

Chapter 1

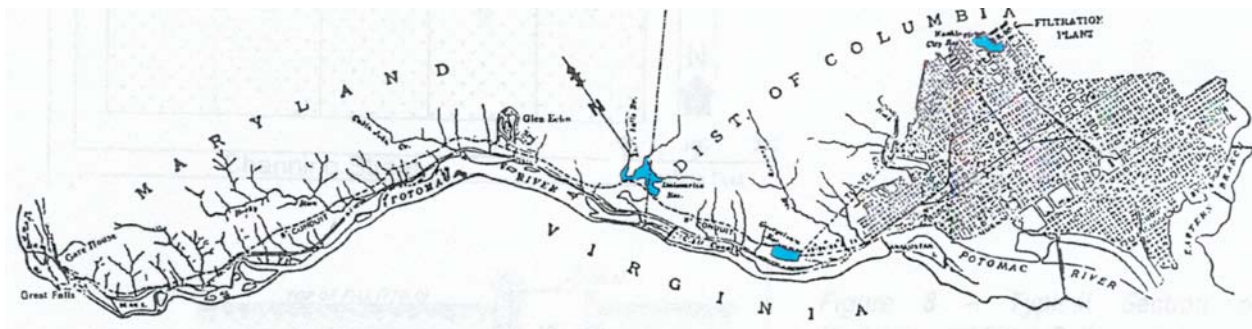
Introduction: A Site, Questions...

Ruins provide the incentive for restoration...There has to be an interim... of death or rejection before there can be renewal and reform. The old order has to die before there can be a born-again landscape.

John Brinckerhoff Jackson (Jackson 1980,102)

In the summer 2001, while exploring thesis possibilities, the author made two important discoveries. The first related to the Society for Industrial Archeology (SIA). Although founded in Washington, DC, in 1971, it took 30 years before the Society returned to hold an annual conference in the nation's capital. At the time, the Society recognized that few considered Washington a prime candidate for the exploration of industrial heritage. Yet while Washington's heritage never duplicated that of cities such as Pittsburgh and Buffalo, the capital had evolved its own industrial heritage, one notable example of which was the Washington Aqueduct and its McMillan Reservoir Sand Filtration Plant, the largest slow sand filtration system built in the United States (SIA 2001). A second discovery came from an old issue of *Landscape Architecture* magazine. In late 1992, the magazine conducted a small informal workshop (LA Forum) to explore revival of the McMillan plant site that had been closed to the public since World War II and abandoned since the late 1980s. Workshop participants visited not only a 25-acre industrial ruin but also the remnants of a park designed and installed atop it by Frederick Law Olmsted, Jr. as an offshoot of the 1902 McMillan Plan for the capital's park system. The five participants considered adapting the park while finding new uses for the structure below. Discussions ranged from fashioning flexible recreational spaces and perhaps modest commercial development to opting for natural restoration. (Leccese 1993, 52-58). While no consensus was reached, the workshop's deliberations heightened a growing interest in taking a closer look at this site. That interest deepened as the author learned of the substantial and oft conflicted interests of a wide range of stakeholders in the site's future.

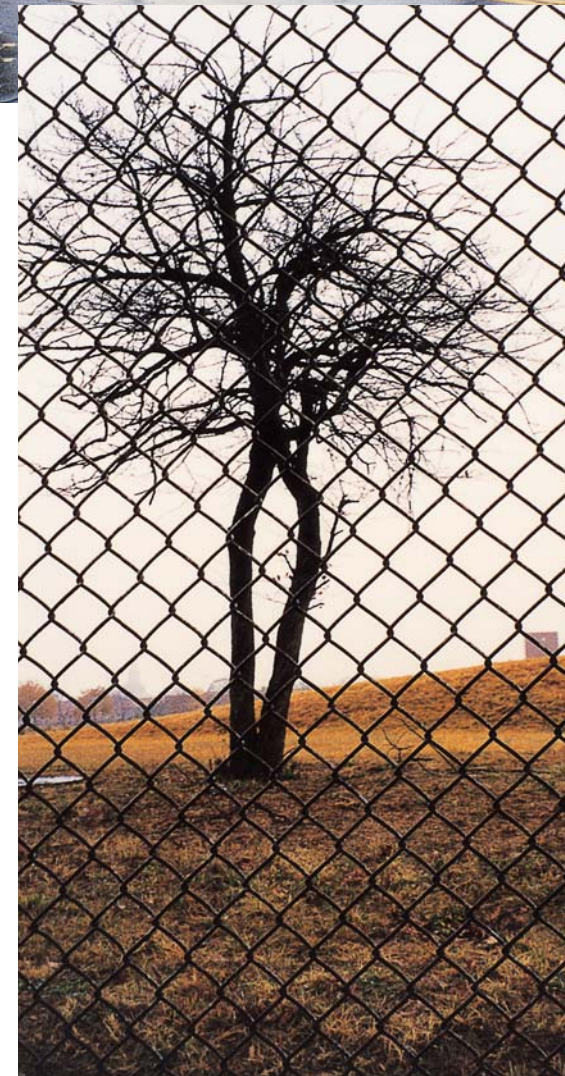
In September 2001, with the helpful assistance of the DC Office of Planning, a visit to the McMillan Reservoir Sand Filtration plant was arranged. The site was vast, a level topography interrupted twice by rows of concrete towers standing like sentinels



