	n/a
B113A	86.0	n/a

GREEN MOUNTAIN BORING CO., INC. - DECEMBER 1988

SB1	appx. 92.8	Wood Particles, Wood chunks at base of fill
SB2	appx. 87.14	Brick, Sawdust, Wood, 1 ft. thick wood layer at appx. 8 ft. below surface
SB5	appx. 95.5	Bituminous mixture

CHAMPLAIN



LEGEND

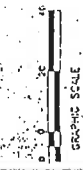
BORINGS B101 THROUGH B113 DRILLED BY GRANITE STATE EXPLORATIONS DURING MAY, 1988 FOR PHASE II GEOTECHNICAL INVESTIGATIONS AND MONITORED BY HALEY & ALDRICH, INC.

BORINGS B1 THROUGH B4 DRILLED BY GREEN MOUNTAIN BORING CO., INC. DURING NOVEMBER AND DECEMBER, 1988 FOR PHASE I GEOTECHNICAL INVESTIGATIONS AND MONITORED BY HALEY & ALDRICH, INC.

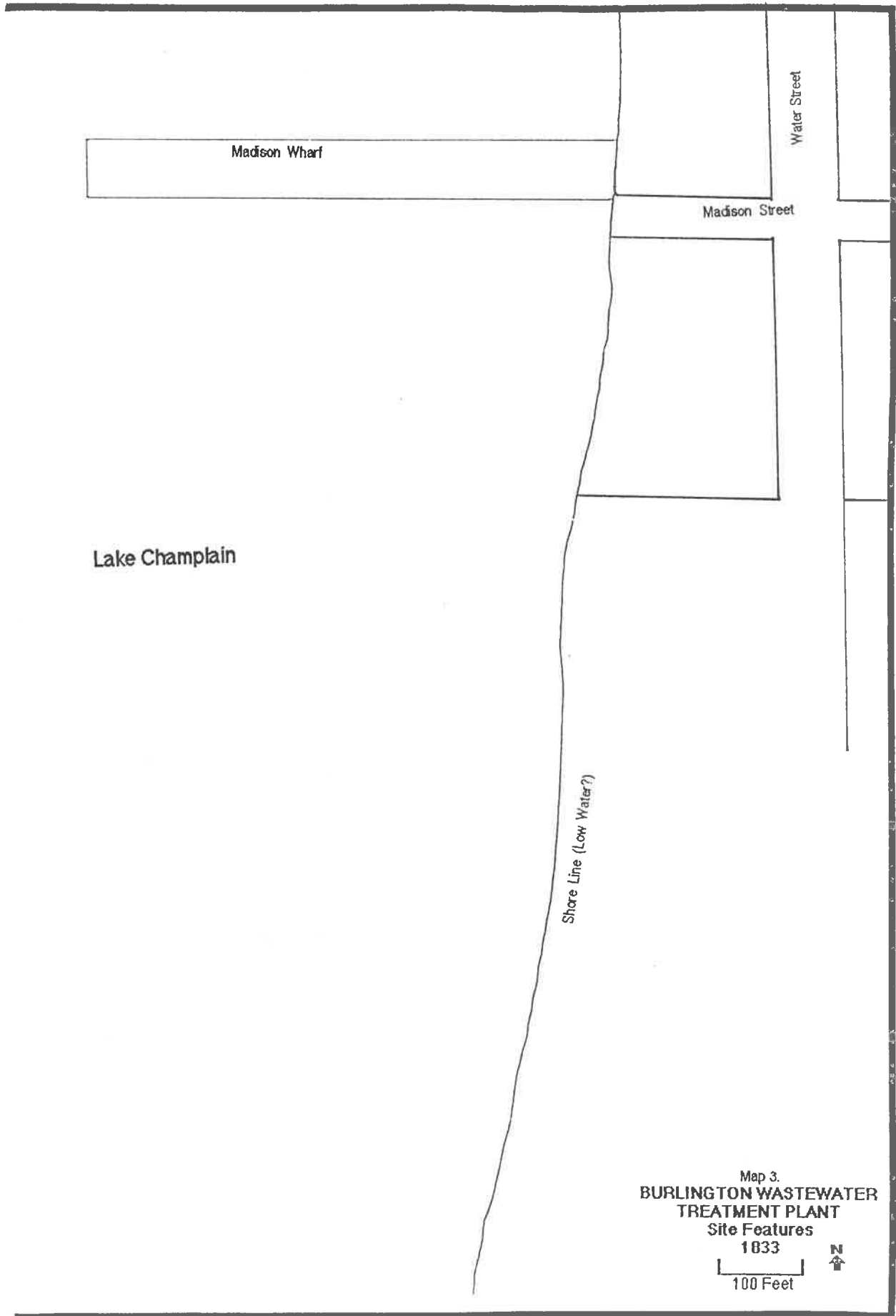
BORINGS S81 THROUGH S85 DRILLED BY GREEN MOUNTAIN BORING CO., INC. DURING DECEMBER, 1988 FOR WEBSTER MARTIN, INC.

