SEPTEMBER 2016

Potomac River Project A

PROJECT BOOKLET

Prepared for the

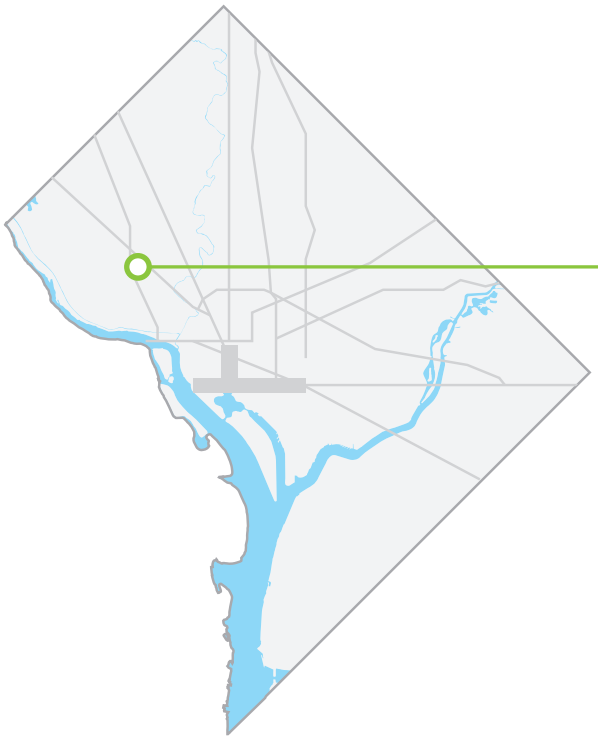
National Capital Planning Commission

Prepared by the

District of Columbia Water and Sewer Authority

dc water is life®

dc clean RIVERS PROJECT



Permeable Pavement Alleys

Permeable Pavement Parking Lanes

Planter Bioretention

Curb Extension Bioretention

DC CLEAN RIVERS PROJECT

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
Washington, DC

National Capital Planning Commission Project Booklet

DC Clean Rivers Project
Potomac River Project A (PR-A)

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September 2016

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Note – Graphic materials for NCPC use provided separately.

DC Water and Sewer Authority
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I. Narrative Materials and Data

A. Purpose and Project Contacts

The District of Columbia Water and Sewer Authority (DC Water) is implementing a Long Term Control Plan (LTCP), also referred to as the DC Clean Rivers Project (DCCR), to control combined sewer overflows (CSOs) to the District of Columbia's (District) waterways. DCCR is comprised of a variety of projects to control CSOs, including pumping station rehabilitation, targeted sewer separation, Green Infrastructure (GI) in two sewer drainage areas within DC, and a system of underground storage/conveyance tunnels. DCCR is being implemented in accordance with a first amendment to the Consent Decree (Amended Consent Decree), entered in the District Court on January 14, 2016, which amends and supersedes the 2005 Consent Decree (Consent Decree). The Potomac River Project A (PR-A) is the second GI contract to be submitted for review.

This undertaking is not located on any federal lands nor will it be constructed with any federal funds, but will be constructed entirely in District Department of Transportation (DDOT) public space. Additionally, this undertaking is located directly to the north of the historic district of Old Georgetown with no portion of this undertaking falling within the historic district's bounds. DC Water has prepared this Project Booklet for review and consideration by the National Capital Planning Commission (NCPC) and the DC Historic Preservation Office (HPO).

The following is the project contact information for PR-A:

Bethany Bezak
Green Infrastructure Manager
5000 Overlook Avenue, SW
Washington, DC 20032
Phone: 202-787-4466
E-mail: bethany.bezak@dcwater.com

Or

Caitlin Feehan
Green Infrastructure Planning Coordinator
5000 Overlook Avenue, SW
Washington, DC 20032
Phone: 202-787-4784
E-mail: caitlin.feehan@dcwater.com

B. Narrative Description of the Project

1. Background

The PR-A Project Area is located within the Glover Park and Burleith neighborhoods in northwest Washington, DC, as shown in Appendix A, and includes approximately 130 acres of area. This Project Area was selected for the following reasons:

- Feasibility of design and construction;
- Availability and feasibility of monitoring locations; and
- Representative land use characteristics typical of Potomac River GI Area.

The Project Area is partially bisected by Whitehaven Parkway and Holy Rood Cemetery with the northern Glover Park area approximately bounded by Fortieth Place NW on the West, Wisconsin Avenue NW to the East and Calvert Street NW to the North. The southern portion of the Project Area is within the Burleith neighborhood and extends from Thirty-Fifth Street NW to Thirty-Ninth Street NW and is bounded by Reservoir Road NW to the South.

The Project Boundary depicted on the various drawings and illustrations included in this report depicts the boundary associated with the drainage area being captured by the proposed GI technologies. This boundary is the study area for evaluation of resources and feasibility of construction. While the drainage boundary may include small portions of National Park Service land, no land disturbance activities or construction activities are proposed on any federal or privately-owned land within the Project Area.

An Overall Briefing is provided in Appendix B which provides the timeline of DCCR's development and the Amended Consent Decree's schedule for GI implementation. In addition, the Briefing presents the various GI technology options evaluated and provides an overview for PR-A. It should be noted that the names of the projects and the larger areas that the projects fall within (also known as GI Areas) correspond to the drainage shed for those areas which flow to Rock Creek and those that drain to the Potomac River rather than the location in which the GI technology is proposed to be constructed. Therefore, the PR-A Project Area drains to the Potomac River.

2. Project Summary

The Amended Consent Decree stipulates that the first project in the Potomac River GI Area (PR-A) will be designed to manage the volume equivalent of 1.2 inches of rain falling on 44 impervious acres. Appendix C presents a map of the proposed locations for GI to meet the Amended Consent Decree requirement. Of the various GI technologies presented in the Overall Briefing, four technologies were selected for implementation in PR-A. These technologies include:

- Permeable pavement in parking lanes;
- Permeable pavement in alleys;

- Planter bioretention behind the curb line within the planting strip; and
- Curb extension bioretention.

Permeable pavement facilities use pavement engineered to allow stormwater to flow through spaces in the pavement surface to a storage layer (often composed of gravel) below. The facilities then temporarily store the runoff allowing it to infiltrate into the in-situ soils or flow slowly into a suitable outlet (such as an existing sewer or stormwater pipe). In PR-A, permeable pavement facilities will be used to replace (or be used in lieu of) traditional impervious pavements as they offer similar functionality with respect to vehicle and pedestrian traffic and closely replicate the existing roadway appearance. As illustrated in Appendix C, permeable pavement facilities were sited in two locations – within the parking lane (Permeable Pavement Parking Lane) and within alleys (Permeable Pavement Alleys).

Bioretention facilities collect runoff in shallow, vegetated depressions. The facilities then filter and temporarily store the runoff allowing it to infiltrate the in-situ soils or flow slowly into a suitable outlet (such as an existing sewer or stormwater pipe). As illustrated in Appendix C, bioretention facilities were sited in two locations – within the planting strip between sidewalks and curbs (Planter Bioretention) and within the section of road between the parking lane and the intersection (Curb Extension Bioretention).

Each of these GI technologies and their siting is further described in the Section below. The volume of stormwater runoff capture varies by GI technology.

C. Area of Site and Allocation of Uses

For each of the four technologies selected, typical renderings demonstrating the before and after conditions at representative locations are included in Appendix F. Typical details for each technology are shown in Appendix G. These details demonstrate the typical plan view and section view for the technology employed. These details can be correlated with the Proposed GI Location Map in Appendix C for all the locations proposed within the PR-A Project Area. To further exemplify the technologies proposed, photos of existing GI installations, which are similar in nature (although not in specific detail) from around the country are provided in Appendix H. These photos are representative only, but provide real life images of how these measures are being implemented and incorporated into streetscapes across the country.

For the four technologies selected for use in PR-A, the sections below further discuss the facilities associated with each technology. Each of the four technologies will be constructed using typical details and all will look similar to the typical renderings provided. This uniformity in design will result in similar visual appeal, regardless of the street or alley. Since photos and renderings of each location would appear essentially the same, representative photos of the existing conditions of streets and alleys in the Project Area are provided in Appendix I. These photos adequately depict the general character and condition of the neighborhood in which these technologies are proposed.

As this project is a design-build project, each technology location where there is land disturbance, requiring erosion and sediment controls will be submitted for permitting through

the established DC permitting process during the design-builder final design. Those final plans will include all erosion and sediment controls, any required traffic controls and will meet all District regulations. The nature of the design-build process requires that DC Water provide Request for Proposal drawings showing the siting and the design of the GI technologies along with the required review by stakeholder agencies with jurisdiction as these require a certain lead time prior to award of the contract. Therefore, DC Water is requesting this review and final approval prior to awarding the contract to the design-builder who will then obtain the necessary B-CIV permits based on the approved locations. Because the design-builder will finalize the design using the locations presented in Appendix C, technical feasibility and/or any unforeseen constraints may cause the design-builder to shift facilities slightly on a street or to eliminate facilities.

1. Permeable Pavement in Parking Lanes

Based on the topography and flow patterns, portions of the roadway parking lanes are optimal for capturing stormwater. To capture and manage this flow, permeable pavement facilities were sited starting at the lowest end of the parking lane on a street. Depending on how much stormwater volume each facility needed to manage, the capture area was extended part way or all the way up the parking lane. In order to minimize the visual impacts to the neighborhood, porous asphalt pavement was selected as most closely matching the existing conditions. The porous asphalt pavement choice for portions of parking lanes in existing roadways will be further visually integrated on blocks where this technology will be implemented by milling and overlaying traditional asphalt adjacent to the facilities as required by DDOT

This interface between new porous asphalt pavement and traditional asphalt pavement is shown in the typical rendering on Beecher Street NW (Appendix F). Actual photos of a project in upstate New York (Appendix H) are provided to also show that interface between the two pavement types. The photos demonstrate the slight difference in texture of porous asphalt adjacent to non-porous asphalt. As shown in the typical details, the two subsurfaces of theses pavements will be separated by a geotextile edge restraint.

There are approximately 80 locations where porous asphalt pavement facitilies are proposed in the parking lanes within the Project Area as indicated on the map in Appendix C. These locations represent the maximum implementation of GI within the project area. As noted above, the project scope may be reduced as required.

2. Permeable Pavement in Alleys

Permeable pavement was also sited in the alleys within the PR-A Project Area. The location of the alleys that will be retrofitted with permeable pavement can be seen on the map in Appendix C. Similar to permeable pavement in the parking lane, certain key areas of the alley are appropriate to capture stormwater runoff. However, entire alley segments will be resurfaced to provide a visually continuous alley surface and to enhance the condition and appearance of the alleyways. Appendix F includes a rendering of the concrete pavers and porous concrete, either of which may be installed in alleys which are currently concrete and a rendering of the porous asphalt which will be installed in those alleys currently with an asphalt surface. The design-build teams may also propose the use of brick pavers.

Unlike the consistency in surface material found along roadways, the existing pavement within the alleys of the Project Area varies in both pavement material and condition as can be seen in the representative existing conditions photos provided in Appendix I. While the existing conditions vary, the material is generally asphalt or concrete. DCCR generally proposes to construct all alleys where a GI technology is proposed using either porous asphalt, permeable pavers, or porous concrete. Generally, the material will be chosen to most similarly match the material currently found in each alley. In one particular case, though, where an alley's current surface is a mix of concrete and asphalt, concrete pavers were requested specifically by the ANC commissioners. That location is presented as a rendering in Appendix F.

Appendix C notes where facilities will be located. Representative photos of a similar project in DC are provided in Appendix H. These photographs represent the general quality of workmanship and appearance (the actual shape of the paver, if used, may vary). Renderings of a representative alley with permeable concrete pavers, porous concrete and porous asphalt are provided in Appendix F and labeled with the corresponding alley location. It can be seen in the renderings, as well as in the typical detail in Appendix G, that there will be an exposed concrete edge restraint in alleys which will enhance the durability of the pavement facility.

There are approximately 60 locations where permeable pavement facilities are proposed in alleys within the Project Area (locations in Appendix C). These locations represent the maximum implementation of GI within the project area. As noted above, the project scope may be reduced as required.

3. Planter Bioretention

Planter bioretention is sited in the existing grass strip between the sidewalk and the street as a way to divert and capture stormwater runoff from the curb and gutter. These facilities are generally located along the block at various locations which are optimal for capture of stormwater. Some of the locations where planter bioretention has been sited will include expanded underground storage which extends under the sidewalk. However, all the planter bioretention areas will appear similar visually. In establishing the location of these structures, existing trees, pedestrian access, federal properties, and potential historic properties, in addition to the stormwater capture requirements, have been considered during the planning process.

Appendix F includes a typical rendering of planter bioretention at Milmarson Place NW. The surface of the planter bioretention is designed to start approximately seven inches below the gutter. Therefore, an eighteen inch high toe guard fence will surround the bioretention area when directly adjacent to pedestrian walkways for safety as required by DDOT. The fence detail can be seen in the typical planter bioretention rendering in Appendix F.

The planting templates and palettes for the bioretention facilities are also provided in Appendix F. The planting palette includes plant sizes at maturity. A total of seven varieties

of plants have been selected to be used in the various configurations shown in the planting templates. The planter bioretention rendering is intended to demonstrate one of the planting templates and palettes provided in Appendix F, while the curb extension bioretention rendering represents another of the planting templates and palettes.

Representative photos of similar projects in Columbus, Ohio and New York are provided in Appendix H. These photographs represent the general quality of workmanship and appearance, while the actual planting, configurations and materials will vary.

There are approximately 40 locations where planter bioretention areas is proposed within the Project Area (locations shown in Appendix C). These locations represent the maximum implementation of GI within the project area. As noted above, the project scope may be reduced as required.

4. Curb Extension Bioretention

Curb extension bioretention is sited within the unused space at the end of the parking lanes before the intersection to capture stormwater runoff from the gutter and street. Because the facilities replace traditional pavement with a vegetated surface, these GI technologies can provide additional traffic-calming and pedestrian safety benefits, protect parked vehicles near an intersection, and contribute to the reduction of the heat island effect in the District. This technology functions similarly to the planter bioretention while providing pedestrian access at the crosswalks as can be seen in the typical detail provided in Appendix G.

As with the other technologies, representative photos of the existing conditions in the Project Area for some of the locations where this technology is proposed can be found in Appendix I. A rendering of a proposed curb extension bioretention facility location is included in Appendix F. The same seven varieties of plants will be utilized as described above for the planter bioretention areas and the curb extension planting templates are also included in Appendix F. Appendix H demonstrates projects in Portland, Oregon and Philadelphia where curb extension bioretention facilities have been successfully implemented.

There are approximately 10 locations where curb extension bioretention is proposed within the Project Area (locations shown in Appendix C). These locations represent the maximum implementation of GI within the project area. As noted above, the project scope may be reduced as required.

D. Area of Buildings and Site Coverage

In terms of land use and zoning, all of the GI technologies proposed in PR-A are proposed within the DDOT public space. Construction will be in conformance with DDOT requirements and be permitted through the DDOT construction plan approval process. In addition the individual locations will receive DOEE review through the established DCRA B-CIV permit process. Typical executed DCRA Environmental Intake Forms are provided. Due to the number of forms, these forms are provided digitally on the enclosed CD under Appendix K.

A zoning overlay map is provided in Appendix D demonstrating the surrounding zoning classifications. While the public space is not subject to zoning constraints, the surrounding zoning classifications include the following: R-1-B, R-3, R-5-A, and C-2-A. These zoning classifications represent residential and commercial business uses, such that the proposed GI Project will not negatively impact the community.

E. Assigned Employment

In 2015, DC Water and the District Government signed the *Memorandum of Agreement Between DC Water And The Government of the District of Columbia Regarding Job Opportunities for District Residents and Contracting Opportunities for District Businesses for Designing, Constructing, Inspecting, and Maintaining Green Infrastructure* (Green Jobs MOA). The Green Jobs MOA established a goal that "at least fifty-one percent (51%) of new jobs created by contracts or procurements entered into by DC Water" to implement GI for the Amended Consent Decree be filled by District residents.

The Green Jobs MOA includes specific targets DC Water will use to escalate hiring of DC residents to meet this goal over the coming years. The PR-A contract will include requirements that the design-builder hire District residents when new employees are needed. DC Water will also provide training and certification opportunities for District residents that perform construction, inspection, and maintenance of GI as part of this project.

F. Relationship of the Project with Agency's Master Plan

PR-A is being implemented to comply with a requirement in DC Water's Amended Consent Decree. The Amended Consent Decree specifies the required volume of runoff to be managed by GI, and the schedule for implementation of the DCCR Project. As indicated in the Amended Consent Decree, GI will be constructed in the CSOs 027, 028, and 029 sewershed areas, which discharge combined sewage during heavier rain events to the Potomac River, to manage 133 impervious acres to the 1.2" retention standard. The 1.2" retention standard is defined as the volume of runoff equivalent to 1.2" of rain falling on an acre of impervious surface. The GI implementation requirements in the Amended Consent Decree for the Potomac River GI Area indicate that there will be three construction contracts to implement GI, which will be phased for planning and construction. PR-A is planned to satisfy the requirements for the first contract of the Amended Consent Decree within the Potomac River GI Area and be the first GI area implemented to meet the established master plan.

G. Coordination with Other Agencies

Over the past few years, DC Water has closely coordinated with the following agencies to facilitate the permitting process and construction of the DCCR project:

- National Capitol Planning Commission (NCPC);
- Commission of Fine Arts (CFA);

- Department of Consumer and Regulatory Affairs (DCRA);
- District of Columbia State Historic Preservation Office (HPO);
- District Department of Energy and Environment (DOEE);
- District Department of Transportation (DDOT);
- Office of the Deputy Mayor for Planning and Economic Development (DMPED);
- Federal Highway Administration (FHWA);
- National Park Service (NPS); and
- United States Army Corps of Engineers (USACE).

More specifically, PR-A, due to location and scope, requires coordination with NCPC, HPO, DDOT, DOEE and DCRA. Coordination, review and permitting efforts are underway with these agencies.

H. Community Participation

The Proposed GI Locations Map in Appendix C indicates the boundaries of the Advisory Neighborhood Commissions (ANC) that oversee the Project Area. Portions of the Project Area fall within ANC2E and ANC3B. The dates of meetings with these ANC's and a detailed summary of community outreach and public feedback, can be found in Appendix J. A total of three ANC presentations have been held along with numerous other public meetings, presentations, and events. Public feedback has been collected from over 200 individuals and addressed where appropriate.

I. Construction Schedule

The Amended Consent Decree requires specific deadlines for GI implementation for the first GI contract in Potomac River, including that the construction contract must be awarded by June 23, 2017 and all GI must be constructed and placed into operation by June 23, 2019. Following completion of the contract, PR-A will be monitored in 2019 through 2020 to assess GI performance.

J. Estimated Cost of Project and Funding Status

The four GI technologies described above have costs which vary between $16 and $29 dollars per gallon of stormwater managed. This project DC Water Ratepayer funded via the Impervious Area Charge (IAC).

K. Transportation Management Program (TMP)

The implementation of PR-A in the public space will not result in any change in employment or daily traffic in or around the neighborhoods.

II. Environmental Documentation

DC Water has done extensive research concerning the applicability of NEPA or Section 106 of NHPA to PR-A. Appendix K provides the findings and justification that PR-A is not a federal undertaking and that this local and discrete portion of DCCR is not subject to NEPA or Section 106 of NHPA. However, DC Water will follow the appropriate local laws governing District of Columbia projects pursuant to Section 9b of the Historic Landmark and Historic District Protection Act of 1978. The Historic Preservation Section below addresses these issues.

Appendix K includes, as part of the environmental documentation, 121 Environmental Intake Forms duly executed by the Department of Consumer and Regulatory Affairs (DCRA) indicating that an Environmental Impact Screening Form is not required. Note that these documents are included digitally on the enclosed CD and are not provided in paper format. Additionally, these intake forms are configured to be prepared for each square and lot (individual parcels) where a project is proposed. Because this entire project is within the public space, one form was completed for each block within the project area by selecting a lot along that block and then adding notes to indicate the applicability to the public space on that particular block.

III. Historic Preservation Documentation

As part of the historic preservation documentation, DC Water has prepared a Phase 1A Archaeological Assessment of the entire Project Area. The report and findings are located in Appendix L. DC Water's archaeologist had previously consulted with DC HPO to reach concurrence on the methodology. Several methodologies were employed to identify areas of prior disturbance or confirm that the proposed facilities would not impact the area of concern. Two locations were identified where it appears that prior disturbance has not taken place. In both of these two locations, DC Water will follow the recommendation of the archaeologist and either avoid the area or implement monitoring during construction. A draft Monitoring and Unanticipated Archaeological Discoveries Investigations Work Plan has been included as part of Appendix L. Once comments have been received from DC HPO, the work plan will be finalized and will incorporate the appropriate contract language to obligate the design-builder to follow the approved procedures.

A Section 9b Assessment of Effects Report was prepared on behalf of DC Water and is included in Appendix M. In order to meet the Amended Consent Decree schedule, this report was undertaken in a way to assess effects as quickly and efficiently as possible. In consultation with DC HPO, it was assumed that all resources are potentially eligible for listing on both the DC Inventory and NRHP. This approach allows the assessment of effects to be written prior to completing the research required for the full Determinations of Eligibility (DOE) for potentially eligible resources within the Project Area. Based on the analysis in this report, it has been determined that the implementation of GI technologies throughout the Project Area will not cause adverse effects on historic resources.

IV. Floodplain Management and Wetlands Protection

The proposed GI within PR-A will decrease stormwater runoff to the respective watersheds and the siting for all the GI facilities is outside the 100-year floodplain elevation for each of the sites. There are no impacts to wetland areas as part of this project.

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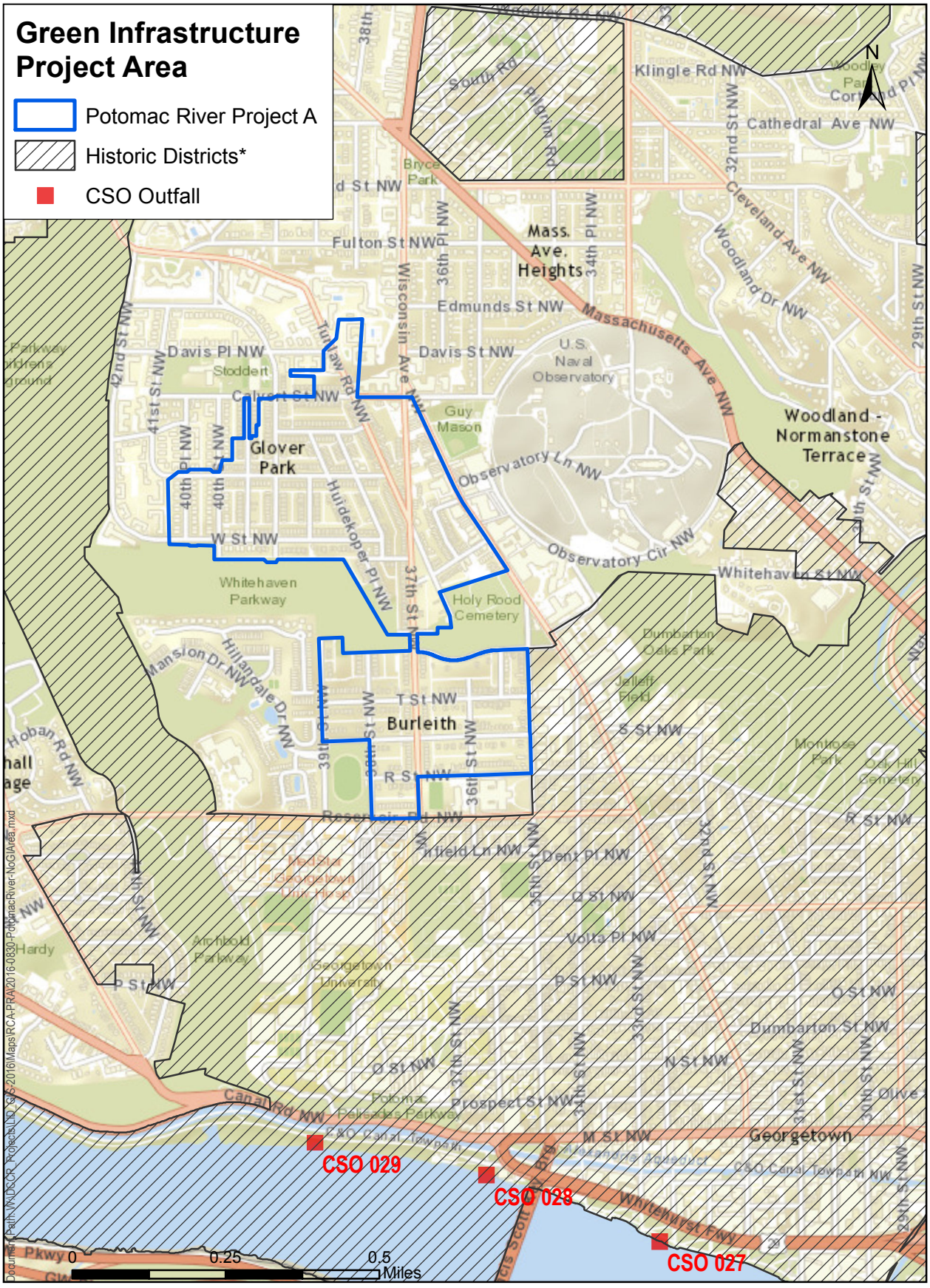
APPENDIX A

VICINITY MAP



*Source: DC OCTO

APPENDIX B

OVERALL BRIEFING

District of Columbia Water and Sewer Authority
George S. Hawkins, General Manager

Briefing on:

Potomac River Project A

Briefing for:

HPO and NCPC

September 2, 2016

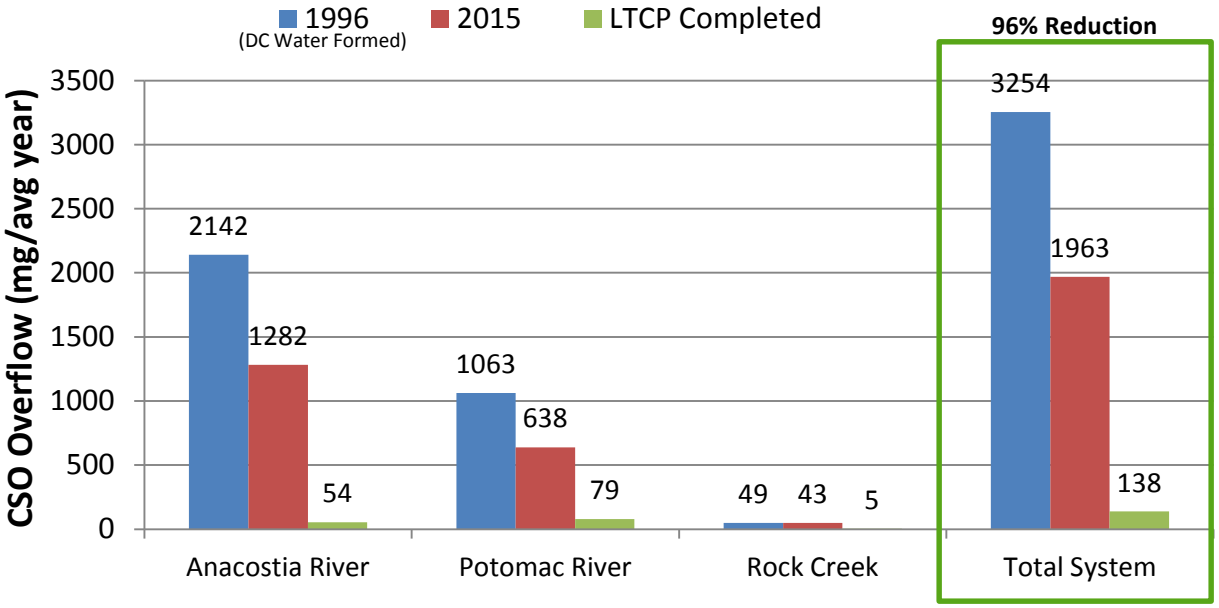
DCWATER.COM

DC Clean Rivers Project:
Reducing Combined Sewer Overflows (CSOs)


CSO 017 Overflowing


Trash in the Anacostia River


CSO 049 Overflowing



Predicted Progress in Controlling CSOs

dc clean RIVERS PROJECT

DC Clean Rivers Project:
Amended Consent Decree Status & Timeline

1998 - LTCP Started

2002 – Final LTCP

2003 – LTCP Meets WQS (EPA/DC)

2005 – Consent Decree Signed

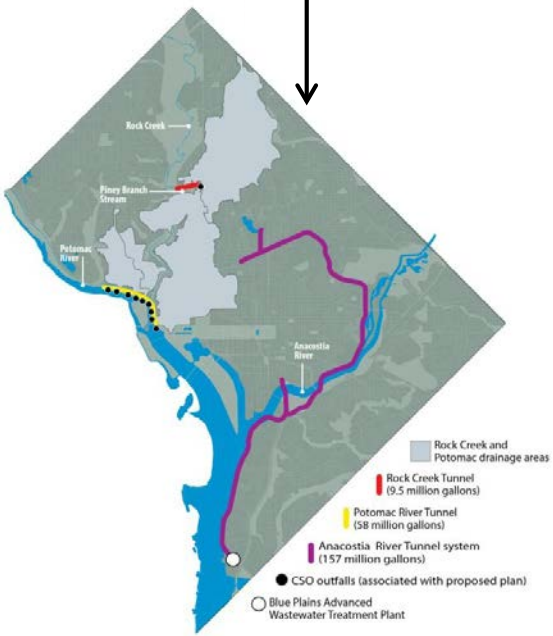
2007 - New Nitrogen limits require changing LTCP

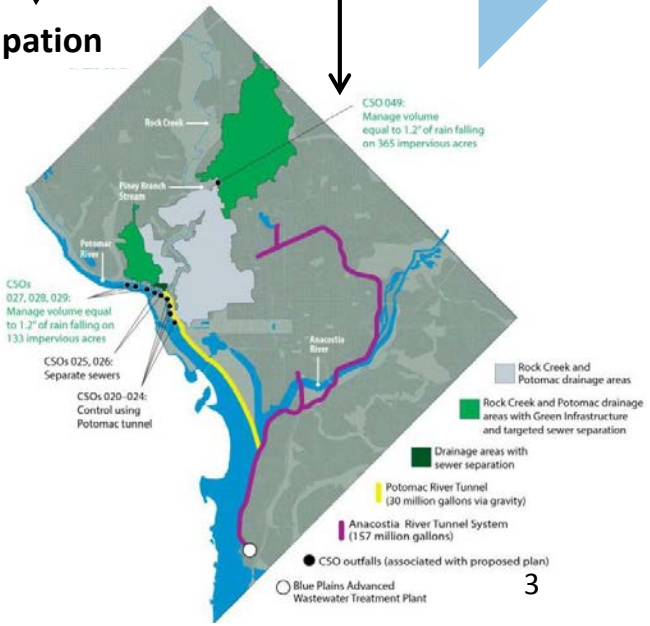
2011 - DC Water evaluates GI for Potomac and Rock Creek

January 14, 2016 – Amended Consent Decree Entered in Federal Court

Public Participation

Public Participation





dc clean RIVERS PROJECT

DC Clean Rivers Project:
Why Green Infrastructure?

- CSO benefits begin sooner for CSOs:
  - 049: Rock Creek
  - 027, 028, 029: Potomac River
- Triple Bottom Line benefits are provided beyond CSO control:
  - Social
  - Economic
  - Environmental
- Green jobs are available with GI:
  - DC Water and District MOU establishes goal of 51% of new hires to be District residents
  - GI training and certification for GI construction, maintenance and inspection
  - Opportunities for Certified Business Enterprises

Pilot Green Roof Maintenance Training Program

dc clean RIVERS PROJECT

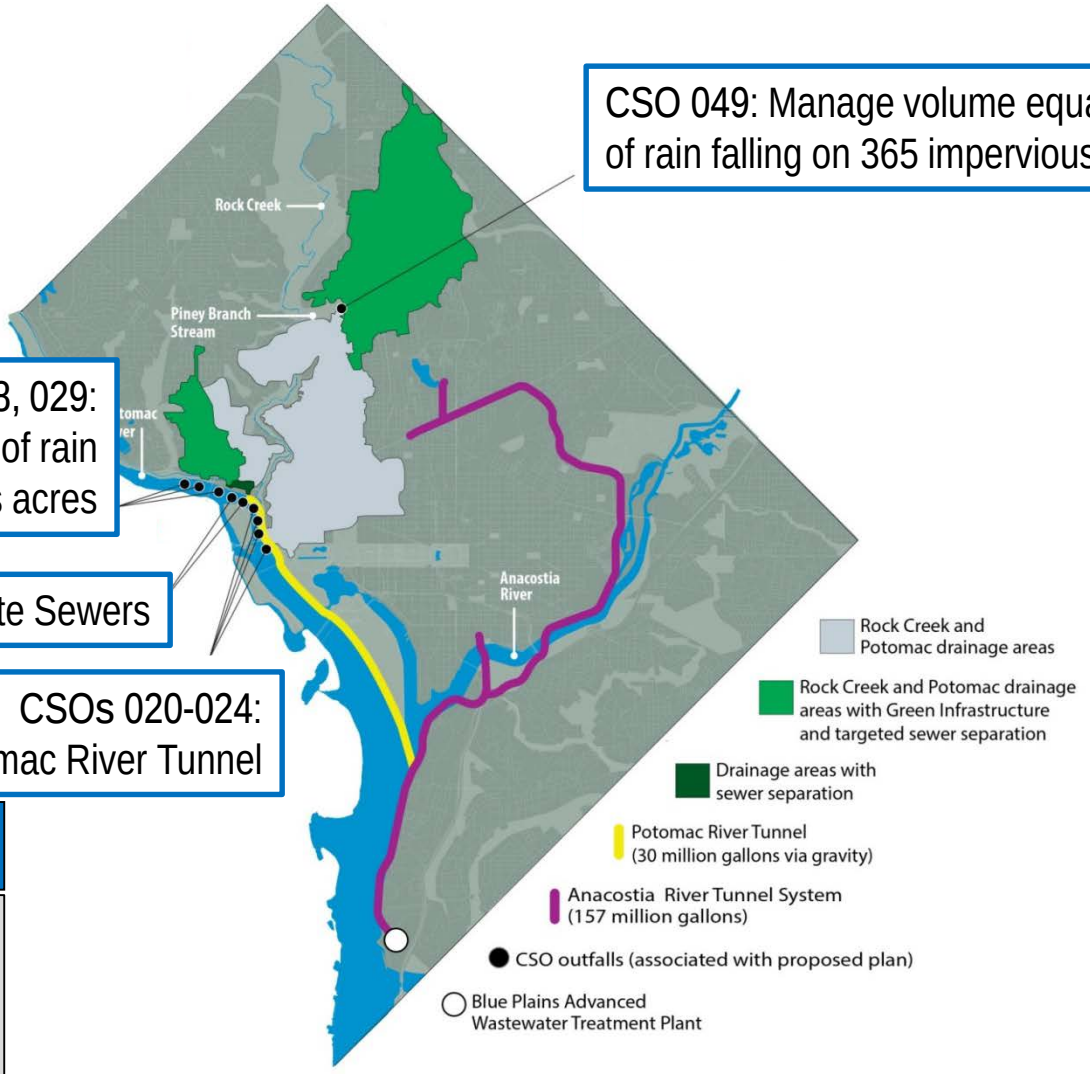
DC Clean Rivers Project:
Amended Consent Decree

CSO 049: Manage volume equal to 1.2” of rain falling on 365 impervious acres

CSOs 027, 028, 029: Manage volume equal to 1.2” of rain falling on 133 impervious acres

CSOs 025, 026: Separate Sewers

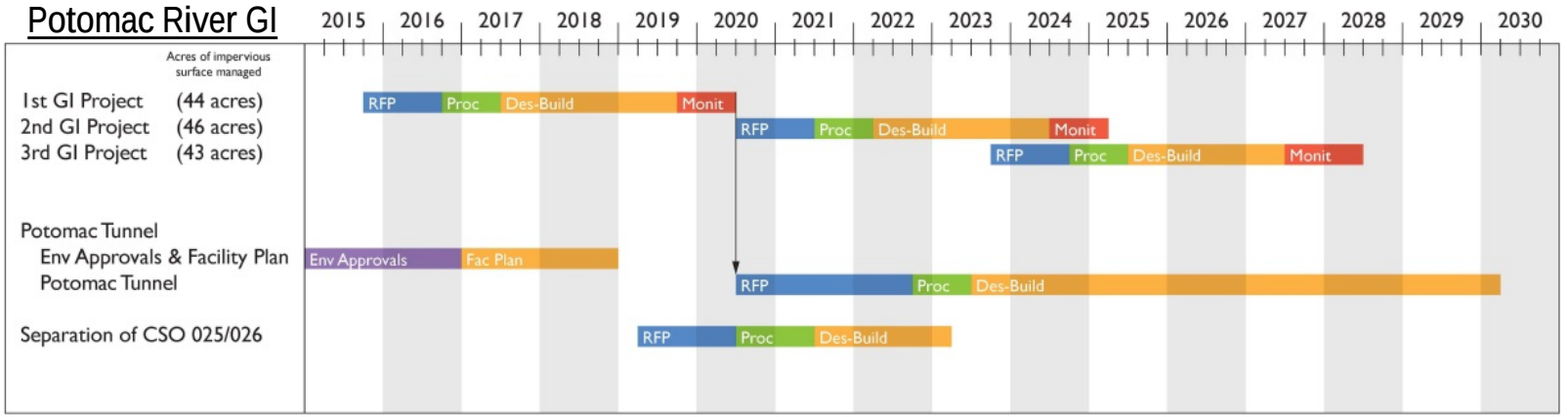
CSOs 020-024: Control using Potomac River Tunnel