1.1 Washington Aqueduct Concept Plan



1.2 Site from First Street

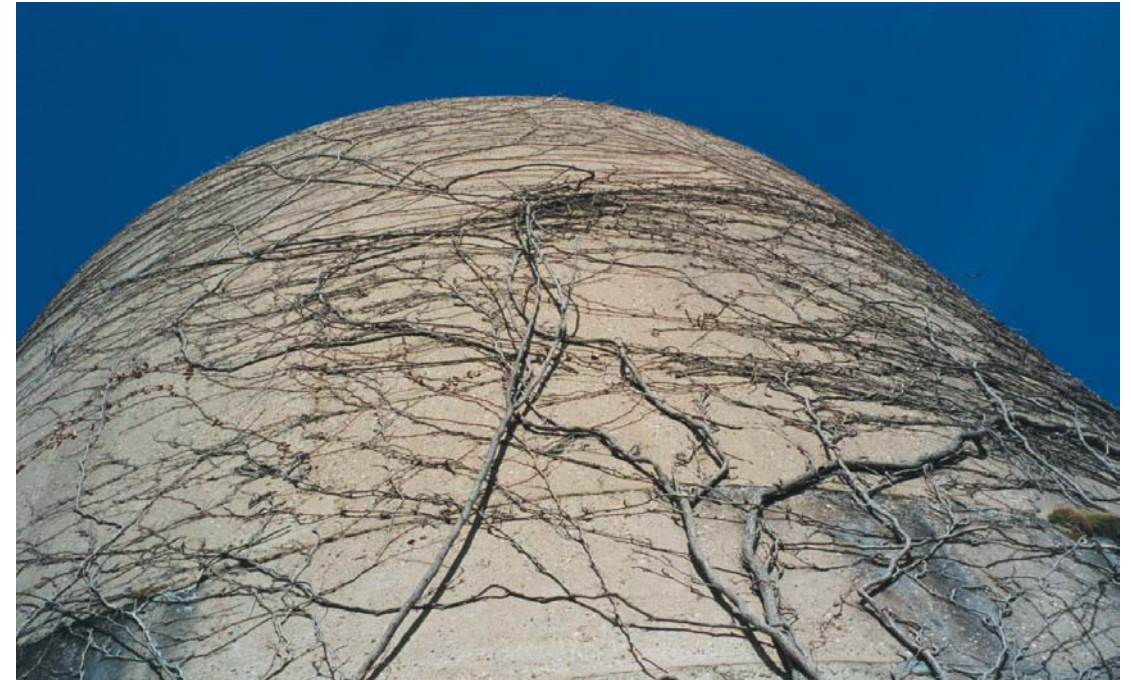


1.3 Remnant

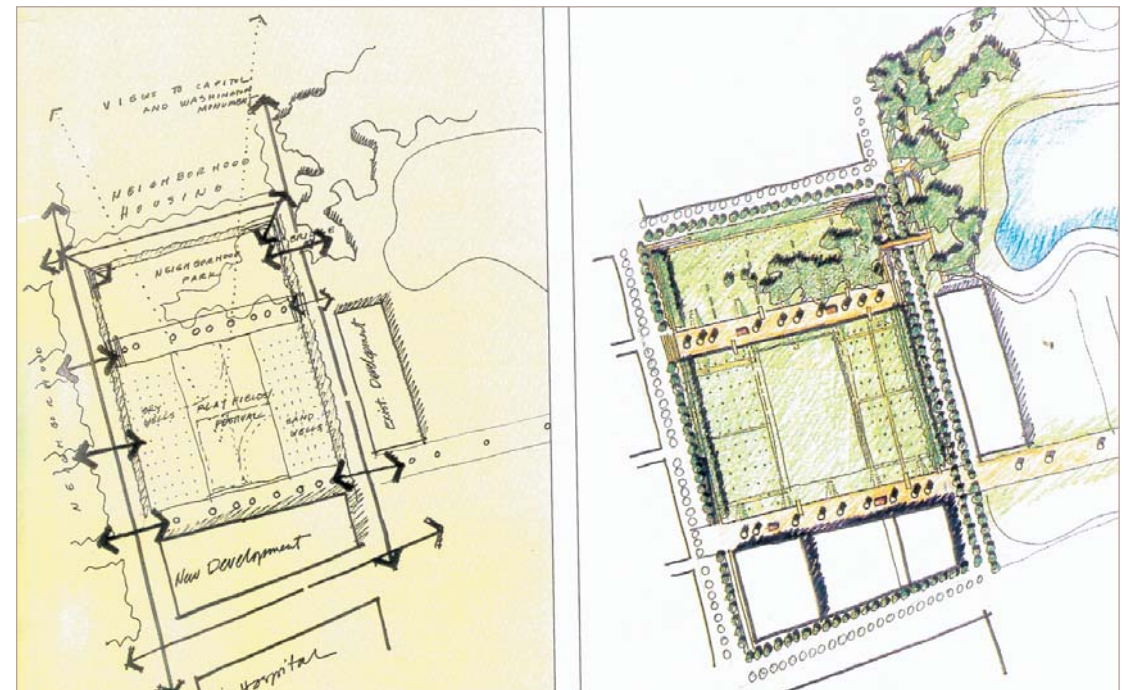
amidst fields of weeds and randomly-rooted volunteer trees. Bermed humps facing the towers and their service courts emphasized the flatness of the plane. In one area, the roof of the underground structure had collapsed. Few of Olmsted's plantings had survived and a forbidding chain link fence enclosed the entire 25 acres. The historical connection with the nearby McMillan Reservoir, to which the plant was intricately linked during its years of operation, was broken. Yet most visitors today are just as taken by the visual power of the site as Olmsted had been when viewing the sand towers and filter plains between them, "the remarkable and interesting effect of the filter bed plain with its ordered ranks of manholes (Bird 1991, 5)."

That these were fascinating ruins was not in doubt; nor was the fact that the time for rebirth had arrived. Serious questions began to emerge. How thick was the landscape of the McMillan site? What were its actual dimensions? By exploring this landscape, what geometry would be discovered? How would any discoveries help formulate design strategies for a 21st century urban park? What role would water, so central to the site's past, play in its future? How should the old and the new, history and future relate? How would a new park be defined, spatially and programmatically, so as to be best positioned to meet contemporary and future community needs and interests? But first, before continuing, details of this significant 20th century industrial landscape, its history, its basic structure and existing condition, and its urban surroundings needed to be examined.

(During its operation, the slow sand filtration plant was located on both sides of First Street. However, the term "site" will henceforth refer only to the 25 acres to the east of First Street, the focus of this thesis).



