historic structure report

powerhouse
volume 3

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ELLIS ISLAND
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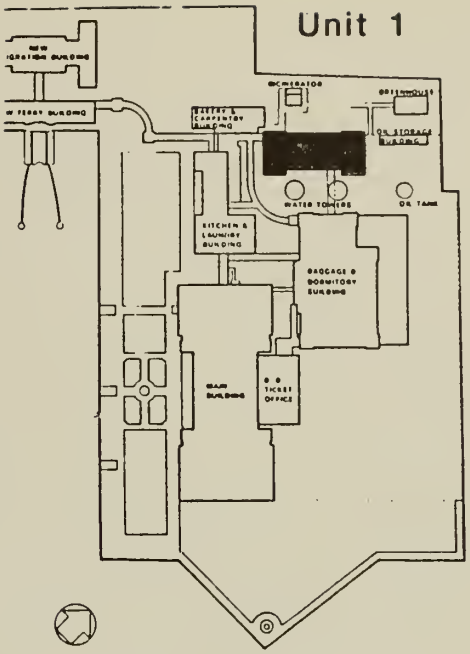
HISTORIC STRUCTURE REPORT
POWERHOUSE

Volume 3

Prepared by

Beyer Blinder Belle/
Anderson Notter Finegold

U.S. Department of the Interior / National Park Service


Unit 1
WATER TOWERS
KITCHEN &
LAUNDRY
BUILDING
TICKET
OFFICE

POWERHOUSE

HISTORIC STRUCTURE REPORT

ELLIS ISLAND - POWERHOUSE

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Preface

This historic structure report (HSR) is for the powerhouse at Ellis Island. Information is presented on the historic use, development, existing conditions, and architectural significance of the building. The powerhouse machinery is also fully documented. Measured drawings and photographs provide documentation of the structure in August through October 1984.

Plans for the future use of the powerhouse as well as recommendations for the architectural treatment of the building are discussed.

The report was prepared by the following staff members of Beyer Blinder Belle/Anderson Notter Finegold, Associated Architects: James Marston Fitch, Director of Historic Preservation, John H. Stubbs, Donna Carney, Fred Wasserman, and James W. Rhodes. Contributions were made by a number of consultants and others who are credited in the text.

I. ADMINISTRATIVE DATA

This historic structure report is for the powerhouse in Unit One of Ellis Island Statue of Liberty National Monument, New Jersey. Ellis Island is of the first order of significance--a resource which possesses national significance. The List of Classified Structures (LCS), March 1981, lists all of Ellis Island in Management Category A--structures that must be preserved and maintained.

The General Management Plan (GMP) for Ellis Island (September 1982) proposes the following treatment and use of Unit One structures:

1. The exteriors of all structures will be preserved to perpetuate the historic setting of Ellis Island in its entirety.

2. Interior spaces that are most closely associated with the immigrants' experiences will be preserved and interpreted: the baggage room, the registry room, original dormitories, one of the rooms used by the social service agencies (on the first floor of the west wing), one of the legal inquiry rooms (on the second floor of the west wing), the later dormitory/detention rooms (on the second floor of the baggage and dormitory building), the dining room (on the second floor of the kitchen and laundry building), and the railroad ticket office (adjoining the first floor of the main building).

3. The remainder of the interior spaces will be adapted for use by the National Park Service (NPS) for administration, curation, and visitor services, or by private organizations under lease agreements or concessions contracts. One of the purposes of the current report is to determine appropriate and feasible uses for the spaces within the adaptive use subzone.

4. The grounds will be preserved or restored in a manner compatible with historic appearance and use, with tables, and benches for outdoor eating provided at selected locations.

The Statue of Liberty/Ellis Island Centennial Commission, appointed by the Secretary of the Interior in 1982, is authorized to conduct a major private fund raising effort to support preservation at the national monument. No other cooperative agreements that are restraints on management in connection with Ellis Island Unit One are now in existence. Leases, contracts, and cooperative agreements may be developed as an outcome of the recommendations generated as a result of this study.

All objects, documents, records, photographs, negatives, and tapes collected or produced as a result of this study will be documented and cataloged according to procedures established in consultation with the park curator, and then will be conserved and stored in the curation facilities to be established at Ellis Island.

II. PHYSICAL HISTORY AND ANALYSIS

A. Statement of Significance

A. Statement of Significance[1]

Ellis Island, located off the New Jersey shoreline in upper New York Bay and within sight of the Statue of Liberty, is significant as it was the principal federal immigration station in the United States after its opening in 1892. Some 1,500,000 immigrants were processed at the first depot for the Port of New York before it was destroyed by fire in 1897. A new inspection station was opened on the island in 1900 with the completion of the massive main building. During the next half century the small island was enlarged to encompass three connected islands covering 27.5 acres on which were built some forty structures, including general hospital and contagious disease hospital complexes, to provide facilities for the administration of federal immigration laws in processing incoming aliens. All told, it is estimated that some 12 million immigrants entered the United States through Ellis Island.

The island affords an intimate understanding of the immigrant experience. While a "Portal of Hope and Freedom" for many, it was an "Island of Tears" for those who were turned away when they failed to meet the requirements of immigration laws and regulations. Despite recurring scandals caused by occasional mismanagement, corruption, and harsh treatment of immigrants, it was probably one of the more efficient operations of the federal government when the volume of immigration and its often overworked staff and overcrowded facilities are taken into account. Its administrators and staff, through herculean efforts,

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[1]This statement appears in U.S. Department of the Interior, National Park Service, Denver Service Center, "Historic Resource Study (Historical Component)," by Harlan D. Unrau, 1984, pp. xxii-xxiii.

processed some 5,000 people daily at the peak of immigration, and up to 11,747 on one record day in 1907.

The physical and social history of Ellis Island also reflects important transitions in American attitudes toward immigration. Between 1900 and 1914 immigration was at flood tide, reaching its peak in 1907 when more than one million aliens passed through its doors. It was during that period when the original island was enlarged several times to provide space for major new structures to supplement the main building, including the kitchen and laundry, baggage and dormitory buildings, and the general hospital and contagious disease hospital complexes. After a sharp decline in immigration during World War I, a period that saw the island used primarily as a military hospital and detention and deportation center for suspected enemy aliens, the flow of aliens quickly revived. Immigration was altered dramatically with the passage of immigration restriction laws in the early 1920's. These statutes, which placed a ceiling on annual immigration and established quotas for foreign nations, also provided for the primary inspection of immigrants in American consulates in the immigrant's country of origin. Thereafter only those immigrants whose status in this country was questioned, whose papers were not in order, or who required medical treatment were sent to Ellis Island. The facilities were increasingly used for the assembly, detention, and deportation of aliens who had entered the United States illegally, or of immigrants who had violated the terms of their admittance. Thus, while the early history of the Ellis Island immigration station reflected America's liberal "open door" attitudes toward immigration, the later history of the island was shaped by the new national restrictionist policies which succeeded in narrowing the "open door" to America.

In recognition of its significance and contributions to America's historical development and cultural institutions, Ellis Island has been entered in the National Register of Historic Places as a nationally significant resource. In 1965, by presidential proclamation, Ellis Island became a part of the Statue of Liberty National Monument and was placed under the administration of the National Park Service.

B. Construction History

B. Construction History[1]

The powerhouse was designed as part of Boring and Tilton's design for a new immigration station, after most of the original station was destroyed in a major fire in 1897. The first powerhouse, a frame building sheathed with slate and metalwork, actually escaped fire (exhibit 1); however it was decided that all of the buildings on the island should be fireproof. The new powerhouse enlarged and incorporated portions of the old building and equipment (exhibit 2).

The contract for the powerhouse, as well as construction of the kitchen and laundry building and various covered walks, was let to Louis Wechsler of New York City in 1900. The sum of $47,500 was allocated for construction of the powerhouse. The completed two-story brick building was comprised of a boiler room, two machinery rooms for tanks, piping, pumps, a disinfecting department, and a coal room. The upper floor was finished in 1901 under a separate contract let to Williams and Gerstle. Photo 1 shows an early view of the powerhouse.

The original 92-foot high smokestack was rejected due to dangerously poor workmanship. The stack was immediately

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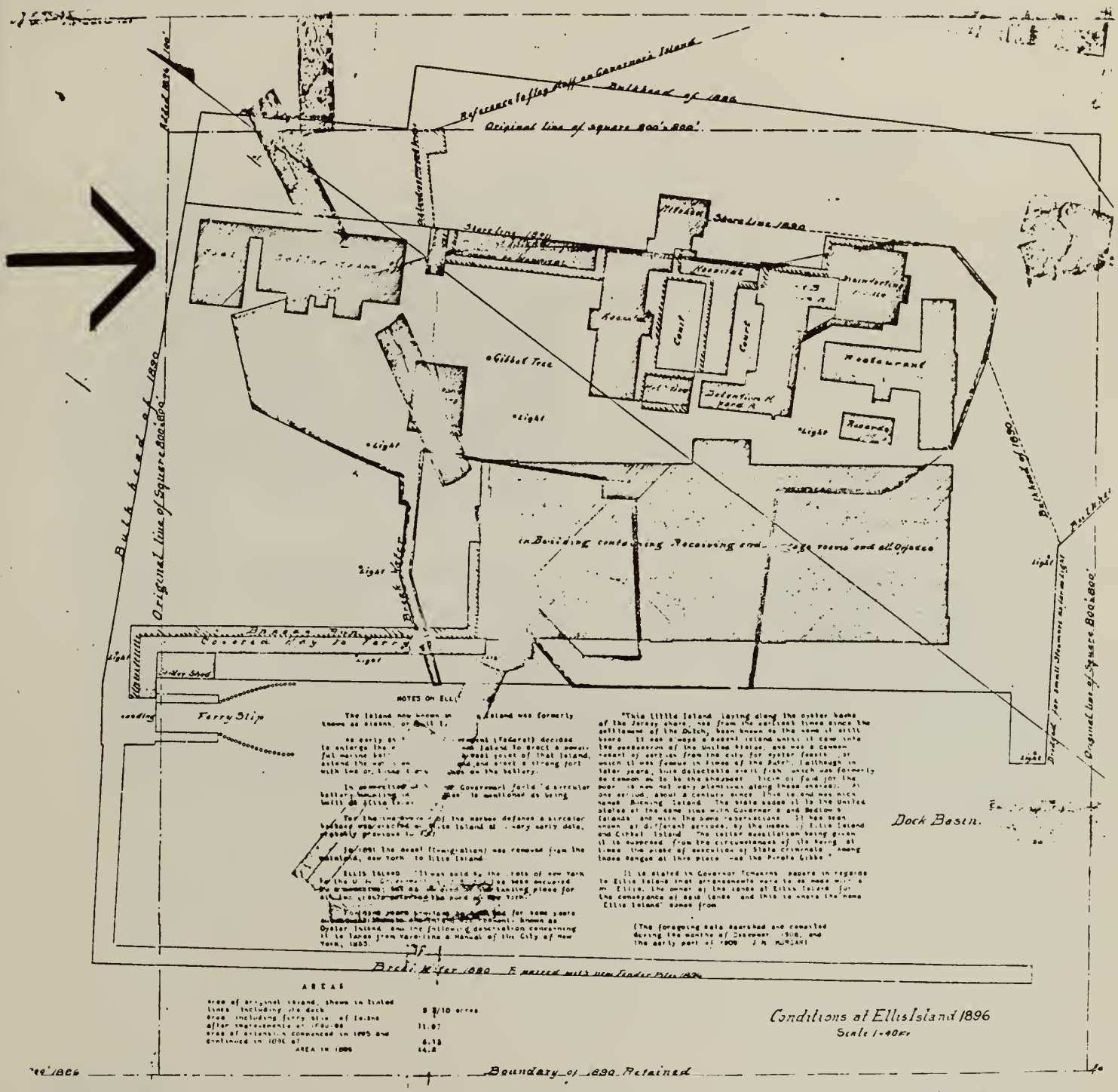
[1]All historical information in this section, as well as succeeding chapters, is based on U.S. Department of the Interior, National Park Service, Denver Service Center, "Historic Structure Report; Ellis Island; Historical Data," by Harlan D. Unrau, 1981, pp. 277-361 and archival drawings in the custody of the Denver Service Center/National Park Service. For a complete list of those drawings relating to the powerhouse see "A Calendar of Architectural Drawings of Buildings on Ellis Island, New York Harbor In the Custody of the National Park Service" by Jerry Minkoff, 1979, pp. 62-86.

rebuilt above the water table with special construction known as the Alphon Custodis stack, with the upper portion being made of Custodis radial material.

A coal hoisting and delivering mechanism was installed at the northwest end of the powerhouse in 1901 (exhibits 3 and 4). The hoist, cars and runway were used to transfer coal from barges on the coal docks to the powerhouse. In 1920, when the sea wall was extended fifty feet, the trestle work was extended and the apparatus moved to the new wall. The trolley runway was relocated in 1926, and became obsolete in 1932 when the power plant was converted from a coal to fuel oil system. At the same time, the coal bunker in the northeast corner became the oil tank room (room 109). The old coal storage tank was replaced by a new steel storage tank thirty-two feet in diameter and twenty feet in height with a steel umbrella type self-supporting roof. A supply line and high pressure steam line led from the tank to an oil dock at the edge of the island for boat hook-up.

A new fire alarm system was installed in all buildings in 1932. The system began in the powerhouse where the control panel, charging panel and motor generator were located in the engine room. The Faraday system, manufactured by Stanley and Patterson Inc. of New York City, was to have 28 fire alarm boxes and was installed by the Quintine Realty Co. of Bloomfield, New Jersey.

Exhibit 1



1896- Location of Coal Boiler House. (first powerhouse)

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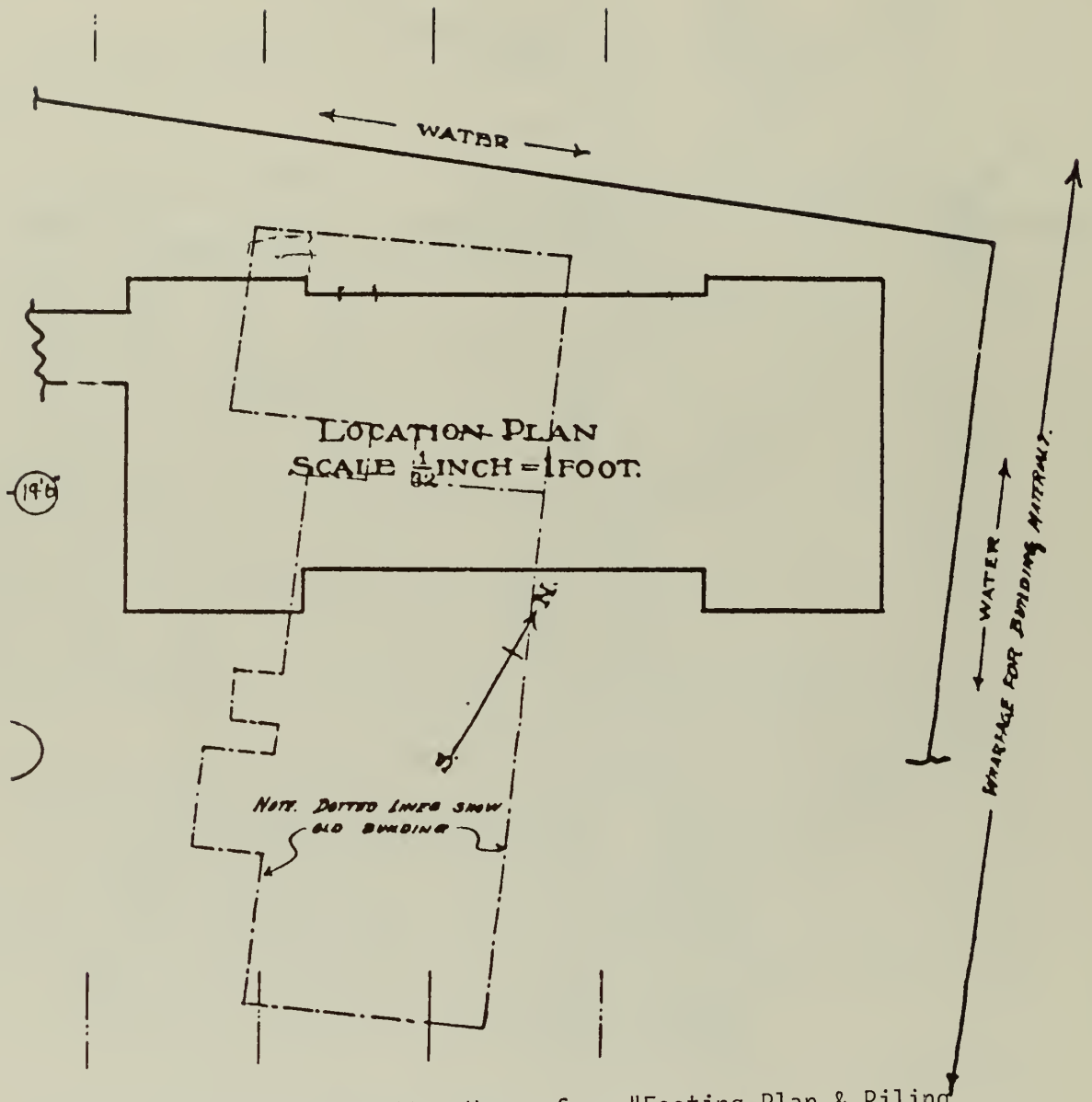

Location plan for new Boiler House from "Footing Plan & Piling Plan" by Boring and Tilton, 1900.

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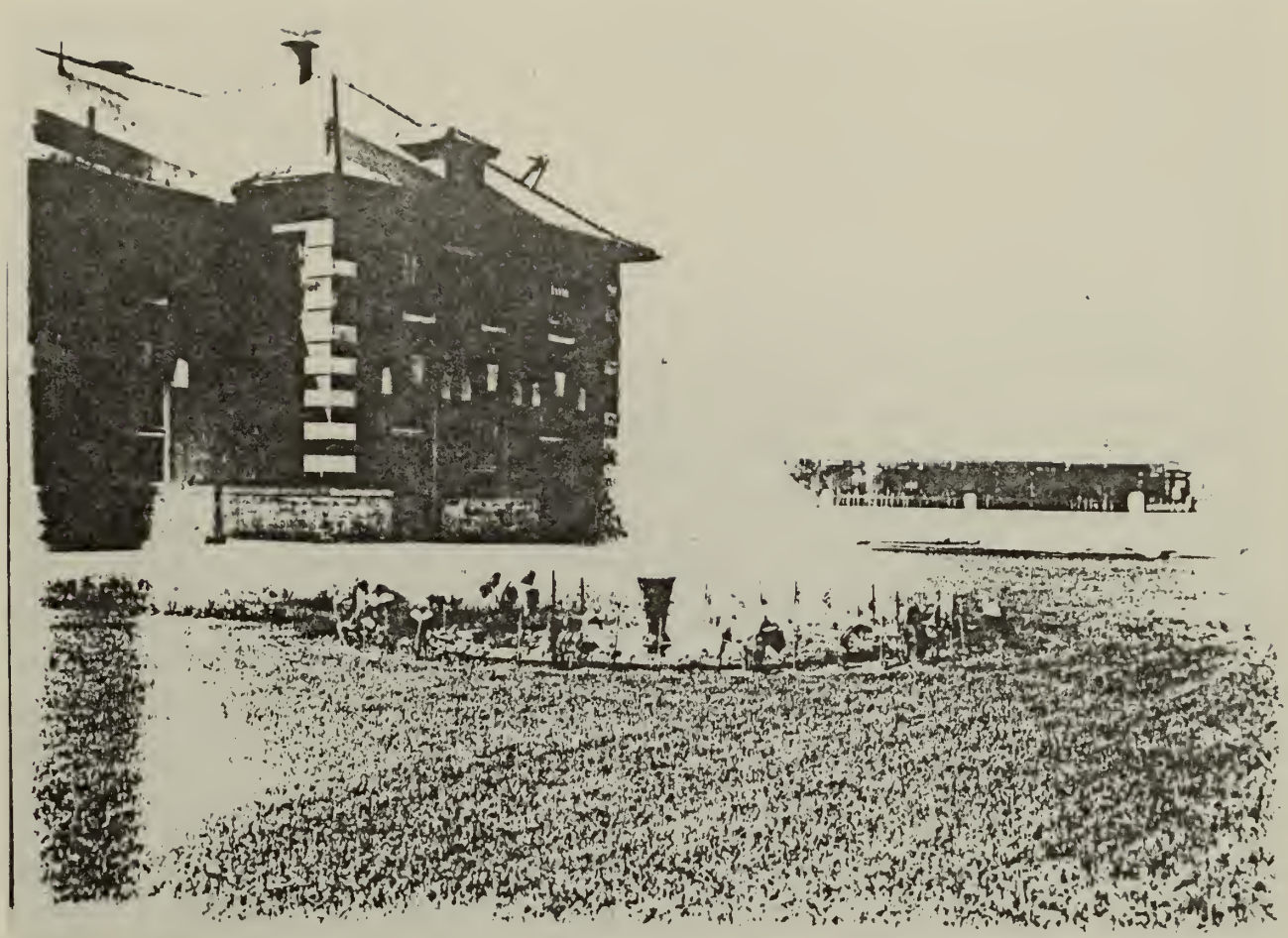


1. East facade of powerhouse. Water fountain between baggage and dormitory building and powerhouse, 1902-1905, photographer unknown. William Williams Collection No. 38. New York Public Library, Local History and Geneology Division.

C. Exterior

C. Exterior

1. Drawings

In August 1984 the architectural/engineering team measured the powerhouse. Drawings at 1/8" scale were prepared that depict the "as found" conditions. See exhibits 1 through 4.

2. History

Exhibits 5 and 6 depict the original elevations and roof plan. Two sections of the powerhouse have historically been problem areas: The northwest walls and the chimney. The northwest section of the building, which originally housed the coal bunker, was unstable from the beginning. In 1902 the northwest wall was braced up and shored at a cost of $1400. Later that year it was also necessary to rebuild a number of stone courses at the base of the coal bunker. The original chimney was determined to be unstable and had to be removed down to the level of the water table. A new stack was constructed in 1901. This chimney needed extensive repairs in 1939 due to weathered and cracked cement, mortar joints, brick, and stepirons, as well as defective lighting system fasteners.

There is also a history of roof repairs. In 1928 missing or broken slate was replaced, the skylights were repaired, and torn and broken gutters, leaders, and ventilators were replaced. A 1939 contract called for a new slate roof, ventilator, and gutters, as well as sheet metal and skylight repairs. No documentation exists regarding when the existing terra-cotta tile roof was installed.

Other exterior work on the powerhouse included the repointing of masonry in 1932 and the repointing of 14,600 square feet of defective brick in 1939. A number of undocumented patches and mortar fills represent a long history of repairs and alterations to the exterior. One window on the north elevation was expanded in 1932 in order to accommodate the oil feed supply line to the new oil tank.

3. Description

The two-story powerhouse is clad in red brick laid in Flemish bond. The building has a granite base of coursed quarry-faced ashlar and a base course of bluestone. The base is surmounted by a bluestone beltcourse at window sill level. Decorative elements include limestone quoins and window trim (photos 1-8).

The seven-bay central section is flanked by hip-roofed pavilions at the north and south ends (photos 1, 3, 4, and 5). The roofs are sheathed in flat terra-cotta tiles (photos 9-11). The pavilions have flared eaves and dormers, three at the ends and one on each side. The dormers on the south pavilion are all the same size (photo 12), while the north pavilion has a large central wall dormer (photos 3 and 4). Two I-beam ends that were part of the original coal trolley system are located below the north dormer. The roof has five air vents and seven skylights (the one on the north pavilion was added at a later date) (photos 9-11), and is surmounted by a buff brick chimney 111 feet in height (photo 13).

Entrances on the east and west elevations have paired multi-light doors surmounted by segmentally arched multi-light transoms (photos 14-17). A pair of double doors on the south side provides access to covered way 5 (photo

18). One entrance on the east facade has been replaced with louvered vents (photo 2). Two doorways on the east elevation have been filled in with brick (photo 19); one of these has a small four-over-four window. All existing doors, with the exception of those at the northeast entrance, are not original.

Windows are of the double-hung wood sash type: eight-over-eight with segmental heads on the first floor and four-over-four with segmental heads on the second story (photos 1, 4, and 7). In addition there are six-light pivotal windows at the second floor of the central section on the west facade (photo 7). Two first floor windows on the north facade and one on the east elevation have been replaced with louvered vents (photo 20). A bluestone beltcourse runs along the first floor window sill level. These windows have segmentally arched lintels of splayed brick with limestone keystones and end blocks. Second story windows on the pavilions have similar lintels, while second floor windows on the central section have limestone sills and flat lintels.

Covered way 5 abuts the powerhouse at the southwest corner of the building (photo 21). A light steel frame passageway at the second story of the southwest corner connects the powerhouse with the bakery and carpentry building.

A wood frame shed is located on the east side of the powerhouse at the juncture of the south pavilion and the central section. The shed has an asphalt-clad gable roof, horizontal wood siding, a large opening at the north end, and a small sashless window on the south side. The wood structure was erected directly on top of the concrete paving (photos 37 and 38).

4. Existing Conditions

A field survey of the powerhouse was conducted in September 1984. The brick and limestone trim is generally in excellent condition. However repointing of all of the limestone and granite, as well as specific areas of the brick, is required.

Two major problems were observed: The northwest wall and the chimney, both of which have historically been problem areas, continue to be in extremely poor condition. The chimney is structurally unsound. The mortar is crumbling, the brickwork is buckling, and the chimney is keeling towards the north (photo 13). The stepirons are severely corroded. The brick walls at the northwest corner are heaving. The mortar is deteriorated and several courses appear to be separating from the wall (photo 22). See Chapter II.G., Structural System, for detailed information on the chimney and the northwest wall.

In addition to these specific problems the powerhouse exhibits the same types of deterioration as the other buildings. The island's geographic location in New York Harbor has created specialized micro-climatic conditions which have acted adversely against exterior surface materials. The powerhouse has experienced exposure to high winds (particularly from the north), fog, salts, intense solar radiation, condensation, and other harsh weathering conditions. Among these, moisture and salt penetration--in the form of rain and fog--and solar radiation seem to have been primary agents for most of the deterioration mechanisms observed.

The most noticeable problem is extensive exfoliation. This is especially severe at the bluestone water table, particularly the areas between the windows that have been affected by water run-off (photos 23-26). Exfoliation appears to be considerably more serious on the east elevation than on the west elevation. The latter probably dries out more quickly than the east elevation which is enclosed in a damp enclave. The bluestone base does not exhibit the same level of exfoliation as the water table.

A number of other forms of deterioration were observed. Cracking and spalling have occurred in a number of locations, particularly at window sills (photo 27) and in areas where ferrous anchors and bolts have been inserted (photo 28). Some entire bricks and pieces of limestone are missing (photos 28 and 29). Copper staining appears to be restricted to the quoins on the west elevation of the south pavilion (photo 30). Iron staining is found in various locations though most frequently at limestone keystones which are in close proximity to iron lighting fixtures or pipes (photo 31). Black crust is evident on the granite base (photo 32), the bluestone courses, and in certain sections of brick, most notably on the west and north elevations. Efflorescence appears to be limited to small areas of the east facade and at the corbeled cornice under the eaves on the west elevation. Weathering is so pronounced on the granite base that it has lost its surface contour (photo 33). A number of patches and mortar fills exist on the building's exterior (photo 34).

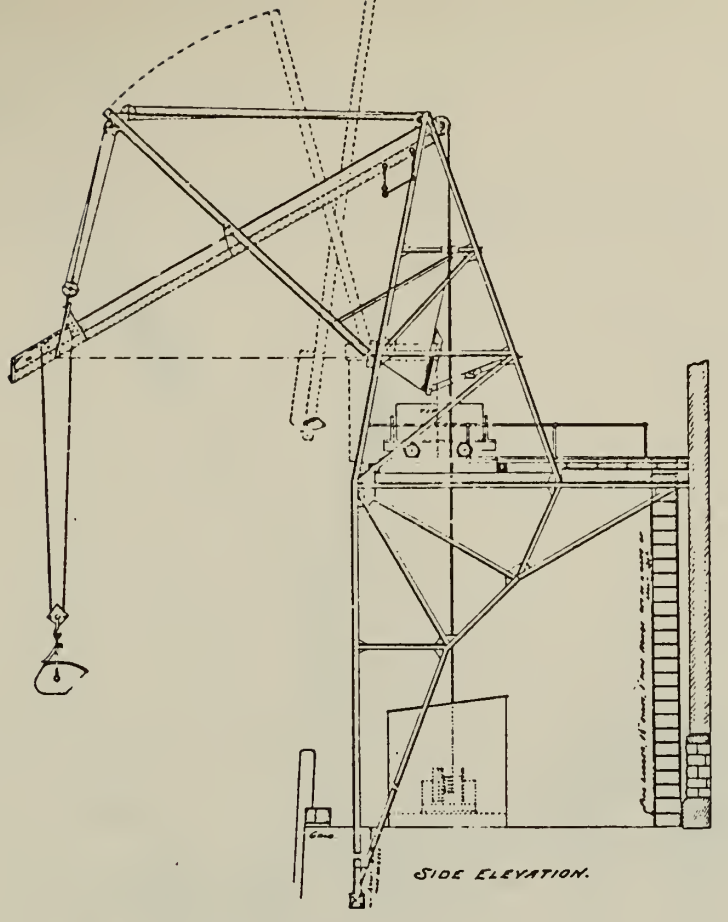
The roof is in poor condition. A significant amount of clay tile is broken or missing. A number of holes are located on the east side of the roof. Copper gutters are torn and missing. All downspouts are missing. The skylight

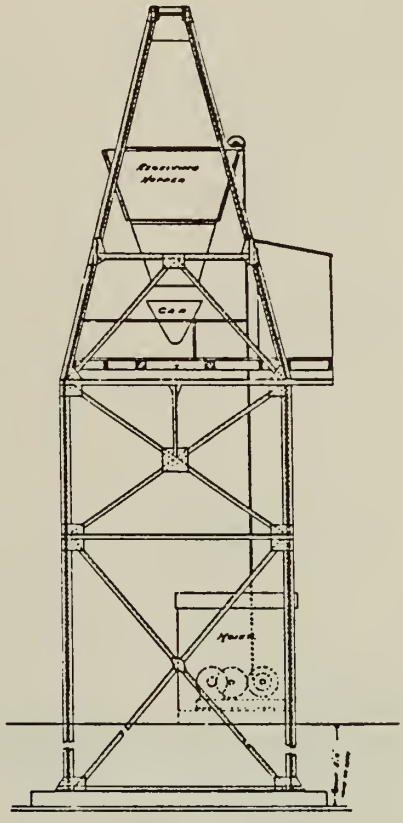
frames are corroded and much of the glazing is missing (photo 35).

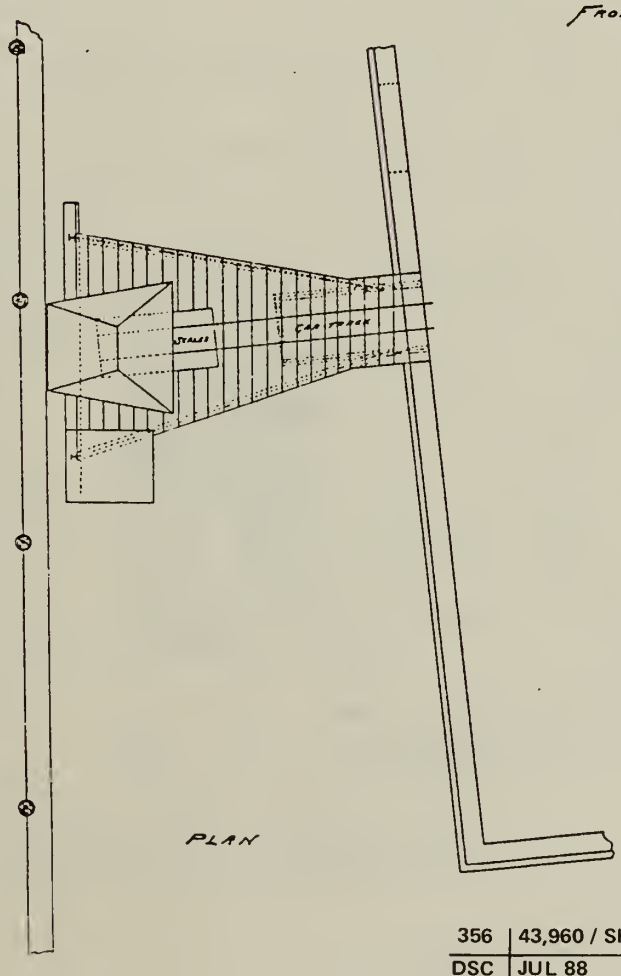
Wood window enframements are in poor condition and are not reusable. Most window sash is splitting and warped. Muntin joints are open and much of the glazing is broken or missing (photos 1, 4, 7, and 36). Several of the dormer windows are no longer extant and have been filled in with plywood.

The adjacent shed on the east side of the powerhouse is in fair condition. Wood siding on the west side of the shed is separating (photo 39) and there is a large hole in the roof.

Exhibit 3







SKETCH

showing proposed superstructure, hoisting tower, boom and apparatus for coal handling and delivering two bunkers, Power Plant Building, Ellis Island, N.Y.H.

Drawing No. S.A.-28

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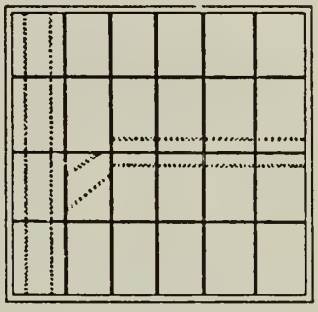

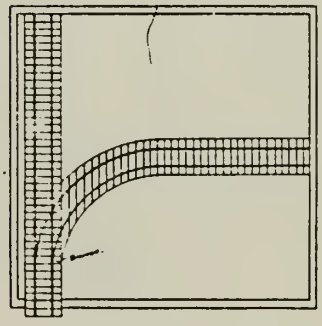

Overhead track plan in Coal Storage Area on Bunker, N.E. end Boiler House, Ellis Island. Scale 1/8 inch = 1 foot.

RETURN TO ROOM 411

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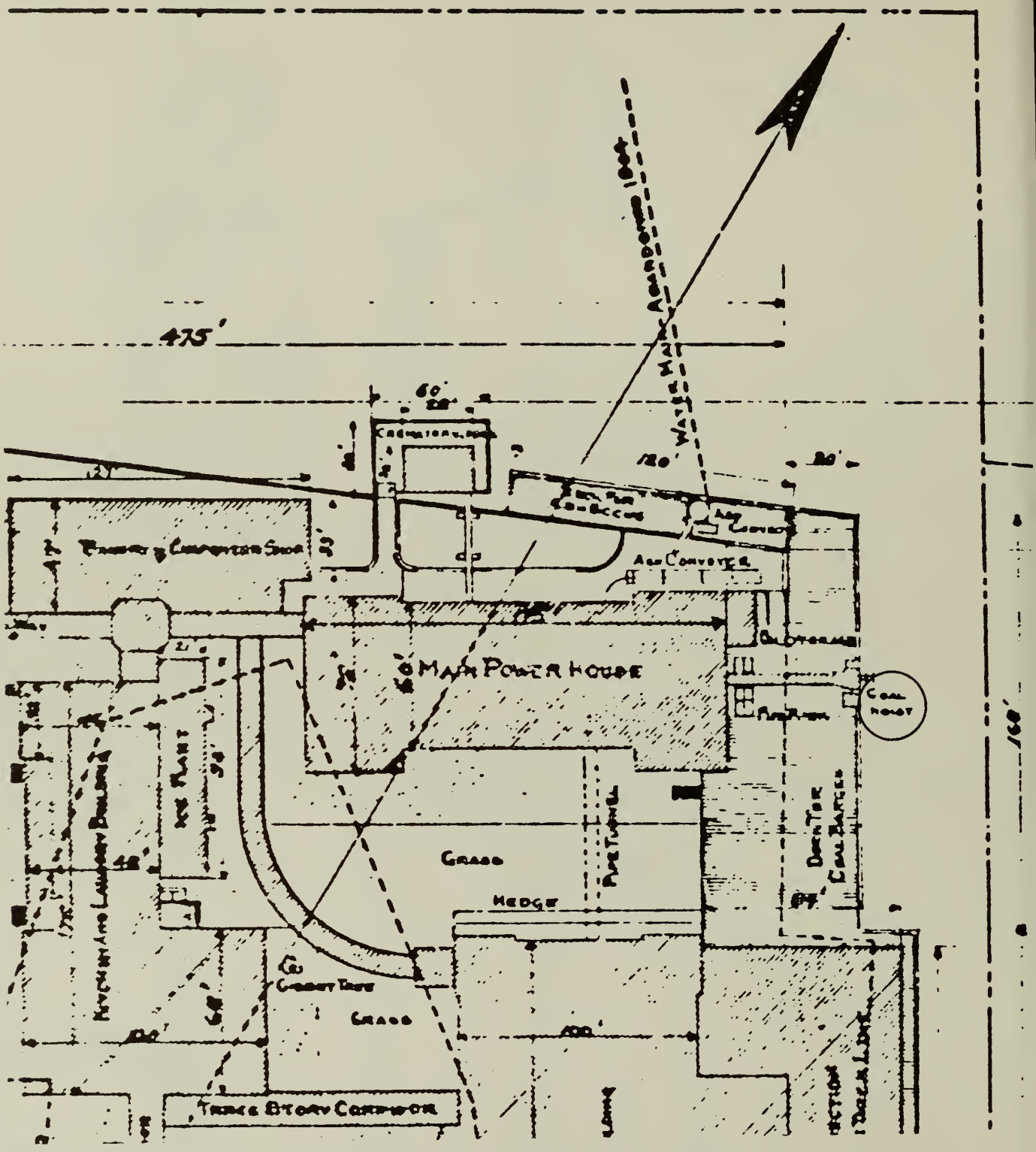
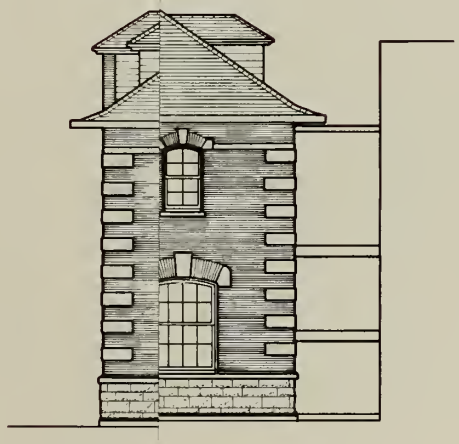
James Knox Taylor, Supervising Architect, Treasury Department

Sketch showing proposed superstructure, hoisting tower, boom and apparatus for coal hoisting and delivering two bunkers.



1913 Plan- Note ash conveyor on west side of building and coal hoist on north side running from the powerhouse to the dock for coal barges.

