BOROUGH OF HADDON HEIGHTS
Camden County, New Jersey

Sanitary Sewer Asset Management Plan

EXECUTIVE SUMMARY

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(Revised November 2023)

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Introduction

The Borough has entered into a funding agreement with the New Jersey Infrastructure Bank to prepare a grant compliant Asset Management Plan for the Borough's Sanitary Sewer System in accordance with the New Jersey Department of Environmental Protection (NJDEP) / New Jersey Infrastructure Bank (NJIB) Small System Asset Management grant requirements.

As generally described by the New Jersey Department of Environmental Protection, an Asset Management Plan documents a utility's asset management program. Therefore, the Plan should be considered a set or compilation of documents and resources that guide and inform the utility's day-to-day activities and decision-making associated with its Asset Management Program.

An asset management plan must also be prepared in a manner that provides for continuous change and allows for modifications to the asset management documentation and will require review, revisions, and updates on a regular basis.

The NJDEP highly recommends that the Asset Management Plan be maintained in an electronic format that can be easily revised and updated. This is critical to the effectiveness of the plan as an ongoing tool for the Borough to reach short and long term goals and objectives. The Asset Management Plan also must be easily accessible in order for Borough's personnel to have the ability to revise and improve the plan over time. In keeping with the NJDEP's recommendations, the Borough has implemented the Sanitary Sewer Asset Management Plan utilizing Cartegraph Asset Management software.

The Sanitary Sewer Asset Management Plan addresses the following required NJDEP / NJIB required components for the entirety of the Borough's sanitary sewer system:

1. Asset Inventory / Mapping and Condition Assessment
2. Level of Service
3. Criticality / Prioritization Assessment
4. Life Cycle Costing
5. Long-term Capital Funding Strategy

1. Asset Inventory / Mapping and Condition Assessment

In accordance with the NJDEP / NJEIT Small System Asset Management grant requirements, all the Borough's Sanitary Sewer System assets have been horizontally mapped in accordance with digitized GIS format mapping conforming to the "New Jersey Department of Environmental Protection Mapping the Present to Protect New Jersey's Future: Mapping and Digital Standards" as outlined in NJAC 7:1D.

The Sanitary Sewer System's assets were field surveyed and incorporated into a GIS mapping of the system which includes all relevant data (manhole rim and elevation inverts, gravity main elevation inverts, and force main elevation inverts).

In addition, the condition of each individual asset (including ranking system) and remaining useful life of the individual assets were determined and recorded in compliant GIS data fields.

Asset Inventory:

The Borough of Haddon Heights' sanitary sewer system assets consist of three (3) sanitary sewerage pump stations and a collection system consisting of approximately 115,000 linear feet of gravity sanity sewer main, 6,600 linear feet of sanitary sewer force main, and 414 sanitary sewer structures (manholes and chambers). It is noted that the Borough's sanitary sewer system is comprised of four (4) distinct subsystems. It is also noted that individual sanitary sewer laterals are not owned / operated by the Borough but are owned / operated by the individual property owners which the laterals service.

The Borough's Sanitary Sewer System was initially constructed in 1911 and expanded in 1923 and 1929. Additional significant expansion of the gravity sewer system and expanded in the 1950s.

Areas of the gravity sewer system are over 110 years old with overall average age of the system being between 70 to 95 years old. The sewer mains vary in size from 8 inch to 15 inch in diameter and generally consist of terracotta pipe (vitrified clay) but there are also sections of cast iron and ductile iron pipe (as compared to today's standard of PVC pipe). The sanitary sewer manholes are generally brick and mortar structures (as compared to today's standard of reinforced concrete manholes).

For the three (3) sanitary sewer pump stations – the Maple Avenue Station is 95 +/- years old, the Cedar Avenue Pump Station is 70+/- years old, and the Lake Street Pump Station was reconstructed in 2015. There was a fourth pump station located on King's Highway adjacent to the County Park which was eliminated and decommissioned by a new direct connection the CCMUA system in 2015. The three (3) pump stations have cast iron force mains which are over 95 +/- years old for the Maple Avenue and Lake Street pump stations and 70 +/- years old for the Cedar Avenue pump station.

The four (4) distinct subsystems are generally comprised of the contributory flow areas to each of the three (3) existing and operating pump stations (Maple Avenue, Cedar Avenue, and Lake Street) and to the location of the 2015 CCMUA direct connection which was former location of the decommissioned and demolished King's Highway Pump Station.