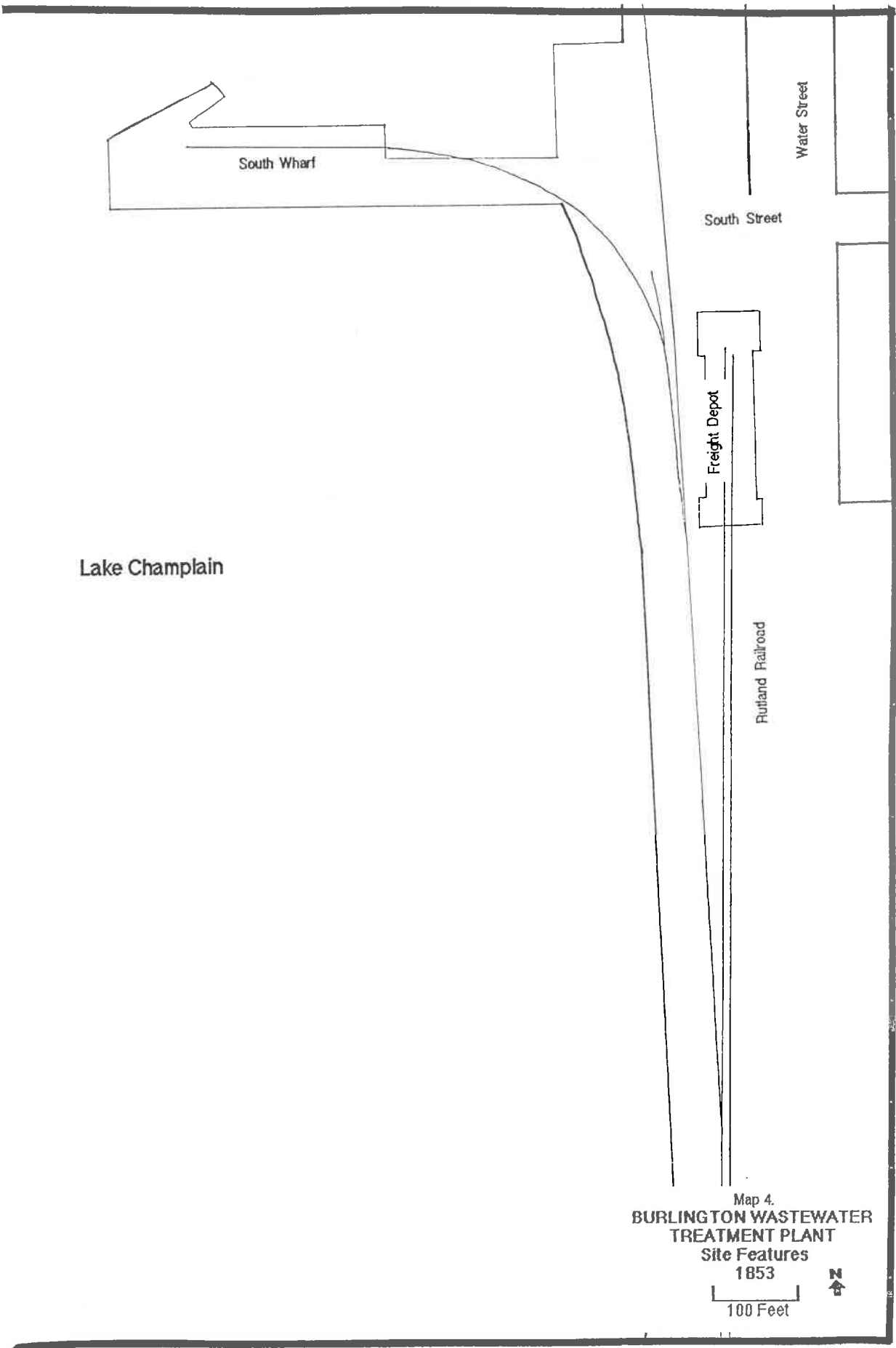
BORINGS A THROUGH J DRILLED BY FRED C. KOERNER DURING OCTOBER AND NOVEMBER, 1989 FOR WHITMAN & HOWARD, INC. SEE SPECIFICATIONS FOR BORING LOGS.

