9/19/2022 Addendum - When the Silver Lake project was presented as a design opportunity at the March 28, 2022 community meeting, some residents within the Negley Run Watershed strongly supported a continued incremental approach of projects already in the pipeline or projects throughout the watershed, rather than one large signature site. The Silver Lake planning information is included in the Stormwater Strategic Plan appendix for reference.

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tel: 412 770-3100
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Memorandum

To: Karl Russek, University of Pennsylvania Water Center

From: AKRF, Inc.

Date: March 11, 2022

Re: PWSA Strategic Plan for Stormwater - Engineering Feasibility Analysis for Silver Lake and McKinley Park

As part of the Pittsburgh Water and Sewer Authority (PWSA) Strategic Plan for Stormwater, AKRF conducted a concept level engineering feasibility analysis for potential stormwater management strategies for the former Silver Lake site in Homewood and the existing bottom portion of McKinley Park along Bausman Street in Beltzhoover. Sites were provided to AKRF by the University of Pennsylvania Water Center/PennPraxis team for further refinement and development of early stormwater management action sites. The following provides a summary of the engineering feasibility findings for each site.

Silver Lake

Existing Parcel Ownership:

Existing Allegheny County Parcel data for Silver Lake was reviewed to determine land ownership status. As shown in Table 1, the majority of the site is privately owned industrial, with the exception of Parcel 1 (URA - Silver Lake Drive) and Parcel 4 (Pittsburgh School District - Westinghouse Academy High School). To build stormwater management within the footprint of the site, property acquisition of private land would be required including parcels with existing warehouse storage facilities.

Table 1. Silver Lake Site Parcel Ownership

Parcels	Property Owner	State Description	Use Description
1	URBAN REDEVELOPMENT AUTH OF PITTSBURGH	Government	MUNICIPAL URBAN RENEWAL
2	SILVER LAKE ASSOCIATES	Industrial	WAREHOUSE
3	SILVER LAKE ASSOCIATES	Industrial	WAREHOUSE
4	BOARD OF PUBLIC EDUCATION OF THE SCHOOL DISTRICT OF PITTSBURGH	Government	OWNED BY BOARD OF EDUCATION
5	SILVER LAKE ASSOCIATES	Industrial	LIGHT MANUFACTURING
6	JVZ LTD	Industrial	LIGHT MANUFACTURING

Silver Lake Historic Desktop Environmental Assessment:

Historic maps of the site were reviewed to check for any possible history of contamination around and at the project site. These maps are prepared using Pittsburgh Historic Maps (arcgis.com) website and are included in Appendix A. Below are findings from this review.

- Areas around the site have a history of industrial/commercial use.
- Maps indicate that the railroad and viaduct on the western edge of the project site was constructed in early 1900.
- In a map of 1957, the lake no longer exists indicating infill of material at the site of undetermined quality.

Given the industrial history of the site and likely presence of infill material, further investigation into possible soil contamination at the site would be required as part of future design considerations.

Silver Lake Stormwater Capture Potential:

Stormwater volume capture potential at Silver Lake was estimated using readily available GIS spatial layers and engineering design assumptions. The following assumptions were made to determine storage footprint and volume of Silver Lake:

- Existing 8-inch water line servicing existing warehouses within the project area to be abandoned. No major water transmission lines are present.
- Buildings within the project area to be purchased and demolished.
- Gas utility data for this site, currently is not available. Requested via PA One Call but not received. Unknown if major transmission lines are within the project site.
- Several combined sewers converge at the center of the site into two major combined sewer trunk lines. These sewers are a 92-inch by 96-inch box sewer and a 57-inch circular pipe. Given the large size of these sewers, relocation of sewer lines may be cost prohibitive.
- Using upstream manhole depth and sewer diameter from GIS, 9.75 feet of cover is assumed for the sewer main. Max excavation depth for stormwater storage is assumed to be 9 feet, limited by sewer main depth as the likely connection/discharge point of storage areas. 1 foot of freeboard space above the water surface was also assumed.
- 100 feet offset from steep slopes (>25%); this assumption is made based on guidance per the City of Stormwater Design Manual (draft).
- 10 foot offset form the sewer main is assumed to put the storage footprint out of 1:1 Zone of Influence (ZOI). This assumption is also based on the Stormwater Design Manual referenced above.
- Using GIS offsets above the potential width of the storage assumed to be 90 feet and storage length is 500 feet. Available storage footprint is approximately 66,400 square feet.
- To determine storage volume, the storage pond is assumed to be a fully open system with a trapezoidal cross section with 4H:1V side slopes.
- It is assumed that the storage pond would need an impermeable liner to retain a permanent water storage/wet pond/lake design element feature. Soil survey data is obtained from Web Soil Survey (usda.gov) and is included in Appendix B.

Figure 1 depicts a map of the Silver Lake site and the storage volume area based on the above design assumptions.

In calculating the storage volume, two design scenarios were explored:

Scenario 1: Assuming an empty 9-foot-deep pond with 8 feet of storage depth available.

Scenario 2: Assuming 3-foot-deep permanent pool in the pond and 5 feet of storage depth available.

The storage volume results of each scenario are shown in Table 2.

Table 2. Storage Volume Capture Potential at Silver Lake

Effective Storage Depth (ft)	Available Storage Volume (CF)
8	232,000
5	115,000

Using calculated storage volumes in Table 1, the upstream contributing impervious drainage area capture was back calculated for a 1-inch, 1.5-inch and 2-inch rainfall event.

Table 3. Impervious Area Capture Potential at Silver Lake for 1-inch, 1.5-inch, and 2-inch Design Storm Events

Scenario	Contributing Impervious DA Capture (Ac) 1" storm	Contributing Impervious DA Capture (Ac) 1.5" storm	Contributing Impervious DA Capture (Ac) 2" storm
Scenario 1	63.91	42.61	31.96
Scenario 2	31.68	21.12	15.84

Using drainage areas delineated from a previous engineering study by ALCOSAN, and the calculated storage volume from Table 1, the calculated depth of runoff managed at Silver Lake was calculated.

Table 4. Rainfall Depth Inches Captured Using ALCOSAN Drainage Areas to Silver Lake

ALCOSAN Drainage Area Scenario	Impervious Area Captured (ac)	Depth of Runoff Managed (in) Scenario 1	Depth of Runoff Managed (in) Scenario 2
Local GSI	2.05	31.80	15.76
Enhanced DA	5.15	12.66	6.27
Total	7.2	9.05	4.49
Source of drainage area values: http://www.livingwaterspgh.org/wp-content/uploads/2020/03/2019_10_00_ACSA_ConceptPlans_NegleyRun.pdf			

Silver Lake Constructability and Long-Term O&M Considerations:

- Purchasing of properties is a significant cost unknown. RAND concluded the following in its 2020 report "*Managing Heavy Rainfall with Green Infrastructure: An Evaluation in Pittsburgh's Negley Run Watershed*":

  "We also estimated compensation for either the purchase or eminent domain acquisition of the self-storage businesses at Silver Lake. This cost was estimated at $3.8 million in NRIP. Appendix E details our two bounding methodologies in full, but extrapolating its 2016 sale value at a 30-percent market increase would result in a low estimate of $4.4 million. This compares to a high estimate based on a $12-per-square-foot net annual income and 10-percent capitalization rate common to industrial properties in the area. Assuming an assembled, buildable site of substantial

density, this could reach up to $22 million. This is a substantial source of uncertainty and would have a notable impact on the overall cost-efficiency of proposed GSI in Homewood and beyond.”

- Adjacent steep hillsides will likely necessitate the need for contractor site access from Washington Boulevard and under the existing railroad viaduct. Heavy equipment access via railroad easements may need to be discussed with railroad owner.
- Soil contamination and offsite disposal requirements will need further exploration and will impact costs pending results. Given the history of Pittsburgh in-fill practices, and presence of contamination, offsite soil removal may be needed.
- To maintain a permanent pool to act as a central water feature piece the installation of an impermeable liner will likely be required. Existing water table and streams are likely fully contained within the twin large existing combined sewers that bisect the project site.
- Sources of stormwater to the storage facility will likely be from roadside runoff from upland areas from Homewood and adjacent neighborhoods from newly constructed storm sewers. The placement and design challenges associated with these new storm sewers were not explored as part of this memo. Design considerations for the pond and the upstream inlets will need to consider pretreatment and regular cleaning of sediments, trash, and other pollutants commonly found in urban areas. A network system of green infrastructure features upstream of the Silver Lake site would help alleviate sediment, trash, and debris concerns. The loading ratio of the pond footprint to contributing the upstream impervious drainage area should be considered in designing pretreatment facilities.
- Existing foundations of warehouse buildings is unknown and a significant source of cost uncertainty. The condition and thickness of building foundations for removal may be expensive. The placement of foundations in relation to existing steep hillsides will also need further consideration as removal of foundations that may destabilize the toe of adjacent steep hillsides.
- Silver Lake appears to be a flood mitigation opportunity given its central proximity to dangerous downstream flooding on Washington Boulevard and upstream basement backups in the Homewood Area. Detention in the storage area coupled with upstream conveyance is likely to help reduce flooding frequency. More detailed modeling for right sizing of the pond is recommended to balance both additional upstream conveyance and pond storage for downstream peak flow mitigation.

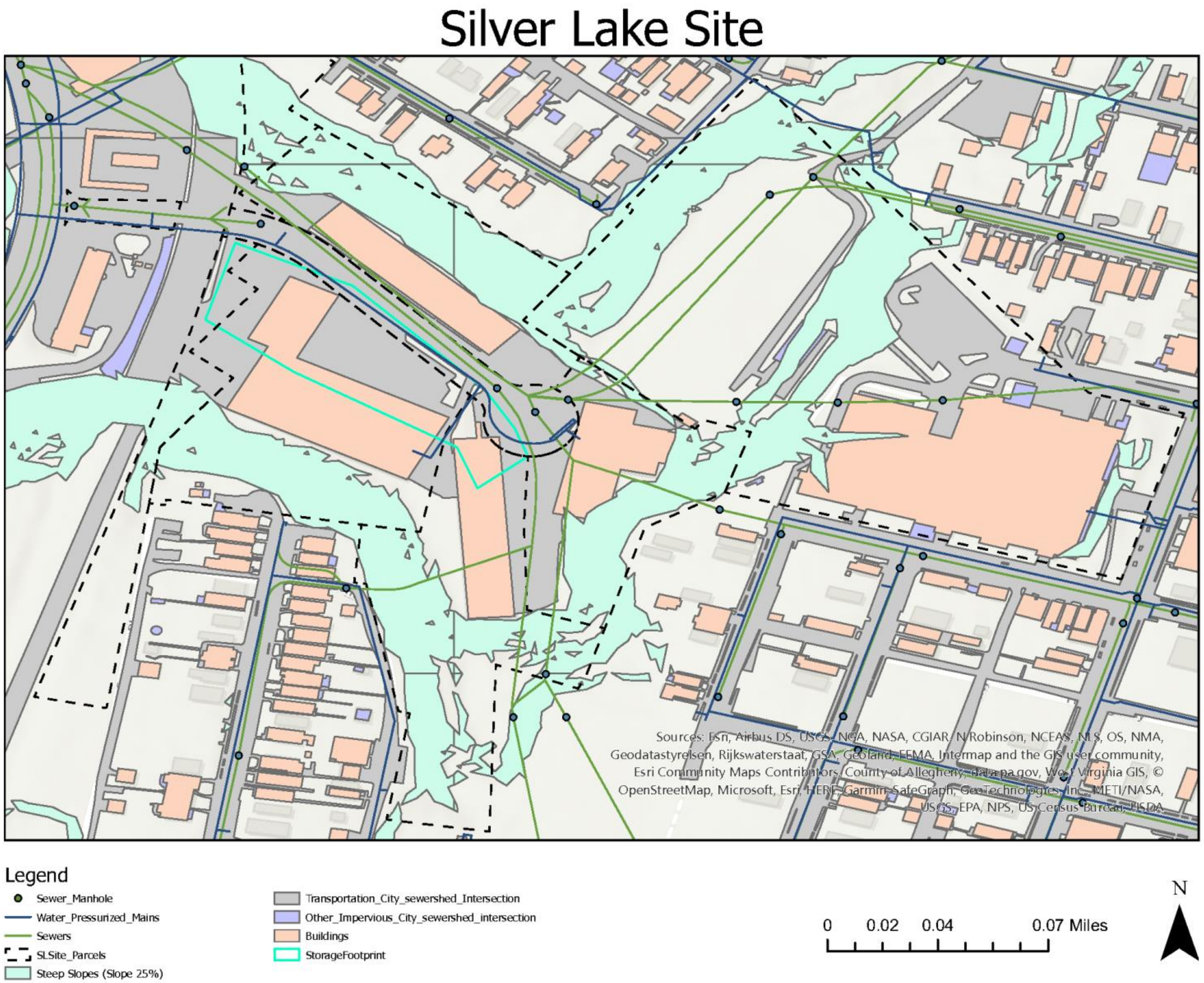


Figure 1. Silver Lake Site Map

McKinley Park Site:

Existing Parcel Ownership:

Existing Allegheny County Parcel data for McKinley Park was reviewed to determine land ownership status. As shown in Table 5, the project site is entirely owned by the City of Pittsburgh.