Exhibit 1



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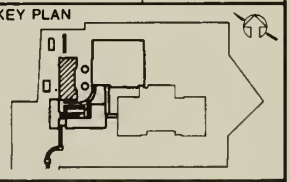

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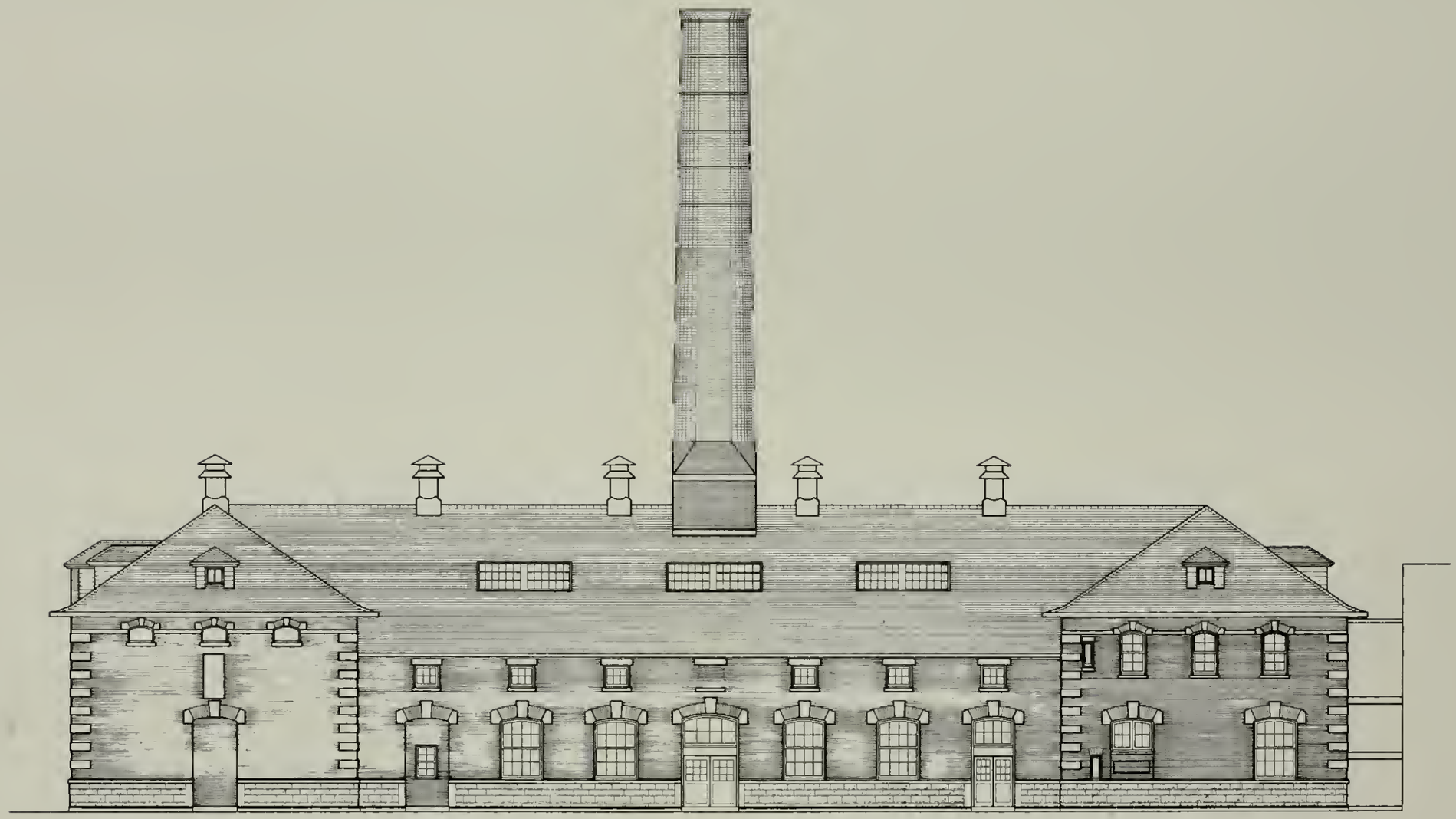

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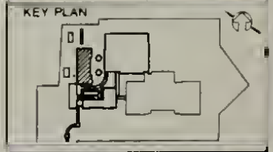

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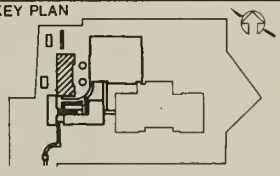

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LOUIS FRY

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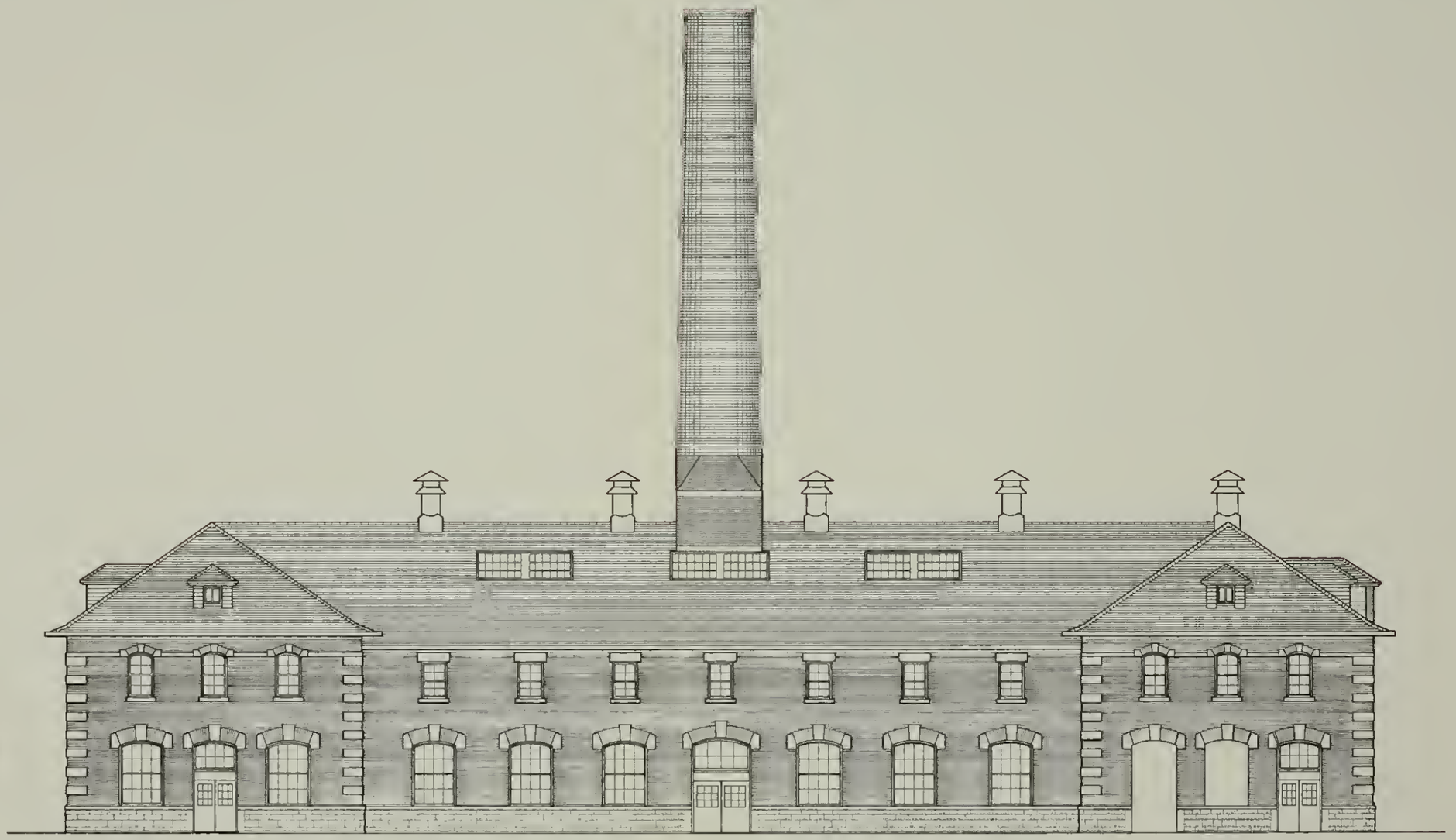

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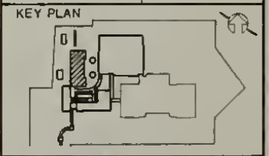

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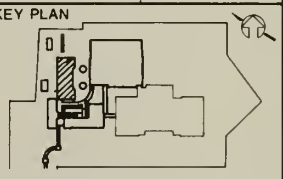
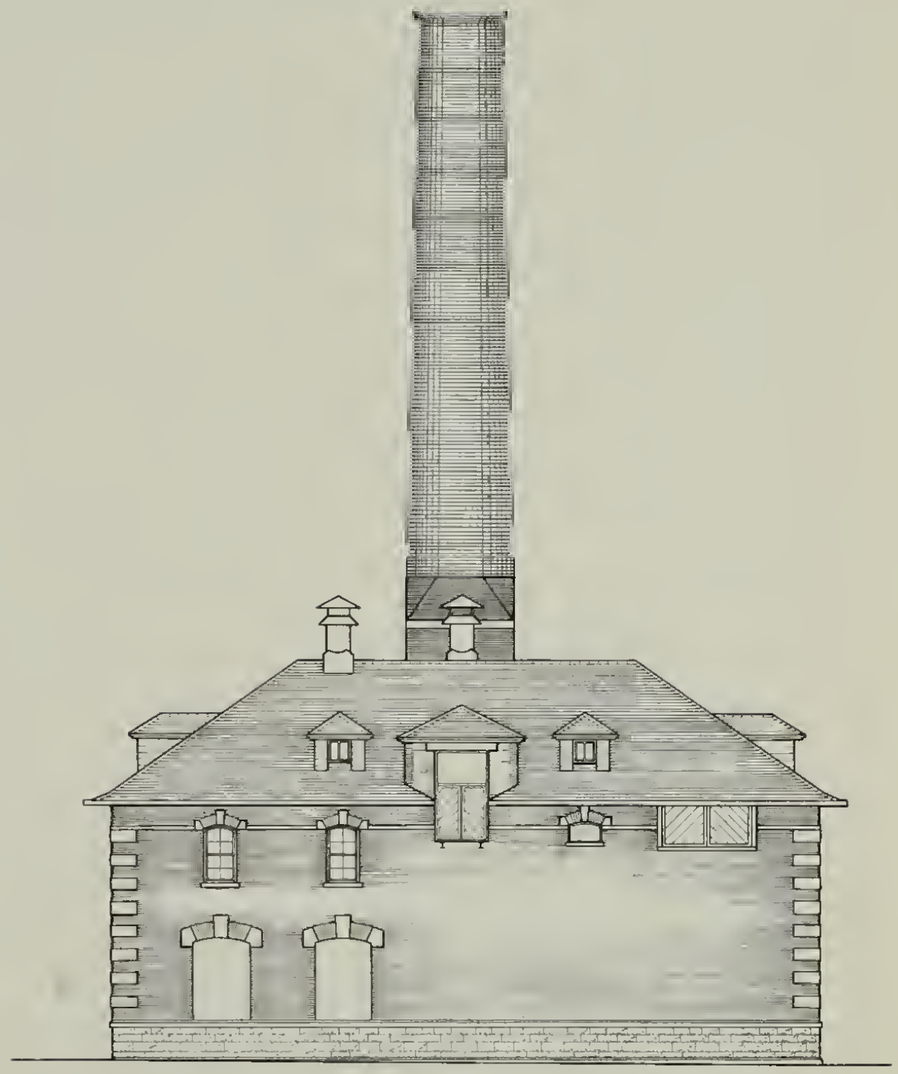


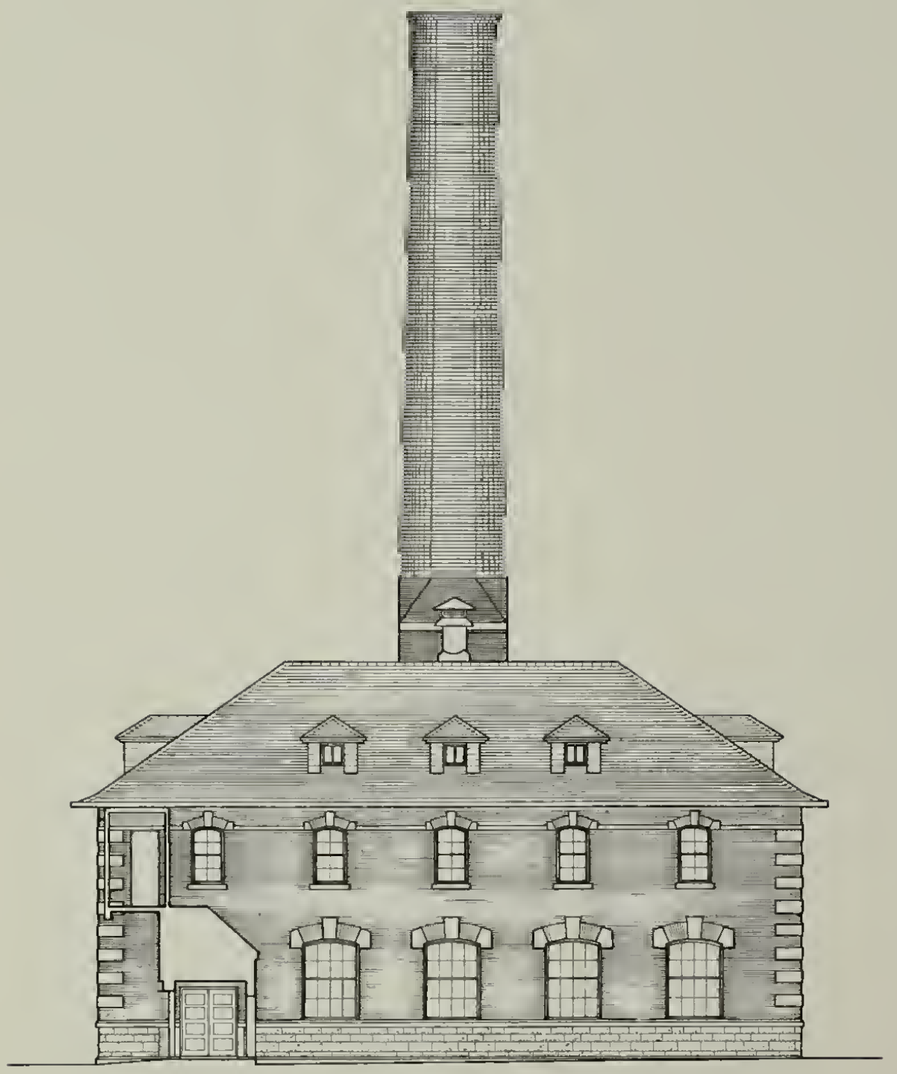
TITLE OF SHEET
POWERHOUSE NORTH & SOUTH ELEVATION

SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET / OF

LOUIS FREY

Exhibit 3





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SCALE OF FEET

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356 | 26,007 / 5 of 24
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SURVEY OF STRUCTURES UNIT ONE

ELLIS ISLAND

STATUE OF LIBERTY
NATIONAL MONUMENT
NEW YORK / NEW JERSEY

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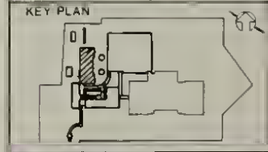

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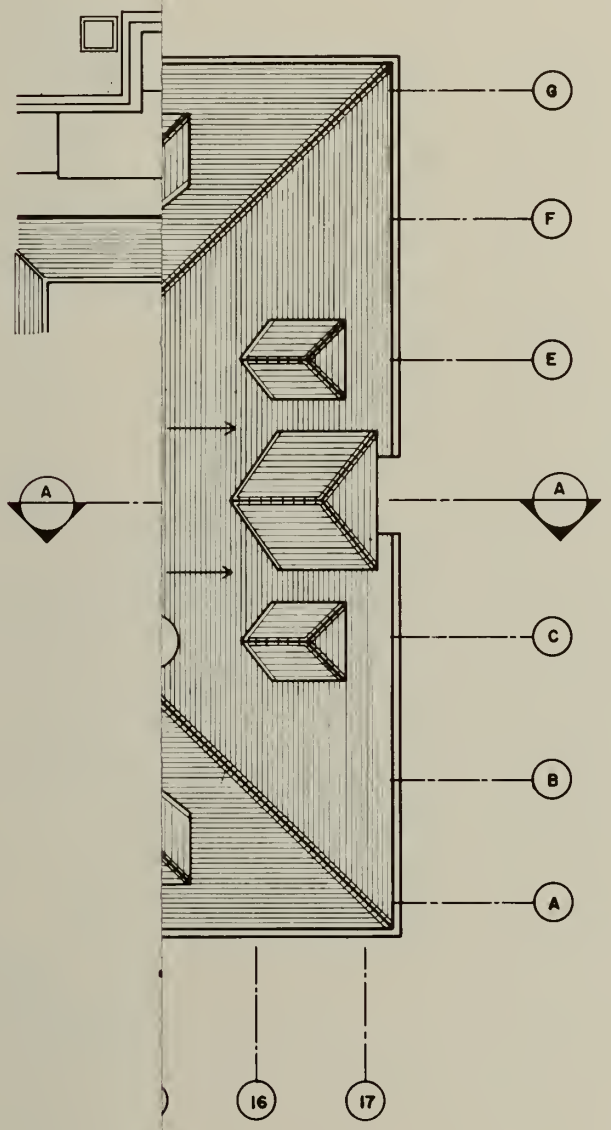
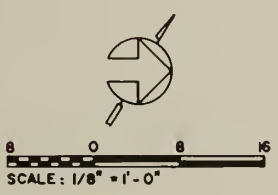
Exhibit 4





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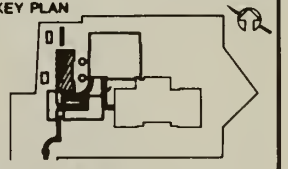

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POWERHOUSE ROOF PLAN

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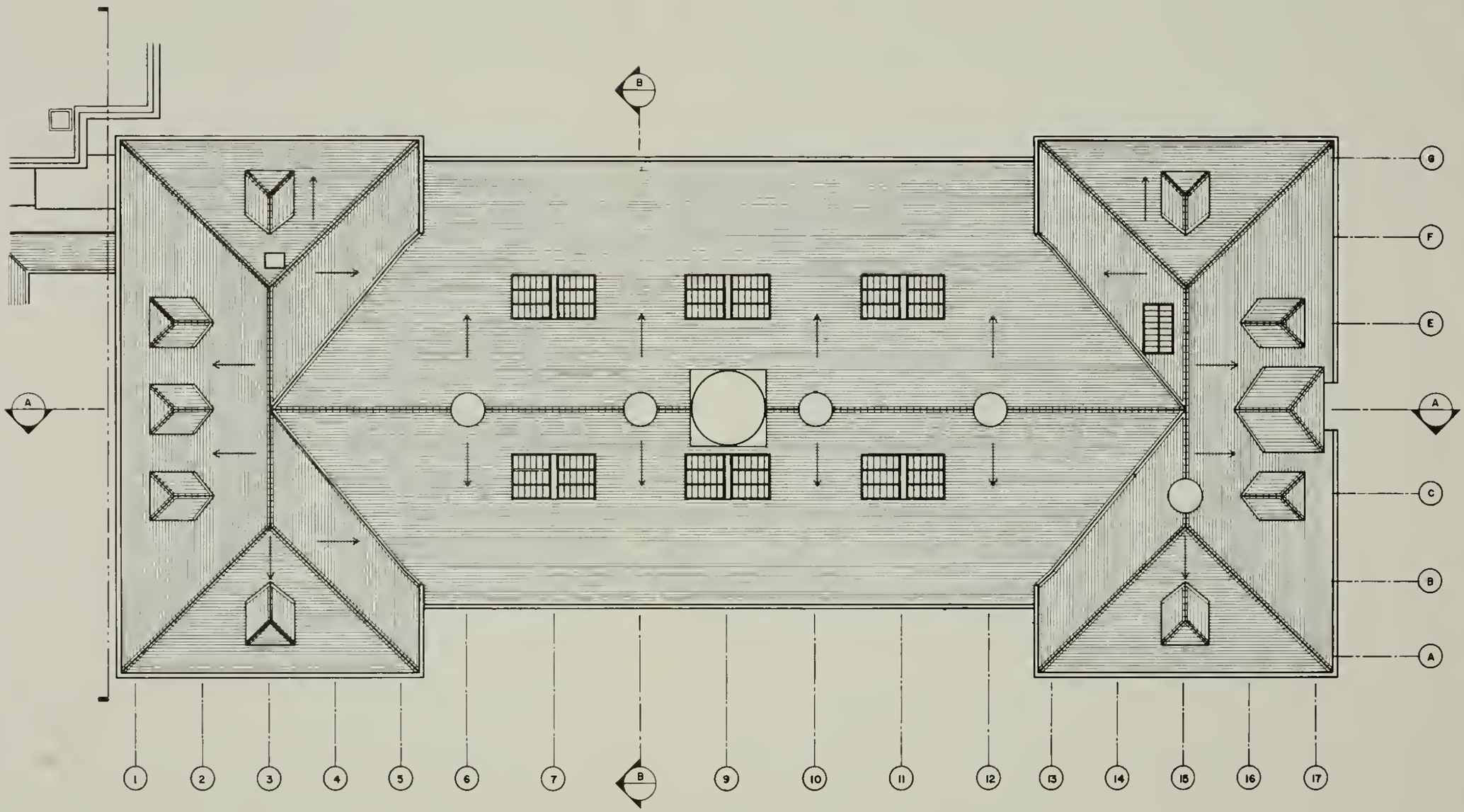

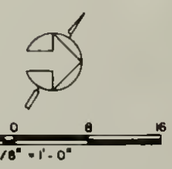

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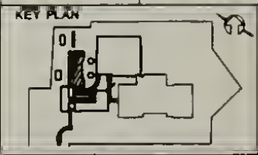

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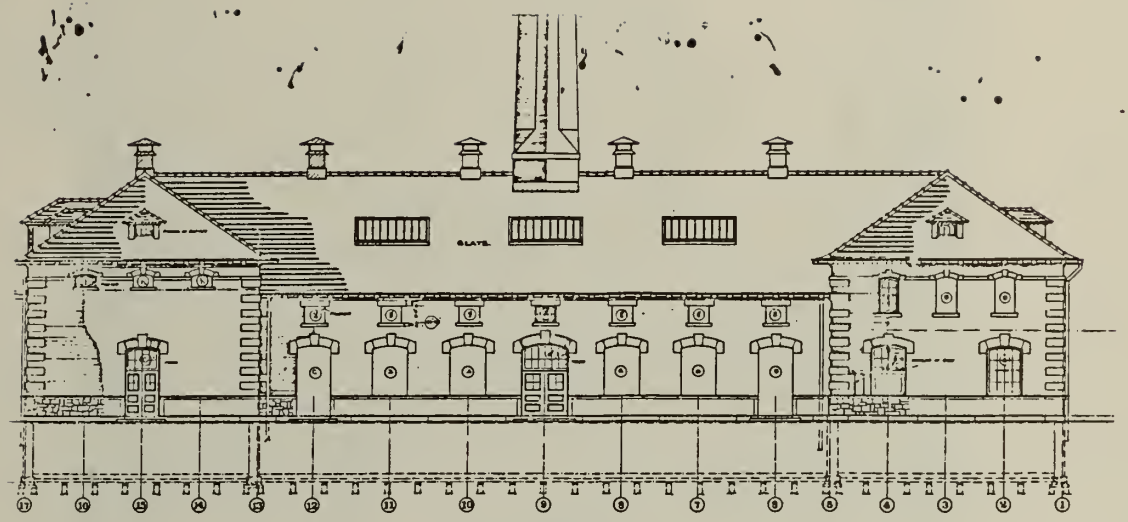
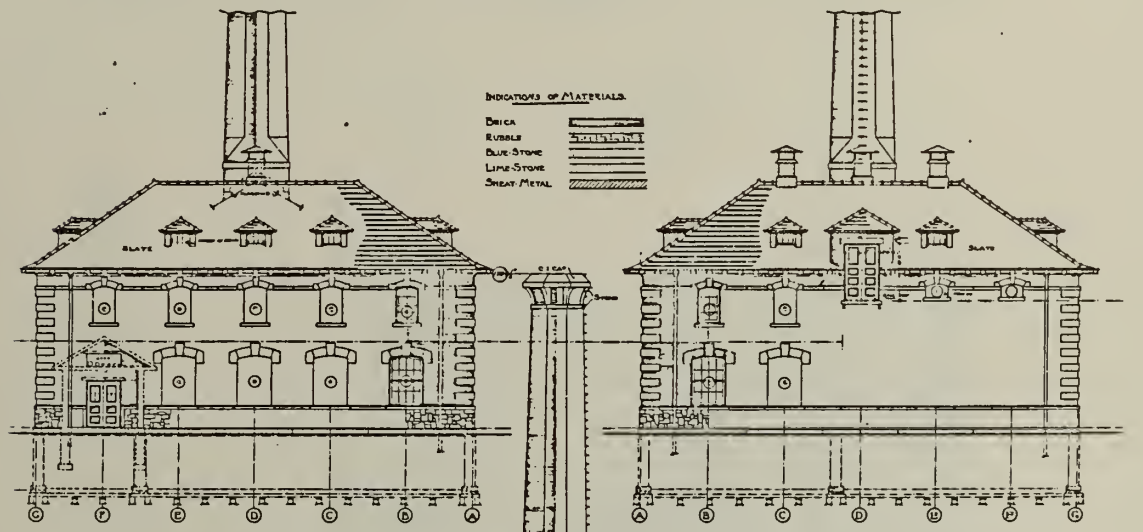
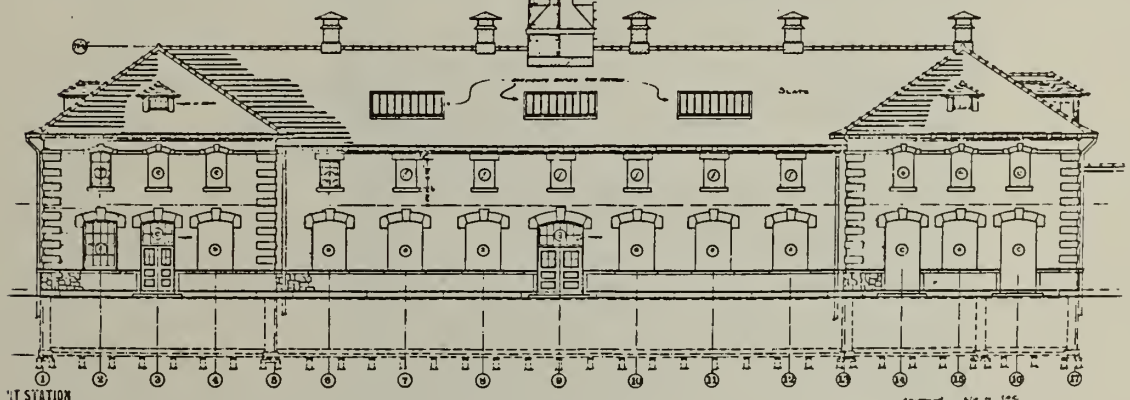


REAR ELEVATION.



SOUTH WEST ELEVATION.

NORTH EAST ELEVATION.



FRONT ELEVATION.

SCALE $\frac{1}{8}$ INCH = 1 FOOT.

T STATION
N.Y. HARBOR
No. 3.

BORING & TILTON Architects
32 BROADWAY NEW YORK

TREASURY DEPARTMENT.

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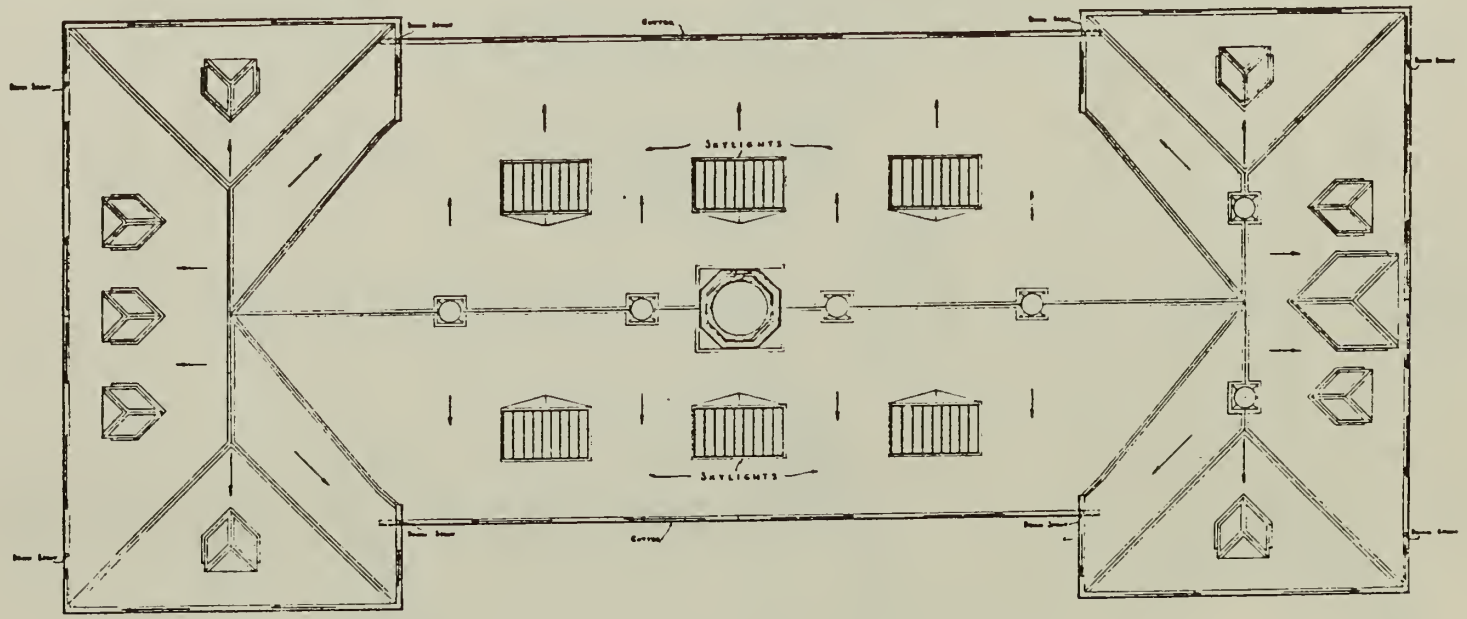

·ROOF·PLAN·

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356	42,908 / Sheet 3
DSC	JUL 88

·ROOF·PLAN·
·POWER·HOUSE·
·ISLAND·NO.1·
U.S. DEPARTMENT OF LABOR
IMMIGRATION & NATURALIZATION SERVICE
ELLIS ISLAND

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TRACED BY _____
CHECKED BY _____
APPROVED _____
SUBMITTED – D____
FILE NO. _____

Exhibit 6

1. South pavilion, east elevation, view northwest.

2. East elevation, view southwest.

3. North elevation, view south.

4. North elevation, view southwest.

5. North elevation, view southwest.

6. West elevation, view southeast.

7. West elevation, view northeast.

8. South elevation, view northwest.

9. Roof, view south west.

11. Roof, northern half, view northwest.

12. Roof, south pavilion, view north.

13. Chimney, view west.

14. South pavilion, entrance, east elevation.

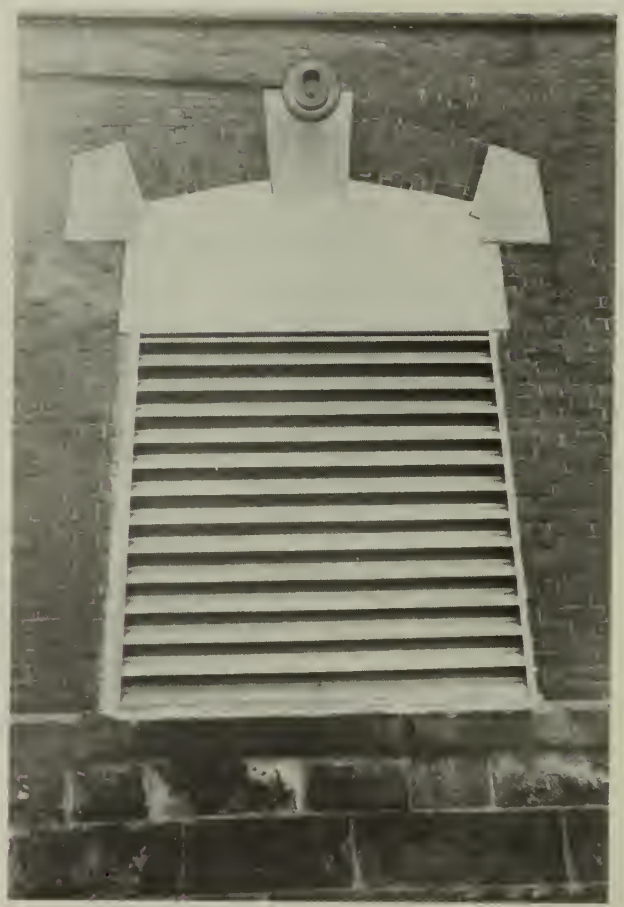
15. Central entrance, east elevation.

16. North pavilion, entrance, east elevation.

17. Central entrance, west elevation.

18. Entrance to covered way 5, south elevation.

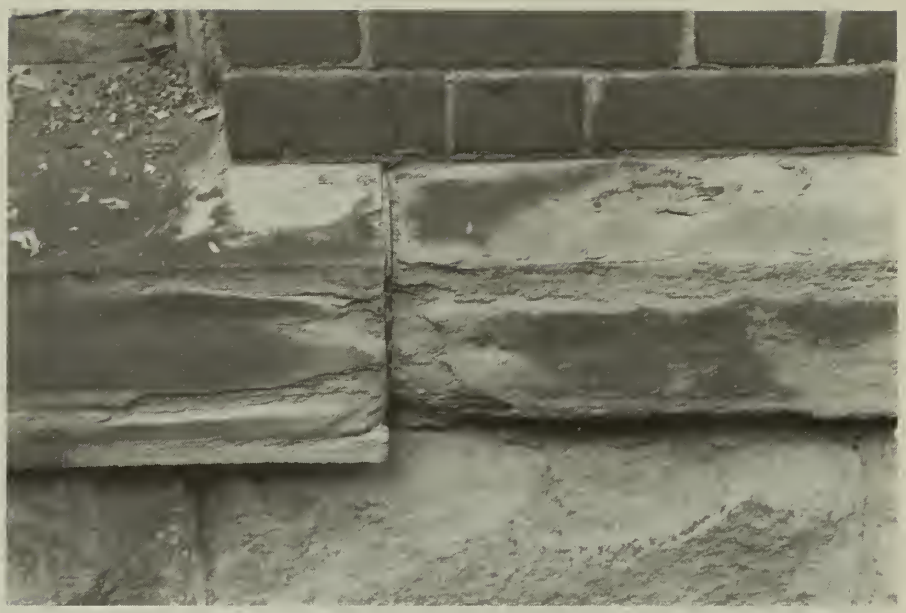
19. North pavilion entrance filled in with brick, west elevation.



20. Window filled in with louvered vents, north elevation.

21. Covered way 5 and connector between the powerhouse and the Bakery and Carpentry Building, view west.

22. Heaving brick courses at northwest corner.

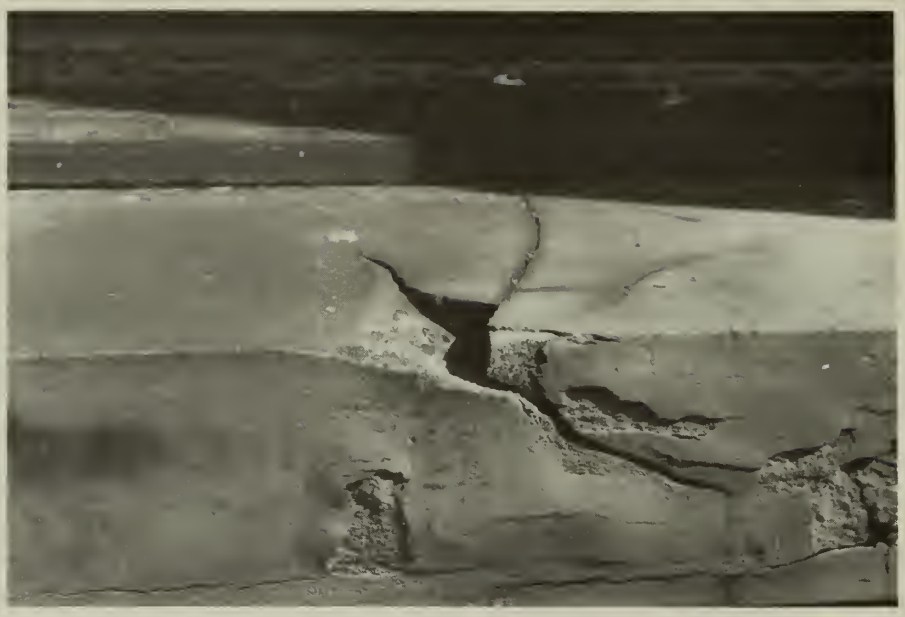


23. Exfoliation, bluestone water table, east elevation.

24. Exfoliation, bluestone water table, east elevation.

25. Exfoliation, bluestone water table, east elevation.

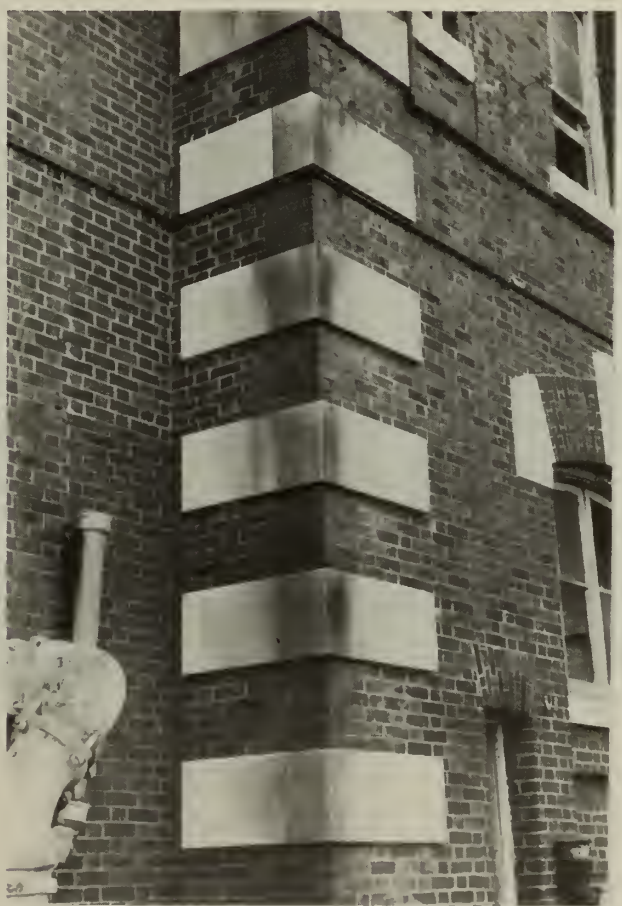
26. Exfoliation, bluestone water table, west elevation.



27. Cracking and spalling at window sill, east elevation.

28. Loss of brick, deteriorating mortar, spalling, and patching, west elevation.

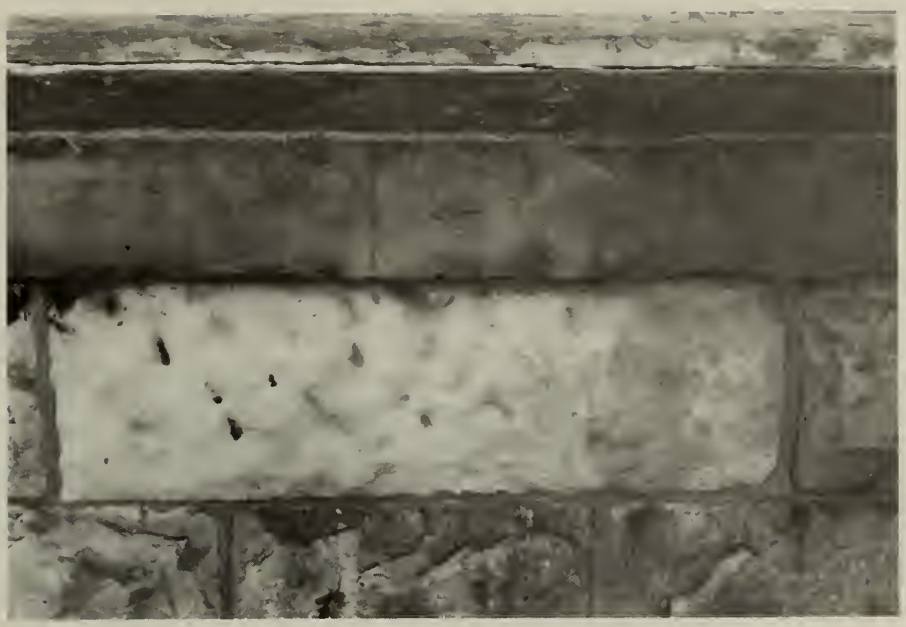
29. Loss of material, granite base, west elevation.



30. Copper staining at quoins, south pavilion, west elevation.

31. Iron staining at keystone, west elevation.

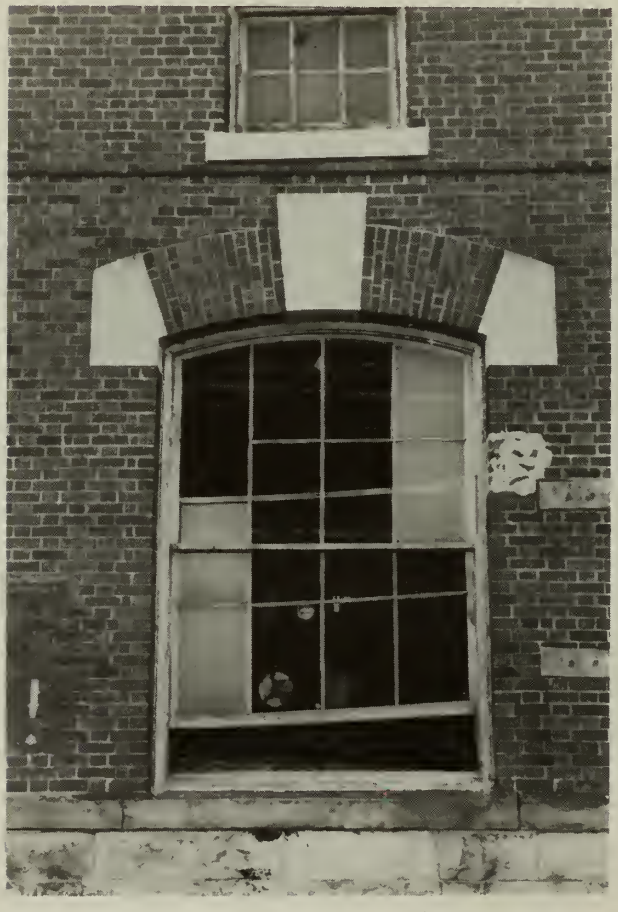
32. Black crust at base, west elevation.



33. Weathering at base, west elevation.

34. Patching, west elevation.

35. East side of roof; holes and broken tiles, view west.



36. Warped window, west elevation.

37. Shed on the east side of the powerhouse, view southwest.

38. Interior of shed, wood frame structure built directly on top of concrete walk, view south.

39. Wood siding separating, west elevation of shed, view south.

D. Interior

D. Interior

1. Drawings

In August 1984 the architectural/engineering team measured the powerhouse building. "As found" plans and sections were prepared at 1/8" scale (exhibits 1-5). Room identification numbers were assigned by the survey team.

2. History

a. Historical Room Use

Original plans for the building show a two-story boiler room and coal room, two machinery rooms, (later called pump room (room 106) and turbine room (room 104), and a disinfecting department on the first floor, and an unfinished second floor (exhibit 6). A year later, plans for the second floor included a sitting room, three store rooms, two bedrooms, one office, five dormitories and two toilets (exhibit 7).

Plans of 1916 show a blacksmith shop and machine shop in place of the disinfecting department (Room 107 and 108) (exhibit 8).

Second floor plans from 1927 for electrical work designate the southern grouping of rooms as electrician's room (room 202), chief engineer's office (room 206), and engineer's locker room (room 208). These uses appear to have continued until the closing of the island, as indicated by the remaining furnishings.

During the conversion of the plant in 1932 from coal to oil, the northwest corner coal bunker room became

the oil tank room. The doors at the room's south interior wall and west exterior wall were removed and the openings were filled in with brick (exhibit 9). Access to this room became limited to a wooden stair from the attic and exterior door and window openings at the attic level.

Partition additions occurred only in the boiler room. In 1930, the open tanks on the attic floor were made obsolete by a hot water return tank on the first floor and the attic area was enclosed on the west with the existing corrugated iron partitions. The iron stair between boiler #1 and #2 and the overhead riveted safety platform above the boilers were installed concurrently with the new boilers in 1948 (exhibit 10).

The historical development and room use of the powerhouse is depicted in exhibits 11, 12 and 13.

b. Historic Finishes

Finishes have changed very little throughout the use of the building. The engine and boiler rooms were originally finished with light cement floors and a rough brick dado. A new floor and wainscot (material unknown) were installed during 1910 or 1911. A new copper-panel ceiling over the original concrete one was also proposed in 1910, but there is no documentation of its installation. The boiler room again received new flooring of red unglazed quarry tile when the coal-burning system was converted to an oil-burning one in 1932 (exhibit 14).

3. Description

White hexagonal tile flooring is found throughout most of the first floor, except for the boiler room, where

the floor is red unglazed quarry tile. The present generator room (107) has a flooring material of loose asphaltic material over the original concrete finish. The adjoining machinery room (108) has concrete flooring to the west and wood plank flooring at the east side.

All rooms with white hexagonal floor tile also have white rectangular tile wainscots with simple rounded cap tiles and cove base tiles. The boiler room has a projecting brick dado. The remainder of all walls are brick which have been painted since construction.

In all rooms except the boiler room, the concrete ceiling is finished with painted cement parging. The boiler room, a two-story space open to the roof, has a ceiling of exposed terra-cotta block, steel beams, and skylights operated by pulley and chain.

The majority of second floor rooms and all hallways have concrete floors, wood bases and plaster walls and ceilings. Three toilets and one shower room have white hexagonal tile floors and white rectangular tile wainscots. In room 206, formerly the Chief Engineer's office, a wood picture rail has been applied to all walls.

The surface materials and fixtures in each space are described and dated in the existing condition survey (Appendix A).

4. Existing Conditions

In October 1984 an "Existing Condition Survey" of the interior spaces was conducted to evaluate existing conditions. The survey consisted of a room-by-room analysis of all visually accessible finishes, decorative trim, doors,

lighting, plumbing, heating and ventilation equipment. Forms were completed for each space (exhibits 15 and 16 are sample forms). The surface materials and fixtures in each space are described on these forms and assessed for their existing condition and approximate date. A summary condition and date was tabulated based on this information. Photographs of each room supplement the written description.

The condition of each space was evaluated according to criteria that were specifically developed for the powerhouse on Ellis Island. A range of conditions was defined for each material in the building following careful field inspection. The condition of a finish was evaluated relative to other similar finishes in this building using the standard terms "good", "fair", "poor", and "destroyed". Since the powerhouse has experienced extensive deterioration no surfaces or fixtures were considered to be in "excellent" condition (exhibit 17 is an example of the definitions that were used for a particular finish).

The results of the condition survey have been plotted on graphically-coded floor plans which illustrate the relative condition of each space (exhibits 18 and 19). The complete survey with a full discussion of methodology and criteria is included in Appendix A.

Most of the first story tile floors are generally worn and discolored with areas of replacement tile in evidence. The main stair hall floor has sagged toward the bottom of the stair, resulting in cracking. The red quarry tile floor in the boiler room is generally in fair condition with some chipping and cracking occurring at the steps to the firing trench of boilers #4 and #5. The white hexagonal tiling of the pump room (106), and engine room (104), are

discolored and cracked. The plank wood flooring of machine room 108 has warped and weathered due to constant exposure to the elements. The plates for the pipe trenches running through both rooms are generally surface corroded.

The tile wainscots of the stair hall, as well as the engine and pump rooms are in good to fair condition, with some cracking and chipping of the base and cap tiles. In the pump room, a section of tile is missing on the west wall and tiles at the base and cap are loosened.

All interior brick walls were kept painted since construction. The painted layers have flaked and cracked off extensively, revealing face brick. In limited areas such as the east wall of the stack, brick spalling and mortar deterioration has occurred.