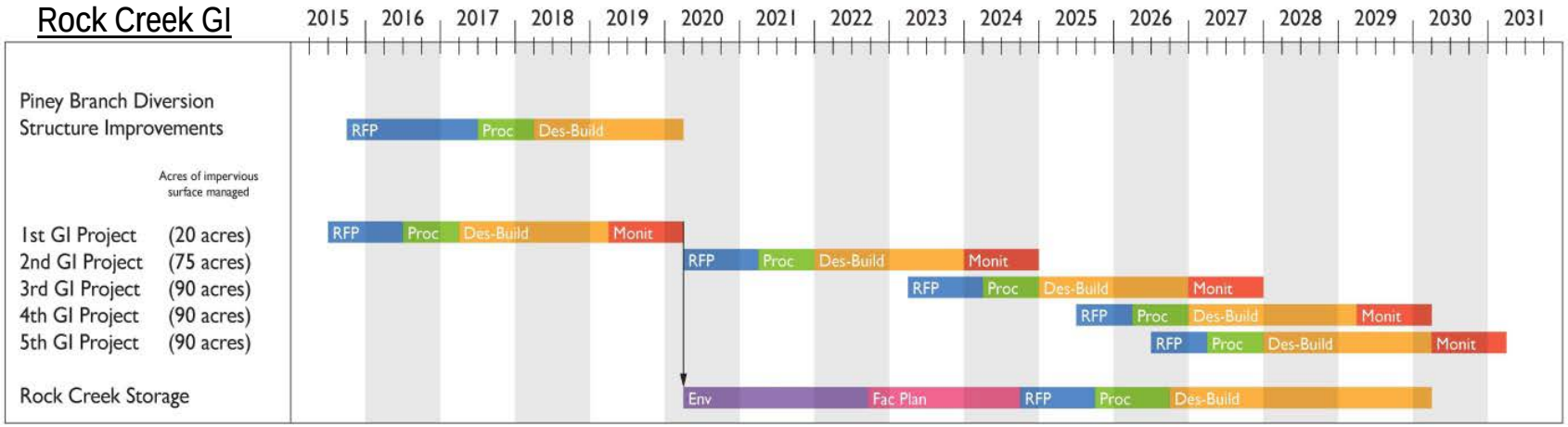


DC CLEAN RIVERS PROJECT AND NITROGEN REMOVAL PROGRAMS

- **DC Clean Rivers Project: $2.6 Billion**
- **Nitrogen Removal: $950 Million**
- **Total > $ 3.5 Billion**
- **25 yr implementation (2005 – 2030)**
- **96% reduction in CSOs & flood relief in Northeast Boundary area**
- **Approx 1 million lbs/yr nitrogen reduction predicted**

DC Clean Rivers Project:
Amended Consent Decree Schedule for GI

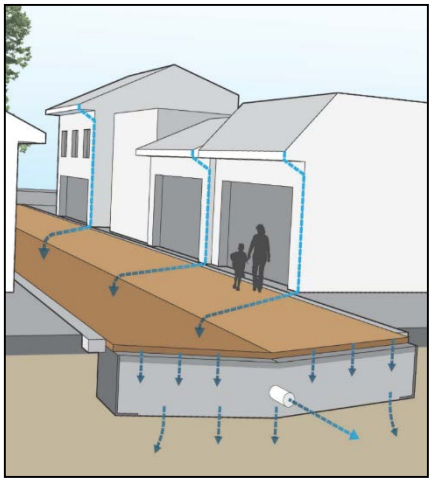




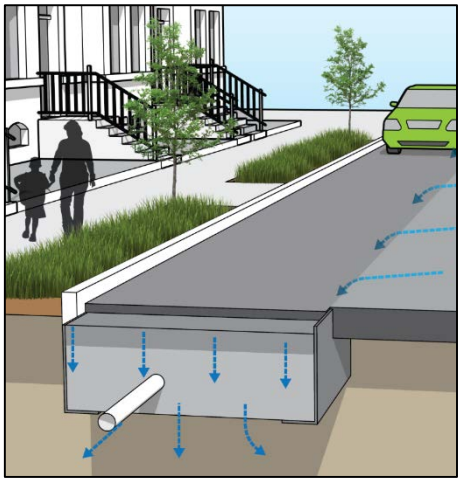
DC Clean Rives Project:
Stakeholder Engagement and Participation

Work	Dates
1st Field Investigations / Field Survey • Public Notifications: Mailer and Door Hanger	July – November 2015 February – May 2016
Community Input / Public Meetings, ANC3B Meeting	September 2015 – February 2016
2nd Field Investigations / Soil Borings • Public Notifications: Mailer and Door Hanger	February – March 2016
Incorporated Field Investigations Results and Community Feedback into Potomac River Project A Design	April 2016
Community Input /ANC2E & ANC3B Meetings / Potomac River Project A Online Survey • Online Survey Postcard: Mailer	May 2016
Incorporate Community Feedback into Design	June – July 2016
3rd Field Investigations / Utility Potholing • Public Notifications: Mailer and Door Hanger	August – September 2016
Incorporate 3rd Field Investigations Results and Community Feedback into Design	September – November 2016
ANC3B & ANC2E Meeting on Final PR-A Design	TBD
Request for Proposals – November 2016	Proposals Due – January 2017	Notice to Proceed – June 2017

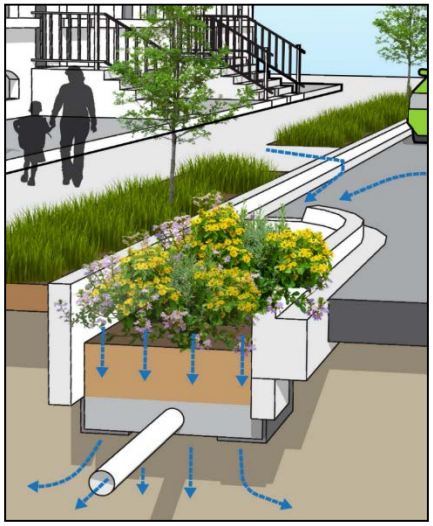
Potomac River Project A:
GI Technologies



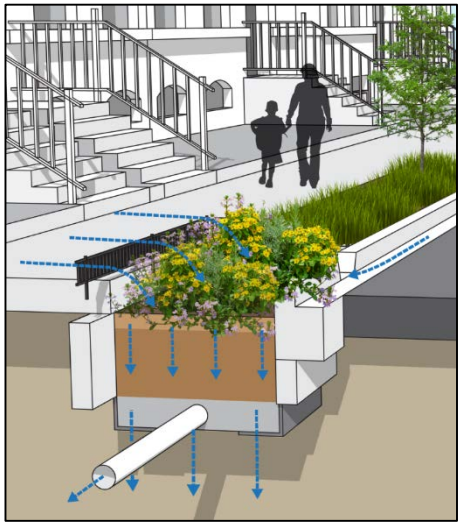
Permeable Alley



Permeable Parking Lane



Curb Extension Bioretention

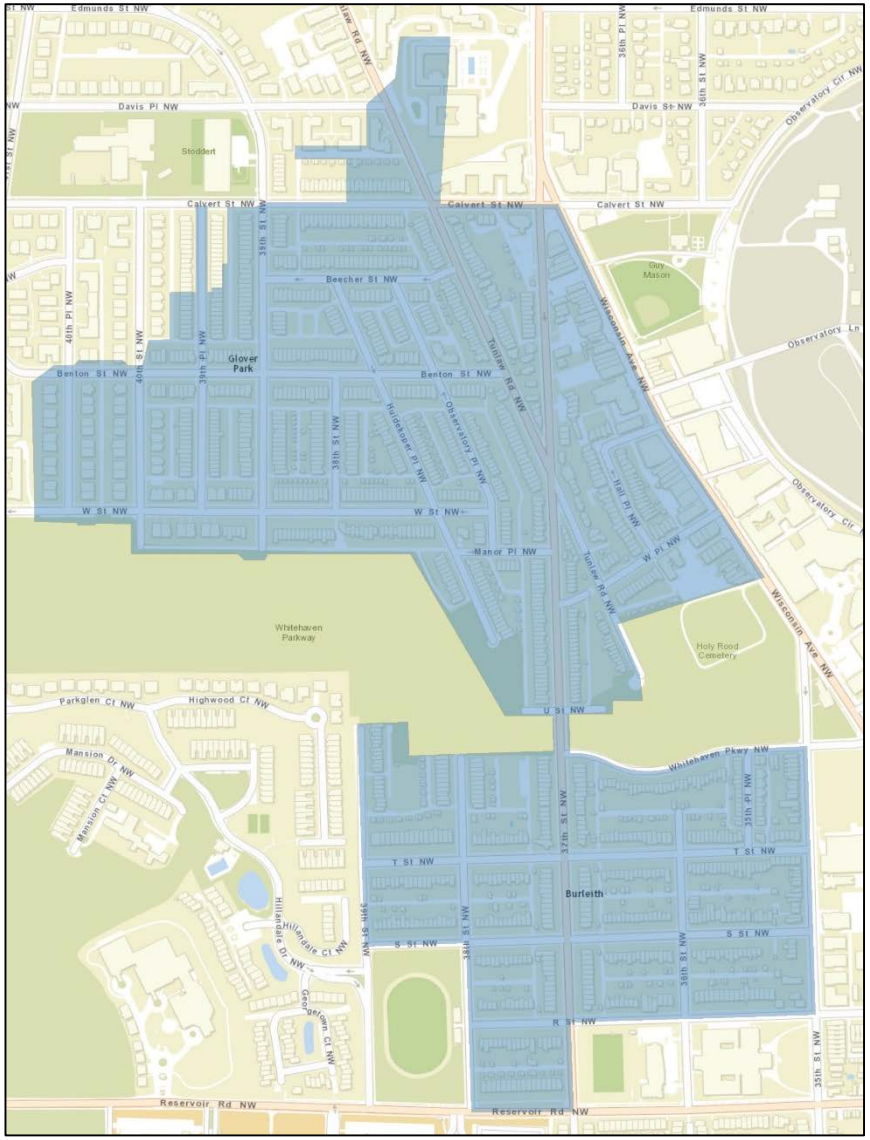


Planter Bioretention

Siting and Design Goals:

- Minimize temporary and long-term impacts to community
- Match character and aesthetic of neighborhoods
- Provide infrastructure upgrades by prioritizing areas for implementation
- Provide ancillary benefits to community
- Coordinate work with other entities (DDOT, other utilities, etc.)

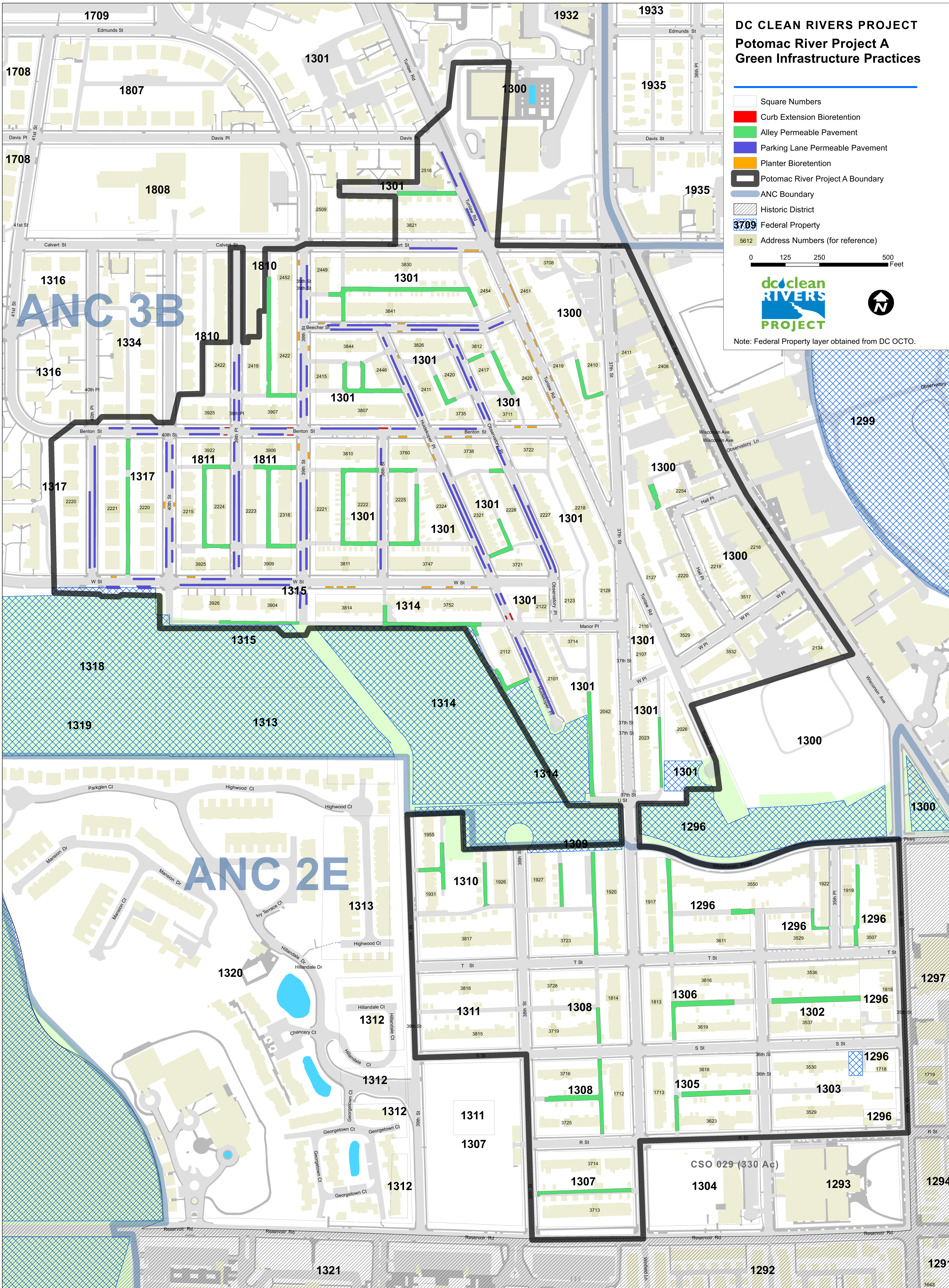
Potomac River Project A:
Project Map and Schedule



- Timeline (2015-2020):
  - RFP Development: 2015 – Late 2016
  - Procurement: Late 2016 – Mid 2017
  - Design-Build: Mid 2017 – 2019
  - Monitoring: 2019 – 2020
  - Public Outreach & Engagement: Throughout Project Duration
- Siting: Within DDOT right-of-way (Not on federal land)

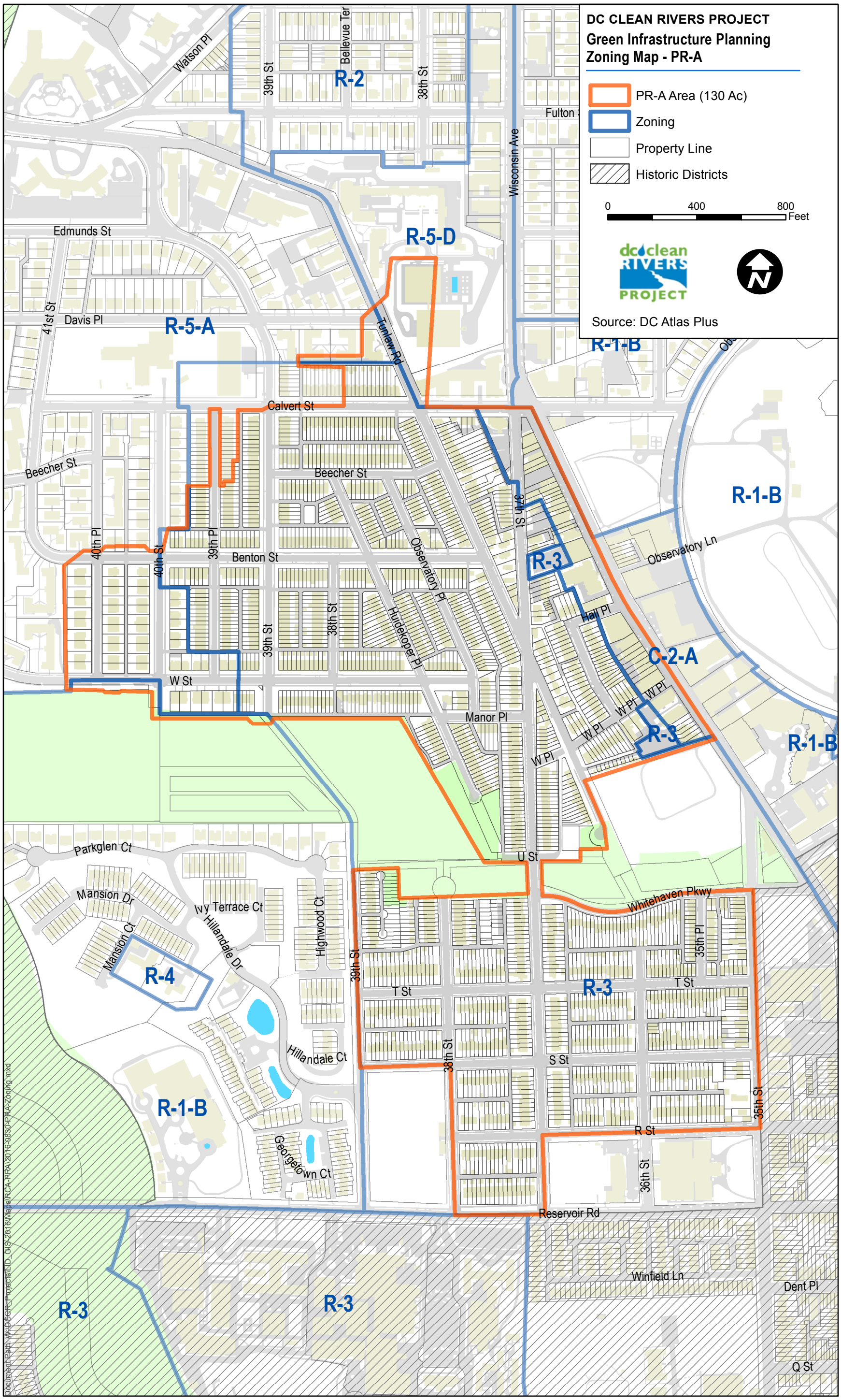
APPENDIX C

PROPOSED GI LOCATIONS MAP


DC CLEAN RIVERS PROJECT
Potomac River Project A
Green Infrastructure Practices
Square Numbers
Curb Extension Bioretention
Alley Permeable Pavement
Parking Lane Permeable Pavement
Planter Bioretention
Potomac River Project A Boundary
ANC Boundary
Historic District
3709 Federal Property
5612 Address Numbers (for reference)
0 125 250 500 Feet
dc clean RIVERS PROJECT
N
Note: Federal Property layer obtained from DC OCTO.
ANC 3B
ANC 2E
CSO 029 (330 Ac)
Edmunds St
Davis Pl
Davis St
Calvert St
Beecher St
Benton St
W St
Manor Pl
Hall Pl
W Pl
Observatory Ln
Wisconsin Ave
Tunlaw Rd
Huidekoper Pl
Observatory Pl
41st St
40th Pl
40th St
39th Pl
39th St
38th St
37th St
36th Pl
36th St
35th Pl
35th St
U St
T St
S St
R St
Whitehaven Pkwy
Reservoir Rd
Winfield Ln
Parkglen Ct
Highwood Ct
Mansion Dr
Mansion Ct
Ivy Terrace Ct
Hillandale Dr
Hillandale Ct
Chancery Ct
Georgetown Ct

APPENDIX D

ZONING MAP


DC CLEAN RIVERS PROJECT
Green Infrastructure Planning
Zoning Map - PR-A
PR-A Area (130 Ac)
Zoning
Property Line
Historic Districts
0
400
800
Feet
Source: DC Atlas Plus
R-2
R-5-D
R-5-A
R-1-B
R-3
C-2-A
R-4
Watson Pl
Bellevue Ter
39th St
38th St
Wisconsin Ave
Fulton
Edmunds St
41st St
Davis Pl
Tunlaw Rd
Calvert St
Beecher St
40th Pl
40th St
39th Pl
Benton St
37th St
Observatory Pl
Observatory Ln
Hall Pl
Huidekoper Pl
W St
W Pl
Manor Pl
U St
Whitehaven Pkwy
Parkglen Ct
Mansion Dr
Ivy Terrace Ct
Mansion Ct
Hillandale Dr
Highwood Ct
Hillandale Ct
T St
S St
R St
35th Pl
35th St
36th St
38th St
Georgetown Ct
Reservoir Rd
Winfield Ln
Dent Pl
Q St
Document Path: W:\DCCR_Projects\D_GIS_2016\Maps\RCA-PRA\2016-0830-PRA-Zoning.mxd

APPENDIX E

TOPOGRAPHY MAP

DC CLEAN RIVERS PROJECT

Green Infrastructure Planning
Topography Map - PR-A

Topography

PR-A Area (130 Ac)

Historic Districts

0 400 800 Feet

Source: DC Atlas Plus

Garfield St
Watson Pl
39th St
Bellevue Ter
38th St
Wisconsin Ave
Edmunds St
41st St
Davis Pl
Tunlaw Rd
Davis St
Observatory Cir
Calvert St
Beecher St
40th Pl
40th St
39th Pl
Benton St
Observatory Pl
37th St
Observatory Ln
Hall Pl
Huidekoper Pl
W St
Manor Pl
W Pl
U St
Whitehaven Pkwy
Parkglen Ct
Mansion Dr
Mansion Ct
Ivy Terrace Ct
Hillandale Dr
Highwood Ct
T St
35th Pl
Hillandale Ct
S St
35th St
R St
36th St
Georgetown Ct
Reservoir Rd
Winfield Ln
Dent Pl

APPENDIX F

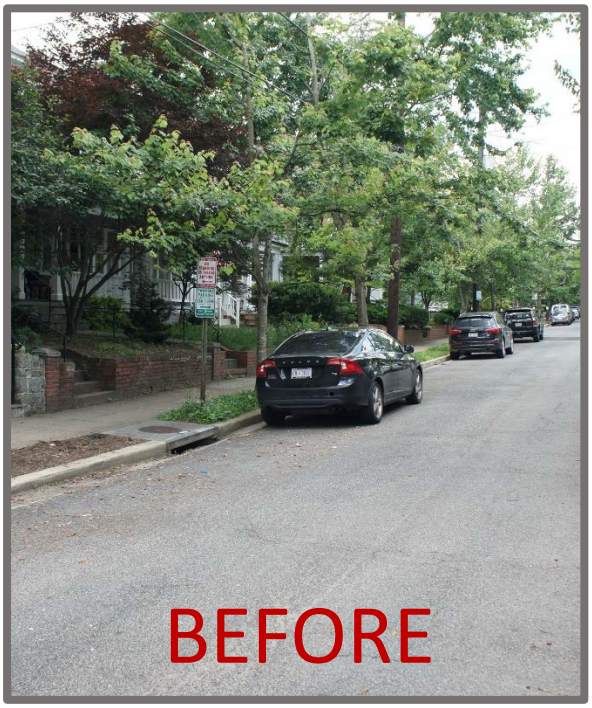
TYPICAL RENDERINGS

AND

PLANTING TEMPLATES/PALETTES

Typical Porous Asphalt in Parking Lanes

Beecher Street NW



- Constructed in Identified Parking Lanes
- Mill and Overlay Adjacent Roadway for Uniformity
- Asphalt Texture Differences Between Traditional and Porous Pavements is Slight

Typical Permeable Alleys (Permeable Pavers)

Interior Alley Between
Huidekoper Pl. NW and 39th St. NW

- Constructed in Select Alleys

Typical Permeable Alleys (Pervious Concrete)

Bounded by
W St. NW, 38th St. NW, and Huidekoper Pl. NW

- Constructed in Select Alleys

Typical Permeable Alleys (Porous Asphalt)

Bounded by
38th & 39th Pl. NW and W St. & Benton St. NW

- Constructed in Select Alleys

Typical Planter Bioretention

Benton St. NW

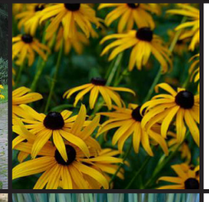
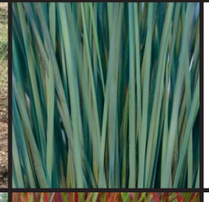
- Constructed at Identified Locations Between Sidewalk and Curb
- Trip Protection with Toe Guard Fence all Sides
- Streetscape Beautification

Typical Curb Extension Bioretention

Benton St. NW & 38th St. NW

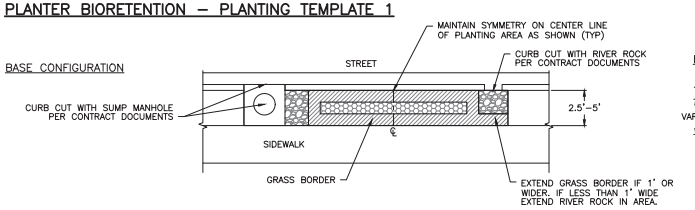
- Constructed in Identified Parking Lanes
- Streetscape Beautification
- Toe Guard Fence is Only Used When Adjacent to Pedestrian Ways

BIORETENTION PLANTING PALETTE

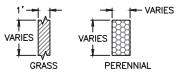
PLANT IMAGES	SPECIES	INSTALLATION SIZE	SPACING	MATURE SIZE	SEASONAL INTEREST (SPRING-SUMMER)	SEASONAL INTEREST (FALL-WINTER)
 	BOTANICAL NAME: *ILEX VERTICILLATA* 'NANA' RED SPRITE COMMON NAME: WINTERBERRY HOLLY 'NANA' RED SPRITE	3 GAL.	2.5' O.C.	HEIGHT: 3' WIDTH: 3'	DULL WHITE BLOOM FROM JUNE TO JULY.	RED BERRIES PERSISIT INTO WINTER.
 	BOTANICAL NAME: *ILEX GLABRA* 'COMPACTA' COMMON NAME: INKBERRY HOLLY 'COMPACTA'	3 GAL.	2.5' O.C.	HEIGHT: 4' WIDTH: 4'	EVERGREEN FOLIAGE.	EVERGREEN FOLIAGE AND BLACK BERRIES THAT PERSISIT INTO WINTER.
 	BOTANICAL NAME: *ASTER NOVAE-ANGLIAE* 'PURPLE DOME' BOTANICAL NAME: NEW-ENGLAND ASTER 'PURPLE DOME'	#2 CONT.	1' O.C.	HEIGHT: 1.5'-2' WIDTH: 1.5'-2'	DENSE PURPLE FLOWERS FROM AUGUST TO EARLY OCTOBER.	TYPICALLY CUT BACK TO GROUND IN LATE FALL.
 	BOTANICAL NAME: *BAPTISIA AUSTRALIS* COMMON NAME: BLUE FALSE INDIGO	#2 CONT.	1' O.C.	HEIGHT: 3' WIDTH: 3'	INDIGO BLUE BLOOMS FROM MAY TO JUNE. SEED PODS DEVELOP THROUGH SUMMER.	BLACK SEED PODS IN EARLY FALL. TYPICALLY CUT BACK TO GROUND IN LATE FALL.
 	BOTANICAL NAME: *RUDBECKIA FULGIDA* 'GOLDSTURM' COMMON NAME: BLACK-EYED SUSAN 'GOLDSTURM'	#2 CONT.	1' O.C.	HEIGHT: 2'-3' WIDTH: 1'-2'	YELLOW-ORANGE BLOOMS FROM JUNE TO SEPTEMBER.	BLACK SEED HEADS PERSIST INTO WINTER TO MAINTAIN UPRIGHT FORM OR CUT BACK TO GROUND IN LATE FALL.
 	BOTANICAL NAME: *JUNCUS* 'BLUE DART' BOTANICAL NAME: RUSH 'BLUE DART'	#2 CONT.	1' O.C.	HEIGHT: 1.5'-2' WIDTH: 1'	EVERGREEN FOLIAGE.	EVERGREEN FOLIAGE.
 	BOTANICAL NAME: *PANICUM VIRGATUM* 'CHEYENNE SKY' COMMON NAME: SWITCHGRASS 'CHEYENNE SKY'	#2 CONT.	1.5' O.C.	HEIGHT: 2.5'-3' WIDTH: 1.5'-2'	DENSE UPRIGHT FOLIAGE TURNS RED IN SUMMER.	REDDISH COLOR PERSISTS INTO FALL. MAINTAINS UPRIGHT FORM THROUGH WINTER. TYPICALLY CUT BACK IN LATE WINTER

PLANTER BIORETENTION – PLANTING TEMPLATE 1

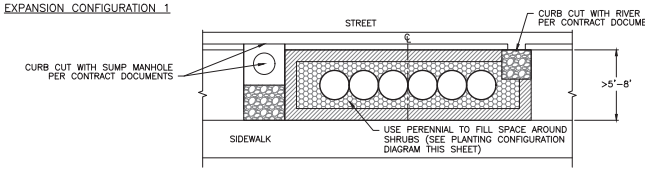
BASE CONFIGURATION



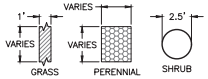
PLANTING UNITS



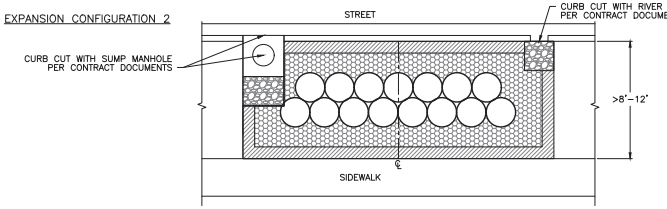
EXPANSION CONFIGURATION 1



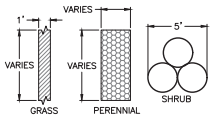
PLANTING UNITS



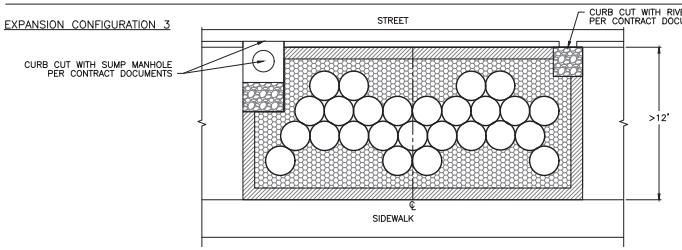
EXPANSION CONFIGURATION 2



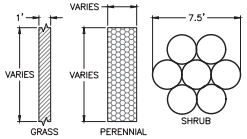
PLANTING UNITS



EXPANSION CONFIGURATION 3



PLANTING UNITS



TREE IMPACTS		
FACILITY ID	SPECIES (IF KNOWN)	SIZE (DBH)
PBR-0707	UNKNOWN	2"
PBR-0707	UNKNOWN	2"
PBR-0708	SYCAMORE	2"
PBR-0708	SYCAMORE	2"
PBR-0709	OAK	2"
PBR-1211	OAK	2"
PBR-1403	MAPLE	6"
PBR-1511	ORNAMENTAL	2"
PBR-1605	OAK	2"
PBR 1701	GINKO	3"
PBR-1702	MYRTLE	3"
PBR 1703	OAK	4"
PBR-2107	CHESNUT	2"
PBR 2108	CHESNUT	2"
PBR-2109	ORNAMENTAL	2"
PBR-2110	CHERRY	2"
PBR 2111	CHERRY	2"
PBR-2211	CHERRY	6"

TOTAL TREES REMOVED	TOTAL TREES PROPOSED
18	18

PLANTING PALETTE A

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	PERENNIAL	RUDBECKIA FULGIDA 'GOLDSTURM' (BLACK–EYED SUSAN 'GOLDSTURM')	#2 CONT.	1.5' O.C.
	SHRUB	ILEX VERTICILLATA 'NANA' RED SPRITE (COMPACT WINTERBERRY HOLLY)	3 GAL.	2.5' O.C.

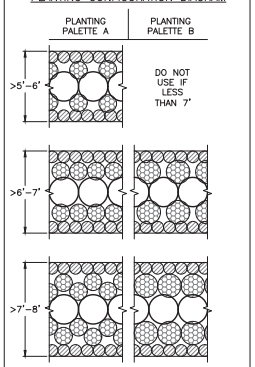
PLANTING PALETTE B

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	PERENNIAL	BAPTISIA AUSTRALIS (BLUE FALSE INDIGO)	#2 CONT.	2' O.C.
	SHRUB	ILEX GLABRA 'COMPACTA' (COMPACT INKBERRY HOLLY)	3 GAL.	2.5' O.C.

NOTES:

1. DETERMINE THE LAYOUT OF PLANTINGS BASED ON THE TEMPLATE DESIGN. TEMPLATE AS SHOWN DOES NOT INCLUDE STEP–OUT ZONE.
2. MAINTAIN INDIVIDUAL PLANT SPACING AS NOTED IN THE PLANTING PALETTES.
3. MAINTAIN 1' GRASS BORDER AROUND FACILITY.
4. TEMPLATES ARE DESIGNED TO CREATE SYMMETRICAL, REPETITIVE FORMS. FINAL DESIGN MUST MAINTAIN OVERALL DESIGN INTENT AND SYMMETRY OF THE FACILITY.
5. PLANTING LAYOUT AND QUANTITIES SHALL BE PROVIDED IN PLANTING PLAN AND SCHEDULES AS PART OF FINAL DESIGN.
6. REPEAT PLANTING UNITS AS NECESSARY TO COVER THE ENTIRE FACILITY. PLANTINGS SHOULD BE CENTERED PER GUIDANCE SHOWN IN PLANTING TEMPLATES.
7. FOLLOW GUIDANCE SHOWN IN PLANTING TEMPLATES FOR USING PARTIAL PLANTING UNITS WHERE SPACE DOES NOT ALLOW THE USE OF THE WHOLE PLANTING UNIT.
8. GI FACILITIES CONTAINING ILEX VERTICILLATA 'NANA' RED SPRITE MUST INCLUDE AT LEAST ONE MALE ILEX VERTICILLATA PER FACILITY OR AS NEEDED TO ENSURE POLLINATION. THE LOCATION OF THE MALE PLANT SHALL BE IDENTIFIED BY THE DESIGN BUILDER IN ADVANCED DESIGN SUBMITTALS AND SHALL BE IN A CONSISTENT LOCATION FOR ALL GI FACILITIES.
9. ALL BIORETENTION FACILITIES CONTAINING CHECK DAMS (TO DIVIDE PONDING AREAS) SHALL BE TREATED AS SINGULAR, CONTINUOUS FACILITIES FOR PLANTING DESIGN PURPOSES. SYMMETRY SHALL BE MAINTAINED FOR THE OVERALL PLANTING AREA WITH PORTIONS OF PLANTING UNITS BEING REMOVED TO ALLOW SPACE FOR THE CHECK DAM AND ASSOCIATED RIVER ROCK.

PLANTING CONFIGURATION DIAGRAM



NOTE: SHOWN FOR EXPANSION CONFIGURATION 1. PERENNIAL PLANTINGS IN DIAGRAM ARE SHOWN TO DEMONSTRATE HOW TO MAXIMIZE THE PERENNIAL DENSITY WITHIN THE PERENNIAL PLANTING AREA. THESE PERENNIAL CONFIGURATIONS SHALL BE APPLIED TO ALL EXPANSION CONFIGURATIONS.

JOB	CZ07
SHEET	XXX OF XXX
CONSTRUCTION	IN-HOUSE ☐ CONTRACT NO. ☒ 150220
DESIGN	DETS FILE NO. ☐ DCFA NO. ☒ 420/421–WSA
DESIGN MGR.	IN-HOUSE ☐ E.P.M.C. NO. ☒ DCCR
INDEX NO.	COE–CZ07
FOREMAN–INSPECTOR	

POST–BID REVISION

NO.	DESCRIPTION	BY	DATE

90% RFP SUBMITTAL

NO.	DESCRIPTION	BY	DATE

PRE–BID REVISION

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

DC CLEAN RIVERS PROJECT
POTOMAC RIVER PROJECTS – DIVISION PR–A1
GREEN INFRASTRUCTURE

PLANTER BIORETENTION PLANTING TEMPLATE 1

LANDSCAPING

SCALE	AS SHOWN	DRAWN	DMC
INTERCEPTOR		CHECKED	FRG
SYSTEM		SUBMITTED	F. GRAZIANO
SURVEYED			
DATE	08/22/16	RECOMMENDED	
CADD FILE	LTCPPRA–L001		

dc clean rivers PROJECT
DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, SW
WASHINGTON, DC 20032
PHONE: 202-787-4460
FAX: 202-787-4478

PROGRAM CONSULTANTS ORGANIZATION
[redacted]
5000 OVERLOOK AVENUE, SW — PHONE: 202-787-4460
WASHINGTON, DC 20032 — FAX: 202-787-4478

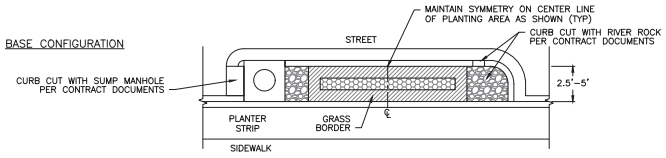
REDUCTION VERIFICATION SCALE 0 10 INCHES

L–01

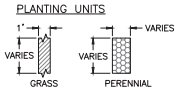
LAST SAVED BY: CONNER, DILLON DATE: 7/28/2016 2:58:41 PM
DRAWING ID: L:\21000s\21900\21983.19\CADD\04-ENGR\PLANTING TEMPLATES\PR-A BORDER\2016_04_12_BIORETENTION TEMPLATES_PRA.DWG

CURB EXTENSION BIORETENTION – PLANTING TEMPLATE 1

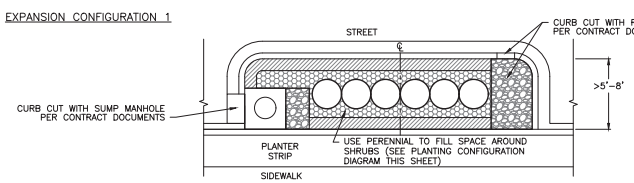
BASE CONFIGURATION



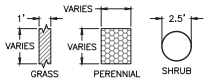
PLANTING UNITS



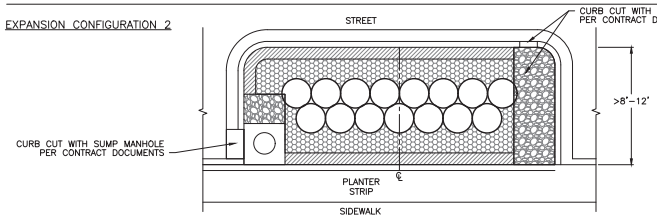
EXPANSION CONFIGURATION 1



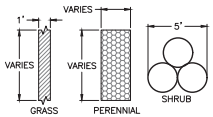
PLANTING UNITS



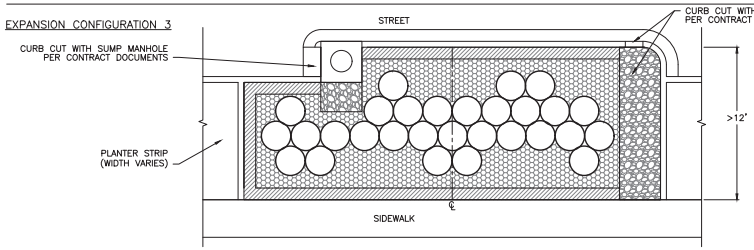
EXPANSION CONFIGURATION 2



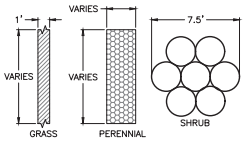
PLANTING UNITS



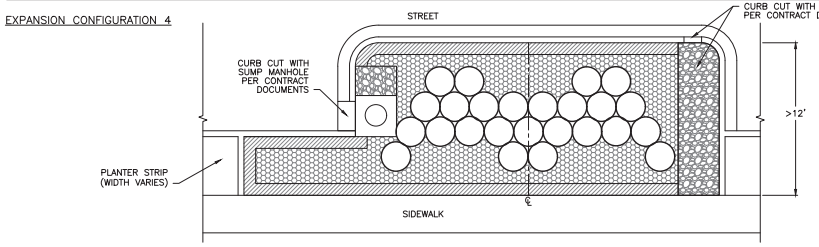
EXPANSION CONFIGURATION 3



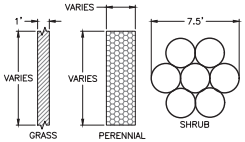
PLANTING UNITS



EXPANSION CONFIGURATION 4



PLANTING UNITS



PLANTING PALETTE A

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	PERENNIAL	RUDBECKIA FULGIDA 'GOLDSTURM' (BLACK–EYED SUSAN 'GOLDSTURM')	#2 CONT.	1.5' O.C.
	SHRUB	ILEX VERTICILLATA 'NANA' RED SPRITE (COMPACT WINTERBERRY HOLLY)	3 GAL.	2.5' O.C.

