COMMENT ON NATIONAL REGISTER NOMINATION

ADDRESS: 411-419 N 9th Street, Willow Steam Plant

OVERVIEW: The Pennsylvania Historical & Museum Commission (PHMC) has requested comments from the Philadelphia Historical Commission on the National Register nomination of 411-419 N 9th Street located in the Callowhill neighborhood of Philadelphia and historically known as the Willow Steam Plant. PHMC is charged with implementing federal historic preservation regulations in the Commonwealth of Pennsylvania, including overseeing the National Register of Historic Places in the state. PHMC reviews all such nominations before forwarding them to the National Park Service for action. As part of the process, PHMC must solicit comments on every National Register nomination from the appropriate local government. The Philadelphia Historical Commission speaks on behalf of the City of Philadelphia in historic preservation matters including the review of National Register nominations. Under federal regulation, the local government not only must provide comments, but must also provide a forum for public comment on nominations. Such a forum is provided during the Philadelphia Historical Commission's meetings.

Built in 1927, the Willow Steam Plant was a significant achievement by the Philadelphia Electric Company, whose goal was to establish a modern district steam heating system for large commercial buildings in Center City. Using an extensive underground network of pipes, steam heating was considered at the time to be one of the most efficient means of heating large buildings in a dense urban area. During this period, Philadelphia's steam system became the fifth largest the United States. The nomination proposes significance at the local level under Criterion A in the area of engineering. It also states it is significant at the local level under Criterion C in the area of architecture as an important example of power plant design during the 1920s. The steam plant was designed by the prominent local firm of John T. Windrim, the architect of numerous buildings for the Philadelphia Electric Company during this period. The period of significance begins with the building's construction in 1927 and ends in 1959, when the plant's status was superseded by newer steam plants. The Willow Steam Plant ceased operations in the 1970s and has been vacant since. This property is not listed on the Philadelphia Register of Historic Places.

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Willow Steam Plant
Other names/site number:
Name of related multiple property listing**:**

(Enter "N/A" if property is not part of a multiple property listing

2. Location

Street & number: 411-419 N. 9th Street
City or town: Philadelphia State: PA County: Philadelphia
Not For Publication: ☐ Vicinity: ☐

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this **x** nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property _x_ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

___national ___statewide _x__local

Applicable National Register Criteria:

_X_A ___B _X_C ___D

Signature of certifying official/Title: **Date**

State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	[X]
Public – Local	[ ]
Public – State	[ ]
Public – Federal	[ ]

Category of Property

(Check only **one** box.)

Building(s)	[X]
District	[ ]
Site	[ ]
Structure	[ ]
Object	[ ]

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
1	0	buildings
0	0	sites
0	0	structures
0	0	objects
1	0	Total

Number of contributing resources previously listed in the National Register 0

6. Function or Use
Historic Functions
(Enter categories from instructions.)

INDUSTRY/PROCESSING/EXTRACTION - Factory

Current Functions
(Enter categories from instructions.)

VACANT/NOT IN USE

7. Description

Architectural Classification
(Enter categories from instructions.)

Art Deco

Materials: (enter categories from instructions.)
Principal exterior materials of the property: Brick

Narrative Description

(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Willow Steam Plant is a seven-story steam heating plant at the northeast corner of North 9th Street and Willow Street in the Callowhill neighborhood of Philadelphia, an urban industrial area just north of the downtown Center City area. Designed by the architectural firm of John T. Windrim and built in 1927-28, for more than two decades the plant served as the sole source of steam for the district steam heating system that the Philadelphia Electric Company created to heat Center City's largest commercial buildings. The plant is roughly square in plan and consists of a primary six-story mass (with a seventh-story penthouse level). It has an original one-story train shed along the south elevation, an original seven-story, steel panel-clad coal tower that rises up the middle of the south elevation from the roof of the train shed, and a two-story addition, which was built in 1950, at the northwest corner. Except for the coal tower, which is entirely constructed of steel, the building has a reinforced concrete and steel structure, and the exterior walls are primarily faced in red brick. Major features include the three cylindrical steel exhaust stacks, which rise 58' above the roof or about 158' above the ground. Few major alterations have been made to the building since it was completed in 1928. While the building conveys an impression of industrial decay, its distinctive exterior form and materials remain nearly entirely intact, contributing to a strong sense of integrity.

Narrative Description

Setting: The Willow Steam Plant occupies the southern two-thirds of the current parcel, which is flat and surrounded by low-rise industrial and commercial buildings dating to the late-nineteenth and early-twentieth centuries, as well as several surface parking lots where buildings once stood. Along most of west elevation (9th Street), there wide concrete sidewalks. At the southeast corner, the ground is paved in granite Belgian blocks, which contain remnants of the rail lines that were historically used to deliver coal to the building (through the large garage door on the west elevation). There are no sidewalks along the south elevation (Willow Street), only a narrow strip of grass between the concrete curb and the building. On the east elevation (Darien Street), there are concrete sidewalks, although Darien Street is currently inaccessible from Willow Street (a chain-link metal fence blocks access). Along the north elevation, there is a parking lot, which has a gravel surface and is surrounded by a chain-link metal fence on the three open sides.

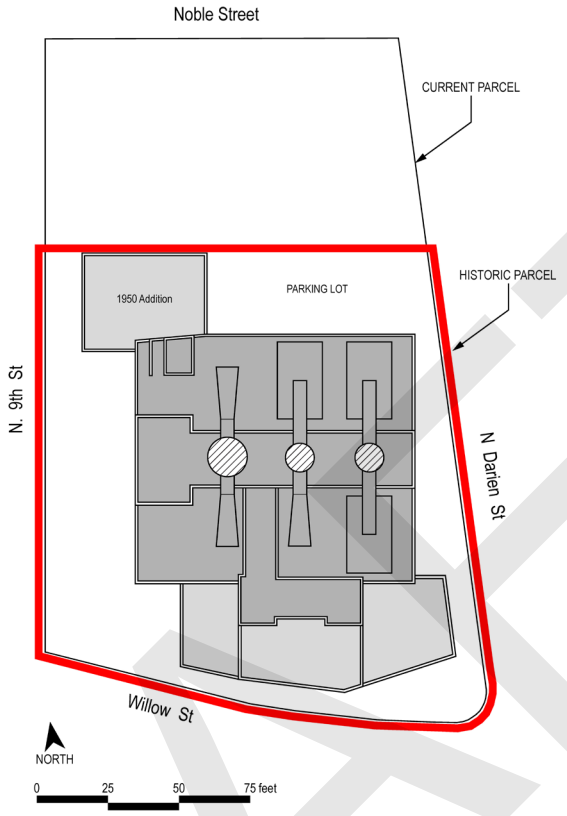

Figure 1: Site plan showing the National Register boundary. The sidewalks are included within the boundary because they were actively used in the operation of Willow Steam Plant, primarily along the west elevation where rail cars crossed the sidewalks to enter the building. Otherwise, the boundary matches the historic parcel as shown in the 1950 Sanborn fire insurance map (see Figure 10) and includes all historically and functionally related resources.

West Elevation: On the west elevation (Photos 1 and 2), the primary six-story mass of the building is five bays-wide and has a subtly defined water table topped by a row of soldier coursed bricks. On the first story, where the lower portion of the wall is painted, the westernmost bay contains a non-historic, painted hollow metal door with what appears to be an original four-light metal transom. The door and transom, which have a slightly projecting brick architrave surround, open to a small concrete stair with painted metal pipe railings, the dates of which are not known. The other four bays on the first story each have a rectangular window opening covered in plywood, although the slightly recessed brick surrounds remain visible. Spanning the full width of the west elevation above the first-story windows is a simple brick cornice.


Photo 1: West and south elevations, looking northeast.
Photo 2: North and west elevations, looking southeast.

On the second through fifth stories, the three center bays, which are slightly recessed from the outermost bays, contain vertically continuous steel factory windows. All three windows are twelve lights tall, although the window in the center bay, which is six lights wide, is twice the width of those on either side, which are each three lights wide. Each row of lights opens outward from the bottom. Tall brick pilasters, which rise to a simple brick cornice between the fifth- and sixth-story windows, separate the three center bays, with half pilasters serving as bookends. At the sixth story, there are three window openings which match the width of those below but are much shorter. These openings were created within the last few years by the previous owner. Above the sixth-story windows, a soldier coursed brick stringcourse spans the full width of the west elevation, and a similar treatment is found along the top of the parapet, which is topped by concrete coping blocks. The seventh story, which consists of a steel-framed penthouse structure clad in square steel panels, rises above the three center bays only.

On the first story, beyond the building's primary six-story mass, are one additional one-story bay at the south end and two additional bays, taking the form of a two-story addition, at the north end. Both are described below.

South Elevation: The primary south elevation (Photos 3 and 4) is six bays wide and consists of several distinct components that create an irregular, three-dimensional massing unlike the relatively planar west elevation. The first story consists of an original one-story brick train shed, which extends out one bay from the primary south elevation, is recessed one bay from the primary west elevation, and extends one bay beyond the primary east elevation. Rail cars entered

the shed through the garage door on the west elevation to deliver coal or remove ash, although the existing roll-down metal door in this opening appears to date to the late-twentieth century. The south elevation of the train shed, which follows the curve of Willow Street, has seven original steel awning windows in a two-over-two configuration matching the small windows on the west elevation. One additional unit of this window type is found on the east elevation of the train shed. Above the center portion of the train shed rises the large steel-framed coal tower, which is clad in original square steel panels. The lower half of this structure, which historically contained coal-handling equipment, is flush with the south elevation of the train shed but steps back above the fourth-story windows and then continues to climb the building's primary south elevation before extending horizontally across the roof. The coal tower has several original steel awning windows in a six-light and six-over-six light configuration. West of the coal tower, the primary south elevation has two bays of window openings at the second through fifth stories. The westernmost bay has original two-over-two steel awning windows, but the openings in the adjacent bay are empty. East of the coal tower there is one additional bay of original two-over-two steel awning windows.

East Elevation: The primary east elevation (Photo 4) is five bays wide and is very similar in appearance to the west elevation. The only differences are as follows: the first story has two large garage-door-type openings, although these are currently infilled with metal panels, and two smaller rectangular window openings. Additionally, at the second story, the monumental steel windows have original glazed steel doors, and similar but smaller doors are found in the three center bays at the sixth story. A steel hoist beam extends out from the east elevation above the center bay at the sixth story.

