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# **THE WEST PHILADELPHIA**

## **DIGITAL DATABASE:**

### **AN ATLAS AND GUIDE**

A Publication of the West Philadelphia Landscape Plan  
Department of Landscape Architecture and Regional Planning  
University of Pennsylvania  
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# ACKNOWLEDGMENTS

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The original development of the digital database evolved over twenty-eight months from June 1988 through September 1990. Anne Whiston Spirm and John Radke supervised the work through all of its phases during this period: construction of the database, data analysis, and display. Spirm was responsible for the conceptual framework of the database and its content, Radke for the development and application of a geographic information system that accommodated the needs of the plan. C. Dana Tomlin has provided valuable advice during the recent phase of development in 1994-1996. The digital database for the West Philadelphia

Landscape Plan includes information drawn from most other parts of the project. Contributions to these components are described in the acknowledgements sections of "The West Philadelphia Plan: A Framework for Action," "Shaping the Block," and "Vacant Land: A Resource for Reshaping Urban Neighborhoods."

The construction of the digital database was initiated in June 1988, and additions and refinements were made throughout the course of the project until 1990. Research assistants Rafael Real de Asua, Jeffrey Poor, and Sarah Cunningham began digitizing data in summer 1988 under the supervision of W. Gary Smith. Rafael Real de Asua continued to incorporate further spatial and statistical information through summer of 1989, including a more detailed data base for the Mill Creek Watershed. Geoffrey Anderson carried on this work from summer 1989 through 1991. Beginning in summer 1989, new maps were created by processing and combining data already digitized. Rafael Real de Asua and Geoffrey Anderson also created new maps demonstrating the correlation between vacant properties and floodplain areas. Rafael Real de Asua developed the first version of an introduction to the database in summer 1989, and Geoffrey Anderson revised and enlarged this demonstration in 1990, with the assistance of Shlomo Zevi and valuable suggestions from Mark Cameron, Daniel Marcucci, and Tarna Agrat. Daniel Marcucci also worked on an earlier version of this publication.

Substantial additions and revisions to the digital database were undertaken in 1994-1996 under the direction of Anne Whiston Spirm. Marcia Karasek reorganized the original data files. Robert Cheetham and Damon Hein documented the contents and structure of the files, redesigned the custom menu system, and reworked the three-dimensional digital terrain models. At the time of this publication, Robert Cheetham and Martin Knox are at work extending the coverage of several maps, adding new maps, and making certain information available on the World Wide Web.

## OTHER PUBLICATIONS IN THIS SERIES:

- I. *The West Philadelphia Landscape Plan: A Framework for Action*
- II. *Models of Success: Landscape Improvements and Community Development*
- III. "This Garden is a Town." *Shaping the Community Garden*
- IV. *Shaping the Block: Redesigning Small Urban Neighborhoods*
- V. *Vacant Land: A Resource for Reshaping Urban Neighborhoods*

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# OVERVIEW

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West Philadelphia is a multi-racial, multi-cultural, inner-city neighborhood. Poverty, unemployment, and the physical deterioration of housing and public infrastructure are pressing issues. These are fundamental problems that any plan for West Philadelphia must address, including a plan for landscape improvements. Clearly landscape development alone cannot solve these problems. However, even small, incremental improvements to the urban landscape can produce major improvements in the function and appearance of the city and in the quality of urban life. Successful landscape projects can serve as catalysts for other community development projects and as important adjuncts to a wide variety of social programs, such as education, job training, employment, and community organizing. The West Philadelphia Landscape Plan addresses these social issues as well as serious environmental problems, such as land subsidence and flooding in areas over buried streams and filled land.

The scope of this plan is more comprehensive than what are commonly referred to as "greening" projects, for the landscape of West Philadelphia is more than parks, gardens, and street trees. The urban landscape embodies the total physical environment within which built structures fit. It includes hills and valleys, rocks and earth, and rivers and underground streams upon which the city is built. It includes the framework of streets, sidewalks, and public utilities which structures the city and through which people, water, wastes, and energy flow. And it includes the playgrounds, parking lots, plazas, private yards, and vacant lots that fit within that larger framework. The plan addresses the major transportation and stream corridors

which provide a neighborhood-wide structure and which serve both local and regional needs, as well as smaller, more discrete projects tailored to suit the needs of local residents.

The West Philadelphia Landscape Plan is based upon the conviction that individuals, small groups, and local organizations all have a role in shaping the landscape of the city, a role as important as public agencies and private developers. Incremental improvements to the urban landscape made by individuals and small groups can have an enormous, cumulative, effect on the city and how it looks and functions. The West Philadelphia Landscape Plan seeks to identify, encourage, and support such incremental improvements, and to propose large-scale projects that can be accomplished only by neighborhood-wide organizations and city-wide or regional public agencies. Landscape planning and the design and construction of small, neighborhood landscape projects have proceeded simultaneously over the past three years and have informed one another throughout the project.

The products of the West Philadelphia Landscape Plan are six reports and a computer database that integrates text, statistics, maps, and drawings. *The West Philadelphia Landscape Plan: A Framework for Action* provides an overview of the plan. *Models of Success: Landscape Improvements and Community Development*, describes examples of successful projects that have already been built and draws lessons for similar projects that could be undertaken in West Philadelphia. "This Garden is a Town" explores existing community gardens as models for neighborhood-based planning. *Shaping the Block* focuses on the block as a significant unit of

neighborhood and explores how residents can reshape the block they live on to better support their needs, values, and activities. *Vacant Urban Land: A Resource for Reshaping Urban Neighborhoods* analyzes the different types of vacant urban land that occur in West Philadelphia and how they can be reclaimed for a variety of uses tailored to fit the needs of particular people and places.

This report, *The Digital Database: An Atlas and Guide*, describes the computer database and its potential uses. The computer has been an essential tool, both in the development of the plan and in making it useful and accessible to others. Data about West Philadelphia's physical and natural environment and the people who live here was collected from diverse sources, including federal agencies, municipal departments, research reports, and field work, then digitized at different scales and levels of detail. This information was analyzed, compared, and combined to yield fresh insights about the dynamics among natural and cultural processes and their relationship to the evolution of the urban landscape. With the necessary software, the database may be accessed by personal computer.

# THE DIGITAL DATABASE

## THE DIGITAL DATABASE

The West Philadelphia Digital Database (WPDD) was created as part of the West Philadelphia Landscape Plan and Greening Project (WPLP). It integrates a range of information about environmental, physical, and demographic characteristics of West Philadelphia, with greater detail for the Mill Creek watershed (which comprises more than half the area of West Philadelphia). The database was compiled from many different sources, including federal agencies, municipal departments, research reports, and field work. The WPDD includes physical information such as the location of different land uses, vacant lots, sewer lines, types of houses and blocks, and topography, as well as demographic information from the 1980 census (race, income, employment, housing tenure, etc.).

It includes data that are not available elsewhere, such as a map of all vacant properties, a topographic contour map, and a map of low-lying, internally drained land in the floodplain over sewers. The WPLP database compiled some information which is not currently digitized, such as the locations of successful models of landscape improvements in West Philadelphia for people to visit and evaluate for themselves and the names of people to contact for advice.

The digital database makes it possible to review, compare, and combine data to yield new information tailored to the needs of an individual or organization with a specific interest or objective. Maps can be created for a group wishing to identify good sites for housing, for example.

While individual maps summarize information for West Philadelphia as a whole, the database is set up so that someone using the system can zoom in on a smaller area, down to the scale of a single property, with much more detailed information. In one small group of blocks in the northeastern section of West Philadelphia, for example, the population was 100 percent African-American in 1980 with 33 percent living below the poverty level (as reported by the U.S. Census). There were 274 housing units, of which 20 percent were vacant. When one turns from such statistics to a map of this area, distinct spatial patterns emerge, giving these statistics further meaning. The vacant buildings and vacant lots in this neighborhood are not scattered, but concentrated, and most are linked, forming a diagonal pattern that cuts across the gridded pattern of streets. The explanation for the distinctive pattern of vacant land lies in an understanding of the pre-urban hydrology of West Philadelphia. The digital database has been set up to facilitate such movement across scales and comparison of information, so that one can identify an area of interest at a large scale, then zoom in, accessing progressively finer grain of information, ultimately down to the scale of a single property and its characteristics.

### Past and Current Use

Collectively, the maps and tabular data in the WPDD comprise an atlas of information on West Philadelphia. The digital database is an archive, a digital version, though currently incomplete, of the original maps drawn on paper as part of the West Philadelphia Landscape Plan and Greening Project in the late 1980s. It is also an archive for current and future projects outside the scope of the original West Philadelphia Landscape

Plan. Since 1991, numerous community groups and individuals have requested information about sites under consideration for development. The WPDD has also been used in graduate courses taught in the Department of Landscape Architecture and Regional Planning. It is an archive of the past and for the future.

### A Resource for the West Philadelphia Community

While this database was designed specifically to inform decisions about the urban landscape, it includes information that would be useful to organizations interested in identifying sites for a variety of purposes including housing, commercial development, and transportation. The WPDD includes features that are not normally considered in city planning and urban design, such as land cover, as well as information that is not available elsewhere, like vacant land and block types. Other, additional kinds of data can also be readily incorporated.

### An Educational Resource

West Philadelphia Elementary and Secondary Schools. The six reports of the West Philadelphia Landscape Plan and the accompanying digital database are a rich resource for elementary, middle school, and high school students to learn about the environment they live in, its history, and ways that people have successfully reshaped their neighborhoods. The digital database provides students with the opportunity to acquire computer skills while learning more about the place they live. Although most schools do not possess the hardware and software necessary to run sophisticated CAD and

GIS systems, a simpler set of hardware and software configurations could be designed.

Another possibility would be for schools to access maps and materials from the Internet, through the West Philadelphia Landscape Project's home page (<http://www.upenn.edu/gsfawplp>) on the World Wide Web. The West Philadelphia Landscape Plan and the West Philadelphia Digital Database provide the raw materials for the creation of a multimedia reference work on the environment of West Philadelphia. Such a multimedia reference work would be an exciting asset for the West Philadelphia neighborhood schools, as well as for the University of Pennsylvania. Additional materials such as text, tables, photos, newspaper articles, and sound recordings could be. One of the most time-consuming aspects of such multimedia projects is gathering and editing the materials to be included. The WPLP and WPDD could comprise the core of such a project. The software to create such materials now exists in the GSFA's Computer Graphics Laboratory.

The University of Pennsylvania. The WPDD and WPLP publications are also an educational resource for students at the University of Pennsylvania, both in the Graduate School of Fine Arts (GSFA) and in the university at large. Copies of files from the digital database can be requested by faculty and by students working on independent projects under the supervision of a faculty member. The Department of Landscape Architecture and Regional Planning offers a variety of courses related to geographic information systems (GIS), computer-aided design (CAD), and multi-media. A GIS project, for example, might involve a choosing a geographic region and topic of interest upon which to base a term project, gather

information, and create a set of maps that along with other data sets are analyzed using GIS software. Digitized information in the WPDD provides a foundation for such student projects. Some of these CAD, GIS and multimedia projects, in turn, might be incorporated into the database thereby providing continual updating and expansion.

## A Research Tool

The WPDD comprises a valuable set of resources for research. It establishes a base of information, compiled in comparable cartographic format, which can be analyzed, evaluated and augmented. It can be used to produce base maps for further studies. It includes information unavailable from other sources, generated from processing existing data and collecting new material in field surveys.

## A Model

The digital database is designed to be useful in both "top-down" and "bottom-up" planning. It is designed for both government agencies and small non-profit organizations and can be accessed by personal computer. As a model, this has enormous potential since a single database could be created for an entire city and then shared by public agencies, non-profit organizations, schools, and businesses. As personal computers become increasingly more powerful and more affordable to greater numbers of people, more and more individuals and small groups will have access to increasingly comprehensive information about the places they live and work. This may very well transform the way cities are planned and designed. While the current database only covers West Philadelphia,

the overall approach is applicable to other parts of Philadelphia and to other cities.

The WPLP and WPDD are now available on the World Wide Web. The Internet site has significantly expanded the potential audience for the database (see <http://www.upenn.edu/gsfawplp>).

## ATLAS

Most of the maps in the West Philadelphia Digital Database (WPDD) were originally drawn on paper, produced as part of the West Philadelphia Landscape Plan (WPLP). The maps in the database represent some, though not all, of the original maps and were digitized by research assistants using computer-aided design (CAD) software. For a list of maps in both the WPDD and WPLP, see Appendices II and IV. Outlined below is a summary of the information included on each map in the WPDD, its source and, in some cases, a legend needed to read the map.

### Base Map

The base map shows streets (including the names of major streets), bridges, surface rail lines, highways, Cobbs Creek on the west and the Schuylkill River on the east, the original WPLP project boundaries, and the boundary of the Mill Creek watershed. Each of these elements can be displayed or hidden by turning them "on" or "off" on the custom menu located on the screen to the right of the basemap; the default setting displays all elements. This map is literally the "base" for the rest; other maps in the database are laid on top of this map. Please note that the areas shown as "streets" are the rights-of-way and so include sidewalks; the lines bounding the street are drawn at property lines, not curb lines. While this is not a concern when looking at West Philadelphia as a whole, it is very important to keep in mind when looking at a more limited area, such as a few blocks.