Condition Assessment:

Based on field inspections and the limited asset data on file with the Borough, each asset was categorized into condition levels on a five point scale: New 1, Good 2, Fair 3, Poor 4, and Failing 5.

As referenced above, the Maple Avenue Station is 95 +/- years old, the Cedar Avenue Pump Station is 70 +/- years old, and the Lake Street Pump Station was reconstructed in 2015. The cast iron pipe force mains associated with the Maple Avenue and Lake Street pump stations are 95 +/- years old and the cast iron pipe force main associated with the Cedar Avenue pump station is 70 +/- years old.

To generally determine the age of the gravity sewers and associated manholes, available construction data was utilized for when parcels were developed. Attached as Map 1 is a year banded "heat map" illustration of parcel development. Utilizing this data, the age of the Borough's Sanitary Sewer System assets was generally determined and are illustrated as Map 2.

From review of the above referenced maps, it is evident that generally 52% percent of the Borough's Sanitary Sewer System is 95 +/- years old, with 45% being 70 +/- years old, and finally the new Glover Mill development being 3 years old representing 3%. It is noted that several sections of the gravity sewer are older than 95 years; however, due to lack of available installation data, these sections of gravity sewer have been included in the area of the Borough that were generally development 70+/- years ago and 95 +/- years ago.

The age of the assets is necessary for evaluation of Life Cycle Costs which are discussed under Section 4. Life Cycle Costs of this summary report.

2. Level of Service

Level of Service (LOS) refers to the intended goals of the Borough in regard to how the sanitary sewer system and associated assets are expected to operate. In accordance with the grant requirements, LOS consideration may involve whatever components, services and goals the utility and customers deem appropriate; provided all regulatory requirements are met. For the Borough of Haddon Heights, each system asset provides sanitary sewer service to developed parcels. Failure of any asset will cause an interruption in level of service to affected parcels and in turn affected residents.

Consistent with NJDEP's "Asset Management Guidance and Best Practices" LOS consideration, the Cartegraph Asset Management program will enable the Borough's staff to plan and track (including costs) the following items:

- Regular Operations and Maintenance (In house and by vendor)
- Reduction of Inflow and Infiltration (I&I)
- Reduction of the number of service interruptions
- Reduction of emergency repairs
- Customer inquiries and responses
- Required regulatory reporting
- Renewal and Replacement

The Borough's Sanitary Sewer System asset data has been imported into the Cartegraph Asset Management computerized software program. Bach Associates has initialized the software program to have data fields available to plan and track the above Level of Service goals and considerations listed above.

Our office will assist the Borough staff in the input of current ongoing asset operations and maintenance items and will assist the Borough staff in becoming familiar with the software program operation, program data retrieval, and program data input.

It is noted that Reduction of Inflow and Infiltration (I&I) is an especially important consideration for the Borough of Haddon Heights as the Borough agreed to initiate an infiltration / inflow removal program under the terms of the January 22, 2013 "Intermunicipal Agreement Providing for the Direct Connection to the CCMUA Regional Interceptor System between the Camden County Municipal Utilities Authority and the Borough of Haddon Heights."

It is also noted that Renewal and Replacement is also an important consideration as Borough records indicate that, with the exception of the 2015 reconstruction of the Lake Street Pump Station, the Borough has not undertaken any renewal and replacement activities.

3. Criticality / Prioritization Assessment

Per the NJDEP, a function central to managing utility assets is justifying timely investments in particular assets before others. To responsibly prioritize the repair or replacement of specific infrastructure components, a utility can make informed management decisions based on the criticality of an asset and the risk and significance of failure to the operation of the system. The threat of an asset failing potentially compromises a utility's ability to function and meet performance standards. This compromised function exposes the utility to adverse consequences, from both a financial and regulatory standpoint. Greater exposure of this risk is associated with assets deemed critical to the operation of the system and those that are more likely to fail before reaching the end of their useful life.

Utilizing the condition ratings established under the Asset Inventory / Mapping and Condition Assessment task delineated above, all assets have been scored in terms of vulnerability, probability of failure, and consequences of failure. The scoring not only considers conditions, but also which assets are most critical.