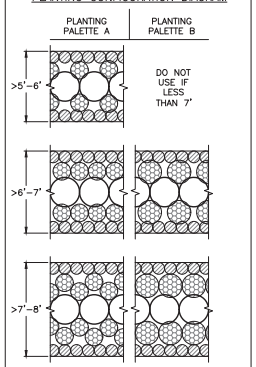
PLANTING PALETTE B

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	PERENNIAL	BAPTISIA AUSTRALIS (BLUE FALSE INDIGO)	#2 CONT.	2' O.C.
	SHRUB	ILEX GLABRA 'COMPACTA' (COMPACT INKBERRY HOLLY)	3 GAL.	2.5' O.C.

NOTES:

1. DETERMINE THE LAYOUT OF PLANTINGS BASED ON THE TEMPLATE DESIGN. TEMPLATE AS SHOWN DOES NOT INCLUDE STEP–OUT ZONE.
2. MAINTAIN INDIVIDUAL PLANT SPACING AS NOTED IN THE PLANTING PALETTES.
3. MAINTAIN 1' GRASS BORDER AROUND FACILITY.
4. TEMPLATES ARE DESIGNED TO CREATE SYMMETRICAL, REPETITIVE FORMS. FINAL DESIGN MUST MAINTAIN OVERALL DESIGN INTENT AND SYMMETRY OF THE FACILITY.
5. PLANTING LAYOUT AND QUANTITIES SHALL BE PROVIDED IN PLANTING PLAN AND SCHEDULES AS PART OF FINAL DESIGN.
6. REPEAT PLANTING UNITS AS NECESSARY TO COVER THE ENTIRE FACILITY. PLANTINGS SHOULD BE CENTERED PER GUIDANCE SHOWN IN PLANTING TEMPLATES.
7. FOLLOW GUIDANCE SHOWN IN PLANTING TEMPLATES FOR USING PARTIAL PLANTING UNITS WHERE SPACE DOES NOT ALLOW THE USE OF THE WHOLE PLANTING UNIT.
8. GI FACILITIES CONTAINING ILEX VERTICILLATA 'NANA' RED SPRITE MUST INCLUDE AT LEAST ONE MALE ILEX VERTICILLATA PER FACILITY OR AS NEEDED TO ENSURE POLLINATION. THE LOCATION OF THE MALE PLANT SHALL BE IDENTIFIED BY THE DESIGN BUILDER IN ADVANCED DESIGN SUBMITTALS AND SHALL BE IN A CONSISTENT LOCATION FOR ALL GI FACILITIES.
9. ALL BIORETENTION FACILITIES CONTAINING CHECK DAMS (TO DIVIDE PONDING AREAS) SHALL BE TREATED AS SINGULAR, CONTINUOUS FACILITIES FOR PLANTING DESIGN PURPOSES. SYMMETRY SHALL BE MAINTAINED FOR THE OVERALL PLANTING AREA WITH PORTIONS OF PLANTING UNITS BEING REMOVED TO ALLOW SPACE FOR THE CHECK DAM AND ASSOCIATED RIVER ROCK.

PLANTING CONFIGURATION DIAGRAM



NOTE: SHOWN FOR EXPANSION CONFIGURATION 1. PERENNIAL PLANTINGS IN DIAGRAM ARE SHOWN TO DEMONSTRATE HOW TO MAXIMIZE THE PERENNIAL DENSITY WITHIN THE PERENNIAL PLANTING AREA. THESE PERENNIAL CONFIGURATIONS SHALL BE APPLIED TO ALL EXPANSION CONFIGURATIONS.

JOB	CZ07
SHEET	XXX OF XXX
CONSTRUCTION	IN–HOUSE CONTRACT NO. ☒ 150220
DESIGN	DETS FILE NO. ☐ DCFA NO. ☒ 420/421–WSA
DESIGN MGR.	IN–HOUSE ☐ E.P.M.C. NO. ☒ DCCR
INDEX NO.	COE–CZ07
FOREMAN–INSPECTOR	

POST–BID REVISION

NO.	DESCRIPTION	BY	DATE

90% RFP SUBMITTAL

NO.	DESCRIPTION	BY	DATE

PRE–BID REVISION

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

DC CLEAN RIVERS PROJECT
POTOMAC RIVER PROJECTS – DIVISION PR–A1
GREEN INFRASTRUCTURE

CURB EXTENSION BIORETENTION PLANTING TEMPLATE 1

LANDSCAPING

SCALE	AS SHOWN	DRAWN	DMC
INTERCEPTOR		CHECKED	FRG
SYSTEM		SUBMITTED	F. GRAZIANO
SURVEYED			
DATE	08/22/16	RECOMMENDED	
CADD FILE	LTCPPRA–L002		

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, SW
WASHINGTON, DC 20032
PHONE: 202-787-4460
FAX: 202-787-4478

PROGRAM CONSULTANTS ORGANIZATION

[redacted]

5000 OVERLOOK AVENUE, SW
WASHINGTON, DC 20032
PHONE: 202-787-4460
FAX: 202-787-4478

REDUCTION VERIFICATION SCALE 0 10 INCHES

L–02

LAST SAVED BY: CONNER, DILLON DATE: 7/28/2016 2:58:41 PM
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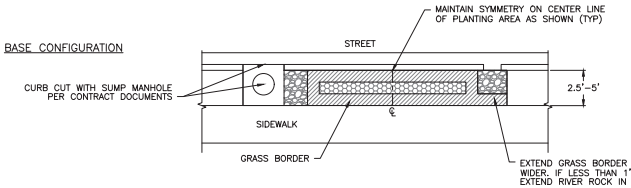
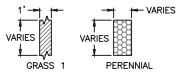
PLANTER BIORETENTION – PLANTING TEMPLATE 2

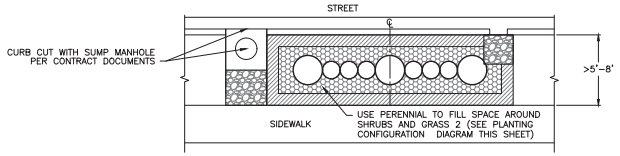
BASE CONFIGURATION



PLANTING UNITS

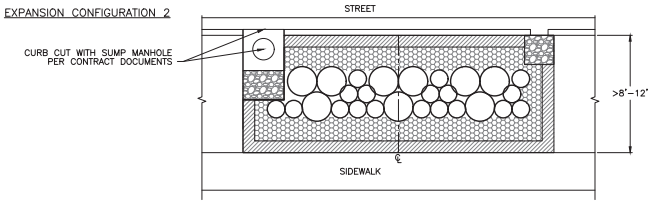


EXPANSION CONFIGURATION 1

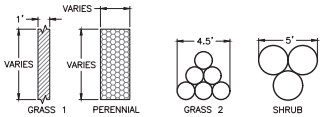


PLANTING UNITS

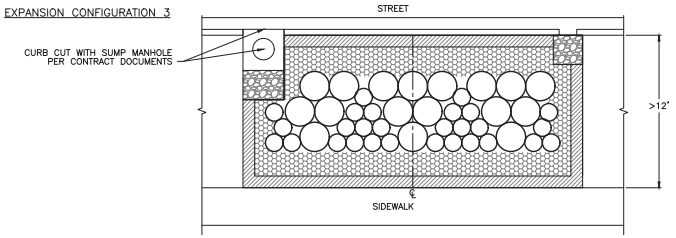
EXPANSION CONFIGURATION 2



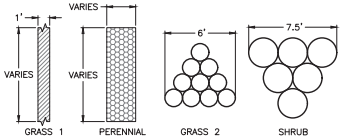
PLANTING UNITS



EXPANSION CONFIGURATION 3



PLANTING UNITS



PLANTING PALETTE A

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS 1	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	GRASS 2	PANICUM VIRGATUM 'CHEYENNE SKY' (SWITCHGRASS 'CHEYENNE SKY')	#2 CONT.	1.5' O.C.
	PERENNIAL	ASTER NOVAE–ANGLIAE 'PURPLE DOME' (NEW ENGLAND ASTER 'PURPLE DOME')	#2 CONT.	1.5' O.C.
	SHRUB	ILEX GLABRA 'COMPACTA' (COMPACT INKBERRY HOLLY)	3 GAL.	2.5' O.C.

PLANTING PALETTE B

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS 1	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	GRASS 2	PANICUM VIRGATUM 'CHEYENNE SKY' (SWITCHGRASS 'CHEYENNE SKY')	#2 CONT.	1.5' O.C.
	PERENNIAL	BAPTISIA AUSTRALIS (BLUE FALSE INDIGO)	#2 CONT.	2' O.C.
	SHRUB	ILEX VERTICILLATA 'NANA' RED SPRITE (COMPACT WINTERBERRY HOLLY)	3 GAL.	2.5' O.C.

NOTES:

1. DETERMINE THE LAYOUT OF PLANTINGS BASED ON THE TEMPLATE DESIGN. TEMPLATE AS SHOWN DOES NOT INCLUDE STEP–OUT ZONE.
2. MAINTAIN INDIVIDUAL PLANT SPACING AS NOTED IN THE PLANTING PALETTES.
3. MAINTAIN 1' GRASS BORDER AROUND FACILITY.
4. TEMPLATES ARE DESIGNED TO CREATE SYMMETRICAL, REPETITIVE FORMS. FINAL DESIGN MUST MAINTAIN OVERALL DESIGN INTENT AND SYMMETRY OF THE FACILITY.
5. PLANTING LAYOUT AND QUANTITIES SHALL BE PROVIDED IN PLANTING PLAN AND SCHEDULES AS PART OF FINAL DESIGN.
6. REPEAT PLANTING UNITS AS NECESSARY TO COVER THE ENTIRE FACILITY. PLANTINGS SHOULD BE CENTERED PER GUIDANCE SHOWN IN PLANTING TEMPLATES.
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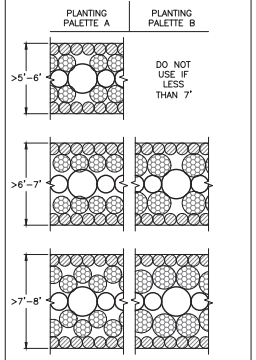
PLANTING CONFIGURATION DIAGRAM



NOTE: SHOWN FOR EXPANSION CONFIGURATION 1. PERENNIAL PLANTINGS IN DIAGRAM ARE SHOWN TO DEMONSTRATE HOW TO MAXIMIZE THE PERENNIAL DENSITY WITHIN THE PERENNIAL PLANTING AREA. THESE PERENNIAL CONFIGURATIONS SHALL BE APPLIED TO ALL EXPANSION CONFIGURATIONS.

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SHEET	XXX OF XXX
CONSTRUCTION	IN–HOUSE ☐ CONTRACT NO. ☒ 150220
DESIGN	DETS FILE NO. ☐ DCFA NO. ☒ 420/421–WSA
DESIGN MGR.	IN–HOUSE ☐ E.P.M.C. NO. ☒ DCCR
INDEX NO.	COE–CZ07
FOREMAN–INSPECTOR	

POST–BID REVISION

NO.	DESCRIPTION	BY	DATE

90% RFP SUBMITTAL

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PRE–BID REVISION

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

DC CLEAN RIVERS PROJECT
POTOMAC RIVER PROJECTS – DIVISION PR–A1
GREEN INFRASTRUCTURE

PLANTER BIORETENTION PLANTING TEMPLATE 2

LANDSCAPING

SCALE	AS SHOWN	DRAWN	DMC
INTERCEPTOR		CHECKED	FRG
SYSTEM		SUBMITTED	F. GRAZIANO
SURVEYED			
DATE	08/22/16	RECOMMENDED	
CADD FILE	LTCPPRA–L003		

dc clean rivers PROJECT
DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
5000 OVERLOOK AVENUE, SW
WASHINGTON, DC 20032
PHONE: 202-787-4460
FAX: 202-787-4478

PROGRAM CONSULTANTS ORGANIZATION
[redacted]
5000 OVERLOOK AVENUE, SW WASHINGTON, DC 20032 PHONE: 202-787-4460 FAX: 202-787-4478

REDUCTION VERIFICATION SCALE 0 10 INCHES

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LAST SAVED BY: CONNER, DILLON DATE: 7/28/2016 2:58:41 PM
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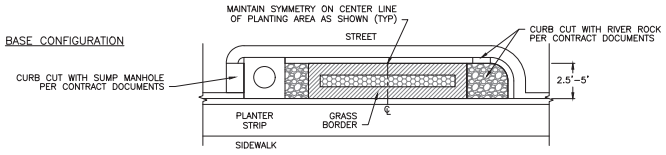
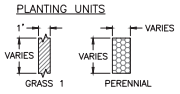
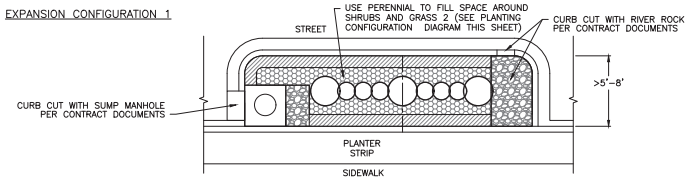
CURB EXTENSION BIORETENTION – PLANTING TEMPLATE 2

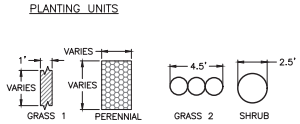
BASE CONFIGURATION



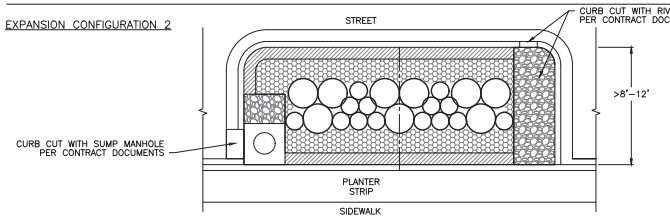


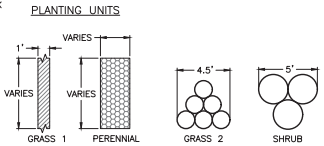
EXPANSION CONFIGURATION 1



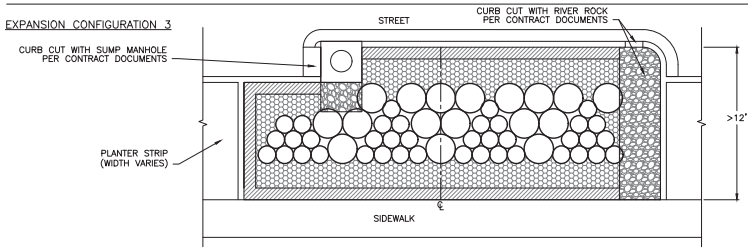


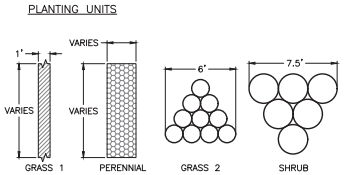
EXPANSION CONFIGURATION 2



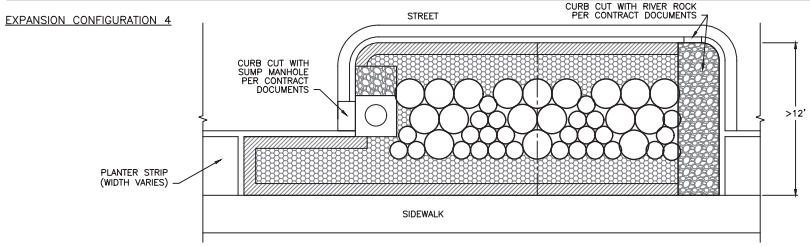


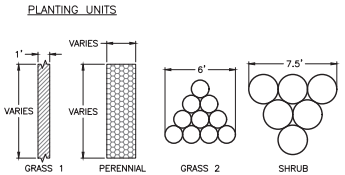
EXPANSION CONFIGURATION 3





EXPANSION CONFIGURATION 4





PLANTING PALETTE A

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS 1	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
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PLANTING PALETTE B

SYMBOL	TYPE	SPECIES	SIZE	SPACING
	GRASS 1	JUNCUS 'BLUE DART' (RUSH 'BLUE DART')	#1 CONT.	1' O.C.
	GRASS 2	PANICUM VIRGATUM 'CHEYENNE SKY' (SWITCHGRASS 'CHEYENNE SKY')	#2 CONT.	1.5' O.C.
	PERENNIAL	BAPTISIA AUSTRALIS (BLUE FALSE INDIGO)	#2 CONT.	2' O.C.
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NOTES:

1. DETERMINE THE LAYOUT OF PLANTINGS BASED ON THE TEMPLATE DESIGN. TEMPLATE AS SHOWN DOES NOT INCLUDE STEP–OUT ZONE.
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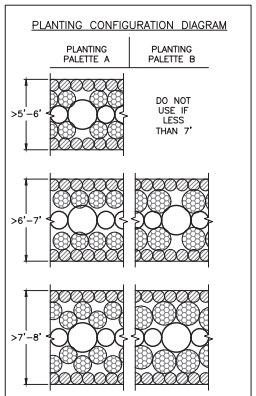
PLANTING CONFIGURATION DIAGRAM



NOTE: SHOWN FOR EXPANSION CONFIGURATION 1. PERENNIAL PLANTINGS IN DIAGRAM ARE SHOWN TO DEMONSTRATE HOW TO MAXIMIZE THE PERENNIAL DENSITY WITHIN THE PERENNIAL PLANTING AREA. THESE PERENNIAL CONFIGURATIONS SHALL BE APPLIED TO ALL EXPANSION CONFIGURATIONS.

JOB	CZ07
SHEET	XXX OF XXX
CONSTRUCTION	IN-HOUSE CONTRACT NO. ☒ 150220
DESIGN	DETS FILE NO. ☐ DCFA NO. ☒ 420/421–WSA
DESIGN MGR.	IN-HOUSE E.P.M.C. NO. ☒ DCCR
INDEX NO.	COE–CZ07
FOREMAN–INSPECTOR	

POST–BID REVISION

NO.	DESCRIPTION	BY	DATE

90% RFP SUBMITTAL

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PRE–BID REVISION

DISTRICT OF COLUMBIA
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DC CLEAN RIVERS PROJECT
POTOMAC RIVER PROJECTS – DIVISION PR–A1
GREEN INFRASTRUCTURE

CURB EXTENSION BIORETENTION PLANTING TEMPLATE 2

LANDSCAPING

SCALE	AS SHOWN	DRAWN	DMC
INTERCEPTOR		CHECKED	FRG
SYSTEM		SUBMITTED	F. GRAZIANO
SURVEYED			
DATE	08/22/16	RECOMMENDED	
CADD FILE	LTCPPRA–L004		

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5000 OVERLOOK AVENUE, SW
WASHINGTON, DC 20032
PHONE: 202-787-4460
FAX: 202-787-4478

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[redacted]
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REDUCTION VERIFICATION SCALE 0 10 INCHES

LAST SAVED BY: CONNER, DILLON DATE: 7/28/2016 2:58:41 PM
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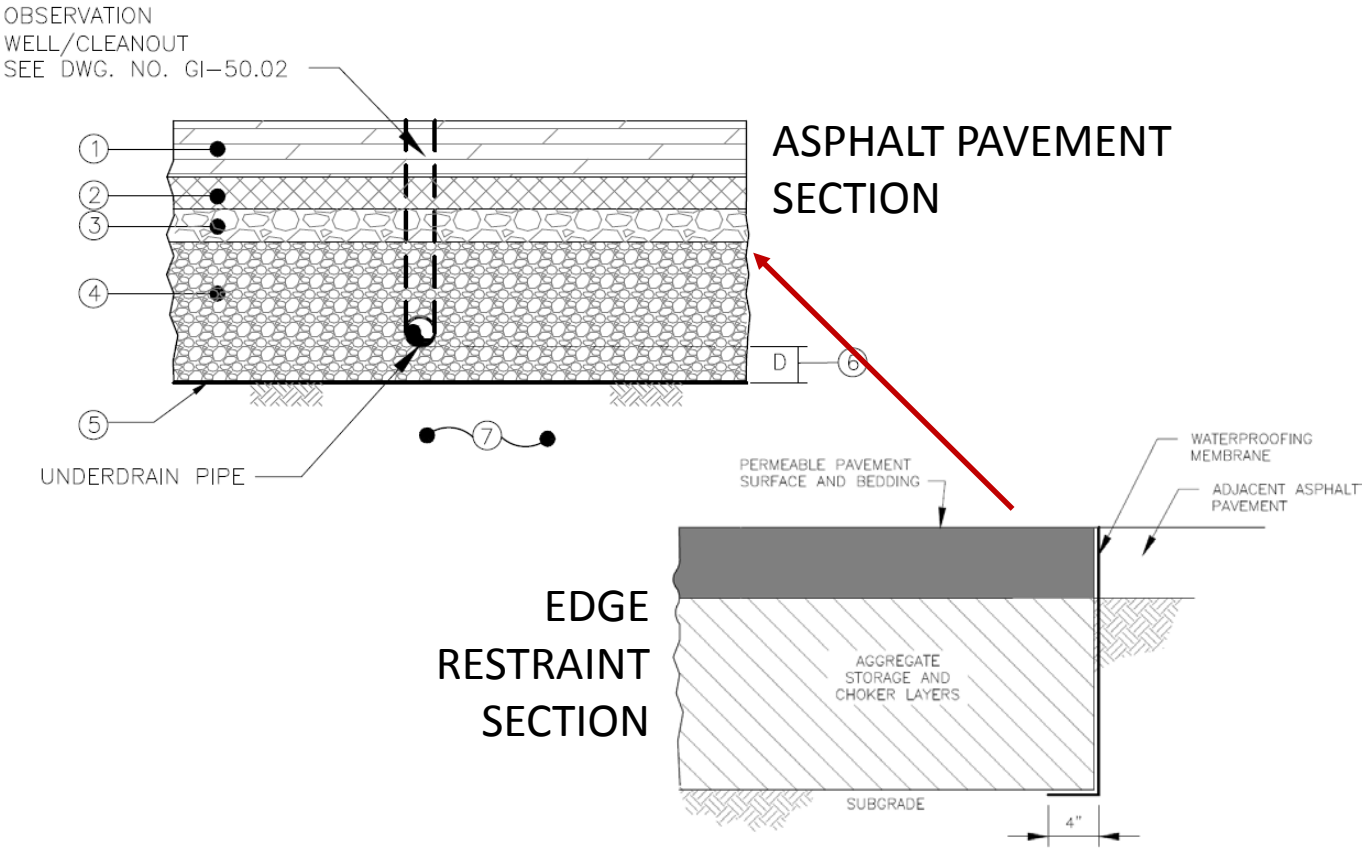
APPENDIX G

TYPICAL DETAILS

Porous Asphalt Detail

GREEN INFRASTRUCTURE TECHNOLOGY
IN PARKING LANES AND ALLEYS



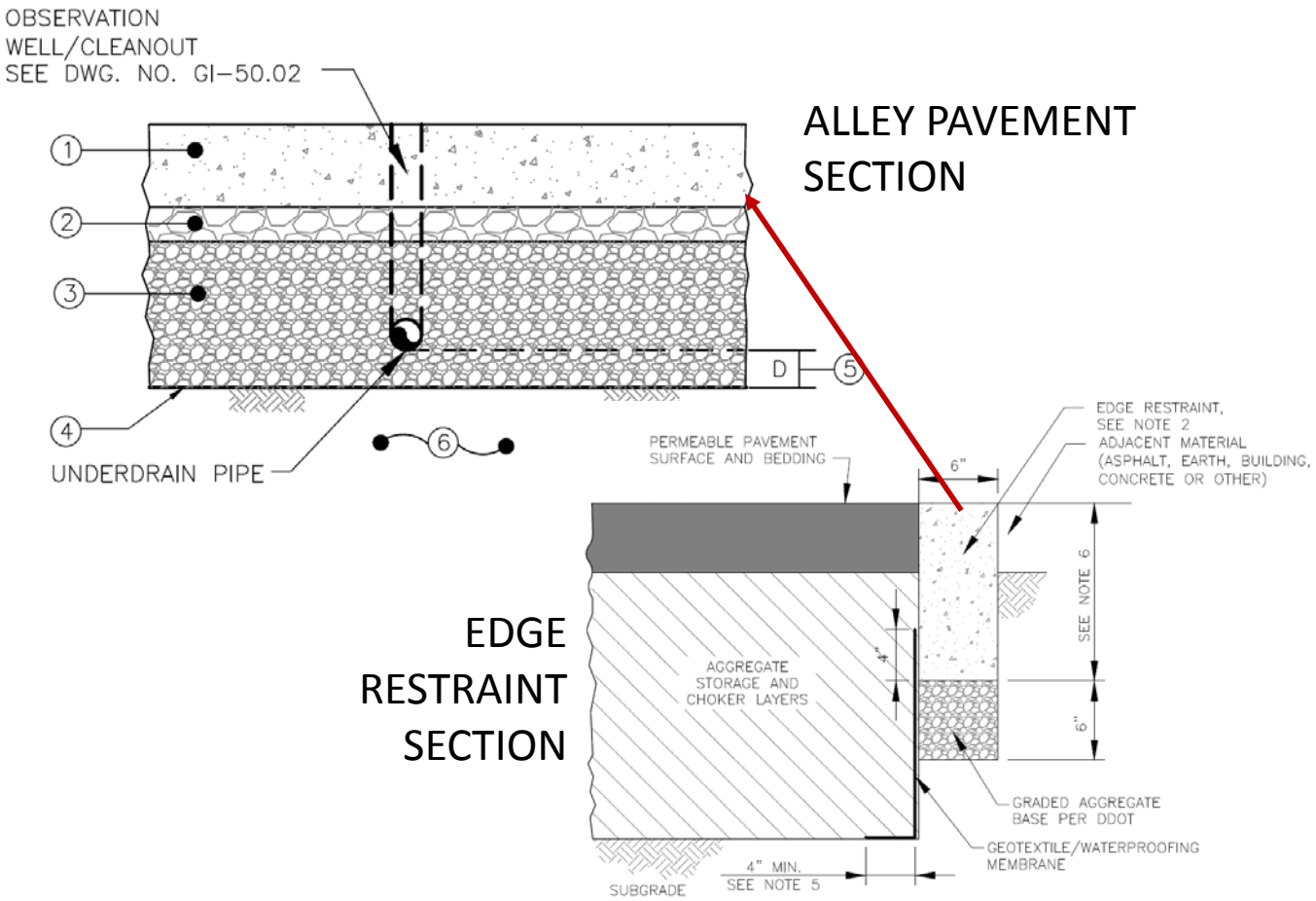
Note: Geotextile edge restraint is used where porous asphalt abuts non-porous asphalt. Restraint is not visible from the surface.

LEGEND:

1. POROUS ASPHALT SURFACE COURSE
2. POROUS ASPHALT BASE COURSE
3. CHOKER LAYER, AASHTO #57 OR APPROVED EQUIVALENT
4. AGGREGATE STORAGE LAYER, AASHTO #3, #2 (OR APPROVED EQUIVALENT)
5. GEOTEXTILE
6. INFILTRATION SUMP, FOR STANDARD DESIGN D=3" FOR UNDERDRAIN BEDDING. FOR ENHANCED DESIGN, SEE NOTE 5.
7. COMPACT AS SPECIFIED IN DDOT SPECIFICATIONS UNLESS OTHERWISE INDICATED. FOR SOFT SOILS, INSTALL GEOGRID PER DESIGN-BUILDER'S ENGINEER OF RECORD RECOMMENDATIONS.

Pervious Concrete Detail

GREEN INFRASTRUCTURE TECHNOLOGY
IN ALLEYS



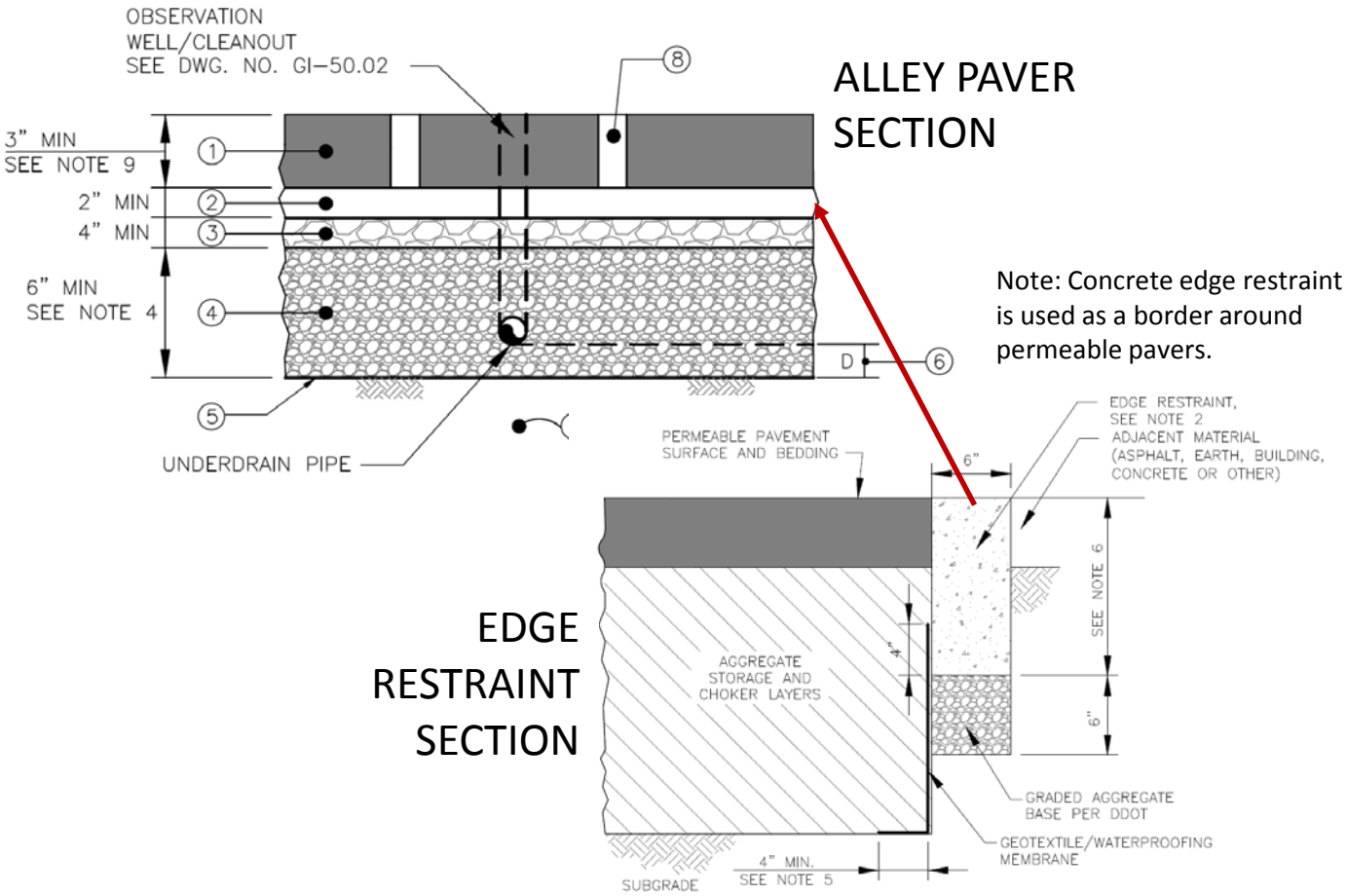
Note: Concrete edge restraint is used as a border around pervious concrete.

LEGEND:

1. PERVIOUS CONCRETE
2. CHOKER LAYER, AASHTO #57 OR APPROVED EQUIVALENT
3. AGGREGATE STORAGE LAYER, AASHTO #3, #2, (OR APPROVED EQUIVALENT)
4. GEOTEXTILE
5. INFILTRATION SUMP, FOR STANDARD DESIGN D=3" FOR UNDERDRAIN BEDDING. FOR ENHANCED DESIGN, SEE NOTE 5.
6. COMPACT AS SPECIFIED IN DDOT SPECIFICATIONS UNLESS OTHERWISE INDICATED. FOR SOFT SOILS, INSTALL GEOGRID PER DESIGN–BUILDER'S ENGINEER OF RECORD RECOMMENDATIONS.

Permeable Paver Detail

GREEN INFRASTRUCTURE TECHNOLOGY
IN ALLEYS



LEGEND:

① PERMEABLE CONCRETE PAVERS OR CLAY BRICK MEETING CURRENT APPROVED DC WATER SPECIFICATION FOR PERMEABLE PAVEMENT FACILITIES.

② BEDDING LAYER, AASHTO #8 OR APPROVED EQUIVALENT

③ CHOKER LAYER, AASHTO #57 OR APPROVED EQUIVALENT

④ AGGREGATE STORAGE LAYER, AASHTO #3, #2, (OR APPROVED EQUIVALENT)

⑤ GEOTEXTILE

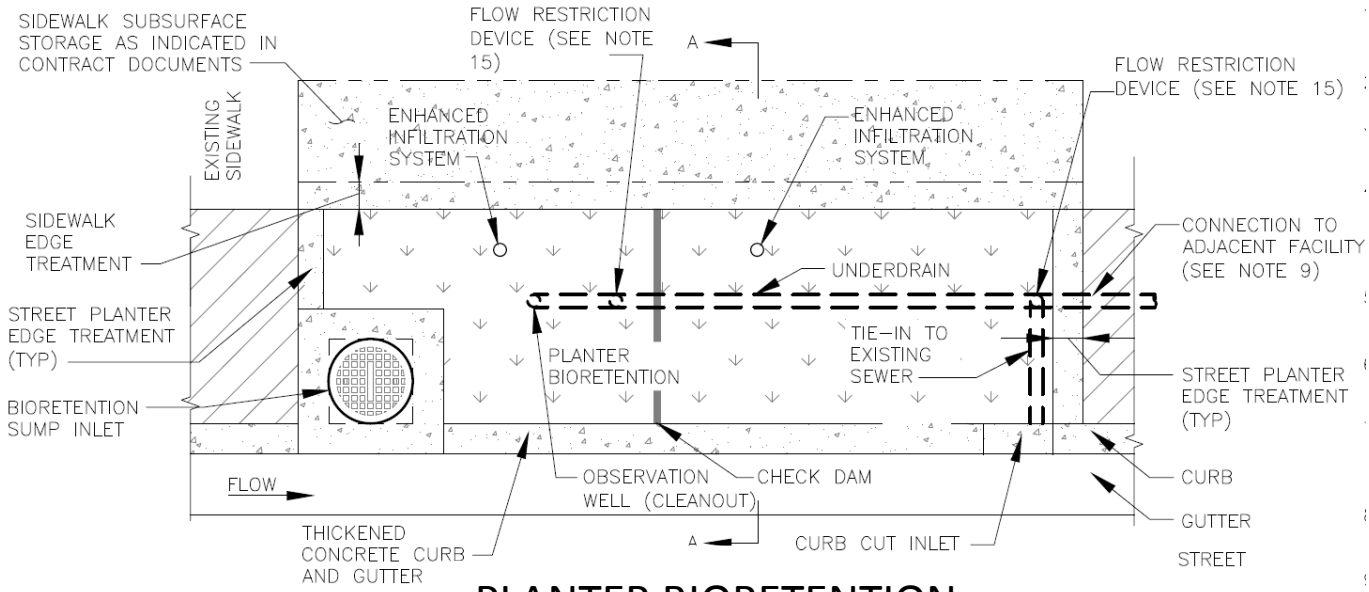
⑥ INFILTRATION SUMP, FOR STANDARD DESIGN D=3" FOR UNDERDRAIN BEDDING. FOR ENHANCED DESIGN, SEE NOTE 5.