1.4 Sand Bin Tower



1.5 LA Forum's Plan and Analysis

Chapter 2

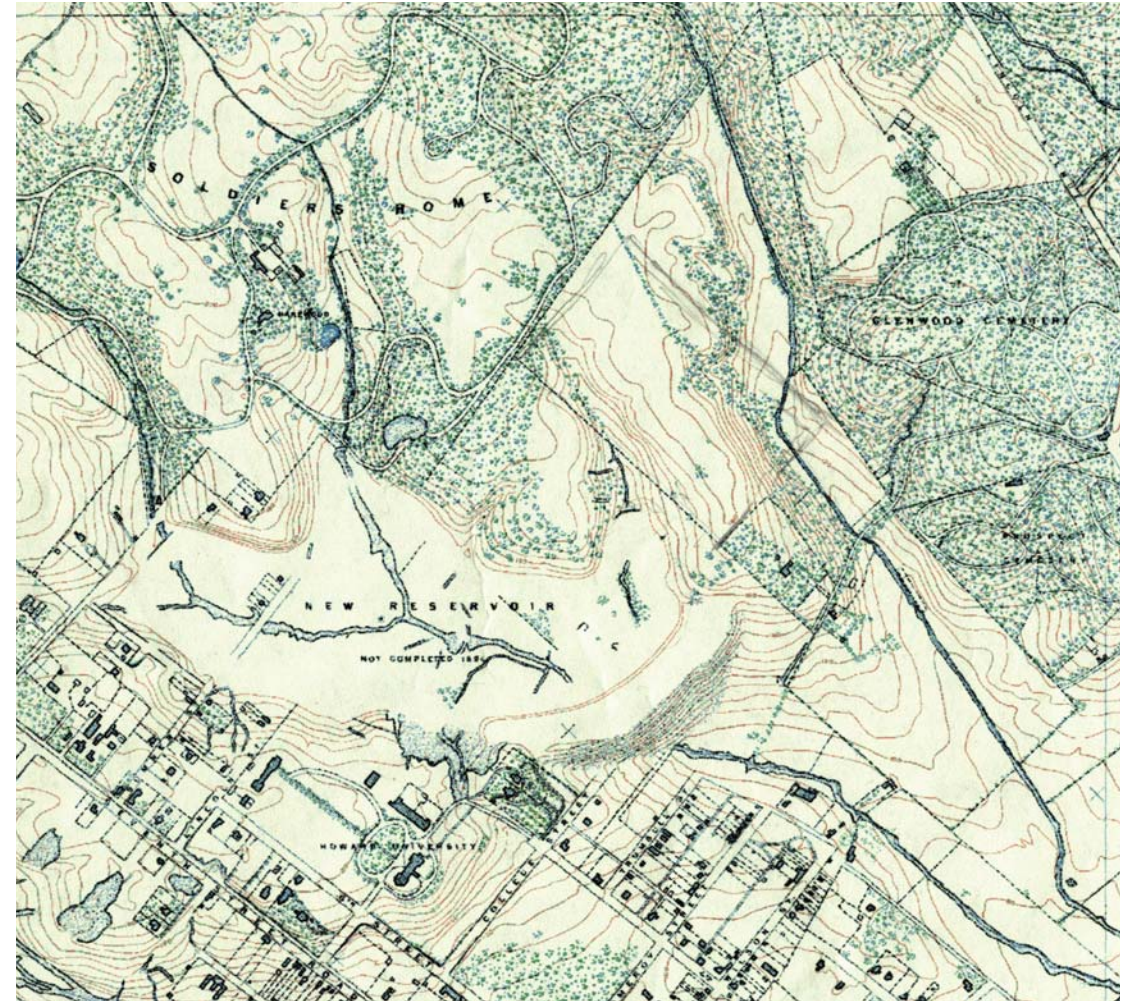
A site: history and now...

Often we're trying to create a sense of layering on the site, and here's one (McMillan Park) that already has layers. We've got the past and the present. Now we can add the layer of the future.

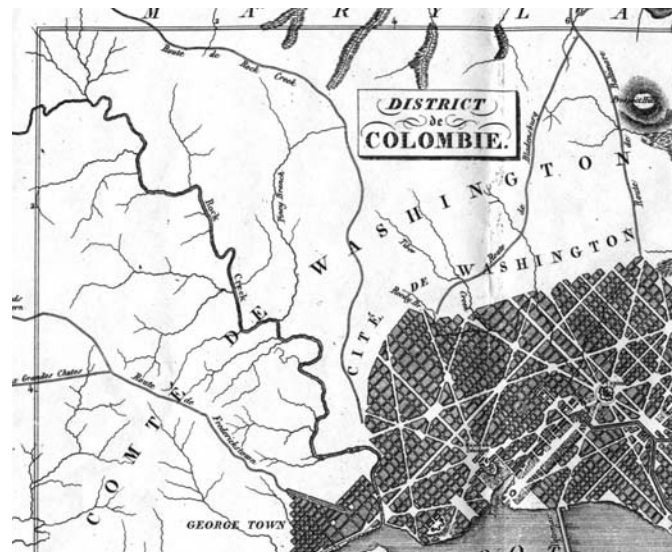
Mary Margaret Jones, 1992 LA Forum participant (Leccese, 54)

Washington's demand for clean safe water increased during the 19th century and, in 1882, Congress approved expansion of the Aqueduct system including a new reservoir (now known as McMillan Reservoir). Congress soon thereafter agreed to the construction of a four mile tunnel that would bring water from the Potomac River to the new reservoir that was constructed to the east of Howard University. Following treatment in an adjacent sand filtration plant, clean water could then be distributed to most of Washington. In 1902, the tunnel was completed and the reservoir filled and the slow sand filtration plant began operations in 1905. The following year, then Secretary of War William Howard Taft officially designated the Reservoir and filtration plant as "McMillan Park." (Ways n.d., 72-93).

The tunnel and subsequent sand filtration system was a major engineering accomplishment. It responded to a demand for water that could no longer be satisfied east of Rock Creek Park by private springs and exemplified the growth of public services as part of the Progressive Era health reform movement. Prior to the arrival of Europeans, the area probably consisted largely of oak and hickory forests on rolling topography. In the 19th century, much of the area had been converted to farmland producing tobacco, corn and orchard fruits. The immediate site area is believed to have been largely orchard with a small tributary of the Tiber Creek running through its southeastern corner (Engineering-Science, Inc. 1990, 10-20). In order to install the sand filters, the site's land had to be leveled, removing as much as 35 feet of soil in the northwestern part and filling with up to 30 feet in the southeastern. Temporary



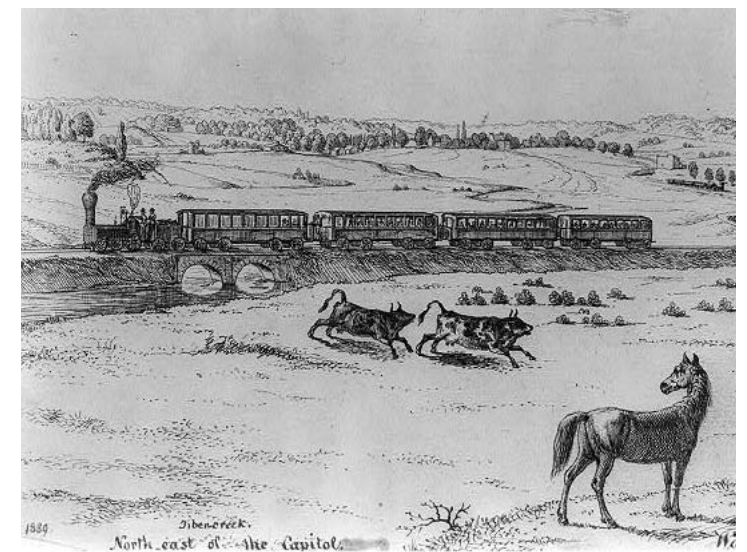
2.1 Vicinity Map (undated)



2.2 District of Columbia Map (1825)



2.3 District of Columbia Map (1892)

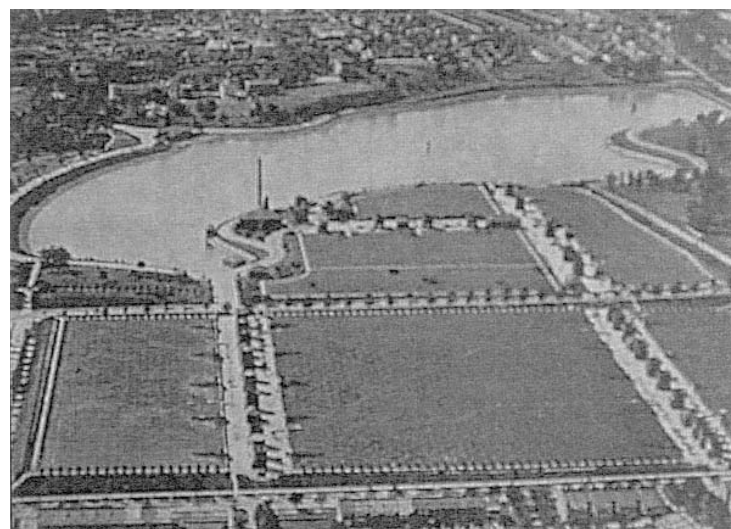


2.4 Tiber Creek, North-east of the Capitol, 1839

rail tracks were laid to move construction materials and specially constructed forms were used to construct the underground filter cells with their concrete arches and ramps (Greenhorne & O'Mara 2001, 2-7, 2-8).