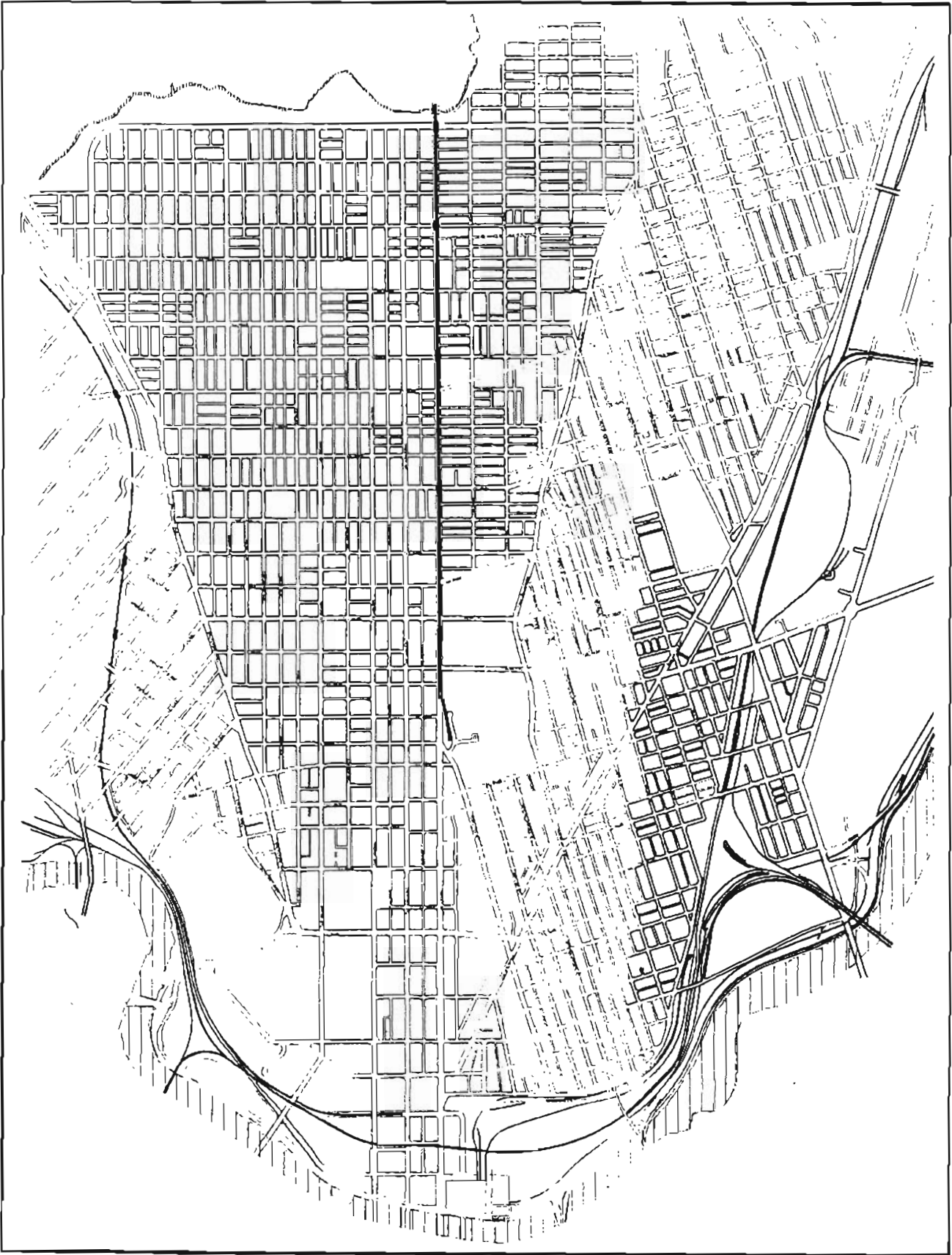
The pattern of major streets in West Philadelphia reveals a place with no hub or central location. In fact, the major streets are routes from somewhere outside the community--Lancaster, Haverford, Baltimore--to somewhere else--Center City. The commercial and institutional band formed by Market, Chestnut, and Walnut Streets is a corridor travelled by thousands of people every day, passing to and from work and school. The rail routes--both Amtrak's eastern corridor and the commuter rail lines to the suburbs of the Main Line and Delaware County--reinforce this sense of being enroute; the tracks skirt the edge of West Philadelphia and create strong boundaries to the north, east, and south. With the exception of the northwestern corner, one enters West Philadelphia by crossing a bridge over a river or railroad.

First ferries and then bridges determined the course of major streets. Lancaster Avenue, Market Street, and Baltimore Avenue all converge toward the Market Street Bridge (once a ferry and then the only bridge across the Schuylkill River for some miles). Haverford Avenue crosses Lancaster and continues toward Spring Garden Bridge (also once the site of a ferry). Within this framework of major streets is a grid of north-south and east-west streets that structure the residential neighborhoods of West Philadelphia.

West Philadelphia is a community of many smaller neighborhoods, each with its own history and distinctive character. The story of each is told by the original lay of the land, the scale and pattern of its streets, the forms of its houses, the nature of its businesses and institutions, the location of parks and vacant land, and the overall condition of these today.

Source: Philadelphia City Planning Commission Property Line and Building Footprint maps. CPC maps created by the Air Survey Corporation from Sanborn Map Company information. Last updated by CPC 1-1-87 from Sanborn surveys. Corrections to the Mill Creek neighborhood made 6-96 by the West Philadelphia Landscape Project.

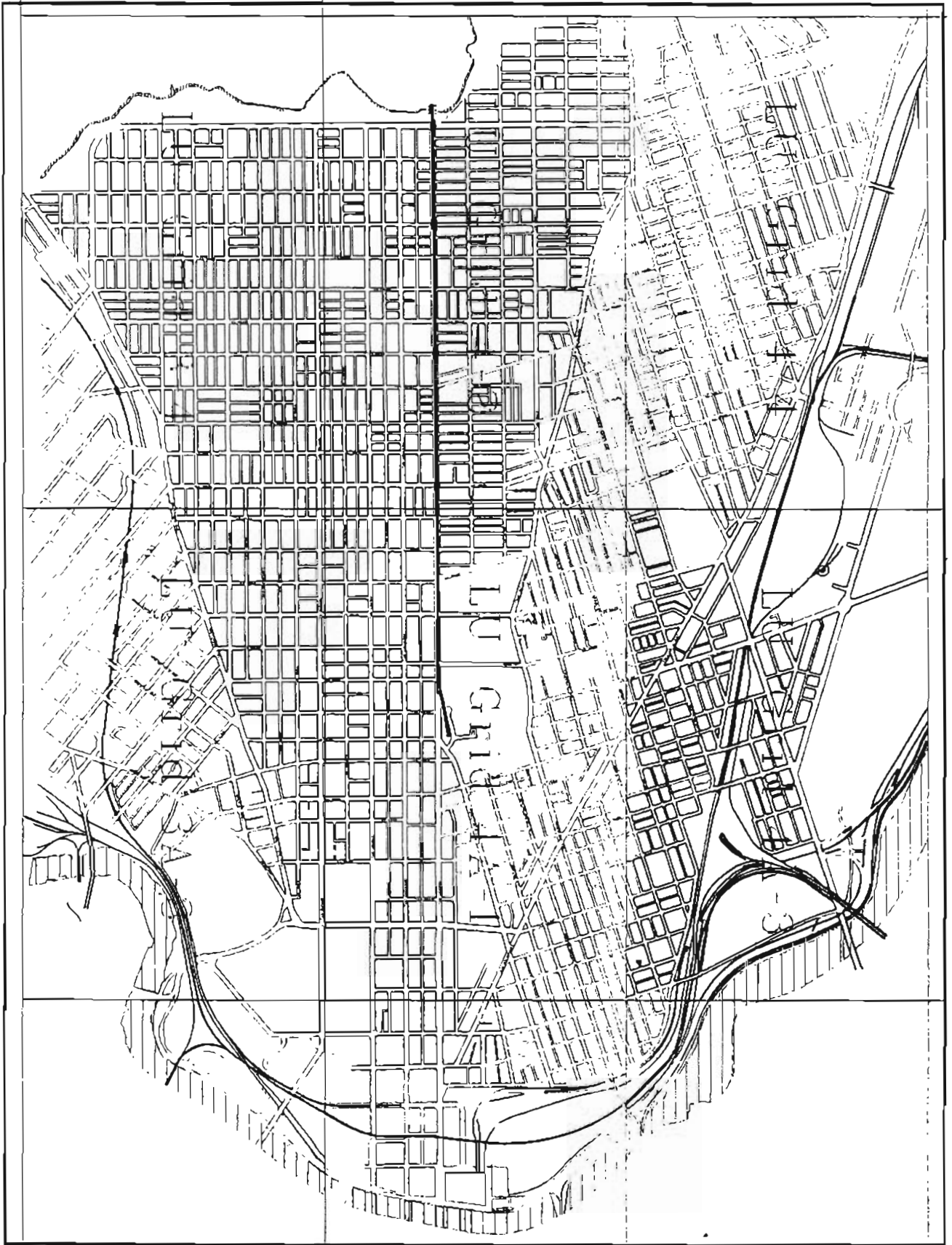




Base Map

## **Grids**

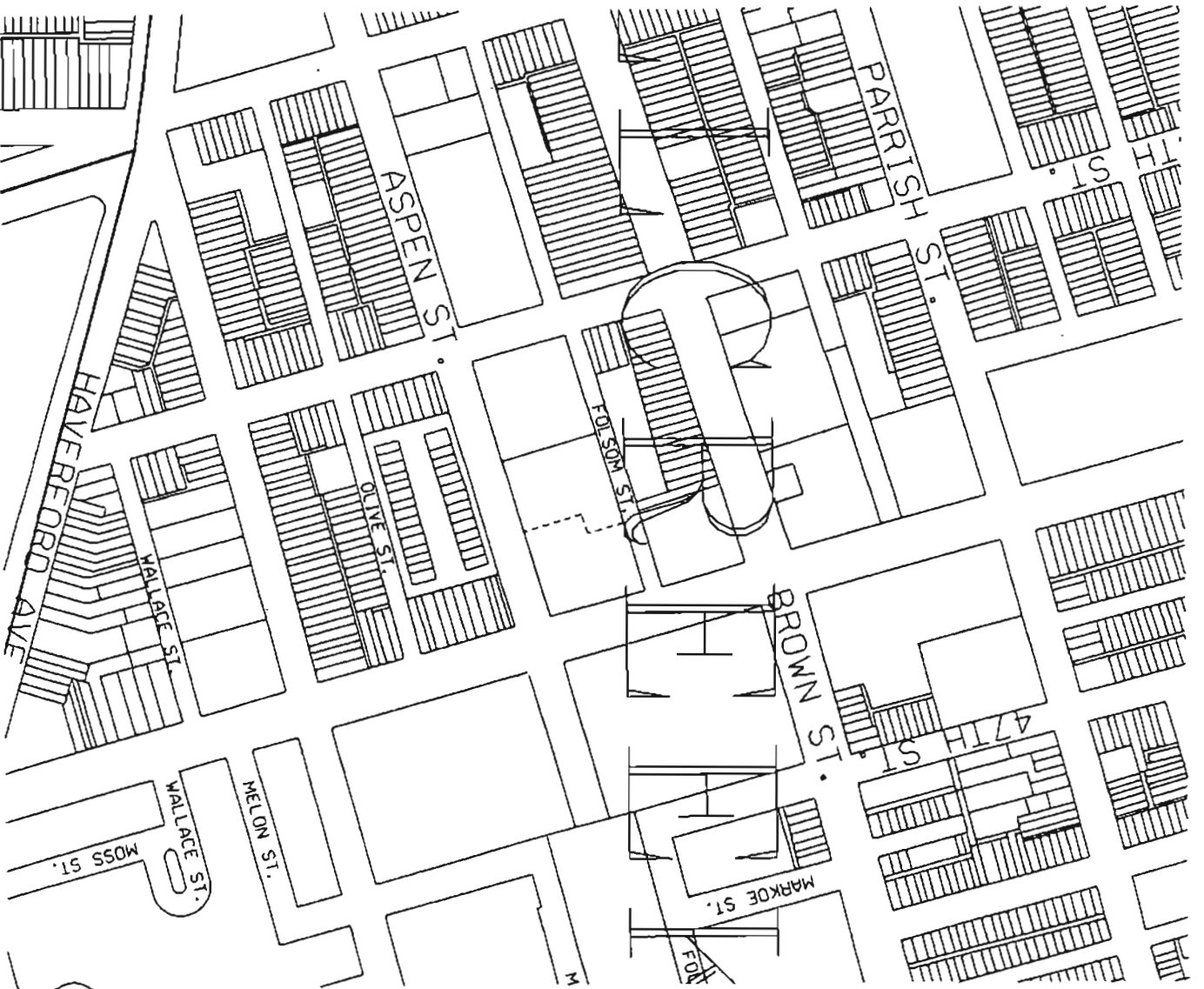
The grids are not maps but the grids of lines and numbers used to reference City Planning Commission and City of Philadelphia Water Department maps.