⑦ COMPACT AS SPECIFIED IN DDOT SPECIFICATIONS UNLESS OTHERWISE INDICATED. FOR SOFT SOILS, INSTALL GEOGRID PER DESIGN–BUILDER'S ENGINEER OF RECORD RECOMMENDATIONS.

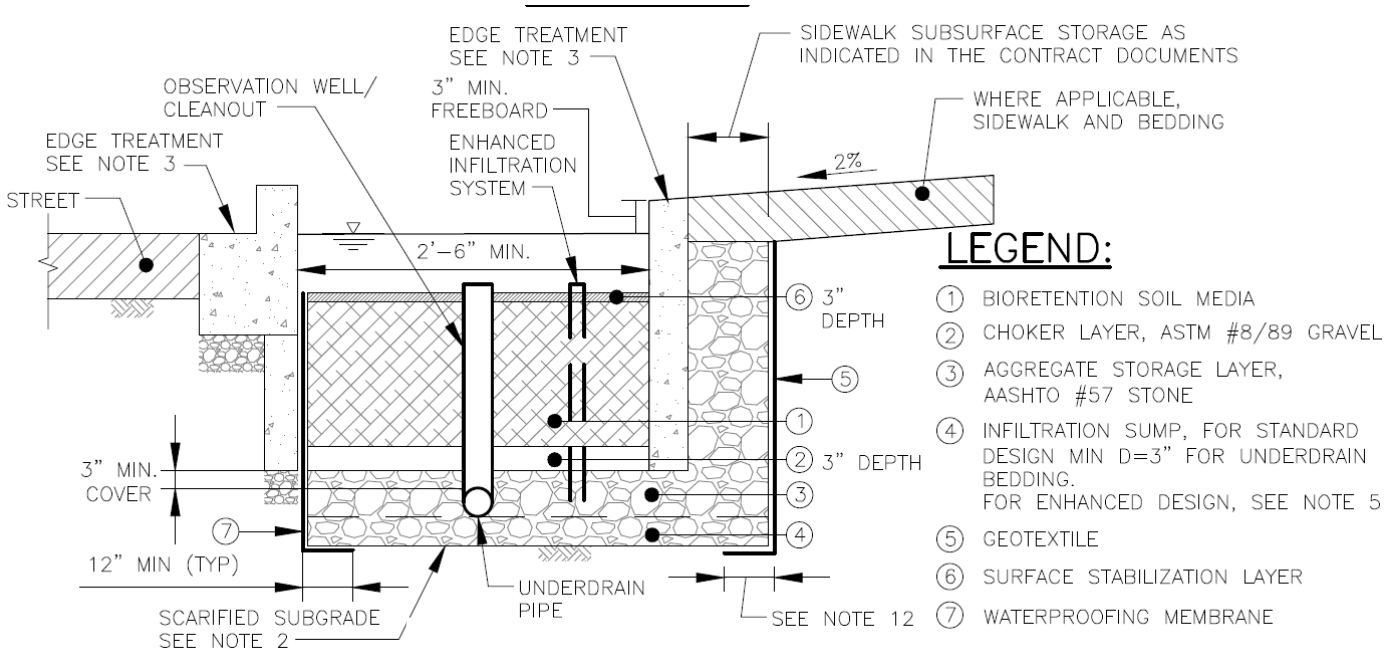
⑧ JOINT TO HAVE 1/2 INCH MAXIMUM GAP IN ACCORDANCE WITH THE LATEST ADA REQUIREMENTS AND TO BE FILLED WITH AASHTO #8 OR APPROVED EQUIVALENT. MINIMUM GAP SHALL BE 1/4" OR PER MANUFACTURERS RECOMMENDATIONS.

Planter Bioretention Detail

GREEN INFRASTRUCTURE TECHNOLOGY
BETWEEN SIDEWALK AND CURB



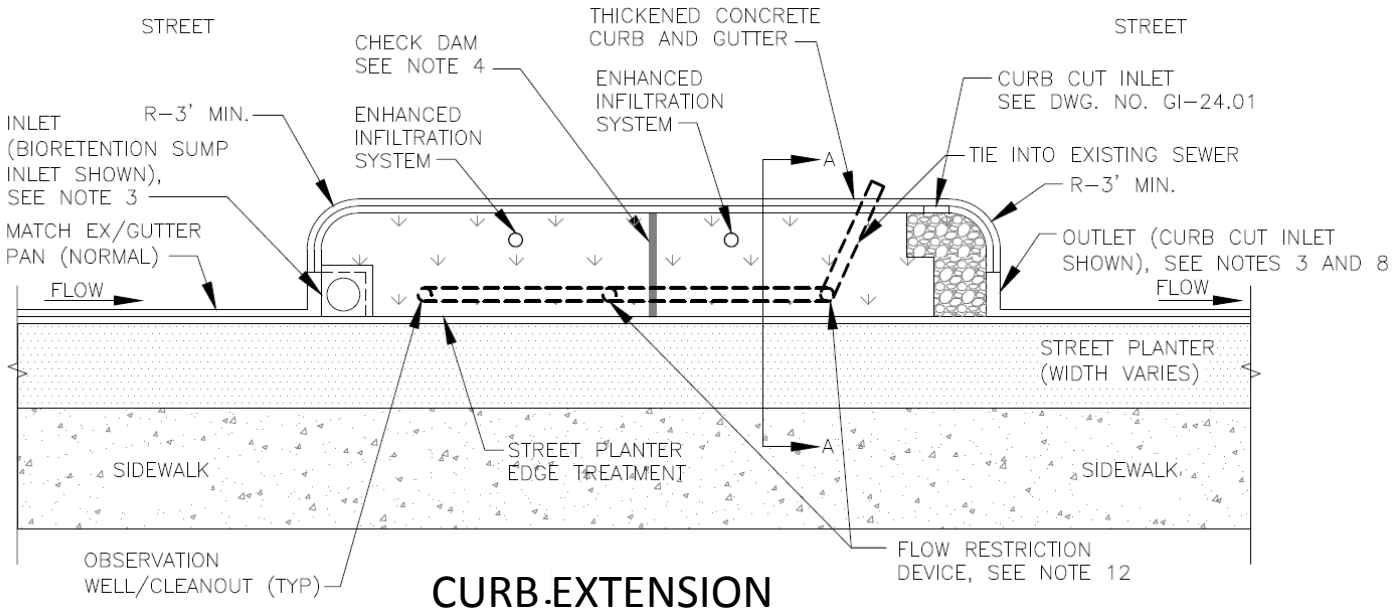
PLANTER BIORETENTION
PLAN VIEW



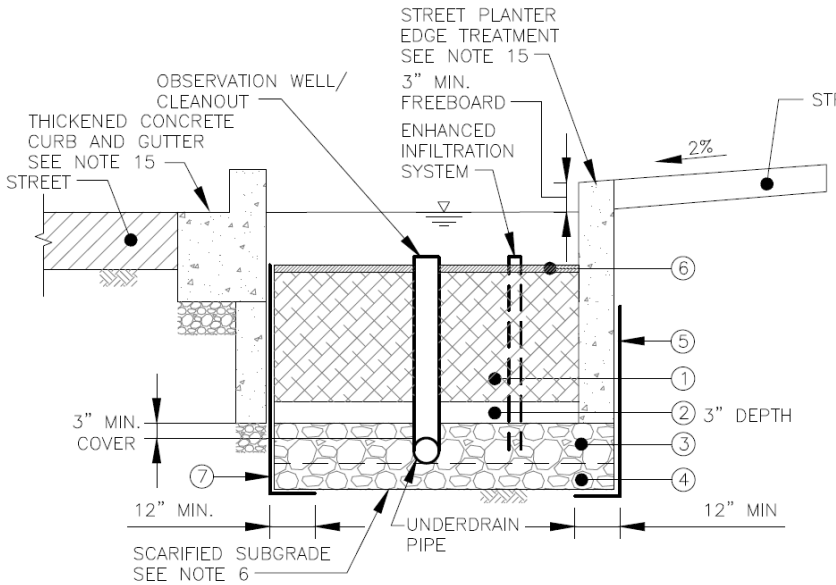
PLANTER BIORETENTION
SECTION A-A

Curb Extension Bioretention Detail

GREEN INFRASTRUCTURE TECHNOLOGY
MID-BLOCK AND END OF PARKING LANES



CURB EXTENSION BIORETENTION PLAN VIEW

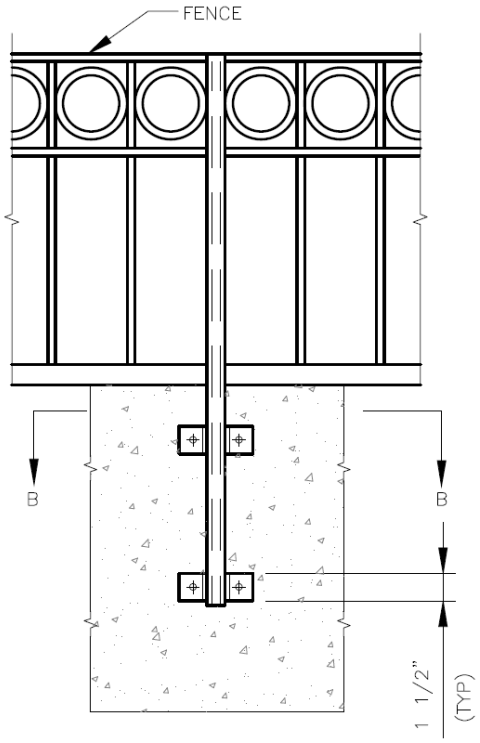


CURB EXTENSION BIORETENTION SECTION A-A

LEGEND:

1. BIORETENTION SOIL MEDIA
2. CHOKER LAYER, ASTM #8/89 GRAVEL
3. AGGREGATE STORAGE LAYER, AASHTO #57 STONE
4. INFILTRATION SUMP, FOR STANDARD DESIGN MIN D=3" FOR UNDERDRAIN BEDDING.
   FOR ENHANCED DESIGN, SEE NOTE 10
5. GEOTEXTILE
6. SURFACE STABILIZATION LAYER
7. WATERPROOFING MEMBRANE

Bioretention Fence Detail



18" FENCE DETAIL

SECTION A–A

NOTES:

1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND A DETAILED DESIGN FOR APPROVAL PRIOR TO FABRICATION. ALTERNATIVE MOUNTING OPTIONS AS APPROVED BY DC WATER.

2. POST SPACING: 4'–0" ON CENTER, MAX.

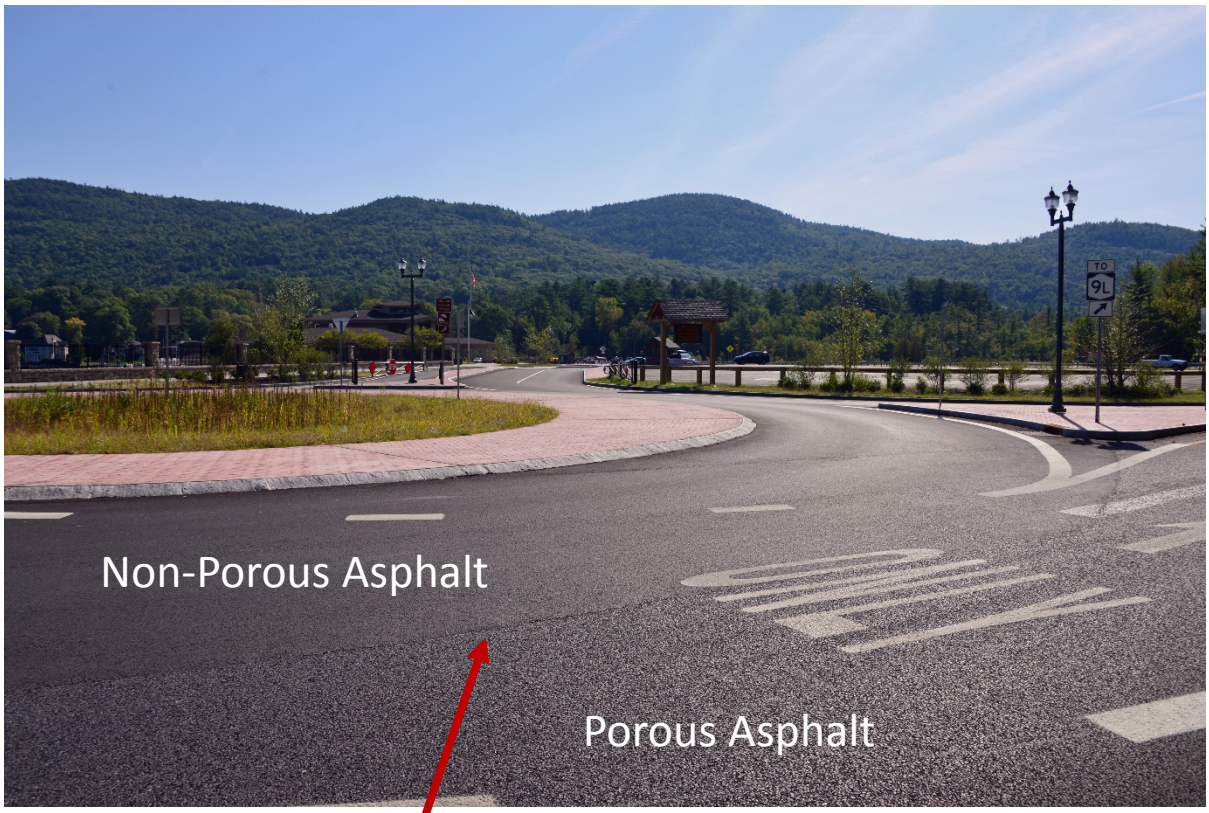
3. ALL EXPOSED FENCE COMPONENTS TO HAVE CONSISTENT COLOR AND FINISH, AS SPECIFIED IN CONTRACT DOCUMENTS.

APPENDIX H

PHOTOS OF REPRESENTATIVE GREEN INFRASTRUCTURE

Porous Asphalt Photos

GREEN INFRASTRUCTURE TECHNOLOGY
IN ALLEYS AND PARKING LANES

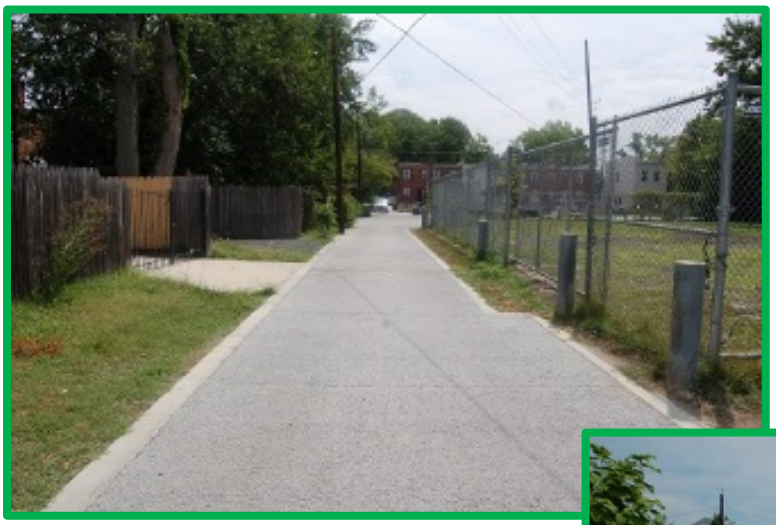


Lake George Beach, NY

Note: Photos provided are of similar projects (locations noted). These photos are intended to be a general representation only. Refer to DC Clean Rivers renderings and details for specific information on the proposed PR-A project.

Pervious Concrete Photos

GREEN INFRASTRUCTURE TECHNOLOGY
IN ALLEYS



Washington, DC
Taken from www.concretemanagementsolutions.com

Note: Photos provided are of similar projects (locations noted). These photos are intended to be a general representation only. Refer to DC Clean Rivers renderings and details for specific information on the proposed PR-A project.

Permeable Paver Photos

GREEN INFRASTRUCTURE TECHNOLOGY
IN ALLEYS

Allison St./Iowa Ave./Webster St./
Georgia Ave. NW in DC

Note: Photos provided are of similar projects (locations noted). These photos are intended to be a general representation only. Refer to DC Clean Rivers renderings and details for specific information on the proposed RC-A project.

Planter Bioretention Photos

GREEN INFRASTRUCTURE TECHNOLOGY
BETWEEN SIDEWALK AND CURB

Columbus, Ohio

New York

Note: Photos provided are of similar projects (locations noted). These photos are intended to be a general representation only. Refer to DC Clean Rivers renderings and details for specific information on the proposed PR-A project.

Curb Extension Bioretention Photos

GREEN INFRASTRUCTURE TECHNOLOGY
MID-BLOCK AND END OF PARKING LANES

Portland, OR

Philadelphia

Note: Photos provided are of similar projects (locations noted). These photos are intended to be a general representation only. Refer to DC Clean Rivers renderings and details for specific information on the proposed PR-A project.

APPENDIX I

PHOTOS OF TYPICAL EXISTING CONDITIONS

Representative Existing Conditions

PHOTOS OF VARIOUS STREETS WHERE

PARKING LANE PERMEABLE PAVEMENT IS PROPOSED

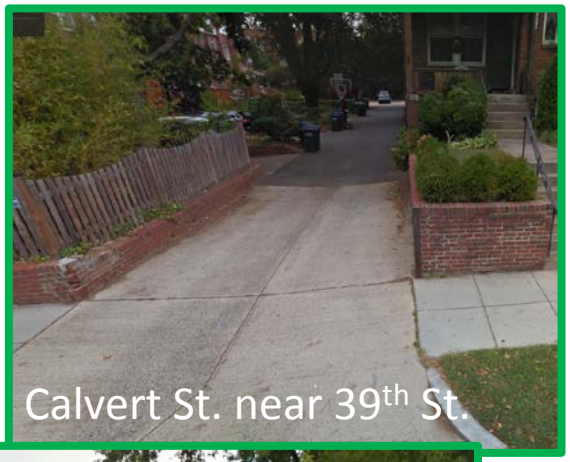
Source: Google Maps

Representative Existing Conditions

PHOTOS OF VARIOUS LOCATIONS WHERE

ALLEY PERMEABLE PAVEMENT IS PROPOSED

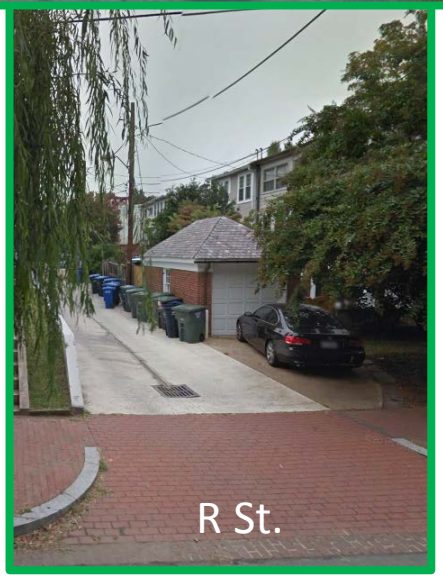

Tunlaw Rd. near Calvert St.


Calvert St. near 39th St.


38th St. South of T St.


Benton St. to W St.


36th St.

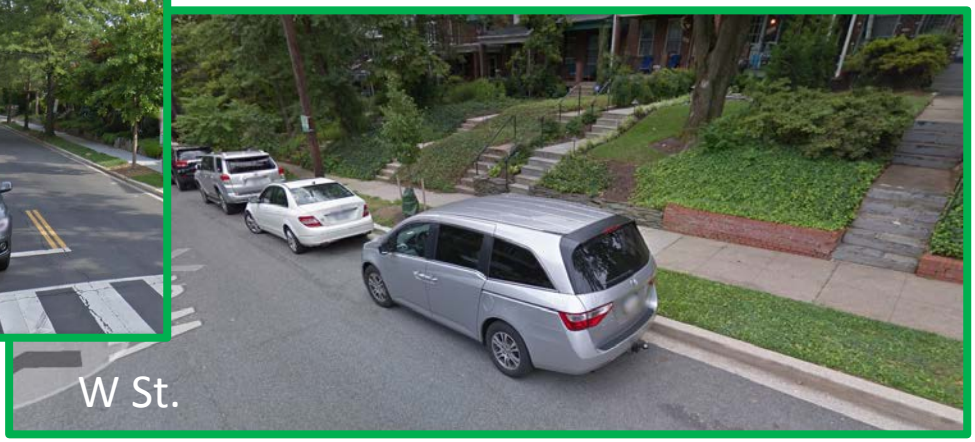

R St.

Source: Google Maps

Representative Existing Conditions

PHOTOS OF VARIOUS LOCATIONS WHERE

CURB EXTENSION & PLANTER BIORETENTION IS PROPOSED



Source: Google Maps

APPENDIX J

SUMMARY OF COMMUNITY ENGAGEMENT

DC Water and Sewer Authority
DC Clean Rivers Project

Green Infrastructure Program
Potomac River Project A (PR-A)

Summary of Community Engagement

As part of DC Water's Green Infrastructure (GI) Program, the DC Clean Rivers Project (DCCR) has implemented an extensive public outreach program for Potomac River Project A (PR-A) since the May 20th, 2015 announcement that the Consent Decree parties (DC Water, the District of Columbia government, the United States Environmental Protection Agency, and the Department of Justice) had reached an agreement on the modifications to the Long Term Control Plan (LTCP) to reduce Combined Sewer Overflows (CSOs). The goals of DCCR's public outreach program are to inform residents, community members and other stakeholders about the overall GI Program and, more specifically PR-A, to foster public awareness, to provide education about GI and its benefits, and to gather support and obtain feedback for a successful GI implementation within the Potomac River sewershed.

From May 2015 through August 2016, DCCR has presented at three ANC meetings for the ANCs within the PR-A Project Area (two regular PR-A Project updates and one special presentation for community feedback), held one community meeting and participated in two town hall meetings, held one working/feedback session with ANC Commissioners within the PR-A Project Area, participated in five community events organized by community partners, presented two times for civic and non-profit organizations, hosted two coffee hours with residents within the PR-A Project Area, hosted one online survey, and participated in ongoing meetings with public agencies, community partners and stakeholders. Table 1 below provides additional detail on each of these events, including the event name and the event date. The community event hosted by DC Water and special ANC presentation were publicized through posters and postcards placed at public buildings and local businesses within the PR-A Project Area, electronic invitations directly to individuals on DCCR's listserv, notifications from community partners to the public, information shared on the DC Water website, and door hangers placed at residences. Three field investigation notifications and one postcard promoting an online survey were distributed via direct mailer and three targeted door-to-door canvasing efforts within the Project Area.

Through these outreach efforts, DC Water has spoken with over 800 individuals across the District regarding GI, both for the DC Water GI Program and PR-A. DC Water has reached out four times via direct mail and three targeted canvasing efforts to over 1,850 residents and businesses within the PR-A Project Area between July 2015 and August 2016 and over 1,600 handouts have been produced and distributed. DC Water has obtained verbal and written feedback from over 200 individuals during presentations, ANC meetings, and public events through comment cards and the online survey.

The feedback obtained during these public outreach efforts about the Potomac River sewershed (including areas within and outside of the historic district of Old Georgetown) has been extensive. Specific to the PR-A project area presented within this submission (which includes areas exclusively outside of the historic district of Old Georgetown), feedback from stakeholders has been positive, expressing support for GI as a tool to manage stormwater, reduce flooding, beautify neighborhoods, and support vehicular and pedestrian safety. The subject of maintaining the GI facilities has been the major emphasis of the inquiries expressed. However, there has been a high level of satisfaction expressed by the residents when informed that DC Water will maintain the facilities. No objections to installation of GI technologies have been expressed by the public. Valuable feedback obtained has been incorporated into the proposed GI practices and locations when practicable. The online survey was administered to obtain feedback on current conditions of public right-of-

way and traffic and pedestrian safety and the proposed GI practices and locations within PR-A. A special presentation for ANC3B was conducted in May 2016 to provide a project update and seek feedback from ANC3B Commissioners and the public and invite the public to participate in the online survey and seek feedback on the proposed GI practices and locations. In coordination with Ward 2 & Ward 3 Councilmembers, DC Water conducts annual town hall meetings to update the public on DC Water projects and provide the public opportunities to address any concerns about DC Water services and ongoing projects.

Table 1 – PR-A Public Outreach Documentation List

Public Outreach Item	DC Water Presentations	Date(s)
DC Water Presentation	ANC3B Monthly Meeting	9/10/15
	ANC3B Monthly Meeting	11/12/15
	ANC3B Meeting with ANC Commissioners (Feedback session)	2/4/16
	ANC3B Monthly Meeting (Special presentation to obtain public feedback)	5/12/16
	Ward 2 Annual Councilmember Jack Evans / DC Water Town Hall Meeting	4/7/16
	Ward 3 Annual Councilmember Mary M. Cheh / DC Water Town Hall Meeting	4/21/16
DC Water-Hosted Community Meetings	GI Program and PR-A Community Meeting	10/7/15
DC Water-Hosted "Coffee Hours"	Alley north of T Street NW (between 37th Street NW and 36th Street NW)	2/6/16
	Alley east of Tunlaw Road NW (south of Calvert Street NW and west of 37th Street NW)	
Community Events Hosted by Community Partners	Rock Creek 125th Anniversary Celebration	9/27/15
	Volta Park Day	11/1/15
	US Department of Transportation Earth Day	4/21/16
	Georgetown Business Improvement District Annual French Market	4/30/16
	Burleith Citizens Association Picnic	6/18/16
Presentations for Civic and Non-profit Organizations	Potomac River Squadron	9/15/15
	Glover Park Citizens Association	5/3/16
Online Survey	Online survey to gather information on current public right-of-way conditions of pavement, sidewalks, traffic safety, and flooding issues as well as feedback on proposed GI practices and locations within PR-A	5/6/16 – 5/22/16
Meetings with Stakeholders and Community Partners	District Government & District agencies (DDOT, DOEE, DGS, etc.)	At least monthly
	Conference Call with ANC2E and Burleith Citizens Association	2/2/16
DC Water Website	Information shared at www.dcwater.com/green	Ongoing
Public Information Materials	GI factsheets, direct mailers, door-to-door flyers, comment cards, posters and postcards	5/25/15 – Present

Description of Outreach Efforts

The following sections provide more specific detail for each of the events introduced above.

DC Water Presentations

1. On Thursday, September 10, 2015, DC Water attended ANC3B's monthly meeting to present the proposal to modify the LTCP to include GI. The meeting was held at the Multipurpose Room at Stoddert Elementary School & Recreation Center, located at 4001 Calvert Street, NW.

2. On Thursday, November 12, 2015, DC Water attended ANC3B's monthly meeting to present an update on PR-A. The meeting was held at the Multipurpose Room at Stoddert Elementary School & Recreation Center, located at 4001 Calvert Street, NW.

3. On Thursday, February 4, 2016, DC Water hosted a meeting with ANC3B Commissioners to present an update for PR-A and seek feedback on proposed GI and locations. The meeting was held at the Auditorium/Activity Room at Guy Mason located at 3600 Calvert Street, NW.

4. On Thursday, May 12, 2016, DC Water attended ANC3B's monthly meeting to present an update for PR-A and seek feedback on proposed GI practices and locations and invite the public to participate in the PR-A online survey. Attendees could review a series of 7 stations manned by DCCR staff discussing various project components on boards and two 30" X 40" PR-A Project Area maps showing proposed GI practices and locations seeking input from the public. DC Water set up the stations in the meeting room for attendees to stop by before, during and after the ANC meeting. Over 50 people attended the meeting, during the event, 10 participants of the meeting provided input mainly regarding current traffic conditions and the need for more green space. No objections to the project were expressed by the public. The meeting was held at the Multipurpose Room at Stoddert Elementary School & Recreation Center, located at 4001 Calvert Street, NW.

5. On Wednesday, April 7, 2016, in coordination with the Office of Jack Evans, Ward 2 Councilmember, DC Water conducted the annual Ward 2 Town Hall Meeting where DC Water's General Manager George Hawkins presented DC Water updates, including an overview of DCCR and the GI Program. After the presentation, an open house-format event included a booth for each DC Water department that included DC Water GI Program providing the public specific information about PR-A and promoting the PR-A Online Survey. About 50 people attended the event. The Town Hall Meeting was held at the Lower Level Room at Georgetown Library, located at 3260 R Street, NW.

6. On Thursday, April 21, 2016, in coordination with the Office of Mary M. Cheh, Ward 3 Councilmember, DC Water conducted the annual Ward 3 Town Hall Meeting where DC Water General Manager George Hawkins presented DC Water updates, including an overview of DCCR and the GI Program. After the presentation, an open house-format event included a booth for each DC Water department that included DC Water GI Program providing the public specific information about PR-A and promoting the PR-A Online Survey. About 50 people attended the event. The Town Hall Meeting was held at the New Student Center Room at the University of the District of Columbia, located at 4200 Connecticut Avenue, NW.

DC Water-Hosted Public Meetings

GI Program and PR-A Community Meeting

On Wednesday, October 7, 2015, DC Water hosted a public meeting to educate the community about

DC Water's GI Program and PR-A. The meeting was initiated with a presentation to educate the public on DCCR, GI, and PR-A. The presentation was followed by an open house-format setting where attendees could review a series of 10 stations manned by DCCR staff discussing various project's components represented on boards. Thirteen residents, business owners and elected officials attended. A limited number of participants in the meeting indicated concerns about GI implementation within the historic district of Old Georgetown, but the participants did not indicate opposition to the PR-A project area presented within this submission. The meeting was held in the Multipurpose Room of Saint John's Episcopal Church, located at 3240 O Street, NW. The meeting was promoted by electronic invitations to ANC2E and ANC3B Commissioners and stakeholders who assisted in promoting the event, posters and postcards were placed at businesses and public buildings and meeting information was posted on DC Water's website.

DC Water-Hosted "Coffee Hours" with Residents

Burleith and Glover Park Neighborhoods

On Saturday, February 6, 2016, DC Water hosted two "Coffee Hours" to educate the community about DC Water's GI Program and PR-A and ongoing field investigations taking place within the project area to gather technical information for the implementation of GI. The events were held as an open house-style and attendees could review a series of six stations manned by DCCR staff discussing the field investigations process and project's components. Nine residents and business owners attended. Positive feedback was received to the discussed field investigations work and proposed amenities and improvement of green areas. Feedback was incorporated into the field investigations work process and GI project design as practicable. No opposition to the field investigations work or project was expressed by the public. The first "Coffee Hour" took place at the alley north of T Street NW (between 37th Street NW and 36th Street NW) and the second at the alley east of Tunlaw Road NW (south of Calvert Street NW and west of 37th Street NW). The events were promoted with invitations delivered door-to-door to the properties near and around the field investigation sites.

Community Events Hosted by Community Partners

Rock Creek Park 125th Anniversary Celebration

On Sunday, September 27, 2015, DC Water participated in the Rock Creek Park 125th Anniversary Celebration, organized by the National Park Service and US Department of the Interior. DC Water hosted a booth to educate the community about DC Water's GI Program and PR-A and have visitors to the booth sign-up to receive updates and related events invitations. Visitors could review a series of four educational boards manned by DCCR staff graphically illustrating various project components. Over 100 GI-related educational handouts were distributed and 11 people signed up to receive further updates. General positive feedback was obtained and no opposition about the PR-A or the GI program was expressed by the public. The event took place at Rock Creek Nature Center at 5200 Glover Road NW.

Volta Park Day Celebration

On Sunday, November 1, 2015, DC Water participated in the Volta Park Day Celebration, organized by Friends of Volta Park. DC Water hosted a booth to educate the community about DC Water's GI Program and PR-A and have visitors to the booth sign-up to receive updates and related events invitations. Visitors could review a series of four educational boards manned by DCCR staff graphically illustrating various project components. Over 50 GI-related educational handouts were distributed and six people signed up to receive further updates. General positive feedback was obtained and no opposition about the PR-A or the GI program was expressed by the public. The event was held at Volta Park located at 1555 34th Street NW.

US Department of Transportation Earth Day Celebration

On Thursday, April 21, 2016, DC Water participated in the Earth Day Celebration, organized by US Department of Transportation (DOT). DC Water hosted a booth to educate the employees of DOT about DC Water's GI Program and PR-A and have visitors to the booth sign-up to receive updates and related events invitations. Visitors could review a series of four educational boards manned by DCCR staff graphically illustrating various project components. Over 300 GI-related educational handouts were distributed. General positive feedback was obtained and no opposition about the PR-A or the GI program was expressed by the public. The event was held at the US Department of Transportation headquarters at 1200 New Jersey Avenue SE.

Georgetown Business Improvement District Annual French Market

On Saturday, April 30, 2016, DC Water participated in the Georgetown Annual French Market, organized by Georgetown Business Improvement District (BID). DC Water hosted a booth to educate the community about DC Water's GI Program and PR-A and have visitors to the booth sign-up to receive updates and related events invitations. Visitors could review a series of four educational boards manned by DCCR staff graphically illustrating various project components. Over 150 GI-related educational handouts were distributed and twenty-seven people signed up to receive further updates. General positive feedback was obtained and no opposition about the PR-A or the GI program was expressed by the public. The event was held at 1611 Wisconsin Avenue NW.

Burleith Citizens Association Annual Picnic

On Saturday, June 18, 2016, DC Water participated in the Annual Burleith Citizens Association Picnic, organized by Burleith Citizens Association. DC Water hosted a booth to educate the community about DC Water's GI Program and PR-A and have visitors to the booth sign-up to receive updates and related events invitations. Visitors could review a series of four educational boards manned by DC Clean Rivers staff graphically illustrating various project components. Over 50 GI-related educational handouts were distributed and seven people signed up to receive further updates. General positive feedback was obtained and no opposition about the PR-A or the GI program was expressed by the public. The event was held the green lot at Whitehaven Park located at 3699 Whitehaven NW Parkway.

Presentations for Civic and Non-profit Organizations

Extensive outreach via phone and email is currently being conducted to stakeholders providing regular updates about PR-A and the GI program and seeking input and assistance to continue to reach out to their members, clients and constituents. In addition, briefings have been presented as follows:

1. On Tuesday, September 15, 2015, DC Water conducted a briefing on its GI Program and PR-A to the Potomac River Squadron located at Capital Yacht Club at 660 Water Street SW.

2. On Tuesday, May 3, 2016, DC Water conducted a briefing on PR-A to Glover Park Citizens Association during their monthly meeting and invited the community members to participate in a free downspout disconnection evaluation for their properties within the PR-Area. The event was held at the Multipurpose Room at Stoddert Elementary School & Recreation Center, located at 4001 Calvert Street, NW.

Online Survey

From Friday, May 6, 2016 through Monday, May 22, 2016, DC Water conducted an online survey to gather information about the PR-A area, including current pavement and sidewalk conditions, flooding and traffic safety issues, interest in participating in a program that would disconnect downspouts on homes, and feedback on proposed GI practices and locations within the PR-A area. SurveyMonkey

was used to administer the survey. Thirty-five individuals answered one or more questions. Positive feedback was expressed by the participants. Valuable information regarding current conditions within the project area was obtain and considered for further GI practices design, when practicable. The survey was promoted by emailing the link directly to over 100 individuals from PR-A community contact database (created from attendees to events DC Water has attended and who had requested receive project updates), emailed to community partners, ANCs, and stakeholders who assisted in promoting the survey and in-person at ANC meetings and stakeholders meetings.

Meetings with Stakeholders and Community Partners

1. On Friday, June 12, 2015, DC Water conducted a meeting with the Director of the District Department of Transportation to discuss DC Water's GI Program and coordination with DDOT's work.

2. At least monthly, DC Water conducts a monthly coordination meeting with the District Government, including multiple agencies within the Government (i.e. DDOT, DOEE, DGS, etc.).

3. On Tuesday, February 2, 2016, DC Water conducted a conference call with Burleith Citizens Association and ANC2E SMD01 to provide an update on the PR-A and discuss upcoming field investigations work within the Burleith neighborhood.

DC Water's Website

DC Water's website has a dedicated webpage to provide information about its DC Water GI Program in which information about PR-A is included. The dedicated webpage contains the following:

- Background on the GI Program
- Plan for GI Implementation
- Benefits to the District from GI Implementation
- Meetings and Public Events information and links to materials presented and distributed
- Resources that provide more information on GI
- Frequently Asked Questions

A dedicated page for PR-A to provide information (throughout design, construction, and maintenance) and resources exclusively on this project is currently being developed and will be available in Fall 2017 to support future updates for stakeholders regarding specific progress with PR-A.

Public Information Materials

DC Water has created multiple informational pieces for use during the described presentations, public meetings and briefings including:

- Nine PowerPoint presentations;
- 800 factsheets on the GI Program have been printed and distributed at all public meetings, events and ANC meetings;
- Over 7,400 direct mailers have been sent out to residents and businesses within PR-a;
- Over 3,500 door-to-door informational flyers have been distributed to residents and businesses within PR-A area;
- Over 80 comment cards have been distributed at hosted community meetings and public events;

- 120 11”X17” posters with information on public meetings were posted on public buildings and businesses within PR-A;
- 800 informational postcards with public meetings information were produced, distributed to stakeholders and placed on public buildings and local businesses within PR-A; and
- PR-A factsheets are currently being developed for future updates to project stakeholders.

APPENDIX K

ENVIRONMENTAL DOCUMENTATION

ENVIRONMENTAL DETERMINATION
&
ENVIRONMENTAL INTAKE FORMS (Provided on CD)

water is life®

Office of the General Manager

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY I 5000 OVERLOOK AVENUE, SW I WASHINGTON, DC 20032

September 2, 2016

Marcel Acosta
Executive Director
National Capital Planning Commission
401 9th Street, NW
North Lobby, Suite 500
Washington, DC 20004

Marcel!

Dear Mr. Acosta:

DC Water is pleased to submit plans for its Potomac River Project A (PR-A) for the National Capital Planning Commission's review and comment. As you are aware, PR-A is one of several infrastructure improvement projects DC Water is engaged in as part of its DC Clean Rivers Project, which is designed to reduce the incidence of combined sewer overflows to the District's waterways. Similar to our previous submission to you for Rock Creek Project A (RC-A), this PR-A submission includes green infrastructure facilities within the District-owned public right-of-way of the Glover Park and Burleith neighborhoods.