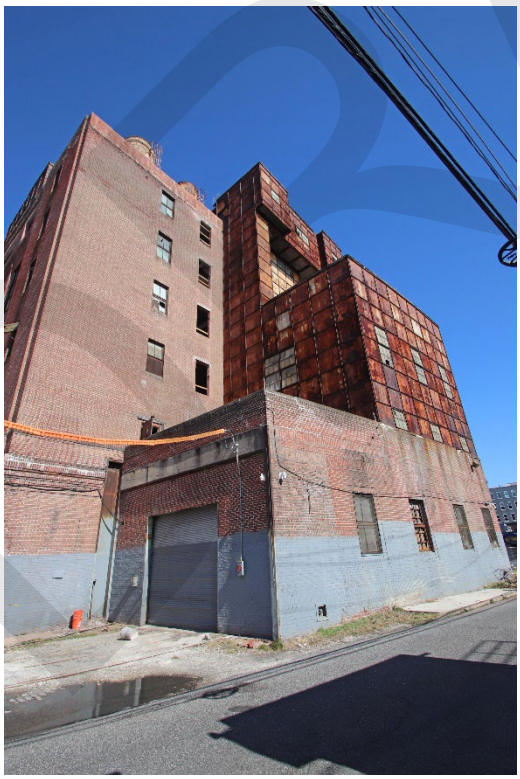

Photo 3: South elevation, looking northeast.
Photo 4: East elevation, looking northwest.

North Elevation: The primary north elevation (Photo 5) is six bays wide. On the first story, there are several flat metal doors, which appear to be from the late twentieth century. At the second story, a three-bay wide, rectangular appendage, which is supported by concrete beams, has brick walls, and a flat roof, extends out from the north elevation. At the third through fifth stories, there are (from east to west) original two-over-two steel awning windows in the first bay, a blank brick wall in the second bay, monumental steel windows similar to those on the east and west elevations in the third and fifth bays, and window openings in the third bay matching the size of those in the first bay but without windows. At the sixth story, the six bays alternate between original two-over-two steel awning windows and larger square openings with metal exhaust louvers, the date of which is unknown.

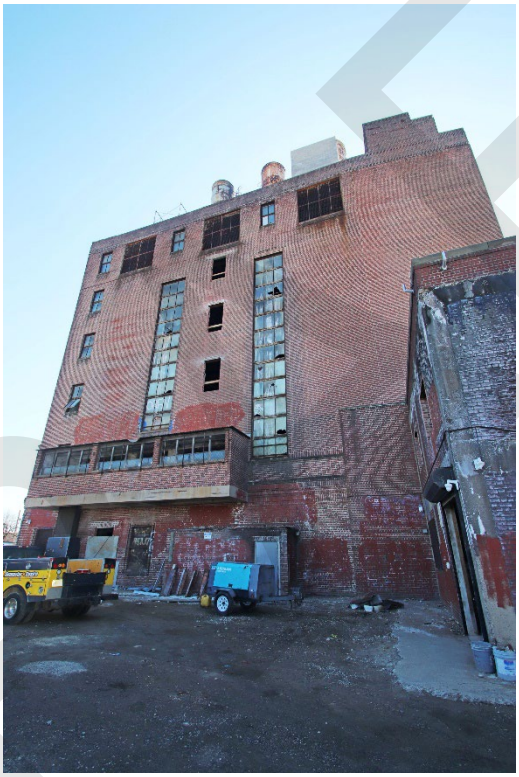

Photo 5: North elevation, looking south.

1950 Addition: At the northwest corner of the original building, a two-story addition, which was built in 1950, extends out two additional bays on each side (Photo 2). The addition, which a 1950 Sanborn fire insurance map indicates was used for storage, has brick walls matching those on the original building, as well as a flat roof with concrete coping along the parapet. On the south elevation, the first story has a garage-size opening that is currently covered with plywood, and the second story has a small square window opening, which is currently empty. On the west and north elevations, the first story has two infilled (with brick) openings on each side. On the east elevation, there is a roll-down metal garage door, which dates to the late-twentieth century, and a small steel awning window on the first story. On the second story, the west, north, and east elevations each contain two square window openings, which currently are empty.

Penthouse: As mentioned above, the roof above the sixth story contains a one-story penthouse structure, which is rectangular in plan, one bay wide, and extends along the center east-west axis of the roof between the west and east elevations. At each end (east and west of the stacks), the penthouse is clad in original square steel panels. Below the stacks, the north and west elevations of the penthouse are built of concrete to support the large metal stacks that rise above it (Photos 6 and 7). The stacks, which are cylindrical in plan and built of riveted steel panels, rise approximately 58' above the penthouse. From the north and south sides of each stack, substantial steel exhaust ducts, which are square in profile, extend down at an angle and connect to the main roof above the sixth floor.

Photo 6: West and south elevations, close-up view of upper stories, looking northeast.
Photo 7: Rooftop, looking northeast.

Interior: Inside the original building, the first through sixth floors are open in plan and contain a regularly spaced grid of substantial concrete and steel columns, some of which have diagonal steel cross bracing (Photos 8-10). On the lower floors, the structure is predominantly concrete, but as the building rises the structure becomes primarily steel. The six square openings on each floor, through which the six boilers once rose continuously through the building, were decked over with steel and covered with concrete by the previous owner within the last five years following the removal of the boilers. The boilers were removed as part of an environmental remediation project; due to the extensive use of asbestos in and around the boilers, they presented a significant health hazard.


Photo 8: First floor, looking east.
Photo 9: Second floor, looking northwest.

Photo 10: Fourth floor, looking north.

On the seventh floor, in the one bay-wide penthouse that extends along the center east-west axis of the roof, there is a long, rectangular space with concrete floors and painted concrete walls and ceilings (Photo 11). Because the penthouse is connected to the coal tower and has the same steel panel cladding, it appears to have played a role in the delivery of coal to the boilers, although its precise use is not known. At the northwest and southeast corners of the building, there are original U-return metal stairs, which rise from the basement to the sixth floor (Photo 12).


Photo 11: Seventh floor, looking east.
Photo 12: Typical stair, looking northwest on the fourth floor.

The train shed on the first floor consists of a single open space with concrete floors, brick walls with remnants of a painted finish, and exposed steel beams and decking at the ceiling (Photo 13). In the two-story addition at the northwest corner, both levels are open spaces with concrete floors, exposed brick walls along the perimeter, and exposed concrete columns and beams (Photo 12).

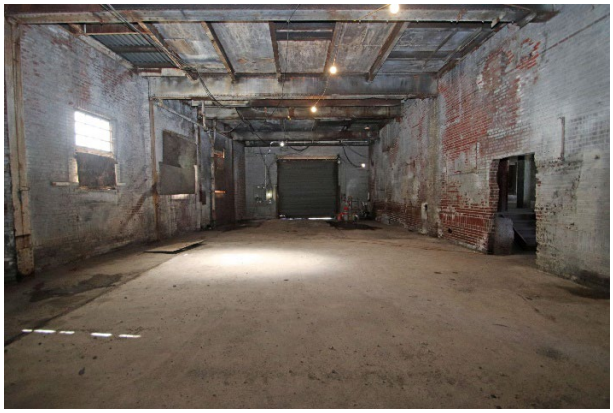


Photo 13: Interior of the train shed, looking west.
Photo 14: Interior of the 1950 addition, first floor, looking southwest.

Integrity: The Willow Steam Plant retains all seven aspects of integrity. In terms of *design*, *materials*, and *workmanship*, both the overall form and the defining characteristics of the steam plant remain intact, including its exterior brickwork with its spare, vaguely Art Deco detailing; the original fenestration, including the monumental steel windows on the west and east elevations; and especially the three rooftop exhaust stacks, which rise 158' above the ground and make the building a major visual landmark that can be seen from many blocks away. These aspects of the plant are highly characteristic of public utility buildings in Philadelphia during the early twentieth century, particularly those designed by the architect John T. Windrim. In regard to *location* and *setting*, the Willow Steam Plant remains on its original site and is surrounded by many of the same industrial and commercial buildings that existed in the area during the building's period of significance. The Willow Steam Plant maintains integrity of *feeling* and *association*, and continues to convey the major role it played in the history of public utility service in Philadelphia for a significant portion of the twentieth century.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [X] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)

ENGINEERING
ARCHITECTURE

Period of Significance

Criterion A: 1927-1959
Criterion C: 1927

Significant Dates

N/A

Significant Person
(Complete only if Criterion B is marked above.)

N/A

Cultural Affiliation

N/A

Architect/Builder

John T. Windrim, architect
W. R. Morton Keast, architect

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Willow Steam Plant is significant at the local level under Criterion A in the area of engineering. Built in 1927, the Willow Steam Plant was a major achievement in the Philadelphia Electric Company's effort to establish a modern district steam heating system for use by large commercial buildings in Center City Philadelphia. As downtown areas expanded during the early twentieth century, district steam heating, powered by a central steam plant and fed to buildings by a vast network of underground pipes, was found to be one of the most efficient means of heating many large buildings across a dense urban area. Although Philadelphia was slow to develop its district steam heating infrastructure – other cities had established systems decades before – Philadelphia's system quickly became the fifth largest in the United States thanks in large part to the Willow Steam Plant. The building is also significant at the local level under Criterion C in the area of architecture as a highly characteristic example of power plant design during the 1920s and as a major work by the firm of John T. Windrim, who were among the most prominent architects in early-twentieth-century Philadelphia and the designers of numerous buildings for the Philadelphia Electric Company during this period. The period of significance for the Willow Steam Plant begins in 1927, the year the building was completed and became operational, and ends in 1959, when the plant was relegated to secondary status in the city's steam system following the opening of newer, more efficient steam plants in other locations. The Willow Steam Plant was retired in in the 1970s and has been vacant since then, but the district heating system it made possible still operates in Center City with steam now supplied from other sources.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

The Early History of Central Heating by Steam

The concept of central heating first arose during the late-eighteenth century when James Watt (1736-1819), the Scottish inventor of the modern steam engine, devised a system of heating his office with steam supplied from a central boiler and fed through a system of pipes mounted to the wall. It was not until the late-nineteenth century, however, that steam began to be widely implemented as a means of heating buildings. The work of the Polish-born Russian inventor Franz San Galli and the Americans Joseph Nason and Robert Briggs, who developed early forms of the cast iron radiator in 1855 and 1863, respectively, helped to encourage the adoption of steam heating. But it was the American Nelson H. Bundy's looped tube radiator, introduced in 1872, that made steam heating efficient for the first time. The looped tube radiator improved the circulation of steam and allowed individual radiators to easily be expanded through modular cast iron loops to suit the heating needs of spaces small and large. Soon, steam heating became one of the standard forms of interior climate control in the United States, with radiators becoming a ubiquitous feature of the Victorian interior.[1]

[1] John Acton, Tania Adams, and Matt Packer, *The Origin of Everyday Things* (New York: Sterling Publishing, 2006), 204-205.

