NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

448

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 *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. 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. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Uline Ice Company Plant and Arena Complex

other names

2. Location

street & number 1132, 1140 and 1146 3rd Street, NE ☐ not for publication

city or town Washington, D.C. ☐ vicinity

state District of Columbia code DC county code 001 zip code

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☒ 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 ☒ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☐ statewide ☒ locally. (☐ See continuation sheet for additional comments).

DAVID MALONEY, ACTING SHPO/DC 04-10-2007
Signature of certifying official/Title Date

DC HISTORIC PRESERVATION OFFICE
State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments).

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby, certify that this property is:
- ☑ entered in the National Register.
  - ☐ See continuation sheet.
- ☐ determined eligible for the National Register.
  - ☐ See continuation sheet.
- ☐ Determined not eligible for the National Register.
- ☐ removed from the National Register.
- ☐ other (explain):

Signature of the Keeper — Date of Action

Patrick Andrus — 5/17/2007

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☒ private
- ☐ public-local
- ☐ public-State
- ☐ public-Federal

Category of Property
(Check only one box)

- ☒ building(s)
- ☐ district
- ☐ site
- ☐ structure
- ☐ object

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

Contributing	Noncontributing	
1		buildings
		sites
		structures
		objects
1		Total

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

N/A

number of contributing resources previously listed in the National Register

6. Function or Use

Historic Functions
(Enter categories from instructions)

RECREATION AND CULTURE/auditorium
INDUSTRY/PROCESSING/Manufacturing facility

Current Functions
(Enter categories from instructions)

OTHER/Parking lot

7. Description

Architectural Classification
(Enter categories from instructions)

MODERN MOVEMENT

Materials
(Enter categories from instructions)

foundation Brick
walls Brick
roof Thin-shelled concrete; built-up membrane
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets)

Description Summary:

The Uline Ice Company and Arena Complex, located in the block bounded by 2nd and 3rd Streets, and Congress and M Streets, N.E., consists of two principal and associated building parts: an ice manufacturing plant and an indoor arena. The ice manufacturing plant is a one- and two-story brick and concrete structure typical of the city's 20th-century industrial buildings. The arena building is a massive vaulted structure constructed of a thin-shelled concrete roof, and non-load bearing brick side and end walls. The vaulted roof, supporting its own weight, allowed for an unobstructed, 140' x 270'interior space that during one point in the building's history accommodated one of the largest indoor hockey rinks in the country. The arena, most impressive for its engineering innovation, is unadorned on the exterior with blank brick walls closing the sides and ends of the vaulted roof.

General Description:

Ice Manufacturing Plant: The ice manufacturing plant, facing 3rd Street, N.E., is an L-shaped concrete and concrete structure covered with a flat roof. The building, constructed in 1931, is broken into two principal sections by a projecting two-story entrance bay that accommodated the plant offices on the interior. To the north of this bay, a two-story recessed wing extends five bays long; to the south, a single-story wing flush with the entrance bay also extends five bays, thus creating the L-shaped footprint. The building, generally spare and industrial in character, does feature brick pilasters separating the building bays, brick corbelling at the cornice line and a corbelled chimney stack on the corner of the main entry/office bay. All of the window openings—large openings on the first story and smaller paired openings on the second story—were likely industrial steel sash, but have been filled in with brick. The north end elevation of the ice manufacturing plant is three bays deep, similarly divided by pilasters and capped by a corbelled cornice. The south end of the building abuts the entrance foyer, built in 1940 along with the arena to provide public access into the arena building. This entrance is three bays wide with a covered porch/narthex leading to five double door openings.

Uline Arena: The Uline Arena is a huge and distinctive barrel-vaulted structure with relatively unadorned brick walls enclosing the structure. The vaulted roof, supporting its own weight, allowed for an unobstructed, approximately 140- by 270-foot interior space that, in turn, accommodated an 88' x 218' ice rink with spectator seating capacity of 5,064. When the rink was operational, it could be drained, and a movable wooden floor installed to accommodate a seating capacity of 7,000.[1]

[1] R.L. Bertin, "Barrel Shell Roof for an Ice Arena," Engineering News Record, May 22, 1941, p.46.

Although the building is one-of-a-kind in D.C., it is not unique in that its design emanated from the Chicago offices of Roberts & Schaefer, the engineers for the Hershey Sports Palace. The firm had exclusive U.S. patent rights to an innovative German system of reinforced concrete roof and it constructed and superintended and tested the construction from its eastern branch office here. The contractor was the White Construction Company of New York.

The thin concrete roof of the Roberts & Schaeffer design was commonly known in engineering terms as the "Z-D System." It essentially consists of four reinforced concrete arch ribs 18 inches wide and 5 feet deep at the crown, spaced 36 feet on center and supporting the thin reinforced concrete barrel roof. The distinguishing feature of this roof design, as opposed to its prototype at Hershey Park, is that the ribs are placed on the outside of the barrel, providing a clear arched ceiling for the interior structure in an effort to improve its appearance on the inside.

The large arena building runs parallel to the railroad trucks along 2nd Street, NE and is attached along its northeast side to the ice manufacturing plant, which provided all the necessary refrigeration for the ice rink. A three-bay-wide entrance pavilion, attached to the south end of the ice manufacturing plant, provides public access from 3rd Street to a door on the eastern elevation of the arena building. The south end of the arena essentially abuts a group of industrial buildings, leaving the north and west elevations exposed.

The north (end) elevation essentially faces M Street, N.E. and consists of an arched end wall which encloses that end of the vaulted space. Three large, metal overhead roll-up doors are found on the first story of the building, while a group of five large former window openings align the second story. The openings, now infilled with brick, are arranged in descending height from the center to either side and were likely filled originally with industrial metal sash. The west side elevation extends eight bays long, with each bay defined by a large window opening (now bricked in) at the second story level. Brick string coursing which separates the first story from the second story similarly runs between the second story windows.

The concrete ribs of the vaulted roof are visible behind this brick side wall. A membrane roof covering spans the space between each rib.

Interior:

The interior of the indoor arena is a large, unobstructed open space with a barrel vaulted ceiling. Historically, the building offered a myriad of uses from ice hockey and other sports to ballet to musical concerts, including most significantly, the Beatles' first American concert in 1962. The building is presently used for parking.

The interior of the ice manufacturing plant is no longer in use, though some ice manufacturing equipment supposedly remains in the building.