The surfaces of paint and cement parging over the concrete ceilings have spalled in specific areas. Corrosion occurs at the points of hanging irons supporting overhead pipes. Virtually all of the parging of the terra-cotta roof tiles at the boiler room ceiling have been destroyed. The exposed steel beams are surface corroded.

The second floor rooms along the south wall are generally in good condition. The plaster in these rooms is intact, with two small isolated spots of spalling plaster and some general peeling paint. In contrast, the plaster condition of hallway H202 and room 208 at the east is poor. Plaster has fallen off completely in some areas and is bulging in others, due to the constant wall washing from above. The same condition continues in the eastern row of rooms and the connecting hallway. The hallway plaster is almost completely destroyed. Sections of metal ceiling lath and the west brick stack wall are exposed. Ceiling bulges

here give further evidence of the damage caused by the leaking roof above.

5. Architectural Significance

The "Existing Condition Survey" (Appendix A) also evaluated the rooms in the powerhouse for architectural significance. A range of significance was developed for existing architectural spaces in the powerhouse. The ranking of spaces for architectural significance is relative to the specific architectural context of this building. Certain factors were considered in evaluating the spaces:

- Volume, size, nonumentality, proportions
- Quality of materials
- Overall design
- Uniqueness of the design, rare features.

The classification of "most architectural significance" was assigned to spaces which have the greatest architectural character in the building. Such spaces generally exhibit monumental proportions and their design, materials, and workmanship are of a high quality. They are often unique volumes. The two-story skylit boiler room (105) is the only space of "most architectural significance" in the powerhouse.

The classification of "some architectural significance" denotes spaces which have a moderate amount of architectural character. Volume, size, monumentality, and proportions may distinguish them from the more common and generally smaller spaces in the building. Careful attention was given to the use of materials and the execution of details. No spaces of "some architectural significance" were found in the powerhouse.

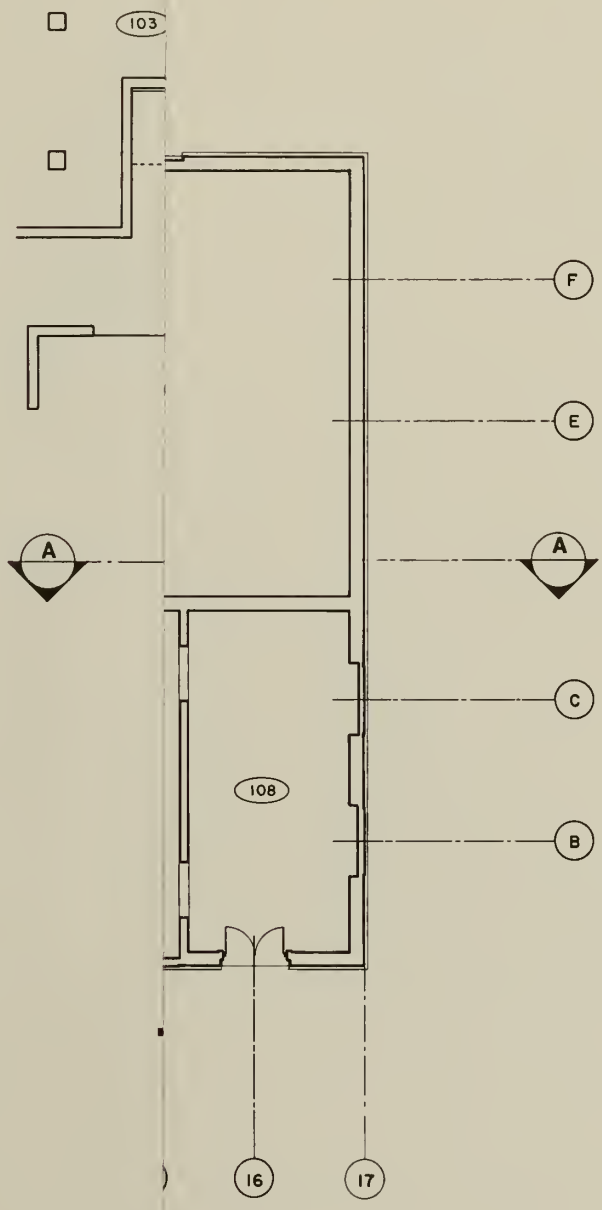
The classification of "minor architectural significance" was assigned to spaces which exhibit few architectural pretensions. Materials and workmanship are standard. Volume and proportions are relatively undistinguished. Rooms are common for their type.

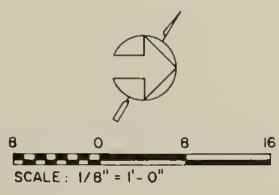
The classification "negligible architectural significance" was assigned to spaces which have no architectural character. They are often very small and of standard materials and design.

Standard finishes throughout the building reflect the utilitarian function of the building. All rooms except the boiler room were classified as having "minor" or "negligible" significance.

The findings of architectural significance have been plotted on graphically-coded floor plans (exhibits 20 and 21).

Exhibit 1





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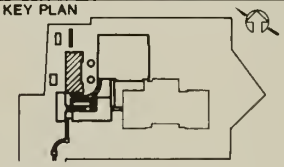

TITLE OF SHEET

POWERHOUSE FIRST FLOOR PLAN

SUB SHEET NO.	DRAWING NO.
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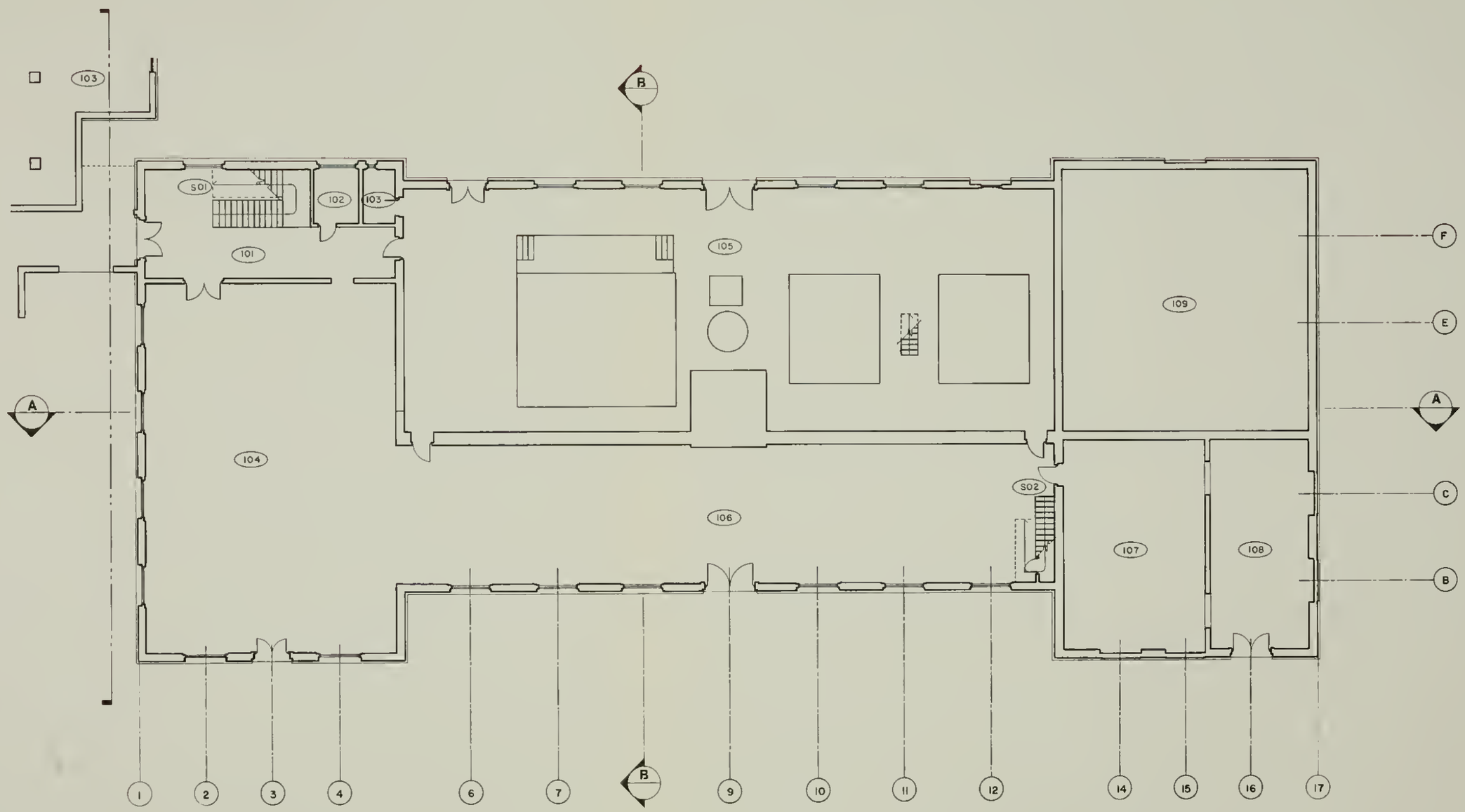

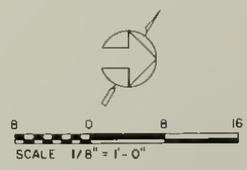

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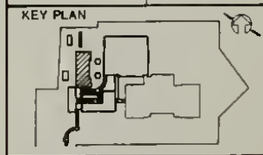

TITLE OF SHEET
POWERHOUSE
FIRST FLOOR PLAN

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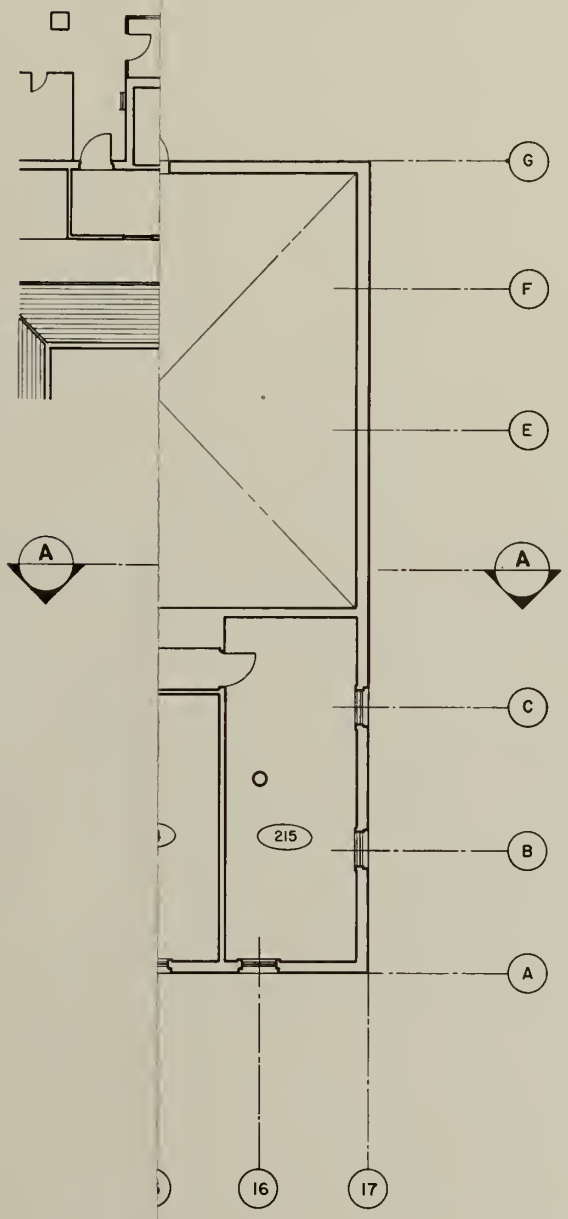
Exhibit 2



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SCALE : 1/8" = 1'-0"

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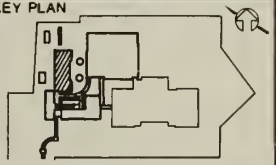

TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

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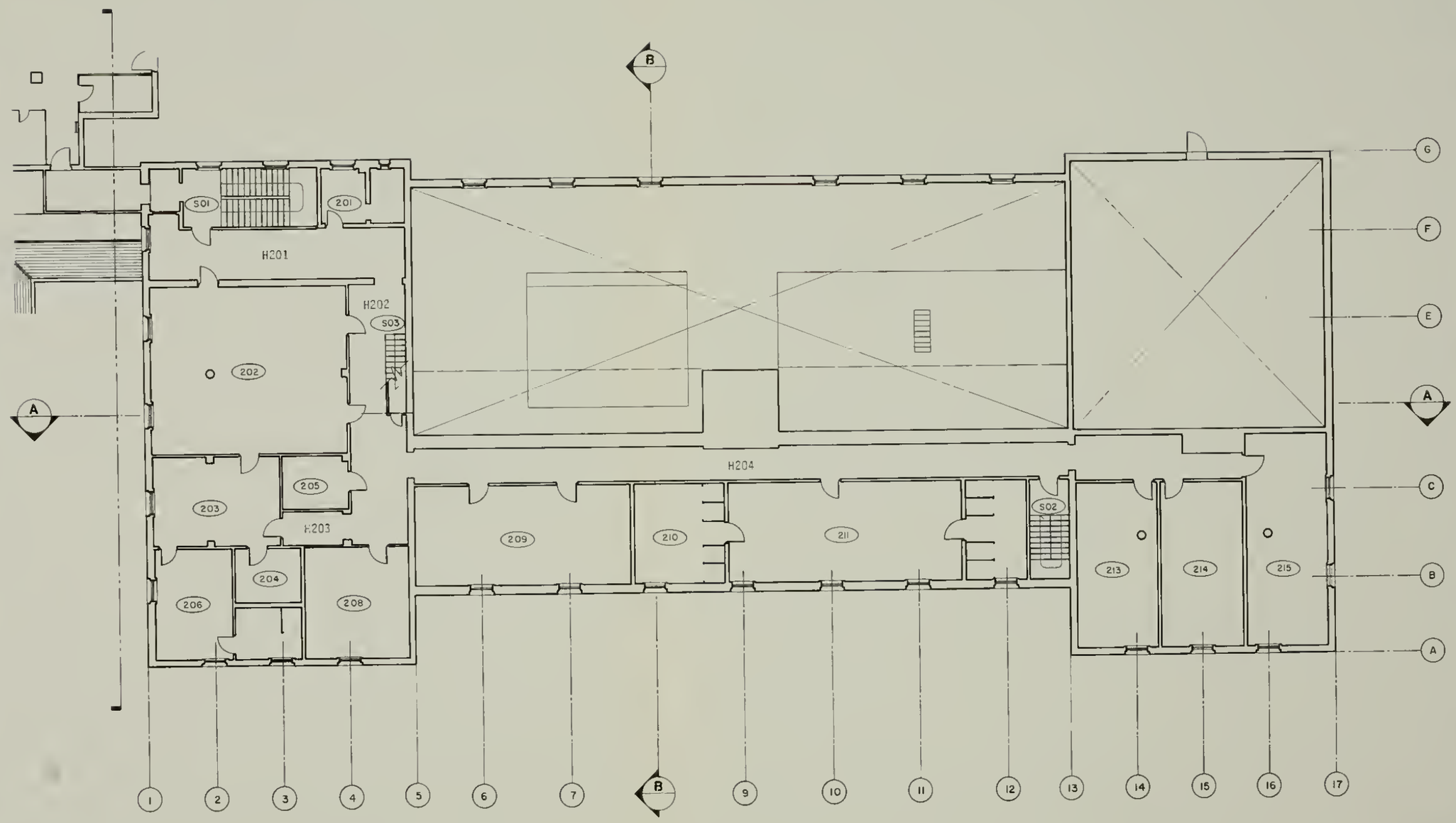
PKG. NO.	SHEET OF

LOUIS FREY

Exhibit 2



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SURVEY OF STRUCTURES UNIT ONE

ELLIS ISLAND

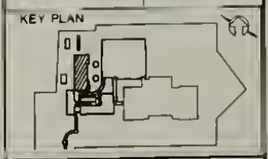
STATUE OF LIBERTY
NATIONAL MONUMENT
NEW YORK / NEW JERSEY

mk	sht	REVISIONS	date	init

DESIGNED: DATE:

DRAWN: TECH REVIEW:

KEY PLAN

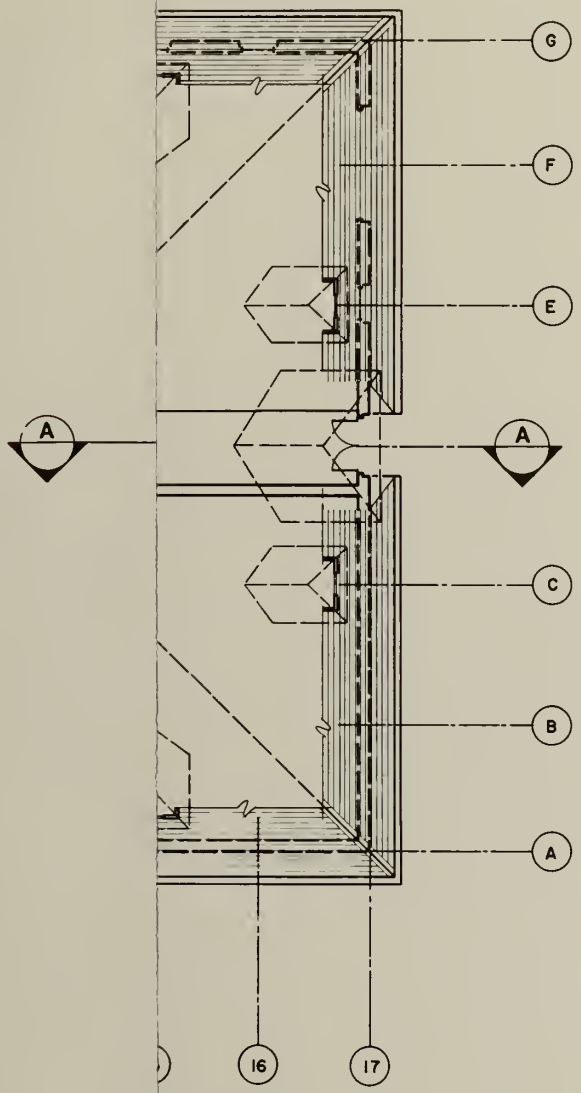


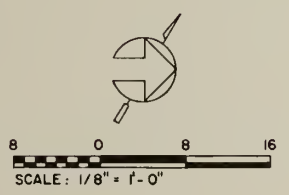
TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

SUB SHEET NO. DRAWING NO.

PKG. NO. SHEET OF

Exhibit 3





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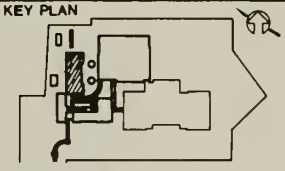
DESIGNED:	DATE:
DRAWN:	TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
THIRD FLOOR PLAN

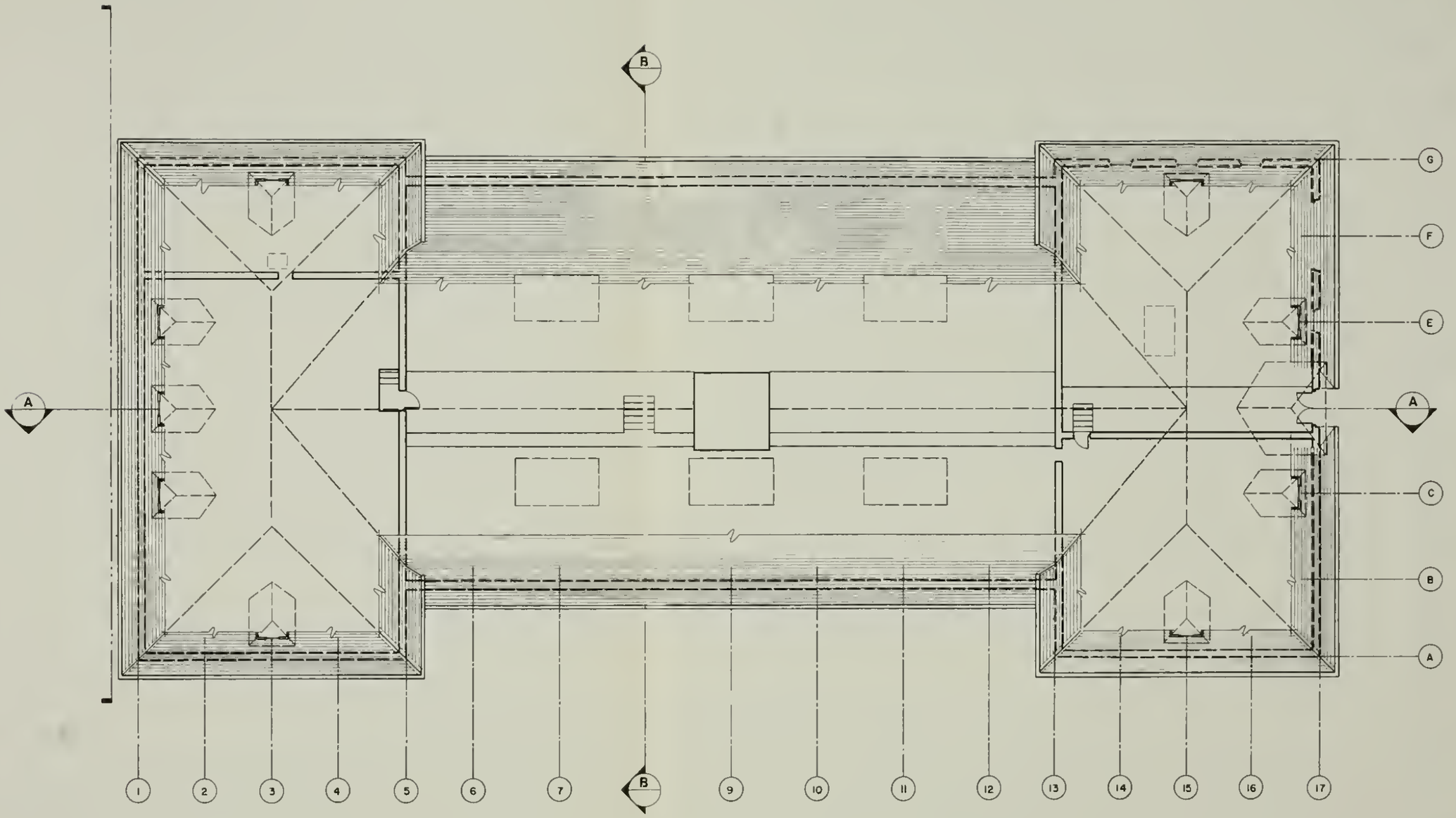
SUB SHEET NO.	DRAWING NO.

PKG. NO. ____

SHEET ____ OF ____

LOUIS FREY

Exhibit 3



8 0 8 16
SCALE 1/8" = 1'-0"

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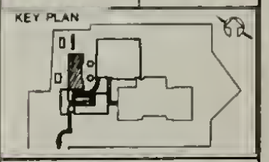
DESIGNED:	DATE:
DRAWN:	TECH REVIEW:

KEY PLAN

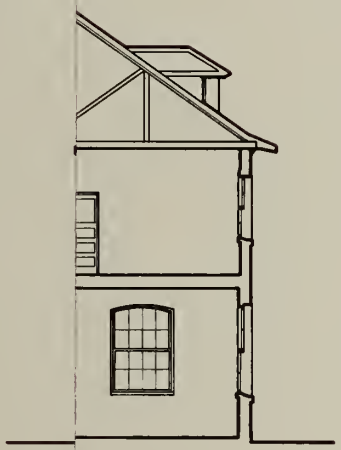


TITLE OF SHEET
POWERHOUSE
THIRD FLOOR PLAN

SUB SHEET NO.	DRAWING NO.

PK.G. NO. | SHEET | OF

Exhibit 4



8 0 8 16
SCALE: 1/8" = 1'-0"

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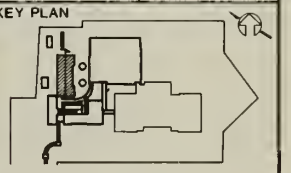
DRAWN:	TECH REVIEW:

KEY PLAN



TITLE OF SHEET

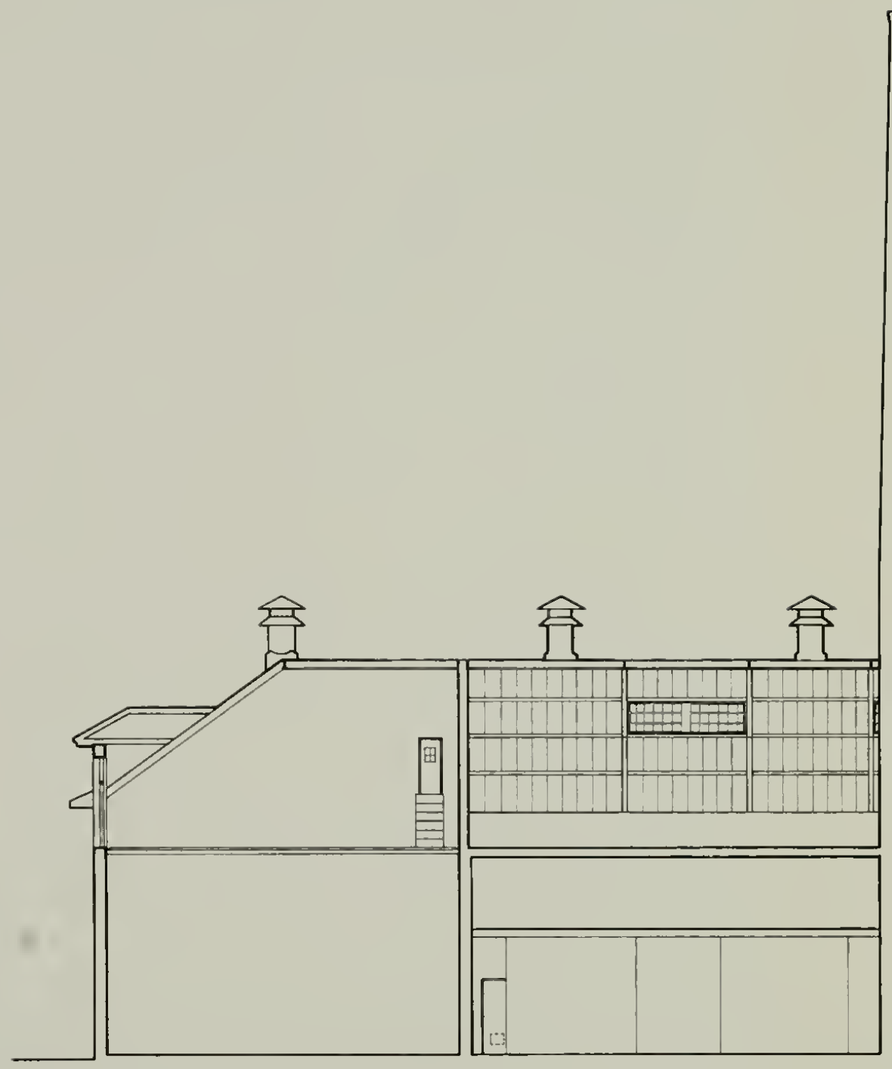
POWERHOUSE
SECTION A-A

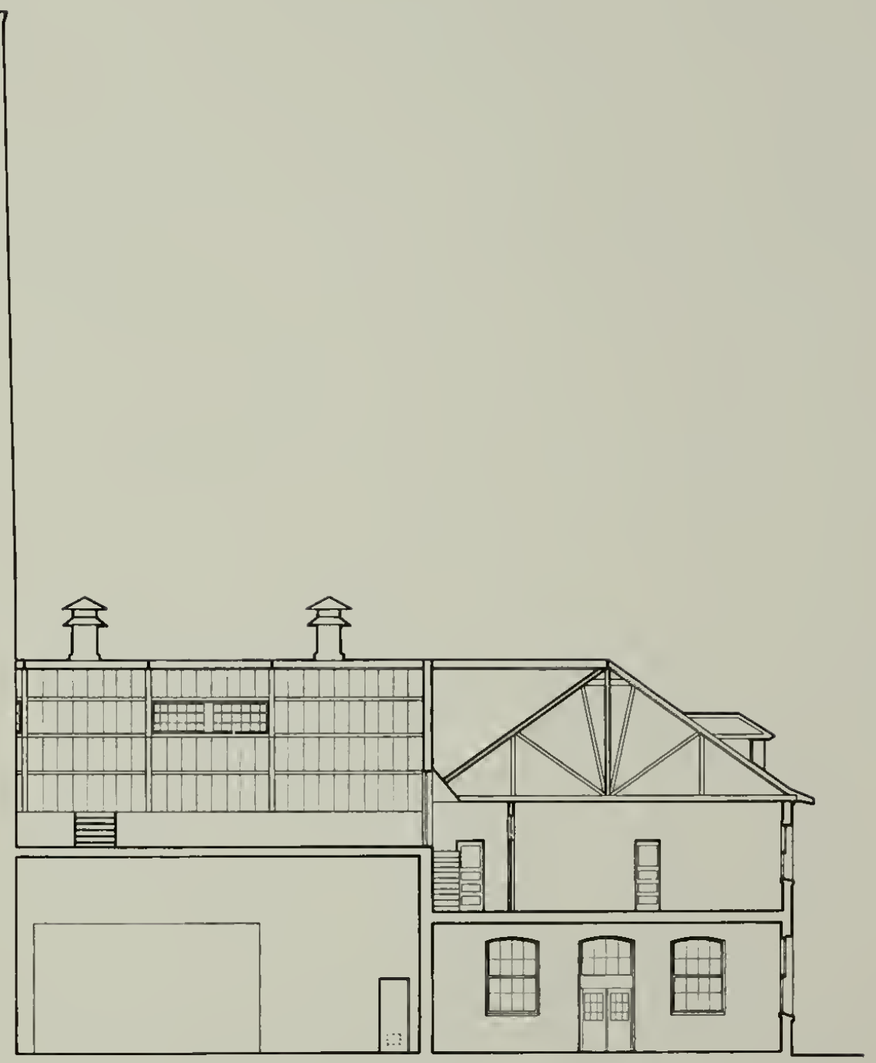
SUB SHEET NO.	DRAWING NO.

PKG. NO.	SHEET
	OF ___

LOUIS FREY

Exhibit 4





8 0 8 16
SCALE · 1/8" • 1'-0"

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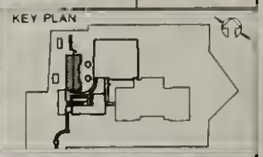
DRAWN | TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
SECTION A-A

SUB SHEET NO. | DRAWING NO.

PROJ. NO. | SHEET OF

Exhibit 5

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DSC | JUL 88

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NATIONAL MONUMENT
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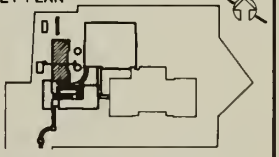
DESIGNED: | DATE:

DRAWN: | TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
SECTION B - B

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET

OF ____

8 0 8 16
SCALE: 1/8" = 1'-0"

LOUIS PREY

Exhibit 5

8 0 8 16
SCALE 1/8" = 1'-0"

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NATIONAL MONUMENT
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mk	sht	REVISIONS	date	ini

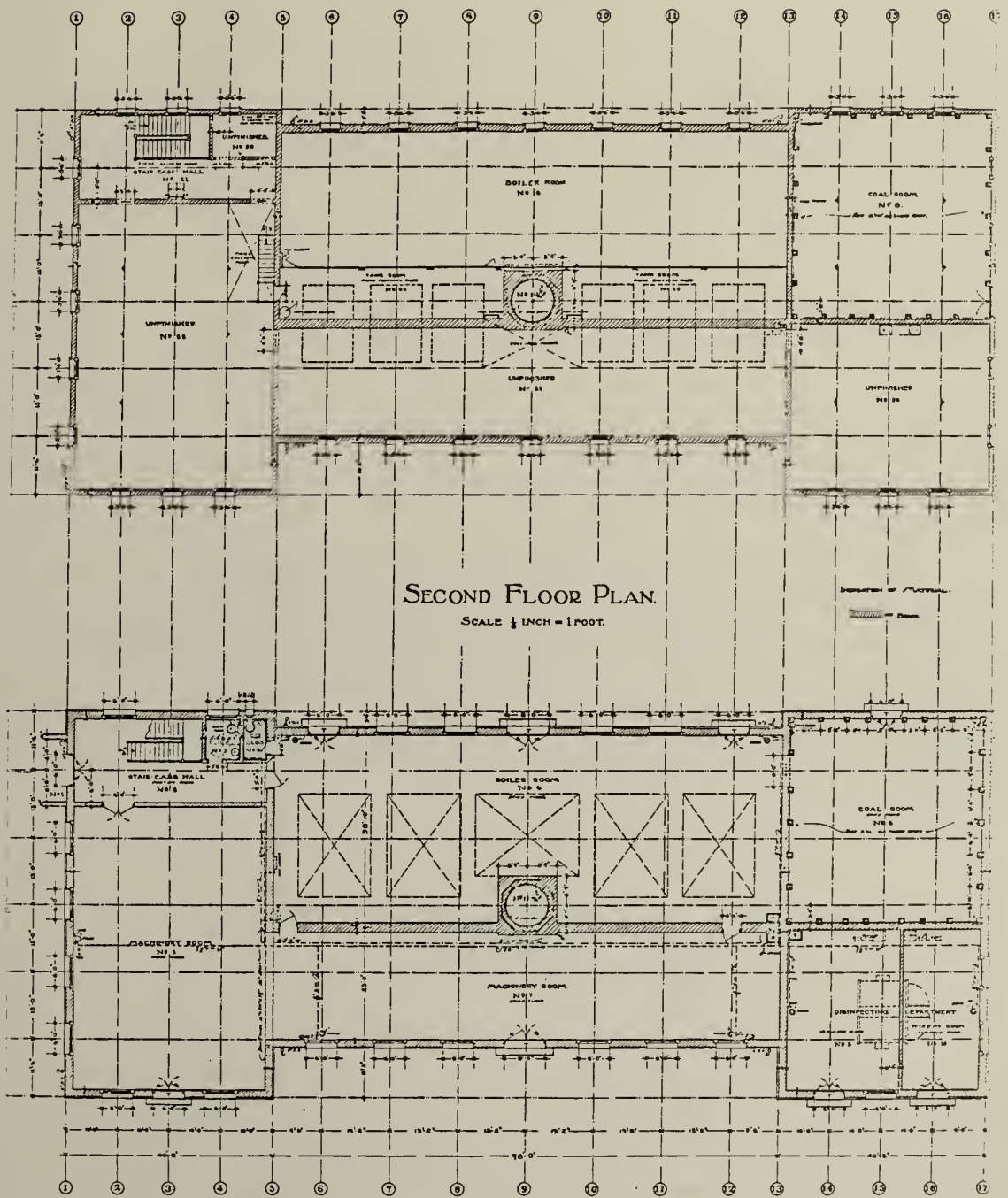
DESIGNED:	DATE:
DRAWN:	TECH REVIEW:

KEY PLAN

TITLE OF SHEET
POWERHOUSE
SECTION B-B

SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET OF

Exhibit 6



SECOND FLOOR PLAN.
SCALE ⅛ INCH = 1 FOOT.

FIRST FLOOR PLAN.
SCALE ⅛ INCH = 1 FOOT.

ENT STATION
N.Y. HARBOR
FOR SE
BT No. 2.
A. B. Tilton
Architects

·BORING·&·TILTON·Architects·
·32·BROADWAY··NEW·YORK·
·BUILDING·NO·165. ·DRAWN BY
·DRAWING·NO· 6 ·TRACED BY
·DELIVERED · ·APPROVED BY

Approved
Supervising Architect,
Treasury Department.

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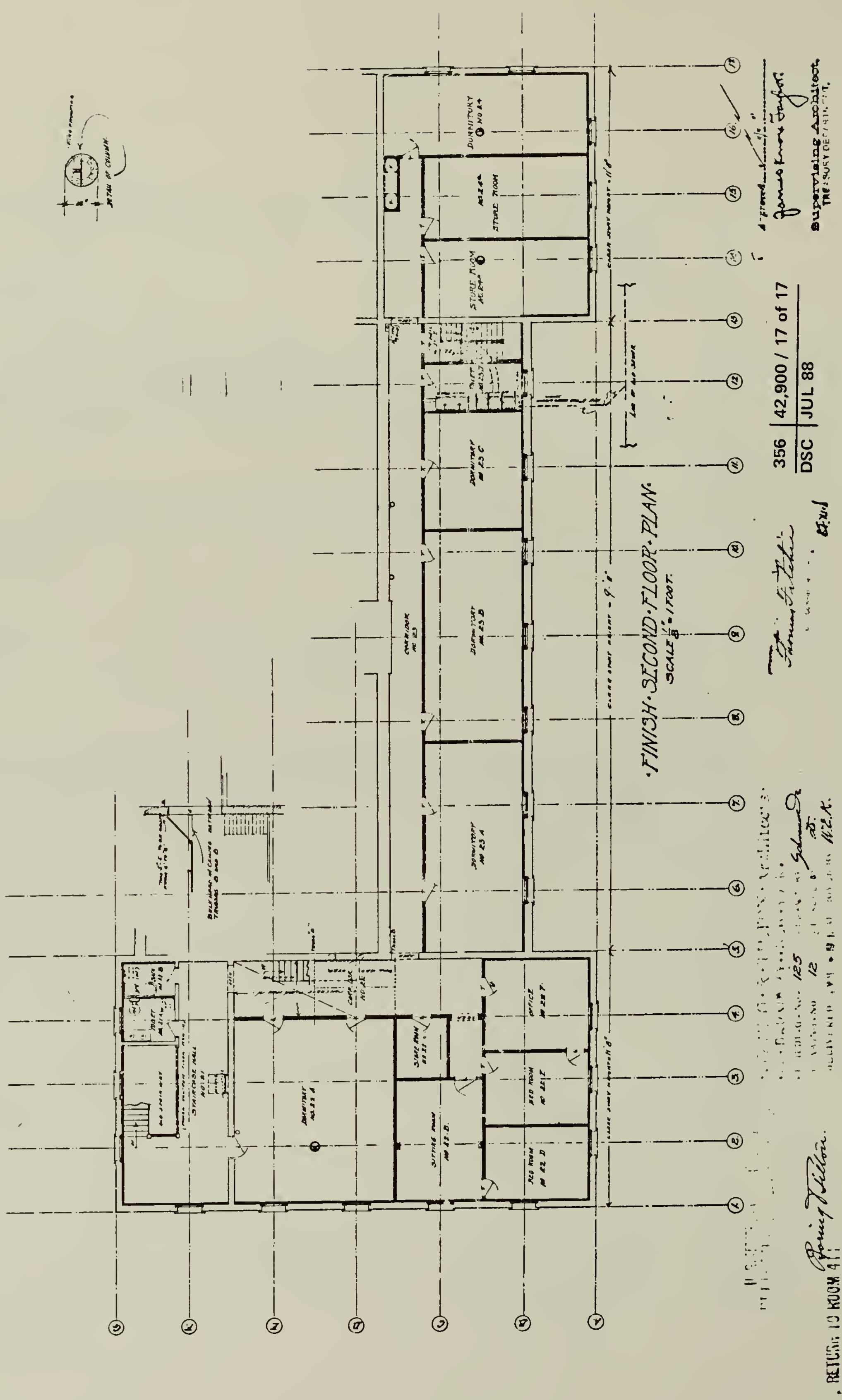
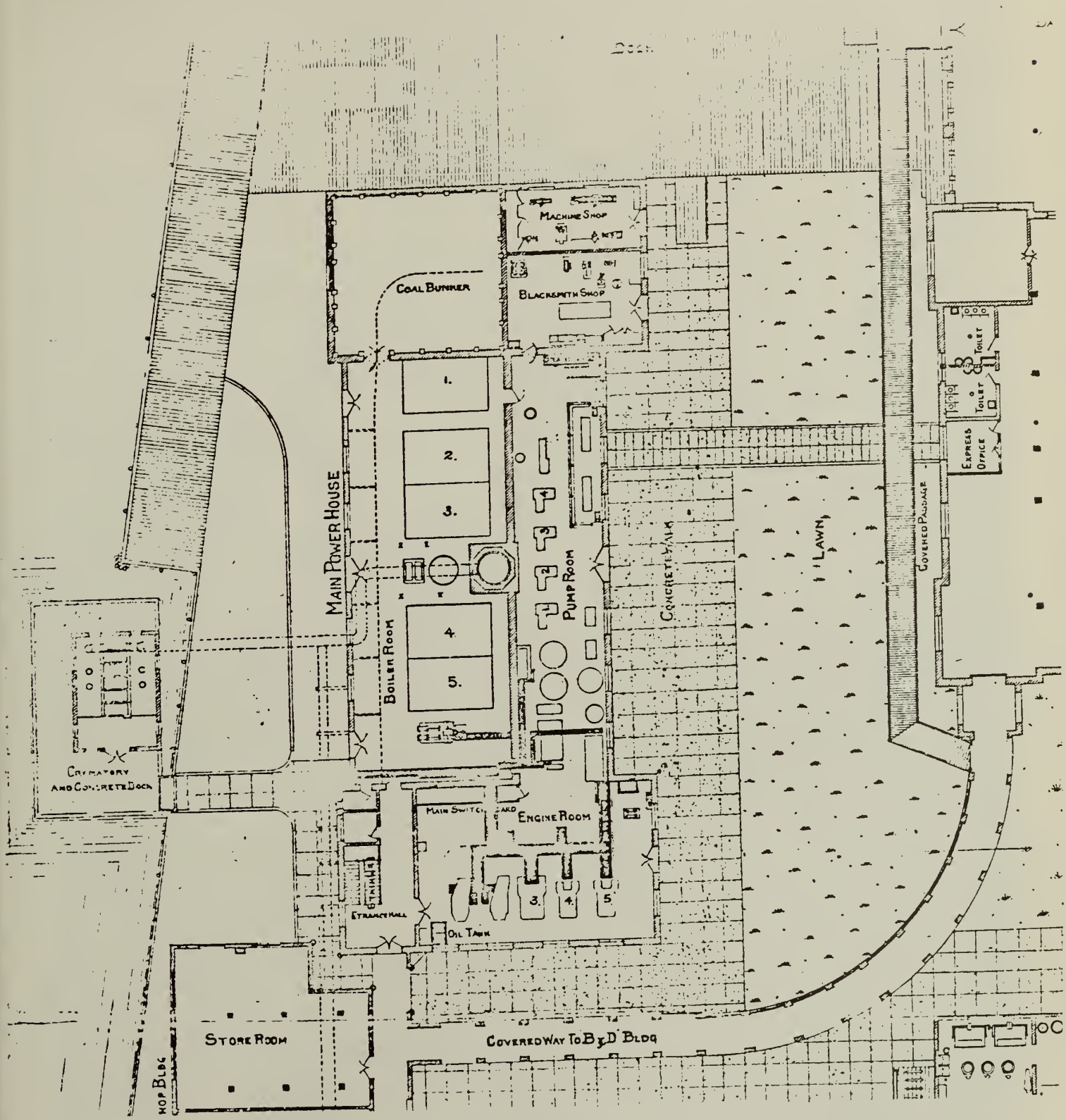
Exhibit 7



·FINISH·SECOND·FLOOR·PLAN·
SCALE 1/8" = 1 FOOT.
356 | 42,900 / 17 of 17
DSC | JUL 88
Supervising Architect
RETURN TO ROOM 411



1916- First floor plan, powerhouse.