Water was pumped from the reservoir to the site's twenty filter cells, each approximately one acre in area and rated at 3 million gallons/day, as well as to nine cells across First Street. The sand-filtered water entered clay tile drains and then into 24-inch cast iron collector drains, traveled through regulator houses, and flowed to an underground clearwell for city distribution. Following sustained periods of filtration, dirty sand was removed, initially by hand and later with the aid of machinery, and washed in concrete washers. Cleaned sand was then stored in cylindrical 32-foot high concrete bins and, initially, reintroduced to the sand filter cells via a grid of manholes located 20 feet on center. (Sand was later replaced hydraulically and ultimately cleaned by mobile machinery within the cells). Four filter cells were normally out of service for cleaning at any given time, their manhole covers removed (Ways, 95-100; Engineering-Science, Inc., 46-63). The regulator houses, sand bin towers and sand washers were located in the two service courts, 100 feet wide and five to six feet below the elevation of the filter plains.

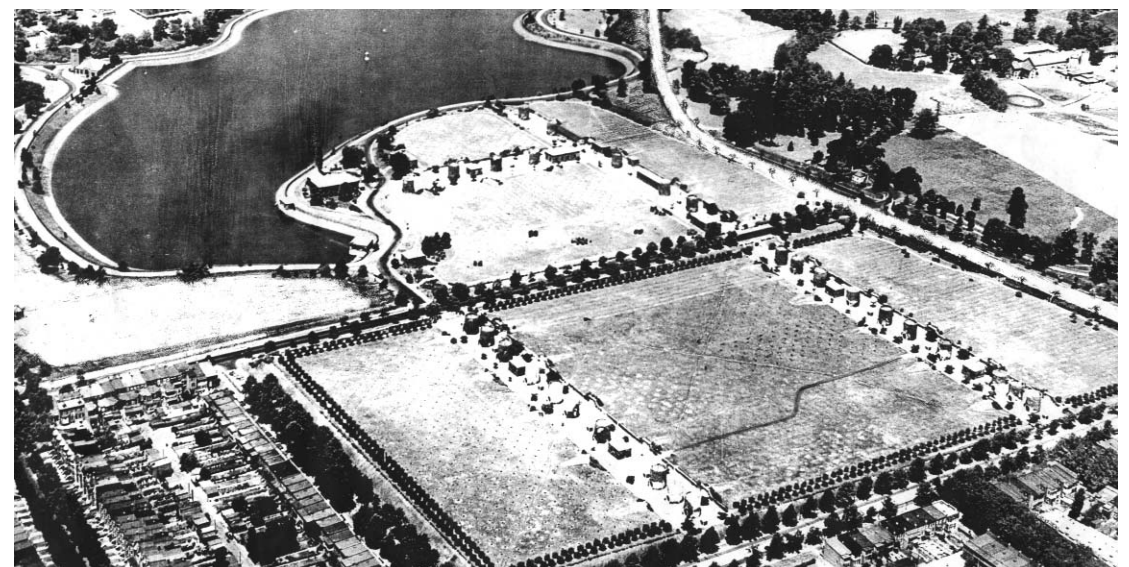
The Senate's McMillan Commission, best known for its efforts regarding the capital's Federal Mall, played a key role in guiding the creation of today's Washington park and parkway system. While the Commission had nothing to do with the design of the sand filtration plant itself, it did recommend that McMillan Reservoir complex, including the filtration plant, be included as part of an "emerald necklace" greenway plan connecting open green spaces extending east-west across the city from Rock Creek Park to Anacostia. Construction of the sand filter cells below ground allowed surface landscaping and Commission member Frederick Law Olmsted Jr. was appointed in 1907 to plan and supervise installation of a landscape for the entire reservoir and filtration plant property of 118 acres. At the sand filtration plant site itself, only grass was planted over the filter cells for fear of root damage to the



2.5 McMillan Reservoir (1925)



2.6 McMillan Reservoir (1930)



2.7 McMillan Reservoir (1930)

non-reinforced concrete structures beneath. A path, flanked by hawthorn trees, and barberry hedges were installed on the site's perimeters, low ground cover was planted on the steep slopes facing Channing Street and some of First Street to the south, cork and mulberry trees and porcelain berry vines were planted in other areas such as on site edges and/or within the service courts, and stairways were installed at each corner of the site to allow access to the filter plain level. Among the landscape features found to the west of First Street (near the Channing Street intersection) was a fountain and statue reached by staircase and honoring Senator McMillan. Olmsted's landscape took 12 years (1908-1920) to complete because of limited Congressional funding each year (Bird, 2-7; Greenhorne & O'Mara, 2-10).

As already noted, Olmsted was taken by the site's visual power and, in 1907, expressed his belief that the park features were clearly secondary to its water works features. Olmsted was intrigued by the visual possibilities of the site and was mindful of views from the pathways and surrounding streets. When new technology eliminated the need to haul sand in carts to the open manhole covers in 1909, Olmsted urged caution when asked for recommendations as to possible additional plantings (Bird, 8). Little has been written about how local citizens actually used the park. People were able to stroll the perimeter pathways and oral historical accounts indicate that nearby residents used to sit evenings on the hillside at Michigan Avenue to catch the breezes and admire the powerful view before them. Access to the reservoir and plant grounds ended in 1941 when they were closed to the public for fear of possible enemy sabotage during World War II. They have never been reopened.