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)

- ☒ **A** Property is associated with events that have made a significant contribution to the broad pattern of our history.
- ☐ **B** Property associated with the lives of persons significant in our past.
- ☒ **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)

Property is:

- ☐ **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 of age or achieved significance within the past 50 years.

Area of Significance
(Enter categories from instructions)

Period of Significance
1931-1964

Significant Dates
1931; 1940-41; 1964

Significant Person
(Complete if Criterion B is marked above)

Cultural Affiliation

Architect/Builder
Kubitz & Koenig; Joe Harry Lapish; Roberts & Schaefer, engineers

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets)

Previous documentation on files (NPS):

- ☐ 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 #_____

Primary location of additional data:

- ☒ State Historic Preservation Office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☐ Other

Name of repository:

Summary Statement of Significance:

The Uline Ice Company Building and Arena Complex consists of two attached, but distinct building types that are related historically and socially and that together provide insight into the city's industrial and recreational heritage. The Uline Ice Company building—an ice manufacturing plant constructed in 1931—represents a significant but nearly vanished industry in Washington and embodies the distinctive characteristics of industrial building in the city.

The Uline Arena, constructed in 1940, adjacent to and attached to the ice plant as a sports and entertainment center, provides an early and distinguished example of an indoor arena. The thin-shelled concrete vaulted building is also a significant example of engineering innovation in the 20th century and is an expression of the early Modern aesthetic. Finally, the Uline Arena has made unique and significant contributions to the entertainment and popular culture in Washington, D.C. For these reasons, the Uline Ice Company Building and Arena Complex meets National Register Criteria A and C, with Architecture, Engineering and Recreation/Entertainment as the Areas of Significance. The Period of Significance for the Uline complex extends from 1931 when the ice plant was constructed until 1964, when the Beatles made their first American debut at the Uline Arena.

Resource History and Historic Context:

The M.J. Uline Ice Company building(s)

The M.J. Uline Ice Company was founded by Migiel "Mike" Uline (originally Uihlein), lately the owner of a string of ice plants in Ohio. The main block of the company's Washington ice plant was erected in the spring of 1931. The brick structure is simple and unremarkable from an architectural point of view, but typical of a rail-side, utilitarian, brick, industrial building of the period. Built by the Consolidated Engineering Company of Baltimore, the plant's architects of record were of the firm Kubitz & Koenig, a construction engineering firm of Baltimore. Otto Kubitz and Martin Koenig, Jr., both civil engineers, partnered in the mid 1920s, but went their separate ways in the mid 1930s, likely as a result of a severe drop in construction during the Depression.[2]

Uline had purchased an ice manufacturing and delivery business that was failing and managed to turn it around, apparently through a combination of hard-headed business sense, innovation, obstinacy, luck—and likely collusion. In addition to the onset of the Great Depression, a likely contributing factor to the company's previous ill health was the fact that artificial refrigeration

[2] Baltimore city directories indicate that Kubitz kept the office, but Koenig joined Baltimore's City Bureau of Buildings.

was increasingly affordable and available to homes and businesses, reducing demand for block ice.[3] The block ice market goes far back in history, as the original sources were natural and local—frozen ponds, lakes and canals—with ice cut and stored in insulated ice houses and ice cellars. Because of the problems of melting, bulk storage and transportation, trade was limited despite substantial demand, particularly for food storage in the hot South. In the nineteenth century, trade in ice grew as fleets of schooners sailed north for ice in winter; in the Washington area, ships generally departed bearing Cumberland coal and returned with Kennebec River ice, which was still sold locally until the beginning of the twentieth century. Not willing to stick with costly and unreliable natural ice, large industrial consumers of ice and artificial refrigeration had generally begun installing their own cooling systems in the 1880s following a spate of patents for such apparatus. Overcoming initial public skepticism about an "artificial" ice produced by machinery generally using anhydrous ammonia, ice manufacturers quickly overtook purveyors of natural ice, able to provide a consistent product year-'round at a reasonable price.[4]

Because the Depression suppressed the market for durable goods, and World War II limited supplies of raw materials, it was not until after the war that pent-up demand for consumer goods translated into huge sales of refrigerators and freezers, sounding the death knell for the neighborhood ice man. Uline had come along at a fortunate time, presumably buying the company for a song and having a decade and a half of stable demand. Uline purportedly turned the company around in 87 days largely through technological innovation, including the use of some machinery he had patented himself. In addition to his numerous patents, Uline was a leader in the local industry, and officer of the National Capital Ice Institute, a lobbying group—and one of several ice company owners cited by the Federal Trade Commission for price fixing in 1939.

Washington has never been known as an industrial town. Its industries tended to be focused on local consumption as opposed to the "export" of manufactured or refined goods, particularly in the post-Civil War era when transportation and mechanization increased regional and national competition by inducing manufacturers' and wholesalers' growth pursuing scale economies. Cities with ports, rail hubs, high urbanization, and ready access to raw materials prospered as producers. In the early twentieth century, printing was Washington's largest private industry, appropriate to a national capital. Nonetheless, a considerable population required a considerable amount of goods. Industrial areas sprang up, more distinct from commercial and residential areas than they had been before, generally located along railways, and increasingly warehousing

[3] The first home refrigerators went on sale in the 1910s, and over the next four decades replaced the ice box. By 1920, there were more than 200 models available to American consumers, but they were driven by separate compressors, much as central air-conditioning systems are. Frigidaire offered the first self-contained unit in 1923. The home freezer followed quickly, inducing a market for frozen foods.

[4] Ice manufacturers advertised their product as "pure" compared to that drawn from nature.

goods from elsewhere. The Uline ice plant was characteristic in that it stood along the rail line from Baltimore, but it was also less common for the fact that it was actually manufacturing something. While certainly not the first ice manufacturer in town, it was likely the last (the building was apparently used for the purpose until 15 years ago and still retains some of its equipment), and it may be the last extant plant from the heyday of ice manufacturing. While relatively scarce to begin with, many of Washington's industrial buildings have disappeared in recent decades, victims of neglect and redevelopment. A 1991 survey of warehouses and industrial buildings identified the plant as eligible for listing in the District of Columbia Inventory of Historic Sites and the National Register of Historic Places. The building is fairly deteriorated inside, but retains much of its original exterior appearance, with some changes to the openings and the loss of its loading dock canopy.