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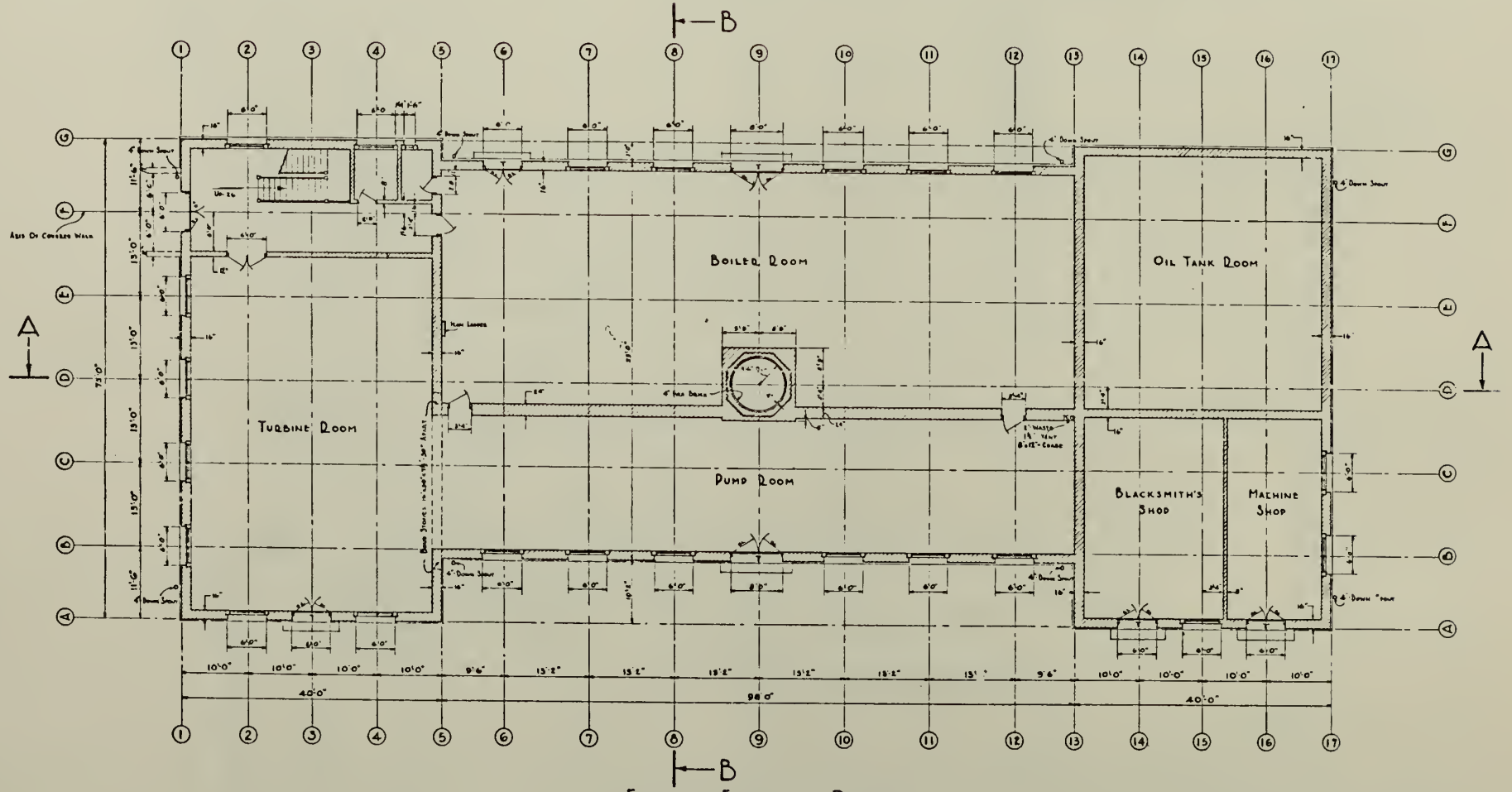


·First·Floor·Plan·

· Scale— ⅛ inch = 1 Foot ·

·First·Floor·Plan·
·Power·House·
·Island·No. 1·
U.S. Department of Labor
Immigration & Naturalization Service
Ellis Island
New York Harbor, New York

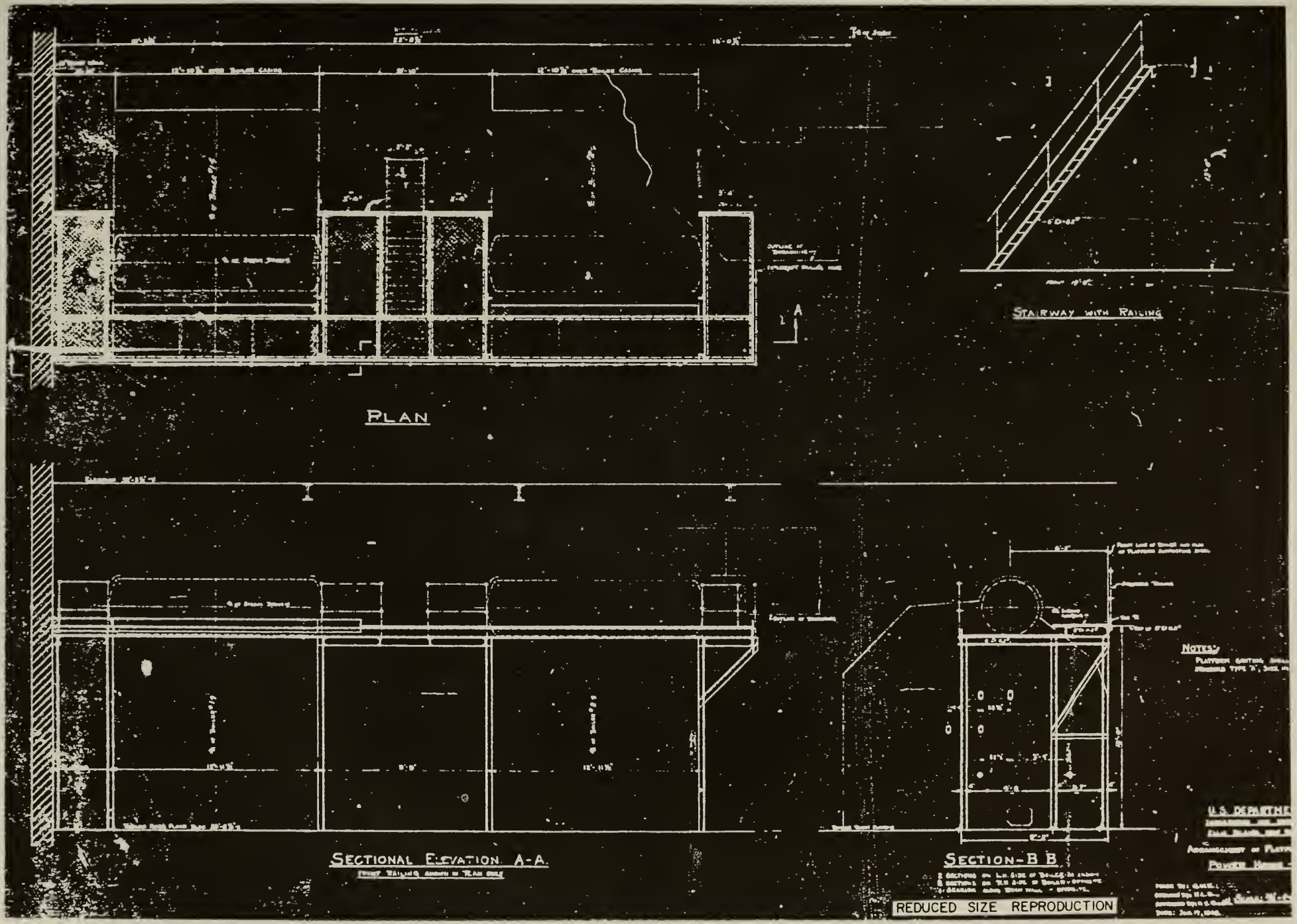
356	42,908 / Sheet 1
DSC	JUL 88

Drawn By:
Traced By: J.W. Cousens
Checked By:
Approved: 193
Drawing No. D
File No.

1932- First floor plan, coal bunker becomes "Oil Tank Room"

REDUCED SIZE REPRODUCTION

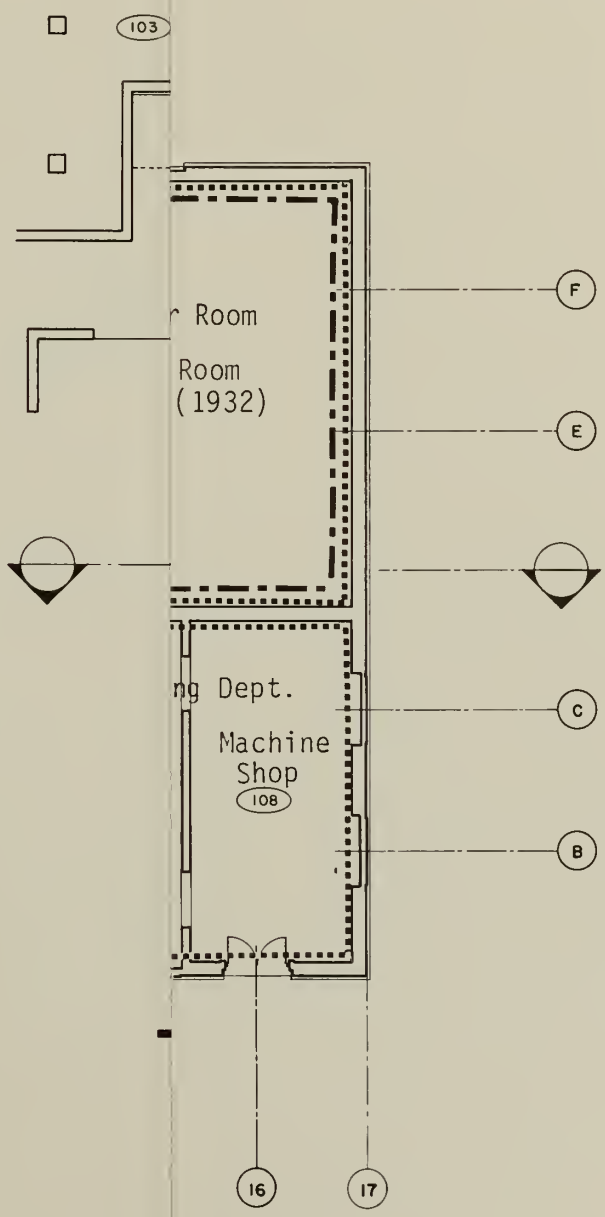
Exhibit 9



1948- Arrangement of platform for altered boilers.

Exhibit 10

Exhibit 11



8 0 8 16
SCALE: 1/8" = 1'-0"

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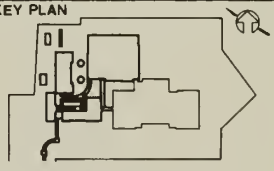
SURVEY OF STRUCTURES UNIT ONE

ELLIS ISLAND
STATUE OF LIBERTY
NATIONAL MONUMENT
NEW YORK / NEW JERSEY

mk	sht	REVISIONS	date	ini

DESIGNED: | DATE:
DRAWN: | TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
FIRST FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET ___ OF ___

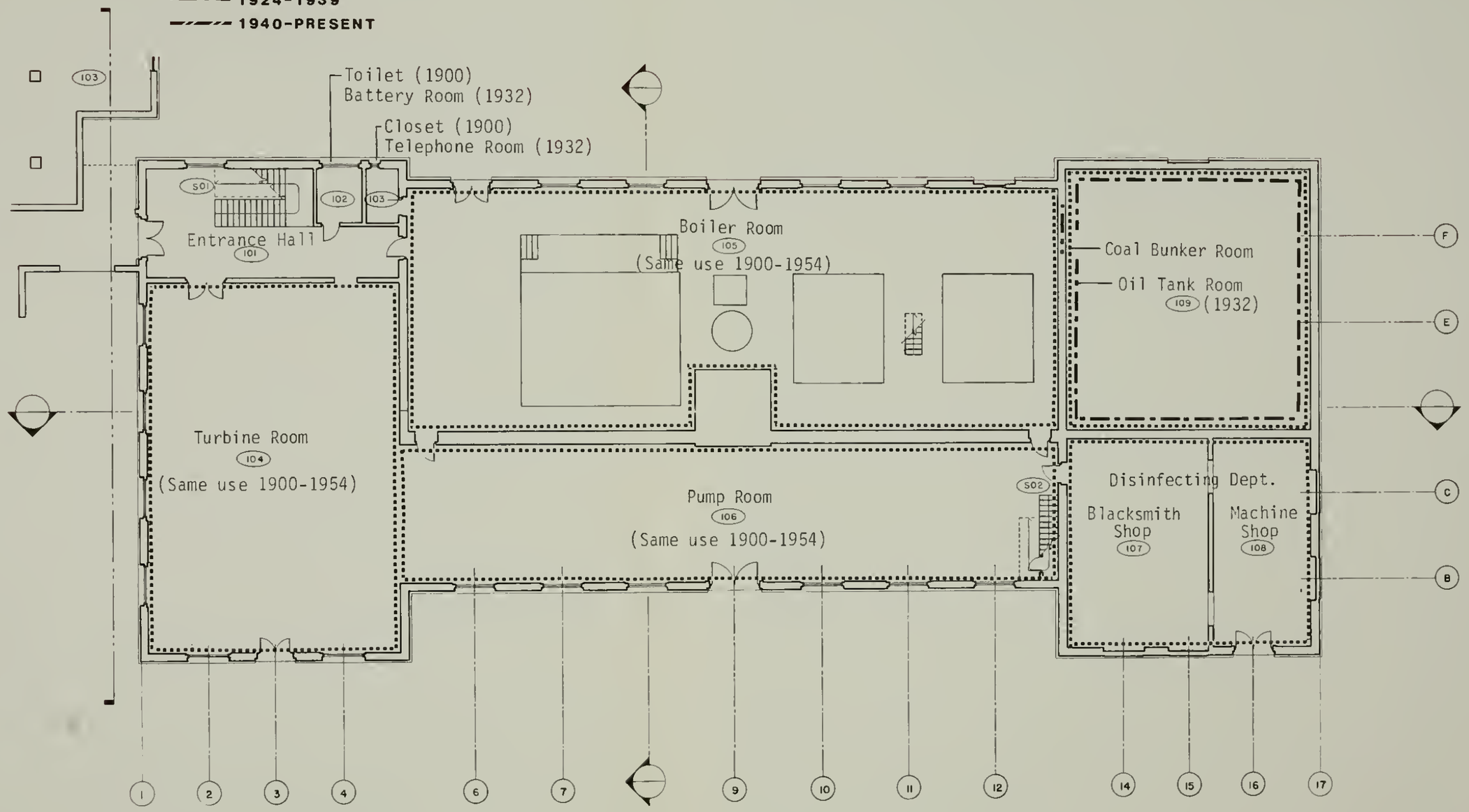
HISTORICAL DEVELOPMENT AND ROOM USES

Exhibit 11

····· 1900-1923

·— · — 1924-1939

—//—// 1940-PRESENT



8 0 8 16

SCALE 1/8" = 1'-0"

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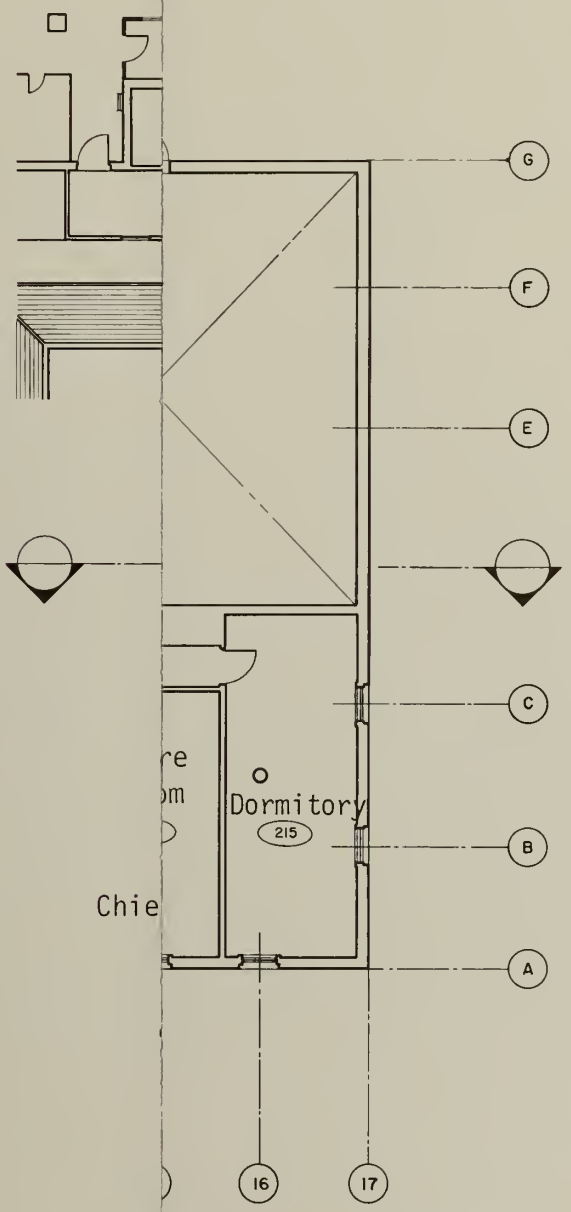
KEY PLAN

TITLE OF SHEET
POWERHOUSE FIRST FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET OF

Exhibit 12



8 0 8 16
SCALE: 1/8" = 1'-0"

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STATUE OF LIBERTY
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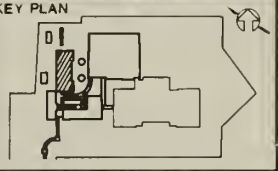
NEW YORK / NEW JERSEY

mk	sht	REVISIONS	date	ini

DESIGNED: | DATE:
DRAWN: | TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

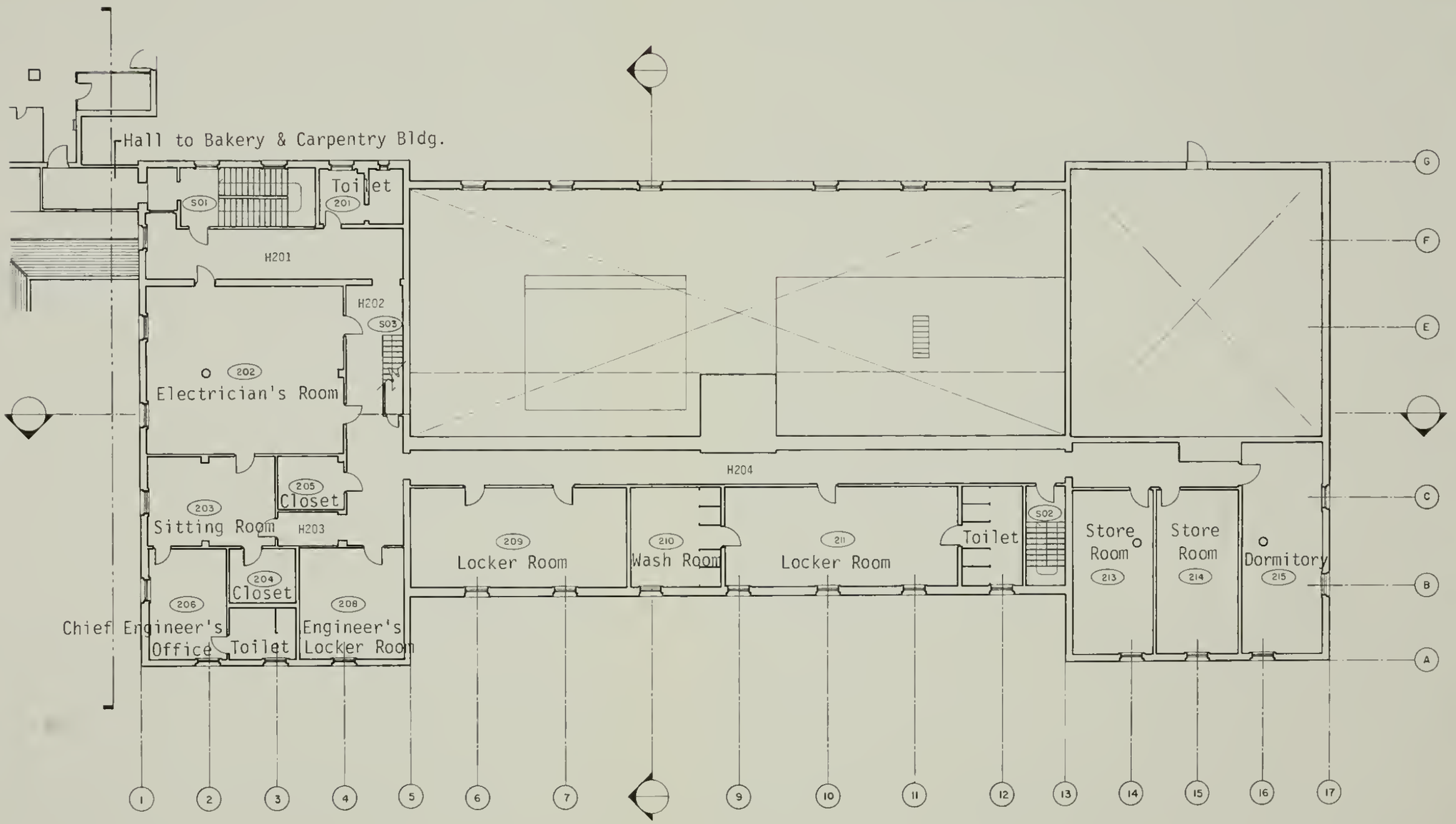
PKG. NO. | SHEET OF

LOUIS PREY

HISTORICAL DEVELOPMENT AND ROOM USES

Exhibit 12

No changes throughout use of building.



8 0 8 16
SCALE 1/8" = 1'-0"

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[redacted]

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DESIGNED: DATE:
DRAWN: TECH REVIEW:

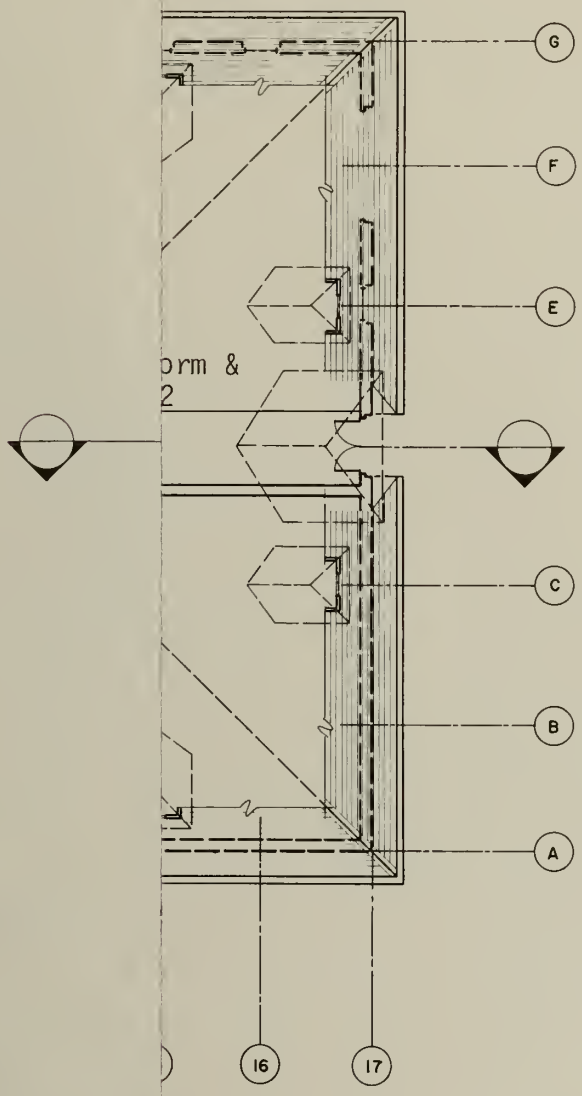
KEY PLAN

TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

508 SHEET NO. DRAWING NO.

PKG NO SHEET OF

Exhibit 13



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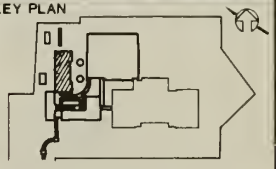
DESIGNED:	DATE:
DRAWN:	TECH REVIEW:

KEY PLAN

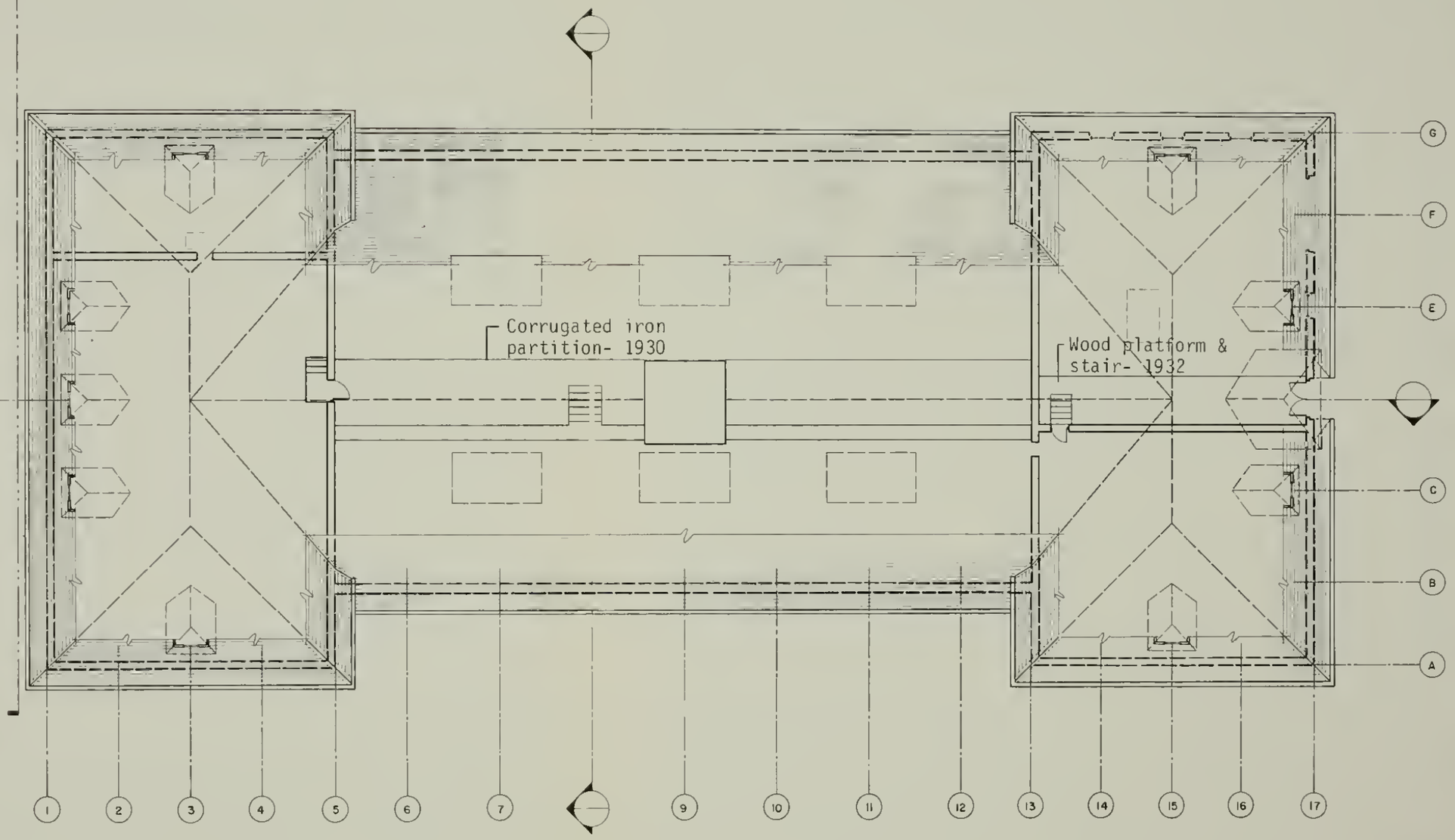


TITLE OF SHEET

POWERHOUSE THIRD FLOOR PLAN

SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET / OF

LOUIS FREY



8 0 8 16
SCALE 1/8" = 1'-0"

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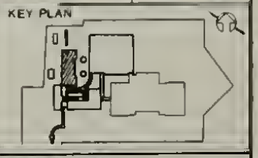
KEY PLAN

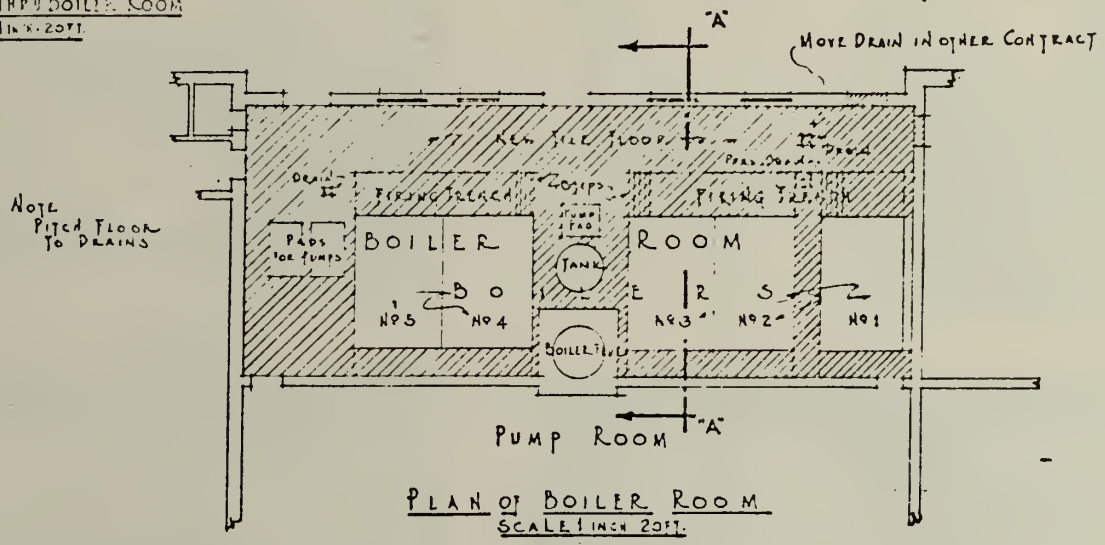


TITLE OF SHEET
POWERHOUSE
THIRD FLOOR PLAN

SUB SHEET NO. DRAWING NO.

PKG. NO. SHEET OF

SECTION "A-A" THRU BOILER ROOM
SCALE 1 INCH = 2 FT.



NOTE
PITCH FLOOR TO DRAINS

PLAN OF BOILER ROOM
SCALE 1 INCH 2 FT.

CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR SAME

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DSC	JUL 88

TILE FLOORING FOR BOILER ROOM
POWER HOUSE, ISLAND No 1, ELLIS ISLAND.
FILE No 98529 - 383
RAYMOND L. MYERS APRIL 29, 1932
SCALE 1 INCH = 2 FT.

Approved April 29, 1932 H. J. Bault Asst. Eng.

1932- Tile flooring for boiler room.

ELLIS ISLAND — EXISTING CONDITION SURVEY — POWERHOUSE — page: 68

ROOM NO: 209 LAST KNOWN USE: LOCKER RM. SQUARE FEET: 472. CEILING HEIGHT: 10'-2" DATE: 10/3/84

	FINISHES:	CONDITION:	DATE:	NOTES:
FLOOR:	☐ Tile ☐ Vinyl ☒ Concrete ☐ Other:	☐ Good ☐ Fair ☐ Poor ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	DEBRIS
BASE:	☒ Wood ☐ Tile ☐ Tile Wainscot ☐ Other:	☐ Good ☐ Fair ☐ Poor ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	DEBRIS
WALLS:	☒ Plaster ☐ Gypsum Board ☐ Partitions ☐ Other:	☐ Good ☐ Fair ☒ Poor ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	E- DESTROYED - EXPOSED T.C. BLOCK MOST OF S. - EXPOSED BRICK
CEILING:	☒ Plaster ☐ Acoustic panels ☐ Cove ☐ Other:	☐ Good ☐ Fair ☒ Poor OVER 50% ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	CENTER SECTION - DESTROYED N SECTION - LATH - BULDGING SE CORNER - DESTROYED
DOORS/ OPENINGS:	☒ Wood/Glass Panelled ☐ Wood Veneer ☐ Galvanized Metal ☐ Other:	☐ Good ☒ Fair ☐ Poor ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	N. - WIRE GLASS / 3 WOOD S. - "
LIGHTING:	☐ Incandescent/Type A ☐ Incandescent/Type B ☐ Incandescent/Type C ☒ Other:	☐ Intact ☐ Destroyed ☐ Intact ☐ Destroyed ☐ Intact ☐ Destroyed ☐ Intact ☐ Destroyed	☐ Pre-1924 ☒ Post-1924 ☐ In Question	2 CEILING BULBS
HEATING/ VENTILATION PLUMBING:	☒ Radiators ☒ Vents/Fans ☒ Sink/Toilet/Urinal ☒ Other: SHOWER	2 Intact ☐ Destroyed 1 Intact ☐ Destroyed 2 Intact ☐ Destroyed 2 Intact ☐ Destroyed	☒ 1900-1923 ☒ 1924-1939 ☒ 1940-Present ☐ In Question	CEILING VENT FAN TO ATTIC 2 - 1920'S SINKS 2 - ALUMIN. ENCLOSED SHOWER UNITS
MISCELLANEOUS:	☐ ☐ ☐ ☐ ☐	☐ Good ☐ Fair ☐ Poor ☐ Destroyed	☐ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	METAL LOCKERS 3 OAK WARDROBES - POOR 1 DESTROYED
SUMMARY:		☐ Good ☐ Fair ☒ Poor ☐ Destroyed	☒ 1900-1923 ☐ 1924-1939 ☐ 1940-Present ☐ In Question	**ARCHITECTURAL SIGNIFICANCE:** ☐ Most ☐ Some ☒ Minor

Exhibit 15

PHOTOGRAPHS: (1 SE (2) NE (3) NW (4) SE ROOM NO. 209

ROOM NO: 501 LAST KNOWN USE: STAIR TO SECOND FLOOR SQUARE FEET: CEILING HEIGHT: DATE: 10/3/84

Description:

General: Main stairway, located in southwest corner of building, is composed of cast iron risers and channel strings, wrought iron baluster and decorative scrolls along the stringer edges, octagonal cast iron newel post at first floor landing. Open stairwell has two equal runs from midway platform.

Floor: Slate treads, concrete platform and second floor landing. First floor landing tile of white hexagonal tile.

Walls: Painted brick.

Ceiling: Plaster over metal lath.

Lighting: One ceiling mounted bulb and one drop cord socket.

Misc.: Rounded wood handrail.

Condition:

General: All ironwork, surface corroded. Balustrade corroding at bases. All metal surfaces badly flaking paint and corroded.

Floor: Generally good. First floor landing tile cracked and floor sagged at center.

Walls: Badly flaking paint.

Ceiling: Fair. Peeling paint and plaster spalling. Exposed lath in northern corner.

Lighting: Missing shades.

Misc.: Intact, worn.

Exhibit 16

SUMMARY:

- [ ] Good
- [x] Fair
- [ ] Poor

- [x] 1900-1923
- [ ] 1924-1939
- [ ] 1940-Present

ARCHITECTURAL SIGNIFICANCE:

- [x] Most
- [ ] Some
- [ ] Minor

BASE
Tile / Tile Wainscot

GOOD

85-100% intact.
Few or no cracks forming. Minimum number of tiles missing.

FAIR

60-85% intact.
Some cracks in localized areas.
Some tiles missing.

POOR

30-60% intact.
Large areas missing, sizable cracks present.

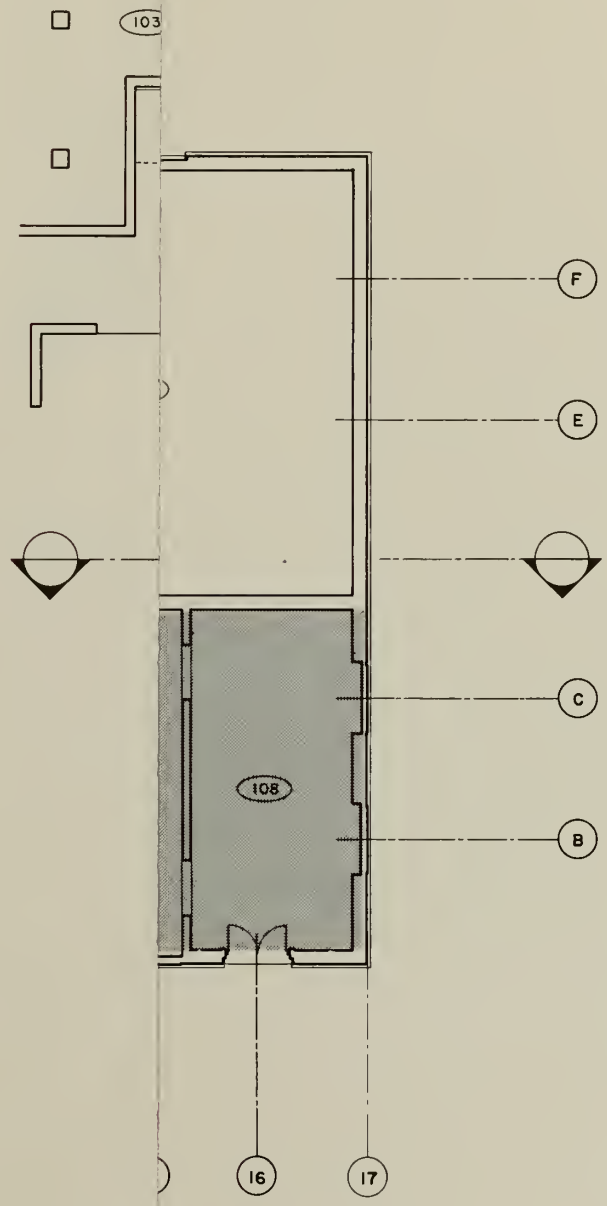
DESTROYED

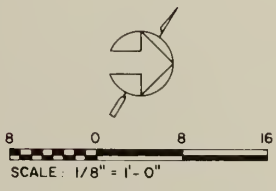
0-30% intact.
Material is completely missing or is destroyed beyond practical retrieval.