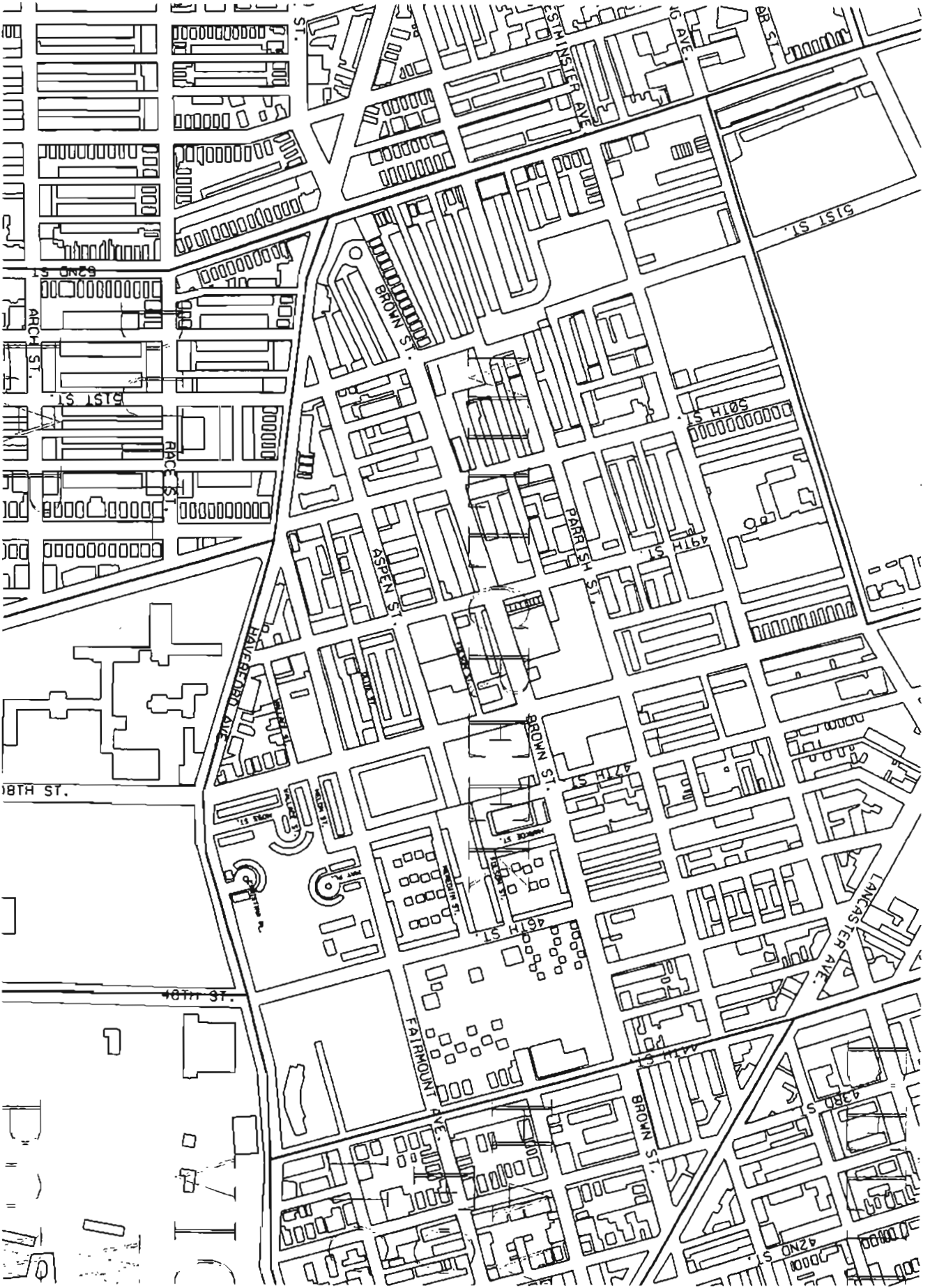


**Property Lines and Buildings**

This map shows property lines in green and the outlines of buildings in brown for most of the project area. Addresses of all corner lots are provided to help locate specific sites at the scale of a neighborhood or block. This map can be viewed with or without buildings.

Source: Philadelphia City Planning Commission Property Line and Building Footprint maps. CPC maps created by the Air Survey Corporation from Sanborn Map Company information. Last updated by CPC 1-1-87 from Sanborn surveys. Corrections to the Mill Creek neighborhood made 6-96 by the West Philadelphia Landscape Project.





Property Lines and Building Footprints

## Neighborhoods

This map contains the boundaries and names of approximately two dozen neighborhoods in West Philadelphia. Various state and local agencies may use neighborhood boundaries that differ from those used here. The boundaries and neighborhood names on this map were taken from a map provided by the Philadelphia City Planning Commission. The neighborhood names listed on the Menu (See Appendix I, below) provide a shortcut to zooming in on a particular area.

West Philadelphia was, and still is, primarily a residential community. There were, and are, few factories and warehouses compared to other parts of Philadelphia. With few exceptions, these are segregated within a narrow band along river and railroad. West Philadelphia's business districts primarily serve the needs of local residents or those passing through. (See Land Use map.)

West Philadelphia is multi-racial and multi-cultural. There are middle class families and families living in poverty. Although the population is mostly African-American, there is a large Caucasian population in neighborhoods near Drexel and Penn - University City, Spruce Hill, Powelton, and Garden Court, and a growing Oriental population, particularly in Walnut Hill, composed of immigrants from many countries. (See Population Characteristics.)

Most of West Philadelphia's neighborhoods are composed of blocks of small rowhouses, some with porches, and some with tiny gardens. There are also neighborhoods of large,

single-family homes with gardens. Market Street is an important boundary. North of Market, in Mantua, Belmont, Mill Creek, and Haddington, are hundreds of blocks of narrow streets lined by small, two-story rowhouses. South of Market and west of University City, in Spruce Hill, Garden Court, Cedar Park, and Cobbs Creek, there are also many blocks of rowhouses, but these tend to be more spacious, with yards. (See Block Types map.)

The differences in the character of West Philadelphia's neighborhoods and their fates in recent times is partly a function of when and for whom they were originally built. The following description of neighborhoods is based on Land Use, Vacant Land, Block Types, and U.S. Census maps.

The ample homes of stone and brick in Spruce Hill and Powelton Village were largely built by 1895, intended for middle-class families. Many of these houses are detached, single-family or two-family homes and tend to be set back from the street with a front garden and back yard. The yards provide residents with outdoor space, and passersby with the view of flowers, shrubs, and trees in front gardens. Most sidewalks are broad and lined with street trees. This gives the public realm of street and sidewalk a pleasant, spacious quality. Spruce Hill and Powelton have maintained their attractiveness to middle-class families and to faculty, staff, and students at nearby institutions like Drexel and Penn. The houses themselves have accommodated shifts in life styles over the years; many have been homes for a single family, boarding houses, apartments, fraternities, or communes. Although West Philadelphia, as a whole, lost population between

1970 and 1980, these two neighborhoods maintained or even gained residents. Both neighborhoods are racially integrated.

Mantua, Belmont, and Mill Creek were also built by 1895, but these neighborhoods have fared differently. They were built extremely densely with small, mainly two-story, rowhouses for families of very modest means. Except for blocks built in Mill Creek after World War I, few houses have even a tiny garden. When originally built, there were no parks or playgrounds, just block upon block of narrow streets and sidewalks lined with houses. Here and there, this grid of two and three story houses was broken by large tracts of land for cemeteries and hospitals. Today, many houses in Mantua, Belmont, and Mill Creek are badly deteriorated, and several public housing projects tower over the older homes. Portions of these neighborhoods lost more than 30 percent of their population between 1970 and 1980; many of those who remained are unemployed and include some of the City's poorest residents. These neighborhoods now have extensive "open space" in the form of vacant lots. In recent decades, many vacant lots have been replaced by playgrounds, ballcourts, playfields, and gardens. Pocket parking lots in Mantua have relieved parking problems in a neighborhood that was not designed for the automobile. Gardens, both private and communal, now offer streets in these neighborhoods some of the same amenities that front gardens give to other parts of West Philadelphia.



In 1895, there were several clusters of houses in the area north of Market known as Haddington, including a number around mills. Haddington was entirely built by World War I with blocks of rowhouses, many with porches. The mills have since vanished, and new housing now stands in their place. Cedar Park, south of Market, was open land in 1895, but was also largely developed by 1910, with rowhouses and attached homes surrounded by yards. Black Oak Woods, now Black Oak Park, was one of the first such neighborhood parks in West Philadelphia, constructed at the same time as the houses.

Other neighborhoods--Garden Court, Walnut Hill, and Cobbs Creek--were built in the years between World War I and 1927. In Cobbs Creek and Garden Court, the automobile was accommodated, sometimes with a driveway to a garage in the backyard; often with a back alley to garages in the rear or underneath the house in the basement. Cobbs Creek is the largest of these neighborhoods. There are few vacant lots, and local shopping districts on 52th and 60th Streets seem thriving and busy. Most streets are broad, but few have street trees. The blocks are composed of brick or stone rowhouses with small yards. These front gardens are quite diverse. Walnut Hill, with its many large, apartment buildings, presents a striking contrast to the surrounding blocks of low, rowhouses and detached, single-family homes with yards. West Philadelphia High School takes up several large blocks in the center of the neighborhood.

There is wide diversity among West Philadelphia's neighborhoods in the income, employment, race and ethnic background of the people who live there and in access to private

open space and public parks and playgrounds. These disparities give rise to equally wide differences in the needs of these neighborhoods. Such diversity and disparity present a challenge to any community-wide landscape plan. Each neighborhood has different resources to draw from, different limitations, and different opportunities.

Source: Philadelphia City Planning Commission.





Neighborhoods

**Land Use**

The Land Use map presents six categories of use: commercial, residential, industrial, institutional, transportation, and vacant. These five categories are composites of more specific categories used by the Philadelphia City Planning Commission (CPC). The WPDD uses standard land-use colors, and the submenu itself is also color-coded to provide a type of key or legend. The more specific designations utilized by the CPC appear in the center of each property. For example, all residential properties appear as a yellow color, but if you look at a particular property, an "M" might indicate that the site is designated as a Multiple Dwelling Unit/University Dormitory. The CPC land-use codes used on the map are as follows:

- Residential (Yellow)
  - (no label) Rowhouse
  - M Multiple Dwelling Unit/University Dormitory
  - D Semi-detached house
  - H Detached House
- Commercial (Red)
  - (no label) Sales
  - O Office
  - W Warehouse
  - X Open Storage and Construction
- Industrial (Purple)
  - F Manufacturing
  - U Utility
- Transportation (Gray)
  - T Rail
  - P Parking
- Institutional (Blue)
  - C Community Service
  - c Church/Cemetery

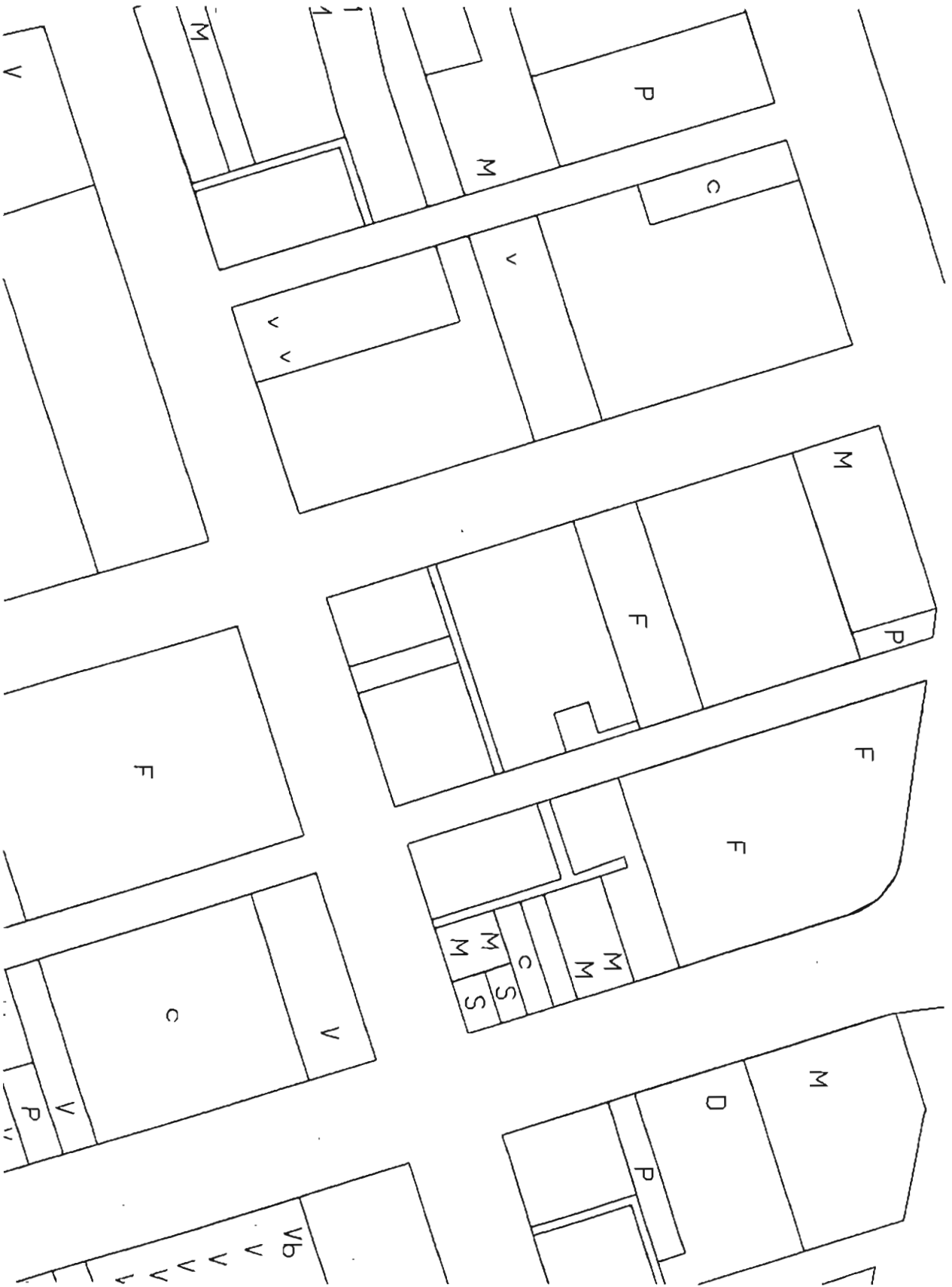
- s School
- u University
- p Library/Public Service
- y Social Facility/Club
- h Health/Medical Facility
- R Recreation
- r Park/Square
- P Playground
- f Playing Field
- c Recreation Center
- s Swimming Pool
- o Private Open Space
- g Community Garden
- Vacant (Brown)

Please note that the vacant land information on this map does not correspond to vacant land mapped in the WPLP field survey conducted in summer 1989.

Land use maps of three areas of the West Philadelphia Landscape Plan were produced in August 1987. Only the Mill Creek neighborhood, however, has been digitized. Work continues at the time of this writing to extend land use coverage to other parts of West Philadelphia.

Source: Philadelphia City Planning Commission Land Use Map (updated July 1981).

**Land Use**



## Vacant Land

Vacant land -- once built and now open once again -- occurs in virtually all of West Philadelphia's neighborhoods. South of Market Street, this vacant land consists largely of single lots, on corners and midblock. North of Market, however, particularly in Belmont, Mill Creek, and Mantua, there are many blocks of tumbled-down houses with almost as many vacant lots as buildings. In the Mill Creek neighborhood, entire blocks are vacant. Some of this open land is covered with grassy rubble, while on others trees have grown twenty feet high.