The Uline Arena/Washington Coliseum as entertainment venue

The juxtaposition of an ice plant and Uline's arena is at first striking, until one considers that the arena's first use was as a skating rink and hockey venue which required extensive refrigeration equipment—not to mention considerable construction financing available to a successful businessman. These factors and Uline's love for sports explain the physical and historical connection between the site's two uses.

Uline made application to erect the ice arena in August 1939. Roberts & Schaefer, a Chicago engineering firm, designed the building. Excavation of the site and the underpinning of the ice plant structures began in March of the following year, with pile driving and foundation work in June and July. Construction of the concrete, brick, and CMU walls were commenced, ultimately using nearly a million bricks and blocks. The construction of the reinforced concrete bleachers took place in September and October. The unusual reinforced concrete vault roof was poured in late autumn and early winter, completed less than three weeks before the building's opening.[5]

When the building did open, a *Washington Post* sportswriter referred to it as "a splendid indoor stadium that must be described as a triumph in concrete." The *Evening Star* reported that the arena

> had been pronounced by architects and experts as one of the finest ever conceived.... [T]he heated arena will feature arm-rest seats, each of which will offer a complete view of the ice surface, unhindered by post supports and beams.
>
> The ice surface, 225 by 120 feet, will be the most spacious of any in the country...[6]

[5] Although its setting, curing, and the removal of the extensive formwork would have taken still longer.
[6] *Evening Star*, December 28, 1940.

The building was clearly patterned after the 1936 Hershey Arena in Hershey, Pennsylvania, another ice "palace" also designed by Roberts & Schaefer.

Set up for hockey or figure skating, the arena initially had a seating capacity of 6,000. By the end of the 1960s, up to 7,000 fans could attend a hockey game. When the rink was covered for other events, the capacity rose to 8,000 to 10,000.

This type of entertainment venue is rare in Washington, D.C. Built for ice sports, it was immediately adapted for boxing and musical events and then also used for professional basketball, tennis, wrestling[7], and even midget auto racing. At this date, it is easy to take for granted that such venues have always existed. But unlike theaters—that were ubiquitous and changed in form relatively little even with the advent of motion pictures—places for wholly enclosed mass entertainments and sporting events awaited innovations with building systems and with construction methods to permit sufficient unobstructed space. The first indoor hockey game is reported to have been in 1875, but professional hockey surely would not have survived without being able to simultaneously heat the air for the comfort of fans and artificially cool the ice surface. Ice palaces and other indoor arenas made possible spectacles such as the Ice Capades, presumably inspired by Broadway follies and Hollywood musical extravaganzas. In fact, the Ice Capades was developed to drum up business for a consortium of the owners such arenas in 1940, with the first show in Hershey. More popular pastimes, such as baseball and football, were still exclusively experienced out of doors, with the assistance of cantilevered stadium roofs. In the early 1930s, the premier boxing venue in the Washington area was a former brewery bottling house in Alexandria.

There have certainly been other large sports venues extant in the District—the DC Armory[8], RFK Stadium, the MCI Center, for instance—but most are of more recent vintage. The open-air Griffith [baseball] Stadium is long gone, as is the little Capitol (aka Turner) Arena at 14th and W NW (essentially a large television studio where wrestling and the "Town and Country Jamboree" were broadcast in the 1950s). Like the District of Columbia's dozen landmark theaters, the Uline Arena is important to the city's social history as a major recreation venue for half a century. But with a seating capacity of 6,000 to 12,000, depending on the use, the Uline Arena,

[7] Joe Louis, in his later, less fortunate years, wrestled a match at Uline. A year later, a basketball game was played as a benefit for Louis. *Washington Post* March 17, 1956 and March 21, 1957. The forerunner of the present professional wrestling associations (owned by Vince McMahon *Sr.*) staged events at Uline.

[8] Most comparable in form and age to Uline, the slightly younger District of Columbia National Guard Armory has hosted circuses, concerts, boxing and wrestling matches, as well as horse, dog, flower and antique shows. It was, very briefly, the home of a Women's Professional Basketball League team in 1979. Although constructed as an armory, its form is more like an arena; in fact, like Uline, it may have been patterned after the form, but not necessarily the construction techniques of the 1936 Hershey [Pennsylvania] Arena. Shortly after its construction, the government-owned Armory began to compete with Uline's venue to host entertainments.

later known as the Washington Coliseum, was something of a combination DC Armory, Constitution Hall, MCI Center, and Kalorama Roller Rink. And unlike many of the District's landmark movie houses, the arena provided principally live entertainment, hosting many celebrities and professional sports teams and figures.

The Uline Arena was home court for three professional basketball teams, including the Washington Capitols during the period 1946-1951 (the Capitols organization failed in 1952). The first three of those years, the team was led by the legendary but then first-time coach Red Auerbach. In 1950, a year after a league merger created the National Basketball Association, newly drafted Capitol Earl Lloyd became the first African American to play in the league.

The Arena was home ice for amateur and professional hockey teams from 1941 to 1960. The teams always struggled to attract fans and were found not to be very profitable. Uline cast about for other events to fill the calendar, so until the mid 1960s, the arena hosted the annual Ice Capades. During World War II, with fewer organized sporting events because of the conflict, the building served as a place for patriotic rallies, swing dances, and even served as temporary barracks for servicemen stopping over in Washington in transit or for "R and R."[9]

The Uline Arena is perhaps best known as the site of the first personal appearance of the Beatles in the United States. It is well remembered that the band's American debut was on the televised Ed Sullivan Show in New York on February 9, 1964. Two days later, they played their first concert at what was now known as the Washington Coliseum. The next day the Beatles returned to New York for a date at Carnegie Hall. After a remote appearance on Sullivan's show from Miami on the 16th, the band returned to England. It was not until the end of the summer of 1964 that the band returned to North America for a proper one-month tour of 24 U.S. and Canadian cities, this time excluding Washington.[10] The Beatles show ushered in a period of high-profile rock-and-roll acts at the Coliseum, including appearances of the Rolling Stones (1965 and 1966), the Yardbirds (1966), Bob Dylan (1967), and reportedly the Dave Clark Five, the Beach Boys, and Chuck Berry.

[9] The War Hospitality Committee provided 572 beds for servicemen in September 1944.