Table 5. McKinley Park Site Parcel Ownership

Parcels	Property Owner	State Description	Use Description
1	CITY OF PITTSBURGH	Government	PUBLIC PARK

McKinley Park Historic Desktop Environmental Assessment:

Historic maps of the site were reviewed to check for any possible history of contamination around and at the project site. These maps are prepared using Pittsburgh Historic Maps (arcgis.com) website and are included in appendix A. Below are findings from this review.

- Areas around the site have a history of mostly residential use but there are signs of history of industrial/mine sites around the project area.
- It seems that there used to be a stream (GIS data also available) where the park sport fields are constructed. Historic map of 1903-06 shows city combined sewer connection to this stream.
- Historic map of 1923 shows that a combined sewer main was constructed approximately where the stream was located, the sewer main exists to date.
- It seems that sport fields in the park were constructed starting around 1939.

The presence of mining around the site would require more detailed site investigations of potential acid mine drainage which could potentially impact the performance of green infrastructure and associated plantings.

McKinley Park Stormwater Capture Potential:

Stormwater volume capture potential at McKinley Park was estimated using readily available GIS spatial layers and engineering design assumptions. The following assumptions were made to determine storage footprint and volume of McKinley Park:

- No gas and water utility lines are located at this project site. PA One-Call data provided by PA American Water and Columbia Gas is included in Appendix C.
- Buildings, parking lots and playgrounds within the project area to be demolished.
- Undermined areas found around the project site. Further investigation and analysis needed.
- Soil survey data is obtained from Web Soil Survey (usda.gov) and is included in appendix B.
- Storage areas 100 feet offset from steep slopes (>25%). This does not apply to steep slopes next to the roads or fully developed areas (buildings, parking lots, etc.). Also, steep slopes with minor area in the middle of the park are ignored.
- Storage areas to have 10 feet offset from roads and streets.
- Storage areas to have 15 feet offset from the 72-inch combined sewer main within the park.
- Using upstream manhole depth and sewer diameter from GIS, 19.20 feet of cover is assumed for the sewer main.

- Max excavation depth is assumed to be 8 feet to keep total excavation depths reasonable and minimize potential rock excavation.
- Storage cells are assumed to be modular storage systems with a 92% void space with 2 feet of ground cover above storage cells.

Figure 2 depicts a map of the McKinley Park site and the storage volume area based on the above design assumptions. Available storage footprint and storage volume are as shown in Table 6.

Table 6. Storage Volume Capture Potential at McKinley Park

Total Storage Footprint (SF)	Available Storage Depth (ft)	Storage Volume (CF)
135,900	6	750,000

Using calculated storage volumes in Table 6, the upstream contributing impervious drainage area capture was back calculated for a 1-inch, 1.5-inch and 2-inch rainfall event. The results are shown in Table 7.

Table 7. Impervious Area Capture Potential at McKinley Park for 1-inch, 1.5-inch, and 2-inch Design Storm Events

Contributing Impervious DA Capture (Ac) 1" storm	Contributing Impervious DA Capture (Ac) 1.5" storm	Contributing Impervious DA Capture (Ac) 2" storm
206.60	137.73	103.30

McKinley Park Constructability and Long-Term O&M Considerations:

- Sources of stormwater to the storage facilities in the park will likely mostly be from roadside runoff from upland areas from Beltzhoover, Allentown and adjacent neighborhoods from newly constructed storm sewers. Although some adjacent springs may be captured (see next bullet). The placement and design challenges associated with these new storm sewers were not explored as part of this memo. Design considerations for the storage areas and the upstream inlets will need to consider pretreatment and regular cleaning of sediments, trash, and other pollutants commonly found in urban areas. A network system green infrastructure features upstream of the McKinley Park site would help alleviate sediment, trash, and debris concerns. The loading ratio of the McKinley Park storage footprints to contributing the upstream impervious drainage area should be considered in designing pretreatment facilities.
- Sources of acid mine drainage (AMD) need to be investigated further within the project site. Effectively managing AMD typically requires large footprint area, which may be infeasible given the available project footprint area. Management of AMD sources may need to consider bypassing the sources of these flows around storage areas so that they do not compromise the performance of the GSI features.
- Bausman Street, particularly its intersection with Route 51, is a known location of severe overland flooding, both from Saw Mill Run overflowing its banks and from visible stormwater erosion from runoff from adjacent hillsides on Bausman Street within McKinley Park. Design considerations should consider ways to effectively manage bypass flows during extreme events and keep an active road corridor safe for pedestrians and traffic. Considerations for the raising of Bausman Street to prevent stormwater from flooding the roadway could also be explored.

McKinley Park Site

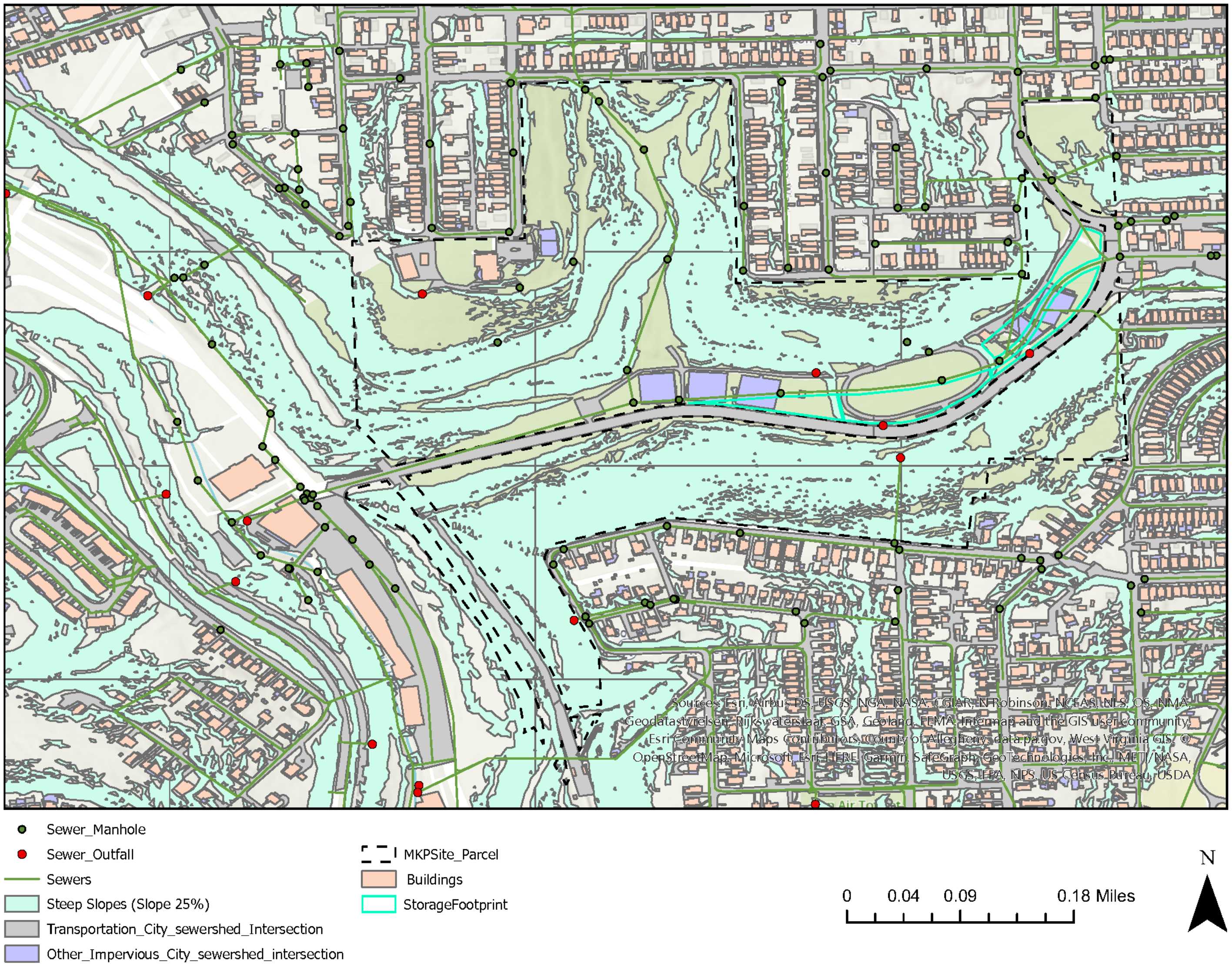
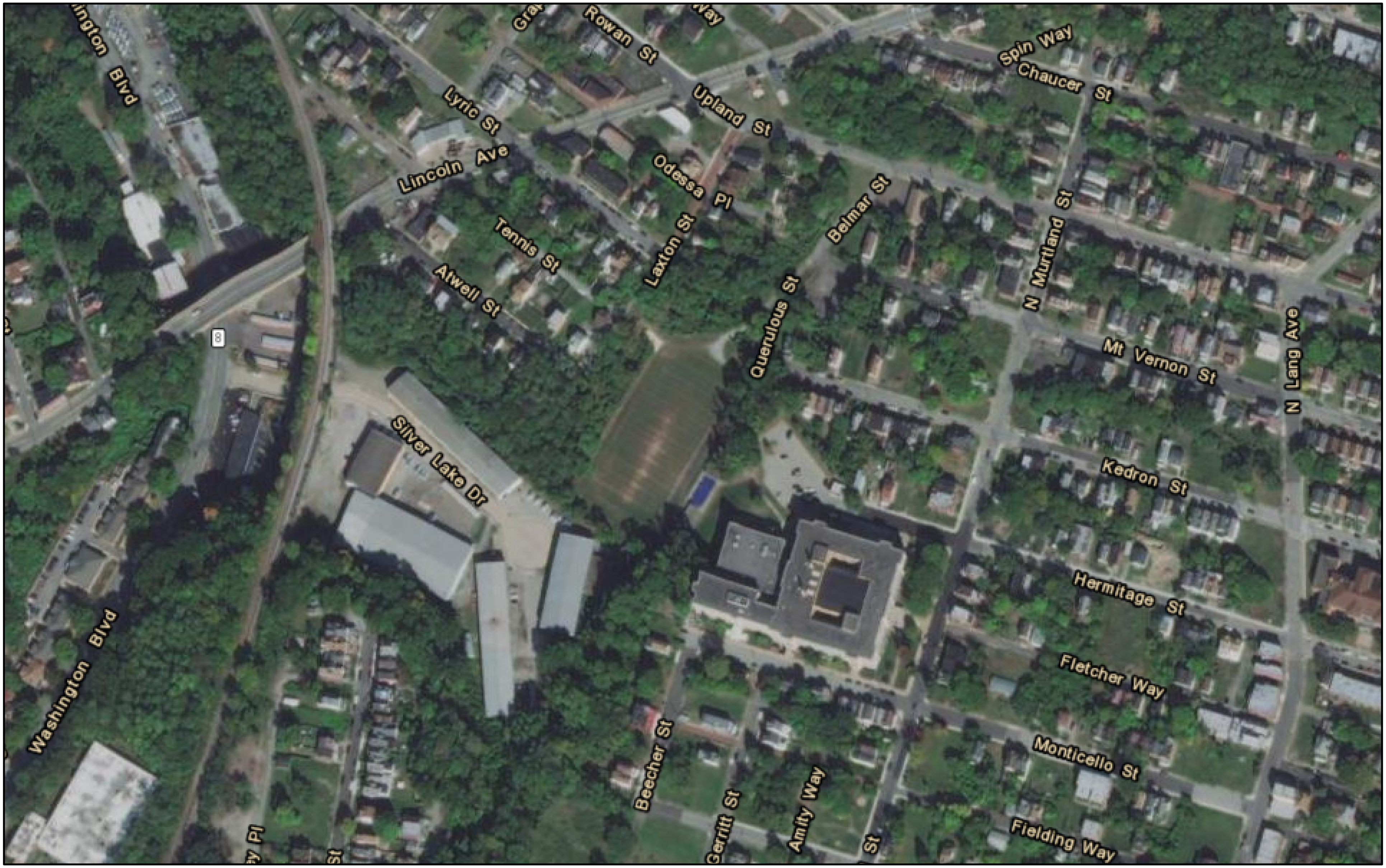