There is no single cause for all these vacant properties. Individual open lots may be due to accidental events like fire. Concentrations of vacancies, however, were caused by larger forces, such as changing patterns of shopping and business and new aspirations for housing. After World War II, federal funds subsidized the construction of highways and new services in suburban areas and provided mortgages for veterans. Banking and insurance practices discouraged investment in many urban neighborhoods and supported new housing construction and purchases in suburban regions. Owners who wished to move from inner-city neighborhoods often found themselves unable to sell their property. (See Kenneth Jackson, *Cradgrass Frontier*, Oxford: 1985, for a description of these policies and their effects.)

These trends affected all of West Philadelphia, but, most particularly, the neighborhoods built before 1895 with no provision for private or public open space and with no accommodation of the automobile: Belmont, Mill Creek, and Mantua. The resulting vacant lands form different patterns which pose different

limitations and opportunities for reuse. (See [The West Philadelphia Landscape Plan](#), "Vacant Land: A Resource for Reshaping Urban Neighborhoods," 1991; WWW site at: <http://www.upenn.edu/gsfawplp/plan/vacant.html>)

**Vacant Corners.** Throughout West Philadelphia, but particularly North of Market Street, there are many vacant corner properties. Most are filled with piles of rubble, overgrown with weeds, and littered with trash. Some have been converted into community gardens, playgrounds, and ballcourts; others are now parking lots. In Belmont, Mantua, and Mill Creek, at least one corner lot at many intersections is vacant, creating holes in what were once densely developed neighborhoods. There were once corner stores throughout West Philadelphia, particularly in residential neighborhoods of rowhouses and apartment buildings. Some of these neighborhood stores still exist, but most have vanished, leaving numerous abandoned corner buildings and vacant corner lots. Small businesses and factories were once embedded within some residential neighborhoods. In Mill Creek, at 48th and Aspen Streets, for example, there was a small factory where several current residents once worked. When the business closed, the building was abandoned, became deteriorated, and was then destroyed, leaving a vacant corner that neighbors eventually transformed into one of Philadelphia's largest and most successful community gardens--Aspen Farms. The story behind vacant corners is one of changing patterns of business and shopping. This is not West Philadelphia's story alone, but one shared by other, older inner-city neighborhoods across the country.

**"Missing Teeth".** A missing tooth is a vacant lot or small group of adjacent lots within a block that creates a gap between a row of houses. Missing teeth are particularly noticeable in blocks of rowhouses where even one missing building creates a break in the block. In some neighborhoods missing teeth have been turned into midblock gardens, parking lots, and playlots, serving the needs of particular people. Sometimes missing teeth connect two streets in the middle of a block. Sometimes the gaps are larger than the remaining houses, a condition which poses an intimidating obstacle to renewal.

**Vacant Blocks.** In North Philadelphia, whole blocks of old warehouses and factories are vacant. These create a formidable obstacle to community development. They are extremely expensive to demolish and, once torn down, create a large gap. Fortunately, West Philadelphia never had many large factories and has therefore largely escaped this predicament. Large blocks of vacant land in West Philadelphia have another cause related to topography, sewers, and flooding. In 1970, 43rd Street caved in between Walnut and Sansom Streets. Passersby who looked down into the hole that spanned the entire street from sidewalk to sidewalk were startled to see a rushing river beneath the street, its waters encased in a huge, masonry conduit. Such cave-ins have happened in many places along the length of the Mill Creek Sewer over the past century. Even where the land has not caved in, there has been extensive damage above ground. In the years since the Mill Creek floodplain was filled in, the land has settled, damaging many homes and businesses. Cracks in the sewer also allow water to saturate the soil, so many buildings in the former floodplain have wet basements.



Vacant Land

The high costs involved in the upkeep of buildings in these areas make them expensive to maintain. Along with foundation problems brought about by subsidence, this caused the abandonment and demolition of entire blocks of buildings, especially where they had been constructed over the sewer. This has happened in the Mill Creek neighborhood and in the Walnut-Market corridor between 42nd and 47th Streets where there are now many vacant lots and even entire blocks that are vacant:

Other low spots in the Mill Creek floodplain lie between Walnut and Market Streets from 43rd to 47th Streets. Here also are contiguous blocks that are largely or partially vacant, creating a huge hole in the urban fabric. Bounded by streets, this land is wide open and unprotected and often becomes a dump for trash and construction debris. The impact of this vacant land is great; it is felt not only on the adjacent blocks, but also extends into adjoining neighborhoods. Such large areas of vacant land exist in several parts of West Philadelphia, but they are related. They trace the course of an underground river.

In the 1960s, the Philadelphia Redevelopment Authority cleared land in the Mill Creek neighborhood and built public housing in these low-lying areas. Today, much of this housing is abandoned or in poor repair, subjected to some of the same problems that plagued the former houses. Other land remains vacant.

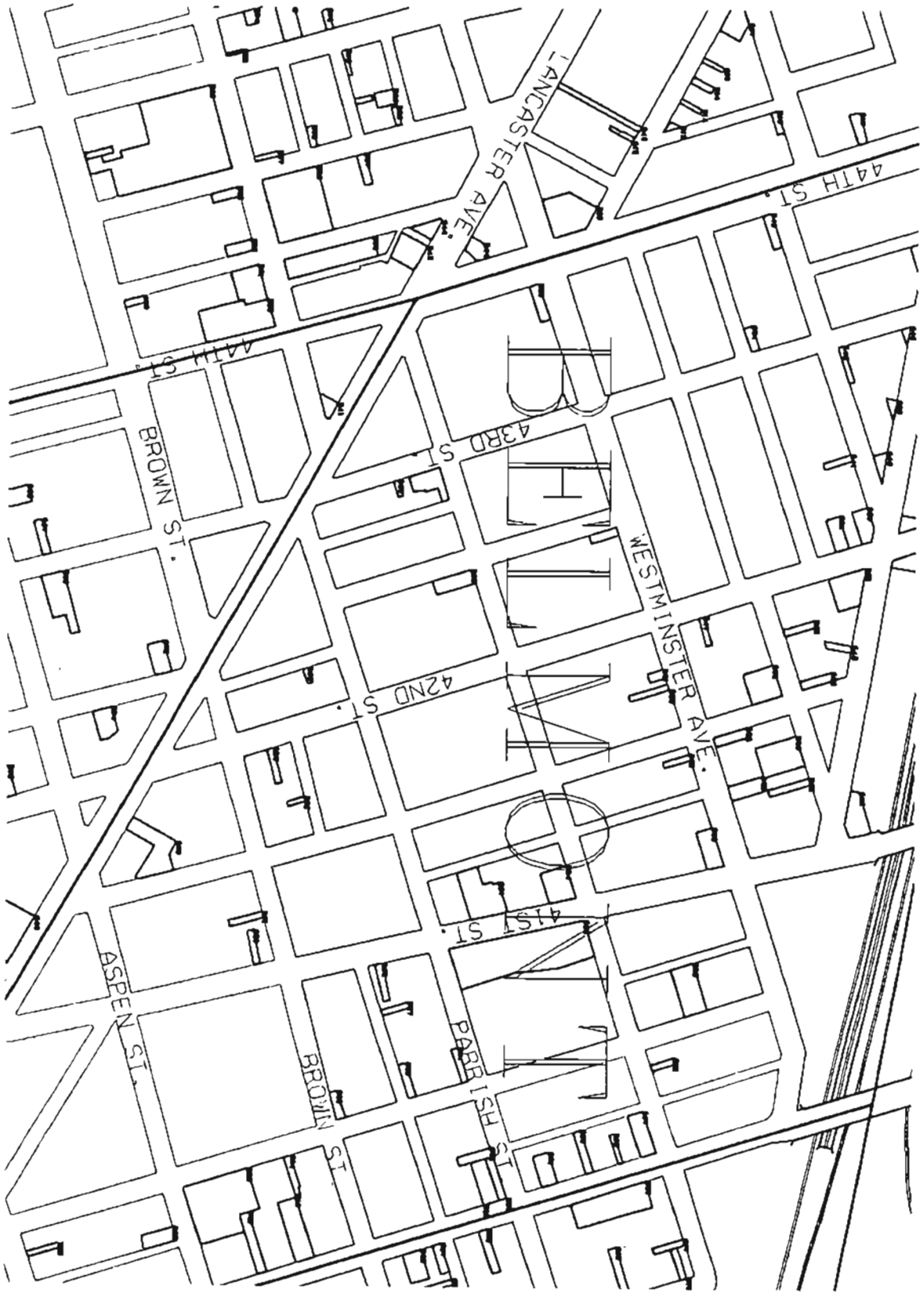
Vacant blocks of land in the Mill Creek floodplain still cover a large area and create a desolate landscape. Their careful redevelopment, whether for large-scale recreation, housing, or commercial uses, has the potential to transform the surrounding neighborhood.

The Vacant Land map in the digital database shows all vacant lots that existed in summer 1989; they have not been updated since. The categories describe the relationship between vacant properties and their immediate context.

The data for these maps was gathered by teams of research assistants who drove through every block of West Philadelphia and recorded every vacant property. These field maps were digitized for most of the WPLP project area. The categories are:

- Corner Lots (Orange)
- Missing Teeth (Purple)
- Lots Connecting Blocks (Light Blue)
- Swiss Cheese (Gray)
- Whole Blocks (Light Green)
- Multiple Contiguous Blocks (Red)

Source: Field survey conducted in summer 1989 by Mark Cameron, Geoff Anderson, Kacey Constable, and Daniel Marcucci under the supervision of Michele Pollio



Vacant Land

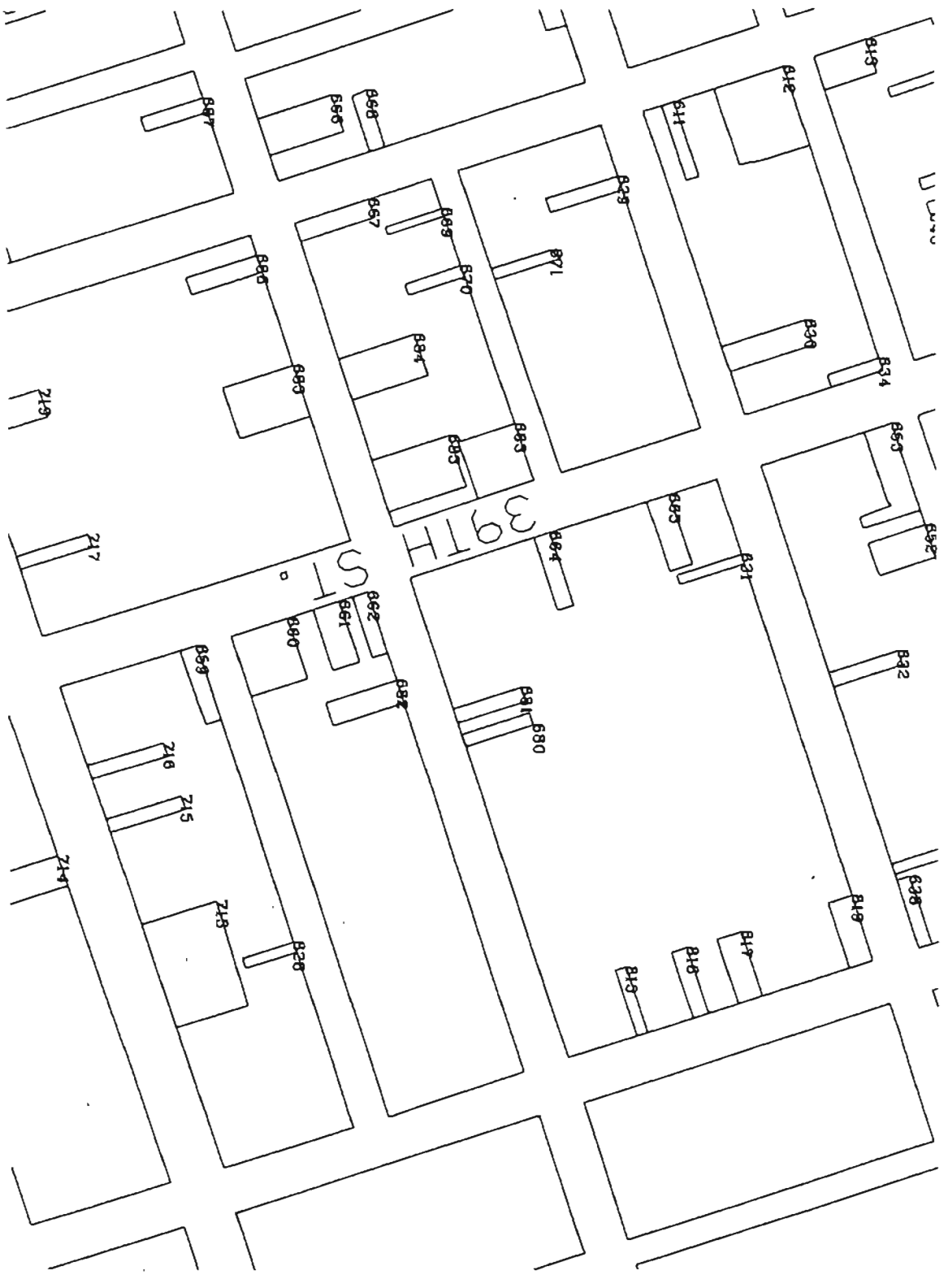
## Vacant Land Cover

This map shows the physical land cover -- pavement, bare soil, rubble, grass, trees, and buildings -- of the vacant land in West Philadelphia. It is based primarily on the field survey of vacant land conducted in summer 1989 and the Property Lines and Buildings map. The map was originally intended to be used to determine the amount of heat absorbed and reradiated by ground and building surfaces and the amount of stormwater run-off or infiltration. It should be noted that the data was gathered in 1988-89 and as the subject can be rather ephemeral (what is lawn one year might be weedy the next and woody five years later), portions of it may be outdated. (Some features are still being added to the menu, and if the item is selected, the message "UNDER CONSTRUCTION" will appear in the command window message box.) (Illust.)

Source: Field survey conducted in summer 1989 by Mark Cameron, Geoff Anderson, Kacey Constable, and Daniel Marcucci under the supervision of Michele Pollio



Vacant Land Cover



## Block Types

The block is the smallest unit of neighborhood. It is where the private domain of the home meets the public domain of the city, an extension of the home and a place shared with others. The private space of stoops, porches, yards, and houses and the public space of street and sidewalk define the character of the block. Variations in width of street and sidewalk, height and setback of buildings, and the presence or absence of porches and front yards combine to form distinctly different block types.