Until the late 1870s, virtually every building that had a steam heating system had its own boiler, which was typically located in a basement. This changed in 1877 when hydraulics engineer Birdsall Holly (1820-1894) of Lockport, New York, started to understand the increased efficiencies and commercial potential of centralized steam heating service. In the summer of 1877, Holly installed a small underground system in Lockport that soon provided steam to forty homes for heating purposes, becoming the first district steam heating system in the world. With the successful implementation of the Lockport system, the advantages of district steam heating immediately became clear to others. Over the next four years, Holly's company, the Holly Steam Combination Company, Ltd., installed district steam heating systems in other towns across upstate New York, and in larger cities like Detroit (1878), Milwaukee (1879), and Denver (1880). In 1881, as Holly's business continued to experience rapid growth, the Holly Steam Combination Company was succeeded by the American District Steam Company (ADSCO), which Holly and others incorporated with capital of $10 million that year. ADSCO assumed the position of national leader in the design and construction of district steam systems, going on to build dozens of systems in cities across the United States. By the turn of the twentieth century, over 130 district steam heating systems had been installed, including in places like New York City (1882), San Francisco (1885), Philadelphia (1889), and Seattle (1890), among others in dozens of smaller cities and towns.[2]

Although district steam heating rapidly expanded in the late-nineteenth century due to its commercial potential – steam service became another product for utility companies to sell – the advantages to property owners were also numerous. For one, by taking advantage of district steam heating, a building did not need its own boiler, which freed up valuable interior space to generate increased rental revenues. Additionally, there were no fires to build or tend to, and no ashes to remove, which meant that labor costs attributed to heating were significantly lower. District steam heating was also much safer for property owners; it reduced the risk of fire, which in turn led to lower insurance rates, and eliminated the risk of accidents like boiler explosions. Some also posited that district steam heating was healthier for city residents; when the smokestacks of dozens of buildings' individual heating systems were eliminated, it meant much less smoke in the central business district.[3]

District Heating in Philadelphia

The origins of district heating in Philadelphia can be traced to the late-nineteenth century, at the dawn of the age of electricity. In March 1889, the Edison Electric Light Company opened a new electrical generating station at 908 Sansom Street in Center City. Edison Electric Light, backed by Thomas Edison himself, was one of numerous electricity suppliers in Philadelphia at the time, vying for business in what was then a highly competitive environment. But with their new Sansom Street plant, which was widely reported to be the largest in the world, Edison soon became the most prominent and profitable electric company in Philadelphia. Although electricity was by far their main product, Edison found that the exhaust steam produced by the boilers in the Sansom Street plant could itself be a source of revenue. The company's first steam customer was the adjacent Irving Hotel at 915-917 Walnut Street. By the end of 1889, Edison had installed a

[2] Morris A. Pierce, "Summary of District Heating Systems in the United States, 1877-2020," *Documentary History of Water-works*, http://waterworkshistory.us/DH/DHsummary.pdf, accessed April 29, 2024.
[3] "District Heating a Sales Asset in Real Estate Developments," *The ADSCO Advocate*, Vol 1. No. 2 (1927), pp. 7, 10.

steam line from the plant into the hotel, supplying enough steam to heat the entire four-story building. While not strictly a district heating system – virtually no effort was made to implement the service more broadly – Edison's steam contract with the Irving Hotel represented the first example in Philadelphia of a building being heated by an off-site, third-party source.[4]

Over the next decade, Edison Electric Light expanded their steam network only on an incidental basis for their own purposes or, in a few cases, for their largest electricity customers. When the Edison company was acquired by the Pennsylvania Heat, Light and Power Company (PHLP) in 1896, the latter's new six-story office building at the northeast corner of 10th and Sansom Streets was fitted up for steam heat supplied by the Sansom Street plant.[5] In 1902, PHLP became the Philadelphia Electric Company, consolidating numerous electric companies into a single corporate structure with one name.[6] Although neither Edison nor Philadelphia Electric pursued widespread implementation of steam heating, they appear to have offered the service as an add-on to major buildings nearby the Sansom Street plant that were already receiving electricity from Edison or, later, Philadelphia Electric. Among the company's small but growing number of steam customers were the Jefferson Medical College Hospital at 10th and Sansom Streets, added in 1906; the Gimbel Brothers Department Store at 9th and Market Street, added in 1910; and the Lit Brothers Department Store at 8th and Market Streets, added in 1921 (Figure 2).[7]

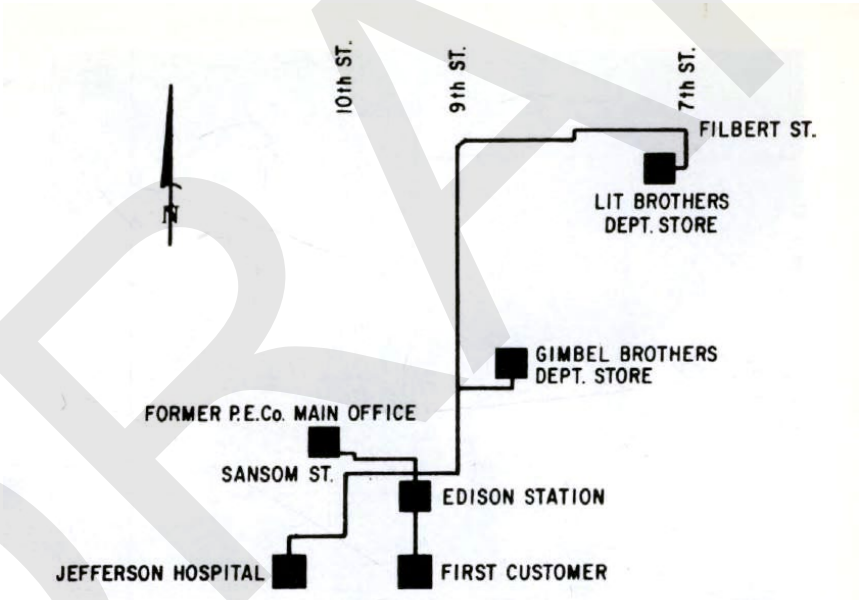

Figure 2: Philadelphia Electric's steam heating system in 1921 (from "The Philadelphia Steam Story" in *District Heating*, Apr-May-Jun 1976).

[4] Morris A. Pearce, "Urban Technological Systems Before Edison: Steam Heat and Power in Philadelphia," *Documentary History of Water-works*, http://waterworkshistory.us/DH/1995Philadelphia.htm, accessed April 29, 2024.
[5] "Pennsylvania H.L. & P. Co.," *The Philadelphia Times*, August 2, 1896; "Electric Heat, Light and Power," *The Philadelphia Times*, December 12, 1897.
[6] Nicholas B. Wainwright, *History of the Philadelphia Electric Company* (Philadelphia, 1961), 63-65.
[7] Wainwright, 196; Ellwood A. Clymer and Thomas M. Loughery, "The Philadelphia Steam Story…Approaching 90, and Still Going Strong," District Heating (April-May-June 1976), 24-25.

The Willow Steam Plant: District Heating Expands

By the mid-1920s the Edison Station on Sansom Street had become obsolete, and Philadelphia Electric made the decision to close it down by the end of 1927. Without a replacement, this meant terminating steam heating service in Center City, a decision that Philadelphia Electric's directors briefly considered making. Ultimately, however, the company "recognized a moral obligation to its steam customers," in the words of historian Nicholas B. Wainwright.[8] Moreover, as Wainwright explained, by continuing to supply steam to large electricity users, the company hoped to avoid the possibility of these customers installing their own electrical plants and dropping Philadelphia Electric as their power supplier. Given the inadequacy of the old Edison Station, the only option was to build a new steam plant somewhere in the vicinity of eastern Center City where most steam customers were found. Toward that end, in May 1926 the company acquired the property at the northeast corner of North 9th Street and Willow Street in the Callowhill neighborhood on the northern edge of Chinatown. This location provided the space required to build a modern steam plant and to connect the plant to the existing system via a new steam main buried under 9th Street. To design the new plant, Philadelphia Electric hired the architectural firm of John T. Windrim, who had designed virtually all of the company's buildings, including several major electrical power stations, since the mid-1910s. A building permit for the project, which was reported to cost $600,000, was issued by the city in late November 1926.[9] Philadelphia Electric awarded the construction contract to the locally based F. M. Harris Company in March 1927, and work appears to have begun not long after.[10]

Although Philadelphia Electric pursued the new steam plant to avoid ending steam service to its largest Center City electricity customers, the building's high cost could not be supported by the small number of existing users. For the new plant to make financial sense, Philadelphia Electric had to seek more customers and significantly expand its steam heating system. Before construction on the Willow Steam Plant was underway, Philadelphia Electric sought an agreement with the City of Philadelphia giving the company the exclusive right to install and operate a district steam heating system in Center City east of Broad Street. The city granted the franchise on February 8, 1927.[11] As construction of the steam plant began, so too did the installation of the 18" main that would extend south under 9th Street to the central business district (Figure 3). This work was undertaken by the American District Steam Company, which Philadelphia Electric had contracted with (Figure 4). By October 1927, both the steam plant and the main were completed and operational (Figure 5). Meanwhile, a competitor, the Philadelphia Steam Company, had emerged with plans to build a similar system west of Broad Street and as far west as 40th Street in West Philadelphia.