Exhibit 17

PHOTOGRAPHS: (1) FROM FIRST FLOOR LANDING (2) FROM PLATFORM (3) FROM TOP LANDING ROOM NO. 501

Exhibit 18





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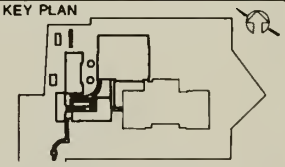
ELLIS ISLAND

STATUE OF LIBERTY
NATIONAL MONUMENT
NEW YORK / NEW JERSEY

mk	sht	REVISIONS	date	ini

DESIGNED: | DATE:
DRAWN: | TECH REVIEW:

KEY PLAN



TITLE OF SHEET
POWERHOUSE
FIRST FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET

OF ___

LOUIS FREY

Exhibit 18

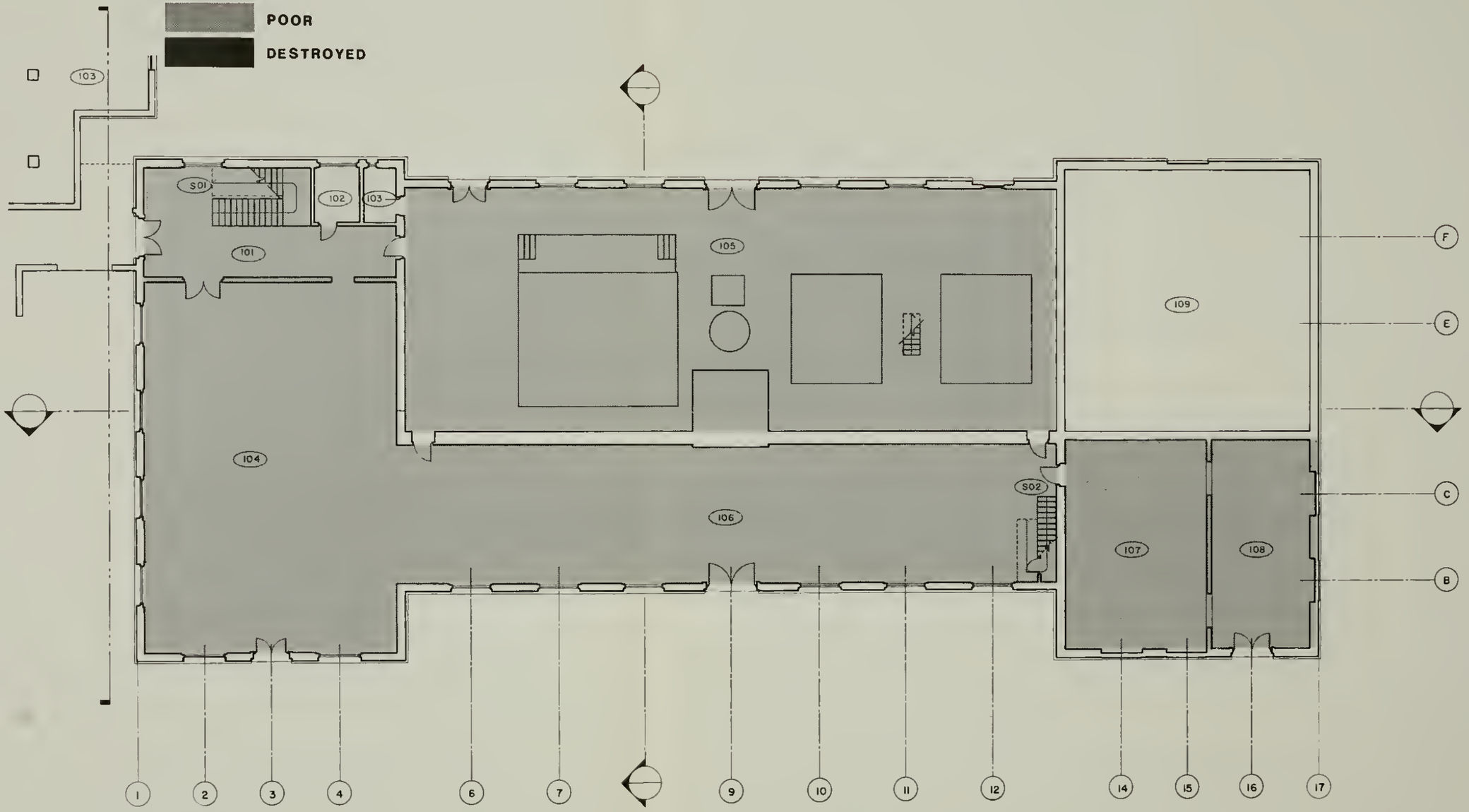
EXISTING CONDITIONS

GOOD

FAIR

POOR

DESTROYED



8 0 8 16

SCALE 1/8" = 1'-0"

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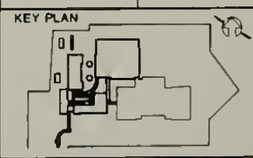
KEY PLAN



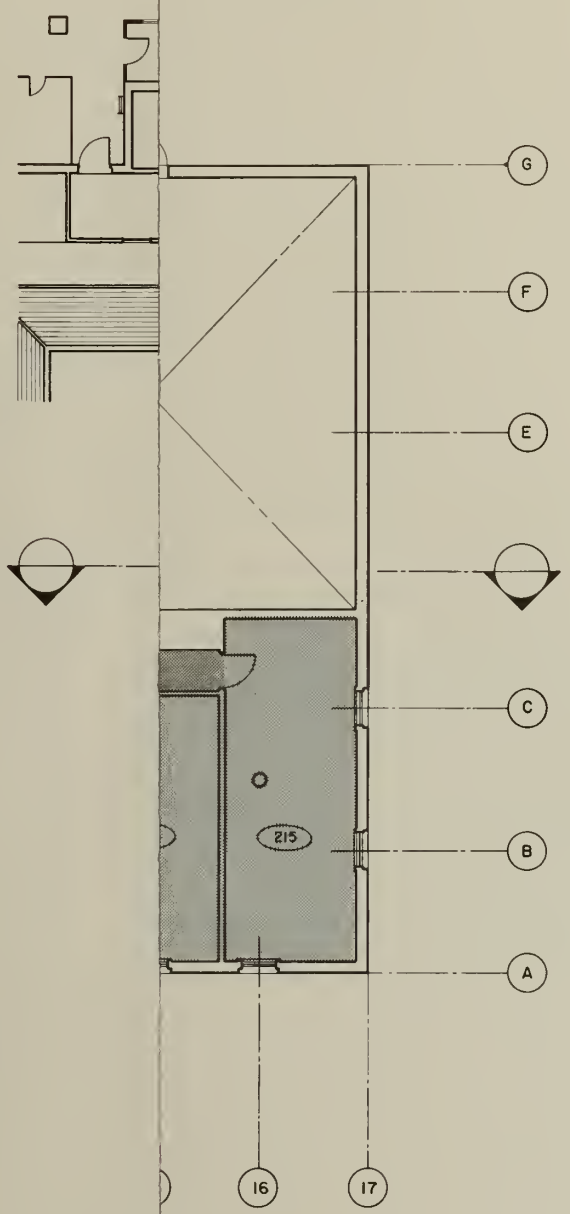
TITLE OF SHEET
POWERHOUSE
FIRST FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET

OF

Exhibit 19



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SCALE : 1/8" = 1'-0"

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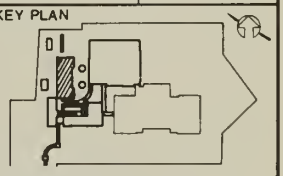
KEY PLAN



TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

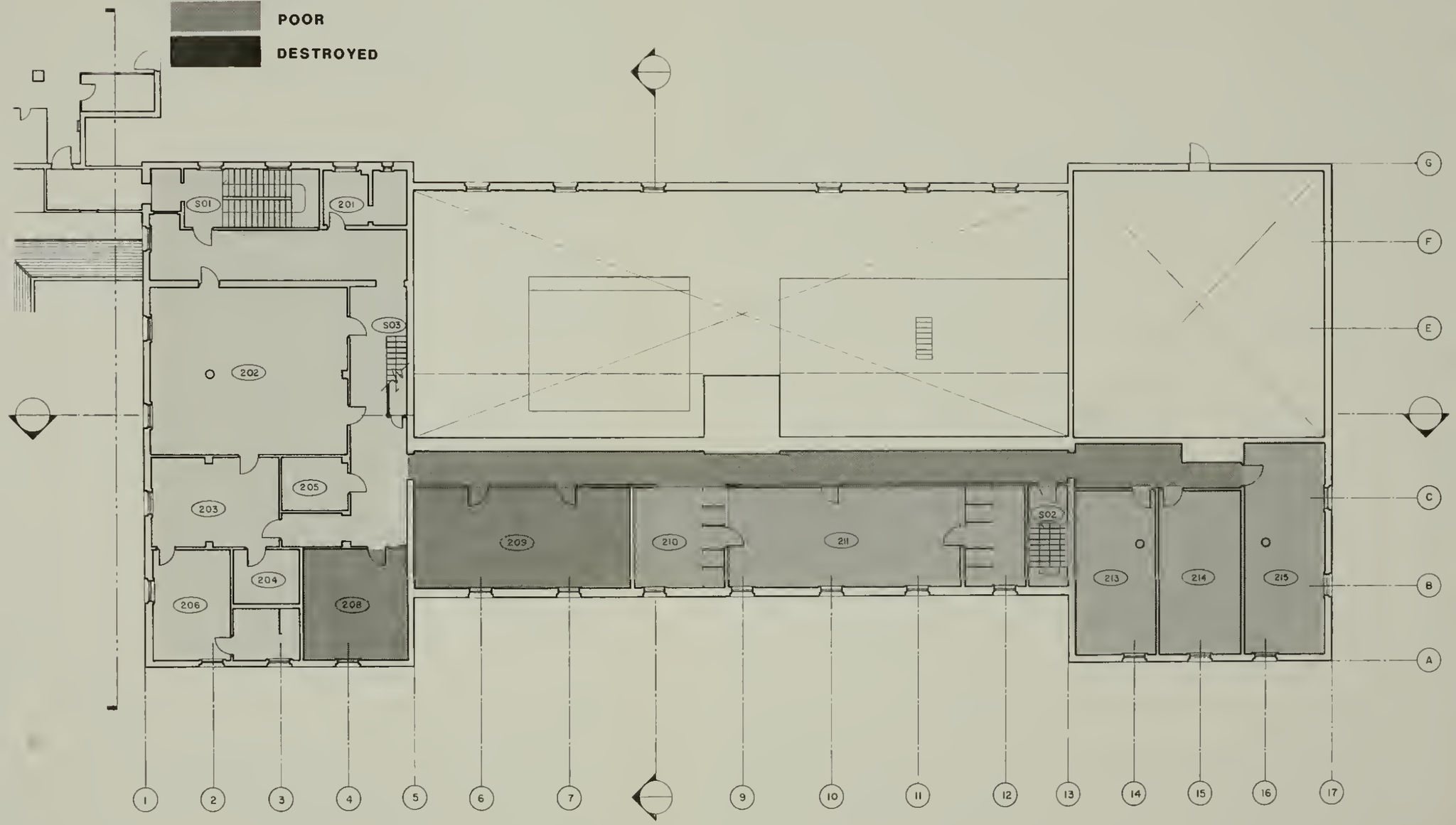
SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET OF ___

LOUIS FAEY

Exhibit 19

EXISTING CONDITIONS

GOOD
FAIR
POOR
DESTROYED



8 0 8 16
SCALE 1/8" = 1'-0"

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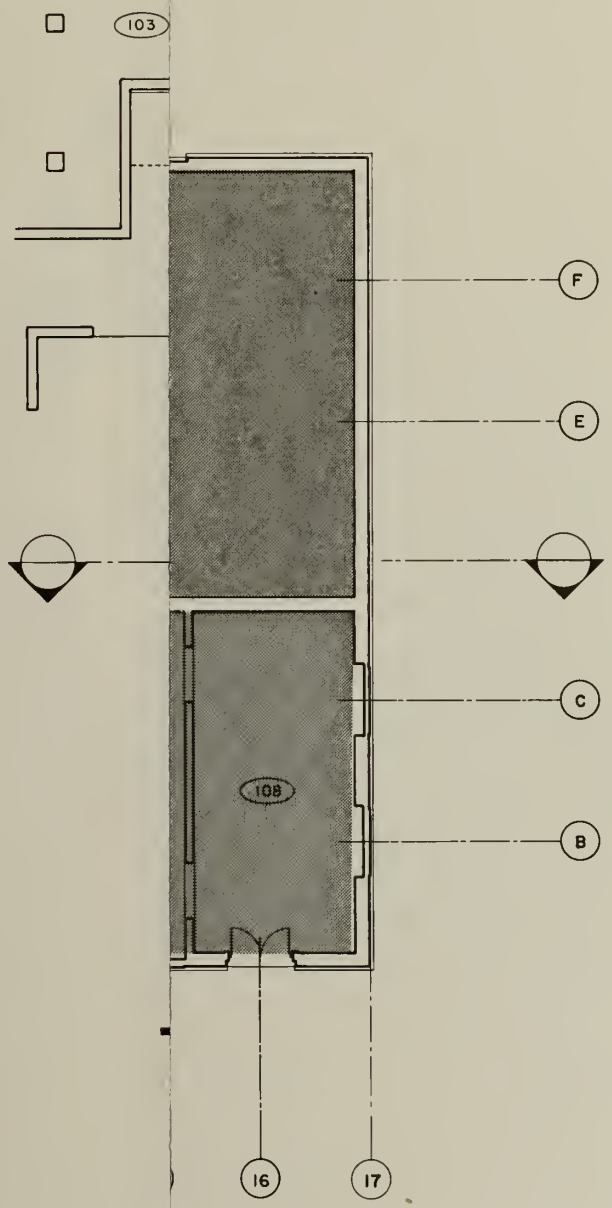
KEY PLAN

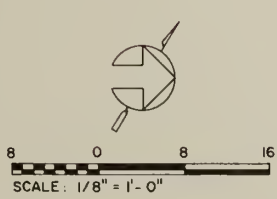
TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

PKG. NO. | SHEET OF

Exhibit 20





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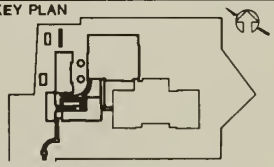
KEY PLAN



TITLE OF SHEET

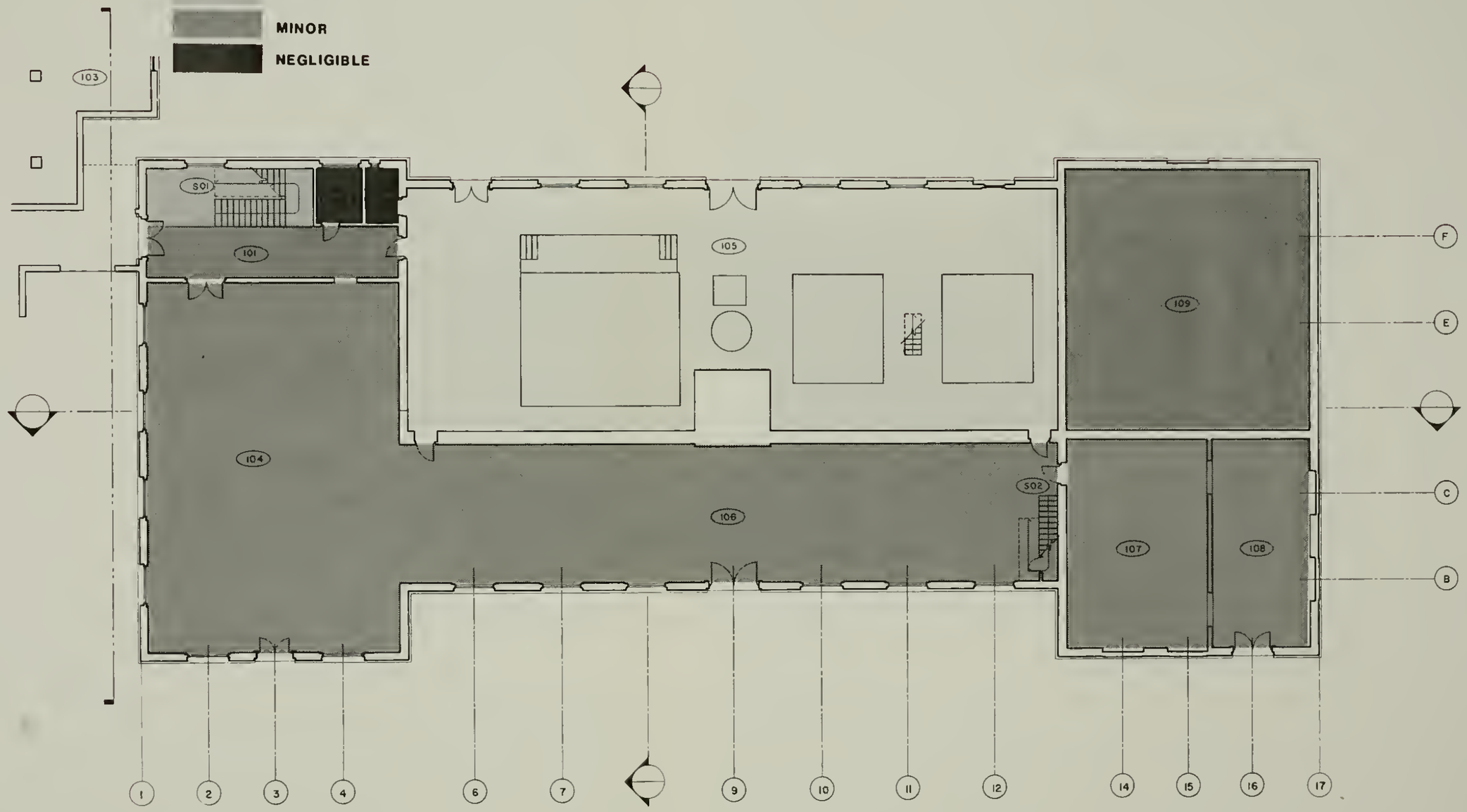
POWERHOUSE FIRST FLOOR PLAN

SUB SHEET NO.	DRAWING NO.
PKG. NO.	SHEET OF

Exhibit 20

ARCHITECTURAL SIGNIFICANCE

MOST
SOME
MINOR
NEGLIGIBLE



8 0 8 16
SCALE 1/8" = 1'-0"

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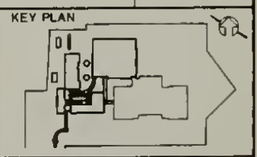
KEY PLAN

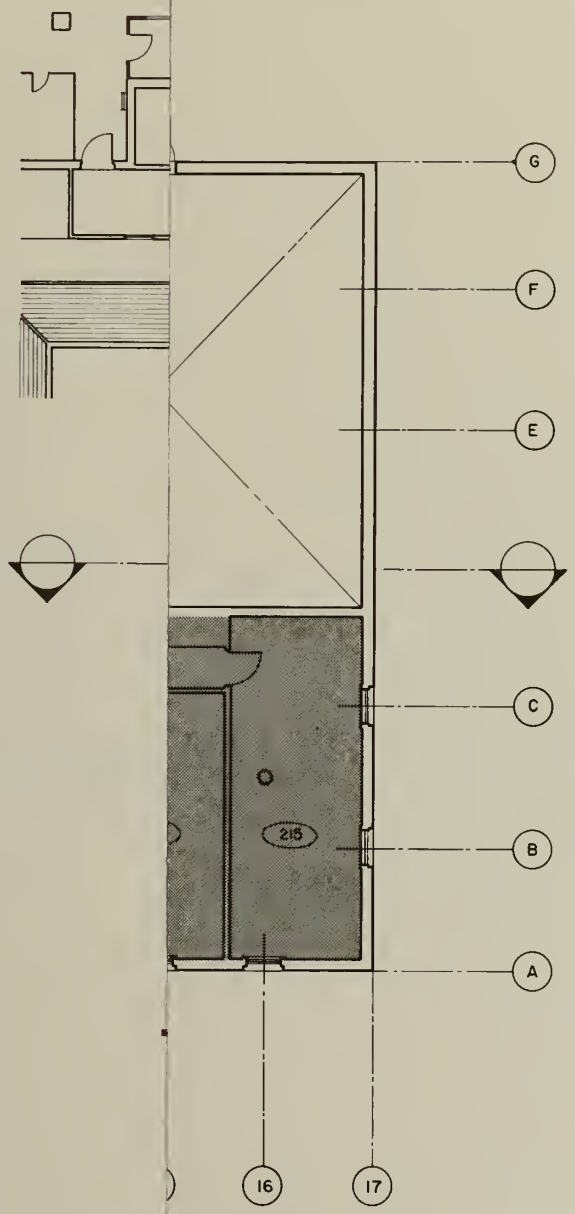


TITLE OF SHEET
POWERHOUSE FIRST FLOOR PLAN

SUB SHEET NO. DRAWING NO.

PKG. NO. SHEET OF

Exhibit 21



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SCALE : 1/8" = 1'-0"

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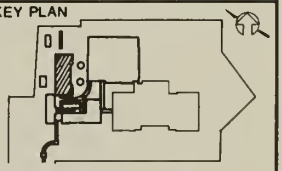
KEY PLAN



TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

SUB SHEET NO. | DRAWING NO.

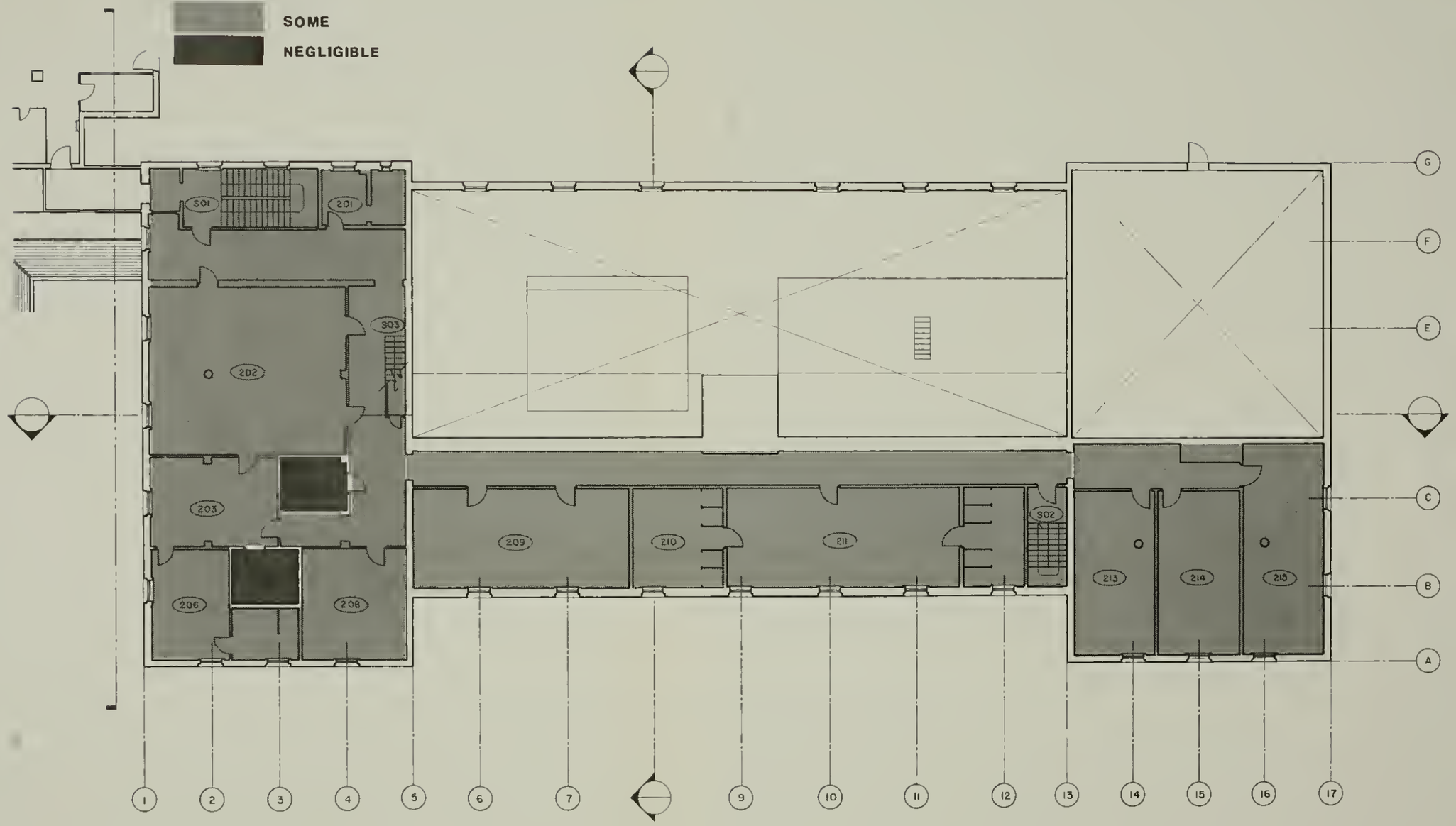
PKG. NO. | SHEET
OF

LOUIS PREY

ARCHITECTURAL SIGNIFICANCE

Exhibit 21

MOST
MINOR
SOME
NEGLIGIBLE



8 0 8 16
SCALE: 1/8" = 1'-0"

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DESIGNED:	DATE:
DRAWN:	TECH REVIEW:

KEY PLAN

TITLE OF SHEET
POWERHOUSE
SECOND FLOOR PLAN

SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET DF ___

E. Powerhouse Machinery

The machinery described in this section is numbered separately room by room on the following floor plan (exhibit 1). With the exception of the boilers, the machine locations are approximate and not to scale.

E. Powerhouse Machinery

1. Boiler Room

a. History

A new high pressure boiler plant supplied by the Oil City Boiler Works was installed in 1900. The eight "Geary" water tube boilers had an average working steam pressure of 125 pounds per square inch (exhibit 2 and 3).

By 1908 the building area of the island had more than doubled and the capacity of the powerhouse to supply power to the island was insufficient. Three boilers were moved to the power plant on island 3 and the remaining four boilers were augmented by three new water-tube boilers. These boilers, #1, #2 and #3, were constructed with vitrified paving brick and white enamel brick, and Vermont white marble coping. In 1917, the boilers located on the south side of the chimney (#4 and #5) were replaced with Webster Furnaces, Patented (exhibit 4). Four 125 horsepower units, installed in 1899, were replaced by three 500 horsepower units. In 1924, the five boilers and furnaces were repaired and baffles replaced (exhibit 5).

In 1932, the powerhouse was converted from coal-burning to oil-burning. The boilers, Babcock and Wilcox tubular boilers of 410 BHP, each having three Bethlehem Dahl oil burners, were to be altered and reused with the new oil system. The conversion was proposed in order to save fuel costs, reduce the maintenance force, and lower overall operating costs (exhibit 6 and 7).

In the years following the conversion to oil, the boilers were further altered and repaired. In 1932 a

contract was let for the retubing, rebaffling, and relining of the five boilers and in 1934 five new sets of boiler flue dampers were installed. A contract including repair for the masonry settings was let in 1935.

In 1946, boilers #4 and #5, installed in 1917, were altered and repaired to increase efficiency and capacity. They were described as Babcock and Wilcox sinuous header type, cross drum straight water tube boilers. Alterations included the installation of wind-box boiler front units, explosion and observation doors, and replacement of baffling (exhibit 8). Boiler #1, #2 and #3 were replaced in 1948 by the two existing integral oil-fired boilers, installed by the Babcock & Wilcox Co. (exhibit 9 and photos 1 and 2).

b. Existing Conditions[1]

The structural steel and exterior steel casings on all boilers are extensively corroded. All oil-firing equipment is missing and gauges are either missing or broken. Furnace wall firebrick and the outside brick setting are badly deteriorated. Boiler auxiliaries such as feedwater heaters, regulators, and pumps are in poor condition and not reusable.

The removal of manhole covers on all steam and mud drums revealed heavy deposits of rust and scale. Feedwater distribution troughs and steam separators have deteriorated badly and are not serviceable.

---

[1]Based in part on Building Conservation Technology/the Ehrenkrantz Group and Syska & Hennessy, Inc., "Mechanical and Electrical Rehabilitation Main Building; Ellis Island," prepared for the National Park Service, 1978.

The following equipment has been documented in the boiler room: (see first floor plan for locations)

Boilers #1, #2, #4 and #5 (photos 3-13)
Boiler #4- top hatch: "D.L. BURNER STEAM MECHANICAL 5"
Boiler #5- "WING TURBINE BLOWER-L.J. WING MFG. CO.- GENERAL OFFICES-N.J."
Overhead pipe connecting all boilers - "Jenkins Bros. Stockham 250"
#6-boiler feed pumps on pads (Chicago Pump Co. and Bethlehem Steel) (photos 14-17).
#7-Reilly heater- Sheblin Eng. Co. Inc. N.Y.C.- Powerplant Contractors (photos 18-19).
#8-Bailey Meter Co.- Cleveland (monitoring panel for draft and fuel oil) (photo 6).

2. Engine Room

a. History

Five engines and generators were originally installed in the engine room in 1900 by the Ridgeway Dynamo and Engine Co. These included five McEwen single-valve tandem compound engines, two 100-kilowatt noncondensing units, one 75-kilowatt noncondensing unit and two 75-kilowatt condensing units. This system produced the original capacity of 425 kilowatts at 240 volts direct current. A generator switchboard, made of Tennessee marble, was contracted to the D'Alier Engineering Co. of Philadelphia (exhibit 10). Photo 20 shows the switchboard as it appeared in the 1940's.

The power was fed from the generators into the switchboard and from there distributed to all portions of the island through central lines and feeder systems that ran above the ceilings of covered walks.

In 1908, two generators were moved to the island 3 power plant. They were replaced by three new turbogenerators to upgrade the plant. Two 200-kilowatt turbogenerators were installed in 1919 to relieve the load on the existing engines and generators. A General Electric type 0-53, 200-kilowatt 3600 RPM turbine was installed for the turbine unit 2 in 1932, which was a duplicate of one installed earlier on unit 1. In the same year, a DeLaval turbogenerator replaced turbine generator #4. In 1936 a steam turbine electric generator replaced existing turbogenerator set 5 (exhibit 11). All existing turbogenerators, except No. 5, were repaired and overhauled by the Holmberg Electric Co. in 1934 and 1936. Photos 21 and 22 illustrate generators in the engine room during the 1940's.

b. Existing Conditions[1]

The existing generators are severely corroded. Copper components have been removed and vandalized to a point where they cannot be utilized. In addition, the reuse of the DC generators is impractical because of their age, voltage and steam turbine driving mechanism. Feeder cables leaving the powerhouse have been removed from the conduits. The latter are badly rusted and not recommended for reuse. Panel boards are rusted and not reusable. The existing cable and conduit system should be replaced by a new system utilizing rigid conduit concealed in the covered walkway and basement spaces, as it was placed in the original installation.

The marble switchboard panel has been destroyed below the top row panels of astatic ammeters (photos 23-24). The wire grating extending from the top of the switchboard to the ceiling and the enclosing end grate door are intact but surface corroded.

The following equipment has been documented in the engine room: (see first floor plan for schematic locations of machines).

Turbogenerators:

#1- General Electric Co. (missing plate) (1932) (photos 25-26)

---

[2]Ibid.

#2- General Electric Co. Direct Current Generator #695807- 220 volts, full load, speed 1200. (1932) (photos 27-28)

#3- General Electric Co., Schenectady, N.Y.- "Curtis Steam Turbine" No. 8120, 300KW speed 1800, "Licensed to be used for all purposes except as a prime mover for marine and aerial craft." (photos 29-30)

#4- (1932) DeLaval "No. 128813" Volts full load-250, amps- 1000, RPM 1200 Allis Chalmers Manufacturing Co., Milwaukee, Wis. Installed by "Turbine Equipment Co. Engineers, N.Y." (photos 31-33)

#5- (1936) DeLaval- "Helical Reduction Gear" DeLaval Steam Turbine Co., Trenton, N.J. (photos 34-35)

#6- Westinghouse- Type D.C.- Marine motor (photos 36)

#7- Westinghouse Marine Generator Type AC, 120 V. 50 KVA RPM-1200 Cycles 60 Westinghouse Electric Manuf. Co. East Pittsburgh Works (photo 37)
West wall - AC/DC alternators (photo 38)

East end:

#8- Synchrostat Voltage Regulator- (stenciled- "U.S.A.F. M.A.A.M.A.) "Ready Power Switch-Ready Power Co. Rated volts-400/230 Rated amps-22.5 (on switchboard wiring plan on inside of door. outside plate: "Ready Power Generator- Century Electric Co. St. Louis "REVOLVING FIELD ALTERNATOR' (photos 39-43)

#9- "Weston Volt Meter" "Weston Electrical Instrument Co., N.J. USA" "Crocker-Wheeler" engine stenciled on housing: "UD264" (photos 44-45)

#10-Faraday metal cabinet- 28-station fire alarm system control panel (photos 46-47)

3. Pump Room

a. History

Original equipment, installed in 1900 by Westinghouse, Church, Kerr and Co. of New York City, included one freshwater and one saltwater pressure tank, one drip tank, one surface condenser, two boiler feed pumps, one vertical feed water heater, two steam separators and one oil extractor. The attic originally housed six freshwater tanks, supplied by the government, to be used as a reserve in case of a break in the water pipe from Jersey City (exhibit 12).

A new 10" high pressure water main was installed during construction of the building. Two salt water pumps from the old boiler house were repaired and reused in the new building. In 1910, a system of hot water circulating mains from heaters in the powerhouse to each of the buildings on islands 1 and 2 was installed. Two new vacuum pumps for steam return mains replaced the old, frequently repaired pumps in 1925.

In 1930, the old water pressure tank on the first floor was converted into a hot water return tank for steam lines. Until that time, open tanks on the third or attic floor were used for hot water returns, resulting in the corrosion of steel beams supporting the roof and loss of water temperature.

In 1932, when the powerhouse was converted from coal to oil, changes were made: Two steam turbine driven centrifugal pumps replaced the existing plunger type boiler feed pumps in the boiler room, and two new centrifugal type pumps replaced existing main line freshwater pumps in the pump room.

Alterations and renewals to the high pressure and low-pressure steam system and hot water circulating system were carried out in 1934. This work included a new boiler blow-off line from the boiler room to the seawall and the change of the 2,500 gallon vertical tank in the pump room from a saltwater pressure tank to use in the hot water circulating system.

In 1932, Sheridan Insulation Co. of New York City was awarded a contract to install nonconducting covering on pipes, tanks, and other apparatus in all Ellis Island buildings. Hot water tanks and two paracoil water heater tanks in the pump room were to be insulated with magnesia blocks, chicken wire mesh, ordinary grade asbestos cement, and asbestos hard finishing cement. Hot piping, as well as the receiving tank and feed water tank, were to be insulated with sectional removable 85% magnesia covering.

A water softener of the Zeolite type was installed in 1934 in the pump room.

Photos 48-50 present views of the pump room in the 1940's.

b. Existing Conditions

The following machinery has been documented in the pump room: (see first floor plan for schematic locations).

#1- Fisher Convertor Co., Manufacture,-Marshalltown, Ia. (photos 51-53)
#2- Condensation return, cold water tank (photo 55)
#3- Salt water tank (photo 56)

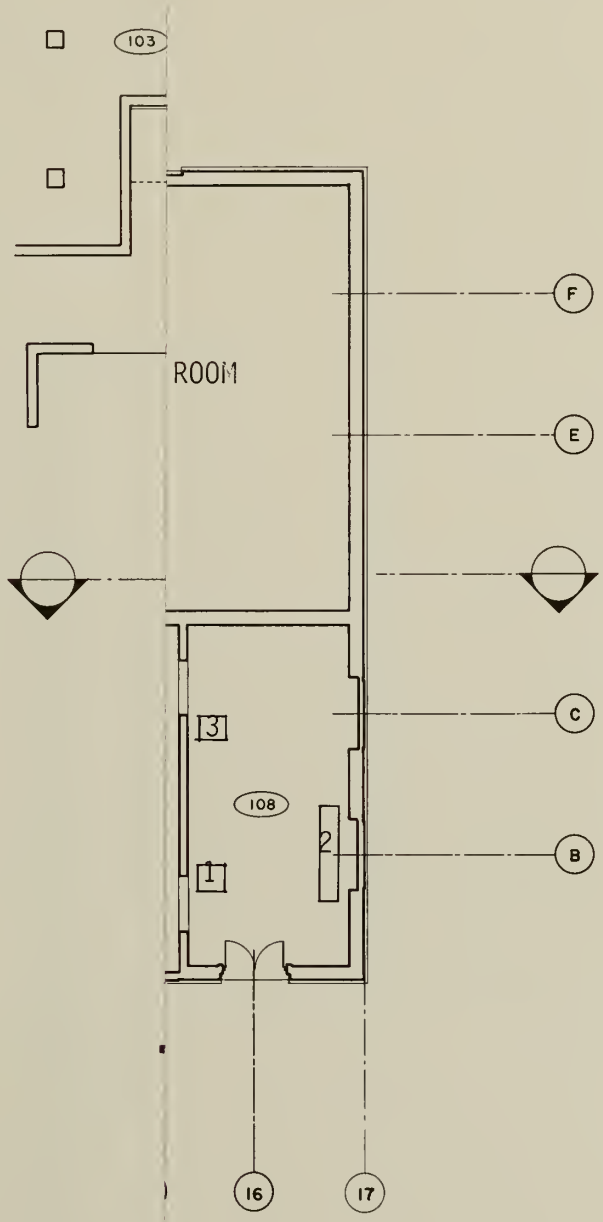
#4- Reliance (photos 57-58)
#5- Cutler hammer motor control
#6- Worthington- pump (photo 59)
#7- 2 vacuum pumps (photos 61-62)
#8- Water softener-"Permutit"- brine rinse (1933) (photo 63)
#9- 2 Crane 125 tanks (photo 54)
#10- 2 Warren motors
#11- Barrel- "Machine Works" Three Rivers, Mich. (photo 54)
#12- Portable fire engine-"BUFFALO POWERBUILT-FOAV FIRE ENGINE BUFFALO FIRE APPLIANCE CORP. DAYTON" (photo 60)

4. Miscellaneous Equipment

In room 107, previously a blacksmith shop, two new Onon Genset generators have been installed and the two east windows have been infilled with new aluminum vents.

The machinery in room 108, previously a machine shop, consists of three belt-driven pieces: A drill press (#1), a lathe (#2) (photo 66), and an unidentified machine with a stoker and vise (#3) (photo 67).

Exhibit 1



8 0 8 16
SCALE : 1/8" = 1'-0"

UNITED STATES DEPARTMENT
OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

ARCHITECTS
BEYER BLINDER BELLE /
ANDERSON NOTTER FINEGOLD
80 FIFTH AVENUE
NEW YORK, NY 10114
(212) 741-3960

356 | 26,007 / 20 of 24
DSC | JUL 88

SURVEY OF STRUCTURES UNIT ONE

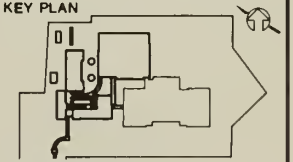
ELLIS ISLAND

STATUE OF LIBERTY
NATIONAL MONUMENT
NEW YORK / NEW JERSEY

mk	sht	REVISIONS	date	ini

DESIGNED: | DATE:
DRAWN: | TECH REVIEW:

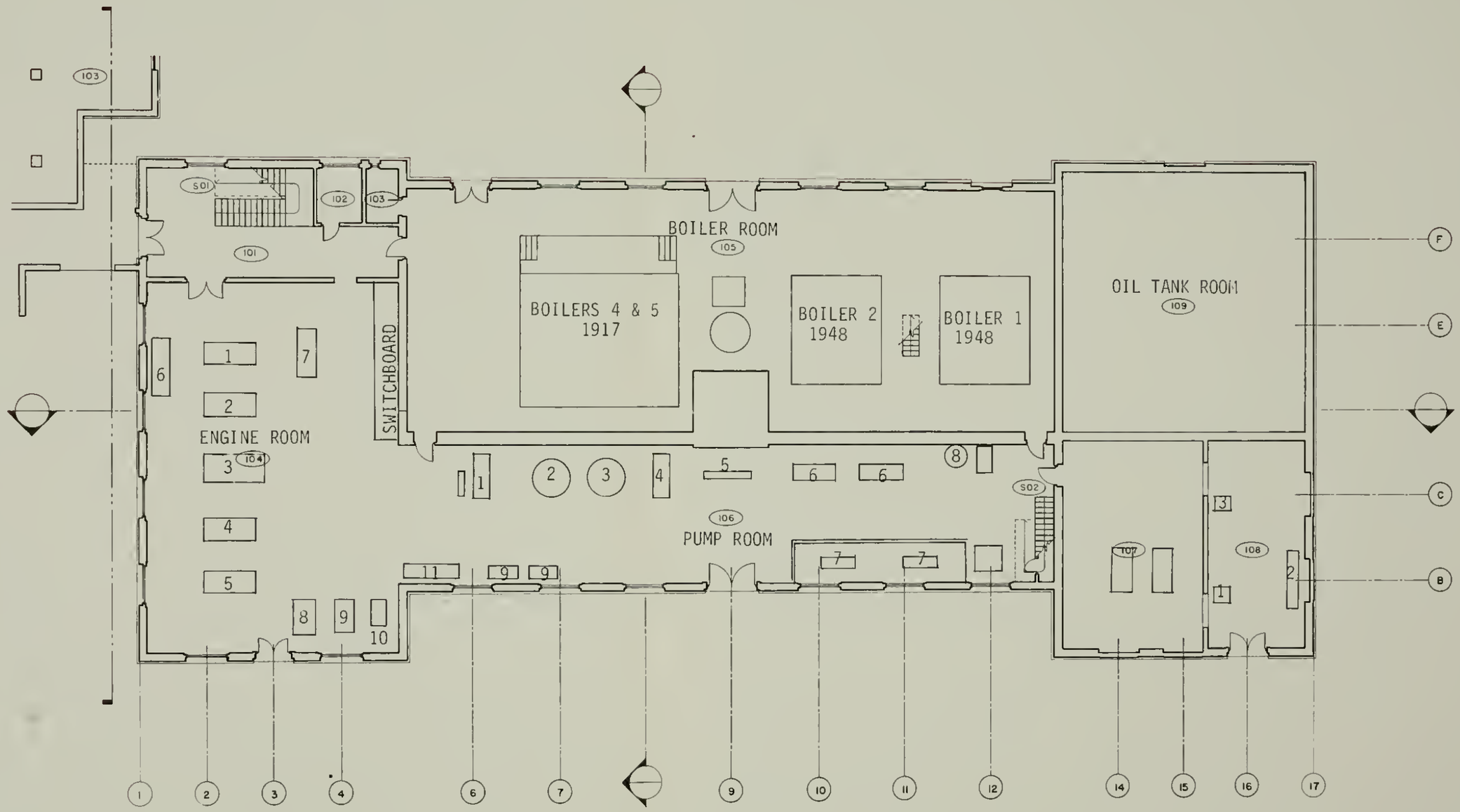
KEY PLAN



TITLE OF SHEET
POWERHOUSE
FIRST FLOOR PLAN

SUB SHEET NO. | DRAWING NO.
PKG. NO. | SHEET OF

Exhibit 1



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KEY PLAN

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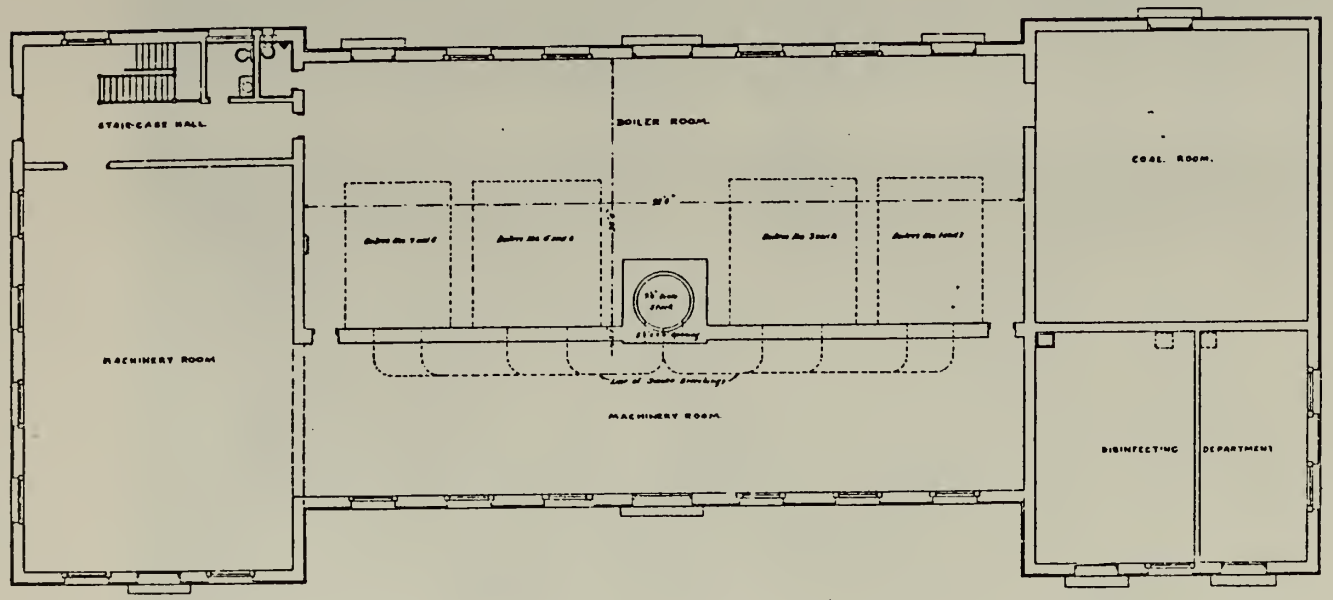
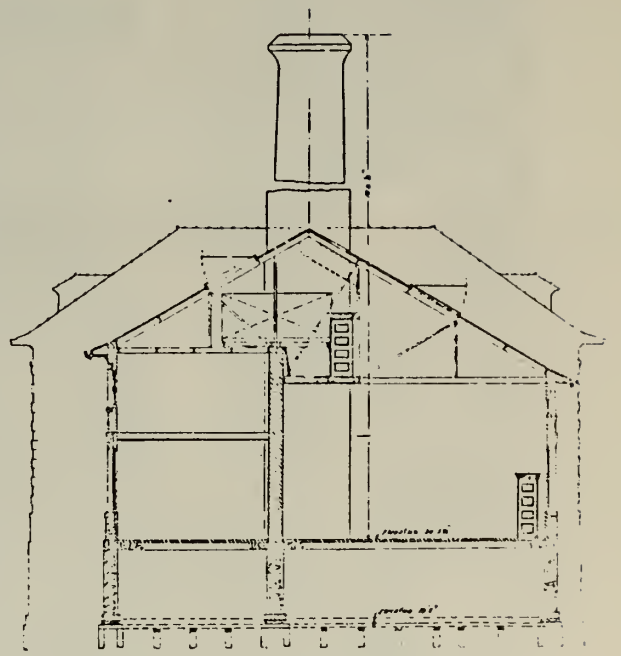
SUB SHEET NO.	DRAWING NO.
	PKG. NO. / SHEET OF





TRANSVERSE SECTION

S. IMMIGRANT STATION
ISLAND, N.Y. HARBOR.
BOILER HOUSE.
Drawing No S.A-9-

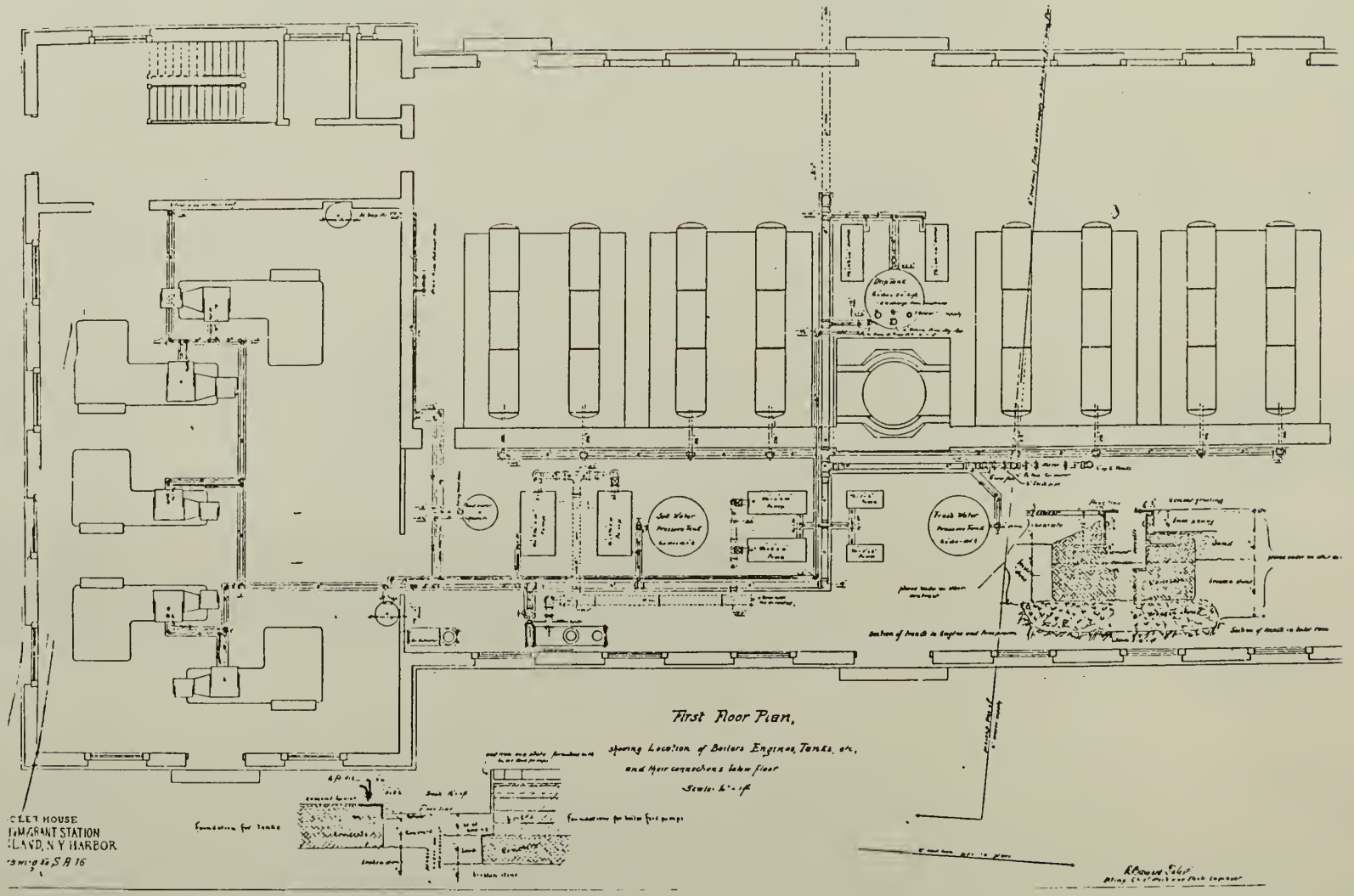
FIRST FLOOR PLAN.