During the planning process for RC-A, DC Water consulted with legal counsel to understand the requirements of Section 106 of the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA), and to determine whether the procedures outlined in either of these statutes apply to RC-A and PR-A. After analyzing the factors triggering review under these statutes in the context of the RC-A and PR-A projects, DC Water and counsel determined that neither NEPA nor Section 106 of NHPA apply to RC-A or PR-A. Attached is the legal memorandum in support of this determination enclosed provided to you previously for RC-A's submission. Accordingly, DC Water will follow the appropriate local laws governing District of Columbia projects pursuant to Section 9b of the Historic Landmark and Historic District Protection Act of 1978.

We appreciate your time in review of this submission, and we look forward to continued collaboration as DC Water implements green infrastructure as part of the DC Clean Rivers Project.

Sincerely,

George S. Hawkins
General Manager and CEO

Attachments: Potomac River Project A Plans
Legal Analysis Regarding Section 106 of the NHPA

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY | 5000 OVERLOOK AVENUE, SW | WASHINGTON, DC 20032

April 15, 2016

Mr. Thomas Luebke, Secretary
U.S. Commission of Fine Arts
401 F Street, Suite 312
Washington DC 20001-2728

Subject: DC Clean Rivers Project
Green Infrastructure Installations in Georgetown

Dear Mr. Luebke:

Thank you for your letter of February 16, 2016, providing comments on the implementation of green infrastructure (GI) in Georgetown. I write today to comment on the major topics raised in your letter.

We appreciate your acknowledgement that the CFA is highly supportive of the DC Clean Rivers initiative and public efforts to reduce discharges of sewage into the environment. We also appreciate CFA's long history of deftly handling its responsibility to protect the historic resources of the Old Georgetown historic district as well as serving as the principal guardian of federal interests in matters of design, aesthetics, and related issues as they affect the nation's capital. CFA and DC Water are companion stewards of dynamic and significant elements of the public trust whose actions and decisions often affect the environment in which future generations will live. Our view is that this shared interest should help us work through any apparent conflicts that might arise from the plan to implement GI in limited portions of the federal National Historic Landmark historic district of Old Georgetown.

The question whether Section 106 of the National Historic Preservation Act (NHPA) applies to Potomac GI Project No. 1 is complex because resolution of the question involves evaluation of Section 106, applicable regulations, the 2005 Consent Decree, and the 2016 Amendment to the 2005 Consent Decree. This letter contains our evaluation of the question and we have attached our counsel's analysis on the question. We encourage you to forward this letter and the attachments to your counsel to consider in connection with his or her review. We also invite communication between our respective legal counsel and request that your attorney contact Dale Mullen at (804) 775-4710 at their earliest opportunity.

The background discussion below is a necessary predicate to our legal analysis. Please also note compliance with Section 9b of D.C. Law 2-144 is a part of our legal analysis.

Background

The purpose of the DC Clean Rivers Projects (DCCR) is to control combined sewer overflows (CSOs) to District waters. In the older sections of the District like Georgetown, there is a single combined sewer in the street which handles both stormwater runoff and sanitary sewage from homes and businesses. During dry weather conditions, sewage is conveyed to DC Water's Advanced Wastewater Treatment Plant at Blue

Plains, located in the southwestern part of the District on the east bank of the Potomac River. When the capacity of a combined sewer is exceeded during storms, the excess flow, which is a mixture of sewage and stormwater runoff, is discharged to the Anacostia and Potomac Rivers, Rock Creek, and tributary waters. This excess flow is called CSO and there are 47 potentially active CSO outfalls in the District's combined sewer system.

CSO 027 and 028 are two CSOs serving the Old Georgetown historic district. These CSOs overflow a mixture of sewage and runoff more than 70 times per year to the Potomac River. Control of these overflows is required by the Clean Water Act and a Consent Decree (Decree) that was entered by DC Water, the District of Columbia, the U.S. Environmental Protection Agency, and the Department of Justice.

The original Consent Decree was entered by the court in 2005 and provided for construction of a 58 million gallon tunnel along the Potomac waterfront (Potomac Tunnel) and a large pumping station in the National Mall area to empty the contents of the tunnel to existing sewers for conveyance to Blue Plains. From 2011 to 2016, DC Water conducted an extensive public process to modify the Decree. The process included two Summits, numerous public meetings, legal notices, public information depositories, social media, water and sewer bill inserts, and earned media coverage in the Washington Post and on the Kojo Nnamdi show.[1] Prior to proceeding, there was a thorough vetting of the advantages and disadvantages of the proposed amendment by the Federal Government, the District Government, and the public.

The amended Decree was entered by the United States District Court for the District of Columbia in January 2016 and, among other items, provided for controlling CSOs 027, 028, and 029 using GI. The Potomac Tunnel was reconfigured such that it would stop in the vicinity of Rock Creek and not need to extend along the Potomac waterfront all the way to CSO 029. In addition, the need for a new large tunnel dewatering pumping station on the National Mall was eliminated by extending the tunnel to the vicinity of Joint Base Anacostia Bolling to connect to another tunnel being constructed as part of the project.

The Decree requires awarding a construction contract for the first Potomac GI project to manage 44 impervious acres using GI by June 23, 2017, with a "place in operation" deadline of June 23, 2019. There are significant stipulated penalties for failing to meet this deadline. DC Water has consulted with and sought input from CFA staff regarding implementation of the project and we appreciate your February letter in that regard.

Historic Preservation Compliance

Your letter indicated that CFA raised a question regarding whether Section 106 of the National Historic Preservation Act applied to Potomac GI Project No. 1. Further, your letter of February 23, 2016, to Reid Nelson, at the Advisory Council on Historic Preservation, requested a review of the applicability of Section 106. Our legal counsel have prepared some analysis (Attachment A) and conclude that Section 106 does not apply because Potomac GI Project No. 1 is a discrete, locally funded portion of the Clean Rivers initiative, and is required to be completed regardless of the status of federally permitted portions of Blue Plains. Further, Potomac GI Project No. 1 will be implemented without any federal permit or license. While other portions of the Clean Rivers initiative may require additional federal agency authorization, the Potomac GI requires only District of Columbia government permits in order to proceed. Neither the Blue Plains Permit

[1] The Commission of Fine Arts was on DC Water's notification list, was invited to events and attended selected events. The extensive outreach conducted and the comments received are included in the "*Long Term Control Plan Modification for Green Infrastructure,*" May 2015, available at https://www.dcwater.com/education/gi-images/green-infrastructure-ltcp-modificaitons.pdf (*See* Section 5 - Public Comments and Responses, and Appendix K - Responses to Public Comments).

nor the Consent Decree are the type of federal involvement with Potomac GI necessary to make it a federal "undertaking" under the NHPA. The analysis also indicates that Section 9b of D.C. Law 2-144, Historic Landmark and Historic District Protection Act of 1978, applies. DC Water is complying with the District Section 9b process for Potomac GI Project No. 1.

Approach to Implementing GI

DC Water's approach to implementing GI is to do so in manner that is sensitive to the limited portions of the federal National Historic Landmark district of Old Georgetown. CFA has indicated that pursuit of a design that uses the "least visible and most concentrated elements, instead of widespread and extensive changes to public space" may be the most appropriate. With these elements in mind, DC Water has adapted conventional GI technologies for use in Old Georgetown in a manner that will not affect the visual character of the community.

We thank you for your comments on the individual technologies and offer the following information which may help clarify certain aspects of the technologies:

- Sewer Separation – sewer separation involves constructing new sanitary sewers or new storm sewers and making the appropriate service connections to the sewers. Your letter indicates this is a preferred technology due to the limited impact on historic resources. Large scale sewer separation requires extensive construction of deep sewers and reconnecting the catch basins and potentially the house services to the new sewer. Because of depth of excavation and the number of service connections required, large scale separation can be disruptive and take considerable time. As a result, DC Water is only considering this on a limited scale where the impacts of construction can be minimized.

- Permeable Alley Pavement – your letter notes the use of permeable alley pavement is less desirable as it would involve roughly 25 separate repaving projects across the federal National Historic Landmark district of Old Georgetown with unknown impacts to drainage inlets and associated tree-box storage structures. DC Water understands your concerns and anticipates conducting a thorough analysis of the historic materials, and is interested in working with you to select the appropriate materials.

- Tree Box Restoration – your letter suggests that tree box restoration would entail deepening tree boxes to store water, thereby changing the character of some tree boxes and not others. Instead, we are proposing to construct the tree box with similar depths/grades to the existing. While the tree box is being replaced, we would use the opportunity to construct adjacent subsurface storage/infiltration adjacent to the tree. Since disruption is already necessary to replace the tree box, this approach avoids a separate construction area and the associated temporary construction impacts.

- Parking Lane and Crosswalk Strategies - these strategies consist of storage below grade, either under the parking lane or under sidewalks. DC Water has developed a range of alternatives for these practices, including alternatives that restore the road and crosswalk surface with the same material types as existing conditions. At the completion of construction, the finished road surface will be

repaved with material consistent with that which currently exists. Additional inlets, if required, will be consistent with those already existing. Lastly, the comment regarding the magnitude of the work required does not consider the time frame over which work may occur or the opportunity to consolidate work in selected areas. The Consent Decree deadline is 2027, so there are more than ten years to phase the work. Further, it is important to keep in mind that no street or utility lasts indefinitely. Normal repair and replacement will need to occur to maintain a functioning city.

- Sidewalk Storage – we understand your comments about sidewalk storage to reflect the desire to carefully remove existing brick and materials on the sidewalks, perform the subgrade work, and then restore the area with the brick that was removed. We appreciate the challenges with this type of work. We will consider these challenges carefully when developing the proposed project.

CFA's participation will assist DC Water in prioritizing the selection of technologies, materials, and locations. In order to assess the potential impact on historic resources, we have retained EHT Traceries, Inc., to review each of the concepts described above and assess the impact on historic resources. Our guiding principal will be to select those concepts with minimal impact to the limited portions of the federal National Historic Landmark district of Old Georgetown. A companion principal will be that the sites impacted will be restored to a state consistent with existing materials and conditions.

Path Forward

Our objective is to develop a GI design that is sensitive to the historic fabric of Old Georgetown, minimizes construction disruption, minimizes operation and maintenance disruption, is effective in controlling CSO overflows, and is cost-effective for ratepayers in the nation's capital. To that end, we welcome and will respond to feedback and comments from CFA and other constituents when structuring proposed GI elements to include in the first GI Project.

We appreciate your acknowledgement that the Consent Decree obliges us to proceed. We also acknowledge and welcome the important role that the CFA wants to play in providing staff comments regarding the possible combinations of installation of green infrastructure elements in the limited portions of the federal National Historic Landmark district of Old Georgetown. *See* letter from T. Luebke to C. Ray dated Feb. 16, 2016. DC Water is eager to meet with CFA staff to discuss your guidance in pursuing designs that meet CFA's stated goals of low visibility and limited impact on historic resources.

Since much of the work in Georgetown is site specific it may be helpful for CFA to identify a staff person that we might conduct site walks with as the work is developed prior to a formal submission so that we can address and respond to each of your concerns. In this way, we can work with the CFA to guide the selection of projects that will minimize impacts, maximize effectiveness, and preserve historic character.

We look forward to working with you. In the meantime, please do not hesitate to contact me at carlton.ray@dcwater.com at 202.787.4469 if you have any questions.

Sincerely,

Carlton Ray, Director
DC Clean Rivers Project

C: Javier Marques, Advisory Council for Historic Preservation
David Maloney, D.C. State Historic Preservation Officer
Marcel Acosta, National Capital Planning Commission
Rich Myers, Department of the Interior – Office of the Solicitor
Reid Nelson, Director, Office of Federal Programs for the Advisory Council on Historic Preservation
Peter May, National Park Service
Carolyn Brown, Castro Hasse+Brown
Leonard Benson, Chief Engineer, DC Water
Gregory Hope, Principal Counsel, DC Water
David Evans, McGuire Woods LLP
Dale Mullen, McGuire Woods, LLP

Attachment A - Legal Analysis Regarding Section 106
Attachment B – EHT Traceries Report

Attachment A

Legal Analysis Regarding Section 106

McGUIREWOODS MEMORANDUM

TO: DC Water - Clean Rivers Project

FROM: Dale Mullen
David Evans
Sonali Dohale
McGuireWoods LLP

DATE: April 14, 2016

RE: Applicability of Section 106 of the National Historic Preservation Act to DC Water's Potomac Green Infrastructure Projects

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Introduction and Background

This memorandum responds to your request for our analysis regarding whether and to what extent, historic consultation is legally required for construction of the Potomac Green Infrastructure Project Number 1 (Potomac GI).

The Potomac GI is a locally-funded portion of the Clean Rivers initiative and requires only District of Columbia government permits for construction. The Potomac GI does not require the use of federal land, federal financial assistance, or a federal agency permit or license for construction or operation. These facts about Potomac River GI Project No. 1 are important to a determination of the appropriate form of historic consultation required for construction and operation of Potomac GI.

The Clean Rivers initiative is part of the Long Term Control Plan (LTCP) prepared by DC Water to control combined sewer overflow (CSO). The Potomac GI, like the other projects that comprise the Clean Rivers initiative, is mandated by the 2016 Consent Decree entered by the United States District Court for the District of Columbia.[1] The Consent Decree represents a settlement between DC Water, the EPA, and private plaintiffs. The EPA issues NPDES permits to DC Water approximately every five years to authorize discharges from DC Water's municipal advanced wastewater treatment plant (Blue Plains). The Potomac GI is mandated by the Consent Decree, not DC Water's Blue Plains NPDES permit (Blue Plains Permit) for collection and discharge at Blue Plains.

National Historic Preservation Act (NHPA) - Section 106

For section 106 of the NHPA to apply, there must be a proposed "Federal or federally assisted undertaking."[2] The text of section 106 reads:

> The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department

[1] First Amendment to Consent Decree at 13-14. (Jan 14, 2016).
[2] 54 U.S.C. § 306108.

> or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, shall take into account the effect of the undertaking on any historic property. The head of the Federal agency shall afford the Council a reasonable opportunity to comment with regard to such undertaking.[3]

"Undertaking" has been further defined in the Advisory Council for Historic Preservation's (ACHP) regulations as: "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license, or approval."[4] The definition of "agency" specifically excludes "courts of the United States" and "the government of the District of Columbia."

Thus, the Potomac GI does not meet the threshold requirements of an "undertaking" requiring section 106 consultation. The Project is a discrete, locally funded portion of the Clean Rivers initiative, and is required to be completed regardless of the status of federally permitted portions of Blue Plains. Further, the Project can be implemented without any federal permit or license. Other portions of the Clean Rivers initiative may require federal land use permits but the Potomac GI requires only District of Columbia government permits. As discussed below, neither the Blue Plains Permit nor the Consent Decree constitute the type of federal involvement with the Potomac GI necessary to make it a federal "undertaking" under the NHPA.

Relationship between the Potomac GI, Consent Decree, and NPDES permits

An important factor in determining the applicability of section 106 of NHPA is the determination of whether a particular project is a "Federal or federally assisted undertaking."[5] It has been suggested that two areas of such federal involvement – the Blue Plains Permit or the First Amendment to the Consent Decree – may constitute a "Federal or federally assisted undertaking."[6] However, the Potomac GI project is independently mandated by the Consent Decree and does not require a federal permit. The Consent Decree is a settlement between parties in an enforcement case approved by a court; it is not a "Federal or federally assisted undertaking."

The Blue Plains NPDES permit does not authorize the Potomac GI project

The existence of the Potomac GI as a discrete element of the overall effort to control pollution does not convert a local project to a "Federal or federally assisted undertaking." The "federal undertaking" of a NPDES permit occurs when the EPA grants permission to a municipal authority to discharge wastewater from a treatment system. For DC Water, this permitting process occurs approximately every five years and will continue to occur independently of the Potomac GI. DC Water does not need a NPDES permit to construct the Potomac GI, and aside from coverage under EPA's General Permit for Discharges from Construction Activities

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[3] *Id.*
[4] 36 CFR § 800.16(y). ACHP regulations at 36 C.F.R. § 800.16(b) state that "agency" is defined as the term is used in 5 U.S.C. § 551, which explicitly excludes "the Congress," "the courts of the United States," and "the government of the District of Columbia."
[5] *See* footnote 2.
[6] *Id.*

(Construction General Permit) the EPA will not exercise permit authority or provide land or any funding for its implementation. The Potomac GI is a separate local project; and its implementation is mandated by the Consent Decree regardless of the EPA's decisions with respect to DC Water's NPDES permit.[7]

The Amended Consent Decree does not require local projects to undergo Section 106

Ultimately, the LTCP/Clean Rivers initiative created obligations for DC Water when it was officially approved and entered by the United States District Court for the District of Columbia in January 2016. It is because of this court order that DC Water is required to construct the Potomac GI.

As noted above, courts are not considered "agencies" for the purposes of NHPA.[8] Thus, the court is not engaging in a federal undertaking when it grants or denies changes to a Consent Decree. In fact, the Consent Decree itself reads that the "Consent Decree is not and shall not be interpreted to be a permit or modification of any permit issued pursuant to Section 402 of the Act, 33 U.S.C. § 1342."[9] Although the Consent Decree requires compliance with local laws when new permits are issued, this language makes it clear that the obligations under the Consent Decree are not, by themselves, permits or permit modifications. In fact, an alternative reading would suggest that actions by private parties to remedy accusations during government enforcement actions taken pursuant to a consent decree could be federal undertakings, unreasonably stretching a statutory provision intended to influence the actions of federal agencies, not private or municipal entities.

Federal involvement with other portions of the Clean Rivers initiative does not render the Potomac GI No. 1 project a federal undertaking

Neither the EPA's NPDES permitting process for the Blue Plains facility nor the involvement of federal agencies with other discrete portions of the Clean Rivers initiative make a local water infrastructure improvement such as the Potomac GI a federal undertaking – such tangential involvement by a federal agency does not rise to the level of a "federal undertaking." Federal case law interpreting the meaning of "undertaking" supports this reading.[10] The D.C. Circuit in particular has rejected arguments that federal agency involvement with other portions of a project, or non-binding review by a federal agency, transforms a local project to an "undertaking."[11]

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[7] First Amendment to Consent Decree, Appendix F.
[8] *See* 36 C.F.R. § 800.16(b) (incorporating 5 U.S.C. § 551). Similarly, CEQ regulations implementing the National Environmental Policy Act state, "Federal agency means all agencies of the Federal Government. It does not mean the Congress, the Judiciary, or the President, including the performance of staff functions for the President in his Executive Office." 40 C.F.R. § 1508.12.
[9] First Amendment to Consent Decree at 40-41. (Jan 14, 2016). 33 U.S.C. § 1342 refers to Section 402 of the Clean Water Act, the section that establishes the National Pollution Discharge Elimination System (NPDES) permitting process.
[10] *Waterford Citizens' Ass'n v. Reilly*, 970 F.2d 1287, 1291-92 (4th Cir. 1992) (locally funded expansion of a sewer system not an undertaking despite EPA funding for the original system); *Lee v. Thornburgh*, 877 F.2d 1053 (D.C. Cir. 1989) (construction of prison on D.C. property using Congressionally appropriated funds was not an undertaking despite DOJ involvement in suggesting sites); *Coal. for Underground Expansion v. Mineta*, 333 F.3d 193, 197 (D.C. Cir. 2003) (local rail line expansion in a metro area was not an undertaking despite federal financial support for the other portions of the rail line).
[11] *See Lee*, 877 F.2d 1053;*Coal. for Underground Expansion*, 333 F.3d at 197.

Historic Preservation Requirements Applicable to the Potomac GI project

Although NHPA's section 106 requirements do not apply to this project, the District of Columbia requires historic consultation pursuant to the procedures outlined in the Historic Landmark and Historic District Protection Act of 1978 (DC Preservation Law). Section 9b of the DC Preservation Law applies to District of Columbia undertakings, which is defined as "a project of the District of Columbia government that involves or contemplates demolition, alteration, subdivision, or new construction affecting a property owned by or under the jurisdiction of a District of Columbia agency, including an independent agency."[12]

DC Water is considered a District of Columbia agency, and accordingly, should follow the consultation procedures necessary for District of Columbia undertakings under District law. Communication between DC Water and the District of Columbia SHPO indicates this process has been discussed and initiated. Further, the potential for the construction of the Potomac GI to have impacts on historic properties will be considered when submitting a Notice of Intent (NOI) for coverage under the EPA's Construction General Permit which is typically required to be submitted by the construction operator at least 14 calendar days prior to commencing earth-disturbing activities. To assist the EPA with its responsibilities under NHPA, applicants are required to follow the "Historic Property Screening Process" to ascertain whether sub-surface stormwater controls will impact historic properties.[13] If necessary, the applicant may include correspondence with the local SHPO regarding any impacts of construction plans on historic properties.

Thus, the conclusion that section 106 of the NHPA does not apply to the Potomac GI will not result in a failure to consider the impacts to historic properties from these projects; rather, the historic preservation impacts for this local project will be considered by the most appropriate process – the local processes in place for protecting the District of Columbia. Any analysis of historic impacts required prior to the issuance of federal NPDES permits by the EPA is separate from the consideration of the Potomac GI No. 1, and can be addressed by the EPA in a manner consistent with the federal agency's policies. DC Water, a District agency, should address concerns regarding the Potomac GI project's potential impacts to historic properties through the local process for the District of Columbia, as required by the typical permitting process in the District.

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[12] D.C. Code § 6-1102.
[13] *See* EPA's 2012 Construction General Permit, Appendix E, *available at* https://www3.epa.gov/npdes/pubs/cgp2012_finalpermit.pdf.

Attachment B

EHT Traceries Report

EHT TRACERIES 1121 5th Street, NW, Washington, DC 20001
P: (202) 393-1199 | www.traceries.com

Memorandum

DATE: **March 21, 2016**

TO: **Carlton Ray, DC Water**

FROM: **Laura Hughes**

SUBJECT: **CFA Response**

In general DC Water's approach is to design and implement green Infrastructure (GI) strategies that are consistent with the historic fabric and the integrity of the Georgetown Historic District. DC Water is aware of the architectural and historical significance of the Georgetown Historic District not only as one of the city's oldest district's whose layout precedes the L'Enfant Plan for Washington, D.C., but because of the character of its narrow streets and dense, urban fabric. As much of the work as possible will be carried out in coordination with other routine maintenance work in order to reduce the amount of traffic and congestion during construction and to minimize ground disturbances. The project will focus on sidewalks, streets, and alley that are either composed of contemporary materials or those that are in need of repair. If any of these features retain historic materials, no GI controls will be put in place in order to reduce the impact this project has on the historic resource.

Five types of green infrastructure were reviewed, including sewer separation, sidewalk storage, permeable parking lanes and crosswalk storage, permeable alley pavement, and tree box restoration. Below is a brief summary of impacts that each technology could potentially have on individual historic resources, as well as on the Georgetown Historic District as a whole.

Sewer Separation: Should a location for sewer separation for CSOs 027 and 028 be strategically chosen, impacts to historic fabric would be limited to temporary impacts, during the time of construction. There would be no permanent adverse effects on historic resources from the two major facilities located at Volta Park and Thirty-Seventh Street, N.W., south of Prospect Street, N.W. Once constructed, the new sewer piping would be located below grade and the surface restoration can consist of whatever material was originally in that location. As there would be no visible evidence of the new sewer pipes under the hardscape, there would be no adverse effect on the historic district.

Sidewalk Storage: Choosing sidewalks consisting of contemporary materials or materials that are in need of replacement, such as broken concrete or damaged brick, would greatly reduce the adverse effects on the historic district. Proposed documentation of existing conditions will identify the historic condition, document the layers and complex evolution of materials and allow replacement in kind to ensure the replication of the historic character of the streetscape. Documentation of existing conditions will help ensure that the sidewalk storage is implemented without permanent impacts to historic fabric and that materials are replaced in kind, ensuring that the historic or same look of each sidewalk is maintained and

that the historic character is maintained throughout Georgetown. No sidewalk storage will be constructed where historic material cannot be retained or would be damaged by the construction especially architectural features such as architectural bays and stairs or driveways and alley aprons.

Permeable Parking Lane and Crosswalk Storage: As most of the streets in the Georgetown Historic District are contemporary pavement, the material flanking the streets can be removed and replaced with permeable pavement that will achieve the same look and feel of the current material. This is also true for the crosswalks, as the proposed material will match the existing and will not adversely affect the historic streetscapes. The scope of pavement restoration and striping delineation for crosswalks can be selected to minimize visual distinction between the permeable parking lane or crosswalk and adjacent paving. No intact historic streetscape with cobble stone streets will be altered during the installation of permeable parking lanes or crosswalk storage avoiding any potential adverse effects to those historic street materials. Potential or known archeologically sensitive streets will also be avoided, so as not to disturb potentially significant sites. The design and location of the proposed covers, slot drains, catch basin inlet grates and underground pipes would have to be carefully conceived and located to avoid impacts to the historic streetscape. As much of the construction as possible will be coordinated with other scheduled maintenance work to minimize construction and disruption of the neighborhood.

Permeable Alley Pavement: Currently, in much the same way as the permeable parking lanes can be constructed to match the materials of the streets that they flank, permeable alley materials can be chosen to match the contemporary materials they are replacing. If an alley is currently composed of broken bricks, a permeable brick alley can be installed; this will ensure a consistent look and feel within the alleys. Historic alleys that retain their original or historic material, such as cobble, fieldstone, or brick, would not be altered with permeable alley materials. Historic alley material would be retained and contemporary or damaged alley pavement would be replaced, and that would be replaced in kind. Also, though these can be seen as multiple separate projects, they will be coordinated as much as possible with other District agency scheduled maintenance work, minimizing the amount of construction and impacts to drain inlets and tree-box storage structures.

Tree Box Restoration: The tree boxes currently located throughout the historic district that are earmarked for tree box restoration will be documented as part of the survey of historic streetscapes to ensure that the existing conditions will be returned once the bioswales have been installed. No long-term adverse effects would result from the restoration of the tree boxes, as the historic material would be put back in place. Bioswales that will be installed in the tree boxes themselves will not alter the grade or depth of the current tree boxes, nor will they alter the streetscapes; trees will be planted flush with the grade to match the existing conditions. Also, locations of tree box restoration will only be selected where there are either no trees or there are dead or dying trees; large and mature, healthy trees will not be disturbed or removed. The same material and plant life that would be removed during the construction of a connection to the sewer storage or permeable parking lane would be replaced in kind. There would be no change to the character of the constrained public environment of Georgetown's sidewalks, although a temporary adverse effect of the tree box restoration would occur and be limited to the construction period.

APPENDIX L

HISTORIC PRESERVATION DOCUMENTATION

PHASE 1A ARCHAEOLOGICAL ASSESSMENT
&
MONITORING AND UNANTICIPATED DISCOVERIES WORK PLAN

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

DC CLEAN RIVERS PROJECT
GREEN INFRASTRUCTURE

PHASE IA ARCHAEOLOGICAL ASSESSMENT OF POTOMAC RIVER PROJECT A

September 2, 2016

Prepared for:

Prepared by:

Blue Plains Advanced Wastewater Treatment Plant
5000 Overlook Avenue, SW
Washington, DC 20032

Distribution

To: DC Water and Sewer Authority

From: Paul P. Kreisa
Stantec Consulting Services Inc.
6110 Frost Place
Laurel, Maryland 20707

Prepared By: Paul P. Kreisa, PhD, RPA
Stantec Consulting Services Inc.

Jacqueline M. McDowell, MA
Stantec Consulting Services Inc.

Geri Knight-Iske, MA, RPA
Stantec Consulting Services Inc.

MANAGEMENT SUMMARY

As part of DC Water's Long Term Control Plan to reduce combined sewer overflows to the District's waterways, the DC Clean Rivers Project (DCCR) will construct Green Infrastructure (GI) facilities in Washington, DC. Specifically, this report presents the Phase IA archaeological site potential assessment ("Phase IA assessment") for the GI to be implemented in the Potomac River sewershed under Potomac River Project A (PR-A).

Siting of the specific types of GI technologies to be implemented and the GI facility locations has been completed. The following GI technologies are being considered for implementation: planter bioretention, curb extension bioretention, alley permeable pavement, and parking lane permeable pavement. Bioretention facilities have been sited in the existing green spaces between the roadway and sidewalk (i.e., existing planting strips) or in the parking lane of the existing roadway. Occasionally the bioretention facilities are enhanced with adjacent subsurface storage (without a surface expression). The maximum depth of excavation will be 7 feet below ground surface. Permeable pavement would be placed in existing parking lanes or in alleys. The estimated maximum depth of excavation for installation of permeable pavement is 5 feet below the current pavement surface.

Stantec has prepared this Phase IA assessment for PR-A. The assessment is based on historical and archaeological background research and on archaeological site potential in part based on predictive site location models. Recommendations for construction monitoring are based on an analysis of these information sources. Initially, background research was conducted to determine the probability that unrecorded archaeological sites are present within PR-A. This included reviews of District of Columbia Historic Preservation Office archaeological site files to determine whether known archaeological sites were located within the project area, locations of now-buried streams to determine locations with high potential for Native American sites, and several historical maps to identify the locations of pre-World War I structures, Civil War earthworks, and streetcar lines.

The PR-A area was also evaluated to determine whether the potential locations of archaeological resources have been impacted by previous development-related activities. Elevation change (also known as cut and fill) analysis was conducted for PR-A to determine whether areas were buried by significant amounts of fill or whether areas, primarily upland rises or ridges, significantly decreased in elevation through mechanical cutting. Other impacts examined include the presence of sewers and water mains and overall development.

Areas identified as having a potential for archaeological resources that have been impacted by development were not further considered. Each location identified as having a potential for archaeological resources that had not been impacted by development, was then field-checked to determine whether other factors mitigated against the potential presence of archaeological resources. The remaining locations are recommended for monitoring during the construction of the GI facilities. Initially, 28 potential archaeological resource locations were identified within PR-A, 22 of which are likely to be avoided. Two locations appear to have been impacted by storm sewer and water main installation. One location (a previously reported Native American site) might not actually be within PR-A. One location has been impacted by cutting associated with road construction. The remaining

two locations are potential pre-World War I Historic period structure complexes, one associated with the Britt farmstead first depicted on an 1861 map, and the other an unidentified structure complex, also depicted on the 1861 Boschke map. Stantec recommends monitoring at these two locations. Stantec also recommends the preparation of an Unanticipated Archaeological Discoveries Work Plan for those areas not recommended for monitoring during GI construction-related excavation.

PUBLIC SUMMARY

DC Water developed a Long Term Control Plan to reduce combined sewer overflows to the District's waterways. As part of this plan, the DC Clean Rivers Project (DCCR) will construct Green Infrastructure (GI) facilities in Washington, DC. This report presents the Phase IA archaeological site potential assessment ("Phase IA assessment") for the GI to be implemented in the Potomac River sewershed under Potomac River Project A (PR-A).

Siting of the GI technologies to be employed and the GI facility locations has been completed. Several GI technologies are being considered: planter bioretention, curb extension bioretention, alley permeable pavement, and parking lane permeable pavement. The bioretention facilities have been sited in the parking lanes of existing roadways or green spaces between the roadway and sidewalk (i.e., existing planting strips). Occasionally, the bioretention facilities are enhanced with adjacent subsurface storage (without a surface expression). Excavations should not be more than 7 feet below ground surface. Permeable pavement would be put in existing parking lanes or in alleys. The estimated maximum depth for installation of permeable pavement is 5 feet below the current pavement surface.

Stantec has prepared this Phase IA assessment for PR-A. The assessment is based on historical and archaeological background research and on archaeological site potential. Site potential is partly based on predictive site location models. Recommendations to monitor construction for archaeological sites are based on analysis of this information. First, background research was done to determine the probability that unrecorded archaeological sites are present within PR-A. This research included review of several resources, including the District's archaeological site files (to see if known archaeological sites are located within the project area), the locations of now-buried streams (to identify locations with high potential for Native American sites), and several historical maps (to identify the locations of pre-World War I structures, Civil War earthworks, and streetcar lines).

Archaeologists also reviewed these resources and did additional analyses to see if the potential locations of archaeological resources have been impacted by previous development-related activities. Elevation change (also known as cut and fill) analysis was conducted for PR-A to see if some areas have been buried by significant amounts of fill or if others (like upland rises or ridges) have been mechanically cut to create a level surface. Other impacts examined include the presence of sewers and water mains and overall development.

Locations where archaeological resources have likely been impacted by development were not further considered. Locations with a potential for archaeological resources but not impacted by development were identified and further considered. Each location with a potential for archaeological resources was then field-checked to see if other factors might have impacted or destroyed the potential archaeological resources. The remaining locations are recommended for monitoring during the construction of the GI facilities.

Initially, 28 potential archaeological resource locations were identified within PR-A, 28 of which will probably be avoided. Two locations appear to have been impacted by storm sewer and water main installation. One location (a previously reported Native American site) might not be within PR-A.

Cutting for road construction impacted one location. The final two locations are potential structure complexes, one associated with the Britt farmstead that first appears on an 1861 map and the other an unnamed complex of structures, also depicted on the 1861 Boschke map. Stantec recommends monitoring at these locations. Stantec also recommends the preparation of an Unanticipated Archaeological Discoveries Work Plan for those areas not recommended for monitoring during GI construction-related excavation.

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1 Introduction

The DC Water Clean Rivers Project (DCCR) will implement a Green Infrastructure (GI) project in the Potomac River sewershed, known as Potomac River Project A (PR-A). This report represents a Phase IA archaeological assessment of PR-A (Figure 1-1). PR-A is located within the Glover Park and Burleith neighborhoods in northwest Washington, DC.

This Phase IA archaeological assessment has been prepared to evaluate the potential for the presence of archaeological sites within PR-A in compliance with the District of Columbia's *Historic Landmark and Historic District Protection Act* of 1978 (DC Law 2-144, as amended) and its implementing regulations "District of Columbia Municipal Regulations Title 10A Historic Preservation." The legislation and its implementing regulations direct the Mayor, heads of subordinate agencies, or heads of independent agencies with jurisdiction over an undertaking to take into account the effect of that undertaking on properties listed in or eligible for listing in the District of Columbia Inventory of Historic Sites. Further, the State Historic Preservation Officer is to be afforded a reasonable opportunity to comment on the undertaking. This document fulfills this mandate in part. The approach used for this archaeological assessment was based on guidelines provided in the Secretary of the Interior's *Standards and Guidelines for Archeological and Historic Preservation* (Federal Register 1983) and the DC Preservation League's *Guidelines for Archaeological Investigations in the District of Columbia* (DC Preservation League 1998, as amended).

1.1 Proposed Undertaking

As part of DC Water's Long Term Control Plan to reduce combined sewer overflows to the District's waterways, DCCR intends to construct GI facilities in northwest Washington, DC within the Potomac River sewershed. The focus of this report is the undertaking known as PR-A.

Siting of the specific types of GI technologies to be implemented and the GI facility locations has been completed. The current proposed undertaking consists of approximately 140 bioretention and permeable pavement facilities in the project area. The following GI technologies were considered for implementation: bioretention and permeable pavement/pavers, both of which would entail subsurface disturbance. The bioretention facilities have been sited in existing green spaces, including areas between the roadway and sidewalk (i.e., existing planting strips, known as planter bioretention) or extended into parking lanes (known as curb extension bioretention). Occasionally, the bioretention facilities are enhanced with adjacent subsurface storage (without a surface expression). Maximum depth of excavation for these facilities is expected to be 7 feet below ground surface. Permeable pavement would be placed in parking lanes along streets (known as parking lane permeable pavement) and in alleys (known as alley permeable pavement). The estimated maximal depth of excavation for installation of permeable pavement is 5 feet below the current pavement surface.

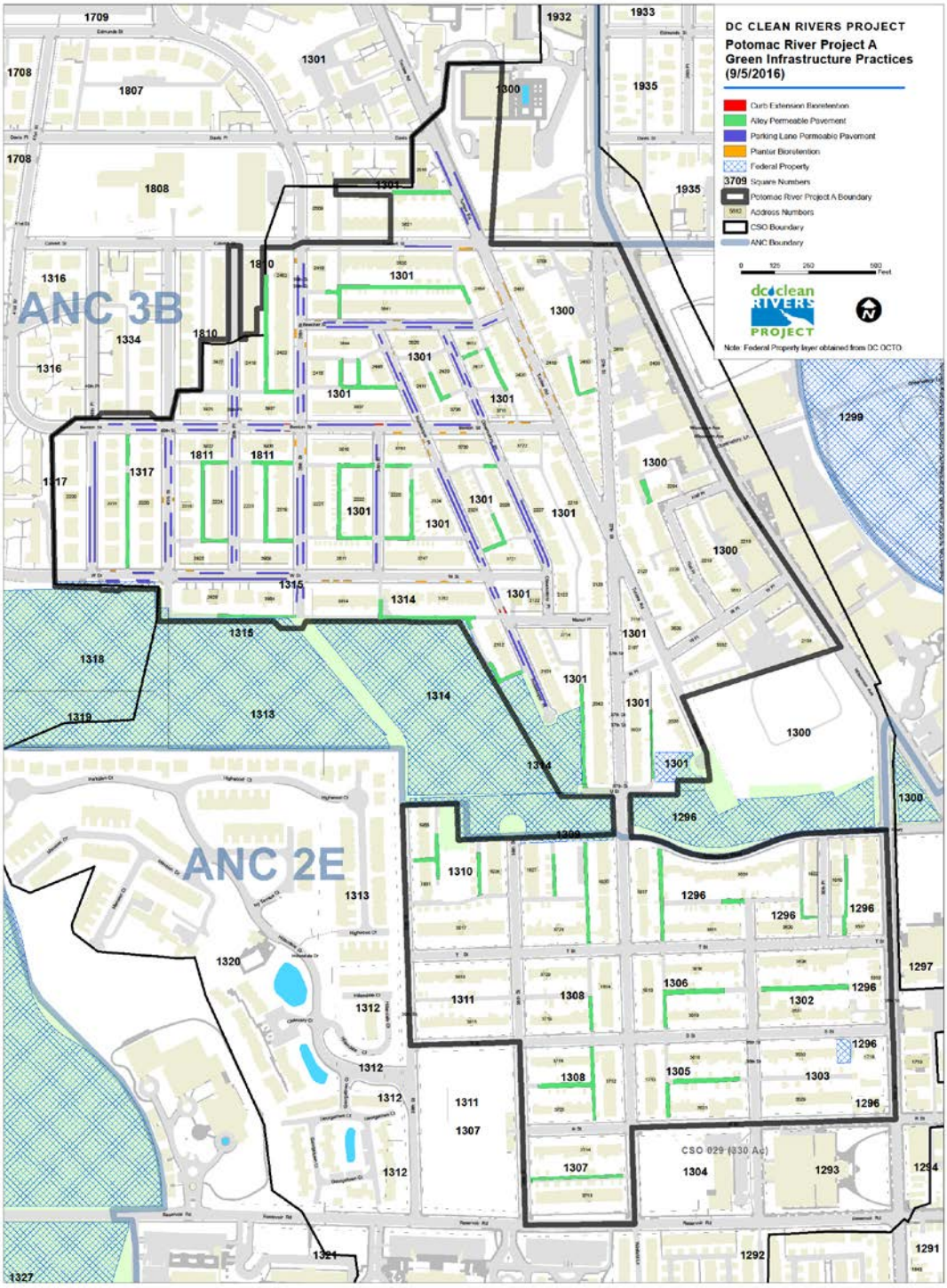

Figure 1-1. Map showing PR-A boundary.