[10] With more than 8,000 in attendance, the Beatles took the stage at the Coliseum after three other acts, the Caravelles, Tommy Roe, and the Chiffons. The Beatles performed ten songs on a rather make-shift stage and set up their own instruments—and moved them periodically, as they were playing in the round and tried to face each side. The concert was filmed by CBS for a special closed circuit presentation to be screened at movie theaters around the country in March. The rebroadcast, packaged with concerts by the Beach Boys and Leslie Gore, was also shown at the Coliseum on March 15. There were also bootleg film and audio recordings of the Beatles performance which have survived.

At about the same time, the arena unexpectedly became a venue for high culture as well, given a dearth of suitable performing arts theaters in the city, as described by the following reminiscence:

> No event better demonstrated the plight of the arts than the May 1965 debut appearances of Rudolf Nureyev and Margot Fonteyn with the Royal Ballet. Without the Capitol Theater, Patrick Hayes and New York impresario Sol Hurok turned in desperation to the Washington Coliseum.... Known mainly as a forum for ice hockey, the cavernous building was to become the only available venue for presentations such as the Leningrad Ballet, the Moiseyev Dance Company, and the Royal Ballet. On a makeshift stage built at one end of the arena, Nureyev and Fonteyn wove their magic to patrons sitting on folding chairs. In all likelihood, few in the audience had ever been to this depressed area of the city. On opening night, in stifling heat, I sat with Attorney General Robert Kennedy on the upper steps leading down into the arena. Thinking back, it is my guess that the planning for the new John F. Kennedy Center for the Performing Arts received an unexpected boost that evening as Kennedy and other cabinet members experienced high art in a setting that was far from luxurious.[11]

The affectionate nickname "Uncle Mike" belied the darker aspects of Migiel Uline's character. Likely set in his ways and certainly opinionated by age 67 when he built the arena, Uline demonstrated at least what might be characterized as an obstinate streak. He carried on a protracted feud with the District of Columbia Armory which, understandably, he considered to be government-subsidized competition with his venue. More troubling was the fact that, like many other public accommodations in Washington at the time, the arena's events were racially segregated, except for matches at which black boxers contended. African Americans could not attend "white's-only" shows but could watch the Harlem Globetrotters or participate in events for the black public schools. During World War II, local chapters of the NAACP encouraged a boycott of the arena and took issue with Uline's renting the space for one of these school events.[12] The campaign was resumed for nearly a year about 1947. Uline merely dug in his heels, only relenting on his rule in 1948. By then, the local Civil Rights movement had made considerable progress in desegregating public facilities, and Uline was probably principally persuaded by economics. But he perversely claimed that he had intended to desegregate but would not be forced to do so; once he felt the heat was off, he went ahead.[13] Uline passed away in 1958, and the arena, renamed the Washington Coliseum, passed into new ownership.

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[11] Douglas H. Wheeler, "The Impresarios on G Street," 2001, the Cosmos Club website, http://www.cosmos-club.org/journals/2001/wheeler.html.
[12] The rallying cry was "Don't Enforce Bigotry! Don't Go to the Uline!" *Washington Tribune* May 8, 1943.
[13] *Washington Post* January 22, 1948.

One irony is that the arena did become an important venue for African-American cultural and political events. Shortly after it opened, a Paul Robeson benefit for the Committee on Aid to China and the National Negro Congress was shifted from the Daughters of the American Revolution's Constitution Hall, much as the more notorious 1939 case involving Marian Anderson.[14] Nation of Islam founder Elijah Muhammad and his disciple, Malcolm X, spoke there in 1959 and 1961. And in the 1980s, it was most notable as home to performances of Washington's indigenous Go-Go music.

The coliseum was in a downward slide in the 1970s and 1980s. Despite being a popular concert hall, masses of young rock and Go-Go fans could be troublesome for the immediate neighborhood. Concerts spilled out into street melees in 1967, 1973 and in the early 1980s. The coliseum also became a holding facility for most of the 12,000 individuals arrested over three days of anti-war protests in 1971. A conversion of the arena to a church was unsuccessful in the mid 1980s, and less than a decade later, the industrial-zoned site was a private garbage-transfer station. The nadir came in 2003, when the building's demolition was proposed. The D.C. Preservation League had already placed the property on its Most Endangered List when it submitted a D.C. landmark nomination on the property that same year. In December 2006, following a public hearing, the Uline Ice Company and Arena Complex was listed in the D.C. Inventory of Historic Sites.

The Uline Arena as architecture

Hailed as "a triumph in concrete" when completed, the Uline Arena was the first thin-shelled concrete building erected in Washington. The vaulted roof, supporting its own weight, allowed for an unobstructed, approximately 140- by 270-foot interior space that, in turn, accommodated the largest indoor hockey rink in the country.

The architect of record was Joe Harry Lapish, a relatively unknown Washington architect of the 1920s, 1930s and 1940s.[15] But the design really emanated from the Chicago offices of Roberts & Schaefer, the engineers for the Hershey Sports Palace. The firm had exclusive U.S. patent rights to an innovative German system of reinforced concrete roof and it constructed and superintended and tested the construction from its eastern branch office here. The contractor was the White Construction Company of New York.

The idea of creating a thin, light concrete roof supported by its own structure and not by trusses or columns was conceived by Walther Bauersfeld, chief designer for the Carl Zeiss optical works of Jena, Germany. At the time, Zeiss was constructing the world's first permanent and purpose-

[14] *Washington Daily News* April 26, 1941.
[15] Lapish competed unsuccessfully for the commission to design Fuld Hall at Princeton University in 1938.

built planetarium and needed to create a hemispherical dome with a smooth, unobstructed interior upon which to project celestial images.[16] Bauersfeld's proposed solution consisted of a geodesic dome system of welded steel-bar mesh encased in a thin shell of concrete. Zeiss partnered with Dyckerhoff & Widmann Aktiengesellschaft, a Hamburg engineering and construction firm specializing in pre-stressed concrete, to make Bauersfeld's idea a reality. Dyckerhoff & Widmann's Franz Dischinger and Ulrich Finsterwalder solved the engineering and construction difficulties during the 1924-1926 project. Because its roof was domed and relatively small, the loads at any particular spot atop the Jena planetarium were small enough that the concrete shell could be as little as six centimeters thick. Poured in place in a thin layer over extensive formwork, the concrete in such shells was not compacted in the way thick concrete members typically are. While such shell roofs took advantage of the compressive strength of concrete, their strength came mainly from their shape and the ability to distribute and dissipate loads. The steel, of course, added tensile strength, counteracting wracking or shearing forces, impacts, and uneven live loads. One of the strengths of such construction, both as engineering and architecture, is that the result was a seamless or "monolithic" roof.