Figure 2. McKinley Park Site Map

Appendix A - Current and Historical Site Maps

Silver Lake



February 24, 2022

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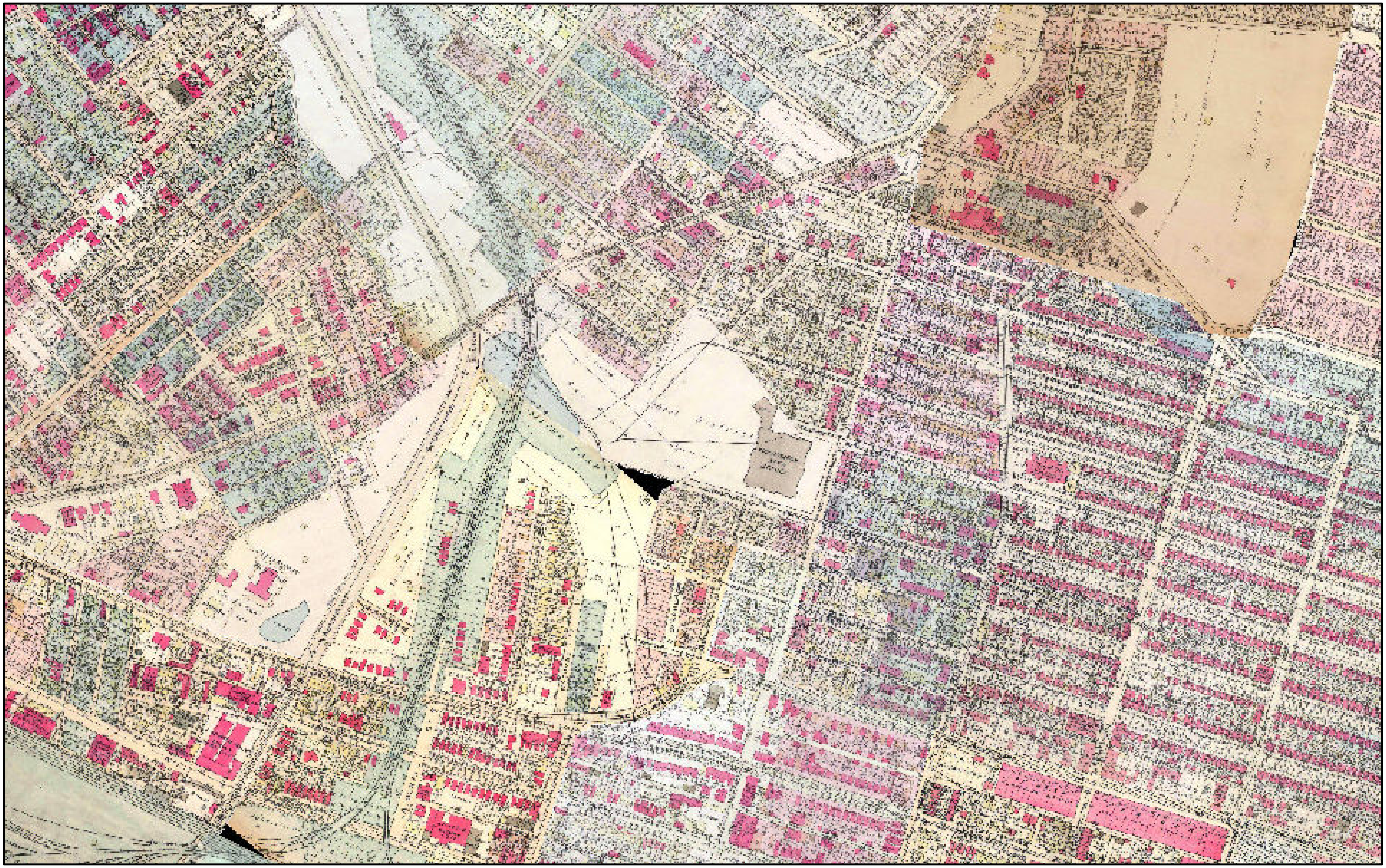
Silver Lake - 1923



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Historic Pittsburgh http://digital.library.pitt.edu/maps, Maxar

Silver Lake - 1967

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Penn Pilot, USGA, Maxar

Silver Lake - 1993

February 24, 2022

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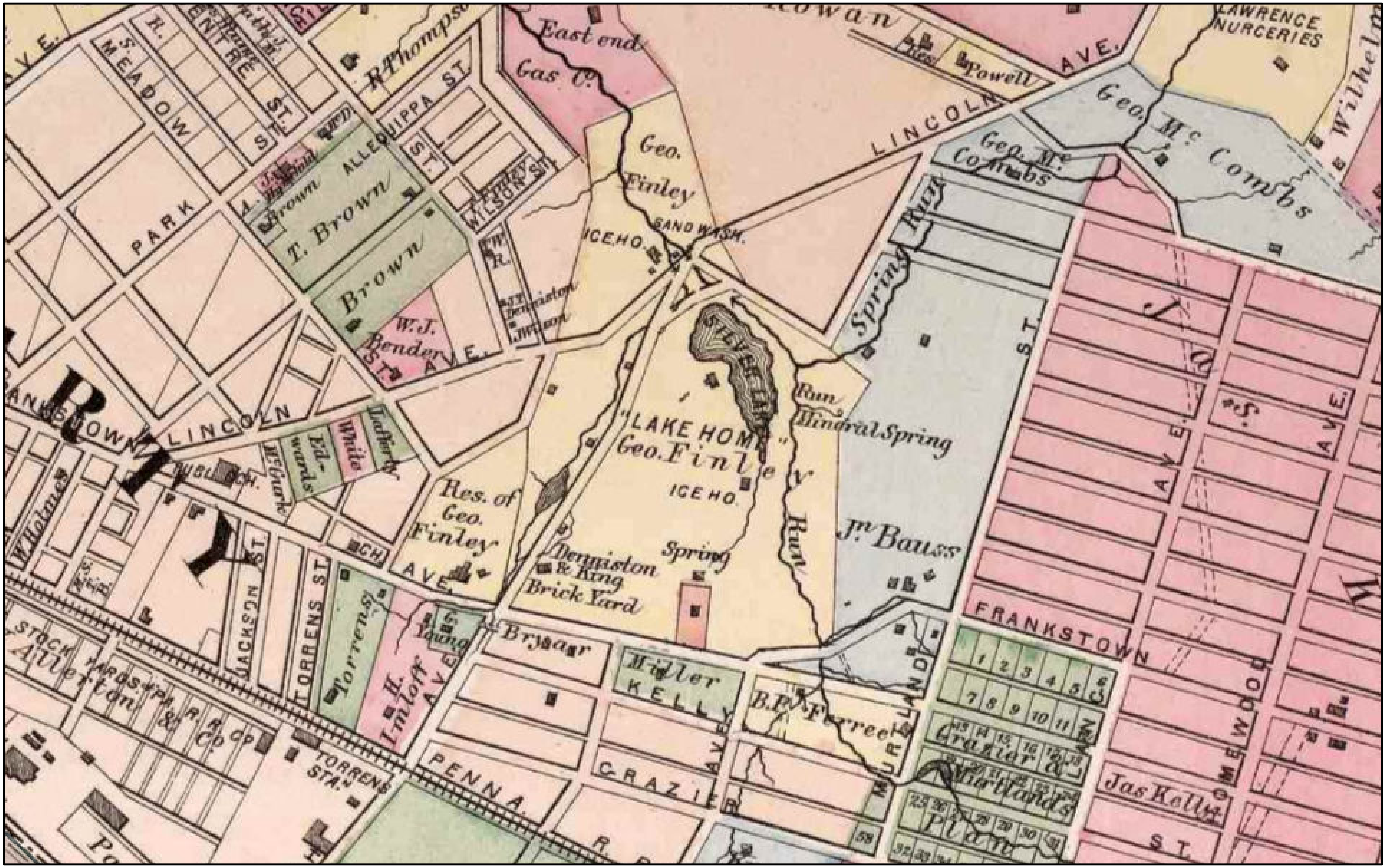
USGS, Esri, Maxar

Silver Lake - 1872



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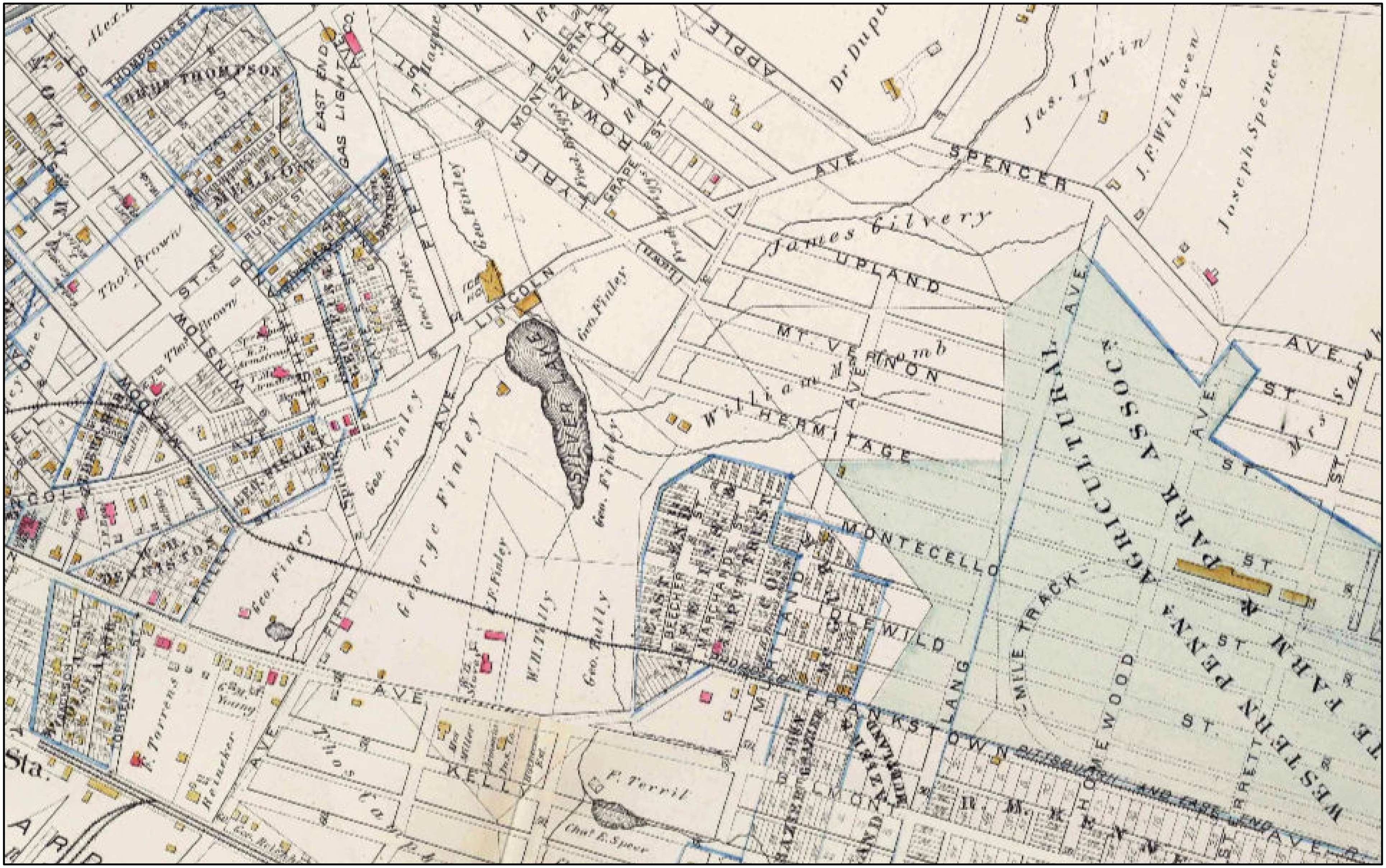
Silver Lake - 1882



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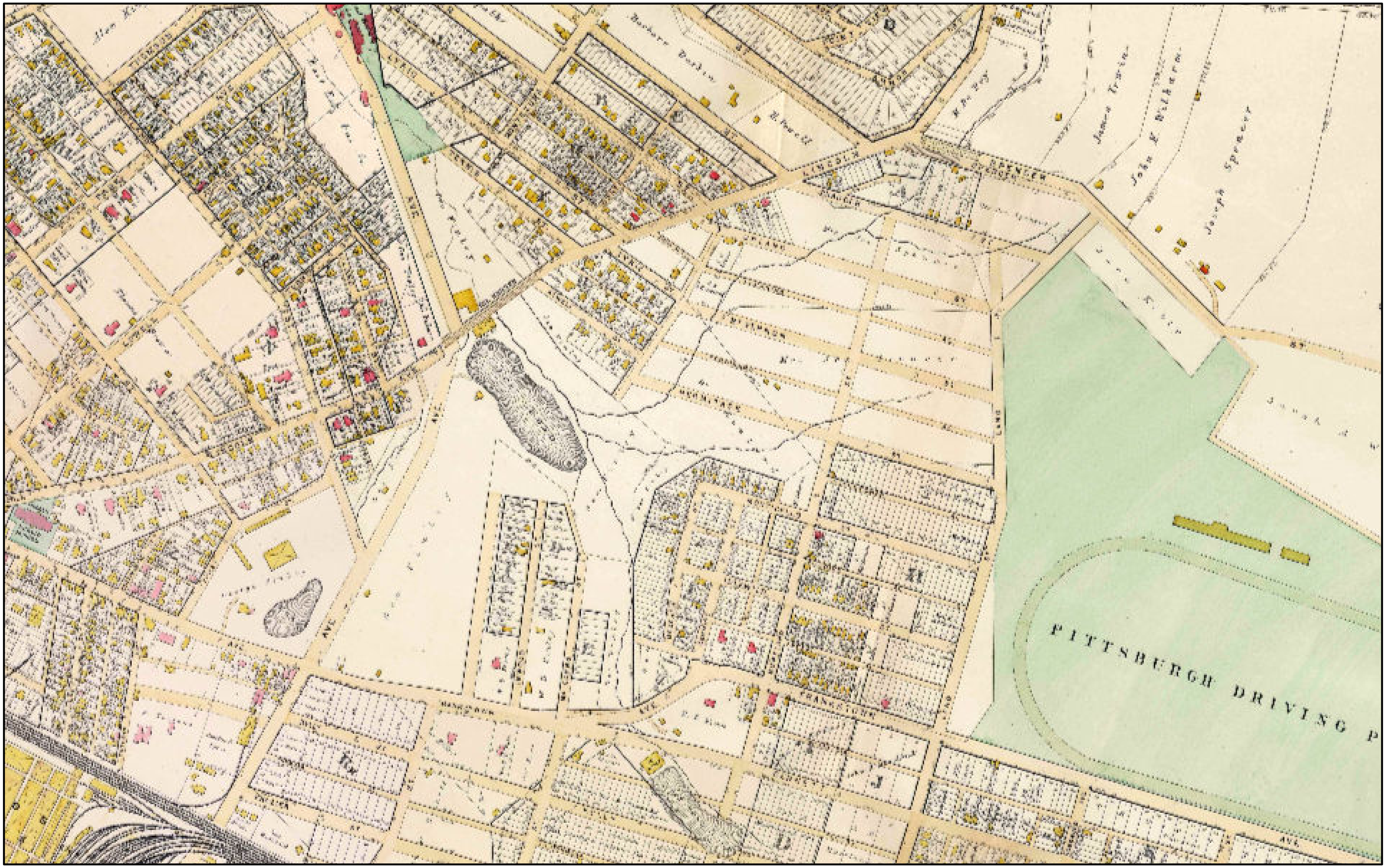
Silver Lake - 1890