1.2 Project Area

PR-A is located in northwest Washington, DC within the Glover Park and Burleith neighborhoods. PR-AI is irregularly shaped and broadly bounded by Calvert Street NW and Edmunds Street NW to the north, Wisconsin Avenue NW and 35th Street NW to the east, Reservoir Road NW to the south, and 39th and 41st Streets NW to the west (Figure 1-1). The Glover Park area was rural through much of the nineteenth century and was a major butchering center for the Georgetown and Washington markets following the decline of tobacco production. Residential development began in earnest in the 1920s and continued into the mid-century and beyond. The Burleith area originally was part of a 1,000-acre plantation established by Henry Threlkeld in the 1700s and later inherited by his granddaughter's husband, John Cox, Georgetown's longest serving mayor. The Burleith area remained rural until the early twentieth century, when subdivisions were first laid out. With the expansion of streetcar lines in the late nineteenth century, suburbanization slowly took hold in these neighborhoods in the twentieth century, accelerating after World War I and World War II to create the modern urban landscape.

1.3 Physiographic Setting

PR-A lies in the Perry Hall Upland District of the Fall Zone Region of the Piedmont Upland Section of the Piedmont Plateau Province (Reger and Cleaves 2008) (Figure 1-2). According to the *Preliminary Geologic Map of the District of Columbia*, PR-A contains both unconsolidated materials (gravel, sand, and loam) of the Coastal Plain and consolidated mixed meta-igneous and meta-volcanic rocks of the Georgetown mafic complex as well as consolidated pelitic schist facies of the Wissahickon Formation and unconsolidated sand and gravel facies of the Potomac Group (Froelich and Hack 1975). (after Reger and Cleaves 2008).

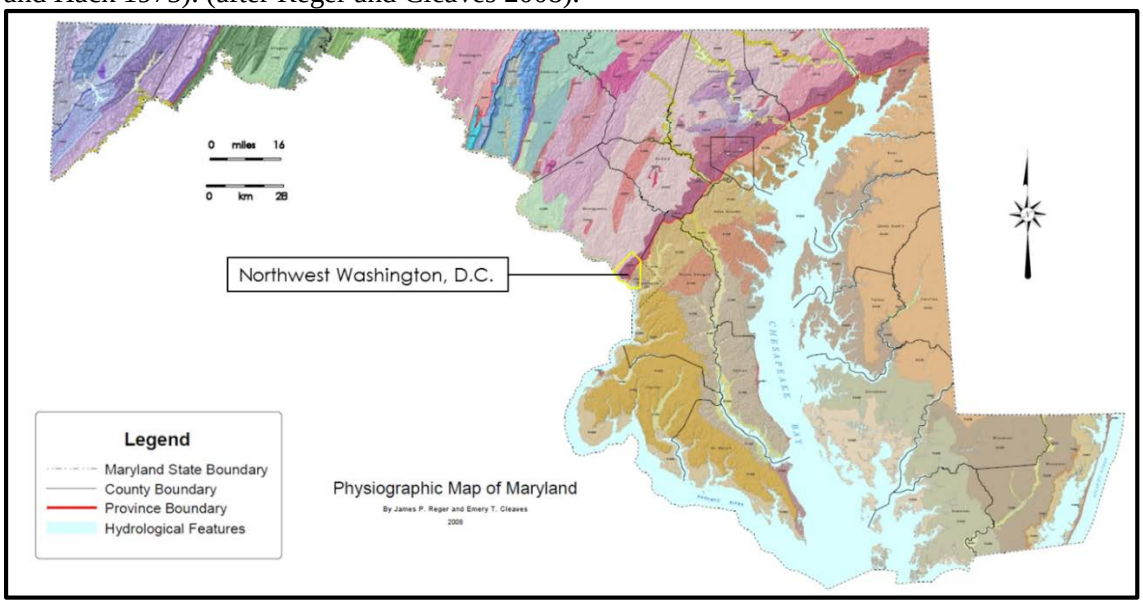

Figure 1-2. Maryland and Washington, D.C., physiographic provinces

PR-A contains two soil associations: Urban land-Sassafras-Chillum and Neshaminy-Urban land (Smith 1976). The Urban land association consists of nearly level to moderately sloping areas, most of which are built-up and occupied by structures and works (Smith 1976:9). The Urban land-Sassafras-Chillum association consists of Urban land and nearly level to steep soils scattered throughout the Coastal Plain. Sassafras soils are deep and loamy and underlain by sandy materials while Chillum soils are deep and loamy in the upper part and overlie compacted gravel and sand (Smith 1976:6). The Neshaminy-Urban association is characterized by steep to moderately sloping soils and Urban land in the Piedmont, especially around Georgetown. Neshaminy soils are deep and well-drained loamy soils overlying semibasic or mixed basic and acidic rock (Smith 1976:8).

1.4 Methods

The methods used to conduct this Phase IA archaeological assessment of PR-A consist of background research (DC HPO archaeological site file, report, and historical records review), historical map review, elevation change (also known as cut and fill) analysis, review of exiting major utilities, and site reconnaissance. Each of these information sources and the methods used for analysis are described below.

1.4.1 Background Research

The identification of the potential for archaeological resources in and within the vicinity of PR-A began with background research. The initial literature search consisted of a review of previously conducted archaeological surveys and identified archaeological sites. This determined the level of previous identification studies and the nature of archaeological sites within general project area. Contract reports documenting the results of previous archaeological investigations conducted in the general project area were also reviewed, as were the District of Columbia archaeological site files. The District archaeological site files were reviewed to determine whether any archaeological sites in or near the subject properties had previously been registered with DC HPO. Historical research for the District of Columbia and the neighborhoods in the study areas included examination of published histories of the District, local historical newspapers, and neighborhood websites when relevant.

1.4.2 Historical Map Review

Background research also entailed review and analysis of a sequence of five District of Columbia historical maps. The review was conducted to identify locations that have a potential for the presence of Historic period pre-1919 archaeological resources. The five maps reviewed include the 1861 Boschke, 1888 U.S. Coast and Geodetic Survey (USCGS), 1903 and 1919 Baist, and the 1959 Sanborn revision of the 1927 map (Baist 1903, 1919; Boschke 1861; Sanborn 1927/1960; U.S. National Oceanic and Atmospheric Administration 2016). This review was used to identify locations of structures within PR-A that dated prior to 1919 and areas where modern development (e.g., 1919 or later) has occurred.

1.4.3 Elevation Change Analysis

To determine the extent of the landscape modification that occurred over time within the project area, an elevation change (also known as cut and fill) analysis was conducted. The elevation change analysis used the USCGS 1888 *Topographic Map of Washington and Vicinity* as the pre-development baseline for the project area. The historical map was first georeferenced to the modern base map of Washington, DC and was then transformed into a three-dimensional elevation model by redrawing the 5-foot contour lines. The three-dimensional elevation model was then transformed into a TIN (triangulated irregular networks) and finally into a raster (a grid of cells or pixels that contain data such as elevation). A vertical datum shift of 2.2 feet was subtracted from the historical map elevations as recommended by Katz et al. (2012) to account for changes in datum elevation between the 1888 and modern maps.

The DC GIS Data Clearinghouse/Catalog modern elevation layer (10-foot contours taken from the 2008 contour map) for Washington, DC was the modern topographic baseline against which the 1888 topography was compared. Similar to the transformation of the 1888 map, the modern contour lines were transformed into a TIN and then a raster. Once both historical and modern data sets were created, an ARCGIS routine calculated the topographical changes to the landscape between the 1888 and 2008 maps. A final raster layer was generated to demonstrate elevation change differences between the two maps using a color gradient and contour intervals to distinguish the areas of elevation decrease (cutting) from areas of elevation increase (filling). Areas that were cut and developed after ca. 1919 will have little potential for the presence of significant archaeological resources.

1.4.4 Existing Utilities Review

Another avenue to gauge the extent of modern impacts in areas identified as having a potential for archaeological resources was review of existing major utilities, namely the combined sewer system and water mains. The DC GIS Data Clearinghouse/Catalog mapping of the combined sewer system provides the location of all sewer manholes. The manhole locations were used as a proxy location for the presence of the combined sewer system. DC Water provided the locations of water mains. The utility locations were then transposed onto maps depicting locations of potential Native American and Historic period archaeological resources to determine the likelihood that such resources may have been impacted by modern utility installation.

1.4.5 Site Reconnaissance

Site reconnaissance consisted of a walkover of PR-A in May 2016 and a more specific inspection of those areas initially recommended for construction monitoring based on background research, historical map review, elevation change analysis, and existing utilities review. The walkover was conducted to determine whether any mitigating circumstances were present at each area recommended for construction monitoring that would change the initial recommendation.

1.4.6 Assessment Recommendations

First, Stantec compiled the archaeological site location or potential location onto maps of the project area. Known site locations were obtained from DC HPO site files while potential site locations were based on the location of pre-1919 structures on the historical maps reviewed for Historic period resources or the location drainages based on the 1861 Boschke map for Native American resources. Next, this map was overlaid with areas of substantial elevation change and existing utilities to determine possible impacts to these resources. Substantial elevation change was defined as being greater than 5 feet of cutting or filling. Greater than 5 feet of cutting most likely would destroy any archaeological resources present. Conversely, 5 feet of fill or more will most likely protect the archaeological resources present from both prior impacts as well as the construction of the proposed GI facilities. Similarly, the clustering of combined sewer and water mains at potential archaeological resource locations was interpreted as likely having impacted those resources.

If a potential resource location was substantially cut or filled, or evidenced clustering of utilities, these locations are not recommended for construction monitoring. These locations, as well as locations recommended for monitoring, were then reviewed during the site reconnaissance. Each location was reviewed to determine if any mitigating, previously unidentified circumstances were present, and a final recommendation was determined.

1.5 Report Organization

Following this Introduction, the report is presented in four additional sections: Precontact Native American and Historic Period Contexts and Previous Investigations, PR-A Assessment and Analysis, Summary and Recommendations, and References Cited. The qualifications of key personnel are presented in Appendix A. A National Archeological Data Base (NADB) form is provided in Appendix B.

2 Precontact Native American and Historic Period Contexts and Previous Investigations

This section presents a general outline of precontact Native American and Historic period cultural development in the Mid-Atlantic region in general, and more specifically within the District of Columbia. The precontact Native American context is based on specific studies that form the sequence of regional Native American history that is presented below. The Historic period context discusses general cultural developments in the District. A specific historical overview of the Glover Park and Burleith neighborhoods is included in Section 3. The following context and review of previous archaeological investigations provide an interpretive framework for defining the types of archaeological sites and remains that could be present within PR-A.

2.1 Precontact Native American Context

Given the unique nature of Washington, DC (a relatively small but highly urbanized area), the precontact context presented below relies on evidence from the archaeological record of nearby Mid-Atlantic states, an early overview by Humphrey and Chambers (1985), and more recent overviews included in Fiedel et al. (2008) and Knepper et al. (2006). Both the Maryland Historical Trust (Maryland Historical Trust 2005) and the Pennsylvania Historical and Museum Commission (Raber 1985; see also Carr and Adovasio 2002; Raber and Cowin 2003; Raber et al. 1998) have published precontact Native American contexts for their states. The Council of Virginia Archaeologists has published a four-volume set that synthesizes the Native American history of that state (Reinhart and Hodges 1990, 1991, 1992; Wittkofski and Reinhart 1989), and Potter (1993) has published an interpretation of late precontact-contact period Native American cultures along the Potomac River. These overviews, and other more specific studies, form the basis for the sequence of regional Native American history that is presented below (Figure 2-1).

2.1.1 Paleoindian Period (12,000 – 9000 BC)

The Paleoindian period reflects a pattern of cultural adaptation based on environmental conditions that marked the shift from the Late Pleistocene to the Early Holocene epoch (Figure 2-1). During this period of glacial retreat, the climate was probably 3 to 8 degrees colder than at present, and vegetation initially consisted of spruce, pine, fir, and alder (Brush 1986:149; LeeDecker and Holt 1991:72). By the end of this period, vegetation patterns comprised a mosaic of microhabitats, with mixed deciduous gallery forests near rivers, mixed coniferous forests and grasslands in foothill and valley floor settings, and coniferous forests on high ridges (Custer 1984; Kavanagh 1982).

Dent (1995:132–133) suggests that three distinct environmental zones can be identified within the Chesapeake Bay region in the Paleoindian period. The first zone consists of areas along the ancestral Susquehanna River and its tributaries, including those along the modern Potomac and Anacostia Rivers. This zone is seen as providing ample resources to early inhabitants. The second zone, the Inner Coastal Plain region, lies to the west where resources were more diffuse. The third zone is the area where the Inner Coastal Plain transitions to the Piedmont region. Ecotonal diversity would have provided increased

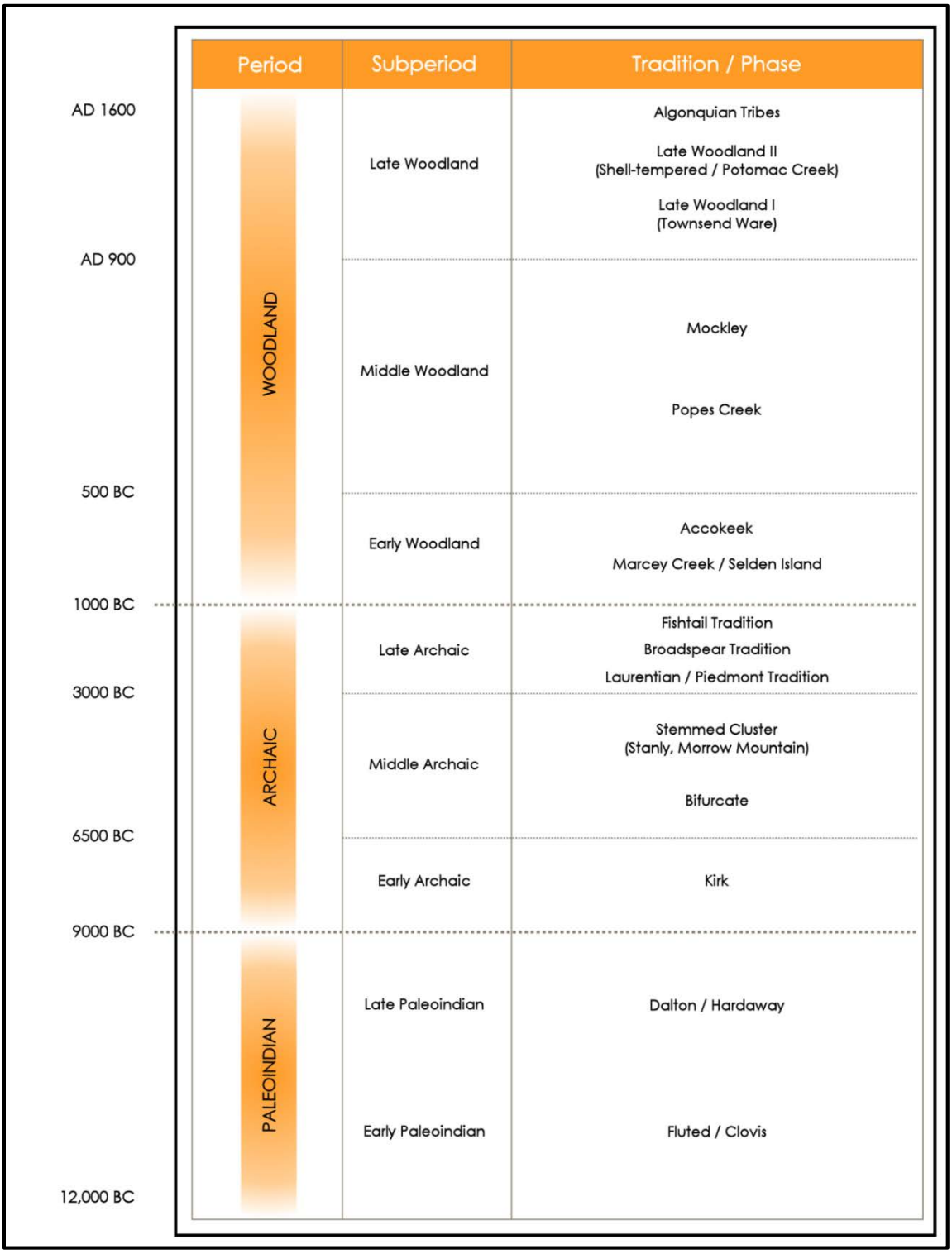

Figure 2-1. Regional precontact Native American chronology of the District of Columbia area.

potential for subsistence resources while the area also contained ample lithic resources. Dent (1995:133–134) also suggests that the area of the Chesapeake Bay region south of the James River in Virginia differed significantly from those areas to the north. The area south of the James River contained more temperate plant species and had larger wetland areas than did areas to the north, indicating the southern area had a more diverse ecosystem.

Traditional characterizations often suggest that Paleoindian settlements consisted of small hunting camps associated with sources of high-quality lithic raw materials. Gardner (1983, 1989) identifies six different functional categories for Paleoindian sites in the nearby Shenandoah Valley: lithic quarries, reduction stations, quarry-related base camps, base-camp maintenance stations, hunting stations, and isolated point find spots. Custer (1984) suggests that these site types may be applicable to the wider Mid-Atlantic region as a whole. Acquisition of high-quality lithics served as a focal point for this system with hunting as its subsistence base, which focused on large game such as moose, elk, and deer (Kavanagh 1982). In contrast, the Shawnee-Minisink site provides evidence that other foodstuffs were exploited as well. The remains of fish, edible seeds, and plants were found in Paleoindian deposits at that site (McNett 1985). Dent (1995:128) notes that virtually no evidence for subsistence practices has been found in the Chesapeake Bay region, although he postulates that they were not based on hunting megafauna (Dent 1995:106).

More recently, Dent (1995) has reviewed Paleoindian sites and settlement patterns in the Chesapeake Bay region. At that time, attributes of 25 known Paleoindian sites were reviewed as were the characteristics of hundreds of isolated (off-site) finds reported in the Chesapeake Bay region. Most of the sites are surface manifestations, with relatively few intact, buried Paleoindian deposits having been located in the region (Dent 1995:122–124). Most sites and isolated finds have been identified south of the James River while a more moderate number has been found north of the Potomac River. Interestingly, the fewest sites and isolates have been found between the James and Potomac Rivers (Dent 1995:120–121).

In contrast to the highly diverse site type model proposed by Gardner and accepted by Custer as discussed above, Dent (1995:137–138) suggests that only two site types can be defined for the Chesapeake Bay region. Larger residential bases, often with multiple, distinct artifact loci, are situated along the ancestral Susquehanna River and its tributaries and along the western margin of the Inner Coastal Plain. These sites tend to be located in areas where a higher diversity of resources would have been available to site inhabitants. The second site type is the "location." Locations are smaller sites, often located in less productive zones, at which few or specific tasks were being undertaken. While many locations in the Chesapeake Bay region are situated near wetlands, the most extreme example of these sites is the isolated find. Dent (1995:138) suggests that this settlement system indicates a high degree of mobility in Paleoindian culture that perhaps was based on seasonal availability of resources and weather patterns. There is some indication that site locations were selected to maximize solar warming while minimizing exposure to prevailing winter winds (Dent 1995:124). Dent (1995) further suggests that sites deviating from this pattern may indicate an occupation in warm-season months.

In the archaeological record, early Paleoindian sites are usually characterized by the presence of large, fluted, lanceolate-shaped projectile points such as Clovis while later Paleoindian components are

identified with projectile point types such as Dalton and Hardaway (Dent 1995:124; Justice 1987). Clovis points have been found throughout North America, from the West Coast to the East Coast, and as far north as Nova Scotia. Most archaeologists suggest that preferred lithic materials for these projectile points were high-quality cryptocrystalline stones such as jasper and chert. Once again, Dent (1995) has questioned the applicability of these generalizations to the Chesapeake Bay region. In reviewing raw material types used at Paleoindian residential bases in the region, Dent (1995:124–127) notes that lower-quality material comprises 25 percent to as much as 75 percent of these assemblages. Quartz, quartzite, silicified wood, slate, and jasper tend to dominate these assemblages. In contrast, high-quality cryptocrystalline materials dominate the location assemblages and are an especially dominant raw material for isolated finds. Paleoindian tool kits in the Chesapeake Bay region include such items as fluted bifaces, end and side scrapers, generalized bifaces, spokeshaves, gravers, awls, drills, denticulates, wedges, and cores (Dent 1995:124–127). Sites with high diversities of tools such as these are most often associated with residential camps. Dent (1995:127) also notes that utilized flakes are numerous at residential camps.

Paleoindian materials are rare along the Anacostia and Potomac Rivers. In 1988, Turner (1989:80) indicated that fewer than five Paleoindian projectile points per county had been found in the Virginia counties that border the Potomac River. The continuing Virginia Paleoindian fluted point survey documented eight additional points in Fairfax County, six in Loudoun County, and one in Prince William County between 1988 and 2011 (PIDBA 2015). The Smithsonian Institution collections, many obtained in the late nineteenth century when the area was more agricultural, include three Paleoindian projectile points from along the Anacostia River (Humphrey and Chambers 1985:8). Also of note, a Clovis point was found near the Aquasco district in south-central Prince George's County in Maryland (Gibb 2006). One reason for the paucity of Paleoindian projectile points and sites along these rivers may be the rise in water levels, in part due to the melting of the glaciers and the subsequent inundation of low-lying areas. While site burial has long been recognized in floodplain and terrace contexts, more recently site burial in upland formations has been demonstrated to have occurred as well (Wagner 2012).

2.1.2 Early Archaic Period (9000 – 6500 BC)

The Pre-Boreal/Boreal climatic episode, dating from 8500–6700 BC, for the most part corresponds to the Early Archaic period (Figure 2-1). Glacial recession continued and deciduous forests expanded, possibly leading to a greater proliferation of game species in this period. In many ways, this climatic period, and the cultural period as well, marks a transition from late Pleistocene to Holocene patterns. Summer temperatures became warmer while the winters continued to be wetter than at present. This resulted in an expansion of coniferous and deciduous trees at the expense of grasslands. The distribution of forests consisted of pine and hemlock on slopes, mixed coniferous-deciduous forests in valley floors, and hydrophytic gallery forests along rivers (Carbone 1976; Kavanagh 1982:9). Kavanagh (1982:9) suggests that while little faunal evidence exists for this period, the environment most likely supported bear, deer, elk, and a variety of small game that were adapted to a northern climate. Evidence for this view comes from the Cactus Hill site (44SX202) faunal assemblage, which contains species that are still common in the region today (Whyte 1995). After 7000 BC, the spread of deciduous woodlands into upland areas,

which had previously been predominantly spruce, hemlock, and pine forests, opened new habitats to be exploited by both animals and humans (Custer 1990).

Some researchers have emphasized that the Early Archaic period in the Mid-Atlantic region evidences continuity in lifeways from the Paleoindian period, with the exception of changes in projectile point styles (see Dent 1995). However, Dent (1995:167) notes that our understanding of the Early Archaic period in the Chesapeake region still depends on information from sites outside of this area. With that said, the most distinctive cultural characteristic of the Early Archaic period was the appearance of notched projectile points, most notably the corner-notched types such as the Kirk varieties along with the Palmer, Charleston, and Amos types (Dent 1995:168; Justice 1987). Other point types associated with the initial portion of the Early Archaic period include Hardaway, Kessel, Taylor, and Big Sandy, all side-notched types, although the Palmer Side-Notched type may be more common in the District (Dent 1995:168; Fiedel et al. 2008:9; Justice 1987). These notched projectile points are more characteristic of the initial portion of the Early Archaic period, typically dating between about 10,000 and 8,500 years ago (Dent 1995:157, 168). Dent (1995:157) suggests that the overall stone-tool assemblages associated with the notched projectile points have similarities with the earlier Paleoindian assemblages, including an emphasis on the use of a core-flake manufacturing process and especially scraper styles (Dent 1995:169–170). Distinctive bifurcate base projectile points, including such types as LeCroy, St. Albans, and Kanawha, characterize the later portion of the period between approximately 9,000 and 7,250 years ago, with some types persisting into the Middle Archaic period (Dent 1995:156–157, 168). Unfortunately, few radiocarbon dates are available for Early Archaic sites in the Chesapeake region. The stone tools associated with these projectile points are less formal and more expedient and appear to evidence use of a bipolar reduction strategy (Dent 1995:157, 170). Utilized flakes also appear to be more common.

The use of high-quality lithic materials also continued until the later portion of this period when quartz and quartzite began to be more frequently used. Archaeological investigations in the Patuxent River drainage show that the majority of Kirk points found are made of rhyolite. This indicates that people either traveled long distances to obtain preferred lithic raw materials or that long-range trade networks had been established by this time (Steponaitis 1980:68). However, Dent (1995:170) suggests that the choice of lithic material changed during this period. Assemblages associated with the notched projectile points, generally in the initial portion of the Early Archaic period, tend to be made from nonlocal materials. The later bifurcate base projectile point assemblages more commonly are made from local materials. Dent (1995:170) suggests that this change may be related to an increasingly restricted social landscape that limited group mobility. Lastly, the first ground-stone tools are associated with the Early Archaic period, including flaked and ground axes, celts, abraders, and adzes (Dent 1995:170).

Early Archaic settlement systems and site locations appear to reflect a dichotomy in landscape use between ecologically diverse floodplains and less ecologically diverse areas, such as uplands. Dent (1995:171) characterizes the distribution of Early Archaic sites in the Chesapeake region as consisting of small sites widely distributed across the landscape. In a wider perspective, settlement appears to include larger residential camps that are located in the ecologically diverse floodplain settings and smaller, short-term occupation camps that are found in less ecologically diverse areas (Dent 1995:165). This bifurcation between floodplain and upland settings continues through the Middle Archaic period and might indicate the initial reliance on aquatic resources. If so, this appears to signal an increasing shift toward a

generalized use of many available food resources. Dent (1995:172) also views the widespread distribution of Early Archaic sites in the Chesapeake region as an effort to both feed and integrate peoples through the minimization of risk by information and resource sharing. In the Southeast, subsistence strategies included the collection of a number of mast species, seeds, and fruits, and hunting of amphibians, reptiles, and mammals as well as fish (Dent 1995:165–166). This pattern is mirrored to some extent in the Chesapeake region (Dent 1995:172–173). It has been suggested that the expansion of projectile point styles may be associated with the diversification of the Early Archaic subsistence base.

Dent (1995:163, 170) notes that Early Archaic sites are generally multicomponent, perhaps, in some instances, because of frequent reoccupation. One aspect of the changing environment, increasingly predictable seasonal patterns, may have promoted repeated visits to locations through greater resource predictability (Dent 1995:195). Hearths are more frequent and more formal than in the earlier Paleoindian period. They include more formal prepared hearths and less formal unprepared hearths, with prepared hearths more common in association with bifurcate point strata. Dent (1995:163, 198) suggests that this change may reflect a shift in lifeways and cooking techniques in the Early Archaic period. The less formal hearths are often clusters of fire-cracked rock measuring less than 1 m in diameter and most likely representing dumps of boiling stones (Dent 1970:171).

Several archaeological sites in the District have yielded Early Archaic projectile points, although intact deposits dating to this period have not been found. McNett (1972:33) and Barse (2002) both identify Kirk Corner-Notched projectile points at the Potomac Avenue site (51NW22) and Fletcher's Boathouse site (51NW13), respectively. Both sites are located on floodplain formations of the Potomac River. Fiedel et al. (2008:9) also suggest that some of the projectile points illustrated by Holmes (1897) date to the Early Archaic period.

2.1.3 Middle Archaic Period (6500 – 3000 BC)

The beginning of the Middle Archaic period coincides with the Atlantic climatic episode, a warm, humid period associated with a gradual rise in sea level that led to the development of inland swamps (Barse and Beauregard 1994:9) (Figure 2-1). It was a time marked by increased summer droughts, sea level rise, grassland expansion into the Eastern Woodlands, and the appearance of new plant species (Carbone 1976:106; Hantman 1990:138). By 5000 BC, there was the onset of a cooling trend. Gardner (1982) suggests that the climatic changes resulted in a zonally patterned floral and faunal species distribution across the region, leading to an increased emphasis on seasonal availability of resources. Unfortunately, Dent (1995:173) suggests that the Middle Archaic period is one of the least understood periods of precontact Native American history in the Chesapeake region.

Common tool types in Paleoindian and Early Archaic lithic assemblages, including unifacial tools and formal end scrapers, decreased in number in the Middle Archaic period (Dent 1995:175; Egloff and McAvoy 1990:64). Modified flakes increased in number, and projectile points and generalized bifaces, many of which appear to be multifunctional tools, became the dominant chipped-stone tool types (Dent 1995:175). The bifurcate tradition of projectile points, including the LeCroy, St. Albans, and Kanawha types, continued at this time, and ground-stone tools (axes, adzes, mauls, grinding stones, and nutting

stones) also became widely utilized as subsistence and settlement patterns changed (Dent 1995:176). Middle Archaic ground-stone tools were completely pecked or ground, in contrast to those associated with the Early Archaic period (Dent 1995:176). The other significant marker of the Middle Archaic period is the stemmed projectile point style (Dent 1995:157). Stemmed projectile points dating to this period include the Stanly Stemmed/Neville, Morrow Mountain I and II, Guilford, and Piscataway types (Justice 1987). In general, these stemmed types date to the initial portion of this period, between about 8,000 and 6,000 years ago (Dent 1995:175). The Piscataway type is found late in this time period and at its earliest dates to the transition from the Middle Archaic to the Late Archaic period (Kavanagh 1982:50). Side-notched projectile points dating to the later portion of the Middle Archaic period, from 6,000–5,000 years ago, include the Halifax, Otter Creek, and Brewerton types (Dent 1995:175; Justice 1987). Dent (1995:175) also notes that Middle Archaic points are less numerous in the northern part of the Chesapeake region. The use of high-quality lithic material for tools was not as common in this period as it was in earlier periods, with the trend toward using local materials, first noted in the later portion of the Early Archaic period, continuing into this period (Dent 1995:176; Fiedel et al. 2008:10).

While many have characterized the Middle Archaic settlement system as something of an enigma, the riverine base camps/upland short-term camps of the Early Archaic period seem to have continued, although this system generally consisted of numerous small sites scattered across the landscape in the Chesapeake region (Dent 1995:165, 177). Middle Archaic sites in Maryland tend to be clustered along tributaries of rivers and not in the estuarine sections of drainages (Steponaitis 1980). Settlements consisted of small base camps located in or near inland swamps that were convenient to seasonally available subsistence resources, as well as smaller temporary upland hunting camps. Researchers have noted that few components dating to the Paleoindian and Early Archaic periods are present at Middle Archaic sites. Gardner (1989:34) suggests that the immediate local ecology of the Paleoindian and Early Archaic sites became increasingly less suited to the needs of Native American groups as climate and vegetation changed in the Middle Archaic period.

Outside of the Chesapeake region, Middle Archaic sites have yielded evidence of prepared floors and post molds, some of the earliest direct evidence for the existence and nature of structures (Dent 1995:164). Formal cemeteries are also known. In the Chesapeake region, sites appear to represent a series of reoccupations. Formal hearths became more common in this period, and researchers have identified discrete activity areas at such sites (Dent 1995:176). Such activities often include tool manufacture or maintenance and subsistence and processing activities. Turning to subsistence, the greater variety of plant resources allowed for an increase in general foraging as a supplement to hunting, continuing a trend first detected at Early Archaic sites (Dent 1995:177; Kavanagh 1982:50). Dent (1995:177) suggests that this Middle Archaic subsistence strategy represents a diffuse adaptation. However, Smith (1986) suggests that populations became increasingly focused on the exploitation of specific resources such as mollusks or oysters.

A few sites in the District have yielded diagnostic projectile points dating to the Middle Archaic period, but similar to the Early Archaic period, intact deposits are rare. McNett (1972:33) identifies several projectile points dating to this period from 51NW22, including a LeCroy Bifurcate Base point and an unidentified serrated point found at the site by a local collector. Inashima (1985) reports several projectile

points from 51NW80 as dating to the Early Archaic and Late Archaic periods, although Fiedel et al. (2008:24) suggest that these points are better classified as Middle Archaic types. All of these sites are located along the Potomac River in northwest Washington, D.C. Louis Berger & Associates (1986) identify Brewerton and Halifax points from the Howard Road site (51SE34) along the Anacostia River as dating to the Middle Archaic period, although other researchers would identify the point types as Late Archaic. Fiedel et al. (2008:11) also suggest that the bifurcate base points illustrated by Holmes (1897) date to this period and that other illustrated points are examples of the Morrow Mountain and Guilford types.

2.1.4 Late Archaic Period (3000 – 1000 BC)

Dent (1995) views the Late Archaic period as a time when the region's occupants adapted to a number of environmental changes (Figure 2-1). The environment of the Late Archaic period included a warmer and drier climate, a continued rise in sea level, the expansion of oak-hickory forests onto valley floors and hillsides, and the reappearance of grasslands (Carbone 1976:189). As well, the distribution of faunal species characteristic of the early Historic period was established at this time. For the Chesapeake Bay region, perhaps the most important change was the establishment of the estuary system, which resembled the modern system only near the end of the Late Archaic period (Dent 1995:199).

Dent (1995:160) suggests that the Late Archaic period can be divided into two time-based segments that may reflect the adaptation of groups to changes in the Chesapeake region environment. The earlier segment is characterized by a predominance of narrow-blade stemmed projectile points such as Bare Island, Lackawaxen, Clagett, Holmes, and Piscataway, along with a few side-notched types more characteristic of the Middle Archaic period such as Brewerton, Halifax, and possibly Otter Creek (Dent 1995:178–180). Dent (1995:180) suggests that these narrow-blade types date to the period of approximately 3000–1500 BC. Beginning at 2200 BC, and thus overlapping with the last half of the narrow-blade tradition, is the broad-blade tradition that continued to approximately 1000 BC (Dent 1995:181). Some researchers have designated this time period as the Terminal Archaic (e.g., Fiedel et al. 2008:11; Kavanagh 1982). Characteristic of this tradition are types such as Savannah River, Susquehanna, Crispin, and Perkiomen, with derivatives such as Orient Fishtail and Dry Brook also present (Dent 1995:180). Dincauze (1976) suggests that the narrow-blade tradition evolved in situ from local Middle Archaic populations while the broad-blade tradition was a result of diffusion from the Southeast. Dent (1995:201–202) appears to support this interpretation as well.

Turning to the remainder of the material culture assemblage associated with Late Archaic sites, Dent (1995:161–162, 181) notes broad similarities between the artifact assemblages of the two projectile-point traditions. Chipped-stone tools were made using both bipolar and bifacial reduction techniques, and projectile points were most likely multipurpose tools. The reliance on multipurpose tools appears to have reduced the diversity of Late Archaic tool types. Specific tool types include generalized bifaces, expedient flake scrapers, drills, perforators, and utilized flakes (Dent 1995:182). Drills and scrapers were often made from exhausted projectile points. Besides the formal chipped-stone tools, the production of expedient tools made from flakes and crude cores appears to have increased (Klein and Klatka 1991:98). Lithic material varies by location, although an emphasis on local materials is characteristic of both

traditions, and some preference for quartzite appears to be associated with the broad-blade tradition (Dent 1995:182). Throughout this period, quartz and quartzite were the most frequently used lithics, although rhyolite and argillite were occasionally used. However, large quarries, often centering on quartzite acquisition, such as the Piney Branch quarries in the District of Columbia, appear to be associated with the broad-blade tradition (Dent 1995:203; Fiedel et al. 2008). Nonlocal materials, when present, appear to have been procured from "down-the-line" trading networks (Dent 1995:182). The use of ground-stone tools also increased in the Late Archaic period and especially with the broad-blade tradition, perhaps reflecting an increase in woodworking activities (Dent 1995:182). Ground-stone tools include adzes, celts, gouges, axes, manos, metates, mortars, net weights, and atlatl weights (Dent 1995:182). Steatite or soapstone bowls were also produced in the Chesapeake region, once again more so with the broad-blade tradition (Dent 1995:161, 182–183).

Aside from projectile point styles, Dent (1995) stresses that the greatest differences between the two traditions is in terms of settlement and site structure. Settlement patterns associated with the narrow-blade tradition consist of a large number of relatively small sites that are equally divided between riverine and upland locations, with wetlands, forests, diverse habitats near streams, and riparian floodplain plant communities offering predictable resources (Dent 1995:185, 197). Because of this, the Inner Coastal Plain was more heavily occupied than the Outer Coastal Plain (Dent 1985:197). Such a strategy also effectively enhanced contact between groups and mitigated risk through information and resource sharing (Dent 1995:197). Sites that appear to be larger are most often the result of a palimpsest of frequent occupations by small groups, with the frequency of reoccupation associated with resource predictability (Dent 1995:199). Subsistence appears to have been based on forest mast, deer, and turkey (Dent 1995:187). Seasonal hunting and foraging continued, but exploitation of riverine resources rapidly became an important part of the subsistence base. Several settlement trends are associated with these changes, including an intensified occupation of the uplands, the initial establishment of large semi-sedentary base camps along rivers and streams, and an overall increase in the number of sites dating to this period. Internally, narrow-blade tradition sites evidence a limited range of features, including discrete activity areas and scatters of fire-cracked rock (Dent 1995:184).