Many sources, including the U.S. Census, define a block as bordered by four streets. Here, blocks are defined as buildings facing each other across a street. Though more difficult to delineate, this definition is more closely related to the social functions of a block. In American cities, the block is often the focus of daily, public life. It is home territory for those who live in adjacent houses. For young children, it is a playground--the center of play outside the home; its boundaries may also define a child's world during pre-teen years. For adults, the block is a meeting place and a stage. Stoops, porches, and front windows provide prospects from which to watch and engage in the theater of street life. At the heart of the block is the street which links each house with the next and with the rest of the city, part of the network of streets that structures the city and knits it together.

There are ten basic block types that occur in West Philadelphia:

- Type 1 -- rowhouses w/ stoops
- Type 2 -- rowhouses w/ porches
- Type 3 -- rowhouses w/ tiny front yards
- Type 4 -- rowhouses w/ courtyards

- Type 5 -- detached houses w/ yards
- Type 6 -- apartment blocks
- Type 7 -- large free-standing buildings
- Type 8 -- sides of houses
- Type 9 -- rows of stores
- Type 10 -- mixture of types

There are variations within each block type; nevertheless, each type represents a specific environment with particular opportunities and limitations for change.

In addition to the above ten blocktypes, variations on the original ten blocktypes were recorded. These appear in the WPPD as Blocktypes 11 and 12. Variations include different corners, vacant lots, backyards fronting the street, smaller streets intersecting midblock, and irregularly-shaped blocks.

Rowhouses with stoops, porches, or tiny front yards, often in combination with one another, are the most common block types in West Philadelphia, particularly north of Market Street. Detached houses with front yards is another common block type in West Philadelphia, particularly south of Market Street in Spruce Hill and garden Court and north of Market in Powelton Village. Sometimes a street is flanked by the sides of houses, rather than front doors, yielding "sides of houses." Blocks lined by large apartment buildings occur throughout West Philadelphia. Rows of stores, usually attached buildings, form commercial blocks, sometimes with apartments in the upper floors. Large, free-standing buildings, whether for offices or apartments, are a relatively new block type, built since the 1950s, and are a distinct departure from surrounding, older

neighborhoods. Finally, there are some blocks that are a mixture of several of these other block types.

The database organizes the blocktype maps into blocks oriented in a north-south direction and those in an east-west direction. Selecting the Blocktype button on the Menu will give a choice of which map you wish to display.

Plan and Elevation drawings are also available from the main menu. If these are selected however, they are loaded into Microstation as separate drawings. In order to return to the Basemap of West Philadelphia, it will be necessary to re-load the basemap. This can be done by selecting the Basemap button on the Menu and selecting <Load>.

Further information on blocktypes and their implications can be found in the [The West Philadelphia Landscape Plan](#). "Shaping the Block", 1991; WWW site at: <http://www.upenn.edu/gsfaw/plp/plant/shpbtk.html>

Source: Block types were delineated by Mark Cameron on the Property Lines and Buildings map and checked by field surveys in summer 1990.



## Topography

The topography maps shows contour lines at one, two, five, and ten-foot intervals. When you push the <Topography> button on the left side of the menu, a submenu appears on the right with simple on/off functions for each of the intervals. Please note that these contour lines are the result of interpolations from street corner spot elevations. They do not reflect local topographical variation within a block.

Source: These contour lines were created using InRoads road alignment by creating digital terrain models. There are no detailed maps of topography for the city of Philadelphia. These maps are based on approximately four thousand street corner spot elevations digitized from Philadelphia City Streets Department and Sewer Department maps. Approximately half of the spot elevations were initially digitized by Jeffrey Poor, Sarah Cunningham and Rafael Real deAsua. This body of data was expanded and re-interpolated by Robert Cheetham in December 1995.



## Pre-Urban Hydrology

Many streams once flowed across West Philadelphia. The largest of these is Mill Creek, a stream that drains nearly two-thirds of West Philadelphia. Its headwaters are in Lower Merion, and it flows into the Schuylkill River south of Woodland Avenue near 43rd Street. The Mill Creek cut a deep valley across parts of West Philadelphia and meandered and pooled in other areas. The large, grassy bowl in Clark Park was once a mill pond. In the late 1800s, Mill Creek was buried in city sewers. Its streambed was filled in and roads and houses were built on top, but it still flows beneath city streets. The steep valley is clearly visible in places like 47th to 48th Streets between Fairmount and Aspen and along 43rd Street from Walnut to Spruce Streets. Mill Creek now carries the rain that falls on much of West Philadelphia as well as sewage from thousands of private homes and businesses. Yet to most people the Mill Creek is invisible.

Source: Watershed boundary (ridge/ine) interpolation from USGS topographic map; 7.5 minutes series; Philadelphia Quadrangle; 1967.



## Sewers

Philadelphia, like most older cities of the eastern United States, has a combined sanitary and storm sewer system. After rainstorms, Philadelphia's sewers pour untreated sewage directly into the Schuylkill and Delaware Rivers. Combined sewer overflows (CSOs) are a major problem in Philadelphia and many other older cities. Most of West Philadelphia is served by the Mill Creek sewer which runs from Montgomery County to the north, through the middle of West Philadelphia, south toward the Schuylkill River. Many parts of this sewer line have caved in and been replaced since its construction.

The sewer map shows the location of the main trunk sewer lines, as well as the smaller sewer lines down to the block level. Three sizes of sewage pipes are represented by different colors, line weights, and line styles. There also exists a map of manholes, but that layer of the map is incomplete.

Source: Philadelphia Water Department sewer maps.





## **Sewer Boundaries**

The Sewer Boundary map is controlled from a sub-menu that appears with the Sewer sub-menu (see above), Sewer "boundaries" refer to the delimitations of the sewersheds, the area drained by a particular network of combined sewers.

Source: Philadelphia Water Department sewer boundary maps.



Sewer Boundaries

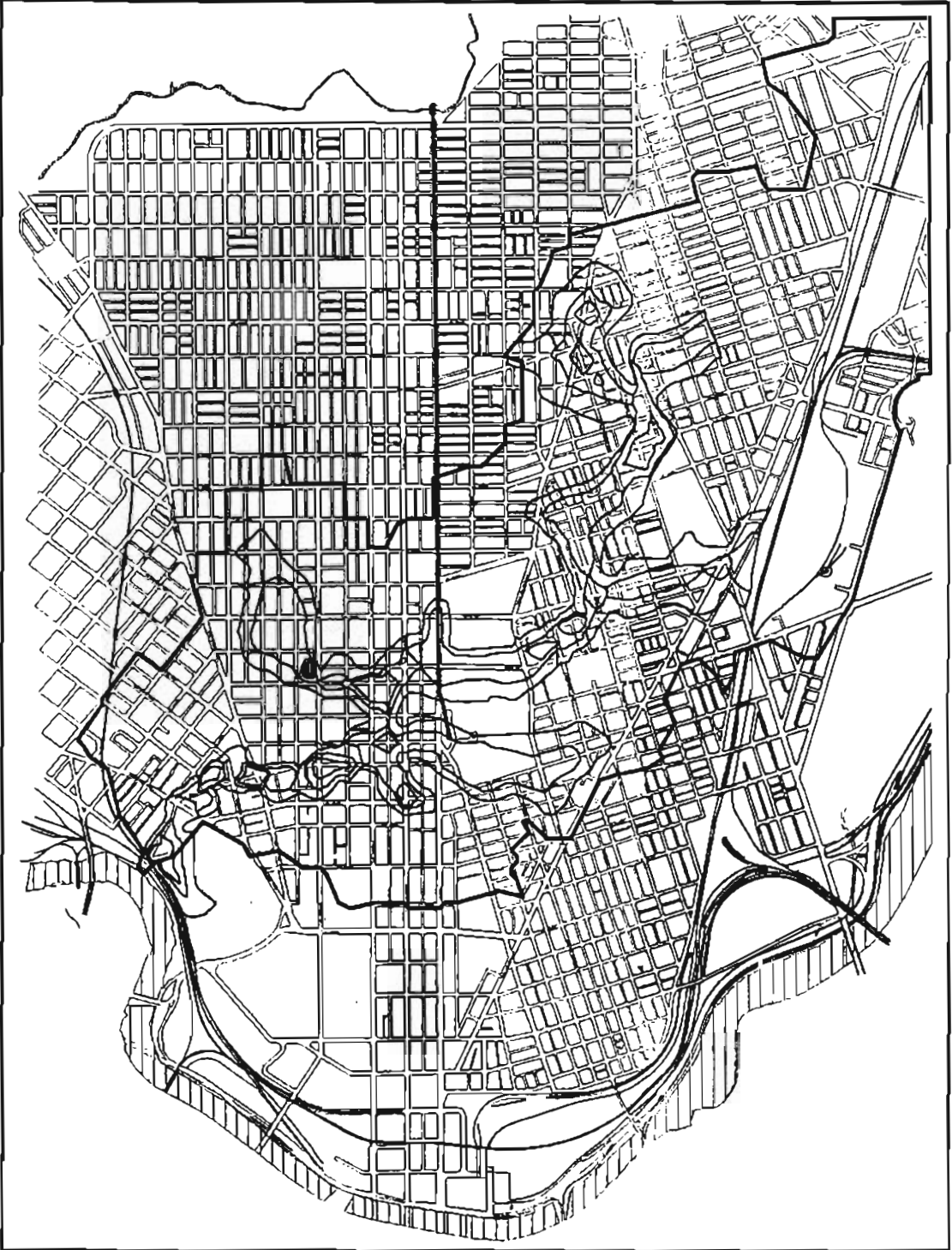
## Urban Hydrology

The WPLP focused on the Mill Creek watershed as a planning area because of the correlation between urban hydrology, vacant land, and damaged buildings and sidewalks. This watershed area comprises more than half of West Philadelphia. Paper maps produced for the WPLP show the original course of the stream and document the sewer, its size, material, and dates of repair (from maps obtained from the Philadelphia Streets Department).

The hydrology map in the database includes the boundary of the Mill Creek watershed (ridgelines), pre-urban stream courses (see Pre-Urban Hydrology, p. ), and some estimates of low points and internally drained depressions (potential problem areas) in the watershed. It should be emphasized that the latter are only estimates. The topography map (see Topography, p. ) was used to identify low spots within the watershed that are internally drained and which might therefore be prone to flooding and ground subsidence. These internally drained areas correlate closely with vacant lands. In some neighborhoods, 90 percent of vacant land and vacant buildings are within the old floodplain or along the current sewer alignment. The WPLP proposed that the city acquire these vacant "floodplain" areas and use some of them to detain stormwater runoff in order to eliminate sewer overflows from the watershed. The WPLP further proposed that the City of Philadelphia apply for federal funding to map the floodplain of the Mill Creek and to develop a plan for sewer, stormwater, and parkland management similar in principle to that implemented in Denver, Colorado. (See [The West Philadelphia Landscape](#)

Plan, "Models of Success", 1991; WWW site at: <http://www.upenn.edu/gsfawplp/plan/model.html>)

Map Source: The Watershed Boundary was interpreted from Philadelphia Water Department sewer maps by members of the Spring 1995 design studio in the Department of Landscape Architecture and Regional Planning. This was later digitized. The Low Points and Depressions were interpreted by Robert Cheetham in summer 1996 based upon topographic maps interpolated from street corner spot elevations.



**Population Characteristics**

Summarizing population characteristics for West Philadelphia as a whole gives a misleading picture. Within West Philadelphia are distinctive neighborhoods with characteristic racial composition, income and employment, and rates of building occupancy. Although West Philadelphia is approximately 77 percent African-American and 15 percent Caucasian in its racial composition, most of West Philadelphia is 90 percent African-American, and the southeastern portion, immediately around the University of Pennsylvania and Drexel University, is more than 80 percent Caucasian. There are also some areas where the proportion of Caucasian to African-American is more evenly balanced.

West Philadelphia lost population between 1970 and 1980 and this trend has continued in the 1980s. The northeastern neighborhoods of West Philadelphia lost more than half their population, and many areas in the western section lost between 10 percent and 25 percent of their population. For those who live or work in the southeastern neighborhoods of West Philadelphia, in and around the University of Pennsylvania and Drexel University, this overall population loss is invisible. This area is an employment center for the city (the University of Pennsylvania alone is the largest private employer within the entire city of Philadelphia), and population here has increased. Employment and income are relatively high in the southeastern neighborhoods, and vacant houses are quite rare. The opposite is true of the northeastern neighborhoods, where the 1980 Census reported unemployment greater than 30 percent, more than 40 percent of the population had incomes placing

them below the poverty level, and greater than 25 percent of houses were vacant and boarded up.

The <Census> button on the left side of the menu is not one map but six maps which summarize information about selected population characteristics. The first map shows the boundaries of tracts and blockgroups as defined by the U.S. Census Bureau in 1980. These boundaries and the tract, blockgroup, and block numbers which identify them can be turned on and off. The other five maps are derived from data from the U.S. Census of 1980 (the 1990 Census was not available during the original WPLP project). These maps include information on unemployment, income, racial/ethnic distribution, building vacancy rates, and population change from 1970 to 1980. Turning <ON> these Population Characteristics maps produces a relatively dense hatch. This may appear solid at the regional scale, but at the neighborhood scale will display with a more fine-grained hatch.

A legend for each of the maps can be called up on the screen by selecting the appropriate button on the Menu.