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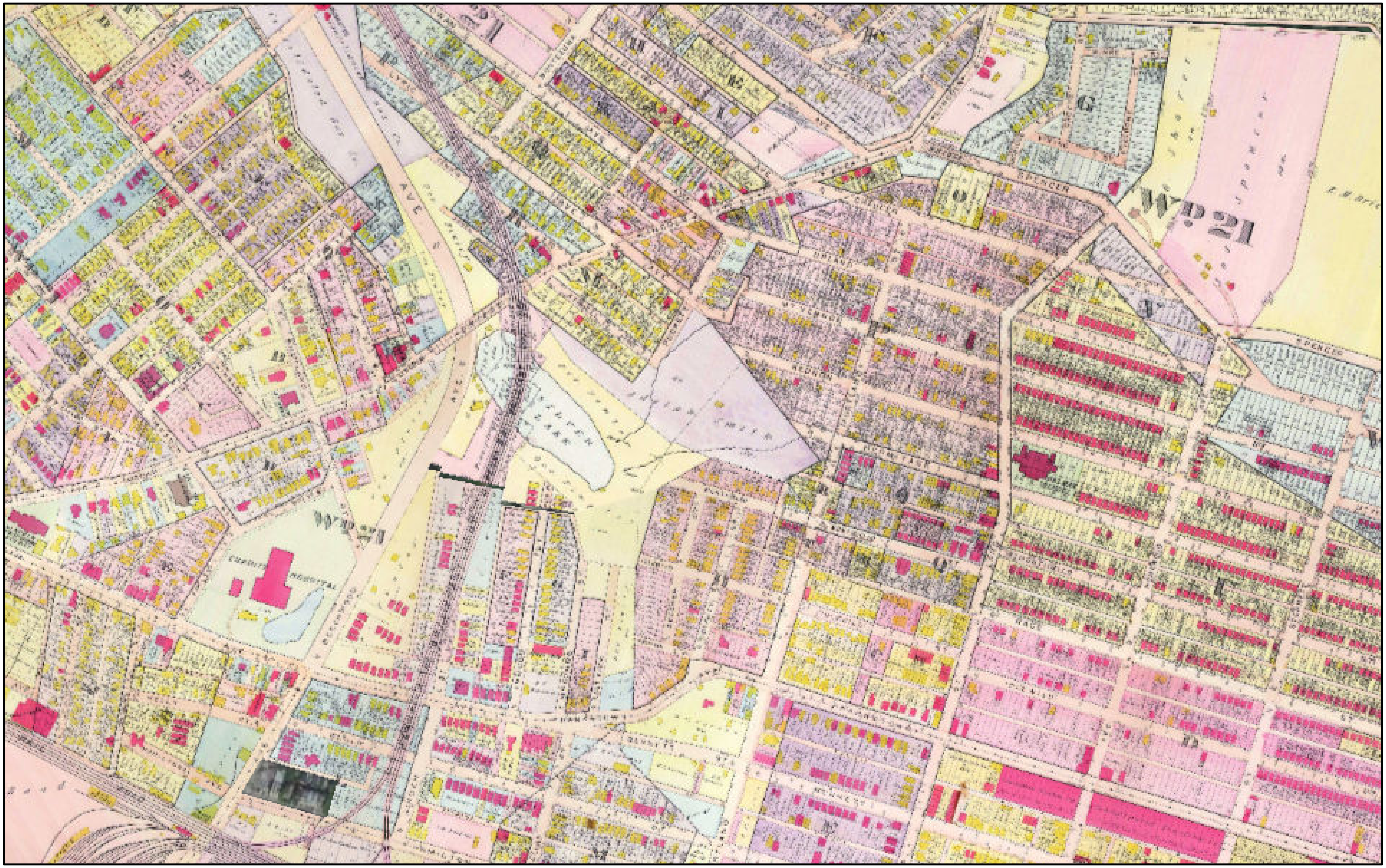
Maxar, Historic Pittsburgh, Penn St University Library, University of

Silver Lake - 1903 to 1906



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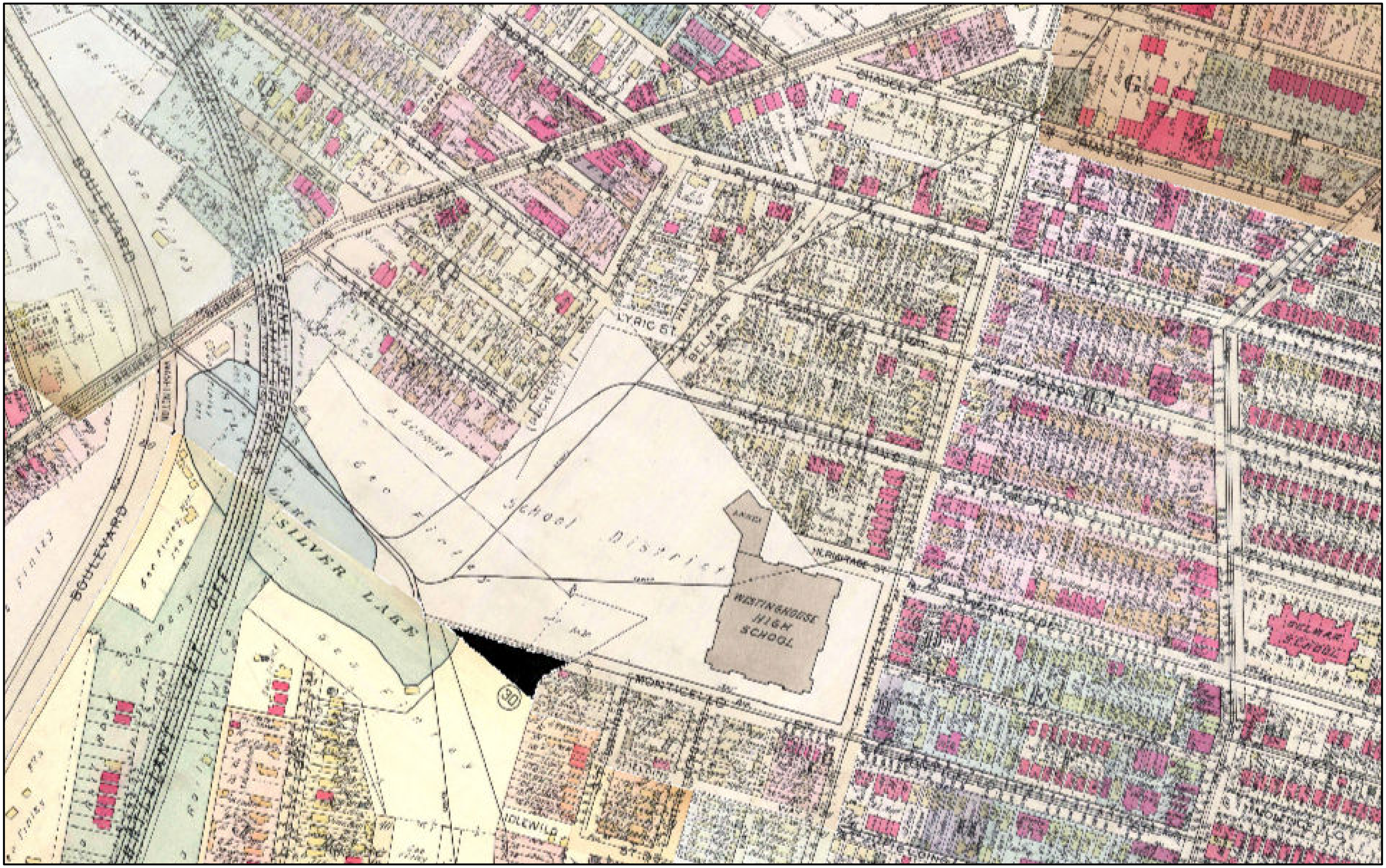
Historic Pittsburgh, University of Pittsburgh, Maxar

Silver Lake - 1923



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Silver Lake - 1939

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Penn Pilot, Maxar

Silver Lake - 1957

February 24, 2022

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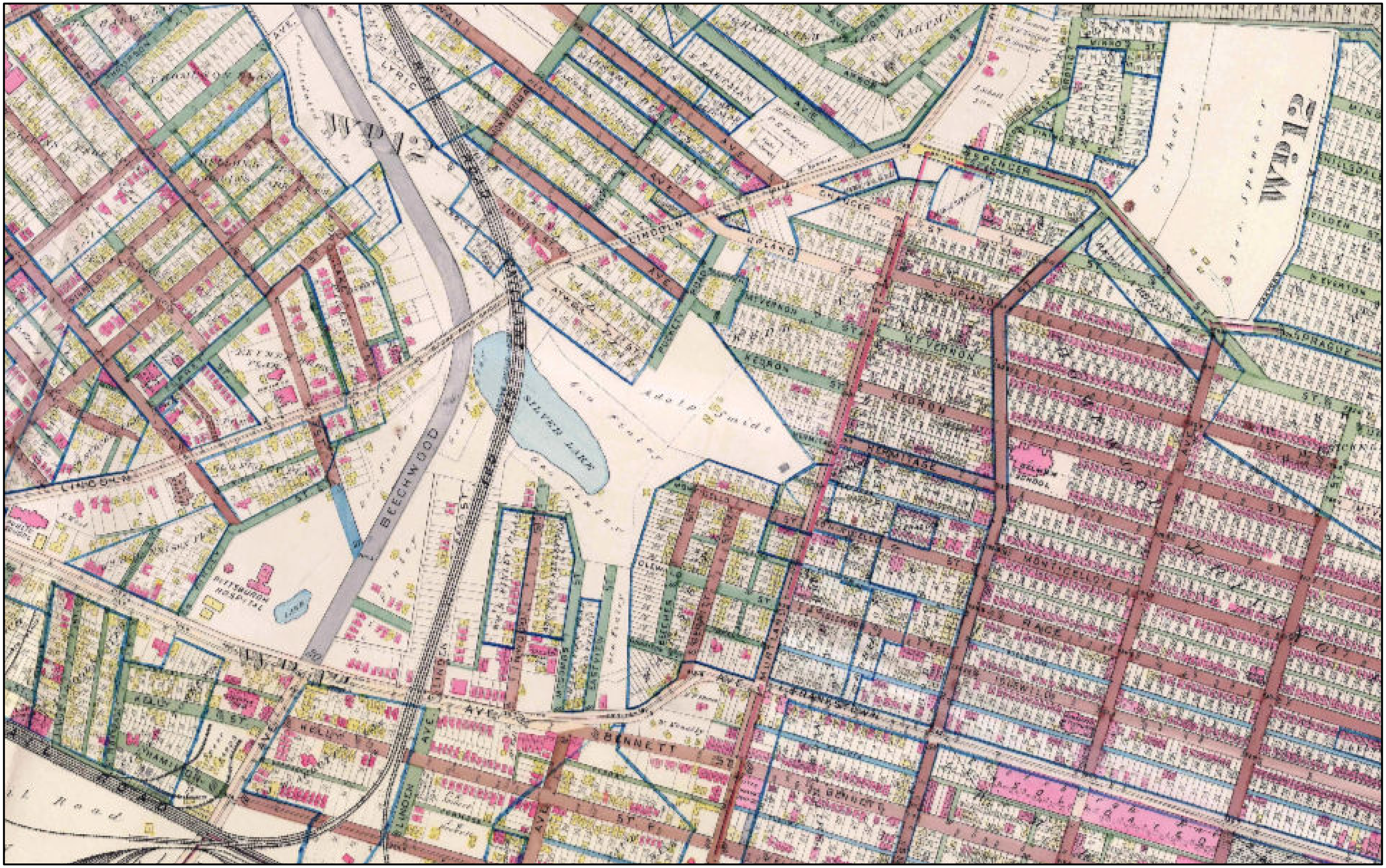
ESRI, Penn Pilot, Maxar