This analysis identifies and prioritizes the Borough's system assets that should be repaired, replaced, or improved as well as establish the costs necessary to accomplish the prioritized items.

Critical assets that are in need of prioritized timely renewal and replacement include:

- Maple Avenue Pump Station – Reconstruction of Maple Avenue Pump Station in a similar manner to the Lake Street rehabilitation effort undertaken in 2015. Estimated Cost: $629,000.

- Lake Street Pump Station – Supplemental pumping equipment to accommodate inflow and infiltration during significant rainfall events and mitigate surcharging of upstream gravity sanitary sewers. Estimated Cost $344,430.50.

- Replacement of 68 sanitary sewer manhole frames and castings due to poor or failed condition. Estimated Cost: $102,000.

- Kings Highway CCMUA Direct Connection - Requirement of this interconnection with the CCMUA was the installation of a flow meter. Estimated Cost: $15,000.

Subtotal: $ 1,090,430.50

Additional critical assets that are in need of prioritized renewal and replacement include:

- Hillside Avenue Inverted Siphons. Construction of pressure rated access manholes and sliplining of 8 inch cast iron inverted syphons from Prospect Ridge Blvd to Narberth Avenue (1,095 LF) and from Haverford Avenue to Hillside Avenue (360 LF): Estimated Cost: $291,000

- Cedar Avenue Pump Station – Rehabilitation / renewal of this station includes new controls, panel boxes, submersible pumps, a new concrete driveway apron, and perimeter fencing. The existing wet well is in generally good condition but is in need of several minor repairs to extend its useful operational life. Estimated Cost: $220,000

Subtotal: $ 511,000

Assets that have or will soon exceed their design life cycles (per Section 4. Life Cycle Costs) and should be scheduled for renewal / replacement included:

- 52% of system's terra cotta gravity sanitary sewer main and brick sanitary sewer manholes. Age: 95 +/- years. Design Life Cycle 100 years. Slip lining of mains and lining of manholes. Estimated Cost $9,930,000

- Replacement of force main for Maple Avenue Pump Station. Age: 95 +/- years. Design Life Cycle: 75 years. Estimated Cost: $590,000

- Replacement of force main for Lake Street Pump Station. Age: 95 +/- years. Design Life Cycle: 75 years. Estimated Cost $255,000

- Replacement of force main for Cedar Avenue Pump Station. Age: 95 +/- years. Design Life Cycle 75 years. Estimated Cost: $160,000

Subtotal: $ 10,620,000

It is noted that prioritization for renewal and replacement of the above assets should be determined considering several factors including but not limited to condition, size, location, depth below grade, frequency of emergency repairs, and anticipated street paving schedules.

Assets for which have longer term renewal and replacement planning should be implemented include:

- 45% of system's terra cotta gravity sanitary sewer main and brick sanitary sewer manholes. Age: 70 +/- years. Design Life Cycle 100 years. Slip lining of mains and lining of manholes. Estimated Cost $8,600,000.

It is noted that prioritization for renewal and replacement of the above assets may be advanced as factors including but not limited to condition, size, location, depth below grade, frequency of emergency repairs, and anticipated street paving schedules change.

4. Life Cycle Costs

As referenced above, all of the Borough's sanitary sewer system assets have been imported into the Cartegraph Asset Management computerized software program. Bach Associates has initialized the software program to have data fields available to plan and track Life Cycle Costs.

Per the NJDEP, the process of developing life cycle costs must address a schedule for maintenance, repair, and replacement as well as capital improvements that is informed by the critical assets' prioritization assessment.

The Cartegraph Asset Management computerized software program has preset fields and functions that allows the Borough to employ selected automated maintenance schedules, work order management, and tracking of maintenance, repair, and replacement costs. With continued data input of these costs by Borough personnel, this will allow the Borough to plan for expected annual system operation costs.

With the exception of the 2015 Lake Street Pump station rehabilitation, the new sanitary sewer associated with the Glover Mill development, and limited areas of replacement due to emergency repairs; the remaining Sanitary Sewer System assets are original.

The following are generally accepted design service life cycles for the Sanitary Sewer System components:

Terra Cotta Vitrified Clay Pipe	100 years
Brick Sanitary Sewer Manholes	100 years
Cast Iron Force Main	75 years
Cast Iron Inverted Siphons	75 years
Sanitary Sewer Pump Stations	40 years

Age of the Borough's Sanitary Sewer System components / assets in comparison of design service life cycles are delineated in the above section "3. Criticality / Prioritization Assessment".