Unemployment	
<10%	Purple
10-20%	Light Purple
20-30%	Light Blue
>30%	Blue
Income	
<\$3000	Brown
\$3000-6000	Rust
>\$6000	Red

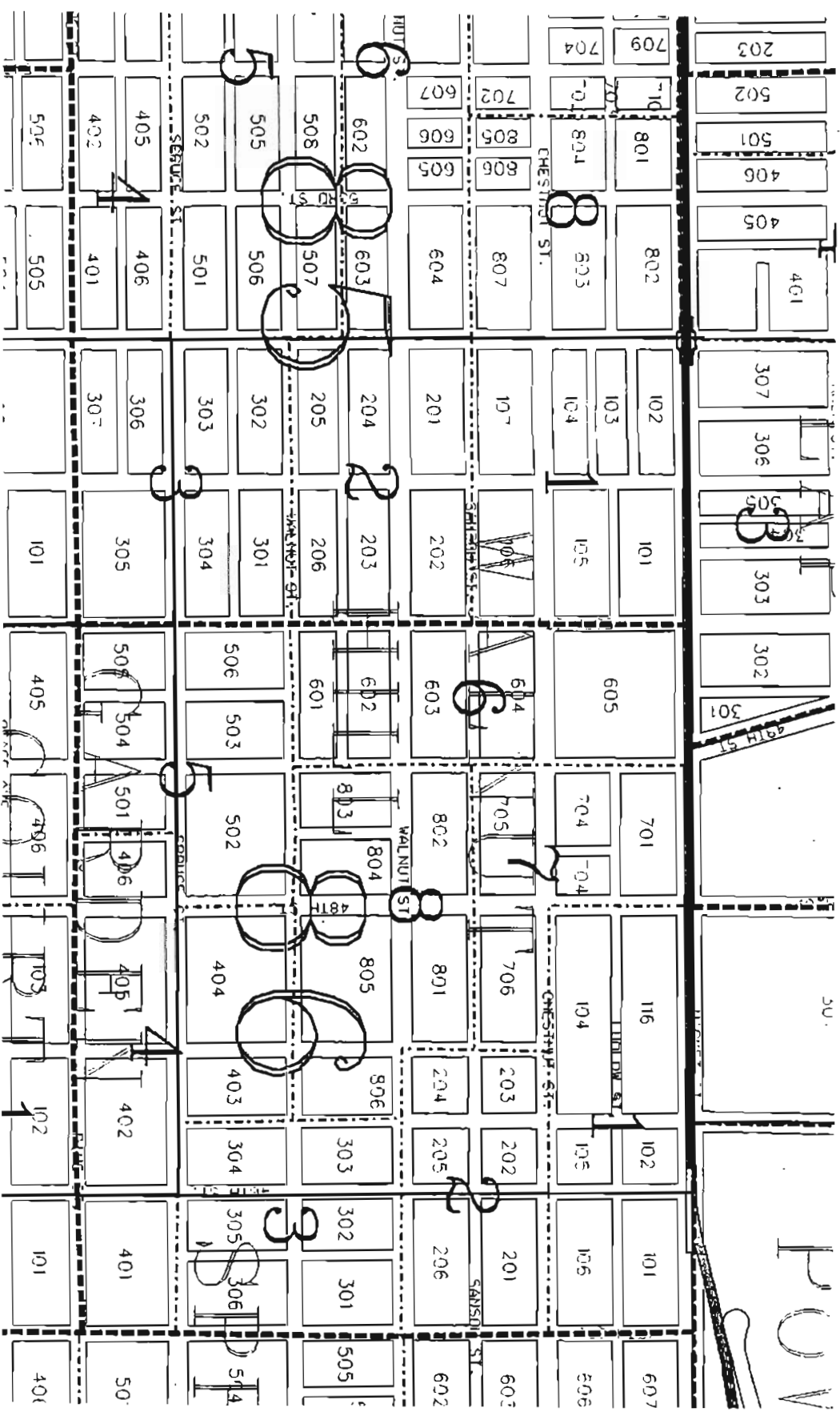
Racial Distribution	
>75% Caucasian	Purple
50-75% Caucasian	Blue
50-75% Black	Light Blue
75-90% Black	Olive
>90% Black	Beige
Other	Rust

Building Vacancy	
0-10%	Brown
10-20%	Dark Red
20-30%	Red
30-40%	Orange
>40%	Yellow

Population Change	
<-50%	Blue
-50 to -25%	Blue
-25 to -10%	Lavender
-10 to 0%	Beige
0 to +15%	Yellow
>+15%	Orange

Source: U. S. Census, 1980. Unemployment, Income, Racial/Ethnic Distribution, and Population Change were interpreted from Summary Tape Files (STF) 3A. Building Vacancy is from STF 1A. Further information regarding U.S. Census data is available at the Reference Desk of the Van Pelt Library.

# Census Tracts and Blockgroups



## **Public Education Catchment Areas**

The Philadelphia Public School System are organized around a particular high school and its "catchment area." This area is defined through a set of boundaries established by the Board of Education. This map contains the high school (clusters), middle school, elementary school, and K-8 catchment boundaries.

**Map Source:** Interpreted from 1993 boundary information in text form (gives street intersections around the edge of the catchment).



Public Education Catchments



# THE EVOLVING DATABASE

## THE EVOLVING DATABASE

The West Philadelphia Digital Database represents an important resource. Existing maps include information unavailable from other sources, and the digital format makes it relatively easy to update. The base map is available for many other uses, in both digital media and in the form of customized paper maps drawn by plotter. Material can be readily accessed and duplicated for use by many different people. If its potential usefulness is to be fulfilled, however, it must continue to be revised, augmented, and refined. This atlas and guide and the recent work reflected here are first steps in this direction.

Many maps were still in progress when work on the database was halted in 1990 at the close of the West Philadelphia Landscape Plan and Greening Project funded by the J. N. Pew Charitable Trust. Sufficient material was digitized to give an idea of how the final digital database might look and work, but some maps were not completed, and many maps produced for the WPLP were never digitized. In addition there are many other maps which could be produced in the future which were outside the scope of the original project. The text below describes the status of unfinished maps, those in need of refinement, as well as ideas for additional maps.

### Revisions

#### Urban Hydrology

A more accurate floodplain map that can be used as the basis for engineering studies should be delineated, and conceptual designs for

innovative strategies to detain stormwater runoff explored further. A more detailed look at the characteristics of the Mill Creek watershed should be undertaken. This would include the creation of a more accurate map of flood-prone areas, an estimate of the amount of stormwater runoff within discrete subareas of the Mill Creek watershed, and an identification of specific open areas to accommodate stormwater detention. A revision of the existing topography and hydrology was undertaken in summer 1996. (See proposal for Mill Creek Park in See *The West Philadelphia Landscape Plan*, "Framework for Action", 1991; WWW site at:

### Additions

**1990 Census Data.** Several paper maps produced for the West Philadelphia Landscape Plan were interpretations of 1980 census data. Some of these were digitized, including income, racial distribution, building vacancy, unemployment and population change since 1970. Far more maps were not digitized, though, and it has been more than fifteen years since the 1980 census. Maps based on the 1990 census or 1995 update are needed. Much of this information is available on CD ROM in the Van Pelt library. Much of this data is available in standard database formats and when combined with a GIS system, hold the potential of being a rich repository of data.

#### Land Use outside the Mill Creek neighborhood.

Land use maps based on the Philadelphia City Planning Commission designations were drawn on paper maps for the entire project area. Only those for the Mill Creek

neighborhood were digitized, however. One much needed amendment to the WPDD is a land use map for all of West Philadelphia. In the summer of 1995, the existing land use map was revised to conform to international standards for color coding of land use. In 1996, the coverage was extended to include the Belmont and Mantua neighborhoods with the goal of including much of the

**Historic Land Use.** Maps of historic land use exist on paper for 1895, 1910, and 1927; drawn from fire-insurance atlases. These would also be significant additions to the WPDD.

**Historic Sites.** West Philadelphia has a number of significant historical sites, some of which appear on local, state and national historic registers. A new map focusing on historic sites or points of potential archeological significance would be an intriguing addition to the database.

**Recreation and Open Space.** A map of parks, playgrounds, sportsfields, and community gardens exists on paper, produced as part of the WPLP. This would be an important addition to the WPDD.

**Transportation.** A set of maps based on traffic information was produced on paper for the West Philadelphia Landscape Plan but was never digitized. Such a map(s) might include bicycle routes, public transportation routes and stops, controlled intersections, one-way streets, and traffic volume.

**Plans and Elevations for Block Types 4-10.** Plans and elevations for blocktypes 1-3 were completed, but the remaining set of schematic diagrams for blocktypes 4-10 were never completed.

# APPENDICES

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## APPENDIX I. A USERS' MANUAL

- The Software
- Getting Started
- Attaching the Menu
- Using the Menu
- Copying Files for Modification
- Plotting and Printing
- When You Are Finished -- Shutting Down
- Adding Your Work to the West Philadelphia Digital Database
- Exporting Files
- Getting Help

## APPENDIX II. LIST OF FILES IN THE WEST PHILADELPHIA DIGITAL DATABASE

- Design Files
- Database Files
- 3-D Files

## APPENDIX III. UCM FILES - HOW THE DATABASE REALLY WORKS

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# APPENDIX I. A USERS' MANUAL

## APPENDIX I. A USERS' MANUAL

In order to be useful to as many people as possible, the West Philadelphia Digital Database (WPDD) is designed to be accessible to someone with minimal computer skills and no experience with Microstation or other CAD/GIS software. To accomplish this goal, a menu system was developed in 1990 that permitted a user to overlay different maps at the push of a button. The menu was designed to appear alongside the map on the right side of the screen and contained all of the functions necessary for display of any combination of maps. In 1995, a more comprehensive and user-friendly menu was developed to increase the flexibility and potential for expansion of the database. Its use is described below in the section on "Getting Started."

### Background: The Software

The WPDD uses a CAD software called Microstation made by Bentley Systems. Microstation was the primary CAD software used at the Graduate School of Fine Arts (GSFA) in the mid-1980's and was adapted for use in producing the maps contained in the WPDD. Since the completion of the West Philadelphia Landscape Plan, the GSFA has shifted to teaching CAD skills on AutoCAD, currently the most popular system used in the design professions.

When the WPDD was reconstructed in 1994-1995, it was necessary to choose the system upon which the old maps would be archived; incomplete maps finished; old information updated; and new maps drawn. The system chosen was Microstation, version 5.0 for a number of reasons:

First, most of the drawings were originally produced on Microstation version 3.0. The conversion of the old files to the new version of the software was a relatively simple process.

Second, since the early 1990s, Bentley Systems had released two generations of improvements to Microstation making it far more graphic, user-friendly and intuitive.

Third, Microstation has powerful import and export capabilities that can translate a design file directly into the DWG format used by AutoCAD or the DXF format commonly supported by other CAD and GIS software for file transfer. It also supports the international standard IGES used in other countries and the ISO standard CGM format. While the export of files does not always result in a perfect translation, if a user wished to produce or modify a particular map on AutoCAD or other software, it would be a relatively straightforward process (see "Exporting Files" in this Appendix for details on how to export files).

Fourth, Bentley Systems associated with Intergraph Corporation, the makers of an extremely powerful suite of GIS software called MGE (Modular GIS Environment.) This partnership has resulted in a CAD system and a GIS system that communicate with each other in a seamless fashion. When properly installed and configured, Microstation becomes embedded in MGE and is directly accessed for creating, viewing and modifying vector information. Anything drawn in Microstation can be used for analysis in one of the most powerful GIS packages available. The GSFA has the academic edition and licenses for twelve complete MGE and Microstation packages and the teaching staff has indicated they will be focusing

their energies on teaching MGE in all GIS classes for the foreseeable future. This combination of events presented the opportunity for the database to be used, modified and updated by students enrolled in GIS classes as well as the provision of resources that will allow the database to remain relevant for years to come.

Finally, one of the key features of the WPDD is the custom menu developed to allow someone to access the database without prior knowledge of a CAD system. This menu interface was written for use with Microstation and could not be exported to an AutoCAD-based system, and it was not clear that the same overlay functions could even be performed on AutoCAD.

### Getting Started

The start-up procedure for Microstation will depend on the operating system of the computer you will be using. The GSFA does not support Microstation for the Power Macintosh. The only computers that have this software loaded are the Gateway 2000 Pentiums or Intergraph TD-3 workstations in the Graphics (Rm 321) and Cartographic Modeling Lab (Rm 323) Please check with the GSFA Computing Center staff to find out which computers have the database loaded. If the computer is running on Windows NT, open the Program Group marked 'Microstation' in the Program Manager. Select the Microstation icon and double click it with the mouse. In Windows 95, select Microstation from the Start menu.

Shortly a dialog box will appear asking for a file to be opened. Go to the directory marked C:\SESSION\WestPhilly\VDGN. or Q:\QUENDATA\COURSES\SLARP60\VDGN. In this

directory will be a file called MASTER.DGN. Select this file with the mouse and click on the Open button. There will now be a short pause while the Microstation program finishes loading and MASTER.DGN is opened. Then the screen will clear and a street map of the West Philadelphia region will appear. On the top of the screen will be the Microstation Command Window. This is where Microstation commands are entered and messages to the user are displayed. (see illust.) Since most functions necessary to display the maps are included in the custom menu, you should not need to use the command window very often. However, messages concerning the status of the system appear in the command window, and you should develop the habit of checking here for confirmation that a task has been performed properly and for information on any problems.

It is not within the scope of this manual to provide information on using Windows or Windows NT. If you require help locating a computer loaded with Microstation 5.0, in using DOS/Windows, or in navigating through the directories to locate a file, please contact one of the lab monitors or consultants in the GSFA Computing Center.

### Attaching the Menu

Once you have the basemap on the screen, the next task is to display the custom menu used to overlay the various maps. Sometimes this will appear on the right side of the screen automatically. If it does not appear when you open MASTER.DGN, open the Palettes menu in the command window by clicking it once with the mouse. At the bottom of the Palettes menu there should be an item called "West Philadelphia." Selecting this palette will produce the WPPD

menu on the right side of the screen. If the Palettes menu does not contain an item marked "West Philadelphia," type "AM=PAGE1.SBM,SB1" at the command prompt.

The menu is a movable gray palette organized into two columns of thirty 'buttons'. The labels on each button indicates their functions. The buttons on the left side of the menu access a particular map topic or perform a specific function. Pressing a button on the left side will produce a sub-menu on the right side. (see illust.) Sometimes it is necessary to navigate through a couple of menus to reach one that turns a map on or off.