Silver Lake - 1910



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McKinley Park

February 24, 2022

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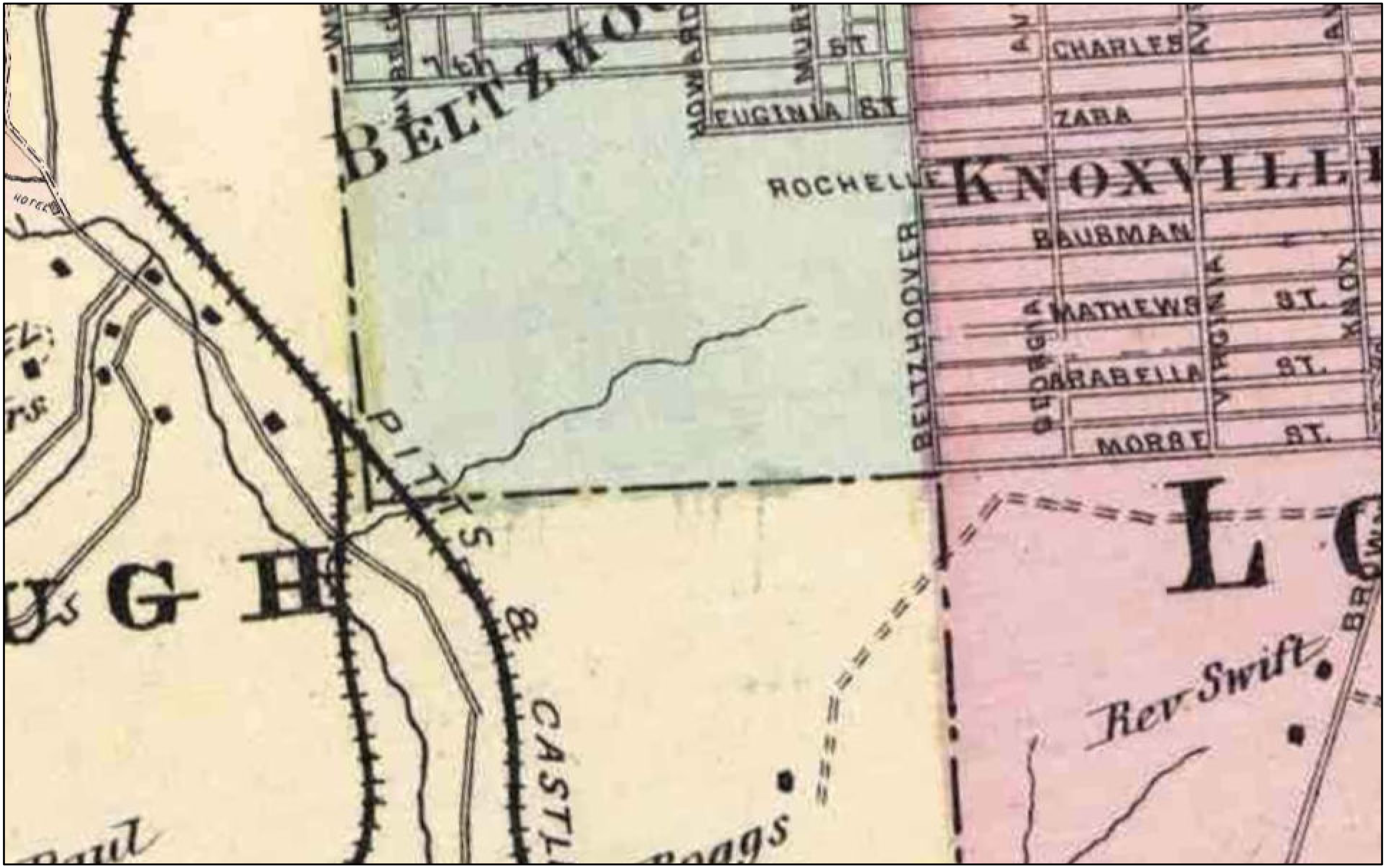
Esri, HERE, GeoTechnologies, Inc., Maxar

McKinley Park - 1872



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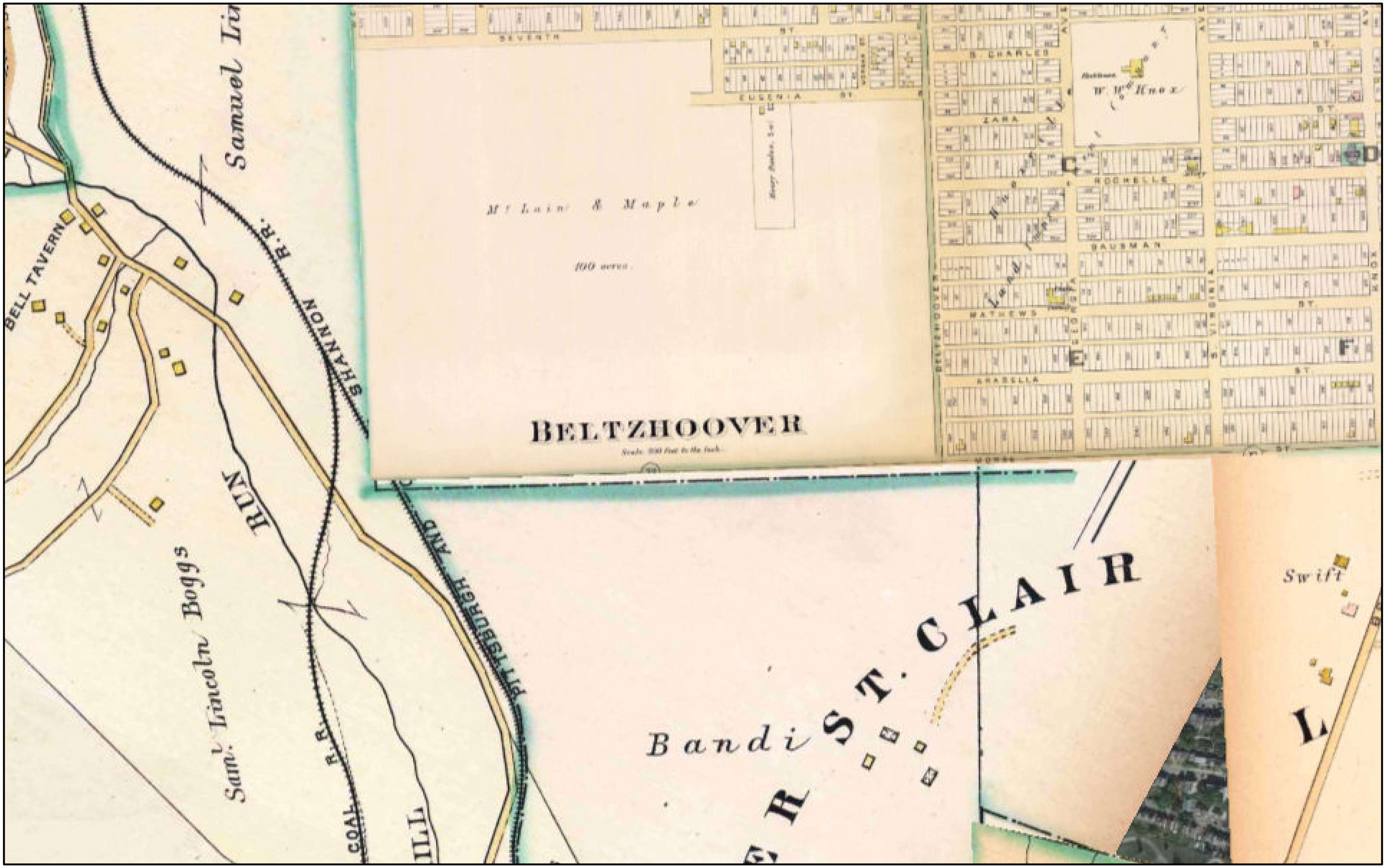
McKinley Park - 1882



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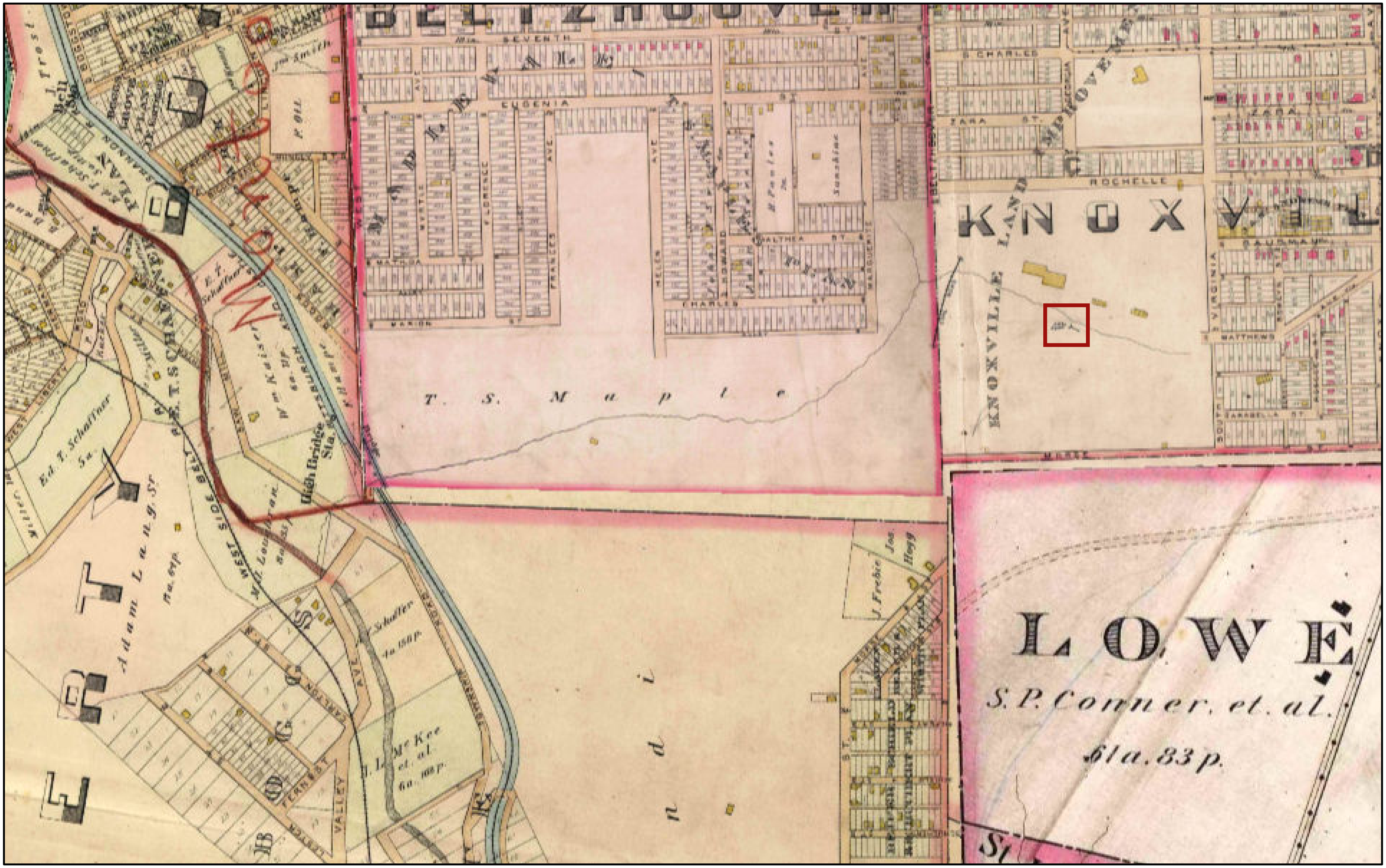
McKinley Park - 1890