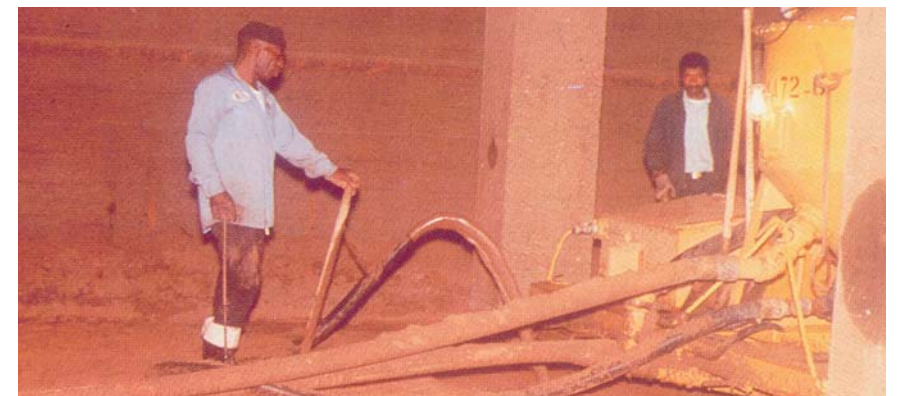
The slow sand filtration plant continued operation until 1985 when the US Army Corps of Engineers opened a new rapid sand filtration plant to the west of First Street. No longer needed, the site was turned over to the General Services Administration (GSA). It in turn sold the site to the DC Government in the fall 1987. The latter decided to commercialize the site and issued an RFP in 1989. Before any commitments could be made, however, local neighborhood associations rose in opposition. In the wake of various legal skirmishes, the DC Government decided to reexamine how the site might best be exploited and in 1999 directed that local community residents be closely consulted in the process. Accordingly, the DC Office of Planning held a series of at least five community meetings between mid-2000 and early 2001 plus separate meetings with developers and with neighboring institutions.



2.8 Site under construction



2.9 McMillan Fountain, Reservoir, and pumping station

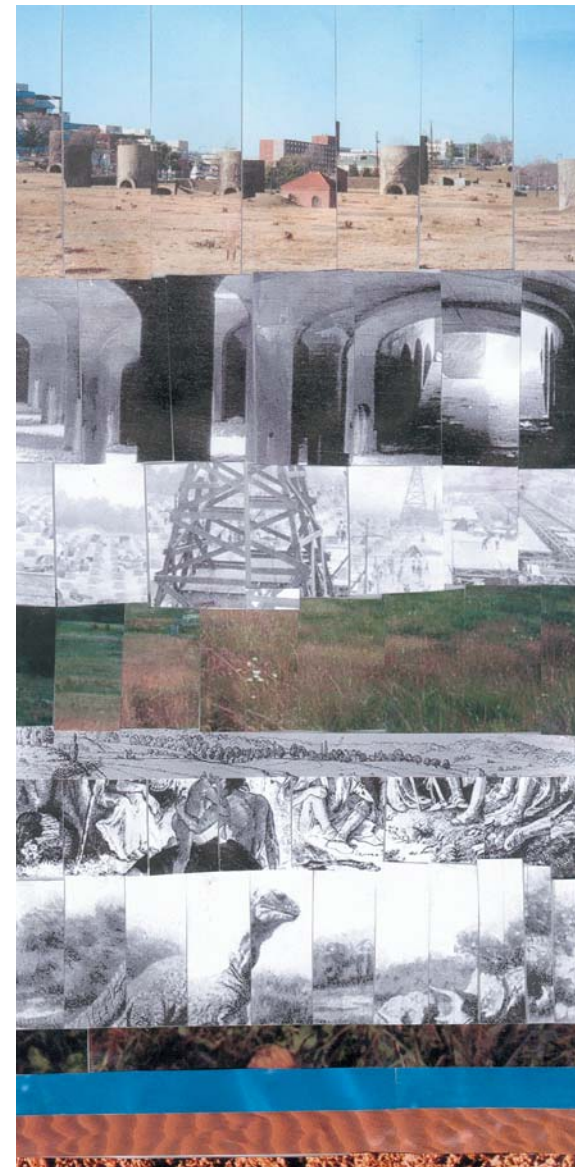


2.10 Working in a filter cell

Representatives of local community groups generally expressed strong preference for preserving the site for open space and recreational use. Historical interpretive and other educational uses, including a possible museum were also welcomed. Residential construction was generally opposed. Limited retail activity received mixed reviews with proposals by neighborhood representatives for select activities such as farmers markets, festivals and even a bottled water enterprise gaining interest. At the third workshop, representatives of Catholic University presented a range of revitalization concepts that further revealed support for some mixed-use site exploitation as long as an emphasis on publicly accessible open space development was not compromised.

The District Government sympathized with resident interests but, armed with engineering studies and market surveys, also argued the need for some revenue-generating activity to help offset high costs of any site development option. With moderate to significant deterioration of much of the site, a preliminary budget estimate indicated that restoration of the site as a park, strictly used for open space, recreational and preservation purposes, could cost between \$22 and \$28 million: \$16 million of that would preserve four filter cells and stabilize the balance, and \$6-12 million would cover park improvements (parking, plantings, recreational facilities, visitors center) and the preservation of surface structures of historical importance (Greenhorne, 5-1, 5-2). At an April 2001 meeting, developers considered a wide range of options that variously combined revenue-generating retail and/or housing development with open space retention on what all agreed was a unique site. Federal funding, private-public partnerships, trusts/conservancies; impact of market developments elsewhere in the vicinity; and institutional stakeholder plans were also discussed. While consensus was neither sought nor reached, a senior DC Planning official concluded the meeting by observing what had become obvious: that a conventional approach to the McMillan site would not suffice. (Washington TV-16 videotape of meeting provided to Author, September 2001).

A final note on history: In 1991, the site was designated a DC Historic Landmark. The D.C. Preservation League included it in its “Most Endangered Places for 2000” list. In 2001, at Congressional direction, the National Capital Planning Commission, working with the Commission of Fine Arts and the National Capital Memorial Commission, issued The Memorials and Museums Master Plan to guide the future location of memorial and museum facilities outside the traditional Monumental Core. 100 candidate sites were selected, 20 of which were identified as prime sites. The McMillan site was Number 17, the Plan stating that it could accommodate “several small memorials, a memorial park, a major memorial, or a museum... (related thematically) to Senator James McMillan and the McMillan Plan, to water resources and US Army Corps of Engineers’ contributions to the District’s historic water supply system, or possibly to the nearby Soldiers’ and Airmen’s Home” (National Capital Planning Commission 2001, 77).



2.11 The Site: layers of history

Chapter 3

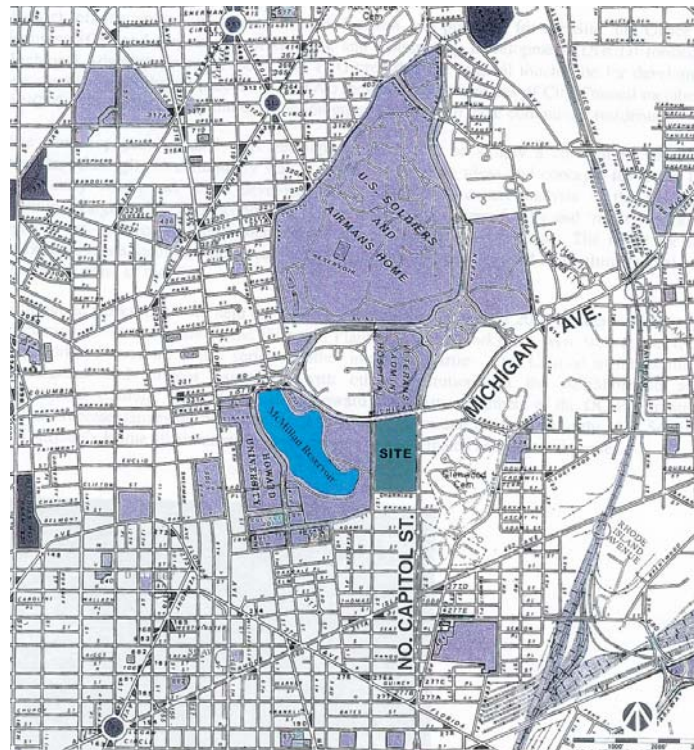
The neighborhood...