[8] Wainwright, 197.
[9] "Advance Construction News," *Philadelphia Real Estate Record and Builders' Guide*, December 1, 1926. See also Building Permit #11136 for 1926 (found in the Philadelphia City Archives).
[10] "Contracts Awarded," *Philadelphia Real Estate Record and Builders' Guide,* March 2, 1927.
[11] "City Ordinances," *Philadelphia Inquirer*, February 12, 1927.

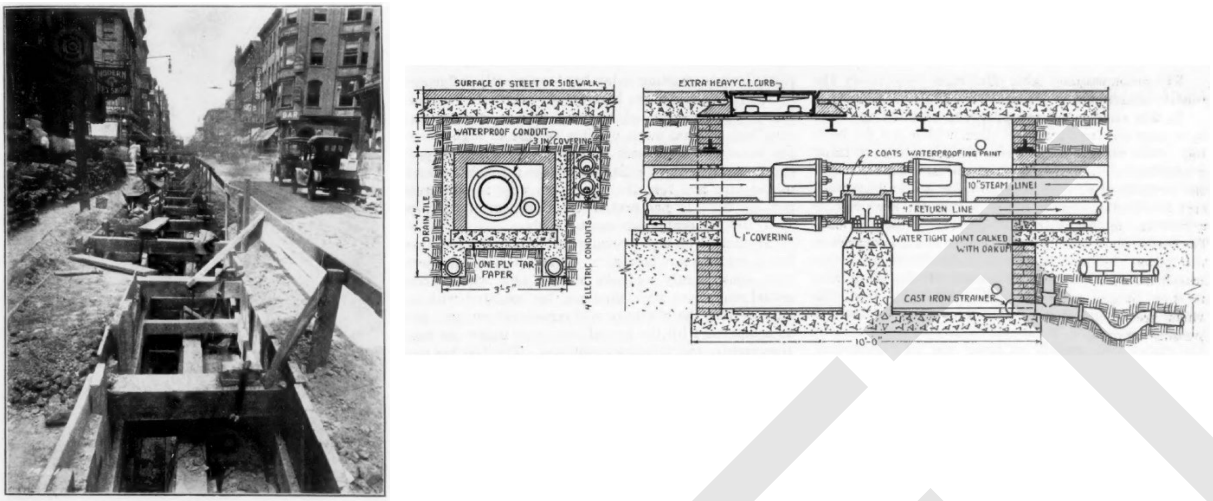

Figure 3: Construction of the steam main under 9th Street and details showing how the main was installed under the sidewalk (from *Power Plant Engineering*, October 15, 1927).

Philadelphia Electric Company Enters District Heating Field

AMONG the larger public utilities that have recently realized the profitable opportunities of district heating is the Philadelphia Electric Company.

When ADSCO completes the mains that are now being installed for this company, the Philadelphia Electric Company will be in a position to supply steam to a considerable portion of downtown Philadelphia—and should obtain the electric load of large buildings that would otherwise generate their own electricity. This will mean considerable additional revenue from the sale of electricity as well as steam.

With but few additions, the district heating business of the Philadelphia Electric Company will be handled by the present personnel and will entail only a slight increase in overhead.

At the present time, many other electric utilities are considering large heating installations. Some of these have favorably located boiler plants suitable for district heating, while others will effect economies by co-ordinating steam generation for electric production with district heating.

ADSCO offers its fifty years' experience in the district heating field to any utility company interested in developing a profitable district heating project.

AMERICAN DISTRICT STEAM COMPANY
GENERAL OFFICES AND WORKS
NORTH TONAWANDA, N.Y.

One of the 18" high pressure mains with ADSCO Duplex-Sleeve Expansion Joints and welded construction, installed for the Philadelphia Electric Company by ADSCO'S subsidiary, the Northeastern Piping and Construction Corporation.

Figure 4: American District Steam Company advertisement detailing their work for Philadelphia Electric (from *The Central Station*, November 1927).

Figure 5: The Willow Steam Plant, seen here during the 1940s (from *History of the Philadelphia Electric Company* by Nicholas B. Wainwright, 1961).

Once the Willow Steam Plant had entered service, Philadelphia Electric saw a dramatic increase in the number of steam customers and revenues from the service. While in 1920 the company's small handful of steam customers brought in only $58,000, by 1930 there were upwards of 813 customers making Philadelphia Electric more than $534,000 per year.[12] Among the new users were many of the largest buildings erected in Center City Philadelphia during the late 1920s and 1930s. The new steam system was particularly well suited to the many high-rise buildings that appeared in the area during this period because, unlike water, steam could rise without a pump. Among numerous high-profile examples were the Philadelphia Electric Company's own twenty-four-story headquarters at 9th and Sansom Streets, built in 1927; the Terminal Commerce Building, a twelve-story, 1.3 million square foot warehouse at North Broad and Callowhill Streets, built 1929-31; the Market Street National Bank, a twenty-four-story office building at One East Penn Square, across from the City Hall, completed in 1930; the Lincoln-Liberty Building, a twenty-eight-story tower at One South Broad Street, also adjacent to the City Hall, built in 1930; the Philadelphia Saving Fund Society or PSFS Building, the 33-story, International Style skyscraper at 12th and Market Streets, built 1930-32; and the Federal Reserve Bank of Philadelphia at 10th and Chestnut Streets, built in 1932 (Figure 6).

[12] Wainwright, 387-389.

Figure 6: Six of the many large buildings that were heated with steam supplied by the Willow Steam Plant. From top left: The Philadelphia Electric Company Building, the Terminal Commerce Building, the Market Street National Bank, the Lincoln-Liberty Building, the PSFS Building, and the Federal Reserve Bank of Philadelphia (all images from the Athenaeum of Philadelphia except the PSFS Building, which is from the Library of Congress).

All six buildings remain standing and three have been individually listed in the National Register of Historic Places: the PSFS Building in 1976 (NR Ref. No. 76001667); the Federal Reserve Bank in 1979 (NR Ref. No. 79002325); and the Terminal Commerce Building in 1996 (NR Ref. No. 96001203). The PSFS Building was also made a National Historic Landmark in 1976.

Several of these examples – particularly the Market Street National Bank, Lincoln-Liberty Building, and the PSFS Building – illustrate a point argued by historian Emmanuelle Gallo that the elimination of the chimney that came with district heating "opened up new aesthetic possibilities for the architect."[13] Not just an efficient means of heating tall buildings, district steam service in some cases directly influenced how these buildings looked. As Gallo further explains, "the ornamental tops of the most beautiful buildings [in New York], such as the Chrysler, Empire State or Waldorf-Astoria" would have been "impossible without a central

[13] Emmanuelle Gallo, "Skyscrapers and District Heating, an Inter-related History, 1876-1933," *Construction History* (2003), 98.

steam service."[14] So too would the dramatic, stepped-back central towers of the Market Street National Bank and Lincoln-Liberty Building, and the strikingly modern flat roof the PSFS Building have been impossible without the elimination of the chimney that district steam heating made possible.

While many new buildings took advantage of the district steam system made possible by the Willow Steam Plant, existing buildings, too, found it profitable to close down their own in-building plants and buy steam from Philadelphia Electric. One of the most notable examples was the John Wanamaker Department Store, the vast 12-story, two-million-square-foot building that was one of the largest in the country. In 1935, the Wanamaker Store removed both its electrical plant and steam boiler facility and began to purchase electricity and steam from the Philadelphia Electric Company.[15] Steam service was also extended to Independence Hall and the adjacent Congress Hall and old Supreme Court buildings on the 500 block of Chestnut Street, and to Pennsylvania Hospital at 9th and Spruce Streets, the oldest hospital in the United States.[16]

In 1931, Philadelphia Electric began to extend steam heating west of Broad Street for the first time. Although the Philadelphia Steam Company had sought a franchise agreement with the city to build and operate a steam system in this area, which the city finally approved in May 1929, the stock market crash that occurred in October of the same year derailed the company's plans to build a new steam plant near 32nd and Market Streets in West Philadelphia.[17] Without the financial means to build their own plant, Philadelphia Steam looked to the Pennsylvania Railroad, which was building its own steam plant behind the company's new terminal at 30th and Market Streets. Philadelphia Steam hoped to serve customers west of Broad Street using excess steam generated at the railroad's new plant, but the two sides could not come to an agreement. Without a source of steam, by February 1930 rumors swirled that the Philadelphia Steam Company was on the verge of collapse.[18] Seeing an opportunity to expand the profitable steam heating service they operated in the area east of Broad Street, Philadelphia Electric pursued acquisition of the Philadelphia Steam Company. The deal required approval by the state's Public Service Commission (forerunner of today's Public Utilities Commission), which the Commission granted in early October 1931. Philadelphia Electric immediately went about extending steam mains west of Broad Street to start supplying new customers in that territory. Although the Willow Steam Plant would remain the primary source of steam for the enlarged system, Philadelphia Electric would also use steam from the Pennsylvania Railroad's plant, which the railroad had finally agreed to, to serve customers in West Philadelphia and the western portion of Center City.[19]

Philadelphia Electric's steam heating system continued its rapid expansion over the 1930s. In 1932, Philadelphia Electric extended a new main under Wood Street as far west as 18th Street and under Walnut Street from Broad to 15th Streets (Figure 7). From Wood Street, branch lines were extended to supply steam to a host of major new customers as impressive as those found east of Broad Street, including the Academy of Natural Sciences on Logan Square, the U.S. Mint

[14] Ibid.
[15] *Ice and Refrigeration*, Vol. 89 (1935).
[16] Wainwright, 351.
[17] "Mayor Awards Heat Franchise and Tells Why," *Philadelphia Inquirer*, May 15, 1929.
[18] "Steam Plant Head Denies Collapse of West Phila. Plans" *Philadelphia Inquirer*, February 1, 1930.
[19] "Phila. Electric Co. Starts $4,000,000 Steam Heat Project," *Philadelphia Inquirer*, October 5, 1931.