The menu system gives you the ability to turn each map or layer of a map on and off. In addition, it allows you to zoom in and out of different neighborhoods or areas of interest, calculate a distance or area as defined by you, or redraw the map to update the screen.

The menu is independent of the basemap and other design files. If you copy a file in order to edit it or use it to draw other types of maps, the menu will not be copied with it. The structure of the menu is quite complex and includes components spread across a number of directories. If you require more information concerning the menu, please refer to Appendix E. If you need to copy the menu system for some reason, please contact a member of the WPPD research team.

### Using the Menu

As mentioned above, the menu is divided into a right side and a left side. The names of maps appear on the left side along with a few functions you will commonly need to manipulate

the maps. The functions are written in purple in the lower left corner of the Menu. These functions allow you to zoom in and out, save views for future use, refresh the screen, and measure distance and area on a map.

Below the four functions is a button called <Next Page>. While almost all of the maps currently available will fit onto the menu now, more maps will be appended in the future. A second 'page' of the menu has been created to accommodate future additions to the database. The second page looks similar to the first with "Basemap" and "Neighborhood" at the upper left and four function buttons in the lower left. The <PrevPage> will take you back to Page 1 of the menu.

In the lower left corner is a red button labeled <Exit>. This will close the WPPD menu, removing it from the screen, but will not exit Microstation.

### Sub-menus

When you select a map on the left, a sub-menu will appear on the right; this sub-menu allows you to select layers to be overlaid on the basemap. The sub-menu is usually split into "ON" and "OFF" buttons. The OFF buttons always appear in red. The ON buttons usually appear in green, though in some cases their color is keyed to colors on the maps. Pressing an ON button overlays the selected map on top of the basemap. The OFF buttons appear in red and serve to erase the layers from the screen. Each sub-menu includes the buttons <All ON> and <All OFF> to turn all of the layers in that topic on and off at once.

It is fine to overlay as many maps as you wish on top of the basemap. You should bear in mind, however, that it will become increasingly difficult to read the maps if there are too many layers.

## Menu Functions

**Panning** around the map. Panning across a map is a simple process similar to moving a piece of paper on a desktop. Simply hold down the shift key and hold down the data button (left button) of the mouse. Moving the mouse will move the entire map left, right, up, or down. You can release the shift button, but the map will remain movable as long as you hold down the mouse button.

**Zooming In and Out.** There are two ways to zoom in and out. From the <Neighborhood> button on the menu, you can select a particular neighborhood (or back out to West Philadelphia again) and Microstation will automatically zoom you into that area. The second way is through the view control sub-menu. Selecting <Zoom In> and <Zoom Out> in the view control sub-menu will allow you to increase or decrease, respectively, the magnification of the view. To make the elements in a view appear larger, select <Zoom In>, move the cursor to the area of the screen you wish to magnify, and press the data button (left button) of the mouse. To decrease magnification, select <Zoom Out> from the View Control sub-menu and click the area of the screen from which you wish to zoom out. Clicking the mouse more than once will zoom the view by another factor.

**Window.** This function allows you to zoom in on an area which you define by drawing a fence around it (a rectangle drawn on the screen

with the mouse.) Selecting <Window> will change the cursor from an arrow to a cross. Using the mouse, you can now draw a fence around the area to which you wish to zoom in. Clicking once will fix one corner of the fence. Clicking a second time will fix the opposite corner. Clicking in the center of the fence a third time will zoom in to the area defined by the fence.

**Fit.** <Fit> causes the entire map of West Philadelphia to appear centered on the screen. When you select Fit, you must click once more in the middle of the screen to activate the command.

**Refreshing the Screen.** After overlaying and erasing a few maps, you will notice that the basemap quickly becomes illegible. It has not been permanently altered. The screen just needs to be redrawn to show what is actually "active." Refresh the screen by selecting <RefreshScreen> in the lower left corner of the WPPD menu. This will cause the screen to be redrawn, thus restoring the basemap and any remaining overlays.

**Taking Measurements** across the screen. Since the maps were digitized in working units (Imperial system of feet/inches), Microstation is capable of measuring the distance, area, perimeter or angle of anything on the map. Selecting <Distances> from the Measure sub-menu will cause Microstation to prompt you to identify two points. You can use the data button of the mouse (left button) to select each point. Microstation will measure the distance between the two points and display the result in the Command Window. Press the reset button (right) on the mouse before taking a new measurement. <DistAlong> is similar but functions to measure the length along the edge of

an element. Again select two points and the result will be displayed in the Command Window.

Area can be measure in two ways. Selecting <AreaElement> will prompt you to select a closed element. This is an important point. If you select a block that was originally drawn with lines, rather than as a closed polygon, Microstation will not be able to measure the area. A number of maps were drawn this way, so that while a feature on the map may appear closed, you may not be able to measure its area. Please refer to the Microstation manual <PolygonArea> allows you to draw a polygon on the screen within which the area will be calculated. A colored line will appear on the screen as you select each vertex of the polygon with the data button (left button) of the mouse. As each vertex is fixed, the blue line will turn a different color. When you are done drawing the polygon, press the reset button (right button) of the mouse to close the polygon. The result displayed in the Command Window at the top of the screen. Microstation also automatically calculates and displays the perimeter of the selected element or drawn polygon alongside the area.

<MeasureAngle> allows you to measure the angle between two lines joined at a vertex. When you click on this button, you will be prompted to identify two lines with the data point of the mouse. Each line will be highlighted when you have selected it. Click the data button a third time to verify your selection and Microstation will display the calculated angle in the Command Window.



Microstation can also measure lengths, radii, minimum distance between elements, area as defined by a fence, area of intersection or union, and volume in the case of a 3D design file. For further information on using the measuring tools, please consult the *Microstation Academic Edition Reference Guide*, Chapter 15.

**Saving Views.** Microstation can save views for reference or plotting later. For example, if you want a map of Spruce Hill with the main sewer line, vacant lots, and topography overlaid upon the basemap, but also want a similar map of Mill Creek with blocktypes 9 and 10 turned on, the "saved view" function would allow you to create these different maps and save them in that state for use later. When saving a view, you will be prompted for a name by which to save it. In addition, you may write a one line description of the view. The neighborhood zooms in the Neighborhood sub-menu were created using this method. The "save view" function is located in the bottom left corner of the WPPDD menu. Pressing this button will display a sub-menu that allows you to save, delete, or display previously saved views. Note that this does not save a design file with the information. You are merely asking Microstation to remember what this View looked like for recall later.

Selecting <View=> will cause Microstation to prompt you for the name of a saved view. In the Command Window, a "vi=" will appear on the command line, and Microstation will wait for you to enter the name of the saved view you wish to see. Key in the name, press Enter and click the left button of the mouse with the cursor in the middle of the screen. The saved view will appear on the screen.

Selecting <SaveView> will display the prompt "SV=" in the Command Window. Microstation is asking you for the name under which you wish to save the view. The name may be up to six alphanumeric characters long. After choosing a name, press enter and click the left button of the mouse in the middle of the screen.

When you are finished with your work in the WPPDD, please delete your saved views. This can be done through the dialogue box (see below) or by selecting <DeleteView>. Microstation will prompt you for the name of the view with "DV=" in the Command Window. Type the name, press enter and click the mouse on the view to confirm your decision.

**Warning: Please do not use the letter "A" or the numbers 0-14 as the name for the view you wish to save!** These are set aside for the saved views that allow you and other users to zoom into the various neighborhoods of West Philadelphia.

<DialogueBox> will open the Saved View dialogue box from which you perform all of the above functions as well as add descriptions and manipulate all of the views currently saved with this file.

### Copying Files for Modification

If you will be working on a particular map or design file as part of a project, it is absolutely necessary that you do so on a copy of the file, not on the original. Microstation saves every change to the file as it is performed to avoid any loss of data. Consequently, any changes you make to the original file will be permanent and the next person using the database will be working on an

altered file. Please do your work on copies of the files!

In order to copy a file in Windows or Windows NT, open the File Manager in the Main Program Group. Locate the WPPDD directory by clicking on folders. The WPPDD design files should be located in:

Q:\QUENDATA\COURSES\ARPP60\IDG\N.\*\*

Click on each file that you need and drag it to the desired location. If you are copying it to a floppy disk, drag it to the Drive A icon. If you are copying it from the network Q drive, drag it to your own folder in the C:\SESSION directory. Windows will prompt you with further instructions if necessary. Before finishing, double check that the original file is still located in the proper directory. If you need copies of multiple files, hold down the <Ctrl> key while you click on each file. This will allow you to select more than one file. When you drag it to the desired location for the copy, all of the selected files will be copied simultaneously.

### Plotting

Plotting a file in Microstation 5.0 is a three-step process:

1. Set up the view you wish to plot using view control tools like "Zoom In/Out" and "Window" or place a fence around the part of the design to be plotted. An area can be fenced off by selecting the "Fence" tool in the main palette. (The main palette can be found in the palettes menu of the Command Window.)
2. Create a plotfile. A plotfile contains all of the necessary information about the area specified as well as the commands needed to drive the plotter.



- a. From the file menu in the Command Window, choose "Plot." This will open the plotting dialogue box. If you are working on more than one view, select the view(s) to be plotted before selecting Plot. If you are plotting from a fence, click the "Use Fence" toggle.
  - b. Click the <Plotters> button to select a plotter. The large format, color inkjet plotter in the computer lab is called an HP755C, but this model will not appear in the dialogue box. If you will be plotting in black and white, choose hpjet.plt If you will be plotting in color, choose hpgl2.plt\*\* as the Plotter Configuration File. If you are using the small desk plotter in the Graphics Lab, choose HP7475a.plt.\*\* When you have chosen a plotter, click OK to return to the plotting dialogue box.
  - c. Select a paper size.
  - d. Adjust the scale to the desired scale in the "Drawing Settings" box.
  - e. Adjust the Plot Origin to position the plot on the page.
  - f. (optional) Click the Preview button if you wish to see the probable result.
  - g. Click the Plot button to name, create and save the plotfile. Make sure you check where the plotfile is going when you generate it. Microstation may set an extension of \*.000 to the plotfile. It is a good idea to change this extension to 'yourfile.plt'.
  - h. Click <DONE> to exit the Plotting dialogue box.
3. Generate the plot. Usually plotting is done from a DOS session independent of

Microstation. This allows you to continue working while the plotting is being done. It also allows you to plot even though the computer you are using might not be connected to the plotter. You will need three things to generate the plot.

- a. The Plotfile you created and saved in steps 1 and 2 above.
- b. Media (vellum, white bond, mylar). Make sure the media is cut absolutely square or the plotter will reject it.
- c. Inkjet cartridges (these cost approximately \$30 (B&W) to \$40 (Cyan, Magenta, Yellow). To do a B&W plot, you will only need the black cartridge. To do a color plot, you will need all four cartridges. The cartridges should be available at area art supply stores. The part numbers are:  
HP51645A (black), HP51644M (magenta), HP51644C (cyan), HP51644Y (yellow).\*\*

When the plotter is set up and initialized, and you are in the directory to containing the plotfile, issue the DOS command:  
copy plotfile.plt lpt1  
The plotter should flash 'Receiving', and the plot generate without any further help. You can send multiple plots simultaneously if you use a roll of media rather than individual cut sheets.

If the computer you are using is not connected to the plotter (check with the GSFA Computing Center staff), copy these three items to a floppy disk in Drive A. Transfer them to the session directory on the hard drive of a computer that is connected to the plotter. (At the time of

this writing, this is the Multi 1 in the Multimedia/Printer Lab.)\*\* Note: the plotter must be loaded with paper and cartridges prior to issuing any commands. You are usually responsible for providing your own cartridges and drafting media. The GSFA Computing Center does provide cartridges if you are willing to pay \$5.00/sheet and do the plots at the pre-scheduled times.\*\* Please check with the GSFA Computing Center staff.

If you have further questions regarding plotting please refer to the *Microstation Academic Edition User's Guide* Chapter 9, *Reference Manual* pp1-39 to 1-44, and *Introducing Microstation* Chapter 5.

## Printing

Using the Print command in the File menu is an alternative to the somewhat complicated Plot procedure. In order to print to any of the printers on the Computing Center network,

1. Select the desired printer as the Default Printer in the Windows Printer Monitor.
2. Select Print Setup in the Microstation File menu. Select a Printer and paper size in the Properties dialogue box. Click OK.
3. Select Print in the File menu. Confirm that the paper size and printer are correct.
4. Enter the desired scale. This is the only confusing part of the Print function as this version of Microstation insists on displaying the Print scale in f/inm. (Divide the desired f/in scale by 25.4 to arrive at a usable f/inm scale.)
5. Select Print.
6. Select Done to leave the Print dialogue box.

## Shutting Down

When you have finished your session with the WPPD, turn off all of the layers you have added to the basemap. Next press <Exit> in the lower left corner of the menu. From the File menu in the Command Window, select Exit. Microstation will check to make sure you want to end this session. Select <OK>. If you are in Windows NT, you may now logoff.

## Adding Your Work to the WPPD

In the course of your work with the WPPD, we recognize that you may produce work that could contribute a great deal to the database, and we welcome the addition of new material. The following procedure has been established for review of spatial and/or digitized statistical data that make a significant contribution to the scope and quality of the database. If you wish to have material considered for addition to the WPPD, please contact a member of the research team through the office of Professor Anne Whiston Spirm in the Department of Landscape Architecture and Regional Planning in the Graduate School of Fine Arts. Please prepare a short summary of how the data was gathered and how it might be useful to the database. All maps should be relatively complete and of high quality. All levels should be named and described in the design file as well as being documented on paper. Even if you know how to write UCM scripts and understand the structure of the menu system, please do not try to add the data yourself. This will be done by a member of the research team.

## Exporting Files

### DXF or DWG

Microstation 5.0 is capable of exporting files in both DXF and DWG formats. DWG is the native format used by AutoCAD for writing its drawing files. If you will be working in AutoCAD, this is the best file format. DXF format was developed by AutoCAD for use in transferring files to and from AutoCAD. It is supported by a number of CAD and GIS software packages and has become the defacto translation standard.