5. Long-Term Capital Funding Strategy

A funding Strategy should be employed by the Borough which includes funding source(s), estimated annual expenditures to address identified criticality/priority areas (including repairs, replacements, and improvements) required to meet system operational goals and objectives and environmental standards.

As referenced above; Borough records indicate that, with the exception of the 2015 reconstruction of the Lake Street Pump Station, the Borough has not undertaken any renewal and replacement activities. However, it is noted that the 2020 Municipal Budget included a capital line item of $300,000 towards Pump Station Improvements over 3 years (2020 – 2022)

In regard to funding sources of capital renewal and replacement projects, the State of New Jersey recommends that municipalities obtain capital financing for sanitary sewer capital projects through the New Jersey Infrastructure Bank (NJIB).

The NJIB currently has financing abatable for terms up to 30 years with a blended interest rate of 1.25% (50% of financed amount at 0% interest rate and 50% of financed amount at market interest rate which is currently 2.5%).

In regard to revenue to support debt service for capital renewal and replacement projects, the Borough of Haddon Heights currently funds the operation and any associated debt service of the Borough's Sanitary Sewer System from the Borough's general tax revenue.

It is noted that Audubon, Bellmawr, and Barrington Borough are three (3) of the municipalities adjacent to Haddon Heights which operate their municipally owned sanitary sewer system use intensities (ie such as single family dwelling, multi-family dwelling based on number of units, or commercial base type, size, and other characteristics).

For comparison purposes, we have listed existing sewer use charges for a single family dwelling in Audubon, Bellmawr, and Barrington Boroughs:

Audubon Borough	$120 / year for a Single Family Dwelling (Flat Rate)
Barrington Borough	$232 / year for a Single Family Dwelling (Flat Rate)
Bellmawr Borough	$ 62 / year for a Single Family Dwelling (Flat Rate)

Mt. Ephraim and Haddonfield Borough are two (2) additional municipalities which are adjacent to Haddon Heights but have sanitary sewer systems that are owned and operated by New Jersey American Water Company. For comparison purposes, we have listed the existing sewer use charges for a single family dwelling in Haddonfield and Mt. Ephraim Boroughs:

Haddonfield Borough	$474 / year for a Single Family Dwelling (Calculate Rate)
Mt. Ephraim Borough	$109 / year for a Single Family Dwelling (Flat Rate)

It is noted that the Haddonfield Borough annual sewer use charge is calculated on a single family dwelling generating 300 gallons per day of sanitary sewer flow (per USEPA).

While the Borough of Haddon Heights does not have a quantified listing of the number of sanitary sewer users and associated usage rates, the following may be useful to the Borough. The Camden County Municipal Utilities Authority (CCMUA) currently lists Haddon Heights Borough of having 3,583 equivalent domestic units (EDU).

The CCMUA has a specific schedule of projected sanitary use intensities (ie such as single family dwelling, multi-family dwelling based on number of units, or commercial base type, size, and other characteristics) and lists a single family dwelling as equal one DCU. For analysis purposes and utilizing a similar calculation of DCUs as employed by the CCMUA, he Borough can consider the Borough's Sanitary Sewer System as servicing the equivalent of 3,583 single family homes.