With the success of the first planetarium, Zeiss and Dyckerhoff & Widmann struck a partnership principally to satisfy a sudden craze for planetaria, but they soon patented the "Zeiss-Dywidag" (or "Z-D") system for use in other types of buildings with wide-span roofs. By the end of 1928, Dyckerhoff & Widmann had undertaken 38 commissions in Germany, including series of narrow vaults over the Great Market Halls of Frankfurt (1926-1928) and Leipzig (1928-1929). In the early 1930s, the company collaborated on the erection of a large wind tunnel at the German Laboratory for Aviation at Berlin, and during World War II "Dywidag" (Dyckerhoff & Widman AG) built several U-boat shelters on the North Sea.[17]

In 1930 the Z-D system was purportedly employed for the first time in America for Chicago's Adler Planetarium, the first planetarium in the western hemisphere.[18] An experimental barrel-vault roof using the system appeared on a temporary dairy barn at the Chicago World's Fair in 1933. By this time, the Z-D system had been patented in the United States, and it was exclusively licensed to Roberts & Schaefer Company. Dyckerhoff & Widmann sent Austrian engineer Anton Tedesko (1903-1994) to Chicago to superintend new projects and to instruct the staff on the technical requirements.[19]

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[16] Zeiss had patented the planetarium projector in 1922 and temporarily installed one at the new German Museum at Munich in 1923.
[17] In the meantime, Spanish engineer Eduardo Torroja constructed a domed thin-shell roof over the market at Algeciras in 1930. Five years later, Torroja designed a thin-shell roof for the Zarzuela Hippodrome near Madrid "formed by segments of hyperboloids of revolution." The roof was as thin as two inches at the edges and five and a half inches where it connected to the structural supports.
[18] There does not seem to be universal agreement or acknowledgement that the Adler was constructed with the Z-D system, perhaps because the system had not yet been patented in the United States.
[19] The Z-D system was patented in the U.S. by Dyckerhoff & Widmann engineer Franz Dischinger in 1933, although the patent application was dated 1932. In the latter year, Anton Tedesko was sent to begin work with Roberts & Schaefer, and he was

Tedesko was thus *the* master of thin-shell concrete in the United States until at least the end of World War II; he appears to have been responsible for all of Roberts & Schaefer's major projects along those lines.[20] The next of these was probably the dome of New York's Hayden Planetarium, completed in 1935 (and demolished in the 1990s, despite opposition from many preservationists[21]). Even with dramatic increases in government spending, large-scale construction jobs were difficult to land during the Depression, and the use of such a new and still experimental technology was limited. The programmatic demand for very broad, uninterrupted new spaces was also limited; most of the examples of the Z-D system in the U.S. prior to World War II were recreation venues. Roberts & Schaefer erected the Hershey Sports Palace (aka Hershey Arena) in 1936; a new Philadelphia Skating Club rink at Ardmore, Pennsylvania in 1937; the Edward Hatch Memorial [Band] Shell in Boston, Massachusetts in 1940, and aircraft hangars for North Island Naval Air Station, San Diego, California in 1941. All of these structures are still in use, and all but the quarter-sphere Boston bandshell have in common the form of a large, single barrel vault as the principal roof.

Construction of Migiel Uline's arena commenced in the summer of 1940 and ultimately consumed nearly a million bricks and blocks for the base and ends of the building. The construction of the reinforced concrete bleachers took place in September and October. The first section of the roof was poured November 11, with each section requiring a few days to cure—and be tested—before a rib and the next section could be done. By that time of year, the engineers and laborers were working in 40- to 50-degree temperatures, and the last roof section was not poured until January 9, less than three weeks before the building's opening. Each section was tested by the Washington Testing Laboratory.

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undoubtedly the engineer for the temporary for the 1933 Century of Progress Exposition barn. In 1931, Dyckerhoff & Widmann sent Hubert Rusch sent to Buenos Aires to begin projects there. Rusch had worked with Dischinger and Finsterwalder on several of their *Grossmarkthallen* commissions.

[20] Tedesko earned a civil engineering degree from the Technical University of Virginia in the 1920s. He worked for Roberts & Schaeffer until 1967. He published articles on the Hershey arena and on various other engineering subjects. His works, in turn, have been discussed in a number journal articles. In 1966 Tedesko received a Civil Engineering Achievement Award, and the following year was elected to the National Academy of Engineering. The Zurich-based International Association for Bridge and Structural Engineering Foundation for the Advancement of Structural Engineering awards its "Anton Tedesko Medal" medal each year to a prominent structural engineer.

[21] "Interestingly, none of the building's champions cited its significance as the first example of the Z-D system in America. While the importance of Hayden Planetarium's dome structure had been widely publicized in the contemporary engineering, and even popular press, this issue never appears to have surfaced in the 1990s preservation debate. This highlights the difficulty of raising public and professional awareness of landmarks in engineering, and hence, the heightened danger that these aging buildings face." Dr. Thomas E. Boothby, ed., "Historic Preservation of Thin-Shelled Concrete Structures," Pennsylvania State University, Department of Architectural Engineering, 2003, http://www.arch.psu.edu/thinshells/module%20I/case_studies.htm

Large, thin-shell vaults were quite new, as the earliest Z-D projects involved domes for planetaria and smaller vaults for market buildings. The vault shape required some re-engineering because, unlike the dome, loads were not distributed equally around the base. The engineers innovated by introducing external arched "ribs" to stiffen the vault.

> The fundamental load-resisting mechanism is the development of membrane stresses that are carried into the arch ribs, to be resisted by axial compression in the arch. Unbalanced loads, such as unbalanced snow loads and wind, produce small transverse bending moments in the shell and much larger bending moments in the arch rib. The tension that results from the action of these bending moments is resisted by the reinforcing steel. Additional stresses that result from the restraint of the shell at the supports is resisted by the placement of diagonal reinforcement. All of these are features of the "Zeiss-Dywidag" System, identified on the title block of the structural drawings and visible in the patent drawings of Dischinger and Finsterwalder.[22]

Of the thin-shell vaulted structures in America, the Hershey Arena is perhaps the best known. Like Uline, it was erected as ice facility for hockey and skating, but it also became a concert hall hosting nationally and internationally known acts as early as 1937. The Hershey Arena vault was faced with limestone, and it was surrounded by a two-story limestone Art Deco structure which contained the entrance lobby, mechanical equipment and support functions. The Uline Arena was consciously modeled on the Hershey Arena, but without the Deco frippery.[23] The Uline Arena was constructed with unadorned brick walls enclosing only the single great space, its mechanical equipment largely accommodated in the existing ice plant and, of course, beneath the floor.