The broad-blade tradition reflects an adaptation to the increased availability of estuarine environments in the Chesapeake region, an adaptation referred to as an intensification effort and characterized as an appropriation of nature (Dent 1995:188, 200). Dent (1995:205) characterizes this adaptational change as a shift to a logistically organized collector strategy. Dent (1995:201) suggests that, like the broad-blade projectile points themselves, the adaptation for intensification, which allowed populations to take advantage of the stabilized, ecologically productive coastal areas, was imported into the Chesapeake region. Reflecting this change is a shift in site location that emphasizes proximity to linear river valleys that allowed an increase in the population and a subsistence focus on estuarine resources (Dent 1995:186, 201). Both site size and total number of sites increased, with sites as large as 2 ha present while smaller sites average 450 square meters (Dent 1995:186). Dent (1995:186) characterizes this settlement system as representing an annual cycle of fusion and fission with settlements including multiband base camps, band camps, and microband foray sites. In contrast, Steponaitis (1986:285) views the settlement pattern of the Patuxent River area as unchanged throughout the entire Late Archaic period. Features associated with the sites also became more diverse. Formal hearths and platform hearths, perhaps having a fish-processing

function, are increasingly common. Shell accumulations, pits, and burial pits have also been reported. Definite evidence for structures, though, is lacking (Dent 1995:185). As may be surmised from the shift in settlement toward estuarine environments, greater evidence for fish and shellfish use is associated with the broad-blade tradition (Dent 1995:187). Mast use appears to have been seasonally determined, as perhaps were aspects of hunting (Dent 1995:187).

The archaeological record in the District documents an increase in site numbers for the Late Archaic period in contrast to the Early Archaic and Middle Archaic periods. A number of sites in the Rock Creek/Potomac River area of the District of Columbia have significant Late Archaic components. One of the earliest recognized sites is 51NW1, the Piney Branch Quarry site, first identified by William Holmes. Reanalysis of points collected by Holmes identified a series of Susquehanna Broadspear points made of rhyolite (Fiedel et al. 2008). In the same region, Fiedel et al. (2008) located small but intensively occupied base camps along Maddox Branch that contain Late Archaic components. Site 51NW158 is perhaps the best example, having yielded a number of Halifax, Lamoka, Holmes, and Savannah River points. Quartz and quartzite dominate the debitage assemblage, although rhyolite is also well-represented. Inashima (1985) also identified Vernon and Holmes or Bare Island points, suggesting the presence of a Late Archaic component at 51NW79. Closer to the Potomac River, McNett (1972:33) identified a series of small side-notched and square-stemmed points, as well as Piscataway points, as evidence for Late Archaic occupation at 51NW22. Finally, Fletcher's Boathouse (51NW13), at the confluence of Rock Creek and the Potomac River, yielded Lamoka, Wading River, Savannah River, and Susquehanna Broadspear points, but no intact deposits dating to this period (Barse 2002).

In southeast Washington, D.C., two sites have been identified as having Late Archaic components. A single untyped projectile point was identified as Late Archaic from the Jenkins Farm site (51SE4) (LeeDecker and Holt 1994). More substantial is the number of Late Archaic points found at the Howard Road site (51SE34) (Louis Berger & Associates 1986). The Howard Road site is interpreted to be a large base camp with repeated occupations. Projectile points associated with this component include Halifax, Vernon, Crispin Broadspear, Lackawaxen, and Brewerton. In addition, investigators identified a biface finishing area as dating to the Late Archaic period at this site. Cobble reduction and tool manufacture were important activities, with late-stage manufacturing debris more common than early-stage decortication debris, although early-stage manufacture is well-represented by 35 cores and numerous biface blanks and preforms.

2.1.5 Early Woodland Period (1000 – 500 BC)

The Early Woodland period, roughly dated between 1000 BC and 300 BC, generally coincides with the Sub-Boreal climatic episode, which approximated modern conditions although attenuated cycles of climatic change have been identified (Carbone 1976) (Figure 2-1). Johnson and Peebles (1983) and Brush (1986) indicate that, by this time period, forest composition was essentially similar to that of the modern period although differences in the frequency of species may have been present. Similarly, Eshelman and Grady (1986) suggest that a modern array of faunal species was present in the region at this time.

Culturally, ceramic manufacture and increased sedentism traditionally mark the beginning of the Early Woodland period. The earliest ceramic types found along the Coastal Plain of Maryland are the steatite-tempered Marcey Creek and Selden Island wares, which are associated with fishtail-type points, including Orient and Dry Creek. Some researchers have characterized these ceramic types as "experimental" wares (e.g., Dent 1995:225; Wise 1975), and they can be described as trough- or bowl-shaped vessels with flat bottoms molded from slabs of clay (Dent 1995:225). Egloff (1991) suggests the early ware types, such as Marcey Creek and Selden Island, are derived from Southeast pottery traditions. The Marcey Creek and Selden Island wares were replaced by the sand- or crushed-quartz-tempered Accokeek wares. These ceramics are associated with Calvert and Rossville point types (Wesler et al. 1981:183). Accokeek ware is the earliest example of this pottery technology on the Western Shore. By about 900 BC, coil production techniques began to be used, with globular vessels having cord- or net-impressed exterior surfaces being fashioned (Dent 1995:227). Aside from projectile points, much of the Early Woodland lithic assemblage is similar to that of the preceding Late Archaic period (Dent 1995:228).

Researchers have suggested that the Early Woodland settlement pattern reflects an intensification of the logistical-collector strategy adopted in the broad-blade tradition of the Late Archaic period (Dent 1995:230). It appears that part of this intensification included increased sedentism, with larger sites being occupied for longer periods of time (Dent 1995:230; Mouer 1991). Smaller resource-extraction sites serviced these larger sites (Dent 1995:230; Gardner 1982). The larger sites were riverine-based and often located at the junction of freshwater and brackish streams in interior regions. Smaller camps were established seasonally in areas with high potential for the exploitation of numerous and differing resources. Gardner (1982:60) has proposed that the settlement-subsistence system of this period included a series of base camps where populations aggregated to exploit seasonal resources. Groups occupying the base camps harvested anadromous fish in the spring and early summer and exploited estuarine resources in the fall and early winter. Features identified at the large base camps reflect the increased sedentism. The Early Woodland period provides the earliest evidence for food storage. Small food-storage pits are common, as are formal hearths with dense deposits of fire-cracked rock (Dent 1995:230). Other characteristics of the large base camps indicative of increased sedentism include dense midden deposits, including shell middens. However, few remains of structures have been identified (Dent 1995:230).

A number of sites with Early Woodland components have been investigated in the District. Again, many of these sites are located in the Rock Creek/Potomac River locality. Inashima (1985) reports the recovery of Accokeek ceramics at 51NW79 while Fiedel et al. (2008) note their presence at sites 51NW51 and 51NW158 in Rock Creek Park. Site 51NW158, a large base camp along Maddox Branch, also yielded Marcey Creek and Selden Island ceramics. The Peter House (51NW103) and Whitehust West (51NW117W) sites, located in the Whitehurst Freeway vicinity, yielded Accokeek ceramics and a number of Early Woodland projectile point types (Knepper et al. 2006). Along the Potomac River, Orient Fishtail points were found at the Fletcher's Boathouse site (Barse 2002) while Susquehanna Broadspear and Drybrook-like points were identified in a collection from the Potomac Avenue site (McNett 1972:33). No intact Early Woodland deposits were found at any of these sites. The Howard Road site (51SE34) in the Anacostia neighborhood also yielded Accokeek ceramics and an Orient Fishtail projectile point, but no intact deposits dating to this period were encountered (Louis Berger & Associates 1986).

2.1.6 Middle Woodland Period (500 BC – AD 900)

Dent (1995:235) suggests that the Middle Woodland was a period of technological homogenization in that projectile point type variability decreased in the Chesapeake region. In contrast, a diversification of ceramic vessel sizes, forms, and styles of surface decoration, including net-, cord-, and fabric-impressed, characterizes the Middle Woodland period (Dent 1995:221). The major ceramic type in the region was the shell-tempered Mockley type (characteristic of the Mockley phase), which evolved from the sand-tempered Popes Creek type (Barse and Beauregard 1994:14; Dent 1995:221, 235) (Figure 2-1). Popes Creek ceramics typically date from about 2,500–1,800 years ago and are thick-walled and sand-tempered with net-impressed exteriors (Dent 1995:235–236). Projectile points associated with Popes Creek ceramics include Calvert and Rossville types as well as unnamed stemmed types (Dent 1995:236). Mockley ceramics date from 1,800–1,100 years ago and are shell-tempered with cord- and net-impressed exteriors (Dent 1995:236). Fox Creek and Selby Bay projectile point types are associated with the Mockley ceramics (Dent 1995:237). The presence of non-local rhyolite, argillite, and jasper lithics at a few sites suggests that localized exchange networks may have operated between the Coastal Plain and areas in both western Maryland and at the New Jersey fall line (Barse and Beauregard 1994:15; Dent 1995:222, 237). There is some suggestion that the rhyolite was traded into the region in the forms of blanks and preforms (Dent 1995:237; Stewart 1992:21). However, much of the stone-tool assemblage associated with the Middle Woodland period is similar to that of the preceding Early Woodland period, although bone tools are more common (Dent 1995:239).

Middle Woodland settlement continued the generalized pattern of seasonal aggregation and dispersal that perhaps began as early as the Middle Archaic period. In general, it appears that base-camp settlements located at freshwater/brackish water junctions, a common location for Early Woodland camps, were abandoned in favor of broad floodplain sites where maximal resource exploitation of tidal and non-tidal aquatic resources was possible (Davis et al. 1997; Dent 1995:222). Dent (1995:241) discusses the Popes Creek site, which appears to represent a major settlement in the fall and winter seasons. The group would disperse in spring to take advantage of anadromous fish runs and to collect shellfish and hunt in the summer. Potter (1993) suggests that in the later portion of this period, smaller groups would seasonally congregate and disperse, whereas by the end of the period, larger, village-sized groups would seasonally congregate. Custer (1989) presents a similar model for the northern portion of the Chesapeake region. However, he identifies mortuary and exchange centers as additional elements of this system. These sites tend to be located in ecologically unproductive areas but are well-situated along potential lines of trade. Such sites are seen as indicators of increased regional interactions and also the coalescence of distinct territories (Dent 1995:242).

As the previous paragraph implies, Middle Woodland sites exhibit an extensive range in size, in one part of the Chesapeake region from .1 ha to 5 ha, that appears to be correlated with site function (Dent 1995:240). Features associated with Middle Woodland sites include dense midden rings, shell middens, subterranean storage pits, storage pits reused as trash receptacles, hearths, roasting pits, and concentrations of fire-cracked rock (Dent 1995:240). However,

structural remains are not well-represented in the archaeological record. Available evidence suggests that houses had prepared floors, interior pits, and a pole-supported structure. Many of the subsistence trends noted for the Early Woodland period continued into the Middle Woodland period, especially the large-scale exploitation of oysters and other shellfish (Dent 1995:242). Deer, turkey, small mammals, and other bird species were important as well. Nuts and seeds were collected, and the increased representation of seeds such as amaranth and chenopod at sites suggests that these species were intensively promoted and harvested (Dent 1995:243). Analyses of human remains indicate an increase in carbohydrate consumption when compared with earlier populations, possibly reflecting the increased consumption of amaranth, chenopod, and wild rice (Dent 1995:243). Dent (1995:243) suggests that the Middle Woodland subsistence strategy can be characterized as a mix of hunting, foraging, and agriculture.

More substantial artifact assemblages and sites with intact deposits dating to the Middle Woodland period have been found in the District. Once again, several of the most important sites are located in the Rock Creek/Potomac River locality. Sites 51NW158 and 51NW171, located along Maddox Branch and interpreted as base camps, have yielded Mockley and Albemarle ceramics and Selby Bay projectile points (Fiedel et al. 2008). Moving toward the Potomac River, one of the earliest of such sites recognized is the Potomac Avenue site (51NW22) (McNett 1972). The American University excavations uncovered a line of post molds and two small pit features, which McNett (1972) interprets as a wall of a large structure and associated pit features dating to the Middle Woodland period. While no diagnostic artifacts were found in the post molds or pits, the preponderance of Middle Woodland artifacts at this site led the investigators to date the features to that time period (McNett 1972:34). Ceramics from the site include Popes Creek and Accokeek types. McNett (1972:34) suggests the site was a small fishing camp.

The nearby Fletcher's Boathouse site excavations yielded nine large circular pits, several smaller pits, and post molds, along with ceramics, lithics, and fire-cracked rock (Barse 2002). While the site yielded artifacts suggesting its occupation from the Early Archaic through the Middle Woodland periods, the features and most temporally diagnostic artifacts are attributed to the Middle Woodland period. The Middle Woodland ceramics include Albemarle, Popes Creek, and Mockley wares that represent the remains of four different jar forms, and the lithics include Selby Bay, Rossville, Yadkin, and Piscataway projectile points. Lithic debris is dominated by late-stage reduction flakes, and quartz and quartzite are the most common materials used, although rhyolite was also recovered. The large pits, about 2.4 m in diameter and 1.5 m deep, are refuse-filled storage pits. Two radiocarbon dates place the Middle Woodland occupation of 51NW13 at 100 BC. Barse (2002) suggests that this site represents repeated occupations by small groups during this period.

Also in the Rock Creek/Potomac River locality, Middle Woodland artifacts were found at the Peter House and Whitehurst West sites (Knepper et al. 2006). Mockley and Popes Creek ceramics and Middle Woodland projectile points were found at the two sites. Two radiocarbon assays dating to the Middle Woodland period were also obtained from somewhat mixed deposits at the Peter House site (Knepper et al. 2006). Excavated in the same Whitehurst Freeway project, the nearby Ramp3 site has yielded perhaps the single most important Middle Woodland feature

in the District (Knepper et al. 2006). An intact oval pit feature located at that site contained a cremation burial and a large number of grave goods, including Popes Creek ceramics. The radiocarbon assays securely date the feature to the Middle Woodland period. The remains were of a female aged 40 years, and the grave goods included an elaborate incised antler comb, antler discs, perforated shark teeth, ground-stone pendants, a wooden bead, and a phallic effigy. Knepper et al. (2006) suggest that the artifacts and burial have similarities with those of the Kipp Island phase of New York and Ontario. The artifacts found with the Ramp3 burial are interpreted to indicate external influences on Middle Woodland populations in the Coastal Plain region, although whether these influences are due to diffusion or population movement is not known. Knepper et al. (2006) favor a movement of Proto-Algonquian speakers from the north into the Middle Atlantic region during the Middle Woodland period.

Finally, along the Anacostia River, Louis Berger & Associates (1986) document what appears to be a large Middle Woodland occupation at the Howard Road site (51SE34). The Howard Road site is interpreted to be a large base camp that was repeatedly occupied. The Middle Woodland component is represented by Mockley and Popes Creek ceramics and Selby Bay projectile points. However, no intact deposits dating to this period were identified at this site.

2.1.7 Late Woodland Period (AD 900 – 1600)

The single most important, and common, element across much of eastern North America in the Late Woodland period was the adoption of agriculturally based subsistence systems (Anderson and Mainfort 2002). In the Mid-Atlantic region, the establishment of a system of stable agriculture in the Late Woodland period led to the development of sedentary floodplain village communities, some of which were fortified by palisades (Turner 1992). For the Monocacy River valley, Kavanagh (1983) notes four major changes that occurred in the Late Woodland period: the appearance of large, permanent or semipermanent villages made possible by the cultivation of maize, beans, and squash; the presence of ceramics at numerous sites, including open camps and habitations; an intensification of riverine orientation through time; and a shift towards the use of local lithic resources, implying a breakdown in procurement networks. Hunting, gathering, and fishing were still practiced but to a lesser extent than before.

The predominant Coastal Plain ceramics of the period include the fabric-impressed Townsend series and the cord-marked Potomac Creek series (Figure 2-1). The Townsend series ceramics have the same distribution as that of the Middle Woodland Mockley ware, and Dent (1995:244) notes that some archaeologists view Townsend as a derivative of the earlier Mockley ware. Ceramic decoration and embellishment appear to have been important and increasing at this time. Townsend ware has been divided into four distinct types that appear to evidence both temporal and geographic variation, with some types continuing into the Contact period. The Potomac Creek ceramics became abundant after AD 1300 in the western shore of Maryland (Dent 1995:245). Potomac Creek ceramics are believed to have been made by Piscataway groups. Dent (1995:245) also emphasizes that while the Late Woodland ceramic types have been shown to have a core area of use, their area of distribution is often larger. This dispersal is attributed to extensive interaction between regional groups. Triangular projectile points are almost exclusively associated with the Late Woodland period (Dent 1995:245). The stone-tool assemblage

largely consists of local materials with tools made from small expedient cores and flakes (Dent 1995:247). The tools include a variety of scrapers, perforators, choppers, and hoes, along with ground-stone items such as axes, mauls, mortars, pestles, grinding stones, and abraders (Dent 1995:248). Bone and antler points were also fashioned, as were other bone tools and ornaments. Clay tobacco pipes and copper beads and pendants are also attributed to the Late Woodland period (Dent 1995:249).

Late Woodland site patterns appear to consist of varying-sized larger sites surrounded by smaller sites, with the size and complexity of the larger sites increasing after about AD 1300 (Dent 1995:250). This site pattern may reflect a larger permanent village that was associated with smaller, resource-extraction hamlets. Village location may have been influenced by proximity to agriculturally suitable soils (Potter 1993). And as across much of eastern North America, Late Woodland groups in the Chesapeake region were becoming increasingly sedentary, with sites described as nucleated or dispersed villages and small hamlets (Dent 1995:249–250). Refuse and shell middens can be substantial, and ditches, trenches, and palisades were constructed at some sites. While some subterranean storage facilities are found on Late Woodland sites, Dent (1995:249) suggests that the period witnessed a shift toward the use of above-ground storage facilities such as warehouses and granaries. Domestic structures appear variable and include longhouses, semi-subterranean pit houses, and smaller, oval house structures (Dent 1995:249). Some of the variability might be explained by site function. One last site type is the ossuary. Ossuaries are places of secondary interment of large numbers of individuals and are often associated with nearby village sites (Dent 1995:255).

In some respects, the Late Woodland subsistence pattern was similar to that of earlier periods. Faunal resources included deer, smaller mammals, ducks, turkey, and other birds, oysters and other shellfish, turtle, and a variety of fish, especially anadromous species (Dent 1995:251). Nuts, starchy and oily seeds, such as amaranth and chenopod, and tubers were also important. But the archaeological remains also indicate that fundamental changes to subsistence and diet occurred in this period. Eight-rowed flint-variety maize was being grown as early as AD 825 in the region, and evidence for the growing of squash and beans has also been found (Dent 1995:254). Potter (1993) suggests that the emphasis on tropical cultigens intensified after AD 1300.

After AD 1500, social and political activity increased among native tribes in Maryland and Virginia, and some archaeologists suggest that an alliance of coastal plain Algonquian groups had formed prior to European contact (Potter 1993:151) (Figure 2-1). Dent (1995:267) identifies the date of about AD 1500 as marking the appearance of ranked societies known as chiefdoms in the Chesapeake region. There has been considerable debate among researchers as to the nature of Late Woodland social organization in this region prior to AD 1500. For instance, Turner (1992) characterizes the socio-political organization of groups settled on the Coastal Plain as ranked while Hantman and Klein (1992) indicate that, at least for the Piedmont region, archaeologists have interpreted Late Woodland societies as ranging from egalitarian, to temporary hierarchies, to chiefdoms. As noted here, with the transition to the Contact period, many of these issues are resolved.

Similar to the Middle Woodland period, a number of Late Woodland sites that contain intact deposits have been recently identified in the District. Once again, a number of these sites are located in the Rock

Creek/Potomac River locality. All three sites investigated by Knepper et al. (2006) for the Whitehurst Freeway project yielded Late Woodland artifacts. Fire-cracked rock features associated with Townsend series ceramics were found at both the Peter House and Whitehurst West sites. Small amounts of Potomac Creek ceramics and Levanna and triangular points were also recovered from these features. One fire-cracked-rock feature at the Peter House yielded a radiocarbon assay that dates to the Late Woodland period. At all three of the Whitehurst Freeway sites, the upper mixed midden-like levels were also dominated by Late Woodland artifacts. Fiedel et al. (2008) also located Late Woodland artifacts at 51NW158, a base camp site along Maddox Branch. Materials from this site include Keyser, Potomac Creek, and Rappahannock Incised ceramics and Levanna projectile points. A Late Woodland component was also identified at the Howard Road site in the Anacostia neighborhood (Louis Berger & Associates 1986). Potomac Creek ceramics and triangular projectile points were found at this large base camp site, although no intact Late Woodland deposits were identified.

2.1.8 Contact Period (AD 1600 – ca. 1650)

English colonists from Jamestown began exploring the Chesapeake region in 1608 and provided many details on the settlements and cultures they encountered. Dent (1995:262) indicates that the region was populated by Algonquian speakers but was ringed by other groups: Iroquoian to the north, Siouan to the northwest, and various groups to the west. On his 1608 map, John Smith recorded 166 different settlements and indicated the presence of social and political groupings by identifying villages with "King's Houses" or "Ordinary Houses" (Dent 1995:261). Powhatan, the major group in the region, was located south of Maryland and the District of Columbia (Dent 1995:262). Groups in the District or Maryland areas may have been loosely allied with Powhatan or were independent. The Piscataway, living north of the Potomac River, were also well-documented during the Contact period. This group was led by a paramount chief and consisted of six or seven groups each headed by a subchief (Dent 1995:264).

At the beginning of the seventeenth century, the Necostins, a tribe visited by Smith, inhabited the lower Anacostia River area. The area now known as Anacostia was described in 1608 as having houses scattered among agricultural fields along the eastern bank of the Anacostia River (Figure 2-2). Also present was a palisaded village called Nacotchtank. Nacotchtank was the residence of the chief of the Necostins and was also said to contain religious structures. The Necostin settlement system appears to be typical of the southern coastal portion of the Mid-Atlantic region; Potter (1993) has documented similar settlement patterns among the Contact period groups along the Virginia Coastal Plain.

Figure 2-2. Smith map of 1608 depicting Nacotchtank (Smith 1608).

Increasingly, the relationship between the English and Necostins became based on trade, with trade in beaver pelts especially important. Evidently, Nacotchtank was a major center where hundreds would congregate, as trade was in part based on Necostin control of beaver pelts from the area. In 1622, a party of colonists from Jamestown, in alliance with other nearby tribes, plundered and burned Nacotchtank. An attempted return to Nacotchtank in 1623 by the Jamestown colonists, ostensibly to trade, was thwarted when the party was ambushed. Henry Fleet, a colonist taken prisoner in the 1623 conflict, was held captive for five years. After escaping, Fleet returned to Nacotchtank in 1632, marking the last mention of this village. Fiedel et al. (2008:19) suggest that the Necostin merged with the Piscataway by 1694, as evidenced by the mention of the presence of an Anacostin king with Piscataway leaders in a council held at St. Mary's City.

To date, the Necostin palisaded village of Nacotchtank has not been found. A site that is most likely similar to Nacotchtank is the Accokeek Creek site, which was excavated in the 1940s (Stephenson et al. 1963). Investigations at this site yielded an outline of a circular palisade that had been rebuilt a number of times. At its largest, the palisade was 400 feet (122 m) in diameter, enclosing an area of less than 3 acres (1.2 ha). Within the palisade walls were up to 30 dwellings, although the exact number occupied at any one time is difficult to determine due to the numerous episodes of structure abandonment and rebuilding noted by the archaeologists. Similarly, the locations of the houses scattered among the agricultural fields

mentioned by the Jamestown colonists have not been positively identified although numerous sites with Contact period artifacts have been located along the Anacostia River.

Not mentioned in relation to the Nacotchtank village by the Jamestown colonists is the use of ossuaries. Ossuaries, or communal graves in which the periodic re-interment of bundle burials took place, are associated with the late precontact period (Late Woodland to Contact period) and have been documented in many parts of the Mid-Atlantic region (Boyd and Boyd 1992; Curry 1999; Feest 1978; Hantman and Gold 2002; Herbert 2002). Two have been located and excavated at Bolling Air Force Base (AFB), containing 63 and 70 individuals, respectively, although no European trade goods were found at these sites (Stewart and Wedel 1937). These ossuaries are thought to be typically located within 1 km of a major village (Curry 1999). If correct, and if the ossuaries date to the Contact period, Nacotchtank would most likely be located within Bolling AFB. The exact location of this Contact period village has yet to be identified and fully accepted by researchers.

2.2 Historic Period Context

The histories of Maryland and the District of Columbia have been covered in a number of publications. This section focuses on the general historical background of the District of Columbia. The more detailed historical discussions of the Glover Park and Burleith neighborhoods are presented in Section 3.

2.2.1 Colonial Maryland to 1790

The District of Columbia originally was part of Maryland until 1790, when that state ceded 69 square miles of territory to form the new federal capital. Well before that event, in the seventeenth century, the first permanent European settlement in the proprietary colony of Maryland was at St. Mary's City (Figure 2-3). Throughout the seventeenth century, settlement spread northward from St. Mary's City along the Potomac River. Settlement was overwhelmingly agrarian in nature and was organized around large landholdings (Bryan 1914:14). This manorial-style system was based on land grants of tracts of 1,000 acres or more made to influential planters. The first and most important crop in Maryland was tobacco, which was shipped to European markets for sale and consumption.

Early in this process, labor for the plantation was supplied mainly by indentured servants (Engerman et al. 2006). However, by 1690, this pattern changed. Between 1698 and 1703, an average of 750 slaves per year was imported into Maryland, whereas after 1703, the average increased to 1,500 per year. Engerman et al. (2006) suggest that the reasons for this change include the scarcity of indentured servants, better life expectancy among slaves, and the increased demand for Chesapeake tobacco.

The growth of trade and shipping also led to the development of port towns and trading centers at this time. The governmental system changed in Maryland from proprietary to provincial to state. Religious, social, cultural, and educational institutions were established, and small local industries began to appear. Transportation in the eighteenth century relied at first on rivers, but as the century progressed, increased road construction facilitated travel and the interconnection of port towns and churches.

By the early 1700s, most of the land along the Potomac River had been surveyed and patented, but actual settlement remained sparse. Several small hamlets coalesced and developed into larger settlements and

commercial centers, including Bladensburg and Georgetown in Maryland and Alexandria in Virginia. These settlements became important ports for the shipment of tobacco.

The relative isolation of the region was reflected during the Revolutionary War, when little importance was placed on this area by either the British or Americans. After the Revolutionary War, George Washington provided the main impetus in focusing the federal government's attention on the Potomac River region. For nearly a decade, Congress debated the location of a permanent site for the federal government. Washington recommended "…a bowl-like depression at the base of the Cumberland Mountains, heavily forested, barely populated, and forked by the junction of two rivers – the Potomac … and the Anacostia" (Lewis 1976:5). On July 16, 1790, Congress established the Potomac region as the new federal capital, and Maryland ceded 69 square miles of land for this purpose.

2.2.1 District of Columbia, 1790–1865

Toward the end of the eighteenth century, both the economy and land structure were changing in the region. Tobacco prices were falling, and soil depletion had lowered the tobacco yields. With the abolishment of the primogeniture laws, large plantations were divided among more children, thereby reducing the size of the properties. These factors made it impossible to maintain the high standards of living that larger and more productive holdings had allowed previously. Many large plantation owners sold off their properties and moved to more productive lands to the west.

PR-A was included in the District of Columbia boundaries, but the areas around the Glover Park and Burleith neighborhoods lay well outside the original city limits and L'Enfant's plan.

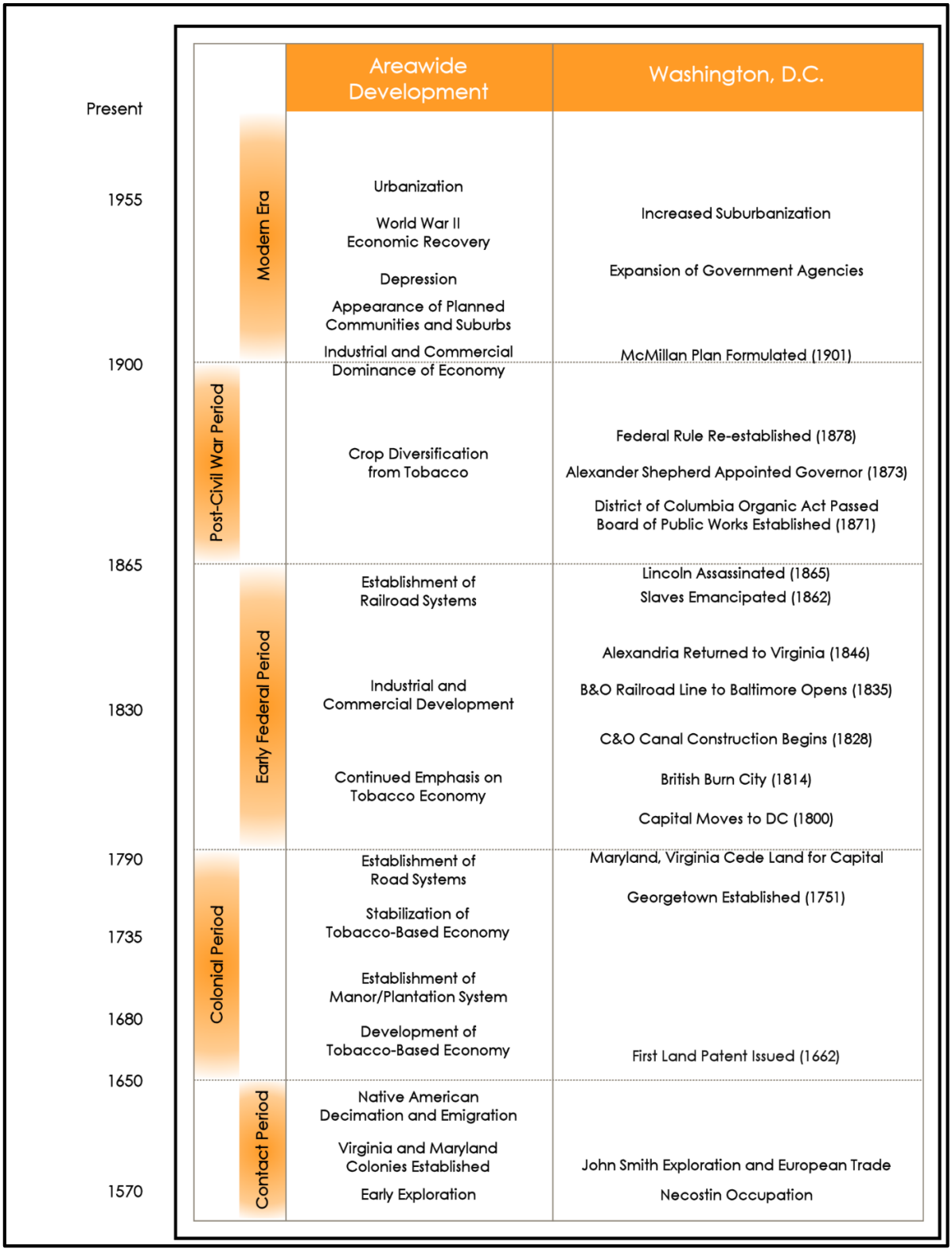

Figure 2-3. Historic period chronology of the District of Columbia area.

Culturally and economically, the residents were still more closely affiliated with rural Prince George's and Montgomery Counties in Maryland. During this period, "Washington County" shared in the developing commercial and industrial system that arose with the appearance of new manufacturing technologies. In the Western Shore region of Maryland, and the area given up for the District of Columbia, these developments were felt most strongly in new transportation systems and local manufacturing industries. A concomitant increase in agricultural development led to an increase in the number of small farms, especially along rivers and branches. In the years leading to the Civil War, Washington County was still an agricultural society with crossroads communities, rural churches, schools, mills, blacksmith shops, and other small enterprises supporting a largely agricultural economy. In Washington County as in Maryland, this economy was based on plantations whose slave laborers accounted for a substantial part of the population.

When the Civil War broke out, the capital was surrounded by Virginia, which had joined the Confederacy, and Maryland, a slaveholding border state. Loyalties within the District of Columbia were strongly divided. Plantation owners depended on slave labor, and many residents in the City of Washington were originally from Maryland and Virginia and retained strong family and cultural ties to those states. The District of Columbia was vulnerable to attack, with the only fortification at Fort Washington, located 12 miles to the south. The federal army began a construction campaign to protect the city, ultimately erecting 68 forts in a 37-mile radius around the city by the close of hostilities in 1865 (U.S. Department of the Interior, National Park Service 2016). An army signal corps training camp ("Camp of Instruction") was present in PR-A. However, its location is uncertain, possibly being between Wisconsin Avenue and Tunlaw Road, and Fulton Street to Calvert Street, a fairly open area at the time of the Civil War. A Civil War-era map depicting forts and earthworks associated with the Defenses of Washington was consulted to determine if any such resources were noted for PR-A (Barnard and Boschke 1865). No such resources were depicted in PR-A on the map.

2.2.2 Postbellum Era, 1865–Present

Following the war, population in the District of Columbia began to expand, aided by the further development of transportation systems, including the streetcar lines that reached beyond the antebellum city limits. Suburbanization beyond the original city core began in earnest in the 1870s and continued into the twentieth century.

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3 PR-A Assessment and Analysis

PR-A is located in northwest Washington, DC to the west of Rock Creek Park. The PR-A boundary is roughly defined by Calvert and Edmunds Streets NW to the north, Wisconsin Avenue NW and 35th Street NW to the east, Reservoir Road NW to the south, and 39th and 41st Streets NW to the west (Figure 1-2). Historically, PR-A was rural until the early 1900s, at which time several residential neighborhoods were established in the eastern portion of the project area, with a mix of single family and multifamily homes and apartment buildings and a few commercial businesses, as it remains today. Siting of the specific types of GI technologies to be implemented and the GI facility locations has been completed. The current proposed undertaking consists of approximately 140 bioretention and permeable pavement facilities in the project area. The following assessment identifies probable archaeological site locations based on a review of DC HPO archaeological site files and locations of now-buried streams and pre-World War I structures. Those locations are then compared to impacts such as land leveling by elevation decrease and the installation of major utilities, or by burial of potential archaeological site locations by significant quantities of fill material. Locations that have both a high probability for the presence of archaeological resources along with a low level of elevation change or utilities or other impacts are identified. These locations have a high potential for the presence of archaeological resources.

3.1 Overview

PR-A consists of the neighborhoods now known as Glover Park and Burleith. Glover Park originally was part of two seventeenth-century land grants: Salop (later part of Alliance) to the west and Salcom (later called Knave's Disappointment) to the east. In 1769, the land lying within Knave's Disappointment was incorporated into the Beatty and Hawkins' Addition to Georgetown. The western part of what would become Glover Park remained agricultural and outside of the corporation limits (Fletcher 2016). In 1791, Burleith was part of John Threlkeld's consolidation of several properties into a single 812.25-acre plantation called Alliance. Parcels of the property were sold over the course of the nineteenth century. By 1887, the initial Burleith subdivision had been platted between Georgetown College and the Catholic (Holy Rood) Cemetery near the U.S. Naval Observatory. Both neighborhoods continued to grow into the twentieth century.

3.1.1 Glover Park History

The earliest known settlers in the area that would become Glover Park were Peter Colter and Murray Barker. Coulter was a German immigrant and Barker a freed slave. Both were listed in the Georgetown assessments from 1808–1810 and were employed, at least in part, as market gardeners. Other early white settlers came mainly from Pennsylvania, Ireland, and Germany. Free blacks and slaves also lived in the upper part of Georgetown (Fletcher 2016).

Before the Civil War, butchering and related activities were the major economic focus. During the Civil War, a Signal Corps training facility was established in the area, and the first National Home for Destitute Colored Women and Children was founded at Burleith, a home confiscated from Richard S.

Cox, who had given up his position at the Treasury Department for one in the Confederate government. Following the war, butchering waned in importance, and the land owners turned their attention to development. In 1911, much of the land in what would become Glover Park was purchased by Charles Carroll Glover, for whom the area was later named. The earliest advertisements for homes using the Glover Park name date to 1926 (e.g., Evening Star [ES], 24 September 1926:50). Single family homes and rowhouses continued to be built into the 1940s with apartment buildings taking over after that time (Fletcher 2016).

3.1.2 Burleith History

In November 1791, John Threlkeld consolidated several properties into a single 812.25-acre plantation called Alliance. Alliance included parts of earlier properties called Knaves Disappointment, Resurvey on Salop, Addition to the Resurvey on Salop, Addition to the Addition to the Resurvey on Salop, White Haven, St. Philip and Jacob, and Addition to St. Philip and Jacob as well as vacant land (Plats.net 2016). Much of this land had been purchased by John Threlkeld's father, Henry, from whom John inherited the properties. The future Burleith neighborhood lay within Alliance (Fletcher 2016). Threlkeld held the property only until 1827, when it was sold at auction to satisfy his debts with the Union Bank of Georgetown, Clement Smith, and the Bank of the United States (Fletcher 2016). Parcels of the property continued to be sold over the course of the nineteenth century.

Before the Civil War, Richard S. Cox, the son of John Cox still owned much of the property in the Burleith neighborhood. In 1861, Richard S. Cox left his position at the U.S. Department of the Treasury for a position in the Confederate government in Richmond. Although later pardoned after the war, Richard Cox was in debt and unable to retain the property, and it was sold at auction in 1876 (Fletcher 2016). This was a period in which the City of Washington expanded, and a number of new subdivisions were platted and established, including the Burleith area adjacent to Georgetown. Part of the Burleith area, including much of PR-A, already had been platted as part of Cox's Addition to Georgetown (Faehtz and Pratt 1874: Plate 2). By 1887, the initial Burleith subdivision had been platted between Georgetown College and the Catholic (Holy Rood) Cemetery near the U.S. Naval Observatory, and lots were being offered for sale (ES, 25 April 1887:1; Hopkins 1887: Plate 43). The neighborhood grew through the first part of the twentieth century, with a mix of single family, semidetached, and multifamily homes constructed mainly in the 1920s.