Conclusion

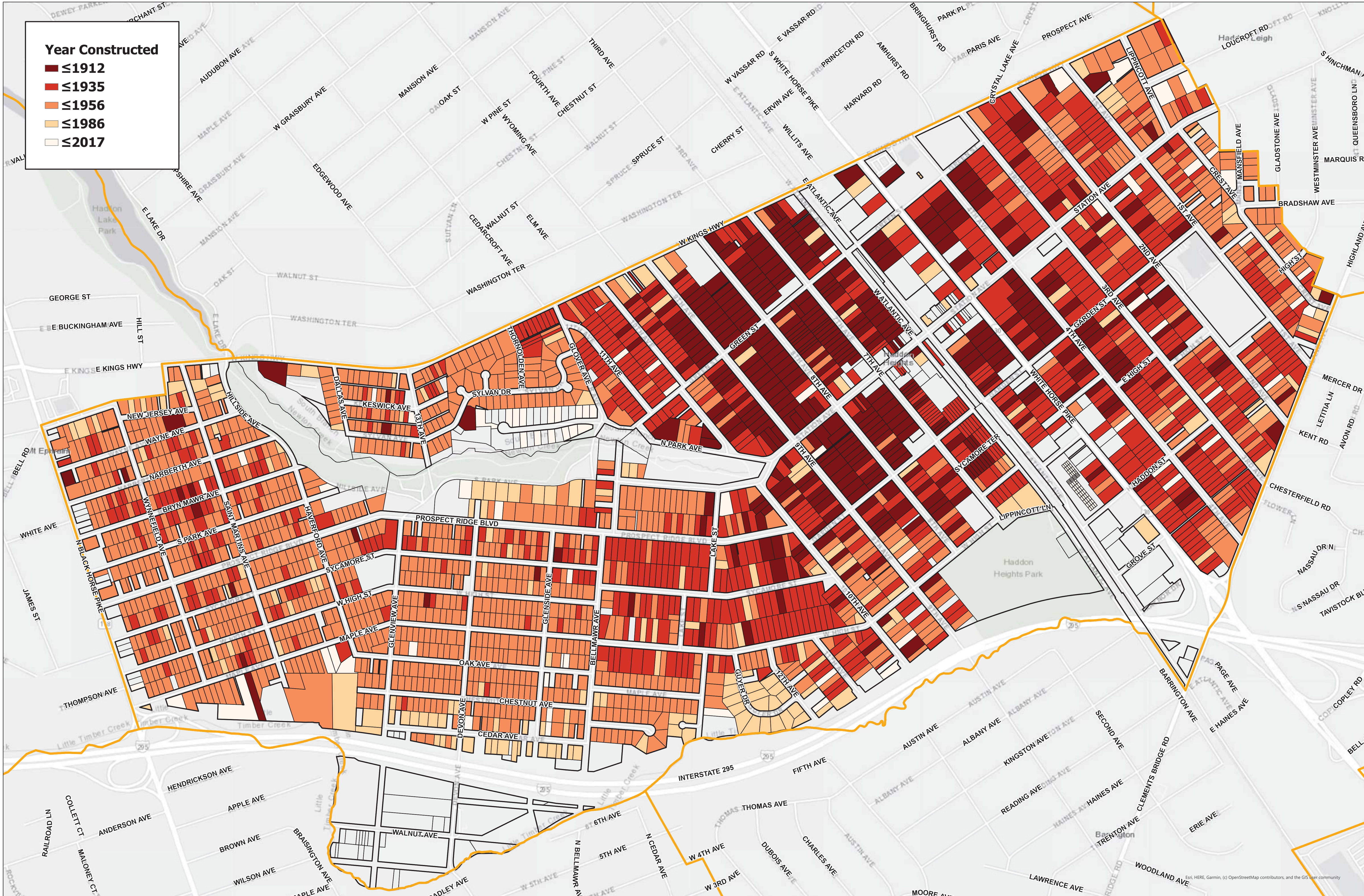
The above was provided as an executive summary of the set or compilation of documents and resources that currently comprise the Borough's Sanitary Sewer Asset Management Program. Detailed data and alternative scenario analysis can be obtained utilizing the initialized Cartegraph Asset Management program.

In addition, the priorities and costs outlined in this executive summary are subject to change as additional updates to the asset management data is reviewed, revised, and updated on a continuing and regular basis.

The Borough's Sanitary Sewer Asset Management Program and the contents of this Executive Summary are to be considered as an additional tool that is available to the Borough of Haddon Heights to inform and guide the Borough in the operation of the Borough's Sanitary Sewer System.