OBSERVATION WELL



**Subsurface Exploration Plan
1989**





Lake Champlain

South Wharf

South Street

Water Street

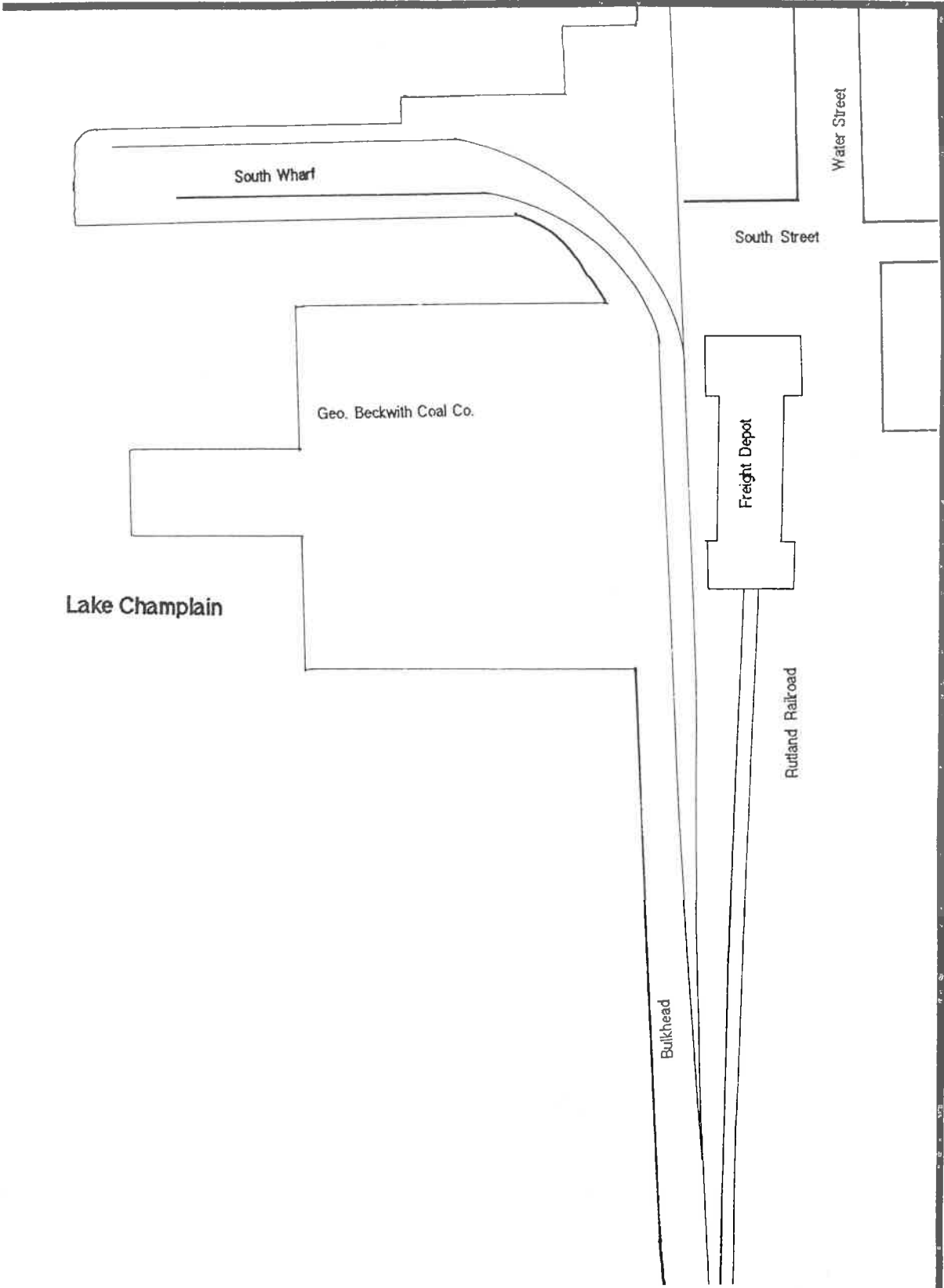
Freight Depot

Rutland Railroad

Map 4.
BURLINGTON WASTEWATER
TREATMENT PLANT
Site Features
1853

100 Feet





Lake Champlain

South Wharf

Geo. Beckwith Coal Co.