SCALE $\frac{1}{8}$ INCH = 1 FOOT.

356	42,900A / Sheet 1
DSC	JUL 88

Location of eight original boilers. 1900.

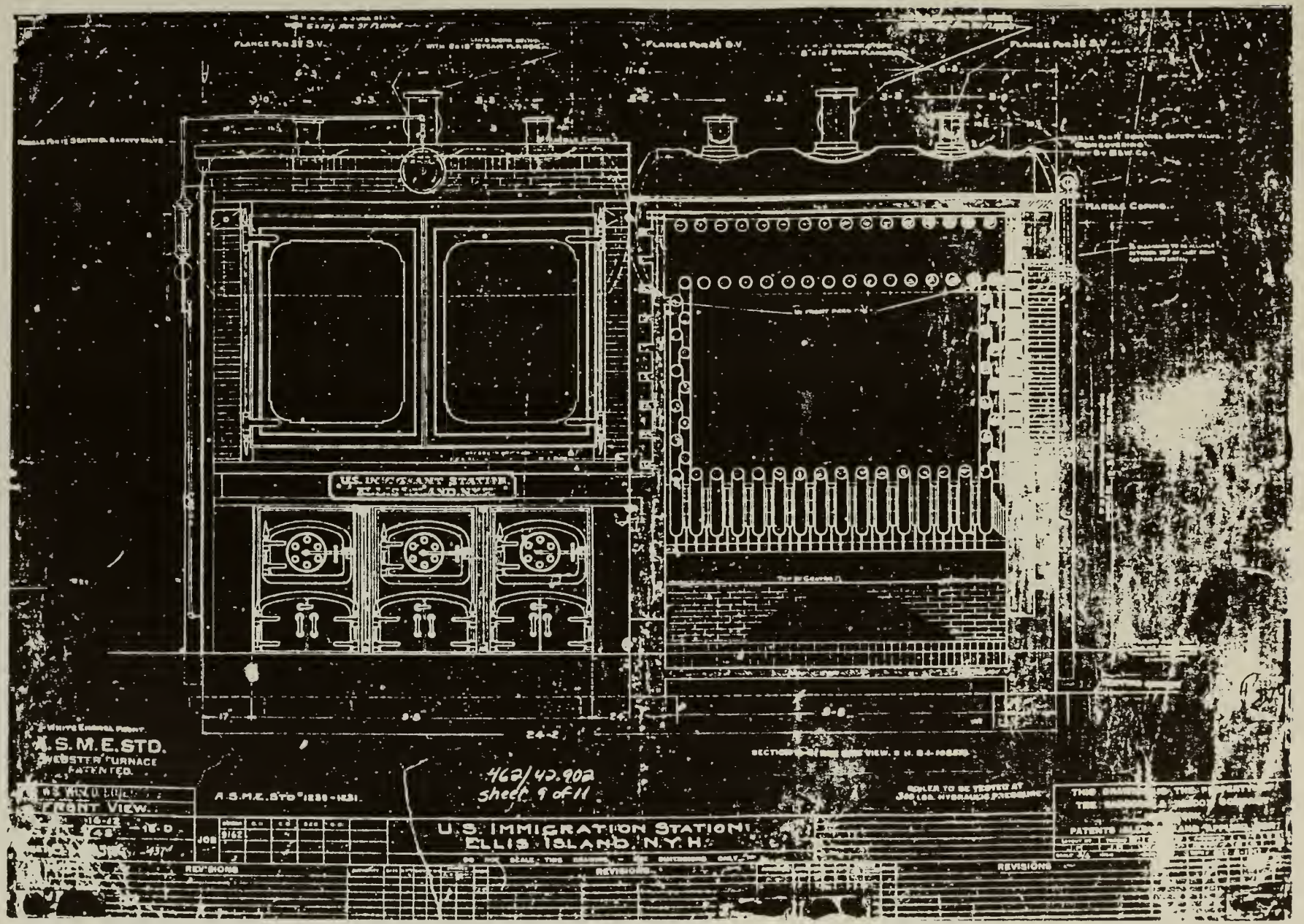
Exhibit 2



1900- First floor plan showing boiler, engine and tank locations.

356	42,900A / Sheet 8
DSC	JUL 88

Exhibit 3



New Boiler- Babcock & Wilcox Co.- 1917

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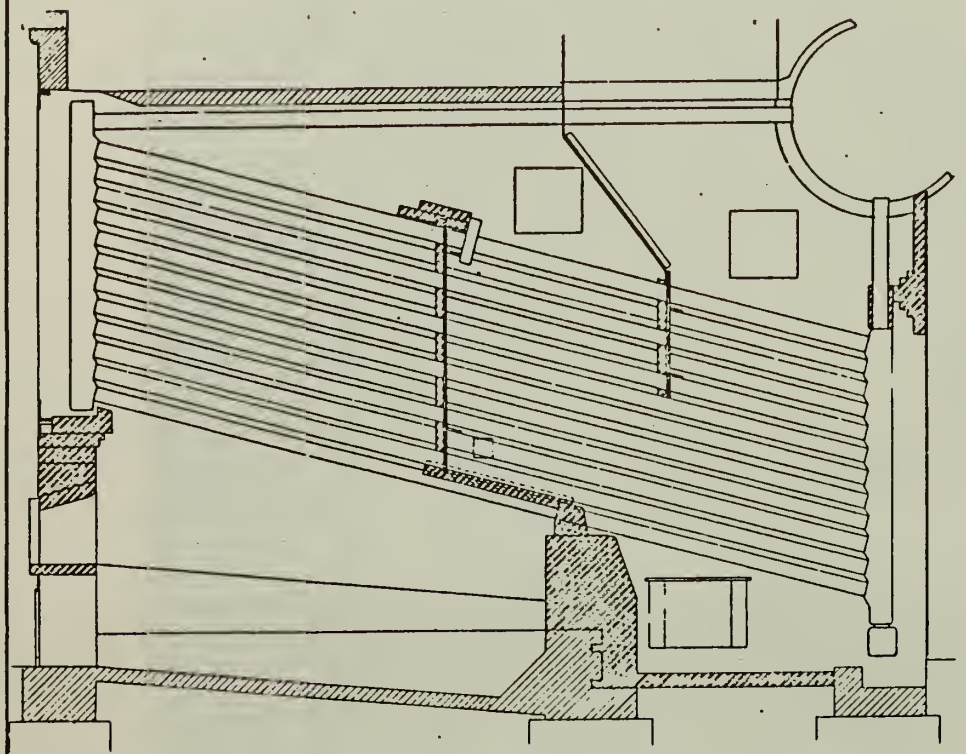
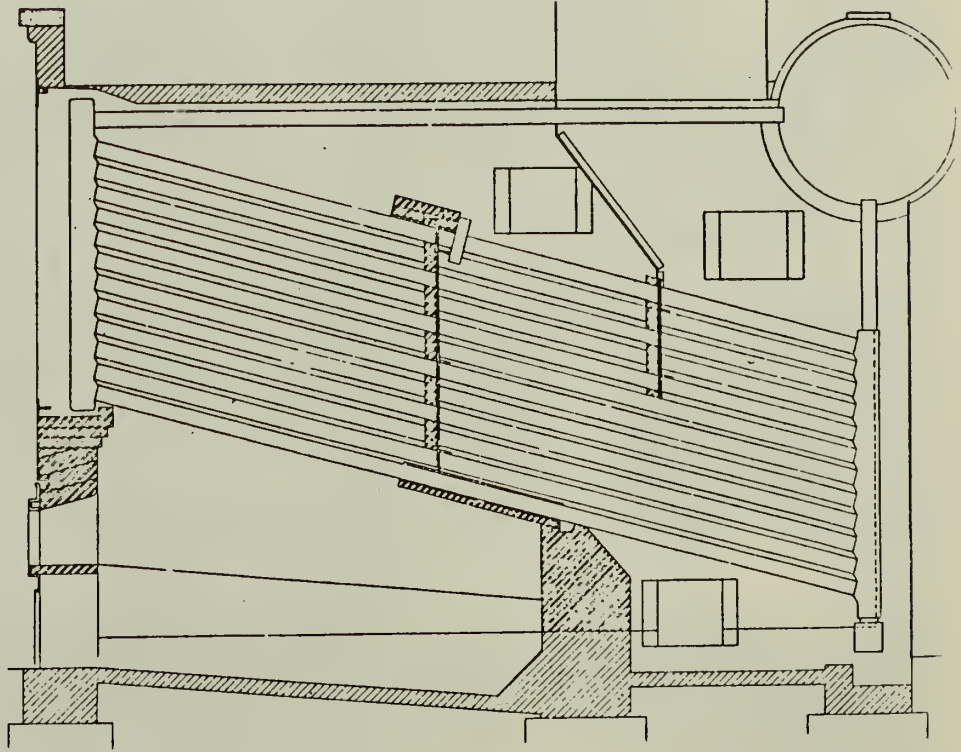
Exhibit 4



SIDE VIEW
TWO BOILERS LIKE THIS
6'-0" 15-1/2 18'S & D.
COPIED FROM B & W SHEET SI-10818-10.8.1917.
401 HP
LOCALLY KNOWN AS BOILERS 4 & 5

SCALE 1/8"-1'-0"



SIDE VIEW
THREE BOILERS LIKE THIS
6'-0" 17-1/2 18'S & D
COPIED FROM B & W SHEET 53797-H 1908
425 HP
LOCALLY KNOWN AS BOILERS 1, 2 & 3

NOTE
PRESENT BAFFLES TO BE CHANGED
TO SUIT FLOW OF GASES.
ALL FURNACES TO BE REMIXED
IN ACCORDANCE WITH THE SPECIFICATIONS

BOILERS (SIDE VIEW)
POWER HOUSE ISLAND No. 1.
U. S. DEPARTMENT OF LABOR
IMMIGRATION SERVICE
ELLIS ISLAND
NEW YORK HARBOR NEW YORK

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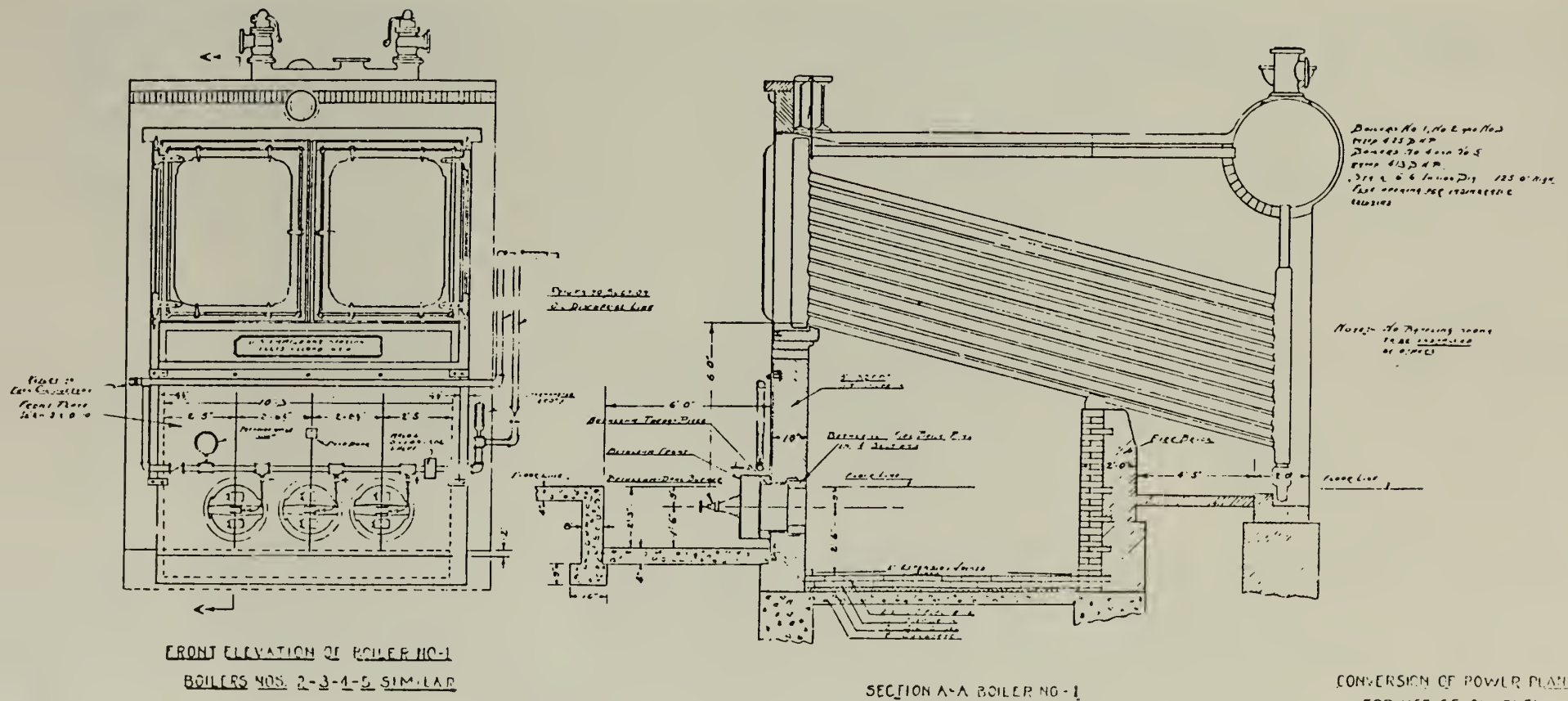
D 989.

Exhibit 5

1924.



FRONT ELEVATION OF BOILER NO-1
BOILERS NOS. 2-3-4-5 SIMILAR

SECTION A-A BOILER NO-1

CONVERSION OF POWER PLANT
FOR USE OF OIL FUEL

US DEPARTMENT OF LABOR
IMMIGRATION SERVICE
ELLIS ISLAND
NEW YORK HARBOR, NY

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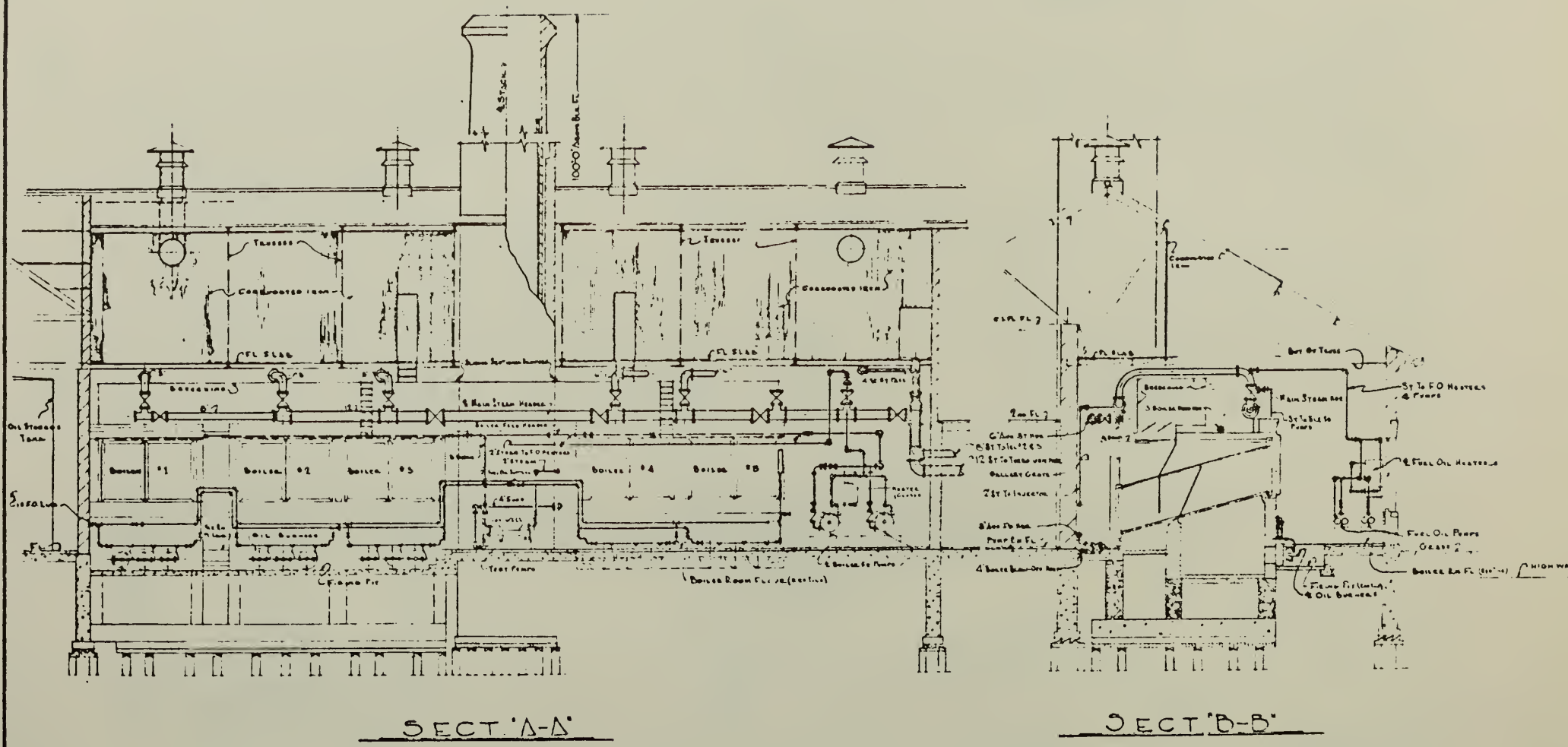
REDUCED SIZE REPRODUCTION

BETHLEHEM NAME
MECHANICAL OIL PUMP
SYSTEM
DRAWING N.

1932- Existing boiler elevation and section.

Exhibit 6



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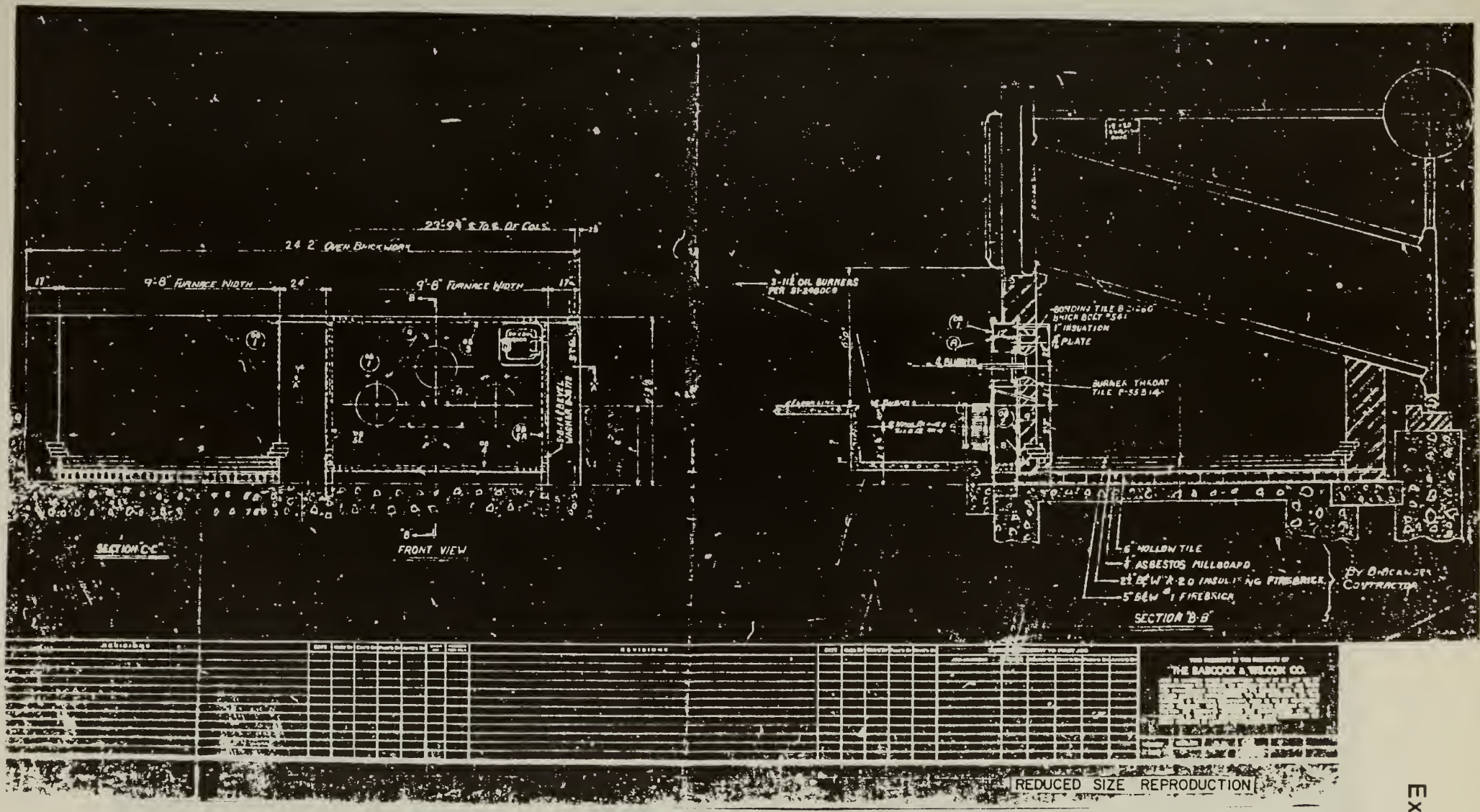
1938- Drawing to accompany specs for furnishing erection and completion of steam generating unit to replace boilers #2 and #3.

Exhibit 7



1947- New burner fronts, boilers #4 and #5.

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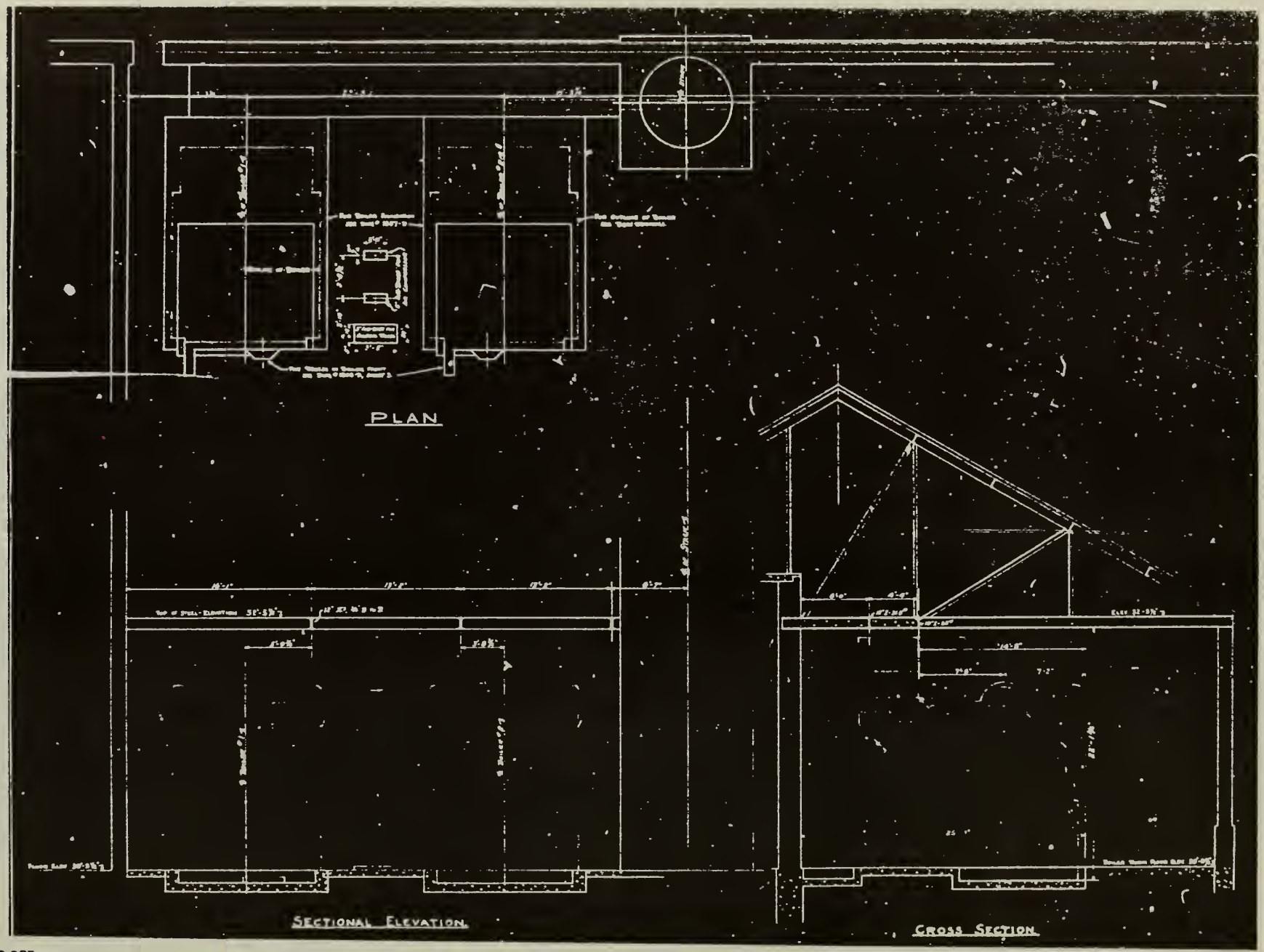
DSC	JUL 88

Exhibit 8



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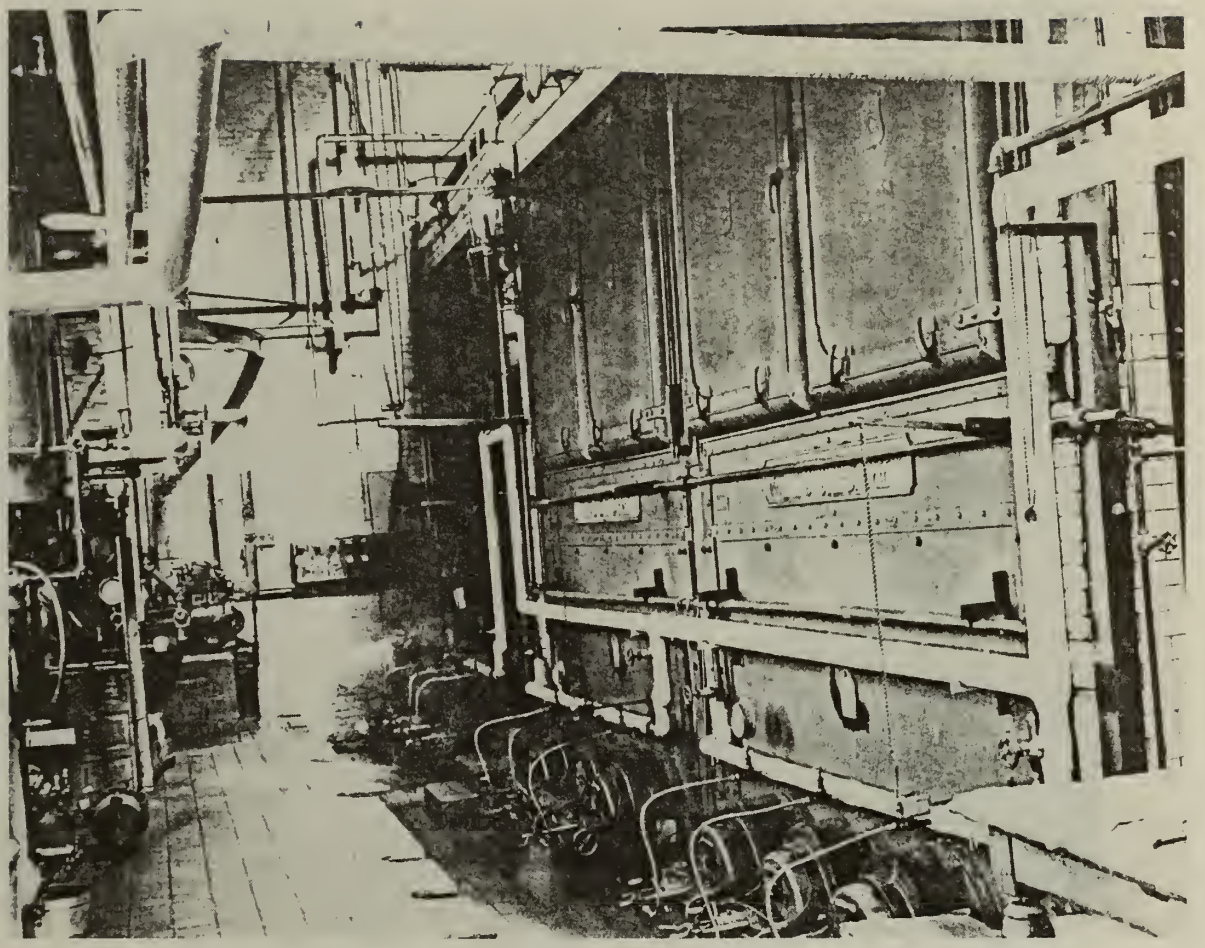
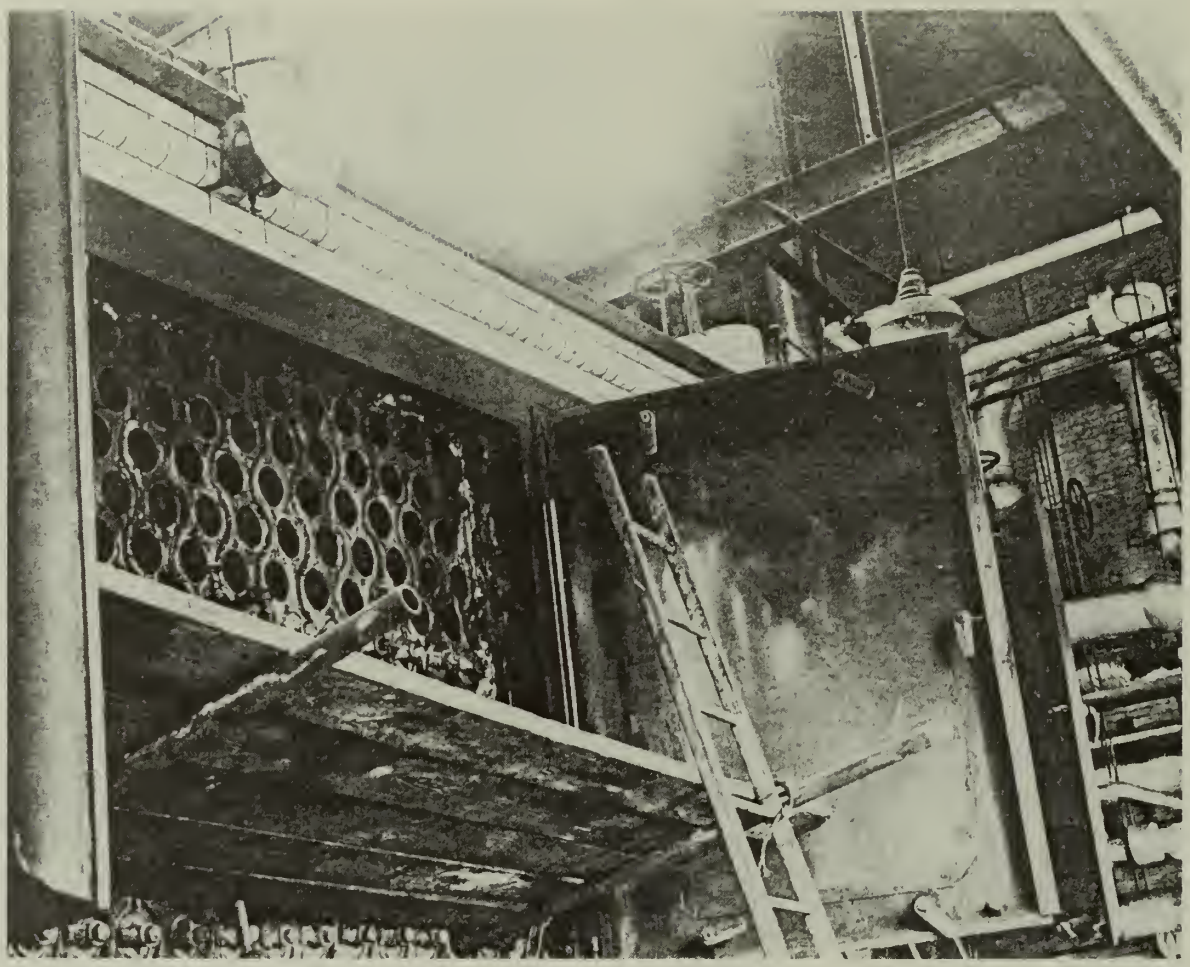
DSC | JUL 88

1948- Drawing 1364-D. "Location Plan with Reference Lines for the Placement of New Boilers #1 and 2.

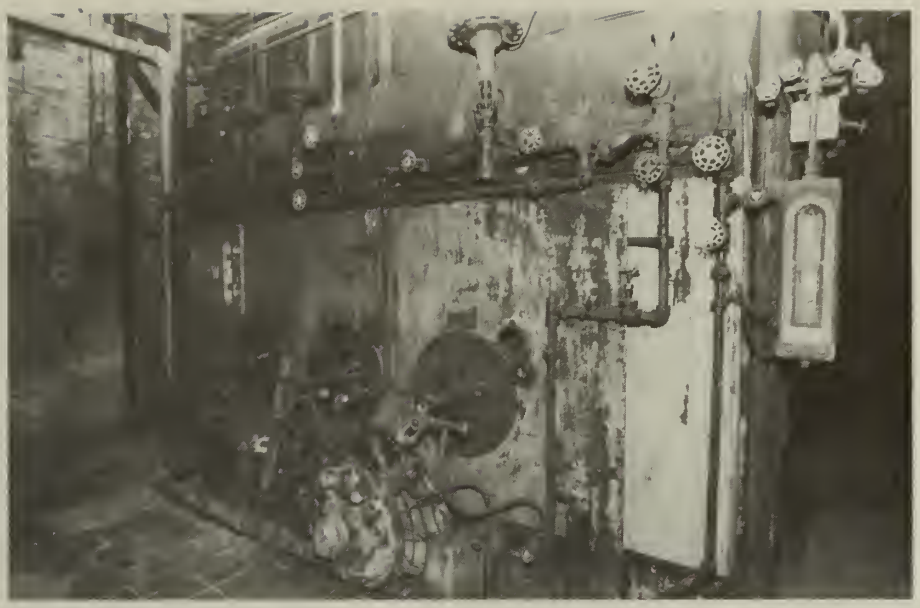
Exhibit 9



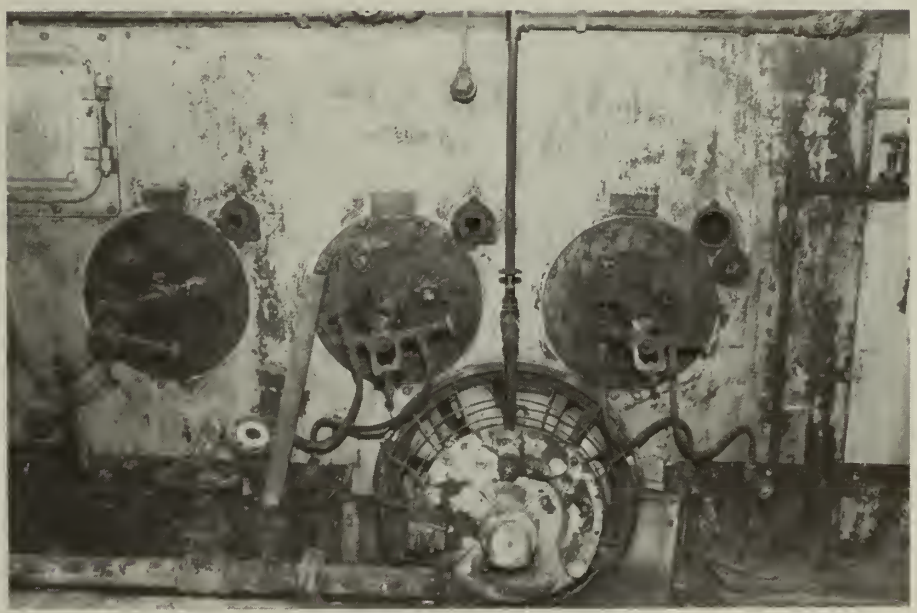
1. Room 105-north wall, boilers #1, 2, and 3, pre-1947. U.S. Immigration and Naturalization Service Photograph, Washington, D.C. Boilers shown date from 1909, modified in 1932 for the conversion to oil-burning system. These three boilers were replaced in 1947 by the two existing boilers. The firing trench was filled in at this time.



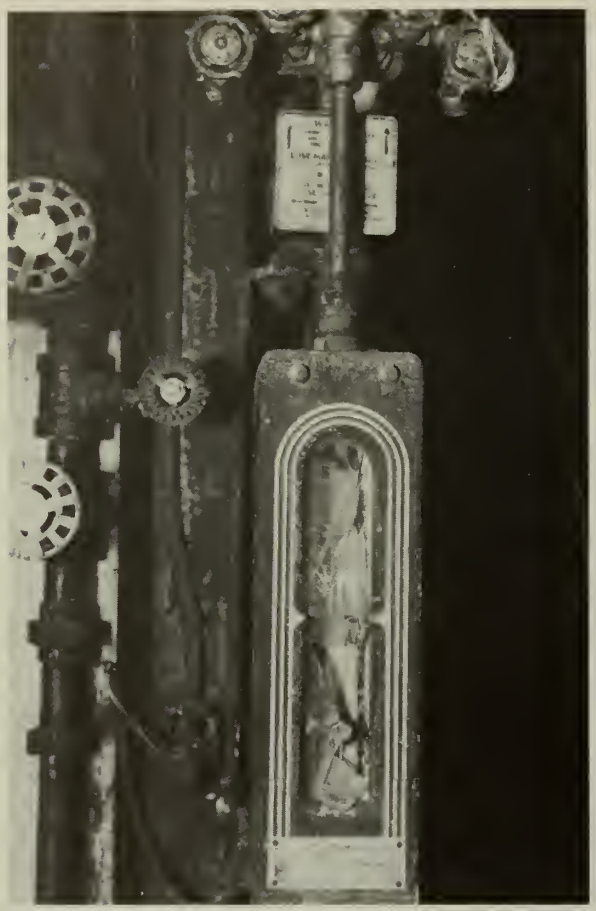
2. Room 105-boiler #4(?) under repair, c. 1940's. U.S. Immigration and Naturalization Service Photograph, Washington, D.C.



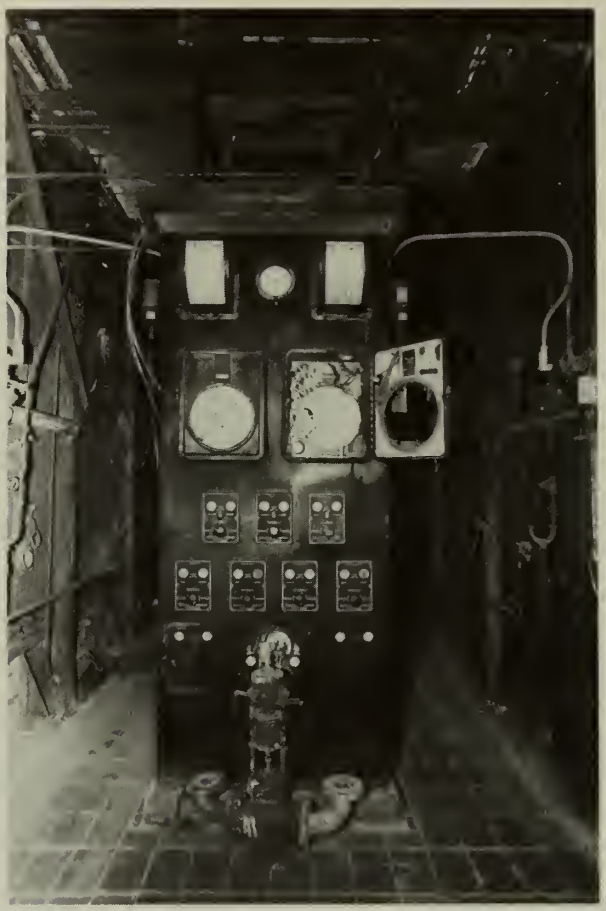
3. Room 105- Boiler #1.



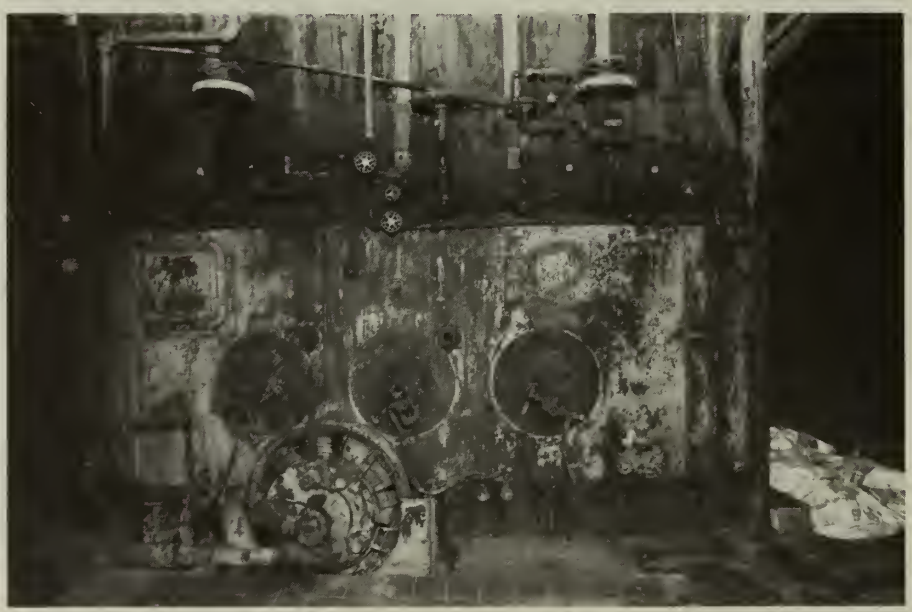
4. Room 105- Boiler #1.