The plainness of the Washington arena surely had much more to do with Uline's concern for the bottom line than with any aesthetic considerations, but the result is one of the first Modern buildings in Washington—new "industrial" technology in the service of pure structure, pure form, pure function. The building embodies the trans-Atlantic give-and-take of modern architecture. Those utilitarian pieces of American engineering so admired by the first European Modernists and proto-Modernists—silos, grain elevators, bridges, and turn-of-the-century factories—influenced their work and helped shape their ideas with regard to form, decoration, the expression of structure, and the "industrial production" of architecture. In turn, the advances made by the Germans in structural engineering and the straightforward expression of structure obviously made possible the Uline Arena; the building is similar to German work of the period which prefigures later Modernist works. The projection of the prominent ribs of the vaulted roofs create an effect similar to that of the exterior steel truss systems later used by Ludwig Mies van der Rohe for the rectilinear Crown Hall at the Illinois Institute of Technology (1950-1956) and the unrealized National Theater project for Mannheim, Germany (1953). And the thin-shell

[22] Boothby.
[23] *Washington Post* December 28, 1940.

reinforced concrete technology itself led to even more creative forms, making possible the artistic hyperbolic paraboloids of the Mexican engineer Felix Candela and the Italian Pier Nervi, Eero Saarinen's eighth-of-a-sphere Kresge Auditorium at M.I.T. (1953-1955) and "winged" TWA Terminal at JFK Airport (1962). On a local level, the smaller, repeating vaults of the I.M. Pei-designed house in Cleveland Park (1962) or the pavilion-type garden and parking structures in the Capitol Park section of the Southwest Redevelopment Area (*circa* 1962) harken back to the Dyckerhoff & Widmann market halls of the late 1920s—as well as to Le Corbusier's mid-1930s design of a weekend house at Vaucresson, France and assuredly other, intervening projects. Collectively, they reference Medieval risk-takers who similarly stretched the vault and the arch and the buttress to the breaking point.

In the introduction to the Museum of Modern Art's catalog of the seminal "Modern Architecture, International Exhibition,"[24] curated by Philip Johnson and Henry-Russell Hitchcock, Alfred Barr, the museum's director, portrayed the characteristics of the new Modernist architecture in a way that could describe the design of the Uline Arena.

> Slender posts and beams, and concrete reinforced by steel have made possible structures of skeleton-like strength and lightness.
>
> ...the modern architect working in the new style conceives of his building...as a skeleton enclosed by a thin light shell. He thinks in terms of *volume*—of space enclosed by planes or surfaces—as opposed to mass and solidity. This principle of volume leads him to make his walls seem thin flat surfaces by eliminating moldings and by making his windows and doors flush with the surface.

Looking at the Uline Arena more than sixty years later and in light of an explosion of thin-shell construction for all types of buildings during the 1950s and 1960s, it would be easy to overlook how revolutionary the technology and form of the building were at the time. Even seventeen years after the arena's completion, one observer could still write:

> Thin-shell construction...is reaching a critical stage of development in the U.S. It is not only finally accepted and thriving, but increasingly fashionable, a dangerous stage for any new engineering or art form. The quip is that h.p. no longer stands for horsepower but for hyperbolic paraboloid.... The shell has arrived.[25]

Although superficially similar in roof form to the Uline Arena, contemporary Washington structures such as the District of Columbia National Guard Armory (1942) and Hangars 1 and 2 at Bolling Air Force Base (1941-1942) were actually erected in a more traditional and conventional manner; those

[24] The show was the museum's first exhibit of architecture, and it presented works by Mies and Le Corbusier, as well as Frank Lloyd Wright. Its title was responsible for popularizing the term "International Style" as applied to the works of the Modernist movement.
[25] Lawrence Lessing, "The Rise of Shells," *Architectural Forum*, July 1958.

concrete roofs are carried by steel bowstring trusses. It was not until 1947 that the Roberts & Schaefer Company designed another example of a wide-span thin-shell concrete roof in Washington, this time over the new Kalorama Roller Rink at 1631 Kalorama Road.[26]

Thin-shell concrete structures fell out of favor for two principal reasons. First, while the materials were relatively cheap, labor and the extensive formwork and scaffolding required were quite costly. The technology was best suited for the Depression and World War II eras, when labor was cheap or steel scarce. In the 1950s and 1960s, however, artistic considerations often overrode ones of cost, but the difficulty of adding to or modifying the unique concrete forms became an impediment. New thin-shell structures are quite rare, thus limiting the universe of existing thin-shell concrete buildings to those produced and extant from an approximately 40-year period.

[26] In that same year, Anton Tedesko superintended the construction of a Z-D-roofed B-36 hangar at Loring Air Force Base in Maine. The structure covers nearly two and a half acres and represented a shift in the military's standards for hangars from the earlier truss-supported type represented by those at Bolling. The use of thin-shell concrete for airplane hangars apparently originated with the Italian architect-engineer Pier Nervi, who designed such a building for the Italian Air Force in 1935.

Major Bibliographical References:

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D.C. Permits to Build, Permit #140751, 3/19/1931.

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Harrington, Richard. "We Saw Them Standing There," *The Washington Post Weekend*, January 30, 2004.

"Ice Plants Here Sell Supplies On Ration Basis," *The Washington Star*, August 2, 1943.

"Ice Shortage Continues as Heat Hits Peak," *The Washington Star*, August 9, 1943.

Lone Star Cement Corporation, Advertisement, *Time Magazine*, May 5, 1941.

"Mr. Uline's Had an Ice Time Here," Washington Daily News, May 23, 1955.

Traceries. D.C. Warehouse Survey. Prepared for the D.C. Historic Preservation Division, 1991 and 1992 (DCHPO files)

"Trend of the Times," *The Washington Post*, January 29, 1948, o. 10.

Triplett, William. "Here Come the Beatles!" *Washingtonian*, p. 43-48, February 2004.