Bulkhead

Freight Depot

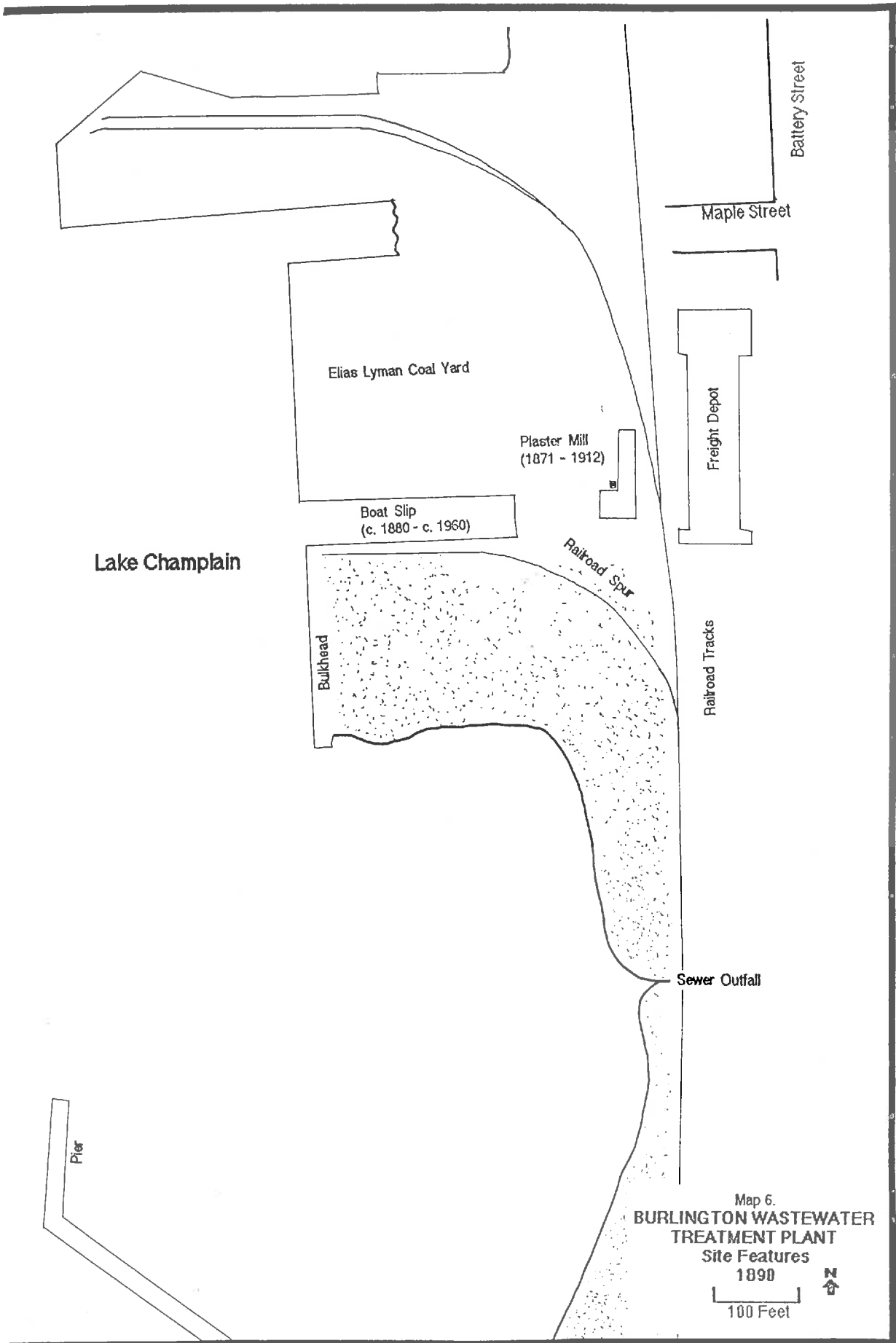
Rutland Railroad

South Street

Water Street

Map 5.
**BURLINGTON WASTEWATER
TREATMENT PLANT**
Site Features
1869
100 Feet





Lake Champlain

Elias Lyman Coal Yard

Plaster Mill
(1871 - 1912)