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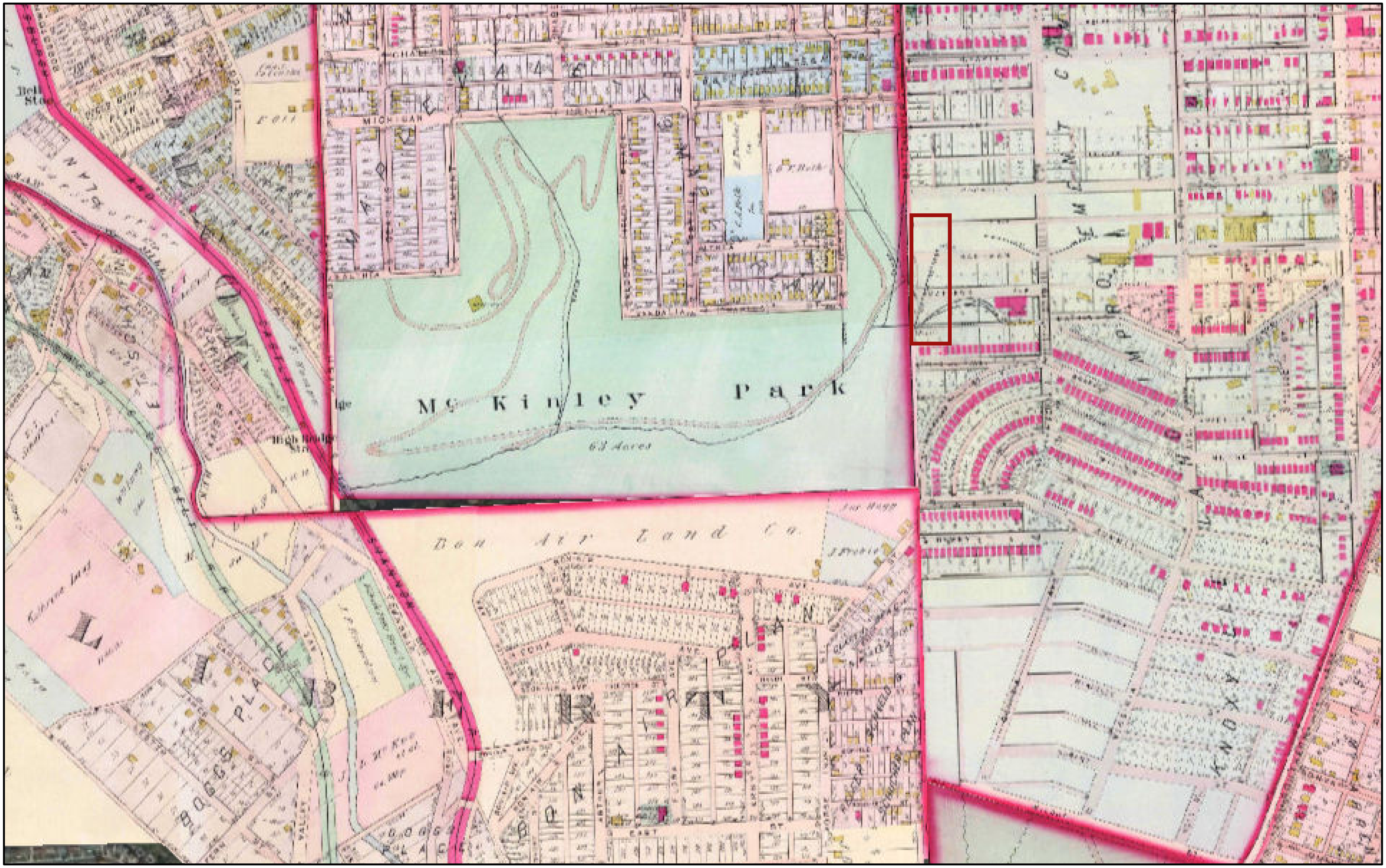
McKinley Park - 1903-06



February 24, 2022

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Historic Pittsburgh, University of Pittsburgh, Maxar

McKinley Park - 1910

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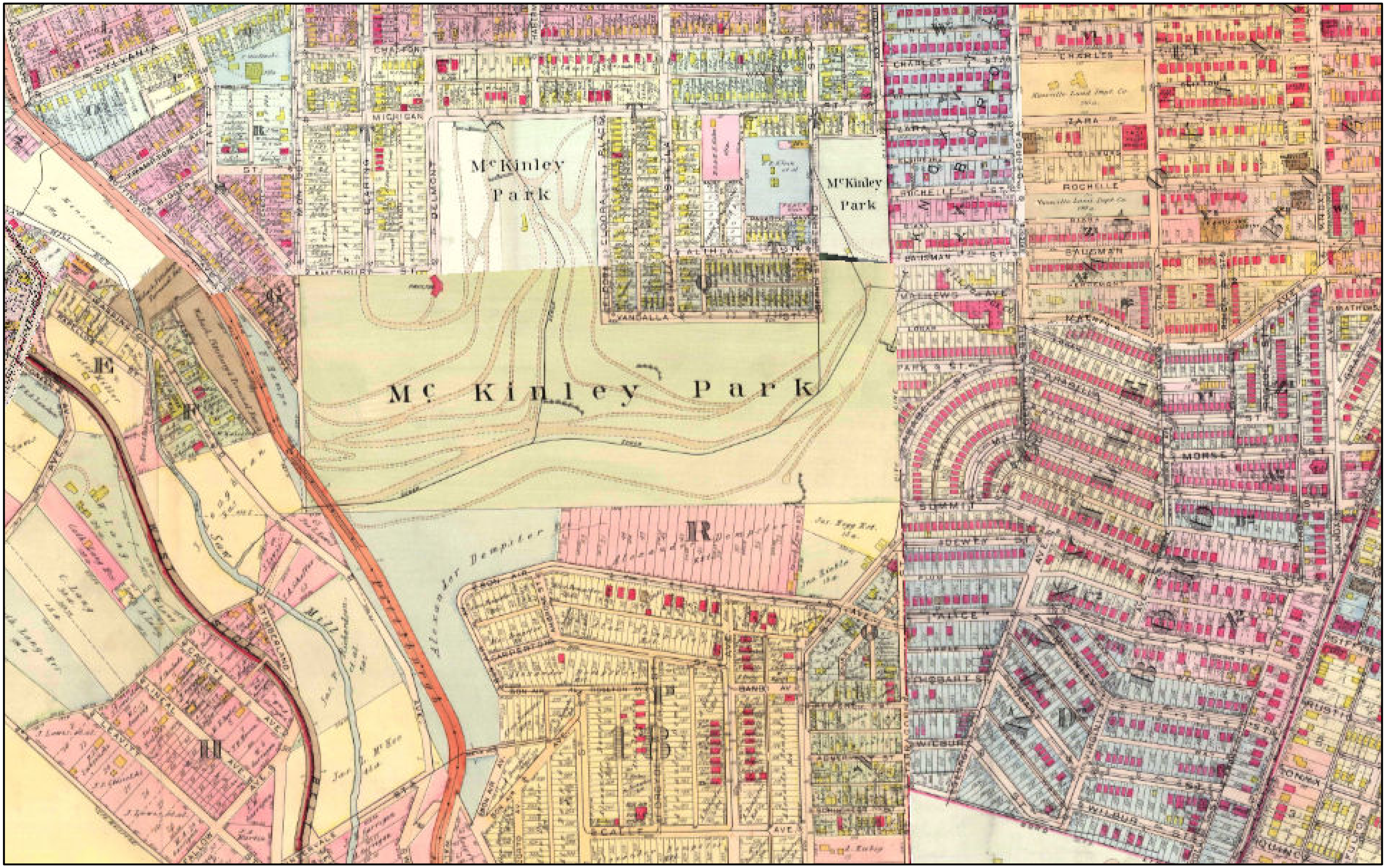
McKinley Park - 1923



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McKinley Park - 1939

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Penn Pilot, Maxar

McKinley Park - 1957

February 24, 2022

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ESRI, Penn Pilot, Maxar

McKinley Park - 1967

February 24, 2022

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Penn Pilot, USGA, Maxar

McKinley Park - 1993

February 24, 2022

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USGS, Esri, Maxar

Appendix B - Soil Survey Reports

United States Department of Agriculture

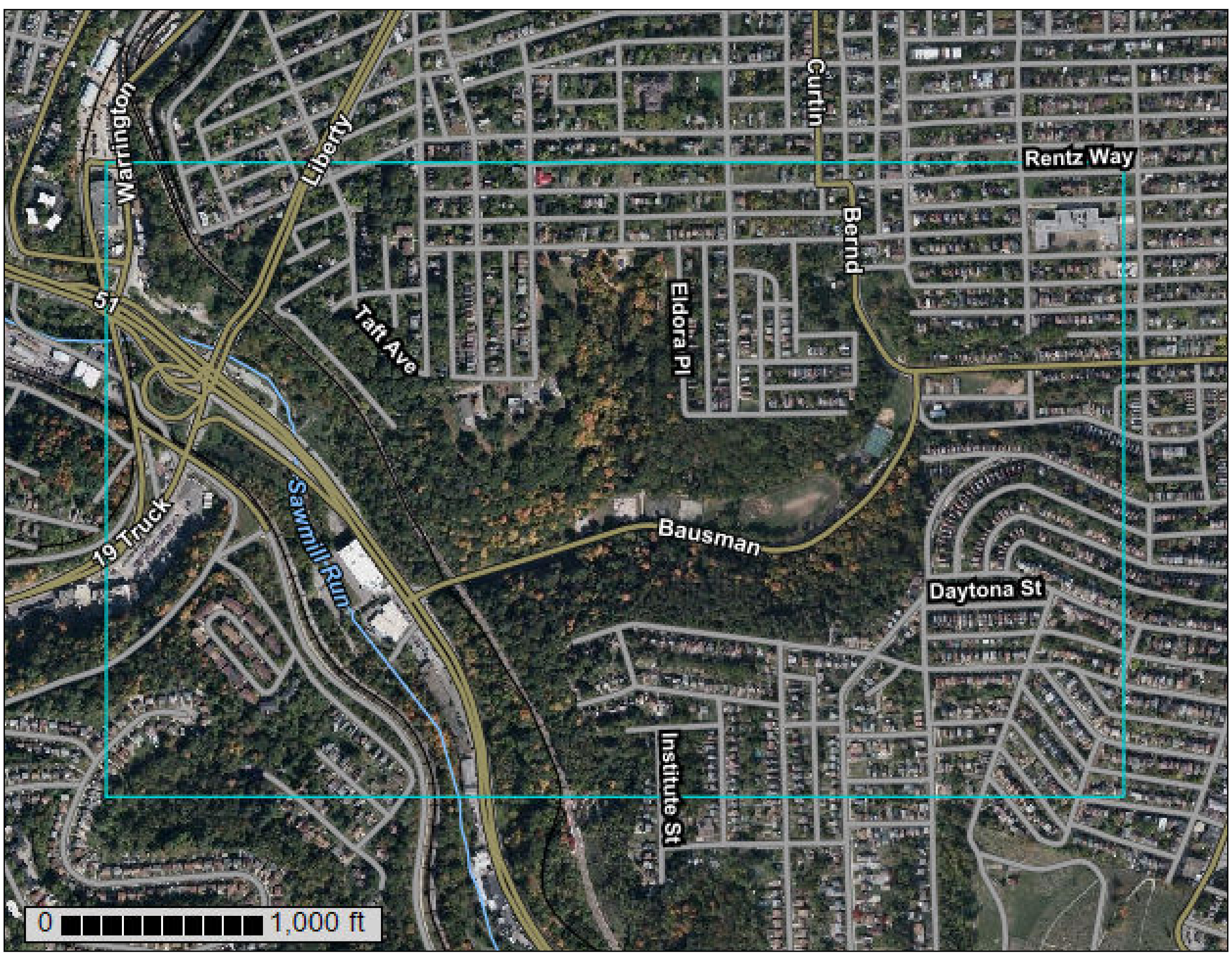
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Allegheny County, Pennsylvania



March 8, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


80° 0' 47" W
79° 59' 29" W
40° 25' 5" N
40° 24' 26" N
583800
583900
584000
584100
584200
584300
584400
584500
584600
584700
584800
584900
585000
585100
585200
585300
585400
585500
4474600
4474500
4474400
4474300
4474200
4474100
4474000
4473900
4473800
4473700
4473600
4473500
Rentz Way
Chalfont St
Liberty
Bernd
UCB
CuD
51
CuD
Bausman
CuB
UCB
UGD
Ramp
GSF
GSF
GSF
UB
Daytona St
DoD
WhC
State Hwy 51
UGB
UWD
Fordyce St
Soil Map may not be valid at this scale.
Map Scale: 1:8,440 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 100 200 400 600
Feet
0 400 800 1600 2400
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Allegheny County, Pennsylvania
Survey Area Data: Version 17, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 25, 2020—Nov 8, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CuB	Culleoka channery silt loam, 3 to 8 percent slopes	1.5	0.4%
CuD	Culleoka channery silt loam, 15 to 25 percent slopes	18.9	5.2%
DoD	Dormont silt loam, 15 to 25 percent slopes	9.0	2.5%
GSF	Gilpin, Weikert, Culleoka channery silt loams and 25 to 80 percent slopes	90.5	24.9%
UB	Urban land	53.7	14.8%
UCB	Urban land-Culleoka complex, gently sloping	3.9	1.1%
UGB	Urban land-Guernsey complex, gently sloping	4.2	1.2%
UGD	Urban land-Guernsey complex, moderately steep	174.6	48.0%
UWD	Urban land-Wharton complex, moderately steep	3.3	0.9%
WhC	Wharton silt loam, 8 to 15 percent slopes	4.0	1.1%
Totals for Area of Interest		**363.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Allegheny County, Pennsylvania

CuB—Culleoka channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2s5gm
Elevation: 720 to 1,610 feet
Mean annual precipitation: 37 to 48 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 173 to 206 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Culleoka and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 10 percent
Landform: Hills

Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

CuD—Culleoka channery silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2s5gp
Elevation: 720 to 1,610 feet
Mean annual precipitation: 37 to 48 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 173 to 206 days
Farmland classification: Not prime farmland

Map Unit Composition

Culleoka and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Dormont

Percent of map unit: 15 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

DoD—Dormont silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2s5gk
Elevation: 800 to 1,540 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Dormont and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dormont

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Fine-loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 21 inches: silt loam
Bt2 - 21 to 31 inches: silty clay loam
Bt3 - 31 to 46 inches: channery silty clay loam
Bt4 - 46 to 62 inches: channery silty clay loam
BC - 62 to 75 inches: channery silty clay loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.66 in/hr)
Depth to water table: About 24 to 44 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Culleoka