5. Room 101, boiler #1, "Reliance"- "Eye Hye"



6. Room 105- Draft and fuel oil monitor, "Bailey Meter Co. Cleveland". Located between boiler #1 and #2.

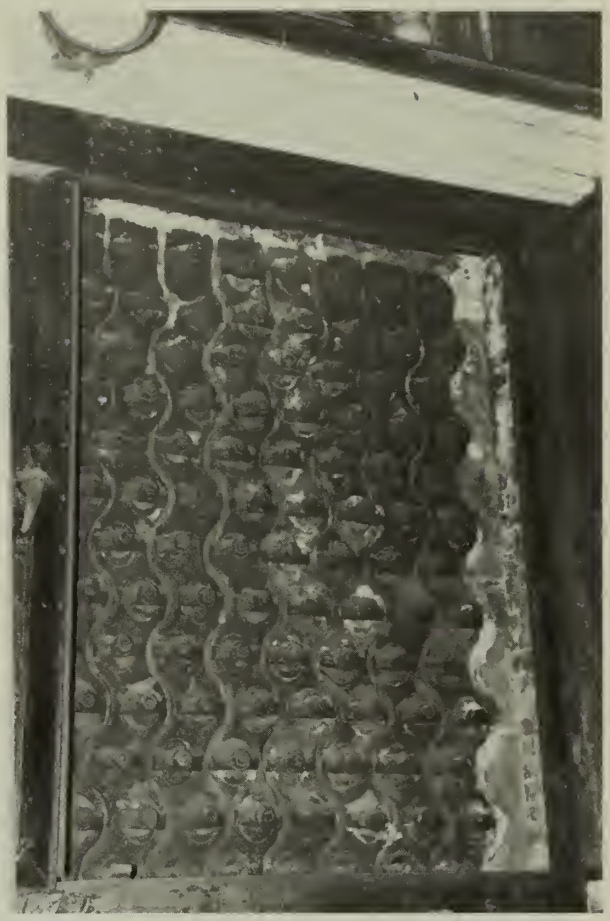


7. Room 105- Boiler #2

8. Room 105, boiler #4 and 5 (1917). Converted from coal to oil-fired in 1932 and further altered in 1947. Steps down to "firing trench" in front

9. Room #105- boiler #4 and 5.

10. Room 105, boiler #5
Upper doors, flame plate

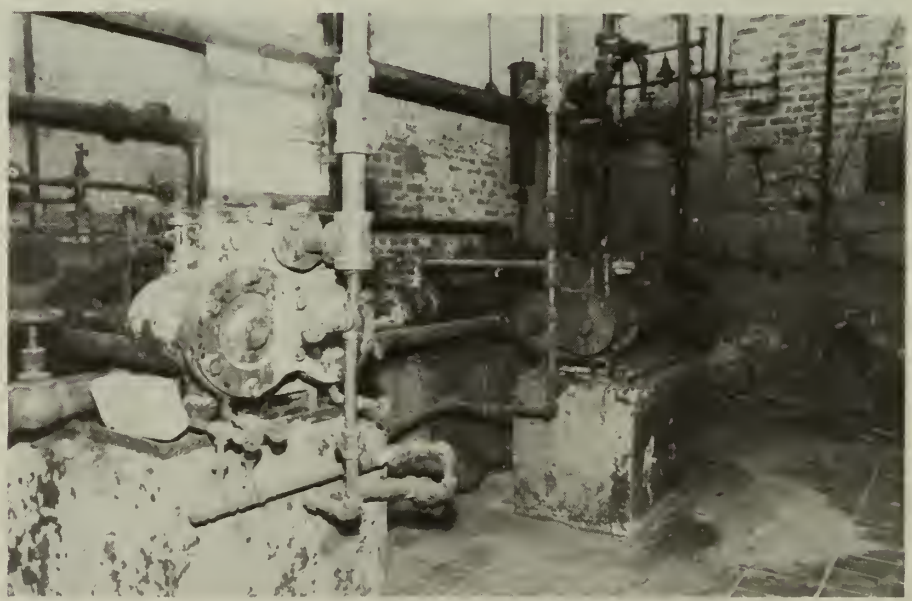


11. Room 105, boiler #5
Close-up of flame plate.

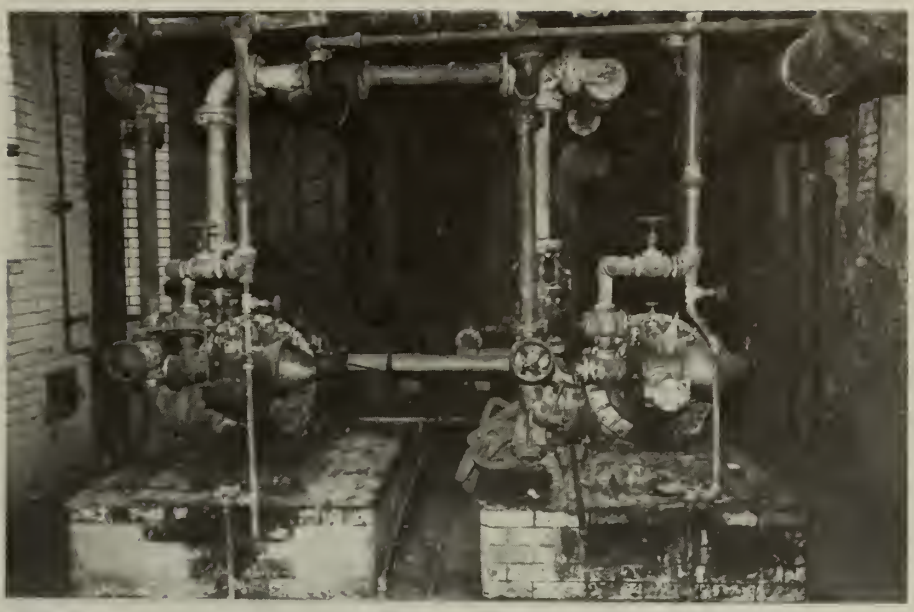
12. Room 106- south side of boiler #5, white glazed brick setting.

13. Room 105, boiler #5, pressure gauge.

14. Room 105, steam-driven pumps in foreground and drip tank and brick base of stack in background.

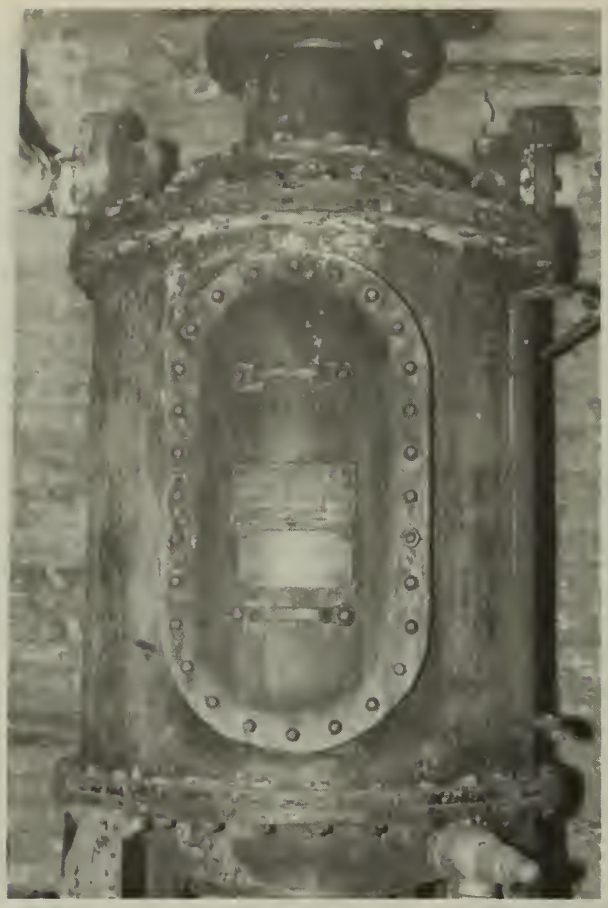


15. Room 105, steam-driven pumps, northwest corner. (installed in 1932 by Bethlehem Steel Co.)

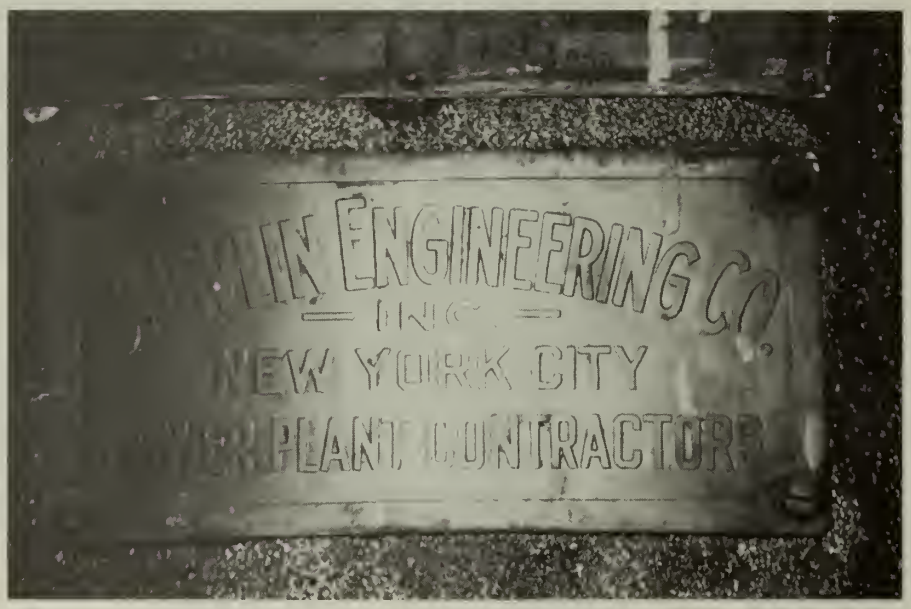


16. Room 105, boiler feed pumps on tiled concrete pads.

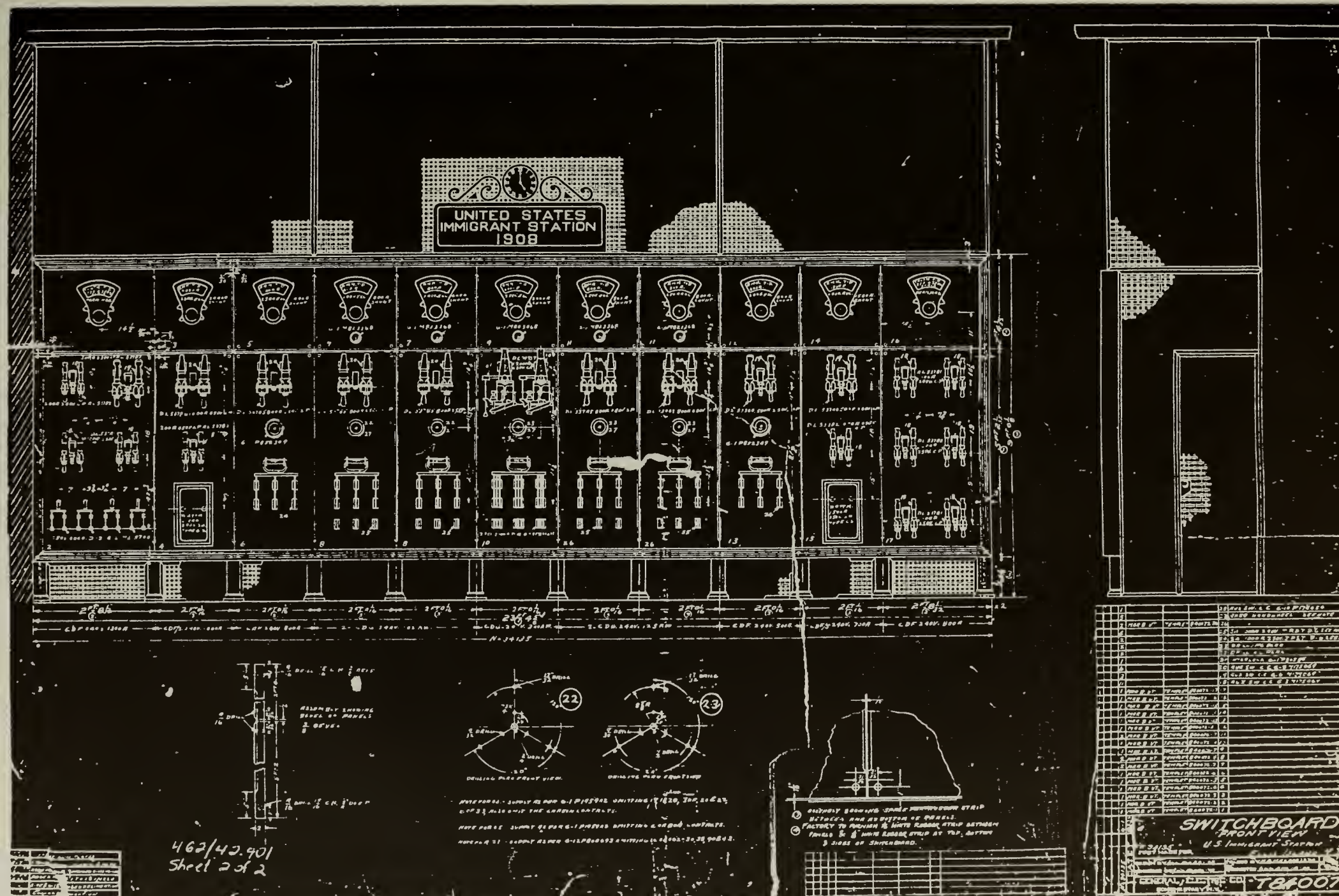
17. Room 105, boiler feed pump, "Chicago Pump Co."
Section of piping located behind (east) of above photo.



18. Room 105, "Reilly" heater, east wall



19. Room 105, "Reilly" heater, front plate.



1901- Engine Room switchboard with wire grille above and below.

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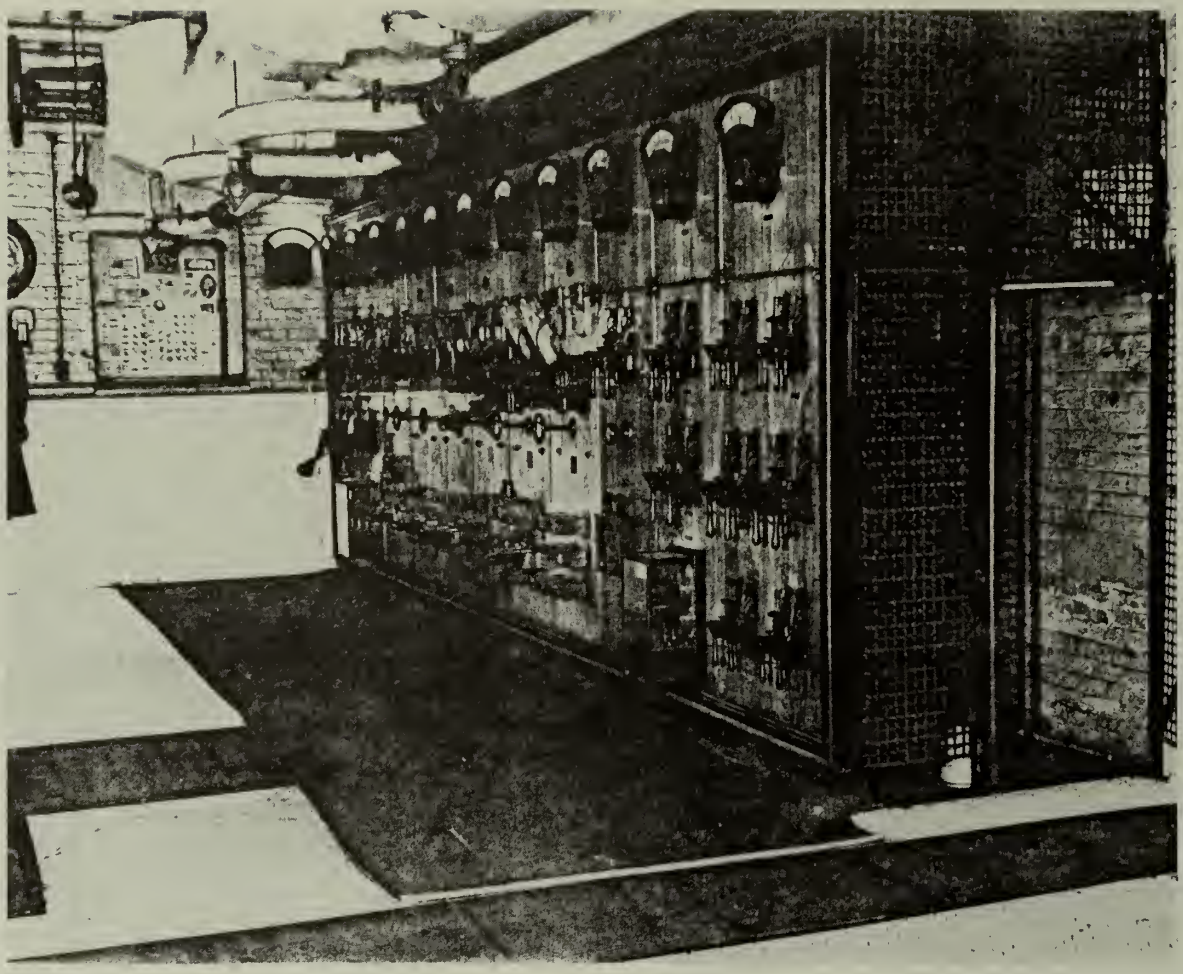
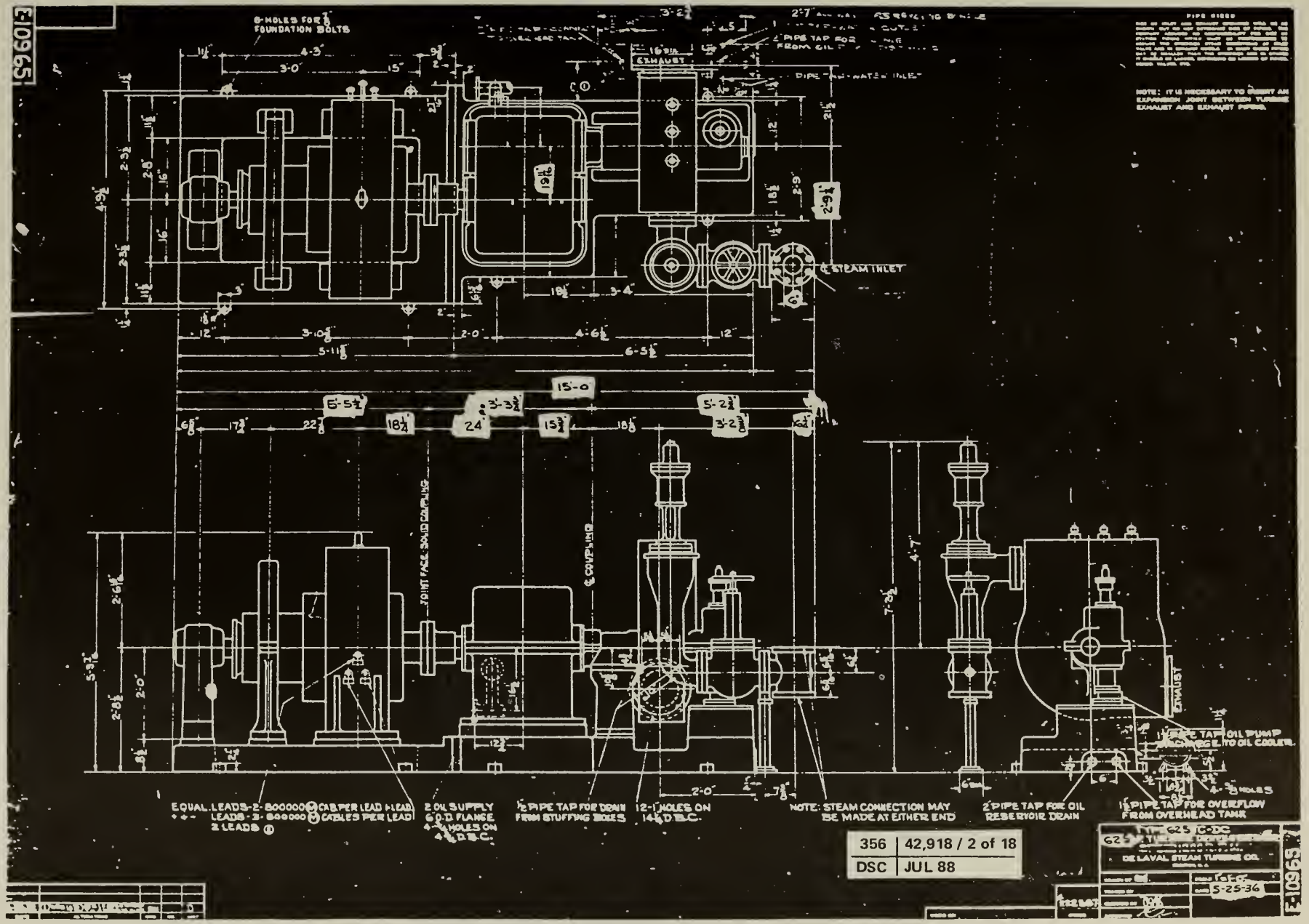
Exhibit 10

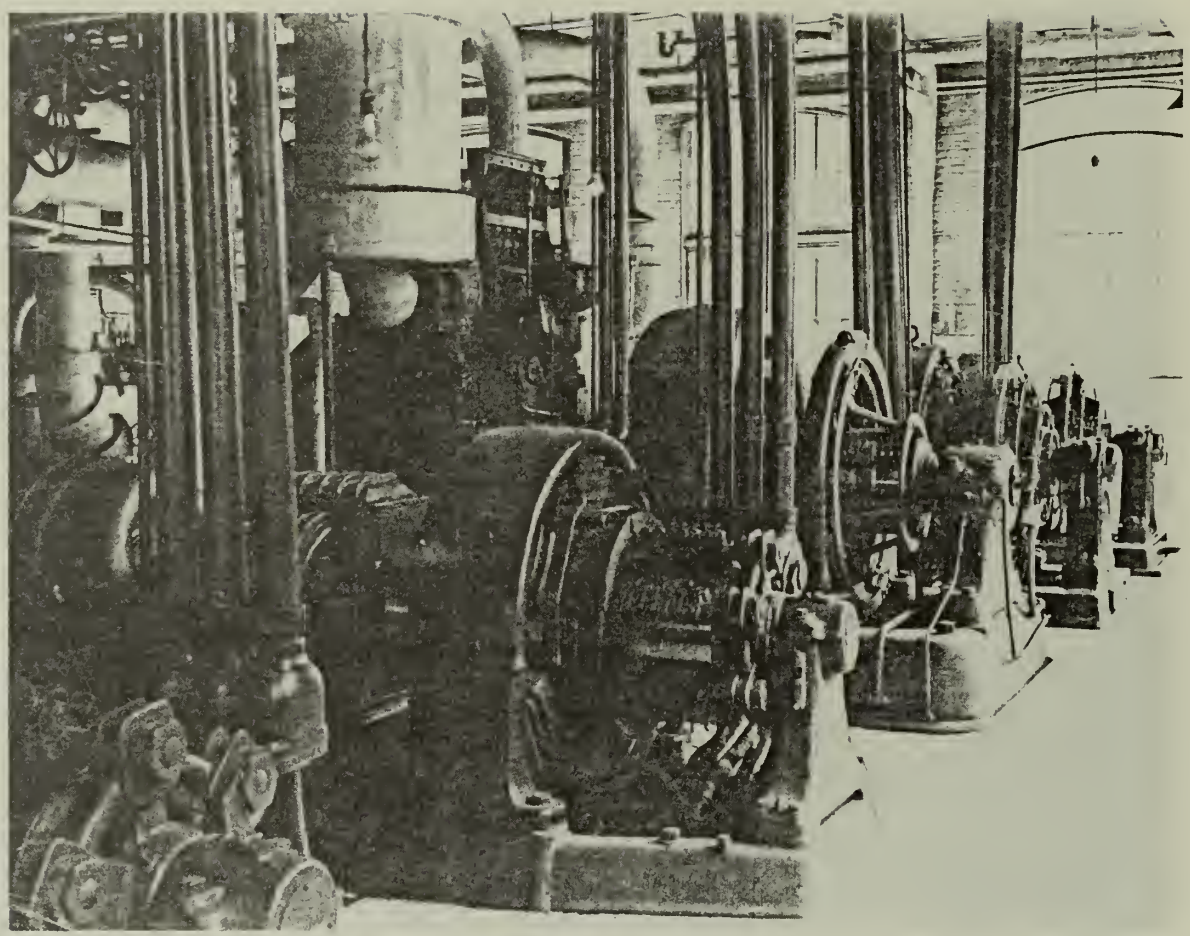


20. Room 104- view of switchboard in northwest corner, c. 1940's(?)
U.S. Immigration and Naturalization Service, Washington, D.C.

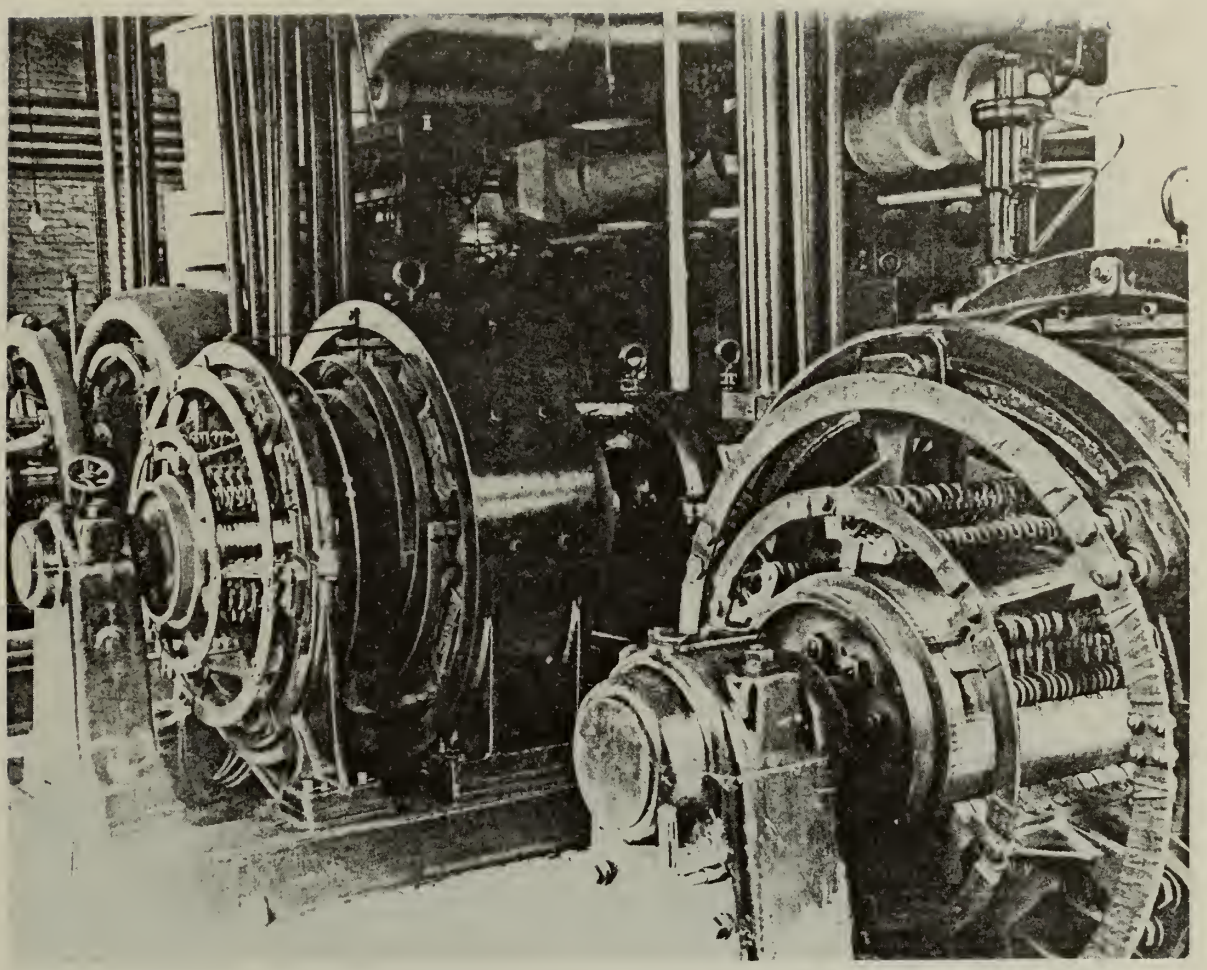


1936- New turbogenerator (#5), De Laval Turbine Co.

Exhibit 11



21. Room 104- view toward east wall, including generators #2-5, c. 1940's. U.S. Immigration and Naturalization Service, Washington, D.C.



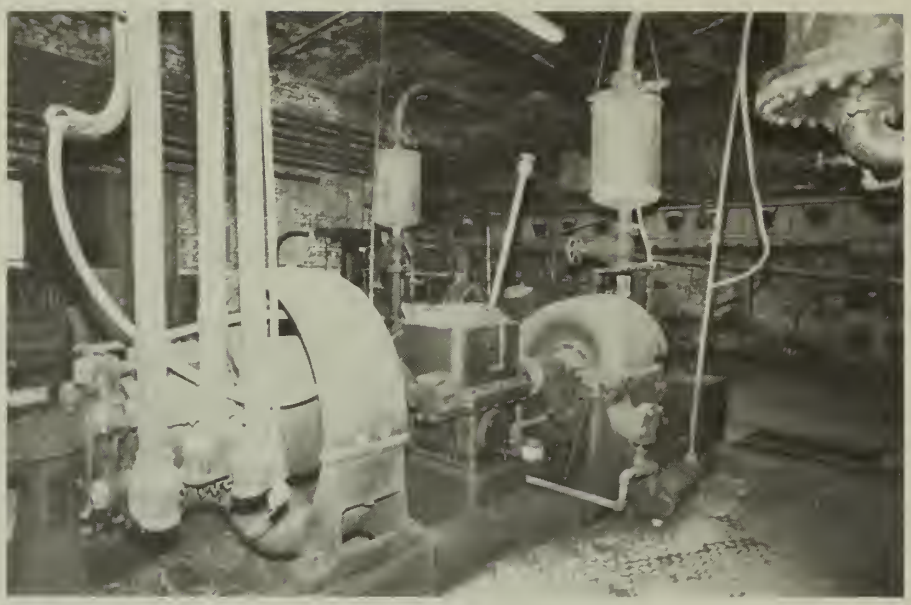
22. Room 104- view toward northwest corner, including generators #1-3, c. 1940's. U.S. Immigration and Naturalization Service, Washington, D.C.

23. Room 104- Top surviving panel of marble switchboard, "Thomson Astatic Ammeter" General Electric Co.

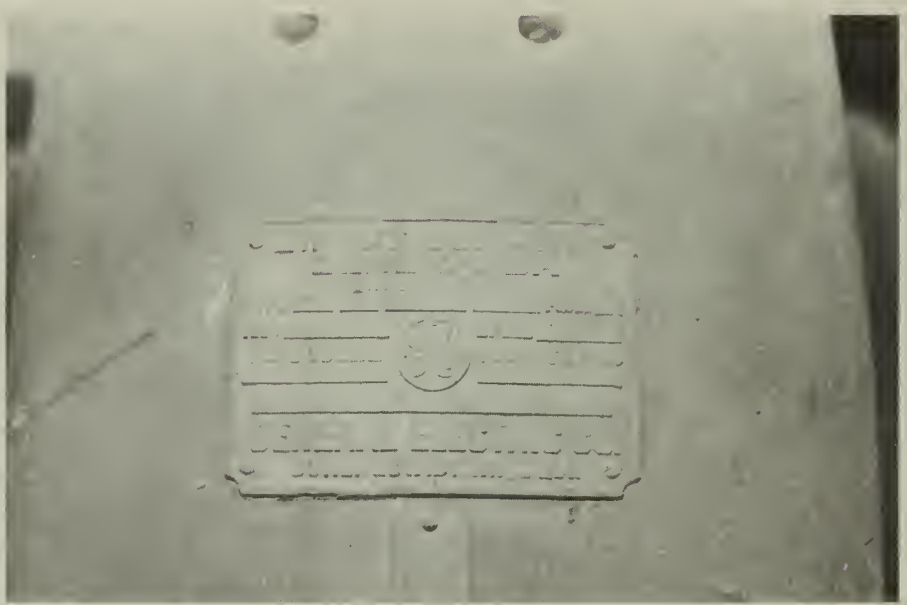
24. Room 104- north wall, main switchboard.

25. Room 105- Turbogenerator #2, west side

26. Room 105- Turbogenerator #2, west side



27. Room 104- generator #2- looking into northwest corner.



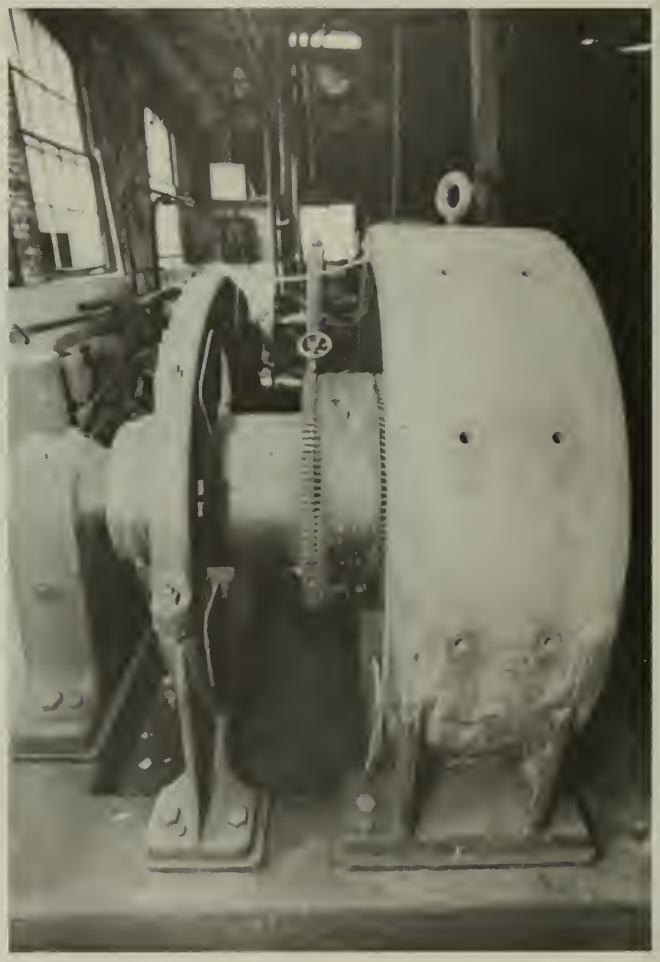
28. Room 104- generator #2, "Direct Current Generator" General Electric Co.

29. Room 104- generator #3.

30. Room 104- generator #3- plate on east side.

31. Room 104- Turbogenerator #4

32. Turbogenerator #4



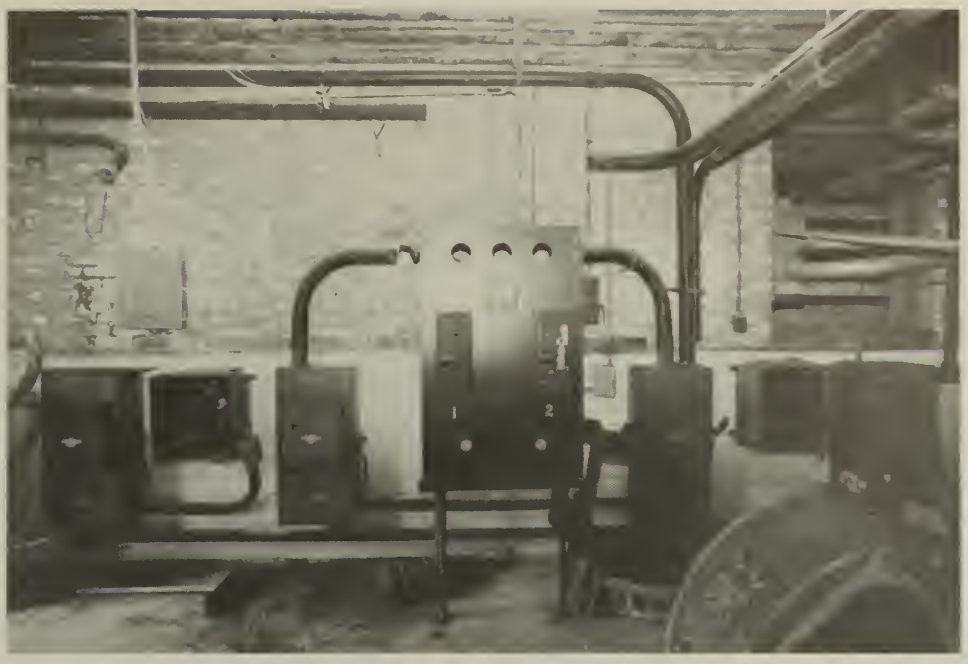
33. Turbogenerator #4

34. Room 104- De Laval generator #5 (1936).

35. Room 104- east side of generator #5- "DE LAVAL HELICAL REDUCTION GEAR - STEAM TURBINE CO. TRENTON, NJ, USA".

36. Room 104, Westinghouse DC marine motor (#6)

37. Room 104- south wall, marine engine (#7).



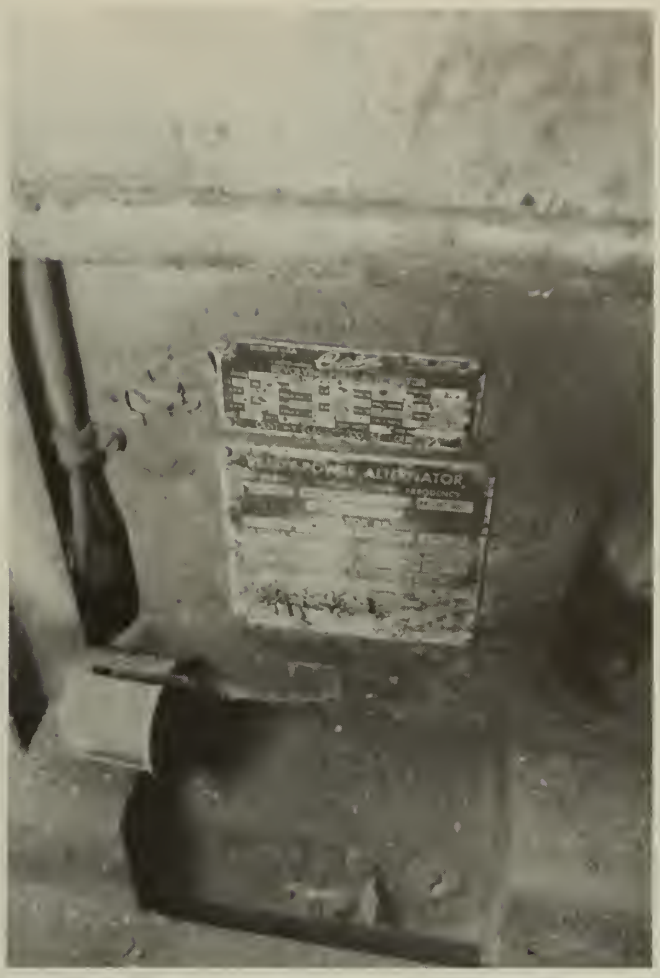
38. Room 104- AC/DC alternators, west wall.