MAP 1

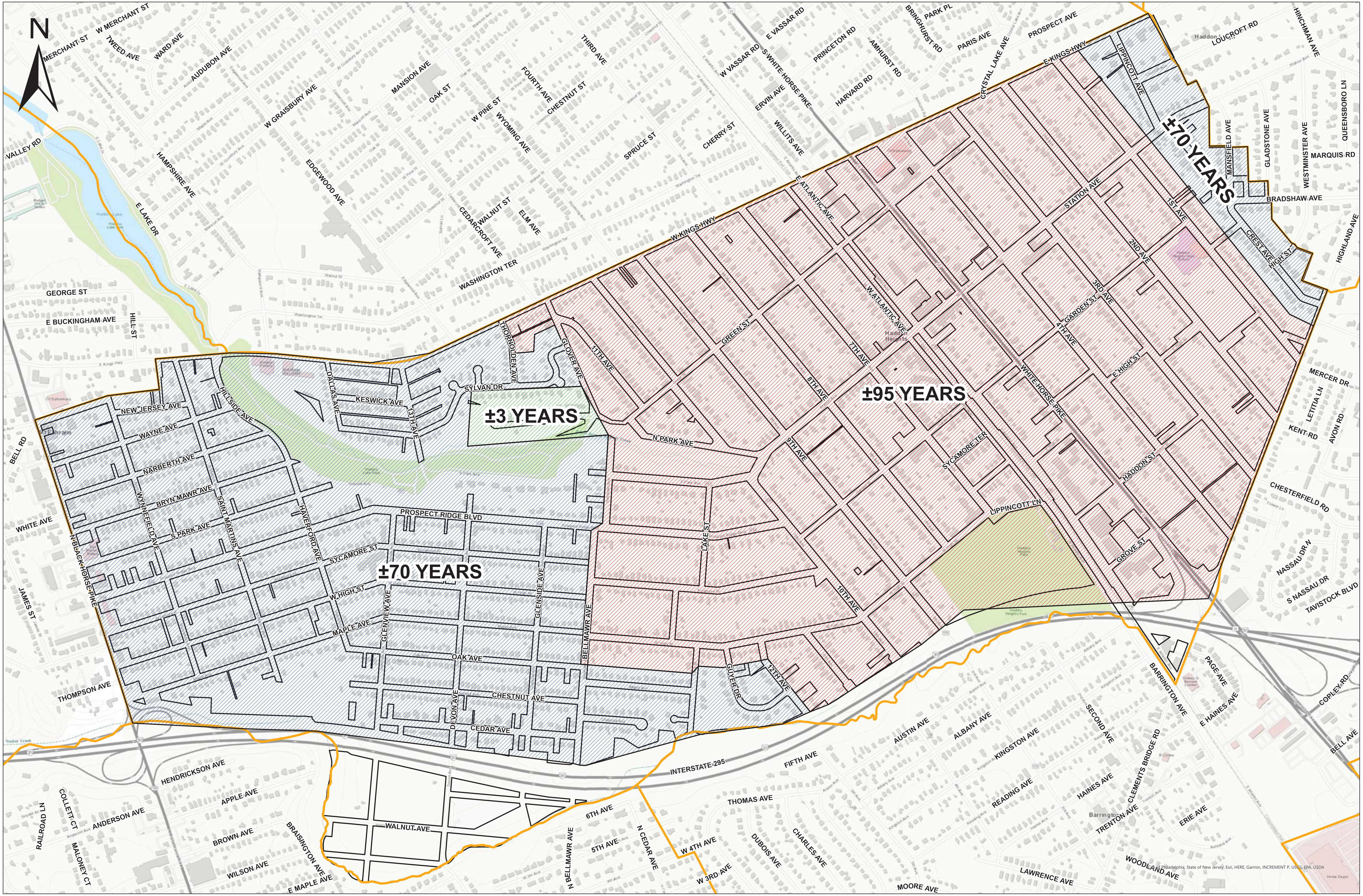
Year Banded “Heat Map” Illustration of Parcel Development



Year Constructed
≤1912
≤1935
≤1956
≤1986
≤2017
Haddon Heights
Haddon Heights Park
W KINGS HWY
E KINGS HWY
WHITE HORSE PIKE
N BLACK HORSE PIKE
STATION AVE
W ATLANTIC AVE
E ATLANTIC AVE
PROSPECT RIDGE BLVD
SYCAMORE ST
W HIGH ST
E HIGH ST
MAPLE AVE
OAK AVE
CHESTNUT AVE
CEDAR AVE
LAKE ST
BELL MAWR AVE
GLENSIDE AVE
GLENVIEW AVE
DEVON AVE
HAVERFORD AVE
SAINT MARTINS AVE
WYNNEFIELD AVE
NEW JERSEY AVE
WAYNE AVE
NARBERTH AVE
BRYN MAWR AVE
S PARK AVE
N PARK AVE
HILLSIDE AVE
DALLAS AVE
KESWICK AVE
13TH AVE
12TH AVE
11TH AVE
10TH AVE
9TH AVE
8TH AVE
7TH AVE
4TH AVE
3RD AVE
2ND AVE
1ST AVE
GREEN ST
GARDEN ST
HADDON ST
GROVE ST
LIPPINCOTT LN
LIPPINCOTT AVE
SYCAMORE TER
SYLVAN DR
THORN OLDEN AVE
GLOVER AVE
GUYER DR
CREST AVE
MANSFIELD AVE
HIGH ST
INTERSTATE 295
WALNUT AVE
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