at 17th and Spring Garden Streets, and the eighteen-story Elverson Building at North Broad and Callowhill Streets, the latter housing the offices and printing plant of the *Philadelphia Inquirer*. With the expansion of the system during the early 1930s, Philadelphia Electric's district steam heating system became the fifth largest in the United States, producing 3.1 billion pounds of steam per square mile annually. The only systems more extensive were found in Pittsburgh (6.5 billion lbs.), Chicago (6.3 billion lbs.), New York City (4.5 billion lbs.), and Rochester, New York (3.5 billion lbs.).[20] By 1940, steam customers numbered nearly 1,100 and generated revenues of over $1.1 million, the latter representing growth of nearly 100% in just ten years.[21] By the middle of 1942, there was such high demand for steam that the company had to decline taking on new customers while it worked on increasing capacity at the Willow Steam Plant.[22] This happened in the autumn of 1942 when a fourth boiler was added and additional mains were laid at a cost of nearly $500,000.[23]

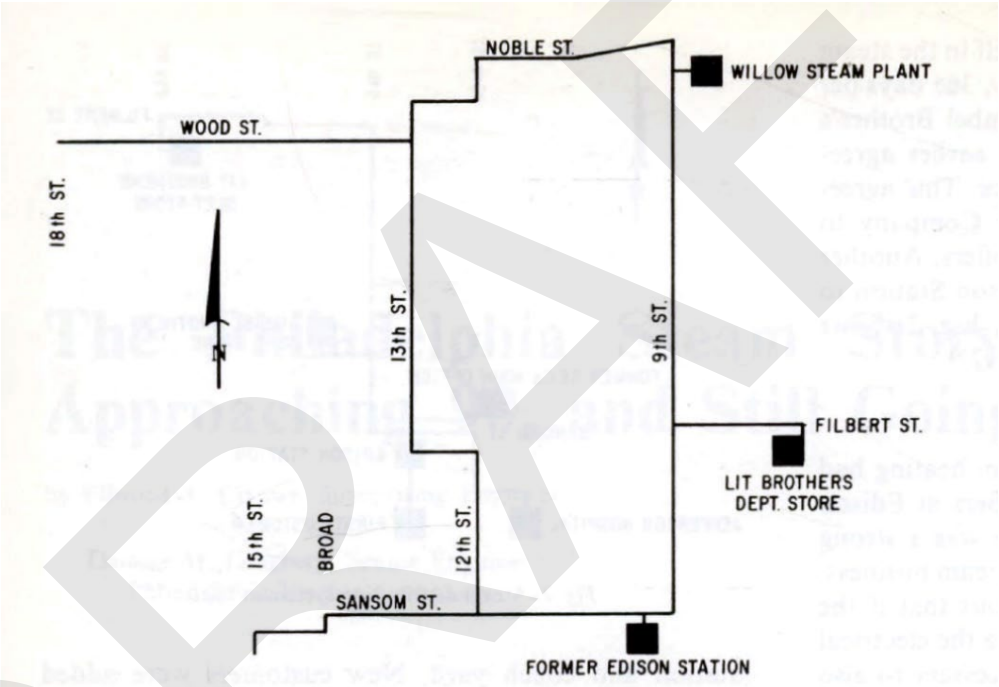

Figure 7: Philadelphia Electric's steam heating system in 1932, following the installation of the Wood Street main and a branch of the Sansom Street main along Walnut Street to 15th Street, but prior to connecting to the Pennsylvania Railroad's steam plant near 30th Street Station (from "The Philadelphia Steam Story" in *District Heating*, Apr-May-Jun 1976).

The district steam system remained one of Philadelphia Electric's primary areas of growth during the 1950s. Even with the benefit of the steam provided by the Pennsylvania Railroad plant, however, and even with all six boilers now in service at the Willow Steam Plant, additional steam was required to satisfy the continuously increasing demand. In 1950, Philadelphia Electric installed new boilers in Schuylkill Station, an existing electrical power plant at 26th and Christian Streets southwest of Center City. A new 24" main was installed under

[20] *District Heating Handbook* (National District Heating Association, 1932), 156.
[21] Wainwright, 387-389.
[22] Wainwright, 288.
[23] "$50,000,000 Program Planned by Philadelphia Electric," *Public Utilities Fortnightly*, February 13, 1941, pp. 36.

22nd Street to connect Schuylkill Station to the Walnut Street main, which had been extended west from 15th Street around the same time (Figure 8). From 1950 on, Schuylkill Station, which became Philadelphia Electric's "most economic supply," provided the base load in Center City and allowed Philadelphia Electric to take on many new customers. Among the largest new customers during the 1950s were the University of Pennsylvania in West Philadelphia and many of the new high-rise office towers being built in the Penn Center urban renewal area west of City Hall. Although the Willow Steam Plant had been surpassed as Philadelphia Electric's largest supply of steam, it "remained an important source for central city heat."[24]

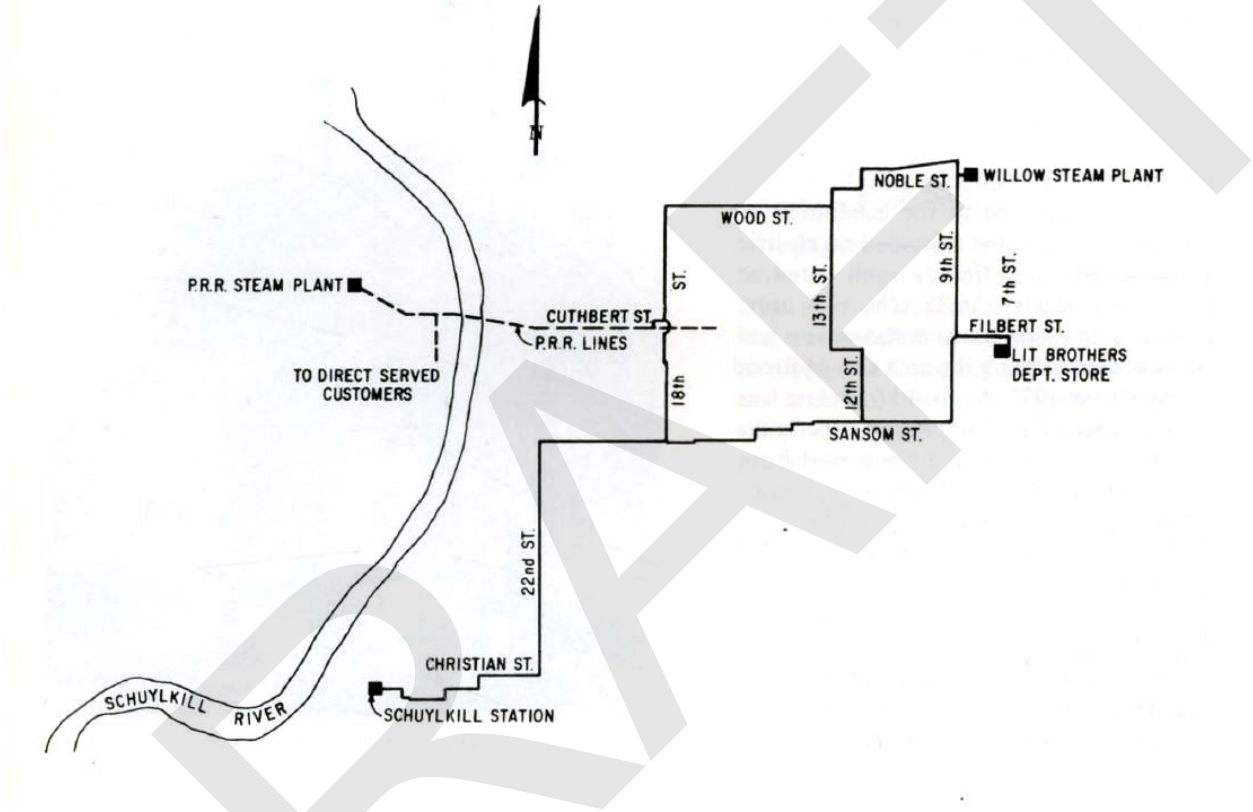

Figure 8: Philadelphia Electric's steam heating system in 1950, following the connection to the Pennsylvania Railroad's plant and the installation of the new steam boilers at Schuylkill Station (from "The Philadelphia Steam Story" in *District Heating*, Apr-May-Jun 1976).

With the expansion of its district steam heating service in 1950, Philadelphia Electric now had the third largest system in the United States and had finally caught up to demand, but the company faced new challenges that ultimately led to the obsolescence of the Willow Steam Plant. Because of its reliance on coal, the company questioned how much longer the plant could efficiently generate steam for the system. Not only were coal shortages a regular cause for concern, but the increasing availability of oil-fired boilers made coal much less cost effective. Around the mid-1950s, Philadelphia Electric began to explore replacing the Willow Steam Plant. In 1958, the company built the new Edison Steam Plant next to its headquarters at 9th and Sansom Streets, in the exact location of the original Edison Station (Figure 9). With space for four oil-fired boilers capable of producing 720,000 pounds of steam per hour, the capacity of the Edison Steam Plant would actually be slightly less than the Willow Steam Plant, but critically it

[24] Wainwright, 351.

would be much cheaper to operate. Although the Willow Steam Plant would remain in service, beginning in 1959 it was only be used during periods of peak loads.[25] The Willow Steam Plant remained operational until sometime in the 1970s. In 1987, Philadelphia Electric sold the steam system to the Philadelphia Thermal Corporation, which itself was acquired by the Trigen Energy Corporation in 1993. Trigen continues to own and operate the system.[26] Both Schuylkill Station and the Edison Steam Plant still supply steam to what has become commonly known as the Center City Steam Loop.

Figure 9: The Edison Steam Plant, built next to the headquarters of the Philadelphia Electric Company at 9th and Sansom Streets in 1958. Photo by the author.