Like all neighborhood parks, it is the creature of its surroundings and of the way its surroundings generate mutual support from diverse uses, or fail to generate such support.

Jane Jacobs (Jacobs 1992, 98, referring to Philadelphia's Washington Square)

The site is destined for more than status as a neighborhood park. But it will be that as well and the piece of urban fabric on which it rests provide clues as to the directions it might take.

The site is located between large institutions to the north, northeast and west and well-established residential neighborhoods to the east and south. To the north is the Washington Hospital Center complex with the Soldiers' and Airmen's Home just beyond. To the northeast are Trinity College, the Basilica of the National Shrine of the Immaculate Conception, and Catholic University of America. To the west are the McMillan Reservoir and the currently operating rapid sand filtration plant. Just beyond is Howard University. To the south and east are the largely middle-income townhouse residential neighborhoods of Bloomingdale and Edgewood with other residential neighborhoods further to the west and northwest. The residential population is predominantly African American (approximately 72%) with non-Hispanic whites and Hispanics comprising 21% and 6% respectively (Greenhorne & O'Mara,



3.1 Vicinity Map



3.2 Neighborhood Map

2-17). The very large Glenwood cemetery tract is located to the east, a short distance from the site. Parcels of land (49 acres) on the Soldiers' Home tract may be sold for residential or mixed-use development in the foreseeable future. A possible conference center has been proposed for a location just east of the site on Michigan Avenue.

While there is considerable open space in the area (cemeteries and a golf course at Soldiers' Home), they are not open to the public. There are no public parks with large-scale recreational facilities in the area. The only small park areas for active recreation are located at neighborhood community centers some distance away. Nearby shopping is limited to a few small corner stores and there is no convenient access to entertainment. There are three elementary schools and a branch public library within the area. ("Area" is defined as being within an approximate one-mile radius).

Public transportation to the site is limited. The closest metrorail station is approximately one mile away, three others slightly farther. Both a cross-town east-west Metrobus route as well as one running north-south on North Capitol Street serve the site. For site visitors neither resident nearby nor employed by or using any of the nearby medical, educational or retirement facilities, primary transportation will undoubtedly be by personal vehicle. Parking available to the non-resident public is currently limited and the primary traffic intersection at North Capitol Street and Michigan Avenue is already heavily congested during peak hours.



3.4 Washington Hospital Center



3.3 North Capitol Street



3.5 Channing Street

Chapter 4 Existing site details and conditions...

The goal of the park design (referring to Peter Latz' Landscape Park Duisburg-Nord) is not to rip out the old and create a new "blank slate" but rather to acknowledge and celebrate the site's history.

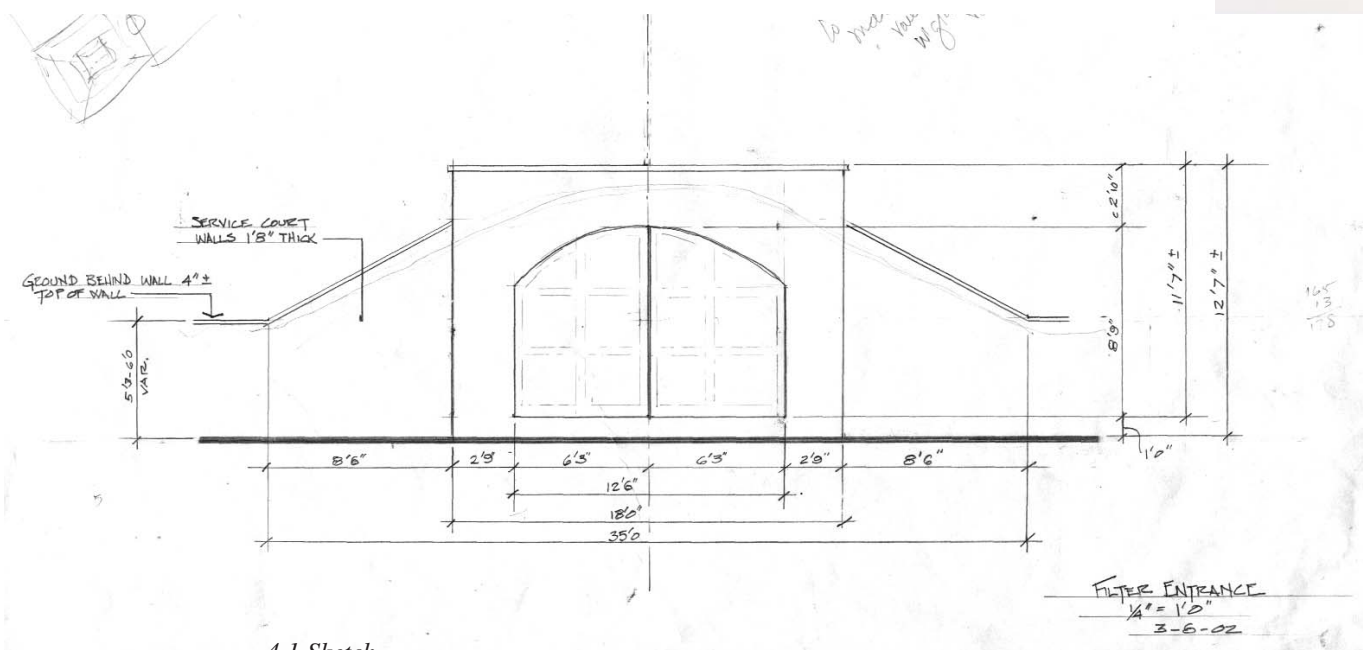
Rebecca Krinke (Krinke 2001, 138)

The most striking visual feature of the McMillan sand filtration plant was, and remains, its two rows of ten concrete sand bin towers, located in the two service courts and often mistaken by casual observers as the filters themselves. The towers, 32 feet high and 23'-6" in diameter, have arched entrances 10'-4" high and 8'-8" wide. The arches face north and south respectively and were used during the first years of plant operation to provide access for the carts being loaded with sand. The walls are 18 inches thick at the base, thinning to 9 inches at the top where the bins are open to the sky (Engineering-Science, 50). The use of ivy vines climbing the towers dates back to 1907 when the Army engineers hoped to improve what they considered the towers' unattractive appearance (Bird, 7).