Boat Slip
(c. 1880 - c. 1960)

Bulkhead

Railroad Spur

Freight Depot

Railroad Tracks

Sewer Outfall

Maple Street

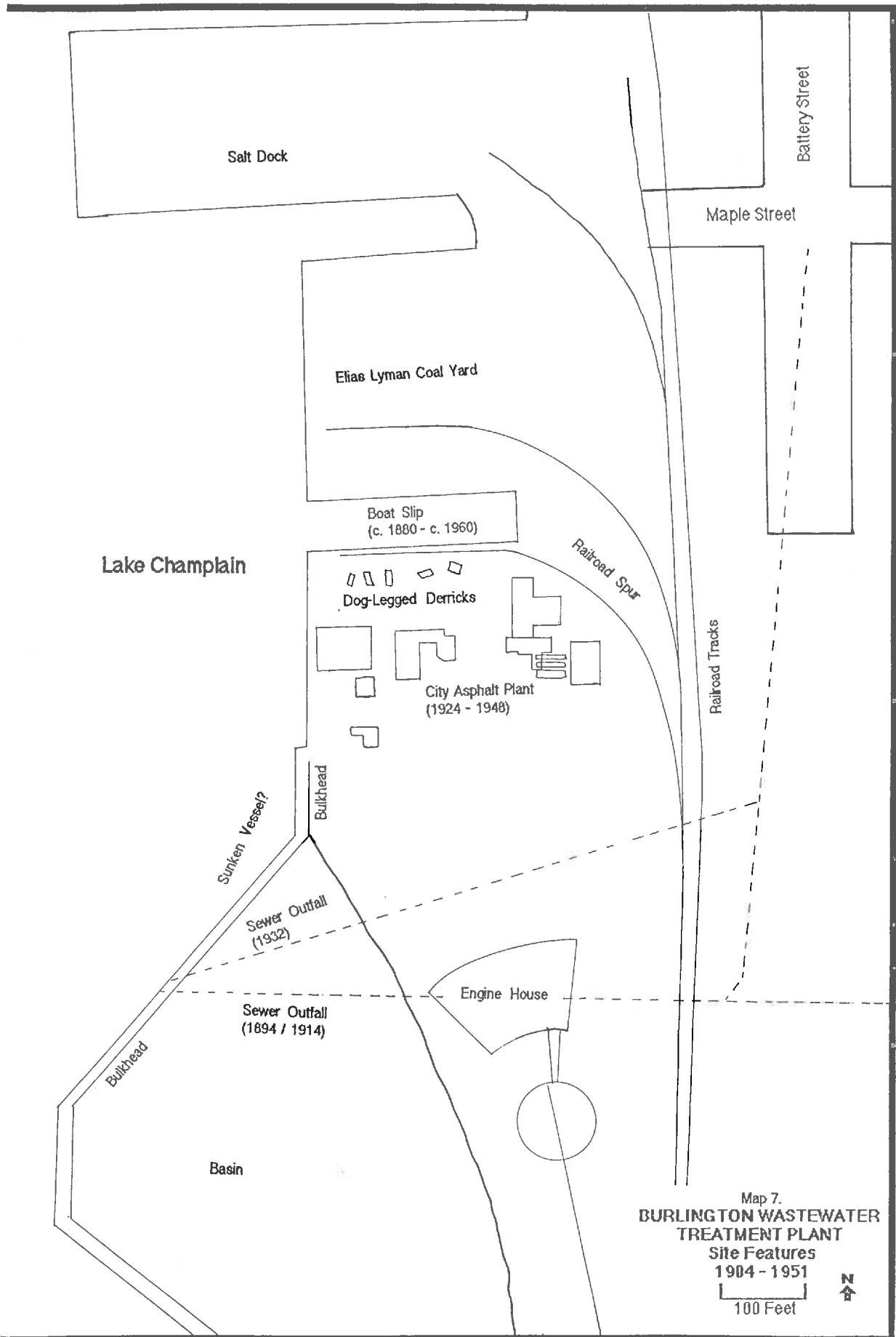
Battery Street