Weeks, Linton, "Ice in His Veins, "*Washington Post Magazine*," December 17, 1991, p. 7.

Uline Ice Company and Arena Complex
Name of Property

Washington, D.C.
County and State

10. Geographical Data

Acreage of Property _____

UTM References
(Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	18	326304	4307934	3			
2				4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet)

11. Form Prepared By

name/title Tim Dennee, Architectural Historian

Organization D.C. Historic Preservation Office date March 2007

street & number 801 North Capitol Street, NE telephone 202 442-8800

city or town Washington, D.C. state _____ zip code 20002

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

X A **USGS map** (7.5 or 15 minute series) indicating the property's location.

X A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

X Representative **black and white photographs** of the property.

Additional Items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO)

name LG Industries, Inc.

street & number P.O. Box 1450 telephone _____

city or town Chicago state Illinois zip code 60690-1450

Paperwork Reduction Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et. seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

Verbal Boundary Description:

The Uline Ice Company and Arena Complex at 1132, 1140 and 1146 occupies lots 8, 9, 10,11, 802, 808, 809, 810, 811, and 812 of Square 748 in Washington, D.C.

Boundary Justification:

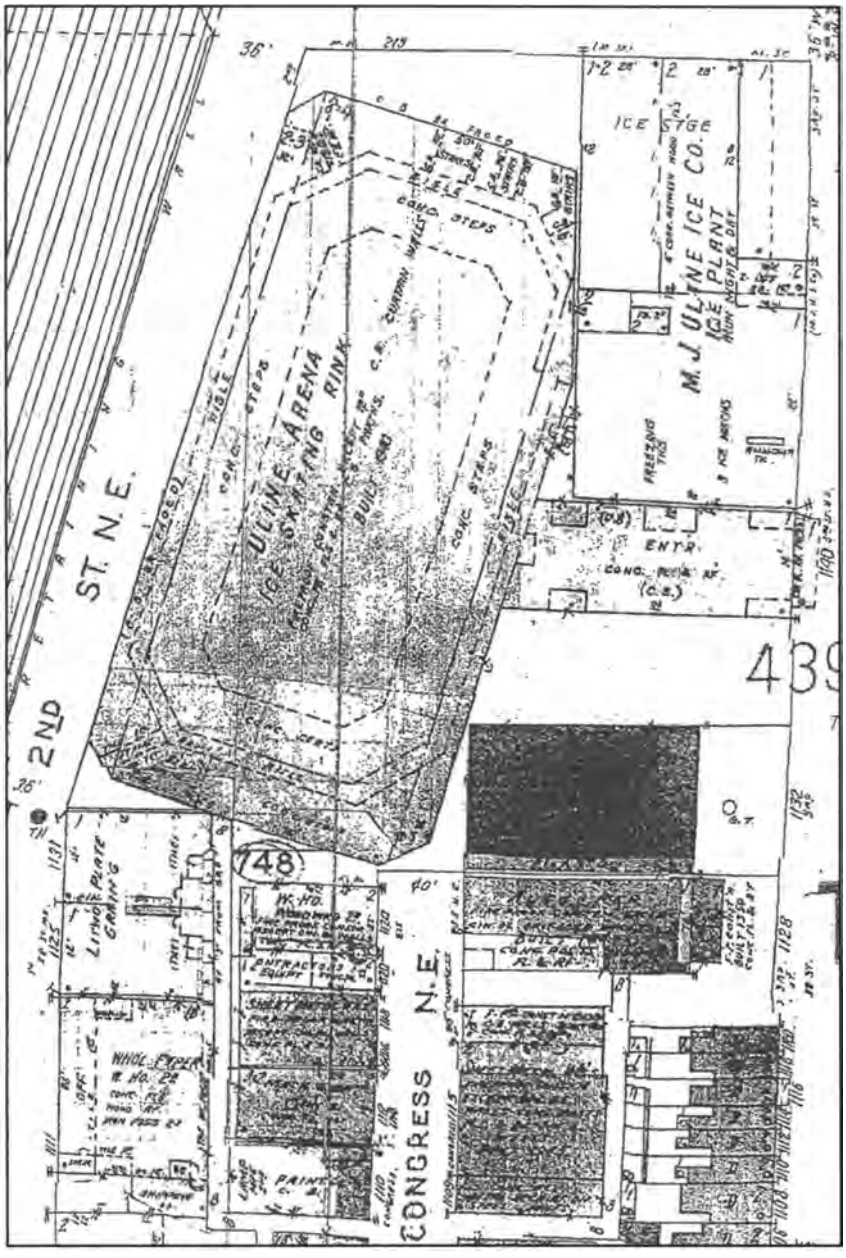
The Uline Ice Company and Arena Complex have been associated with these lots since construction of the ice plant in 1931 and construction of the arena in 1940-1941.
+

National Register of Historic Places Continuation Sheet

Uline Ice Company and Arena Complex
Name of Property

Washington, D.C.
County and State

SITE MAP



Uline Ice Company and Arena Complex
1132, 1140 and 1146 3rd Street, N.E.
Washington, D.C.
(From Sanborn Map, 1991)

National Register of Historic Places Continuation Sheet

Uline Ice Company and Arena Complex
Name of Property

Washington, D.C.
County and State

HISTORIC IMAGES

Historic View (n.d.) Showing Interior of the Uline Arena

National Register of Historic Places Continuation Sheet

Uline Ice Company and Arena Complex
Name of Property

Washington, D.C.
County and State

PHOTOGRAPHS

The following information is common to all photographs:

Uline Ice Company and Arena Complex
1132, 1140 and 1146 3rd Street, NE
Washington, D.C.
Kim Williams, photographer
March 2007
DC Historic Preservation Office (DC HPO)

1) View looking northeast across railroad tracks to the Uline Arena showing concrete rib arches
1 of 7
2) View looking south along 2nd Street, NE showing west elevation of Uline Arena
2 of 7
3) View looking south showing north elevation of Uline Arena
3 of 7
4) View looking north along 3rd Street showing east elevation of the Uline Ice Company plant
4 of 7
5) View looking northwest at east elevation of Uline Ice Company plant showing two-story office
5 of 7
6) View looking southwest showing north elevation of Uline Ice Company plant and north elevation of the Arena
6 of 7
7) View looking west showing east elevation of the entry to the Uline Arena, attached to the southern end of the Uline Ice Company plant building.
7 of 7

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Name of Property

County and State

Section number _____ Page _____ Name of multiple property listing (if applicable)

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 07000448 Date Listed: 5/17/2007

Property Name: Uline Ice Company Plant and Arena Complex State: DC

Multiple Name

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Patrick Andrus
Signature of the Keeper

5/17/2007
Date of Action

Amended Items in Nomination:

The nomination form did not include an acreage figure for the nominated property; the DC SHPO has confirmed that the acreage of the nominated area is 3.9 acres. In Section 8 of the cover form, no Areas of Significance are listed. In Section 8, p. 1 of the form it is noted that the property is nominated for its significance in the areas of Architecture, Engineering, and Recreation/Entertainment. The form is amended to add this information.