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Guernsey

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Fluvaquents

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Lowell

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

GSF—Gilpin, Weikert, Culleoka channery silt loams and 25 to 80 percent slopes

Map Unit Setting

National map unit symbol: 2wds4
Elevation: 730 to 1,380 feet
Mean annual precipitation: 37 to 41 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 179 to 206 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 35 percent
Weikert and similar soils: 30 percent
Culleoka and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 8 inches: channery silt loam
Bt - 8 to 24 inches: channery silt loam

C - 24 to 33 inches: extremely channery loam
R - 33 to 43 inches: bedrock

Properties and qualities
Slope: 25 to 80 percent
Depth to restrictive feature: 30 to 36 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Weikert

Setting
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Acid loamy residuum weathered from shale

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 7 inches: channery silt loam
Bw - 7 to 15 inches: very channery silt loam
C - 15 to 17 inches: extremely channery silt loam
R - 17 to 26 inches: bedrock

Properties and qualities
Slope: 25 to 80 percent
Depth to restrictive feature: 14 to 19 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Culleoka

Setting
Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Nonacid fine-loamy residuum weathered from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 10 inches: channery silt loam
Bt - 10 to 19 inches: channery silt loam
BC - 19 to 26 inches: very channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 41 inches: bedrock

Properties and qualities

Slope: 25 to 80 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Wharton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

UB—Urban land

Map Unit Setting

National map unit symbol: l5px
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 inches to densic material
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, steep

Percent of map unit: 10 percent
Landform: Mountains
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

UCB—Urban land-Culleoka complex, gently sloping

Map Unit Setting

National map unit symbol: l5py
Elevation: 700 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Culleoka and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas human transported material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 26 inches: channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 33 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

UGB—Urban land-Guernsey complex, gently sloping

Map Unit Setting

National map unit symbol: l5q1
Elevation: 200 to 1,200 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 75 percent
Guernsey and similar soils: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Human transported material

Typical profile

H1 - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 inches to
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Guernsey

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope

Landform position (three-dimensional): Interfluve
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Residuum weathered from limestone and calcareous shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 27 inches: silty clay loam
Btg - 27 to 47 inches: clay
Cg - 47 to 56 inches: silty clay
R - 56 to 63 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 50 to 75 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 17 to 25 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Thorndale

Percent of map unit: 5 percent
Landform: Draws
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

UGD—Urban land-Guernsey complex, moderately steep

Map Unit Setting

National map unit symbol: l5q2
Elevation: 800 to 1,200 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 75 percent
Guernsey and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Human transported material

Typical profile

H1 - 0 to 6 inches: variable

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 inches to
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Guernsey

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Residuum weathered from limestone and calcareous shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 27 inches: silty clay loam
Btg - 27 to 47 inches: clay
Cg - 47 to 56 inches: silty clay
R - 56 to 63 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 50 to 75 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 17 to 25 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D

Hydric soil rating: No

Minor Components

Library

Percent of map unit: 5 percent
Hydric soil rating: No

Culleoka

Percent of map unit: 5 percent
Hydric soil rating: No

UWD—Urban land-Wharton complex, moderately steep

Map Unit Setting

National map unit symbol: l5q6
Elevation: 740 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Wharton and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Human transported material

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 inches to
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Wharton

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Concave

Parent material: Fine-loamy residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 42 inches: silty clay loam
H3 - 42 to 60 inches: silty clay
H4 - 60 to 73 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 48 to 72 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Cavode

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Gilpin

Percent of map unit: 5 percent
Hydric soil rating: No

WhC—Wharton silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t5mm
Elevation: 620 to 2,160 feet
Mean annual precipitation: 37 to 51 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 161 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wharton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wharton

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 9 inches: silt loam
Bt1 - 9 to 16 inches: silt loam
Bt2 - 16 to 22 inches: silt loam
Bt3 - 22 to 31 inches: silt loam
BC - 31 to 46 inches: silty clay loam
C - 46 to 69 inches: channery silty clay loam
Cr - 69 to 79 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 40 to 71 inches to paralithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 16 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Forage suitability group: Unnamed (G126XYA-6OH)
Other vegetative classification: Unnamed (G126XYA-6OH)
Hydric soil rating: No

Minor Components

Gilpin

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Ernest

Percent of map unit: 5 percent

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Rarden

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Allegheny County, Pennsylvania

March 2, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


79° 54' 35" W
79° 53' 48" W
40° 27' 49" N
40° 27' 26" N
592500
592600
592700
592800
592900
593000
593100
593200
593300
593400
593500
4479800
4479700
4479600
4479500
4479400
4479300
4479200
4479100
URB
UB
GQF
UCB
UCB
URB
UCB
URB
UCB
Armstrong Way
Lincoln
Atwell St
Mount Vernon St
Lang
Monticello St
Gerritt St
Murtland
Frankstown
380
8
Soil Map may not be valid at this scale.
Map Scale: 1:5,100 if printed on A landscape (11" x 8.5") sheet.
N
0
50
100
200
300
Meters
0
200
400
800
1200
Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Allegheny County, Pennsylvania
Survey Area Data: Version 17, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 15, 2019—Nov 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GQF	Gilpin-Upshur complex, very steep	15.4	16.9%
UB	Urban land	9.9	10.9%
UCB	Urban land-Culleoka complex, gently sloping	18.5	20.2%
URB	Urban land-Rainsboro complex, gently sloping	47.5	52.0%
Totals for Area of Interest		**91.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Allegheny County, Pennsylvania

GQF—Gilpin-Upshur complex, very steep

Map Unit Setting

National map unit symbol: 2xqvc
Elevation: 680 to 1,330 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 179 to 206 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 45 percent
Upshur and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Acid fine-loamy residuum weathered from shale and siltstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: channery silt loam
Bt - 6 to 24 inches: channery silt loam
C - 24 to 30 inches: very channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 25 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Upshur

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Residuum weathered from clayey shale and/or residuum weathered from mudstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: silty clay loam
Bt1 - 6 to 9 inches: silty clay
Bt2 - 9 to 25 inches: silty clay
Bt3 - 25 to 35 inches: silty clay
BCt - 35 to 40 inches: parachannery silty clay loam
C - 40 to 50 inches: very parachannery silty clay loam
Cr - 50 to 60 inches: bedrock

Properties and qualities

Slope: 25 to 75 percent
Depth to restrictive feature: 42 to 84 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Weikert

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Culleoka

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear

Across-slope shape: Linear
Hydric soil rating: No

Guernsey

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Hazleton

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Wharton

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Hydric soil rating: No

UB—Urban land

Map Unit Setting

National map unit symbol: l5px
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 inches to densic material
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, steep

Percent of map unit: 10 percent
Landform: Mountains
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

UCB—Urban land-Culleoka complex, gently sloping

Map Unit Setting

National map unit symbol: l5py
Elevation: 700 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Culleoka and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas human transported material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Culleoka

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 26 inches: channery silt loam
C - 26 to 31 inches: very channery silt loam
R - 31 to 33 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

URB—Urban land-Rainsboro complex, gently sloping

Map Unit Setting

National map unit symbol: l5q3
Elevation: 700 to 1,100 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 176 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 75 percent
Rainsboro and similar soils: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Parent material: Human transported material

Typical profile

H1 - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 inches to
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Rainsboro

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Old alluvium

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 26 inches: silt loam
H3 - 26 to 40 inches: silt loam
H4 - 40 to 60 inches: sandy clay loam
H5 - 60 to 72 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 19 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Ginat

Percent of map unit: 5 percent
Landform: Terraces

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

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Memorandum

To: Karl Russek, University of Pennsylvania Water Center

From: AKRF, Inc.

Date: March 22, 2022

Re: PWSA Strategic Plan for Stormwater - Engineering Feasibility Analysis for Seldom Seen

As part of the Pittsburgh Water and Sewer Authority (PWSA) Strategic Plan for Stormwater, AKRF conducted a concept level engineering feasibility analysis for floodplain restoration strategies for Seldom Seen Greenway.

Existing Parcel Ownership:

Existing Allegheny County Parcel data was reviewed to determine land ownership status. As shown in Table 1, the majority of the site is owned by the City of Pittsburgh or Allegheny County with additional portions privately held by the Pittsburgh and West Virginia Railway along the active railway and Wabash Properties owning the portion of the land near the entryway to the greenway. To build floodplain management within the footprint of the site, property acquisition of private land and or land owner negotiations may be required.

Table 1. Seldom Seen Site Parcel Ownership

Parcels	Property Owner	State Description	Use Description
1	PITTSBURGH & WEST VIRGINIA RAILWAY	Utilities	R.R. USED IN OPERATION
2	WABASH PROPERTIES LLC	Industrial	LIGHT MANUFACTURING
3	CITY OF PITTSBURGH	Government	GOVERNMENT
4	COUNTY OF ALLEGHENY	Government	GOVERNMENT

Seldom Seen Historic Desktop Environmental Assessment:

Historic maps of the site were reviewed to check for any possible history of contamination around and at the project site. These maps are prepared using Pittsburgh Historic Maps (arcgis.com) website. Below are findings from this review.

- There are signs of history of industrial/mine sites around the project area.

- The stream appears to always have been present however it may have been moved locations once the West Side Belt railroad was constructed around the latter half of the 19th century. The railroad viaduct that passed over the stream has a historical marker construction date of 1902.
- Historic map of 1923 shows the presence of a residential community in the Seldom Seen Greenway with what appear to be numerous residential structures on the western bank of Saw Mill Run. These structures are present up until the 1960s.
- Previous site visits by AKRF staff to Seldom Seen have shown historical presence of fill material on the east sides of the bank directly upstream from the viaduct. Material from eroded stream banks contain large fragments of broken glass/antique glassware and burnt slag material (see Figures 6, 7, and 8).

Given the industrial history of the site and likely presence of infill material, further investigation into possible soil contamination at the site would be required as part of future design considerations.

Seldom Seen Stream Flows and Capture Potential:

Seldom Seen is a floodplain and streambank restoration project and requires engineering design considerations beyond the traditional green infrastructure project that detains and stores stormwater runoff from impervious area. Floodplain and stream bank restoration projects involve evaluation of the stream hydraulic behavior for a range of flood frequency flows. The general design goals for a successful restoration project like Seldom Seen is to stabilize eroded stream banks and create more floodplain storage by improving the stream banks and regrading the floodplains. Restoration efforts also include revegetation of the banks and floodplain areas with plantings conducive to highly erosive and wet flood prone environments.

As part of the design process, it is critical to evaluate the hydraulics of the stream and its associated floodplains. Typically, this is done using a hydraulic model such as HEC-RAS to understand stream behavior for a range of design flows and corresponding base flood elevations, velocities, and shear stresses during each design condition. This will ensure that proposed stream and floodplain improvements are able to withstand erosive conditions often seen in streams during large design floods. A stream bank assessment is also recommended as part of the design process to quantify existing streambank erosion rates for TMDL and MS4 permit pollutant crediting.

The stream hydraulics of Saw Mill Run at Seldom Seen were preliminarily evaluated at a conceptual high level for the 10-year and 100-year flood frequency flows using the existing HEC-RAS model developed by the United States Army Corps of Engineers for Saw Mill Run. It is important to note that the results of the HEC-RAS model simulations have not been QA/QC'd by AKRF nor discussed with the model developers at the Army Corps. All results should be considered preliminary and for use as high level conceptual planning purposes only. Existing streambank conditions for potential pollutant crediting were not evaluated and are beyond the scope of this work.

Existing Stream Flows

Stream flows on Saw Mill Run can rise very quickly and result in dangerous public safety flash floods. On September 6, 2018 at the intersection of Saw Mill Run Boulevard and Woodruff Street (the main entrance to Seldom Seen) was closed due to flooding. The Saw Mill Run USGS stream flow gage for this rain event was obtained and is shown in Figure 1. Water depths during this flood event rose 3 feet in approximately 30 minutes and quickly receded back to previous levels in about 2 hours after the peak. Given the steep topography of the Saw Mill Run watershed, impervious area cover, and lack of upstream stormwater management, streams flows during flood events in Seldom Seen are likely very "flashy" with rapid changes in depth and velocity.