Two brick regulator houses, which controlled the flow of water in the filter system, are located in each service court. They are 24 x 29 feet in area with an estimated 23-foot height and have terra cotta tile roofs. All four remain in good structural condition. Most if not all proposals regarding the future of the site agree on retaining the service courts, sand bin towers and regulator houses.



4.2 Service court with sand bin towers



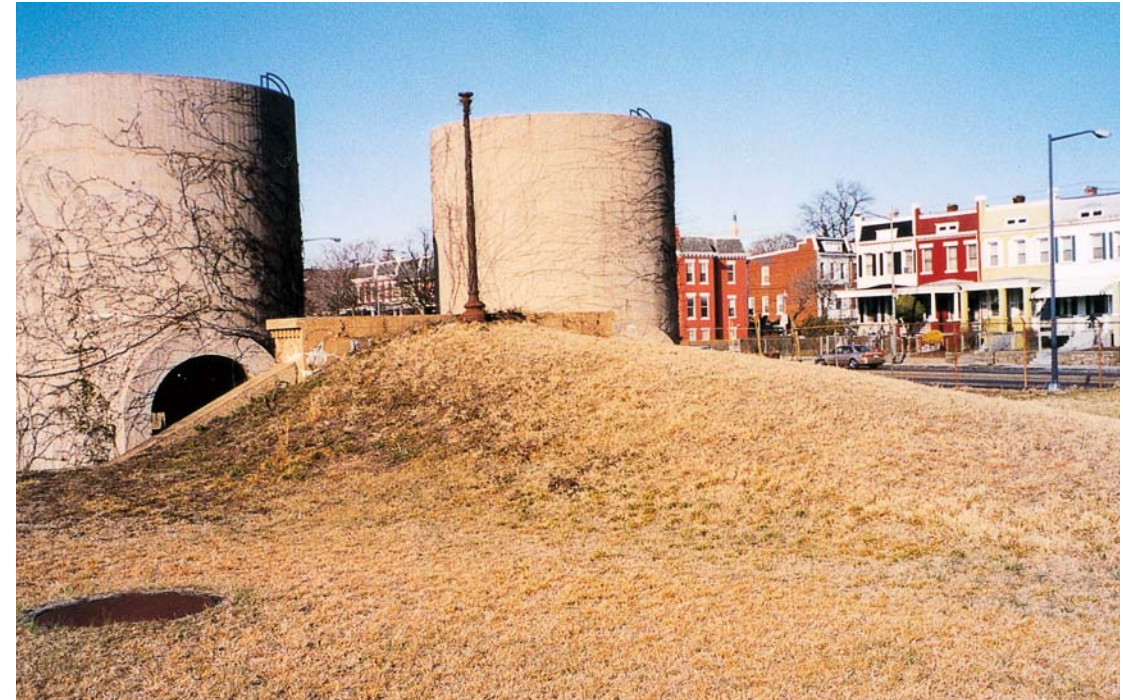
4.1 Sketch



4.3 Filter cell entrance

The bulk of the site consists of the extensive flat filter fields or planes covering the twenty filter cells. A grid of some 2000 manholes, each manhole 3'-4 1/2" in diameter and 20 feet on center, covers the fields, the manholes once providing access to the filter cells below. Bermed humps in the planes, located atop the ramps leading from the service courts to the underground cells, hint at what lies beneath. The fields are at a constant El. 170, the service courts at El. 165. Michigan Avenue on the site's northern border slopes to the east but is above the site field elevation throughout the length of the site. First Street bordering the site on the west and North Capitol Street on the east both slope to the south. The field-street slope differential increases as one moves toward the south, reaching approximately 20 feet at the southern edge facing Channing Street.

Each filter cell, approximately one acre in area, has a floor at El. 155. In a cell, 22 x 22-inch poured-in-place concrete columns, 14 feet on center, support the filter ceilings. The domed ceilings formed by each quartet of columns are about 12 feet at their highest point. The concrete slab floors were covered by approximately one foot of gravel overlain with sand during the plant's operation. The roof of each cell is covered with approximately two feet of earth fill on top of the ceiling slab at crown. The slab collected and directed surface waters into 2-inch drains that go through the column centers and discharge into the filter beds. The concrete walls were built in 30-foot precast sections and connected by tongue-and-groove joints (Engineering-Science, 48) . Steep concrete ramps provided service access from the service courts to each filter cell floor (or varying sand level when the plant was in operation). The filter cell entrances in the service courts are circa 12'-6" above the court floor and have 8'-9" high double wooden doors. A metal lamppost is now centered atop each entrance. (They replaced lampposts originally set into the courts).



4.4 Bermed hump over filter cell entrance



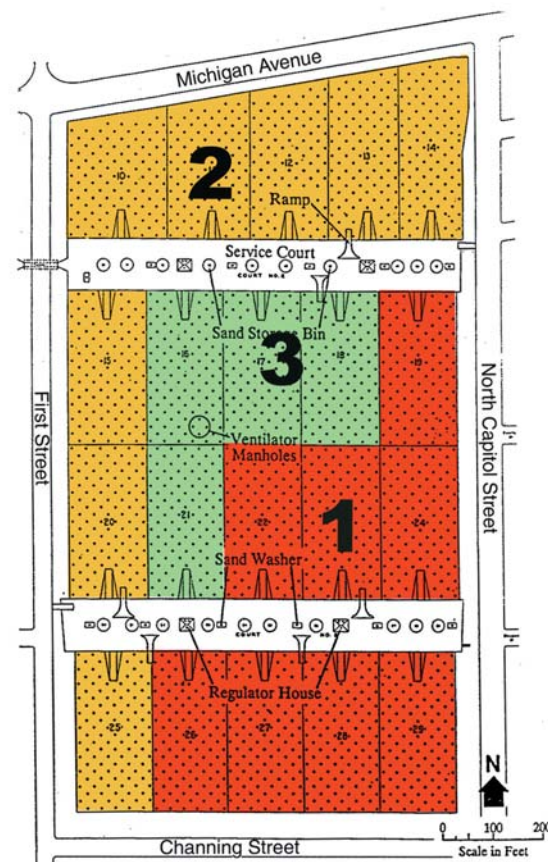
4.5 Regulator house

The concrete-paved service courts have concrete aggregate walls running the length of each court. Flared concrete ramps and narrow stairways provided access from the courts to the filter cell roofs (filter fields). There are two concrete-paved ramped street entrances to the site, one off North Capitol Street into the northern service court, the other off First Street into the southern court. In addition to the sand bin towers and regulator houses, twelve sand washers made of reinforced concrete aggregate are located in the two courts. The sand washers are replacements for the original ones (Engineering-Science, 63).