39. Room 104- northeast corner, (#8-10).

40. Room 104- Synchrostat Voltage Regulator (#8)

41. Room 104- Synchrostat voltage regular, inside front doors (#8)

42. Synchrostat voltage regulator- front doors- (#8)



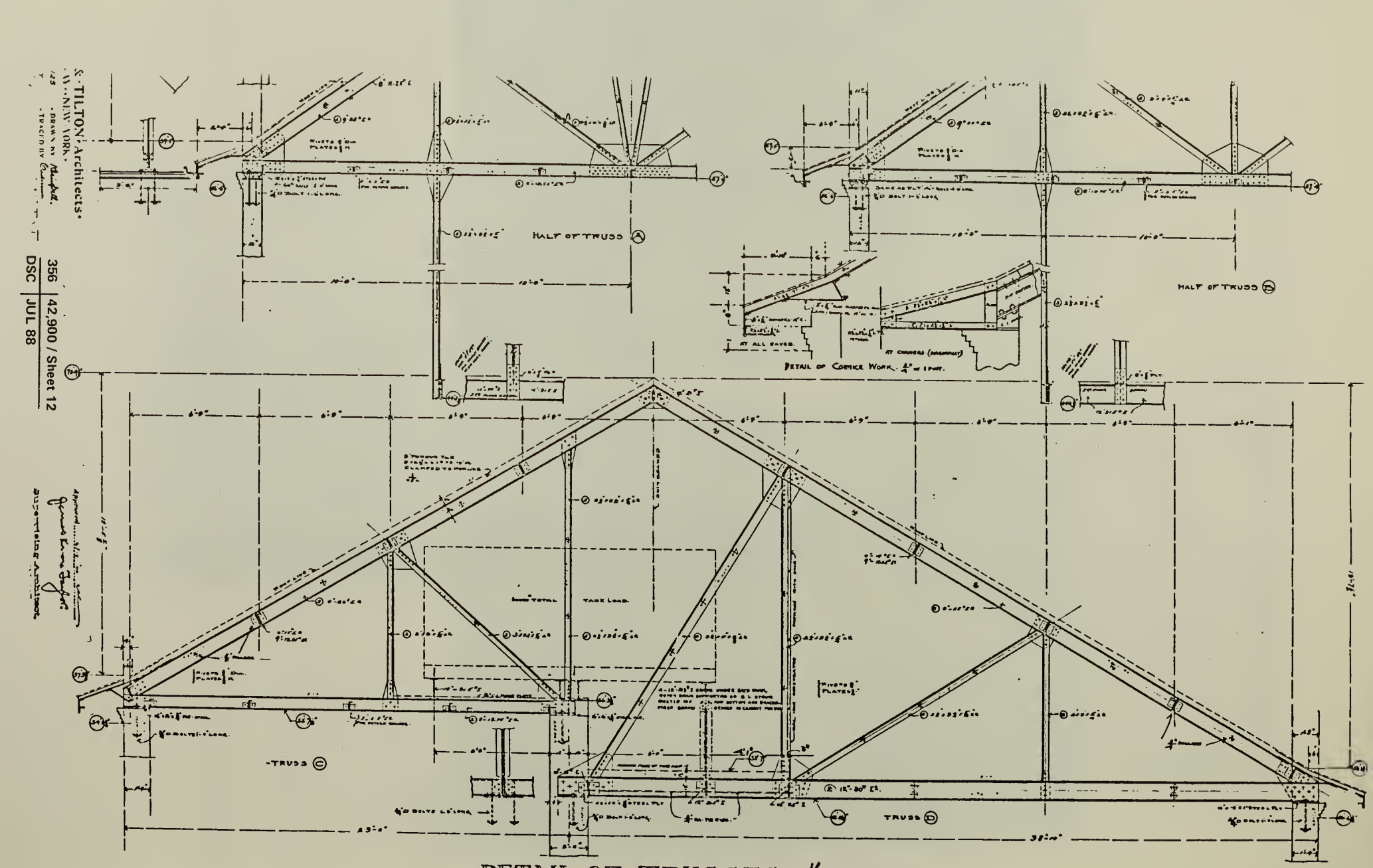
43. Side plate- "READY POWER ALTERNATOR" (#8)

44. Room 104- "WESTON VOLT METER" "UD264" (#9)

45. Room 104- volt meter, west end (#9)

46. Faraday 28-station fire alarm panel (#10)

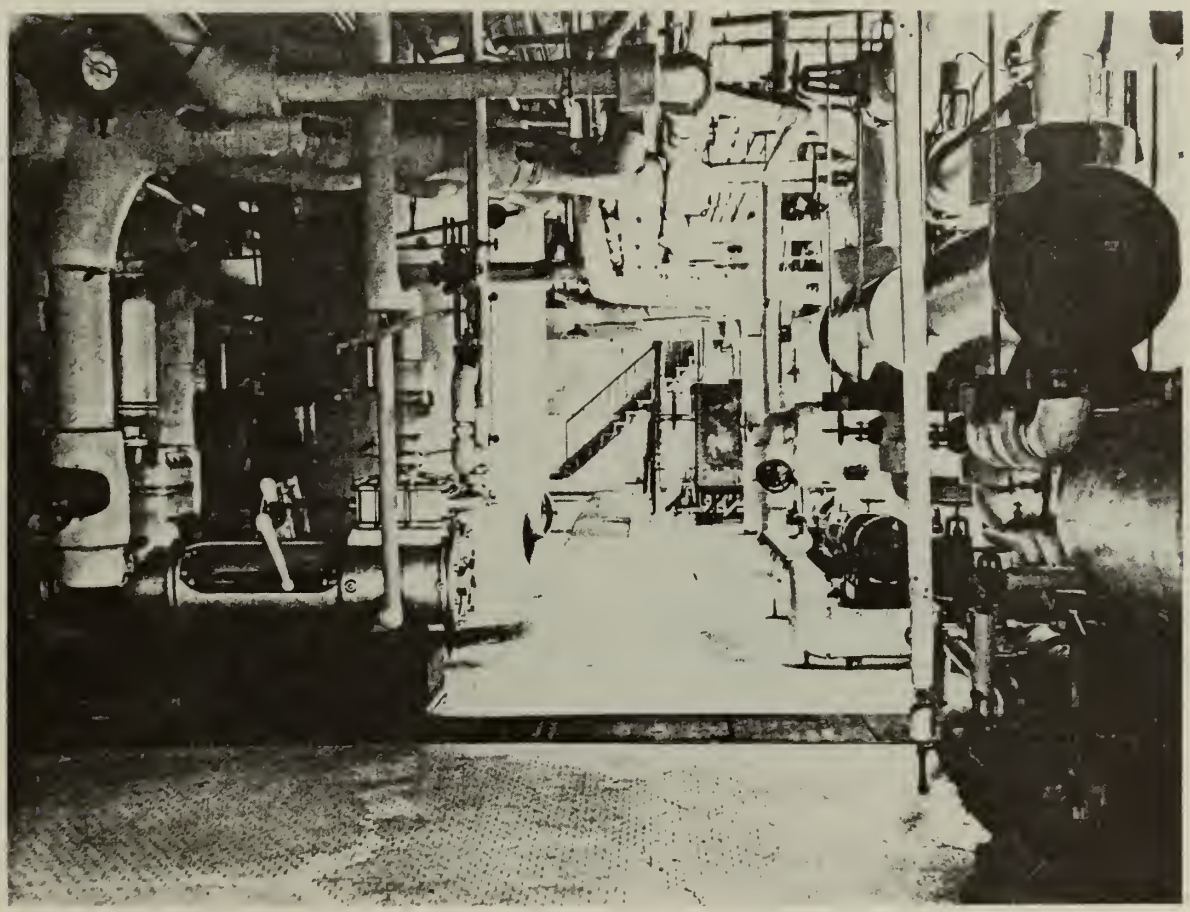
47. Faraday alarm system-inside panel (#10)



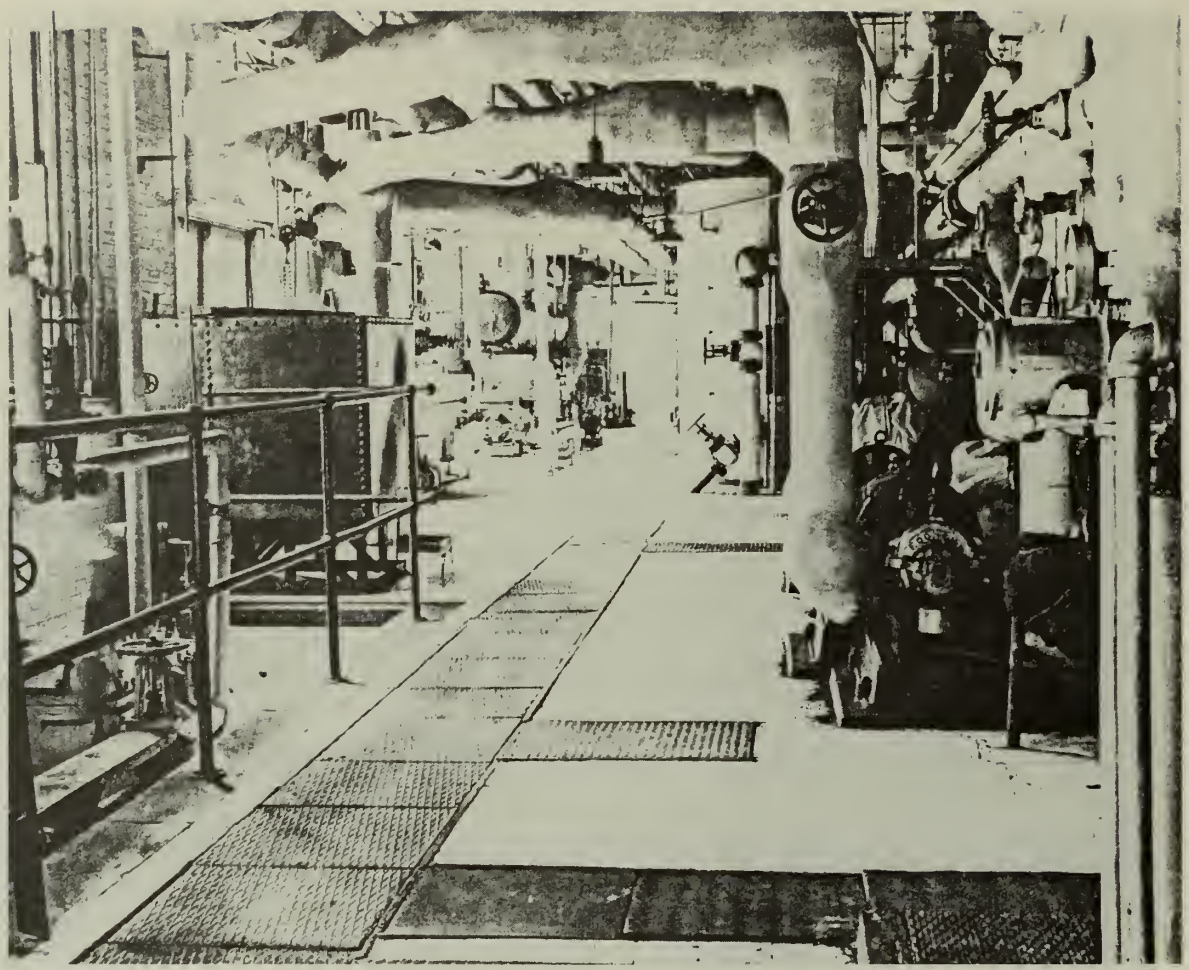
DETAIL OF TRUSSES ½" SCALE

1900- Drawing by Boring & Tilton showing location of water storage tanks (6) in attic.

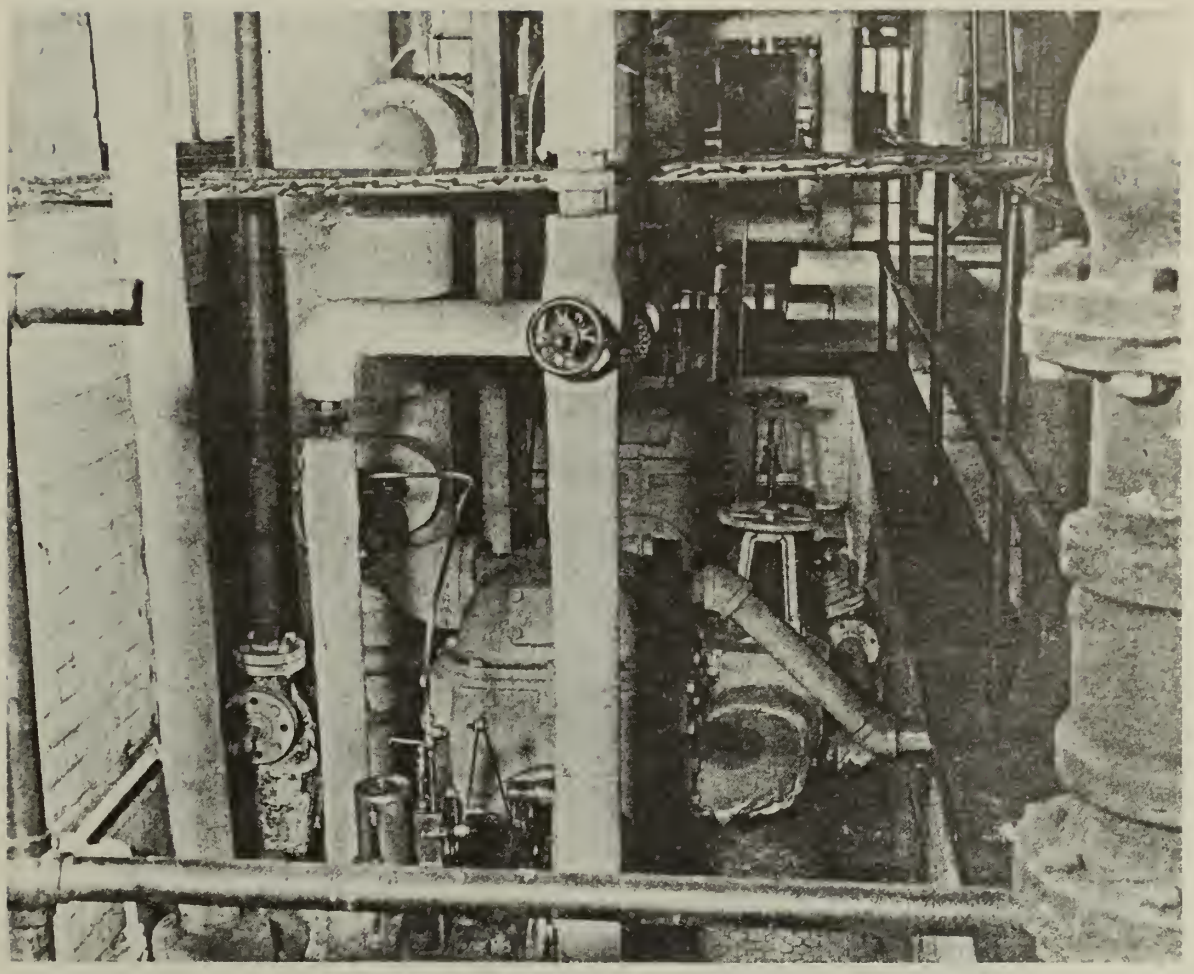
Exhibit 12



43. Room 106-view toward north wall, c. 1940's(?). U.S. Immigration and Naturalization Service, Washington, D.C.



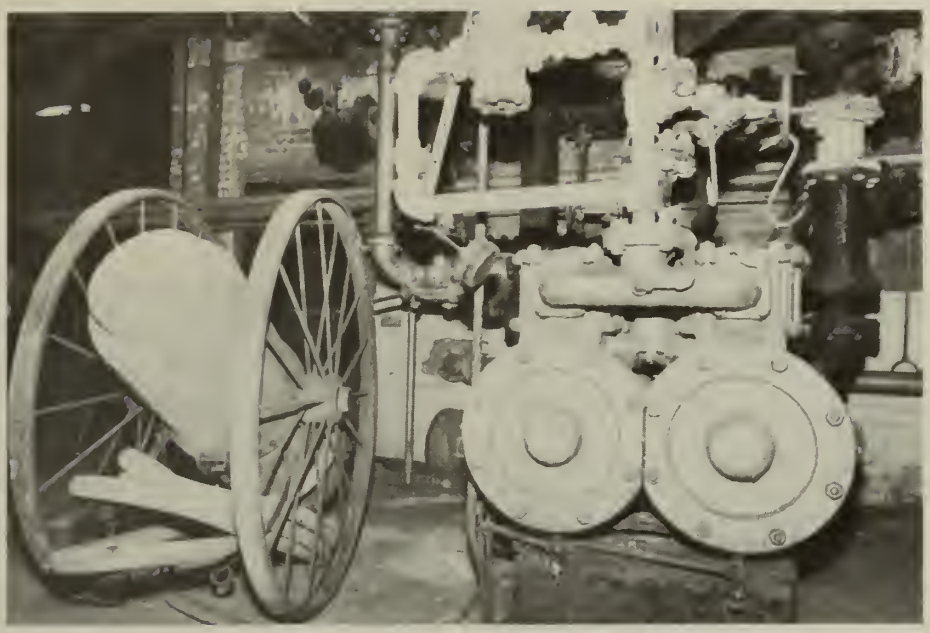
49. Room 106-view toward south end, c. 1940's(?). U.S. Immigration and Naturalization Service, Washington, D.C.



50. Room 106-view south of oil pump well (pump pit), c. 1940's(?).
U.S. Immigration and Naturalization Service, Washington, D.C.

51. Room 106- "FISHER CONVERTOR" (#1)

52. Room 106- "FISHER CONVERTOR" (#1), north side



53. Room 106- west wall, Fisher Convertor, (#8)

54. Room 106- east wall, two Warren tanks-ceiling suspended, at left,(#9), at right- "Machine Works" barrel, (#11).

55. Room 106- cold water condensation return tank (#2)

56. Room 106- salt water tank (#3)

57. Room 106- "RELIANCE" motor, north wall (#4)

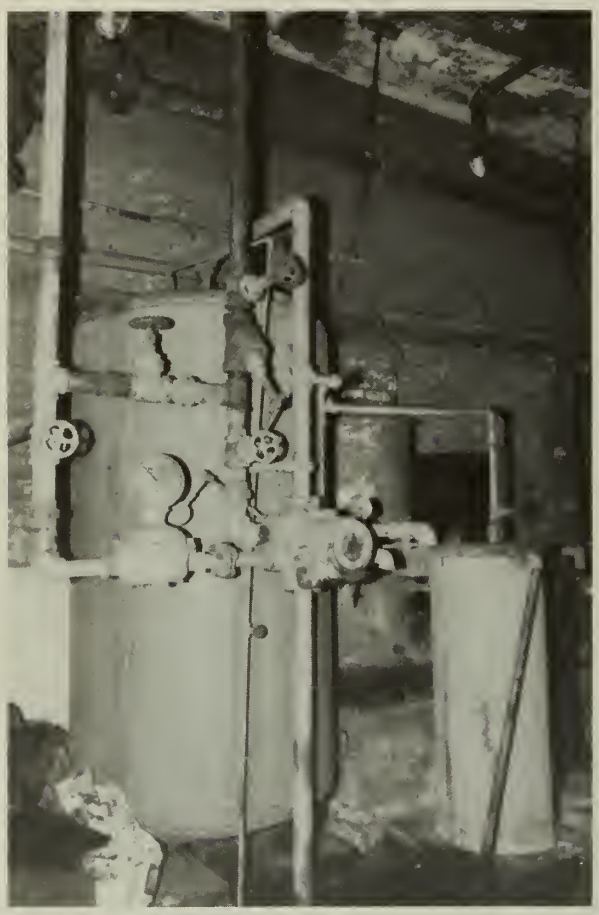
58. Room 106- "RELIANCE" motor, (#4), south side

59. Room 106, "Worthington" pump, west wall. (#6)

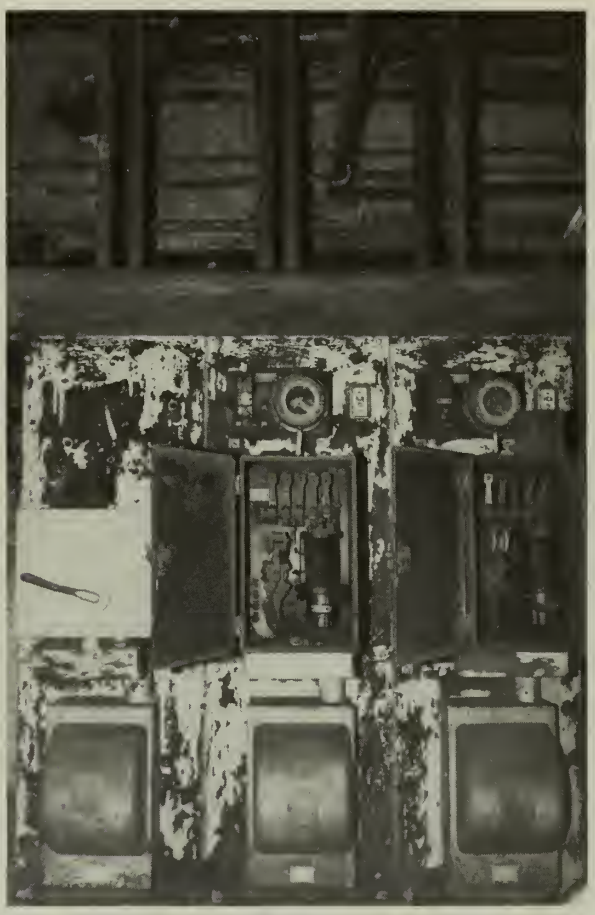
60. Room 106, fire extinguisher, foreground. (#12)

61. Room 106- pumps on pads, east wall.

62. Room 106, pump pit, iron railing. (#7)



63. Room 106- water softener, west wall. "Permutit"- brine rinse.



64. Room 106- west wall.

65. Room 106- holding tank, northeast corner

66. Room 108- Belt-driven lathe, (#2)

67. Room 108- Unidentified, (#3)

F. Mechanical Systems

F. Mechanical Systems

1. Electrical

One of the two 75-kw diesel generators operating alternately in room 107 currently generates the power for the lighting in buildings and passages, receptacles, electric heat and exterior floodlighting now in operation on the island. The 460V, three-phase output of the generator in operation is distributed via distribution boards, 120/208V transformers, and lighting panels at various locations.

The distribution panels which fed the various buildings on the island are located in the powerhouse. Panelboards serve the building's lighting and mechanical systems and maintenance areas. Those not supplied by the 75-kw generators are not the type currently approved by UL and local authorities. All distribution equipment, conduit, and wiring and the currently used lighting fixtures and receptacles are of recent vintage. The conduits not used for distributing power from the 75-kw generator are steel. Original wiring is copper with rubber/cambric insulation.

Lighting throughout the building consists of a mix of fluorescent trough and conduit-mounted incandescent bulbs and bulbs with metal shades. In most rooms ceiling conduits provide outlets for bare bulbs. In the engine room and pump room, ceiling-mounted fluorescent troughs augment the incandescent system. In the boiler room, "Benjamin" glass safety lights are conduit-mounted to a beam over the platform above boilers #1 and #2. Green enamel metal shades are mounted on wall-mounted hook arms are located on the west wall of the boiler room. Similar metal shades are placed found in front of the switchboard in room 104.

All original electrical equipment including panelboards, conduit, wiring and lighting fixtures is badly deteriorated. The system should not be refurbished as it is unsuitable for reuse in the modernization of the building's systems.

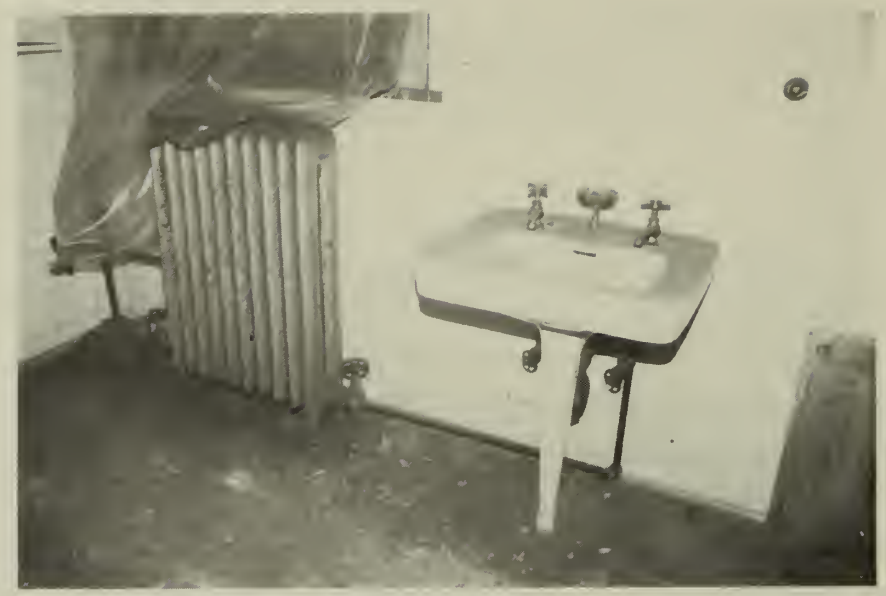
2. Heating and Ventilation

Steam was produced in the powerhouse by three high-pressure (approximately 125 psig) water tube boilers fabricated by Babcock and Wilcox. The steam was primarily used to power back-pressure-type steam turbines driving direct-current generators as well as for boiler accessories such as feed pumps. The exhaust steam was used for heating purposes and operated at low pressure (2 psig). (For a discussion on the history of the boilers and conditions see pages 27-29).

There are no radiators on the first floor, but sectional cast-iron radiators are found in almost every room on the second floor. Ventilation fans have been placed in door transoms and circular holes exist in two rooms where ceiling fans to the attic were once installed (photos 1 and 2).

3. Plumbing

The fixtures in the powerhouse are primarily limited to the second floor. On the first floor, there is only one slop sink located at the west wall of the boiler room. On the second floor, there are three toilets, one shower/wash room, two room sinks, and two aluminum enclosed showers. All fixtures date from the 1930's or later (photos 3-6).



1. Room 208, sectional radiator and square pedestal sink.

2. Room 211, rotary wall-mounted fan.

3. Room 212, floor-type urinal.

4. Room 212, toilet.

5. Room 201, sink, slop sink and toilet.

6. Room 202, round pedestal sink, c. 1920's.

G. Structural System

G. Structural System

I. Description and Existing Condition

A. Description

The Power House is a two story structure with no basement. The substructural system consists of solid brick and stone loadbearing walls supported by a network of wood piles capped with wood and concrete grillages. The superstructural system is composed of steel roof trusses or floor framing spanning between solid brick loadbearing walls.

The foundation structure engages the bottom 10 feet of the masonry bearing walls below ground level. The brick and stone walls are transferred to a system of wood piles through a line concrete cap on two way heavy timber grillages. In both the boiler and generator rooms internal masonry bearing walls, located below the first floor slab, transfer equipment loads to an independent system of piles and grillage.

The first floor is concrete slab on grade with several superficial concrete encased mechanical trenches in the generator and boiler rooms.

The second floor structural system consists of a concrete slab spanning between closely spaced steel beams which in turn span between masonry bearing walls. The steel beams are tied together with continuous 3/4" diameter steel rods at 5 to 6 feet on center.

The roof structure is a three way spanning system composed of hollow clay tiles spanning between steel

"I" shaped subpurlins. These are supported by channel purlins, and are in turn supported by trusses. The roof trusses, in addition to supporting the roofs, also support the second floor framing system with steel angle hangers. In the boiler room where there is no second floor the trusses serve as support of a mezzanine level above the second floor and the support of catwalks above the ducts and boilers. In the oil tank room the trusses support a steel frame which serves as a catwalk platform and braces the two story masonry walls.

The Covered Way 5 roof is framed with steel A-frames supporting wood planks and beaming on masonry bearing walls. The ceiling is a reinforced concrete slab.

B. Existing Conditions

The structural clay roof tiles are in generally fair condition with some breakage and tee sub-purlins having some corrosion (photo 1). Roof-purlins are badly corroded in only a few places. The purlins are bowing laterally due to lack of sag rods. The main trusses are in good condition (photo 2), with one truss having a missing section of chord.

The Second Floor structure shows no visible signs of distress. However, analysis disclosed that the steel beams were in general overstressed. The configuration of the concrete slab and beam tie rods indicate that the beams were originally designed for clay tile construction with a full depth concrete slab substituted. This has increase the dead load substantially. The beams were not redesigned to accommodate this increased load.

The Ground Floor slab on grade is generally in good condition with the exception of an area in the

southwest corner. Here the slab has settled about 4" with the bottom of the stair run settling with it. This has caused the steel stair to rack and pull away from its supporting walls.

Some of the steel supporting the roof over Covered Way 5 is badly corroded and the wood planks are not in good condition due to prolonged exposure to penetrating rain water.

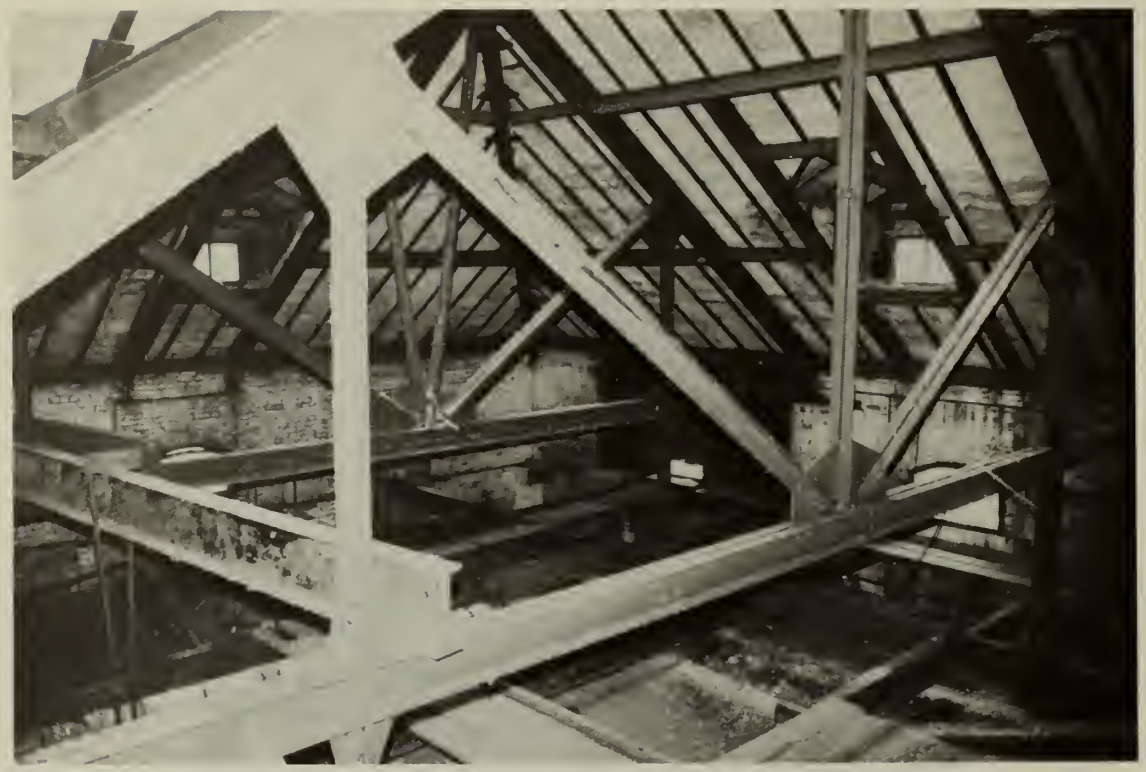
The pile foundations were investigated by trenching and wood samples taken. These were found to be sound. No foundation settlement has been found.

The exterior bearing walls exhibit some cracking (photo 3) with bad bulging and cracking occurring in the northwest corner at the oil tank room (photos 4 and 5) due to corrosion of embedded angles (photo 6).

Interior bearing walls showed some severe cracking due to expansion and contraction of the building when it was unheated (photos 7, 8, 9).

The main stack lower shaft also exhibits severe cracking (photos 10 and 11).

1. Typical condition of structural clay roof tiles and corrosion of tee sub-purlins



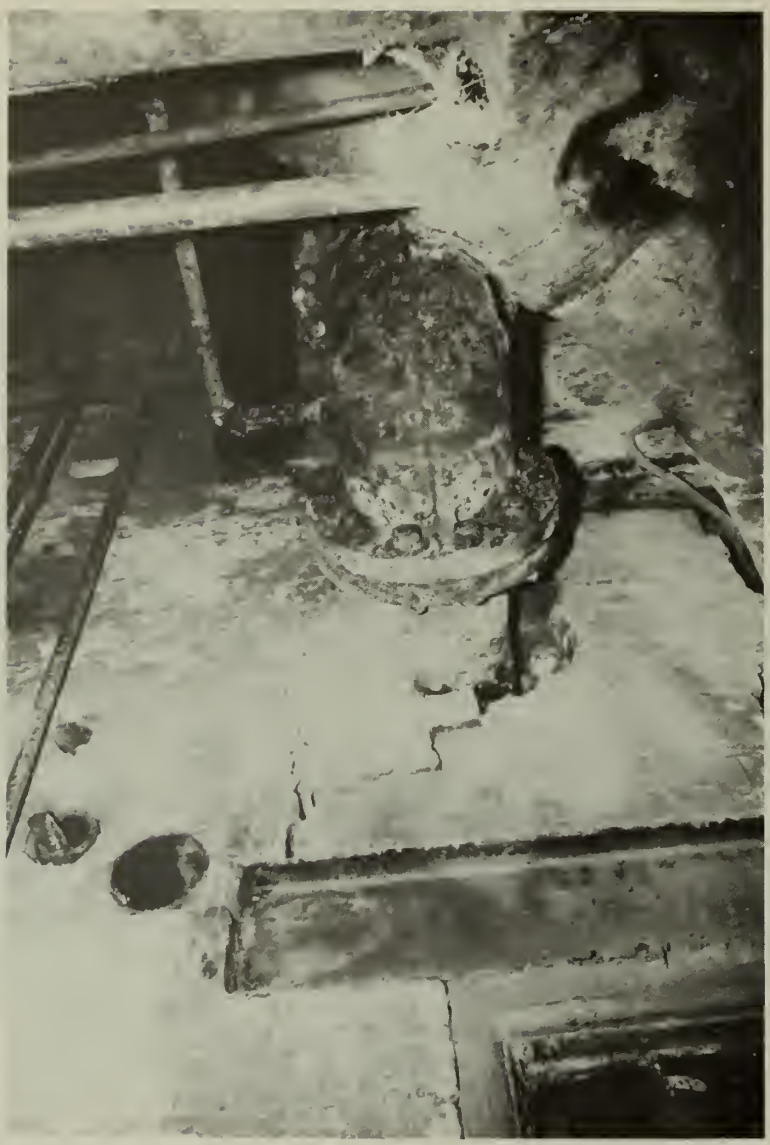
2. View showing the lateral bowing of the purlins due to the lack of sag rods

3. Typical example of cracking of exterior bearing walls

4. View showing bulging and cracking of exterior bearing walls in the area of the northwest corner of the oil tank room due to corrosion of embedded angles

5. View of the bulging of the exterior bearing wall. As photograph 4

6. Typical example of cracking of exterior bearing walls due to corrosion of embedded angles



7. View showing severe cracking of interior bearing walls due to expansion and contraction of building when unheated

8. View showing cracking of interior bearing walls. As photograph 7

9. View showing cracking of interior bearing walls. As photograph 7

10. Typical example of cracking of main stack lower shaft

11. View showing severe cracking of the lower shaft of the main stack

H. Architectural Treatment of the Building

H. Architectural Treatment of the Building

1. Discussion of Use

The powerhouse will be rehabilitated as a central power generating and utilities distribution source for the island. The modernization of the plant equipment will not affect the architectural integrity of the building. By revitalizing the original function of the powerhouse and reusing the original distribution spaces in ceilings of covered walkways, intervention in existing building fabric will be minimal.

In order to function as the central plant, existing machinery, including pumps, boilers, turbogenerators, and tanks will be removed and replaced by new equipment. The two 75-kw, 460-volt generators will be removed after three new generators are installed in a prefabricated enclosure. The existing feeders of the 75-kw generator distribution system will be reconnected to the new generator, serving the existing panelboards, transformers, lighting receptacles, and heating. This equipment will remain in use until the installation of new equipment. In addition, some new uses will be housed on the first floor. The boiler room will house three new boilers which will provide steam heating, as well as three refrigeration units. The fuel source will be natural gas with an emergency back-up system of fuel oil, provided by three underground tanks. The engine room will continue to supply the electrical distribution. Two new partitioned rooms will house a 400-kw emergency generator, in case of a disruption in power supplied by New Jersey, and a telephone room. The pump room's function will change to that of incineration, with two incinerators. Rooms 107 and 108 will become general waste and refrigerated food service waste storage facilities. The oil tank room, a two-story

open space, will be divided into two floors, with the first floor housing water tower pumps, chiller pumps, and water treatment equipment. Access from the boiler room, closed when the system was converted from coal to oil, will be reopened.

The second floor will be divided by new interior partition walls, reusing a portion of existing bearing walls. The new rooms will house the maintenance and security personnel showers, locker rooms, a security monitor, a manager's office, a reception area, a conference room, and a lounge. Exhibits 1 and 2 depict the new design.

2. Recommendations

a. Exterior

Plans for the rehabilitation of the building include the restoration of the facade to its original appearance. The brick chimney, determined to be unstable, should be removed and reconstructed for reuse. Structural investigation during this process will determine the extent of brick removal. An entire section of the northwest wall below the upper level of steel framing should be removed and reconstructed (see Structural section).

All of the limestone trim and specific areas of the brick should be repointed. Minor areas of limestone spalling should be repatched to match the existing. The granite base requires a thorough cleaning and complete repointing. The latter should be soft pointing with flush finish joints to match existing in appearance. Bluestone with loose layers (i.e.: base course) should be manually redressed and retooled to match the original smooth sawn finish. A loss of 1/4" to 3/8" of stone is tolerable with a

difference in finish face elevation between stone units acceptable. Severely worn bluestone units (i.e.: window sills) should be cut back to a depth within the existing brick wall, removed, and replaced with a new unit of bluestone. The entire masonry surface should be cleaned. The badly deteriorated roof tiles and terra-cotta ceiling tiles should be removed. Roof tiles in good condition should be stored for reuse. Window frames and sash are not reusable and will have to be replaced. All doors should be replaced by new ones to match the existing. Skylights should be restored.

b. Interior

Interior finishes found throughout the building reflect its utilitarian function. No unusual or historically significant finish exists that should be considered a preservation priority. Finishes should be chosen that will be compatible with the retrofitting of the building as a modern power plant.

c. Mechanical Systems

Existing equipment in the boiler, engine and pump rooms are in a very deteriorated state in addition to being incompatible with the new systems for power plant modernization. The original Babcock & Wilcox boilers represent a common type of industrial installation during the first decade of the twentieth century. It was common practice in such powerhouses, factories, and mills to convert these coal-fired boilers to oil-fired. Boilers #4 and #5, though intact with their original 1917 brick housing and settings, have been altered extensively. They now have as little historical significance as boilers #1 and #2, dating from 1948.

Portable equipment such as the wheeled fire engine in the pump room and the belt-driven drill press and lathe in room 108 may be removed from the building to a location on the island appropriate for exhibition.

d. Structural System

Roof Structure: The installation of new plywood sheeting stiff enough to substitute for structural clay tile. Areas of deterioration to purlins and sub-purlins should be reinforced. New sag rods should be installed. The missing truss chord should be replaced.

Second Floor: In room 106, the slab should be removed and replaced with lighter construction. In the north and south ends an additional support line should be added.

Ground Floor: Framed slab and beam on grade should be added at the the stair in the southwest corner. New steel structural members for the stair should be installed.

Covered Way 5: Corroded members and rotted wood planking should be replaced.

Exterior Bearing Walls: Cracks should be repaired and all areas repointed with the exception of the northwest corner. At this location the walls should be removed and replaced.

Interior Bearing Walls: Cracks should be repaired and walls repointed.

Main Stack Lower Shaft: Cracks should be repaired and brickwork repointed. A new steel girdle should be installed.

3. Recent Developments

Work on the rehabilitation of the powerhouse has proceeded following the above recommendations. The most immediate needs of the project have been addressed: The unstable brick chimney has been removed down to the brick base; the northwest wall has been temporarily shored; all machinery has been removed from the building; some portable machines have been salvaged by the National Park Service.

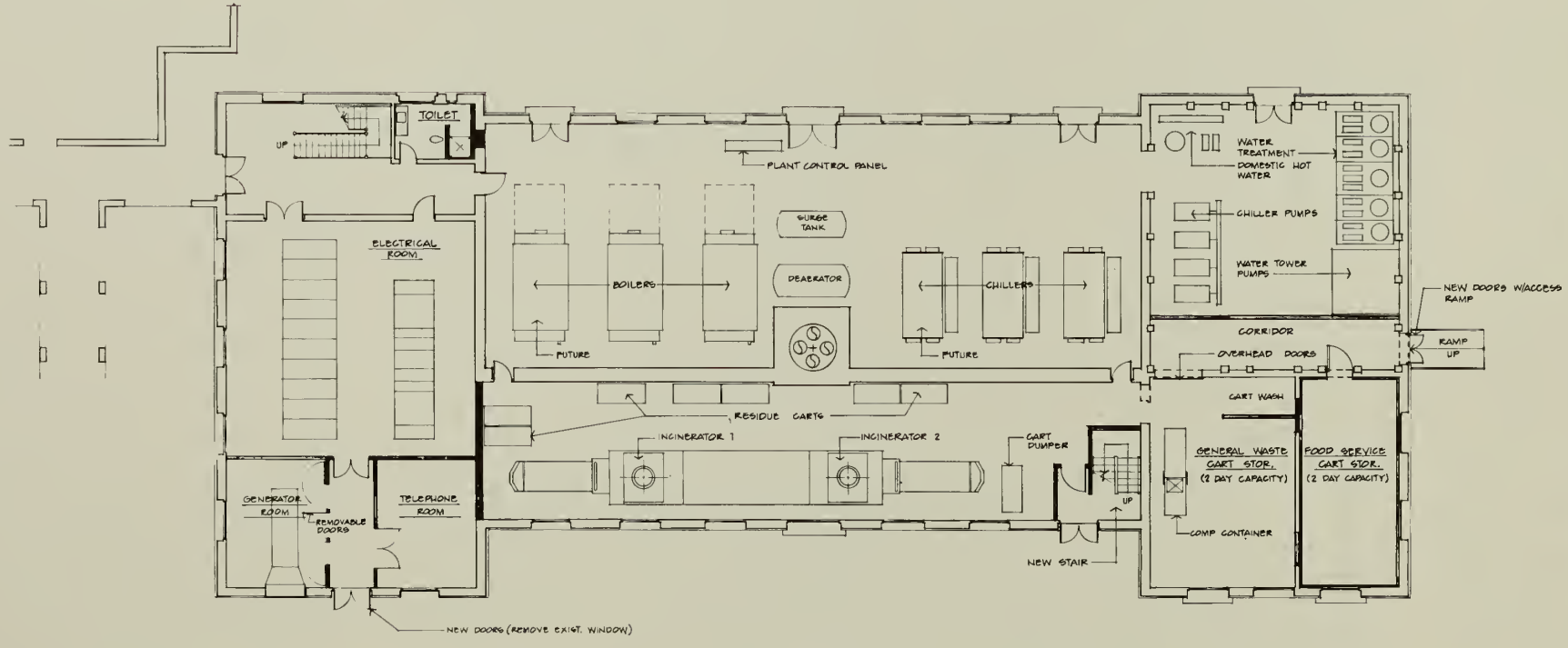


Exhibit 1

SCALE OF FEET

SCALE OF METERS

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UNITED STATES DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

ARCHITECTS

SEYER BLINDER SELLE / ANDERSON NOTTER FINEGOLD
80 FIFTH AVENUE
NEW YORK, NY 10114
(212) 741-3880

STRUCTURAL ENGINEERS

ROBERT SILMAN ASSOCIATES, P.C.

MECHANICAL & ELECTRICAL ENGINEERS

SYSKA & HENNESSY INC.

HISTORIC LANDSCAPE ARCHITECT

BRUCE KELLY

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MATERIALS CONSULTANT

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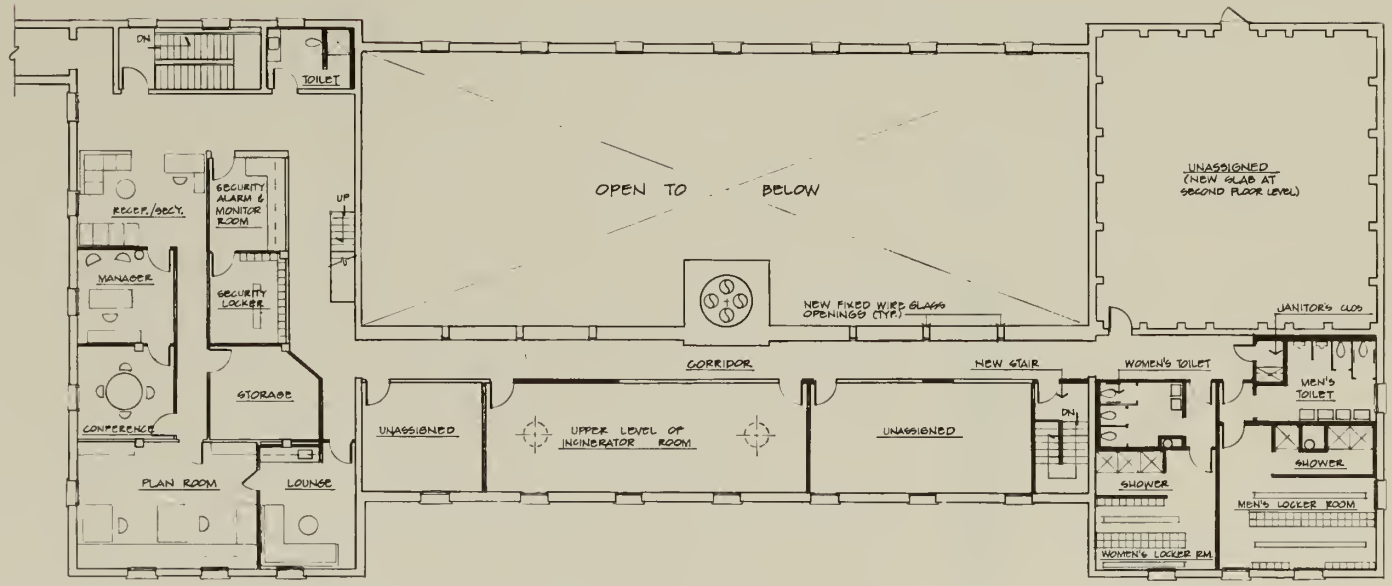

Exhibit 2

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80 FIFTH AVENUE
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SECOND FLOOR PLAN

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III. APPENDIXES

Appendix A

Appendix B

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DOCUMENTATION

Prepared for the U.S. Department of Interior/National Park Service, Denver Service Center by Beyer Blinder Belle/Notter Finegold Alexander

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Volume 1	The Main Building June 1, 1984	NPS D-41
Volume 2 Part One	Unit One Buildings December 1985	NPS D-42
Volume 2 Part Two	Unit One Buildings December 1985	NPS D-42
Volume 3	Powerhouse December 1985	NPS D-43
Volume 4 Part One	Units 2, 3 and 4 August 30, 1986	NPS D-44
Volume 4 Part Two	Units 2, 3 and 4 August 30, 1986	NPS D-44
Volume 4 Part Three	Units 2, 3 and 4 August 30, 1986	NPS D-44

EXISTING CONDITION SURVEYS

Volume 1 Appendix A	Main Building February 1, 1984	NPS D-41
Volume 2 Appendix D	Unit One Buildings July 1985	NPS D-42
Volume 3 Appendix A	Powerhouse December 1985	NPS D-43
Volume 4 Appendix A Part One	Units 2, 3 and 4 July 1986	NPS D-44
Volume 4 Appendix A Part Two	Units 2, 3 and 4 July 1986	NPS D-44

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