Operation of the Willow Steam Plant

The Willow Steam Plant was designed large enough to house six boilers, each capable of generating a maximum of 136,000 pounds of steam per hour. Initially, three boilers were installed, and the other three entered service in stages from the 1930s through the 1950s. The boilers produced steam through the following process:

First, coal was delivered to the plant by rail, with cars entering the building on the west elevation of the one-story train shed along Willow Street (Figure 10). The coal was then elevated by bucket to the top of the building, a process contained within the steel-framed structure that rises from the roof of the one-story train shed to the roof of the main building. At the top, the coal was distributed by conveyer to central coal bunkers and then fed by gravity and stokers into the

[25] Wainwright, 351-352.
[26] "Trigen Completes Buy," Philadelphia Inquirer, December 7, 1993.

boilers (Figure 11). Once ignited, the coal would heat city-supplied water, which was pre-treated with a water softener and stored in tanks below the building. The steam produced by the boilers would exit through pipes connected to an 18" main under 9th Street. Extending south about 2,500 feet to the business district, the main supplied secondary distribution lines to which customers could connect their buildings' heating systems. Once the steam had condensed back into water, it would leave customers' buildings through return lines running parallel to the feed lines and reenter the city's water supply. Vapors and the heat generated by the coal burning process would exhaust via the tall metal stacks at the top of the plant. The ash produced by the burning of the coal was removed from the building by truck.[27]

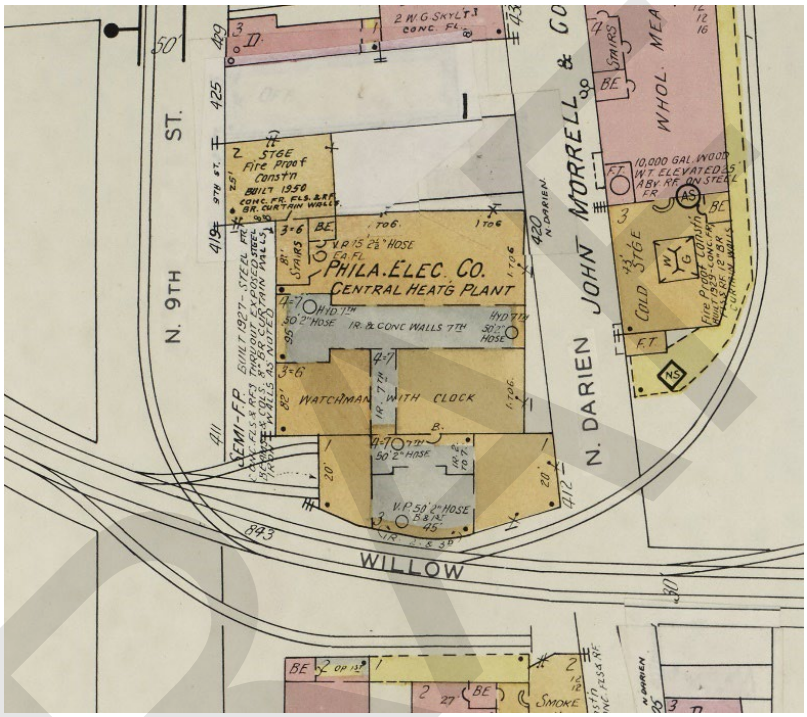

Figure 10: Sanborn fire insurance map from 1950, showing how the rail lines connected to the Willow Steam Plant. As seen here, the area north of the two-story addition was historically not part of the property and therefore has been excluded from the proposed NRN boundary.

[27] John W. Meyer, "Progress in District Heating," *Bulletin of the National District Heating Association* (15 Apr 1928), 142-144.

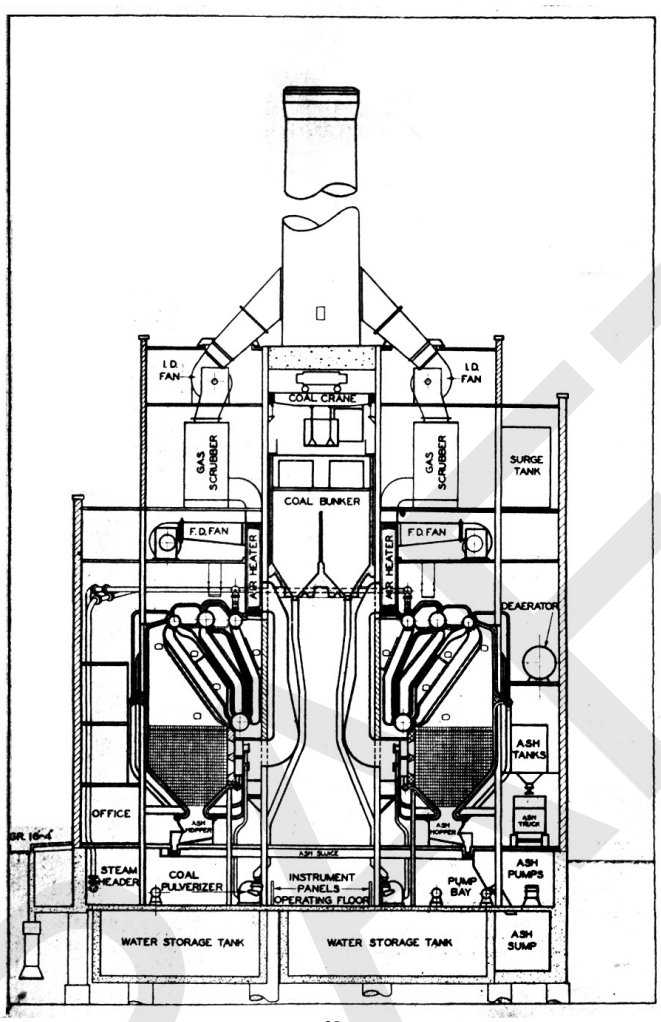

Figure 11: Cross-section of a typical steam heating plant.[28] The arrangement of the Willow Steam Plant was similar.

The Architecture of the Willow Steam Plant

The Willow Steam Plant was designed by the firm of John Torrey Windrim (1866-1934), arguably Philadelphia's preeminent civic architect of the late-nineteenth and early-twentieth centuries. Born in Philadelphia, Windrim began his study of architecture under his father, James H. Windrim (1840-1919), a prominent architect in his own right who served as Supervising Architect of the U.S. Treasury from 1889 to 1891 and then as the Director of Public Works for the City of Philadelphia until 1895. It was during the 1890s that the younger Windrim largely assumed control of his father's firm and leveraged the political connections the two had made to win a string of commissions from the City of Philadelphia and other major clients. Apart from numerous court houses, museums, and other civic buildings, Windrim and his firm designed many large office buildings, banks, hospitals, theaters, and private residences for many of Philadelphia's most prominent companies, institutions, and citizens. Some of the firm's most notable work in the city includes the Commonwealth Title & Trust Company Building, a fifteen-story, Beaux-Arts-style bank and office tower at 1201 Chestnut Street (1901; extant); the Franklin Institute, a Classical Revival museum on Logan Square (1931; extant); and the Lincoln-

[28] This image is from Davis S. Boyden, "Development of District Steam Heating," *The Tech Engineering News* (Apr 1931), 73-74.

Liberty Building, an Art Deco-style office tower at 1 South Broad Street (1932; extant). According to architectural historian Sandra L. Tatman, "Due to the visibility of his projects, Windrim became the best-known Philadelphia practitioner of the classical revival style often designated as Beaux Arts."[29] However, as Tatman further explains, "Buildings which were designed in Windrim's firm were most assuredly the work of younger designers." The most notable of Windrim's staff was W. R. Morton Keast (1888-1973) who served as the firm's chief designer for almost the entire period between about 1910 and 1934, when Windrim died.[30] Because of his senior position within the firm, Keast likely had a role in the design of most projects that passed through the office, although his authorship of specific works is sometimes difficult to verify.

One of the Windrim firm's first commissions from Philadelphia Electric came in 1902 when they were hired to design the Schuylkill A-1 Station. Located on the Schuylkill River at the foot of Christian Street in South Philadelphia, Schuylkill A-1 was the first central power station in the city and one of the largest in the world up to that point.[31] Windrim's firm remained Philadelphia Electric's near exclusive architects over the next three decades. In recognition of his central role in shaping the Philadelphia Electric system, Windrim was elected to the company's board of directors in 1911, serving in this position for many years. After Schuylkill A-1, which was significantly enlarged with A-2 in 1914, Windrim and his firm would design over thirty buildings for Philadelphia Electric, including everything from small substations to massive central power stations, and even the company's twenty-four-story headquarters at 9th and Sansom Streets in Center City (1927; extant). By far the largest commissions were the Chester Station (1916; extant), located just south of the city in Chester, Pennsylvania, and the Delaware and Richmond Stations (1919/1923 and 1925; both extant) in Philadelphia. These massive, Beaux-Arts-style buildings, all of which were built along the Delaware River, were significant not only for their innovative engineering, but also as widely influential works of architecture that served as models for the design of central power stations nationally. All three buildings have been individually listed in the National Register.[32] As chief designers for the Philadelphia Electric system, Windrim and his firm played a central role in the standardization of the utility during the early-twentieth century. In many ways, because of their ubiquity and often commanding presence throughout the city, the buildings Windrim designed for Philadelphia Electric became the public face of the standardization effort and served as public relations devices, helping to shape Philadelphia Electric's image.[33]

By the late 1920s, the work Windrim's firm was producing for Philadelphia Electric had started to veer away from the highly formal classical language of the Beaux-Arts style and begun to

[29] Sandra L. Tatman and Roger W. Moss, *Biographical Dictionary of Philadelphia Architects: 1700-1930* (Boston: G.K. Hall, 1985), 871, 873-4.
[30] Ibid., 429-430.
[31] "Spinning of a Giant Top," *Machinists' Monthly Journal* (Jan 1906), 109.
[32] Suzanna Barucco, "Chester Waterside Station," National Register Nomination, 2007 (NR #07000467); Kevin McMahon, "The Delaware Station of the Philadelphia Electric Company," National Register Nomination, 2016 (NR #16000427); Kevin McMahon, "Richmond Station, Philadelphia Electric Company," National Register Nomination, 2021 (NR # 100007095).
[33] The role of architecture in shaping the public perception of Philadelphia Electric is discussed at length by architectural historian Aaron Wunsch in *Palazzos of Power: Central Stations of the Philadelphia Electric Company, 1900-1930* (New York, Princeton Architectural Press, 2016).

show an increasing reliance on functionalism as a source of architectural beauty. This trend is visible in the company's headquarters building at 9th and Sansom Streets, built in 1927 and discussed above, and in many of the small substations built in newly developed parts of the city after 1925. The Willow Steam Plant, too, is one of the most visible examples of this shift. Unlike the Beaux-Arts-style central power stations that preceded them, these buildings typically had simpler geometric forms, emphasized verticality, and had smoother wall surfaces with only the sparest of architectural ornamentation. The Willow Steam Plant, in particular, while it does embody some key aspects of classical design, such as symmetry and the use of pilasters (or, at least the suggestion of pilasters), its sharp, cubic form and reddish-brown brick walls – rather than concrete in imitation of natural stone, as in the Delaware and Richmond Stations – demonstrates a clear break with the monumental classicism of Philadelphia Electric's earlier major buildings.