MAP 2

Age of Sanitary Sewer System Assets


N
±95 YEARS
±70 YEARS
±70 YEARS
±3 YEARS
W MERCHANT ST
MERCHANT ST
TWEED AVE
WARD AVE
AUDUBON AVE
VALLEY RD
HAMPSHIRE AVE
E LAKE DR
W GRAISBURY AVE
EDGEWOOD AVE
MANSION AVE
OAK ST
W PINE ST
WYOMING AVE
FOURTH AVE
CHESTNUT ST
THIRD AVE
SPRUCE ST
CHERRY ST
WALNUT ST
ELM AVE
CEDARCROFT AVE
WASHINGTON TER
W VASSAR RD
E VASSAR RD
S WHITE HORSE PIKE
ERVIN AVE
WILLITS AVE
PRINCETON RD
HARVARD RD
AMHURST RD
BRINGHURST RD
PARK PL
PARIS AVE
CRYSTAL LAKE AVE
PROSPECT AVE
E KINGS HWY
W KINGS HWY
E ATLANTIC AVE
W ATLANTIC AVE
LIPPINCOTT AVE
LOUCROFT RD
HINCHMAN AVE
QUEENSBORO LN
GLADSTONE AVE
WESTMINSTER AVE
MARQUIS RD
MANSFIELD AVE
BRADSHAW AVE
CREST AVE
HIGH ST
HIGHLAND AVE
STATION AVE
1ST AVE
2ND AVE
3RD AVE
4TH AVE
GARDEN ST
E HIGH ST
GREEN ST
7TH AVE
8TH AVE
9TH AVE
10TH AVE
11TH AVE
12TH AVE
13TH AVE
WHITE HORSE PIKE
SYCAMORE TER
HADDON ST
GROVE ST
LIPPINCOTT LN
N PARK AVE
LAKE ST
GEORGE ST
E BUCKINGHAM AVE
HILL ST
NEW JERSEY AVE
WAYNE AVE
NARBERTH AVE
BRYN MAWR AVE
S PARK AVE
HILLSIDE AVE
WYNNEFIELD AVE
SAINT MARTINS AVE
HAVERFORD AVE
DALLAS AVE
KESWICK AVE
SYLVAN DR
THORNDLDEN AVE
GLOVER AVE
PROSPECT RIDGE BLVD
SYCAMORE ST
W HIGH ST
MAPLE AVE
OAK AVE
CHESTNUT AVE
CEDAR AVE
GLENVIEW AVE
DEVON AVE
GLENSIDE AVE
BELLMAWR AVE
GLOVER DR
N BLACK HORSE PIKE
BELL RD
WHITE AVE
JAMES ST
THOMPSON AVE
MERCER DR
LETITIA LN
AVON RD
KENT RD
CHESTERFIELD RD
NASSAU DR N
S NASSAU DR
TAVISTOCK BLVD
PAGE AVE
E HAINES AVE
BARRINGTON AVE
COPLEY RD
BELL AVE
INTERSTATE 295
HENDRICKSON AVE
APPLE AVE
ANDERSON AVE
BROWN AVE
WILSON AVE
BRAISINGTON AVE
E MAPLE AVE
RAILROAD LN
COLLETT CT
MALONEY CT
WALNUT AVE
6TH AVE
5TH AVE
N BELLMAWR AVE
N CEDAR AVE
W 4TH AVE
W 3RD AVE
DUBOIS AVE
CHARLES AVE
THOMAS AVE
FIFTH AVE
AUSTIN AVE
ALBANY AVE
KINGSTON AVE
READING AVE
SECOND AVE
HAINES AVE
CLEMENTS BRIDGE RD
TRENTON AVE
ERIE AVE
WOODLAND AVE
LAWRENCE AVE
MOORE AVE