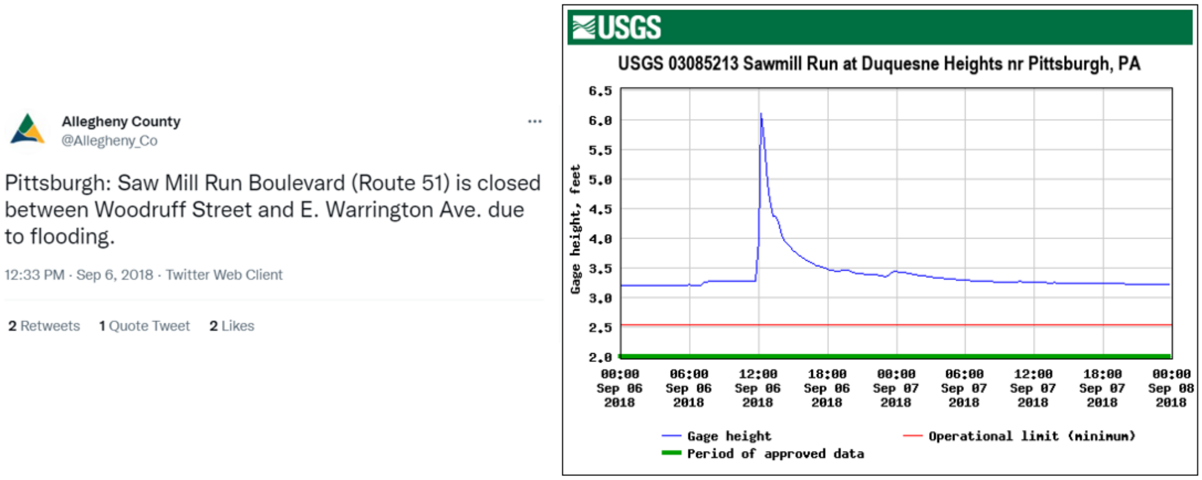
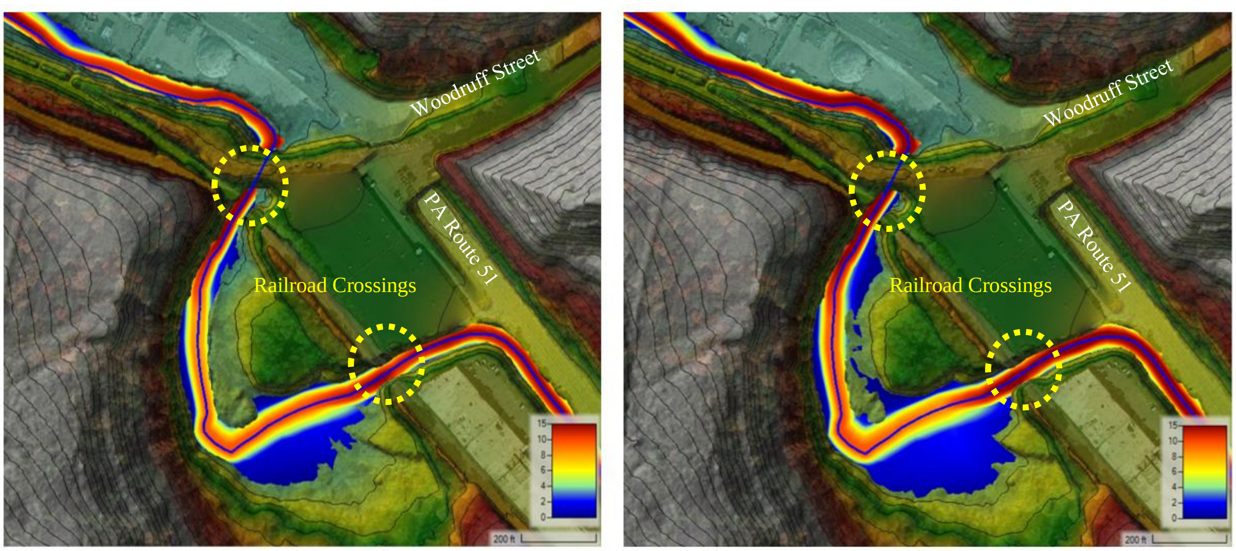


Figure 1. Rapid Rise in Saw Mill Run Stream During September 8, 2018 Flood Event

According to the HEC-RAS model for Saw Mill Run, peak stream flows through Seldom Seen for the 10-year and 100-year event are 4,333 cfs and 7,333 cfs, respectively. According to USGS Stream Stats report generated for the project area expected baseflows at Seldom Seen are approximately 5 cfs. This is a very large change in flow in relatively short duration. Any floodplain and stream bank restoration project in Seldom Seen must consider these rapid changes in stream flow regime within the Saw Mill Run stream. Intensifying rain events from climate change should also be considered as the stream flood flows may be higher than what is predicted in the HEC-RAS model.

Stream Channel Velocities

According to the HEC-RAS model simulation results, stream velocities in Seldom Seen for the both the 10-year and 100-year event are approximately 10 feet per second in the main portion of the stream channel. In the narrower stream sections through the railroad viaduct crossings at the upstream and downstream portion of the site velocities exceed 15 feet per second. Figure 2 depicts the maximum stream velocities in Seldom Seen as per the HEC-RAS model. Any stream channel or stream bank improvements must consider these types of velocities as part of the design.

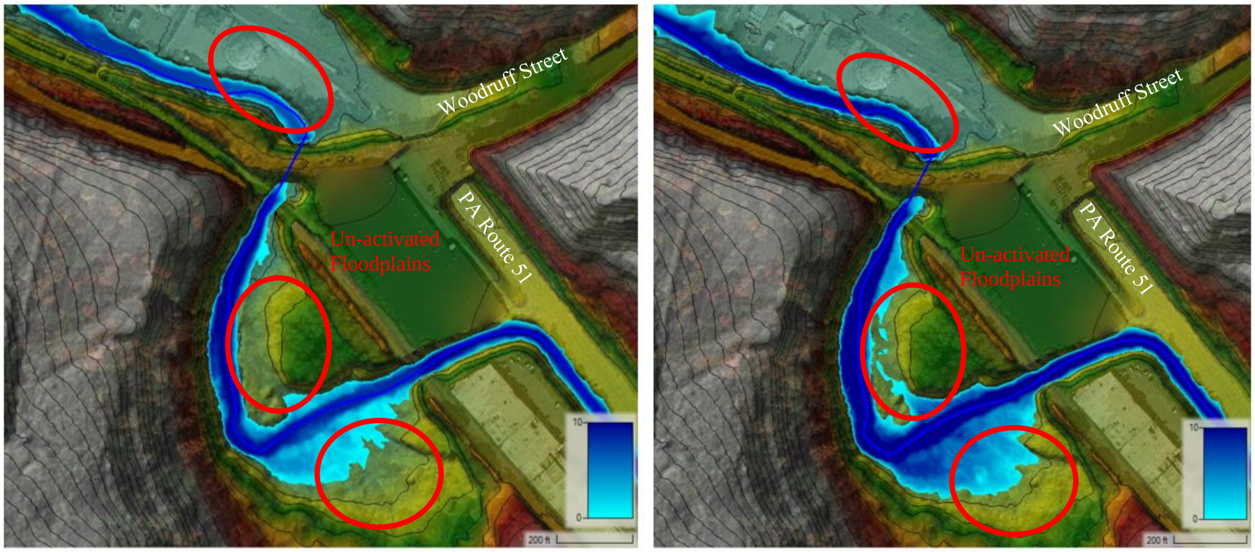


10-year stream velocity 100-year stream velocity

Figure 2. Seldom Seen HEC-RAS Maximum Stream Velocity Results (legend in fps)

Floodplain Activation

Healthy streams should naturally overtop their banks into the floodplain during large storm events. This provides peak flood mitigation and storage, as well as valuable filtration and settling of pollutants and sediments. The HEC-RAS model was used to determine the existing floodplain activation in Seldom Seen for the 10-year and 100-year events and are shown in Figure 3.



10-year stream water depths 100-year stream water depths

Figure 3. Seldom Seen HEC-RAS Maximum Stream Water Depth Results (legend in feet)

As shown in Figure 3, the adjacent floodplains in Seldom Seen only partially activate. This is especially evident in the areas circled in red on Figure 3. It is evident that more effective floodplain activation could be realized in Seldom Seen. Potential realized floodplain storage is primarily a regrading exercise by modifying the existing terrain and re-simulating the HEC-RAS model to confirm appropriate activation typically during a 1 or 2-year flood event. This iterative modeling process is outside the scope of this work. However, the areas indicated in Figure 3 in red are approximately 4 acres in total combined area. Assuming these areas were regraded to capture 2 feet of additional flood plain storage this would be equal to approximately 8 ac-ft of storage on the site. The quantity of soil to excavate this much material to achieve this storage was not estimated and is beyond the scope of work. However, removal of soil would likely be substantial, especially on the eastern side of the Seldom Seen where historic infill is suspected.

Seldom Seen Constructability and Long-Term O&M Considerations:

- Existing sewers infrastructure is not present according to PWSA GIS layers provided. Water and gas utilities were not obtained for the project area.
- Site access for heavy machinery to excavate and remove soil will be a challenge. The project site is surrounded by adjacent steep hillsides, two railroad lines (based on conversations with Lisa Brown from Watersheds of South Pittsburgh it is suspected that one line is active and the other is not), and industrial buildings (see Figure 4). For the contractor to get excavators and trucks into the site, it may be needed to cut a long access road from the hilltop on Brashear High School that is graded at a low slope for truck access. Contractor site access via underneath the historic viaduct at the main entrance to Seldom Seen may be infeasible depending on the size of the equipment needed. The viaduct is narrow with minimal overhead clearance (See photo in Figure 5.) Additionally, the land at the viaduct entrance to Seldom Seen is not owned by the City of Pittsburgh and is owned by a combination of the railroad company and Wabash Properties LLC. Access easements via the viaduct may be needed to be discussed with both property owners to access the site via the main entrance.

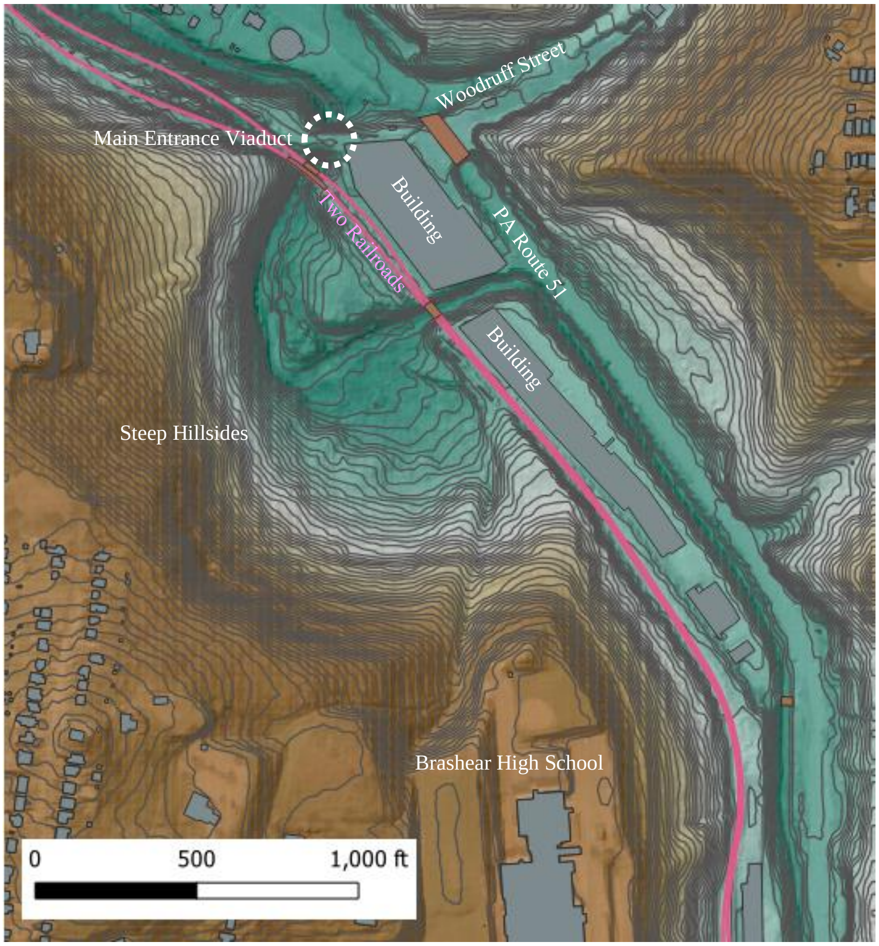


Figure 4. Site Access Constraints (Contours are shown at 5' interval)

Figure 5. Viaduct Main Entrance Clearance Access Constraint

- Soil contamination and offsite disposal requirements will need further exploration and will impact costs pending results. Given the history of Pittsburgh in-fill practices, evidence of dumping in the area, and presence of contamination, offsite soil removal may be needed. See photos in Figures 6, 7, and 8 (photos provided courtesy of Lisa Brown) of stream bank on the eastern side of Seldom Seen with evidence of significant dumping and infill.

Figure 6. Eastern Streambank with Evidence of Historic Infill

Figure 7. Eastern Streambank with Evidence of Historic Infill

Figure 8. Eastern Streambank with Evidence of Historic Infill

- Existing foundations of the historic Seldom Seen residential community that were abandoned in the 1960s is unknown and a significant source of cost uncertainty. The condition and thickness of building foundations for removal may be expensive. The placement of foundations in relation to existing steep hillsides will also need further consideration as removal of foundations that may destabilize the toe of adjacent steep hillsides.
- As previously discussed in this memo, stream flows, depths, and velocities in Saw Mill Run rapidly change from baseflow to flood condition in a matter of minutes. High stream velocities and shear stresses should be considered as part of the design. This may necessitate the design of stream banks with larger boulder sizes that can withstand these conditions and not mobilize during flood events. Hydraulic bypass during high flood flows using structures such as weirs may need to be considered to protect sensitive stream restoration components and plantings.
- Given the large urbanized upstream drainage area (~15 square miles), trash and litter within the stream and floodplains will be a continual source of on-going maintenance for any project constructed in Seldom Seen. This will likely necessitate semi-annual volunteer pickups, as are currently being done by the Watersheds of South Pittsburgh.