The straightforward architectural treatment of the Willow Steam Plant represented a broader evolution in thinking about the design of power plants, of which steam plants were a subtype, during the 1920s. The monumental neoclassicism of the Beaux-Arts style had helped the public to accept electric utilities and the power plant as essential components of modern life when both were still so new. Increasingly, however, architects and engineers viewed historical styles as incompatible with this modern technology, especially as, the editors of *Power Plant Engineering* wrote, these two fields became "more appreciative of each other's functions and have displayed a greater tendency towards mutual cooperation."[34] With the growing collaboration between architects and engineers, the editors continued, "The idea of functional design has gained favor. People are beginning to see that if a machine or a building is shaped along lines which arise naturally from the scientific laws which govern its operation or use, it is naturally attractive."[35] Around the same time, these ideas were being explored more generally in industrial buildings of all types by architects like Albert Kahn in Detroit, George C. Nimmons in Chicago, and the Ballinger Company in Philadelphia, all of which had a major influence on the development of a new kind of architecture that embodied what engineer Willard Case called the "modern industrial spirit."[36]

The question of exactly what "functional design" meant in the context of power plants was answered by Frederick T. Morse in 1932. In his book *Power Plant Engineering and Design*, which became one of the standard works in the field for several decades, Morse argued that "simplicity and ruggedness of structures may contribute more to pleasing appearance than a wealth of costly materials and ornaments."[37] The architectural form of a power plant, Morse continued, "should in its heavy massive lines, suggest power and permanency. Each wall should receive a symmetrical treatment in window opening and ornamentation as far as it is possible to do so. Symmetry and proportion are far more effective than expensive marbles in lending the proper dignity to the structure. Simple contrasting stone trimmings can be used very effectively

[34] The Editors of Power Plant Engineering, "The Architectural Design of Power Plants," *Power Plant Engineering* (May 1944), 68.
[35] Ibid.
[36] Willard L. Case, *The Factory Buildings*. Vol. 7 of *Factory Management Course* (New York: Industrial Extension Institute, 1922), 257-264. For a broader discussion of Case's writings and factory design in general, see Betsy Hunter Bradley, *The Works: The Industrial Architecture of the United States* (New York: Oxford University Press, 1999), 221-258.
[37] Frederick T. Morse, *Power Plant Engineering and Design* (New York: D. Van Nostrand Co., 1932), 71.

to relieve the monotony of walls." Morse also recommended exterior walls of brick because this material made it easy to achieve certain architectural effects, such as depth and shadow, without additive or superfluous ornamentation. In many ways, the building Morse described as the ideal power plant was the Willow Steam Plant, and an illustrative sketch he included alongside his words looked very much like that building (Fig. 12).

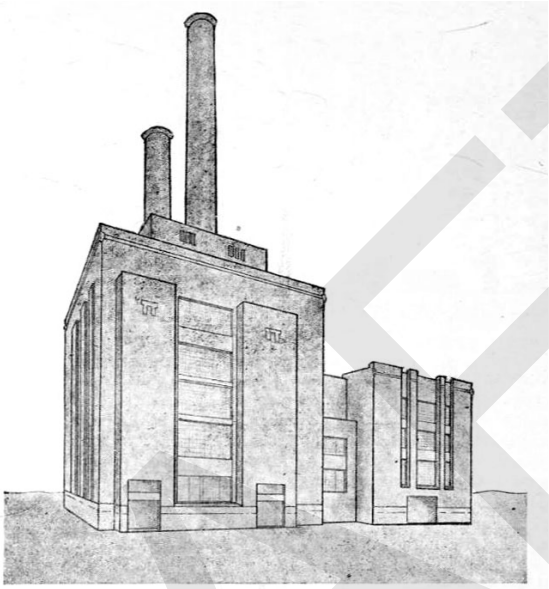

FIG. 35.—Heavy massive lines suggest the architectural motif of power and permanence.

Figure 12: Illustrative sketch of the ideal power plant, from *Power Plant Engineering and Design* by Frederick T. Morse (1932).

Architecturally, the Willow Steam Plant is highly characteristic of district steam heating plants built in large American cities during the 1910s and 1920s. In Philadelphia, the Pennsylvania Railroad's steam plant next to 30th Street Station (Paul Cret, arch., 1929; demolished) was the only example built in the city during this period that is comparable to the Willow Steam Plant (Figure 13). Major steam plants built in other cities around the same time include the Beacon Street Heating Plant in Detroit (architect unknown, 1926; extant), which was built by the Detroit Edison Company and had a capacity of 645,000lbs/hr.; the Kip's Bay Station in New York City (Dwight P. Robinson & Co., engineers, 1926; demolished), which was built by the New York Steam Corporation and had an ultimate capacity of over 1.2 million lbs./hr.; and the Kneeland Street Steam Plant in Boston (Bigelow, Wadsworth, Hubbard & Smith, archs., 1931; extant), which was built by the Boston Edison Company in 1931 with a capacity of 820,000lbs/hr. (Figures 14-16). Like the Willow Steam Plant, these four examples largely reduced the architectural treatment of the exterior to what was required functionally, relying on simple cubic forms, vertical lines, and the subtle articulation of the wall surfaces to create a new aesthetic for the power plant, one that remained popular for several decades to come.

Figure 13 (left): Pennsylvania Railroad Steam Plant in Philadelphia, built in 1929 (from *Transportation*, Sep. 1930).
Figure 14 (right): The Beacon Street Heating Plant in Detroit, built in 1926 (ASME).

Figure 15 (left): The Kips Bay Steam Plant in New York City, built in 1926 (from *Fifty Years of Service,* 1932).
Figure 16 (right): Kneeland Street Steam Plant in Boston, built in 1929 (Northeastern University Libraries).

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Previous documentation on file (NPS):

__X_ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____previously determined eligible by the National Register
____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
____recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

__X__ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: _____

Historic Resources Survey Number (if assigned): 1988RE00779

10. Geographical Data

Acreage of Property ~0.42 acres

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)
1. Latitude: 39.959127 Longitude: -75.153112

2. Latitude: _____ Longitude: _____

3. Latitude: _____ Longitude: _____

4. Latitude: _____ Longitude: _____

Verbal Boundary Description (Describe the boundaries of the property.)
The boundary of the property is shown as a red line on the accompanying map entitled "**Figure 1:** Site Plan showing the National Register Boundary." The sidewalks along 9th Street are included within the boundary because rail cars and trucks would have regularly crossed over them in the daily operation of the building.

Boundary Justification (Explain why the boundaries were selected.)
The National Register Boundary corresponds to the historic parcel and contains all historically associated resources. As illustrated in Figure 1, the portion of the current parcel that extends north of the historic northern boundary has been excluded.

Form Prepared By

name/title: Kevin McMahon, Senior Associate
organization: Powers & Company, Inc.
street & number: 1315 Walnut Street, Suite 1717
city or town: Philadelphia state: PA zip code: 19107
e-mail: kevin@powersco.net
telephone: (215) 636-0192
date: April 30, 2024

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Willow Steam Plant

City or Vicinity: Philadelphia

County: Philadelphia State: PA

Photographer: Kevin McMahon

Date Photographed: February 29, 2024

Description of Photograph(s) and number, include description of view indicating direction of camera:

Photograph #	*Description of Photograph*
1.	West and south elevations, looking northeast.
2.	North and west elevations, looking southeast.
3.	South elevation, looking northeast.
4.	East elevation, looking northwest.
5.	North elevation, looking south.
6.	West and south elevations, close-up view of upper stories, looking northeast.
7.	Rooftop, looking northeast.

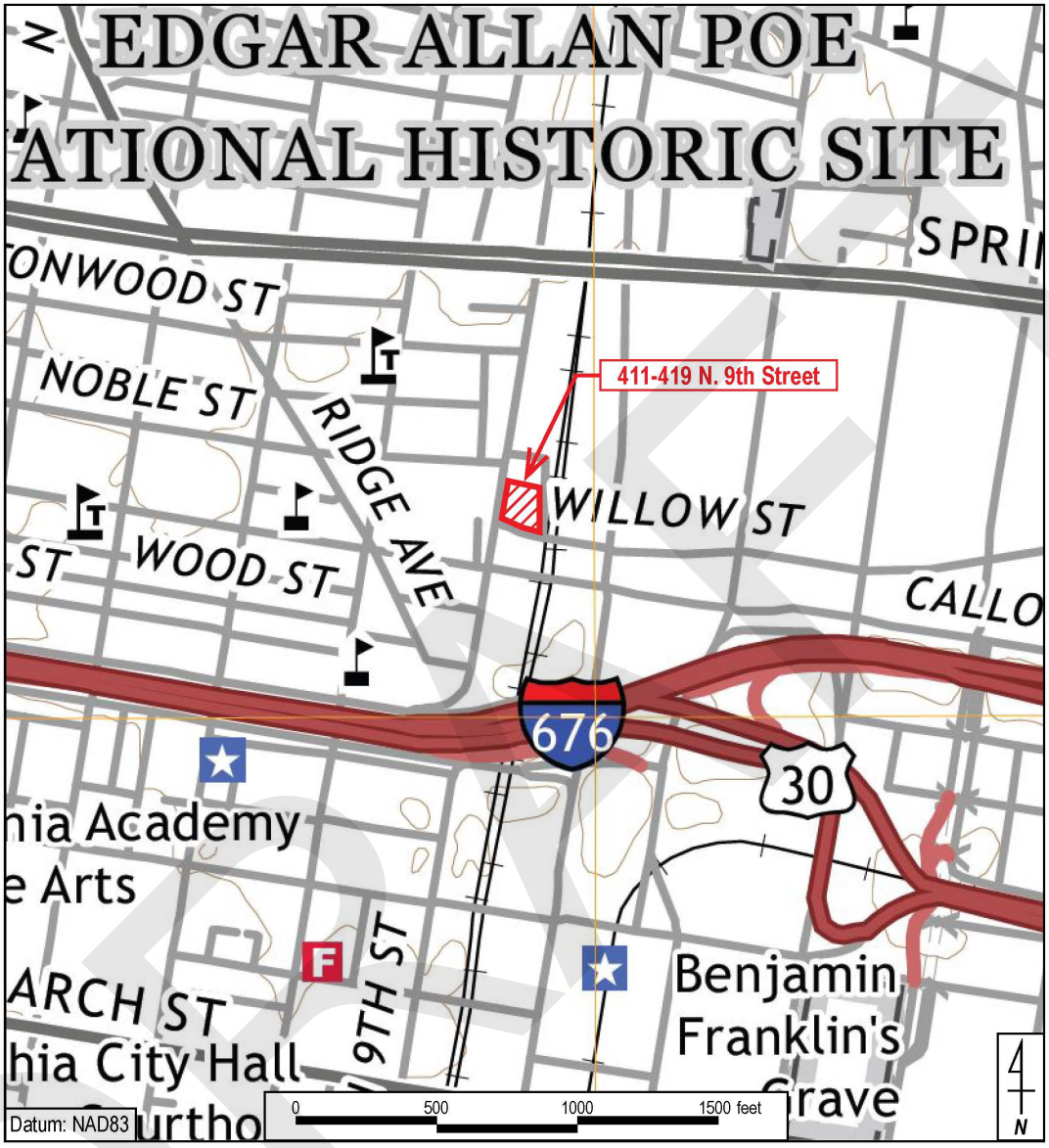
8.	First floor, looking east.
9.	Second floor, looking northwest.
10.	Fourth floor, looking north.
11.	Seventh floor, looking east.
12.	Typical stair, looking northwest on the fourth floor.
13.	Interior of the train shed, looking west.
14.	Interior of the 1950 addition, first floor, looking southwest.