In order to export a file in DXF or DWG format, open the File menu in the Microstation Command Window. Clicking on Export will open a submenu. Selecting 'DWG/DXF' will open the dialogue box needed to complete the operation. Insure that the information is correct and select the <OK> button. If the information is correct in the next dialogue box, select <Export> and wait. Usually the operation will be completed in less than 5 minutes. The new file will have the .dxf or .dwg subscript. You will need to save it to the C:\SESSION directory as the Microstation directories are usually set to read only. An abbreviated version of the export procedure can be done through Save As in the File menu, but options to alter the conversion process will not be offered. For further information on the export procedure, please refer to the Microstation Academic Edition User's Guide, pp10-13 to 10-32 or the and Reference Guide, pp1-88 to 1-107.

### IGES

IGES is a public domain, international standard developed to translate CAD/CAM drawings between systems. It is not a format supported by most software at the GSFA, but it

may be useful in exporting or importing work from systems off campus. The procedure is similar to that outline above for DXF/DWG, but because the file structure is significantly different from Microstation's, the permutations are potentially very complex. For further details on IGES conversion, please refer to the Microstation Academic Edition User's Guide, pp10-23 to 10-47 or the Reference Guide, pp1-107 to 1-119.

### Raster Image formats

Image processing software like Adobe Photoshop is presently not able to read the vector files structures created by CAD software. For someone interested in using the images, not as maps in a CAD or vector GIS system, but for use on the Internet (GIF and JPEG), in multimedia authoring software, in Photoshop, Illustrator, or raster GIS systems, other formats are necessary. There are three ways of doing this.

One is by using the Screen Capture utility in Microstation. This will allow you to capture a picture of the entire screen, a single view or a selected portion of a view as a raster file in any of two dozen formats and compression regimes. The resolution will be exactly what is seen on the monitor. Color codes are not always stable when exporting across formats and some modification may be necessary afterward.

A second method is to create a plotfile using "Plot" under the File menu and to save the image in encapsulated Postscript (EPS) format (this is listed as one of the types of plotters in the plot setup dialogue box (see section on "Plotting" above). This is a readable format for many image processing software packages and will produce a higher resolution if the user will be printing the image later.

A final method is to select "Save Image as.." in the File menu. This will allow you to save the currently active view as a raster image file and adjust the resolution at which it is saved.

### **Getting Help**

If you should have questions regarding the project, please do not try to contact the people listed in the acknowledgments section directly. Questions regarding the WPPDD should be directed to the current West Philadelphia Landscape Database research team through the office of Professor Anne Whiston Spirn in the Department of Landscape Architecture and Regional Planning.

# APPENDIX II. LIST OF FILES

## APPENDIX II. LIST OF FILES IN THE WEST PHILADELPHIA DIGITAL DATABASE

### Design Files (Spatial Data) \*.dgn

The core of the West Philadelphia Digital Database exists as spatial data in the form of digitized maps drawn on Microstation and saved as a "design file" (This is Microstation's term for a drawing file.) Forty design files are organized into nineteen different maps. If you wish to use the files in the WPDD, it is absolutely necessary to copy them before making any modifications. To make this easier, a short description of each file appears below.

BADSEWR.DGN	Intersections and discharge points for sewers	MCSEWR.DGN	Mill Creek & Mantua lot lines
BLOEW.DGN	E/W Blocktypes	LUMILLADGN	Land use plan.
BLONS.DGN	N/S Blocktypes	MASTER.DGN	Basemap: streets, WPLP project boundary, railway, highway, street names, rivers
BLOPLA1.DGN	Blocktype 1 plan	SEWRBOUN.DGN	Sewer lines and manholes and drainage map grid
BLOPLA2.DGN	Blocktype 2 plan	SURFACE.DGN	Sewershed boundary lines
BLOPLA3.DGN	Blocktype 3 plan	TOPO1FT.DGN	Surface cover in Mill Creek
CONTEXT.L.DGN	Diagrammatic context map of WPhila relative to PA & NJ	TOPO2FT.DGN	Topography - 1ft contours
EDUCATN.DGN	Education catchments	TOPO5FT.DGN	Topography - 5ft contours
ELEV1.DGN	Blocktype 1 elevation	TOPO10FT.DGN	Topography - 10ft contours
ELEV2.DGN	Blocktype 2 elevation	WPBLACK.DGN	Racial distribution
ELEV3.DGN	Blocktype 3 elevation	WPBLOCK.DGN	Census tract and blockgroup lines and numbers
ELEV9.DGN	Blocktype 9 elevation	WPGHYDPH.DGN	Pre-urban hydrology, creeks, ridge lines, "flood zones"
ELEV10.DGN	Blocktype 10 elevation	WPINCO.DGN	Income distribution
FLOOD.DGN	Low areas, depressions, watershed outline	WPLEGL.DGN	Legend and title block for West Philadelphia Landscape Plan
FPWPHI.DGN	Building footprints	WPMAP.DGN	Neighborhood boundaries and names
GRID.DGN	CPC land use grid	WPNUVAC.DGN	Vacant land types (missing teeth, corner lots, etc.)
HATSEWR.DGN	Sewersheds hatched - note: not attached to WPDD menu	WPPOP.DGN	Population change 1970-80
LOTWPHI.DGN	Lot lines for all except Mill Creek and Mantua	WPUNEM.DGN	Unemployment distribution
		WPVACLLOT.DGN	Vacant lot surface cover (lawn, paving, weeds, etc.)
		WPVACP.DGN	Building vacancy (Census)

### Database Files (Statistical Data) \*.dbf

Microstation and the GIS software that it works with have the ability to link graphical information to tabular data that is spatially located in some way. When properly configured and linked it is possible to call up statistical data for a

particular area, block, or neighborhood on a map. It was originally envisioned that the WPDD would be linked to census and other data for each of the neighborhoods. The user would be able to simply choose a location on the map and call up the statistical data for that area. This was the vision and the groundwork was laid for this to be accomplished. Much of the statistical data from the 1980 Census and information on blocktypes and vacant land exists in \*.dbf relational database files. In all of its versions Microstation is able to make links with statistical data in this format.

However, while some of the data has been entered in a usable format, the links between the spatial and statistical data have not been made. The configuring of version 5.0 to allow these links and the construction of the links will be a major project for the future.

In order to create these links, a relational database system, a RLS data server, and the actual tables are all necessary.

### 3D files - digital terrain models

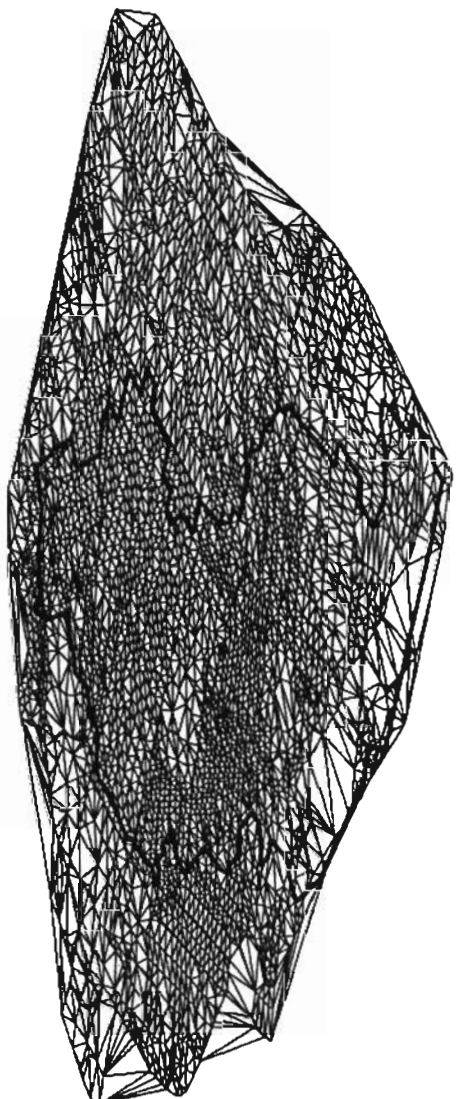
It was realized in the early stages of the project that to fully take advantage of the computer's ability to analyze spatial data, it would be necessary to create not only a digitized version of a flat, two-dimensional map, but also three dimensional models of the West Philadelphia landscape. A profound lack of reliable data on existing and historical topography of the region was a pernicious problem, but after some research it was found that the city sewer department had spot elevations for each street corner and for the center of each block. These were entered into a 3D design file overlaid on the street map. From this it was possible to develop a digital terrain model using a specialized piece of software designed for that purpose. Much of this work was

# Digital Terrain Models

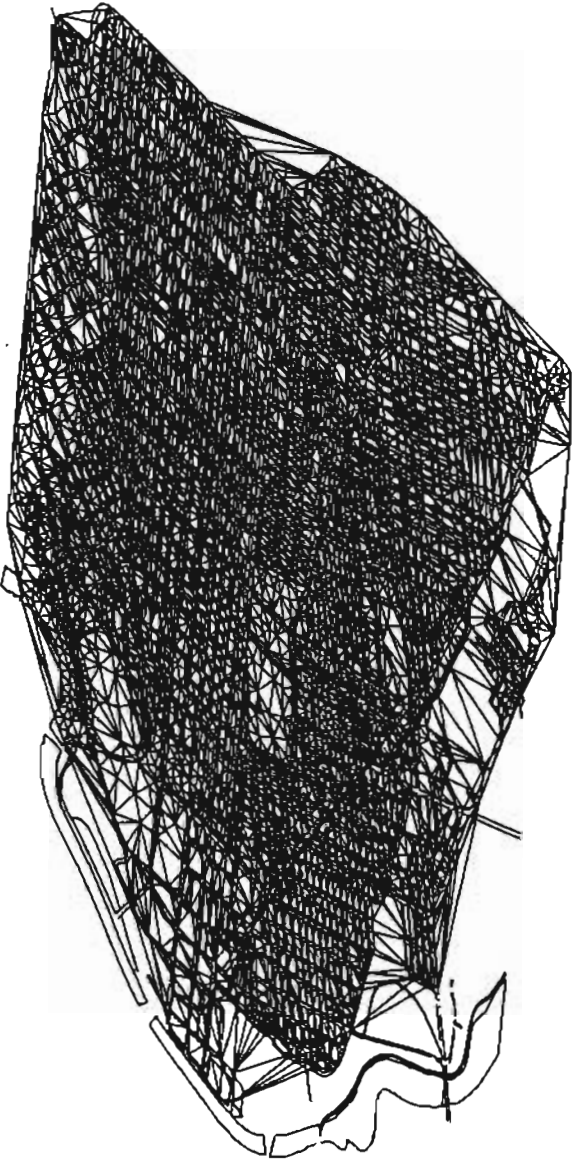
done at Temple University, and the the software package necessary to display the work is no longer supported by the GSFA computing center. The spot elevations still exist in 3D design files readable by Microstation 5.0. The WPPDD research team also has copies of the original digital terrain models as well as the ASCII files with coordinates and spot elevations.

One recently completed project involved the development of a more rigorous 3D model of the neighborhood. It is this sort of information that will be necessary in order to conduct watershed/runoff analysis, and develop more accurate topographical maps. In December 1995, the 2500 spot elevations originally digitized were edited and an additional 1700 added to extend the area of the model. From this data set, a road alignment and digital terrain model software called InRoads was used to interpolate topography and a triangulated surface. The contour lines, were flattened from 3D files into 2D files and replaced the original set of topography maps. The triangulated model has other applications including watershed modeling, hydrological analysis, visual visibility analysis and other applications. At this point the 3D files are not accessible from the WPPDD menu system. If copies of these files are required, please contact the WPPDD research team.

- 3DSPOT.DGN Spot elevations digitized as points in a 3D file. Includes triangulated surface on level 20.
- 3DDEMO.DGN Copy of spot elevation file above without triangulated surface.
- WESTPHIL.DTM InRoads surface file with point and triangle data.



Digital Terrain Model overlaid with Mill Creek watershed outline.



Digital Terrain Model overlaid with street grid.

# APPENDIX III. HOW THE DATABASE WORKS -- UCM FILES

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## APPENDIX III. HOW THE DATABASE REALLY WORKS: UCM FILES AND THE MENU SYSTEM

What follows is a short description of how the overlay process works in a CAD system.

When a map is overlaid onto the basemap, the new one appears to be added to and redrawn over the basemap. This is somewhat deceptive. While it may seem like another file has been opened and added to the first, it actually has not been. In reality, the only file that is ever open is MASTER.DGN, the basemap. Twenty-six files are attached as "reference files" to this basemap. Microstation allows the attachment of reference files to aid in the drawing process. The WPDD uses it for a slightly different function: to overlay maps. This function would correspond to the XREFs set of commands in AutoCAD.

Each of the twenty-six reference files is composed of a number of "levels" or layers. A level has a category of information drawn on it. For example, levels 21-24 in the Land Use design file have Residential Land Use on them: level 21 might have Rowhouses, level 22 Apartments, level 23 Detached Houses, and so on. Levels 31-34 have Commercial Land Use associated with them. When you click on the <Residential> button in the Land Use menu, levels 21-24 in the reference file LUMILLA.DGN are "turned on," and the yellow residential land use for the Mill Creek area is 'drawn' over the Basemap.

The WPDD menu itself was created using a special scripting language designed for that purpose. It is called a "sidebar menu" and is contained in an \*.shn file. The sidebar menu

script does not actually tell Microstation what to turn on and off, however. It indicates where to look for another file called a UCM file. UCMs are User Command statements written in yet another scripting language. They correspond to Macros written on the Macintosh or a BAT file in DOS. There is a UCM file for every function on the menu, about 300 in all. Most are only a dozen or so lines long, but each one is necessary to make the menu work properly. **Please do not alter any UCM files.**

If you have questions about how the menu is constructed or about UCM files, please contact a member of the WPDD research team. There is also a section on UCMs in the Microstation Academic Edition Development and Support Guide, Chapter 2.

# APPENDIX IV. LIST OF WPLP PAPER MAPS

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## APPENDIX IV. LIST OF PAPER MAPS AND DRAWINGS PRODUCED FOR THE WEST PHILADELPHIA LANDSCAPE PLAN AND GREENING PROJECT

Not yet available.