DISTRIBUTION:

National Register property file
Nominating Authority (without nomination attachment)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: NOMINATION

PROPERTY NAME: Uline Ice Company Plant and Arena Complex

MULTIPLE NAME:

STATE & COUNTY: DISTRICT OF COLUMBIA, District of Columbia

DATE RECEIVED: 4/12/07 DATE OF PENDING LIST: 4/30/07
DATE OF 16TH DAY: 5/15/07 DATE OF 45TH DAY: 5/26/07
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 07000448

REASONS FOR REVIEW:

APPEAL:	N	DATA PROBLEM:	N	LANDSCAPE:	N	LESS THAN 50 YEARS:	Y
OTHER:	N	PDIL:	N	PERIOD:	N	PROGRAM UNAPPROVED:	N
REQUEST:	N	SAMPLE:	N	SLR DRAFT:	Y	NATIONAL:	N

COMMENT WAIVER: N

✓ ACCEPT ___RETURN ___REJECT 5/17/07 DATE

ABSTRACT/SUMMARY COMMENTS:

RECOM./CRITERIA Accept

REVIEWER Patrick Andrus DISCIPLINE

TELEPHONE DATE 5/17/2007

DOCUMENTATION see attached comments Y/N see attached SLR Y/N
655

If a nomination is returned to the nominating authority, the nomination is no longer under consideration by the NPS.


Pull Forward
NO
BACKING IN

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd St., NE
WDC
Kim Williams
3/2007
DC HPO
View looking northeast across railroad tracks to the Uline Arena showing concrete rib arches
1/7

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking south along 2nd Street, NE (Delaware Ave.) showing west elevation of Uline Arena
2/7

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking south showing north elevation of Uline Arena
3/7

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking north along 3rd Street showing east elevation of the ice plant building
4/7

Uline Ice Company Plant and Arena Complex
1132, 1140 and 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking northwest at east elevation of Uline Ice Company plant showing two-story office entry
5/7


13

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking southwest showing north elevation of ice plant and north elevation of arena
6/7

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
WDC
Kim Williams
3/2007
DC HPO
View looking west showing east elevation of the entry to the Uline Arena at southern end of ice plant building
7/7

Uline Ice Company Plant and Arena Complex
1132, 1140, 1146 3rd Street, NE
Washington, DC

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WASHINGTON WEST QUADRANGLE
DISTRICT OF COLUMBIA—MARYLAND—VIRGINIA
7.5 MINUTE SERIES
(TOPOGRAPHIC—BATHYMETRIC)

Mapped, edited, and published by the Geological Survey and the National Ocean Service

Control by USGS, NOS/NOAA, NCPS, and WSSC

Compiled by photogrammetric methods from aerial photographs taken 1955. Field checked 1956. Revised 1965

Bathymetry compiled by the National Ocean Service from tide-coordinated hydrographic surveys. This information is not intended for navigational purposes

Mean low water (dotted) line and mean high water (heavy solid) line compiled by NOS from tide-coordinated aerial photographs. Apparent shoreline (outer edge of vegetation) shown by light solid line

Polyconic projection. 10,000-foot grid ticks based on Maryland coordinate system, and Virginia coordinate system, north zone
1000-meter Universal Transverse Mercator grid, zone 18
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 8 meters south and 26 meters west as shown by dashed corner ticks

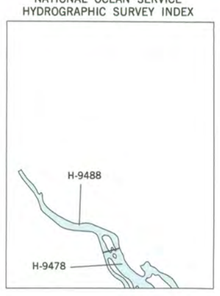
Red tint indicates areas in which only landmark buildings are shown

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1981 and other sources. This information not field checked
Map edited 1983

Purple tint indicates extension of urban areas

NATIONAL OCEAN SERVICE
HYDROGRAPHIC SURVEY INDEX



HYDROGRAPHIC SURVEY INFORMATION

Survey Number	Survey Date	Survey Scale	Survey Line spacing (Naut. Miles)
H-9478	1977	1:5,000	.01–.08
H-9488	1976	1:5,000	.01–.05

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
BATHYMETRIC CONTOUR INTERVAL 1 METER WITH SUPPLEMENTARY 0.5 METER CONTOURS—DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
THE MEAN RANGE OF TIDE IS APPROXIMATELY 0.4 METER

BASE MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
BATHYMETRIC SURVEY DATA COMPLIES WITH INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO) SPECIAL PUBLICATION 44 ACCURACY STANDARDS AND/OR STANDARDS USED AT THE DATE OF THE SURVEY
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
NATIONAL OCEAN SERVICE, ROCKVILLE, MARYLAND 20852
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
Interstate Route — U. S. Route — State Route

WASHINGTON WEST, D. C.—MD.—VA.
38077-H1-TB-024

1965

PHOTOREVISED 1983
BATHYMETRY ADDED 1982

DMA 5561 I NE—SERIES V833

CONVERSION SCALES

Feet	Meters
15000	4500
14000	4000
13000	3500
12000	3000
11000	2500
10000	2000
9000	1500
8000	1000
7000	900
6000	800
5000	700
4000	600
3000	500
2000	400
1000	300
0	200
	100
	0

Feet	Meters
1	3048
2	6096
3	9144
4	1.2192
5	1.5240
6	1.8288
7	2.1336
8	2.4384
9	2.7432
10	3.0480

To convert feet to meters multiply by .3048

To convert meters to feet multiply by 3.2808

Uline Ice Company Plant and Arena Complex
18 326304
4307934

Exposed at low tide

Meters	Feet
0	0
DEPTH GRADIENT	
5	16.4
10	32.8
15	49.2
20	65.6
25	82.0

Maximum depth

ISBN 0-607-13454-2