Index of Figures – Section 7

Figure #	*Description of Figure*
1.	Site plan with the National Register Boundary shown in red.

Index of Figures – Section 8

Figure #	*Description of Figure*
2.	Map of Philadelphia Electric's steam heating system in 1921.
3.	Construction of the steam main under 9th Street and details showing how the main was installed under the sidewalk
4.	American District Steam Company advertisement detailing their work for Philadelphia Electric.
5.	The Willow Steam Plant, seen here during the 1940s.
6.	Six of the many large buildings that were heated with steam supplied by the Willow Steam Plant.
7.	Map of Philadelphia Electric's steam heating system in 1932
8.	Map of Philadelphia Electric's steam heating system in 1950.
9.	The Edison Steam Plant at 9th and Sansom Streets.
10.	Sanborn fire insurance map from 1950.
11.	Cross-section of a typical steam heating plant.
12.	Illustrative sketch of the ideal power plant.
13.	Pennsylvania Railroad Steam Plant in Philadelphia.
14.	Beacon Street Heating Plant in Detroit.
15.	Kip's Bay Steam Plant in New York City.
16.	Kneeland Street Steam Plant in Boston.
17.	USGS Map.
18.	Photo Key – Site.
19.	Photo Key – First Floor.
20.	Photo Key – Second Floor.
21.	Photo Key – Fourth Floor.
22.	Photo Key – Seventh Floor.



USGS Map - Philadelphia Quadrangle - PA, NJ (2019)

Willow Steam Plant
411-419 N. 9th Street
Philadelphia, Philadelphia County, PA

Latitude, Longitude
39.959127, -75.153112

Figure 17: USGS Map.

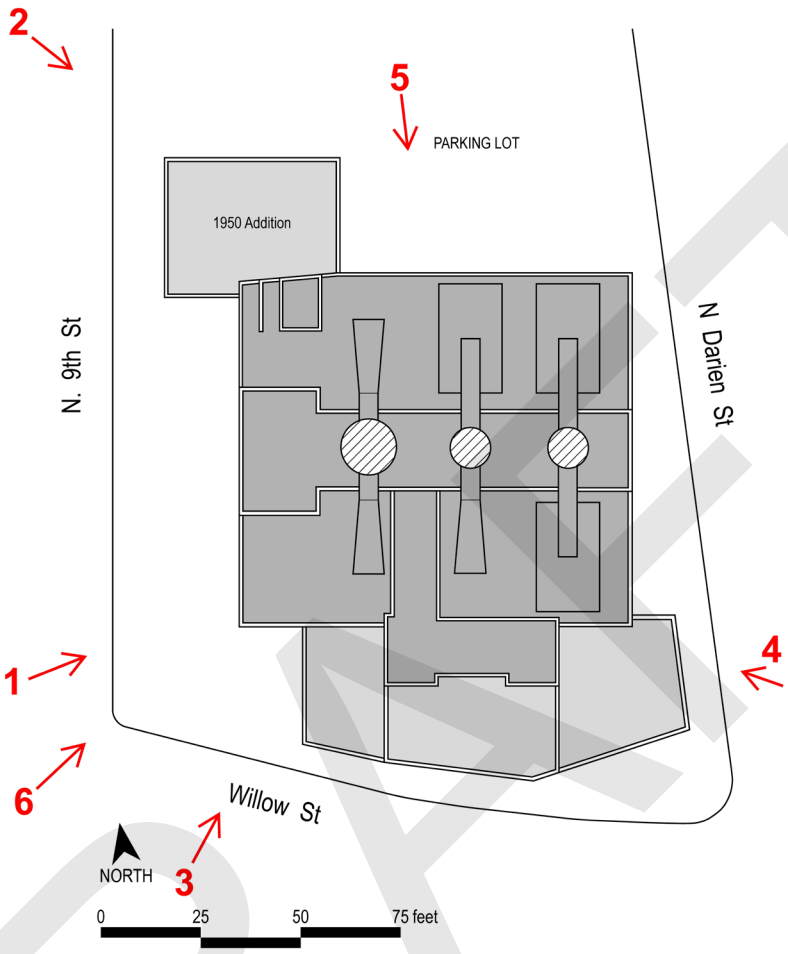


Figure 18: Site plan with photo key.

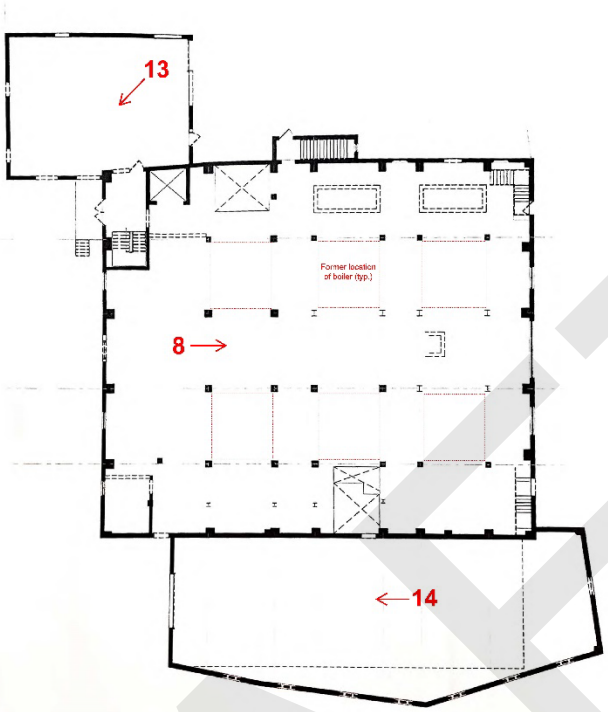


Figure 19: First floor plan with photo key.

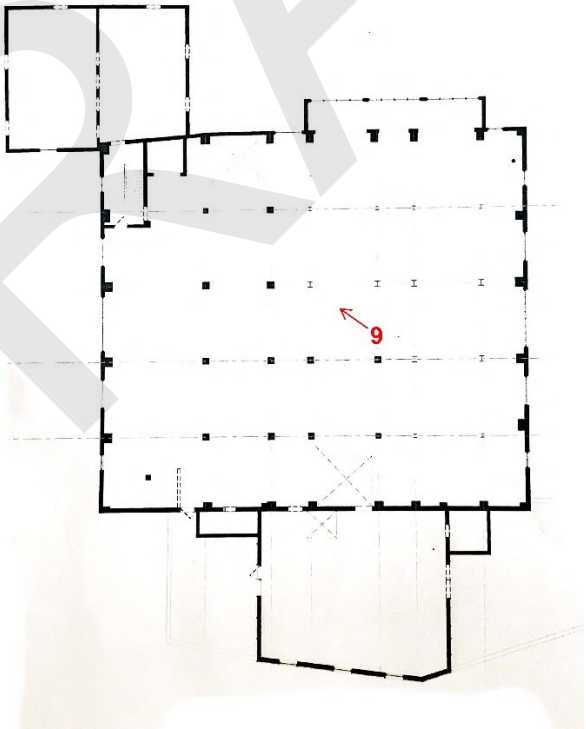


Figure 20: Second floor plan with photo key.

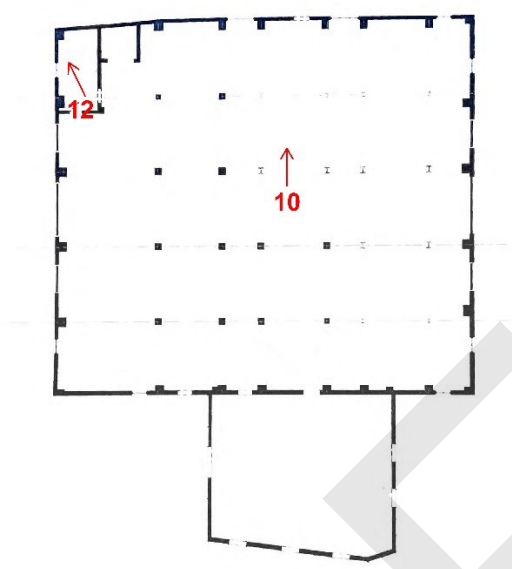


Figure 21: Fourth floor plan with photo key.

Figure 22: First floor plan with photo key.