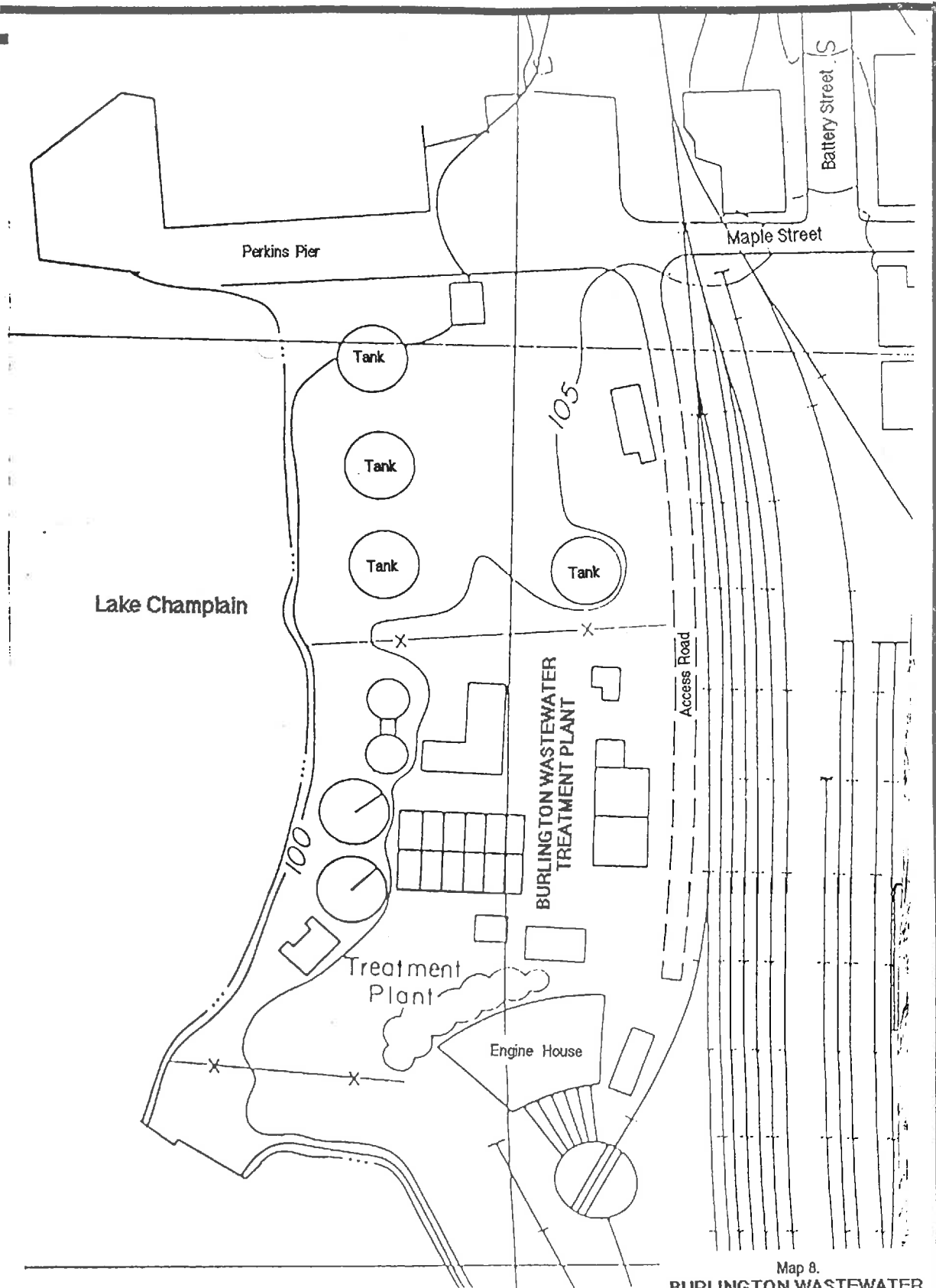
Pier

Map 6.
BURLINGTON WASTEWATER
TREATMENT PLANT
Site Features
1890

100 Feet







Map 8.
**BURLINGTON WASTEWATER
 TREATMENT PLANT**
 Site Features
 1979

100 Feet

N