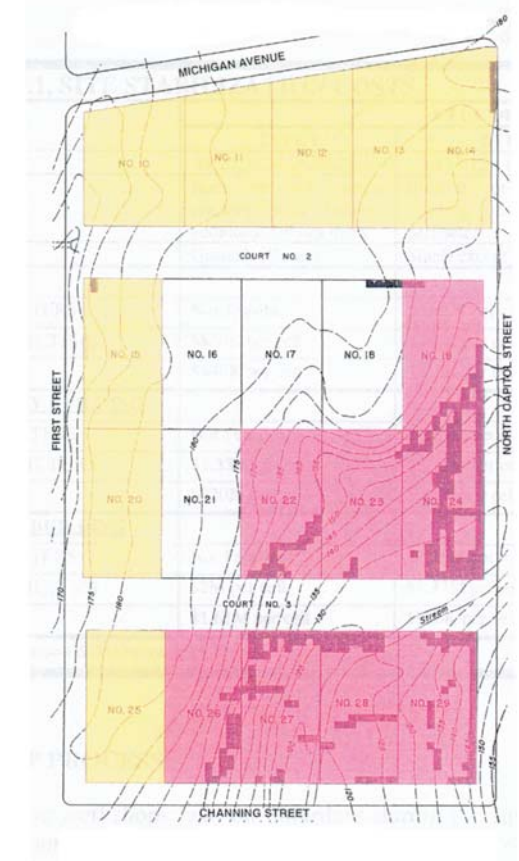
Unlike the sand bin towers (and sand washers), the filter cells were constructed of 100% lean, non-reinforced concrete. The conditions of the cells reveal three basic stages of deterioration: Level 1 (red) includes eight filter cells and represents significant deterioration with cracks up to two inches or larger, joint separations up to four inches. Cell damage significantly increased during the period between 1968 and 2000 engineering surveys, with major ceiling/wall collapse by 2000. Level 2 (yellow) includes eight filter cells and represents moderate deterioration with cracks up to one inch and joint separations up to two inches. Only in the vicinity of the exterior walls of these cells was serious deterioration noted in the 2000 survey. Level three (green) includes four filter cells with only hairline cracks and less than 1/8 inch joint separations. The 2000 survey showed no significant deterioration since 1968. The groundwater level at site is at El. 135 and is thus unlikely to impact construction of any new facilities. (Greenhorne & O'Mara, 2-42, citing C.C. Johnson and Malhotra, PC). The three stages of cell deterioration undoubtedly reflect the grading undertaken during original site construction (e.g., Level 1 cells with the worst deterioration are located atop fill).

For an interior Level 3 cell to be preserved, the existing soil would have to be removed, a reinforced cast-in-place concrete slab installed, and soil backfilled to cover the slab and to support grass. The 2000 survey estimated that 5% of the columns in a Level 3 cell would be cracked and in need of reinforcing or repair. Upon completion of this work, the cells would support open space development (C.C. Johnson and Malhotra, Chapter 6).

Most of Olmsted's original landscape is gone. A couple of small trees serve as scraggly reminders of the hawthorn tree allee that once flanked the perimeter walkway. Sufficient fragments of the walkway reveal the latter's location around most of the site. The Olmsted plan drawings show rows of red maple trees planted on both sides of all four streets bordering the site. A number of red maple street trees are still growing along these streets although, with the exception of First Street, their patterns are now irregular, in part undoubtedly the result of adverse conditions for most street trees (e.g., insufficiently sized tree pits, street pollution, trunk damage). In addition to a profusion of weeds that one would expect in an abandoned site, a good number of volunteer trees, not of species found in Olmsted's plan, took root on the site. With a couple of exceptions, the trees as well as weeds have been cut back by City maintenance personnel for sanitary reasons and from concern for further possible damage to the filter cell ceilings pending decisions regarding the site's future.



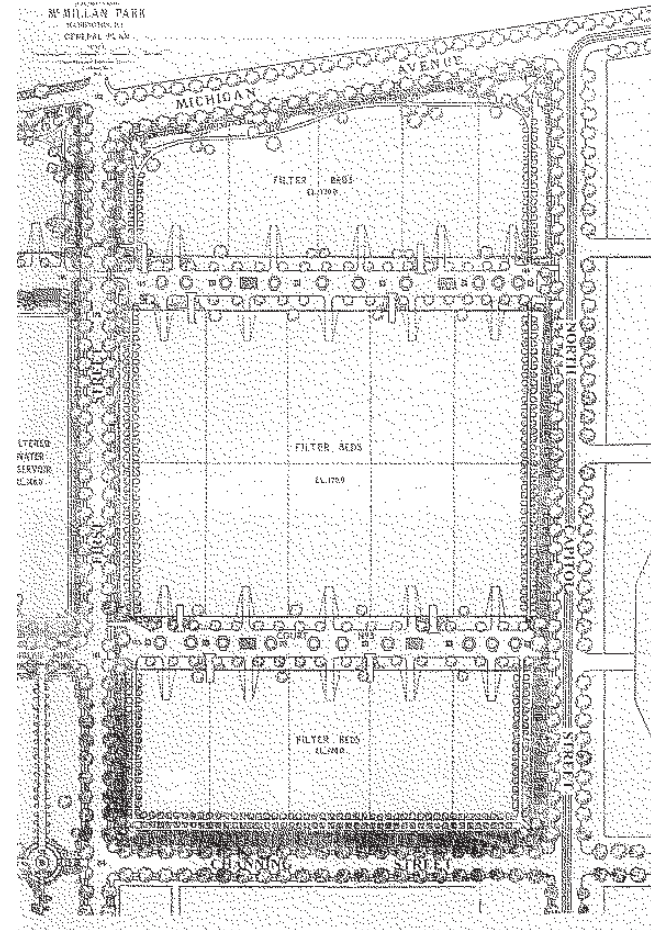
4.6 Existing cell conditions



4.7 Pre-construction topography

Olmsted's limited plant list, necessitated by the constraints dictated by the site's operational and structural restrictions, contained plants that would not be specified by many landscape architects today: Japanese barberry (*Berberis thunbergii*), porcelain berry (*Ampelopsis brevipedunculata*), and Hall's honeysuckle (*Lonicera japonica* 'Halliana') which are invasives; mulberry and cork trees in the service courts, the former messy and arguably lacking landscape value, the latter reportedly performing poorly in the Washington climate and even more so in confined spaces; and a variety of euonymus ground cover (var. *radicans* 'Carrierei') that is in fact a semi-shrub, considered unstable and susceptible to numerous insects and diseases.

Olmsted recognized that, in contrast to more varied and in some areas less restricted plantings west of First Street, plantings east of the street would be "slight and subordinate decoration." In addition, he appears to have paid special attention to the "remarkable" effect of the filter bed plain from outside the site. Olmsted did recognize the aggressive growing habit of porcelain berry if not "judiciously restrained" and suggested its possible replacement in the future with creepers (Olmsted Jr. 1908, 12-15).



4.8 Olmsted Landscape Planting Plan



4.9 View of Olmsted landscape (undated)