3.2 Archaeological Site File Review Results

No archaeological investigations have been conducted within PR-A and only one has been conducted adjacent to PR-A. In 1984, Engineering-Science undertook a preliminary archaeological assessment at the Stoddert Recreation Center, a small corner of which is located adjacent to PR-A. Additional investigations were recommended because of the potential for both Native American sites, especially those relating to habitation or workshops, and Historic period sites such as plantation/farm houses and outbuildings (Artemel et al. 1984). Two other archaeological sites have been identified within PR-A by avocational archaeologists. Site 51NW152 was located roughly between 39th and W Streets NW, and 51NW007 is located roughly between 40th and W Streets NW. Both are Native American sites.

3.3 Elevation Change Analysis

The elevation change analysis of PR-A compared topographic elevation between the USCGS 1888 *Topographic Map of Washington and Vicinity* (Sheets 43 and 53) with that of the modern District of Columbia GIS topographic map. The results of this analysis, depicted in Figure 3-1, illustrate areas of elevation increased (i.e., filling) as shaded in red and areas of elevation decrease (i.e., cutting) as shaded in green. Areas of yellow have witnessed little change in elevation. Added to this figure are 5-foot interval contour lines to better illustrate areas of elevation increase and decrease.

Several areas within PR-A have been subject to major elevation changes since 1888. The areas in red indicate the presents of extensive filling, most likely the result of infilling ravines to create a level surface on which to construct both infrastructure such as road and the urban residences now present in Glover Park. The deepest area infilled occurs in the vicinity of 38th and W Streets NW where there is approximately 15 feet of fill. The area north of Benton and 38th Streets NW has witnessed approximately 10 feet of fill. The area south of Manor Place NW also indicates approximately 12 feet of fill. These areas include and are adjacent to the head of a small ravine and stream depicted on the 1861 Boschke map.

Extensive cutting is evident in the northernmost portion of the study area, where the landform was cut by up to 23 feet. The area around 40th and Benton Streets NW was also cut but to a lesser extent, by up to 8 feet. The remainder of the study area has seen approximately 5 feet or less of change in elevation since 1888.

3.4 Historical Map Analysis

Five historical maps were analyzed to determine the locations of former structures in order to assess the potential for Historic period archaeological resources. PR-A was rural through much of the Historic period, a fact which is illustrated by the historical maps. The maps selected for this review were the 1861 Boschke map, the 1888 USCGS topographic map, the 1903 and 1919 Baist maps, and the 1927/1960 Sanborn map (Figures 3-2 through 3-6).

Several structure clusters and individual structures are illustrated in PR-A on the 1861 Boschke map (Figure 3-2). In the northern part of PR-A, the clusters include the J. Britt structures northeast of present-day W and 39th Streets NW and the J. G. Dashiel structures east of modern 39th and Beecher Streets NW. Smaller groupings and single structures in the northern part include eight along what is now Tunlaw Road NW and another 13 along and near the old Rockville Road north of High Street (modern Wisconsin Avenue NW). Structures in the southern part of PR-A are limited to one at the wood edge south of the Britt property and seven along Fayette Street (now 35th Street NW). Many of the structure clusters remain on all subsequent maps through and including the 1919 Baist map, with some individual structures disappearing at various times through that period.

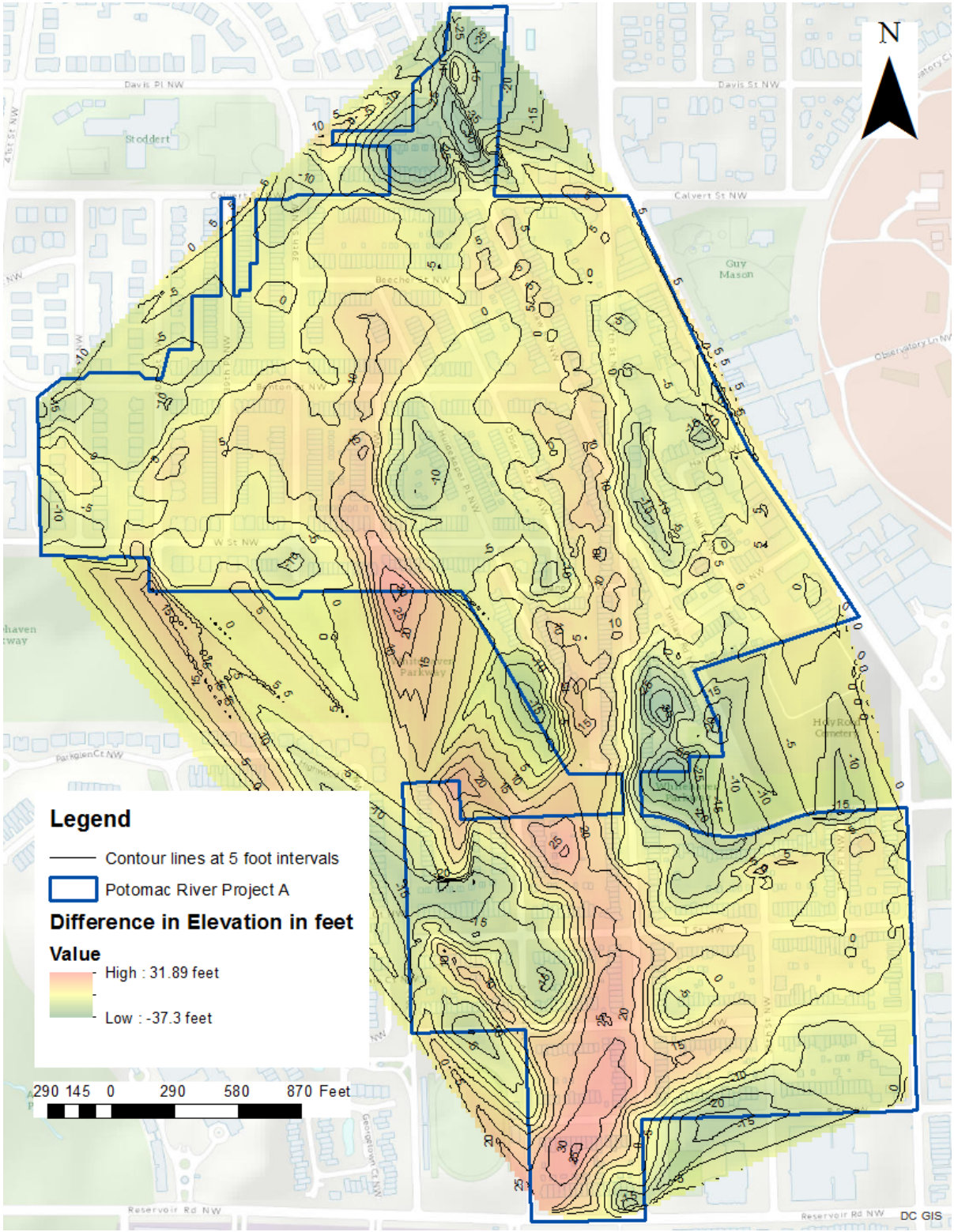

Figure 3-1. PR-A elevation change analysis.

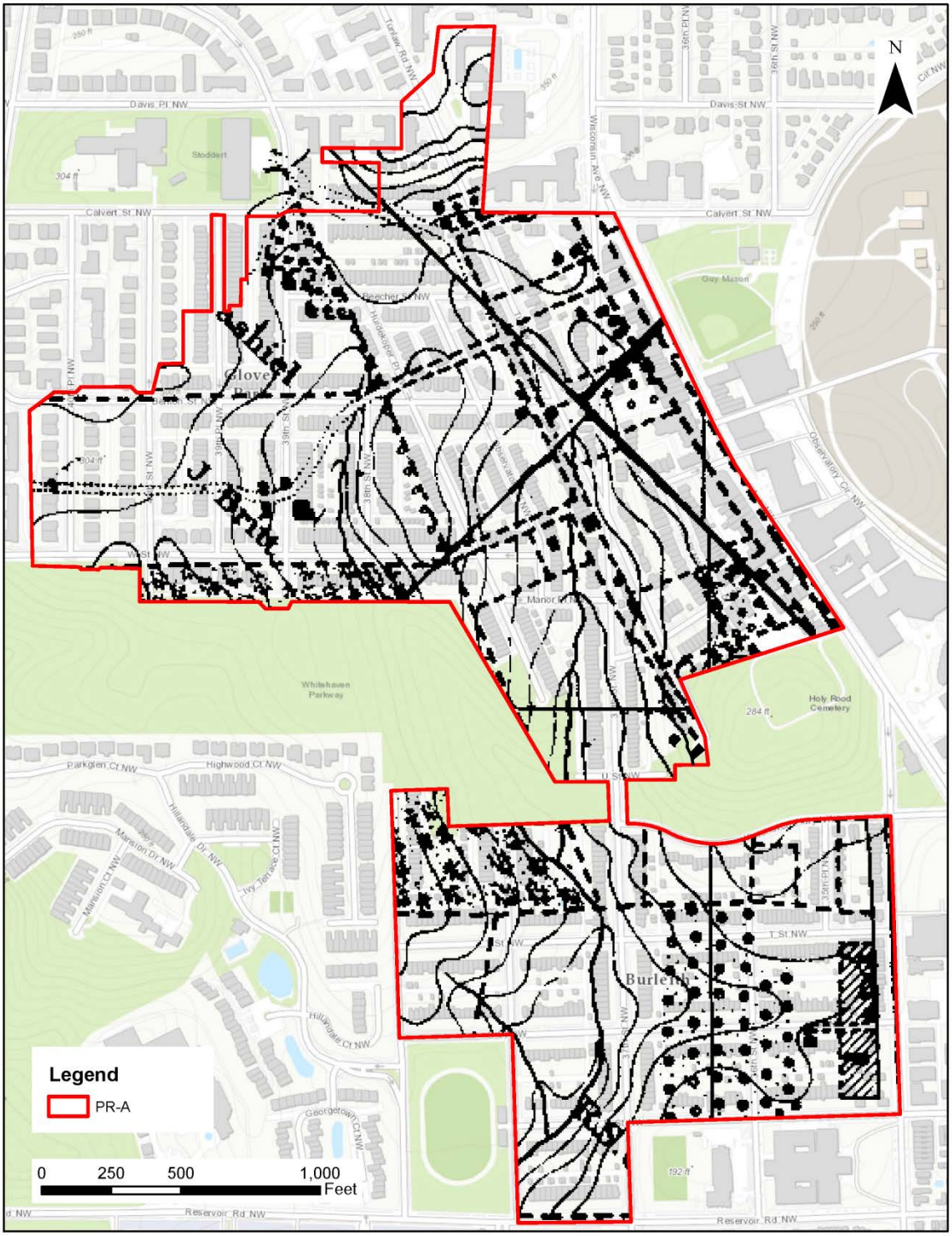

Figure 3-2. 1861 Boschke map of PR-A.

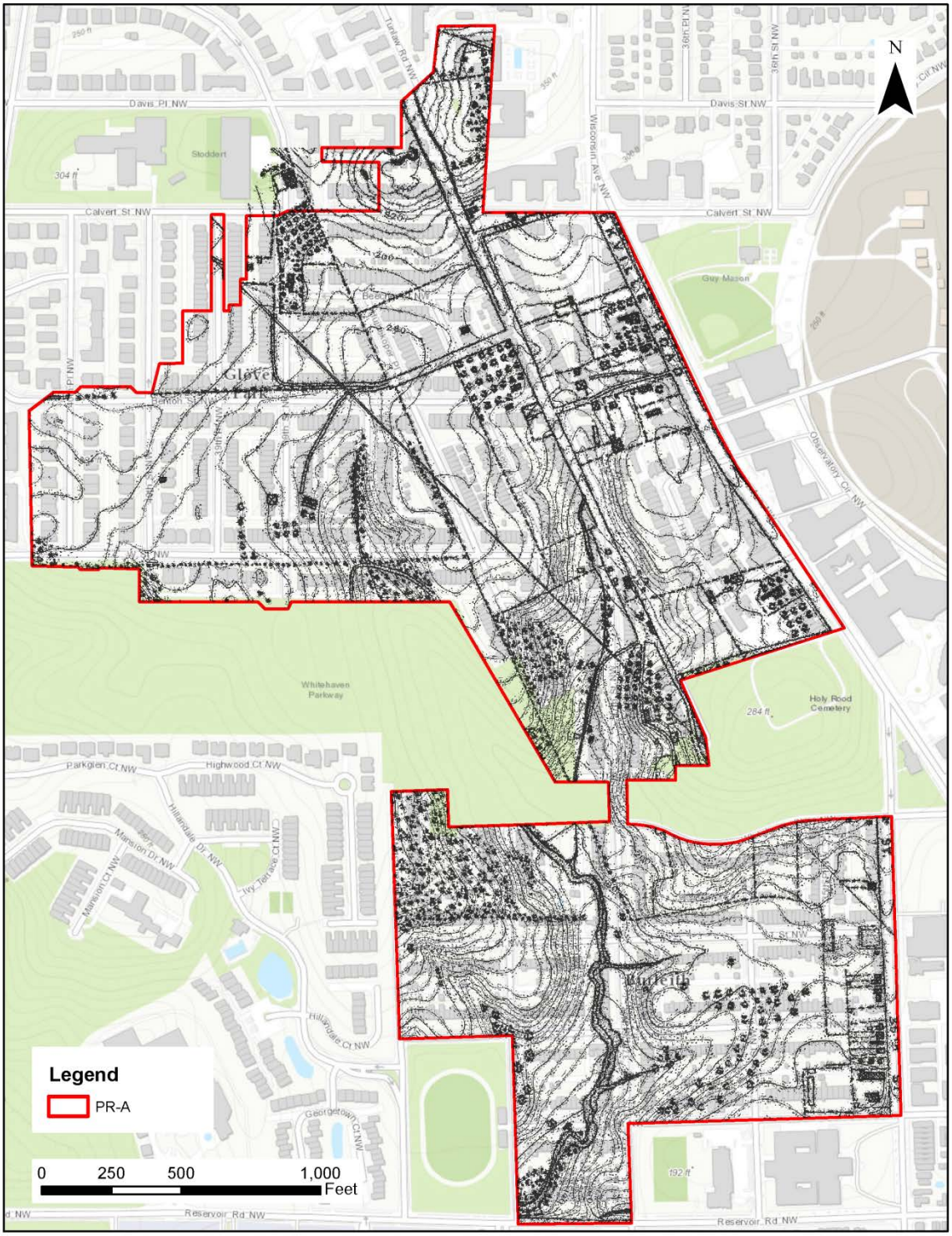

Figure 3-3. 1888 USCGS topographic map (Sheets 43 and 53) of PR-A.

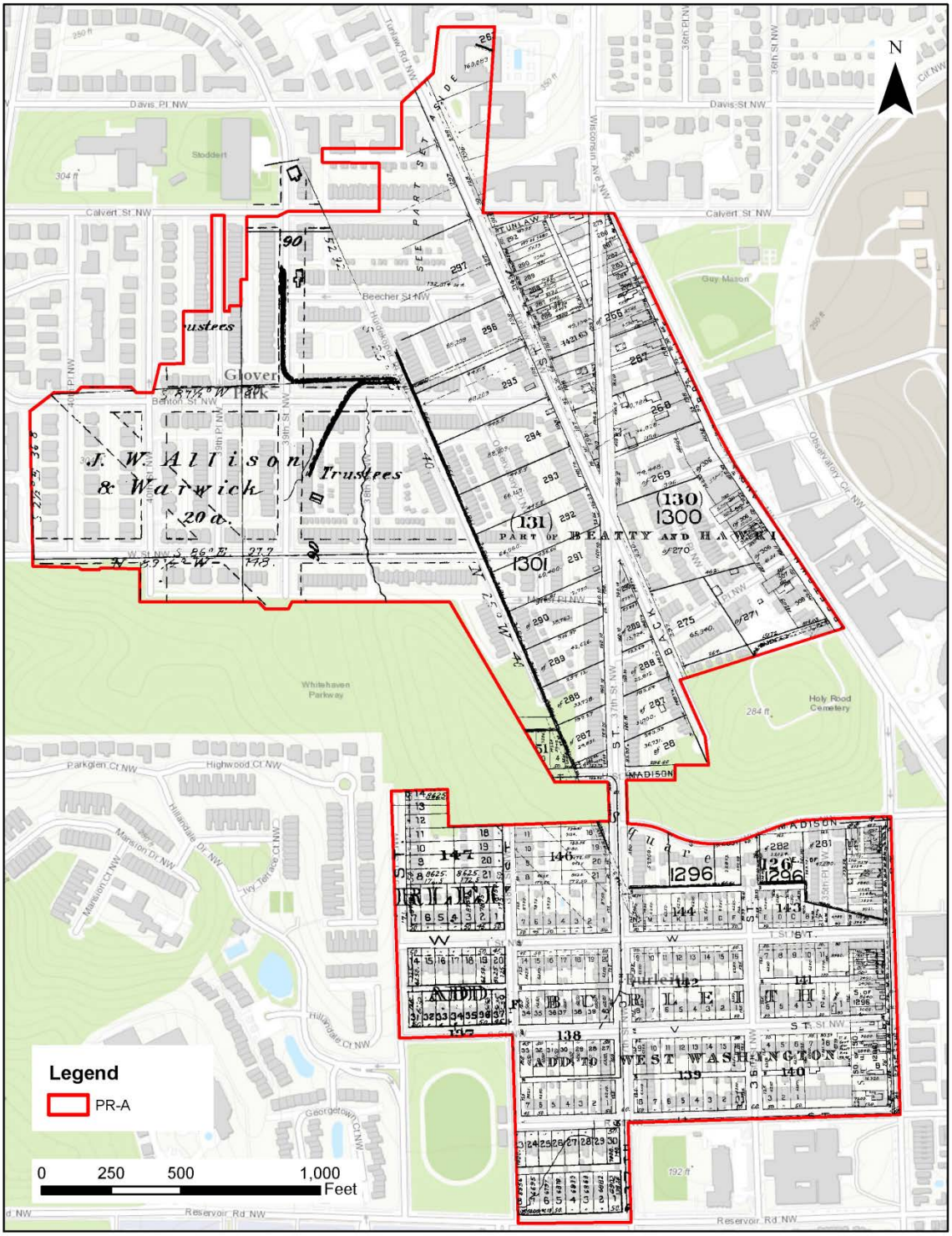

Figure 3-4. 1903 Baist map (Vol. 3, Plates 6, 18, and 19) of PR-A.

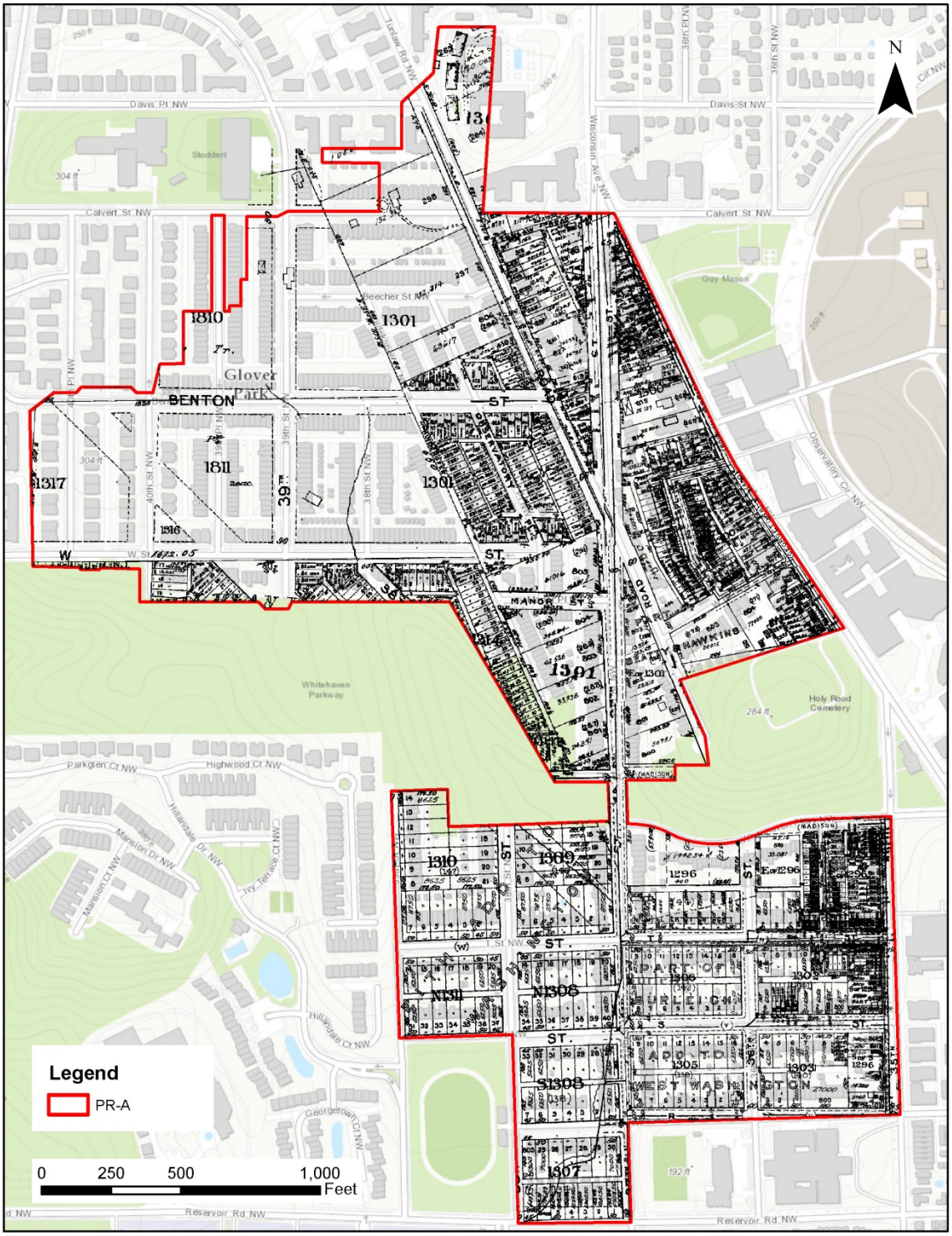

Figure 3-5. 1919 Baist map (Vol. 3, Plates 23, 24, and 25) of PR-A.

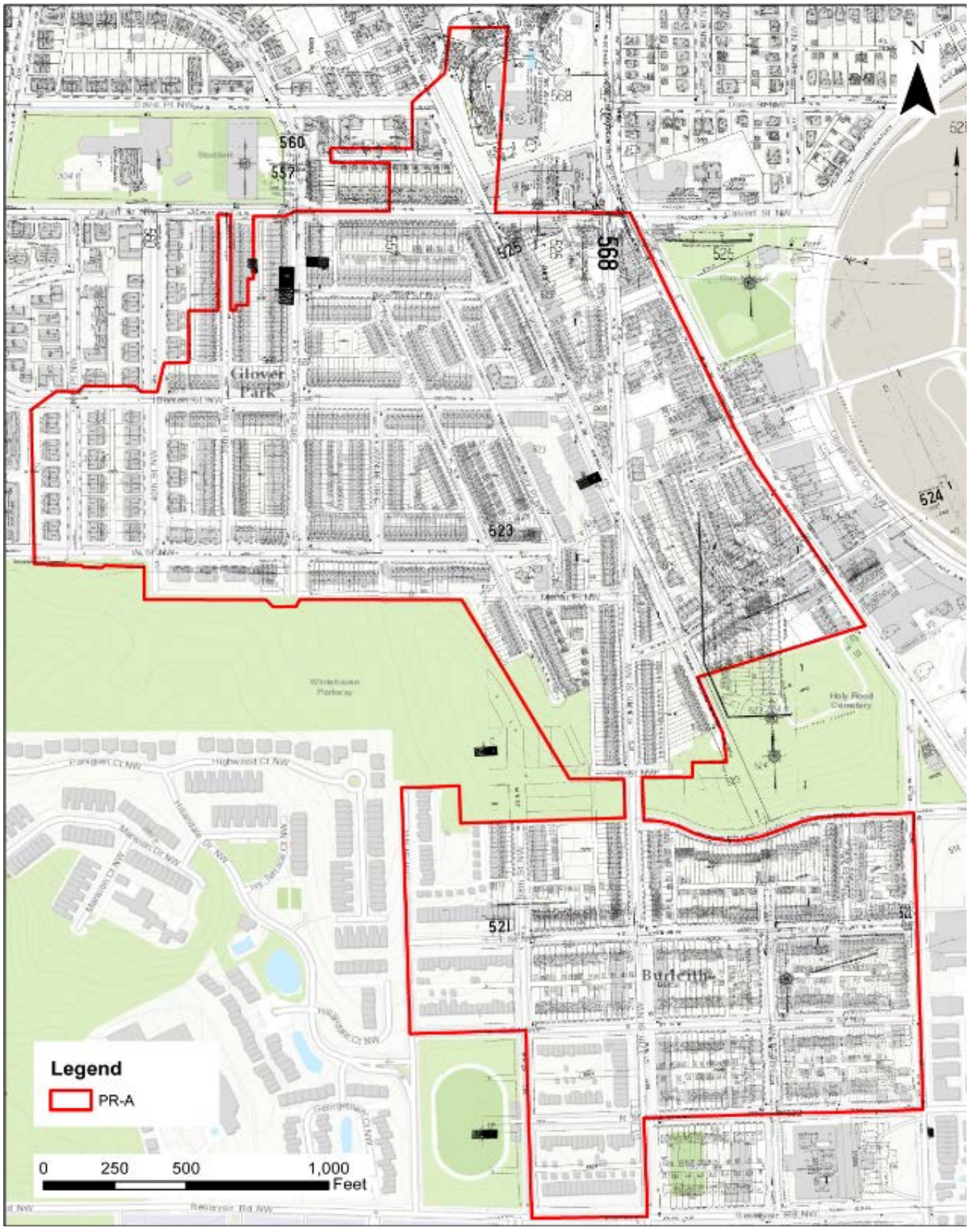

Figure 3-6. 1927/1960 Sanborn map (Vol. 5, Sheets 521–525, 527, 534, 555–557, 560, and 568) of PR-A.

The 1888 USCGS map (Figure 3-3) shows additional structures in these clusters, many representing outbuildings associated with the residences shown on the 1861 Boschke map. Several are not visible due to the overlapping of the maps resulting from the mapping software. New structures are also depicted along Fayette Avenue and 5th Street (now 35th Street NW and R Street NW), perhaps showing the initial development of the Burleith neighborhood as population growth extended from Georgetown.

The 1903 Baist map is the first to illustrate the encroaching urbanization in the Glover Park and Burleith areas. While the far northwestern part of PR-A remained rural in nature, new streets had been platted. The southern part of PR-A, however, depicts the increased subdivision of this part of the city (Figure 3-4). In the south, the Burleith Addition to West Washington had been platted, and a number of frame and brick buildings had been constructed on 35th, U, and V Streets. Moving northward, additional structures also had been built along the Georgetown and Rockville Pike (present-day Wisconsin Avenue NW) and Back Street/Tunlaw Road (modern Tunlaw Road NW). The 1919 Baist map shows continued and significant construction in the northern part of PR-A around the Georgetown and Rockville Pike and Tunlaw Road and well as W Street (Figure 3-5). By the time of the revision of the 1927 Sanborn map (ca. 1960), nearly the entirety of Glover Park and Burleith had been developed (Figure 3-6).

3.5 Utility Locations

The locations of modern underground utilities (combined sewer system and water mains) within PR-A are depicted in Figure 3-7. These utilities are present near the center of all roadways but appear to be absent in the project area alleys. Stantec assumed for this assessment that the greatest areas of disturbance were those intersections with multiple storm sewer manholes.

3.6 Assessment Analysis

Figure 3-8 depicts locations that have the potential for archaeological resources within PR-A and the proposed locations of GI facilities to be constructed. In all, 28 potential locations were identified, including 26 locations of structures depicted on maps dating between 1861 and 1903 and two reported locations of Native American sites. Table 3-1 enumerates the 28 locations and provides the rationale for recommendations for additional archaeological investigations.

The review of the DC HPO archaeological site files indicated that two known Native American archaeological sites are present in the project area, and both are located near W Street NW. Both archaeological sites were reported by amateur archaeologists and the locations included in the DC HPO archaeological site database for these two sites are at best of questionable certainty. One location (Map Key 2), the intersection of two streets, has been disturbed by storm sewers, while the other (Map Key 1) is potentially undisturbed.

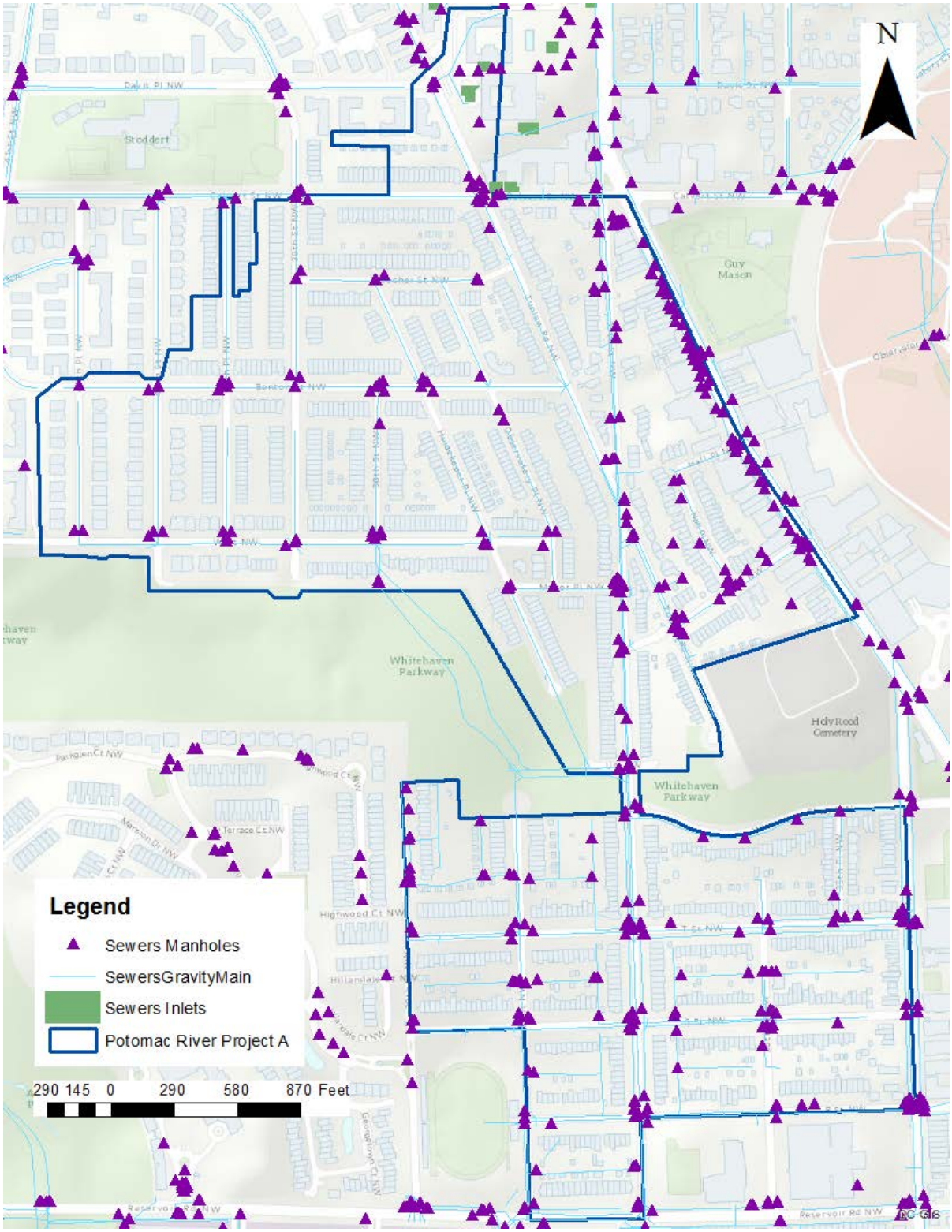

Figure 3-7. Major underground utilities within PR-A.

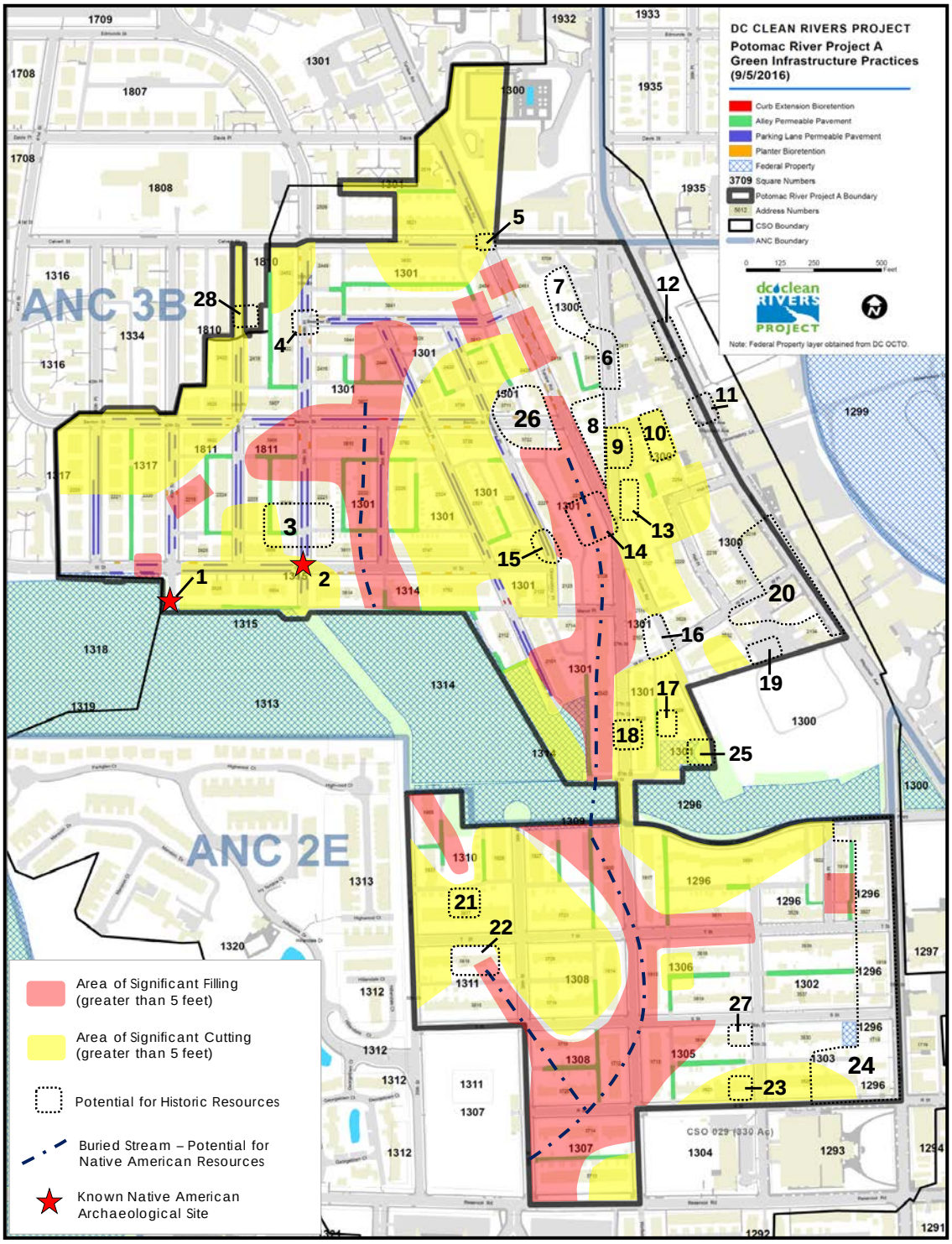

Figure 3-8. Potential archaeological resources identified in PR-A.

Table 3-1. Identified resources in PR-A.

Map Key	Resource	Earliest Map Reference	Comments
1	Native American Archaeological Site	Not Applicable	Location uncertain-no additional work recommended
2	Native American Archaeological Site	Not Applicable	Disturbed-storm sewer
3	J. Britt Farmstead	1861	Monitor-permeable pavement
4	J. G. Dashiel Farmstead	1861	Disturbed by cutting-visual confirmation
5	Unnamed structure	1888	No GI sited in area
6	Unnamed structures	1861	No GI sited in area
7	Unnamed structures	1861	No GI sited in area
8	Unnamed structure	1888	No GI sited in area
9	Unnamed structure	1888	No GI sited in area
10	Unnamed structure	1888	No GI sited in area
11	Unnamed structure	1861	No GI sited in area
12	Unnamed structure	1888	No GI sited in area
13	Unnamed structure	1888	No GI sited in area
14	Unnamed structure	1861	No GI sited in area
15	Unnamed structure	1861	Disturbed-storm sewers; significant
16	Unnamed structure	1888	No GI sited in area
17	Unnamed structure	1903	No GI sited in area
18	Unnamed structure	1888	No GI sited in area
19	Unnamed structure	1861	No GI sited in area
20	Unnamed structures	1861/1888	No GI sited in area
21	Unnamed structure	1903	No GI sited in area
22	Unnamed structure	1903	No GI sited in area
23	Unnamed structure	1903	No GI sited in area
24	Unnamed structure	1903	No GI sited in area
25	Unnamed structures	1861	No GI sited in area; significant cutting
26	Unnamed structures	1861/1888	Monitor planter bioretention installation
27	Unnamed structure	1903	No GI sited in area
28	J.D. Dashiel Farmstead	1861	No GI sited in area

However, Stantec does not recommend monitoring of this location as it is a highly unusual area (another street intersection) for the recovery of archaeological materials by an amateur archaeologist. It is more likely that any artifacts were found to the south closer to an extant tributary stream. Drainages of the same stream cut northward into PR-A but have been covered by 5 feet or more of fill. It is unlikely that any excavations conducted during construction will reach the buried land surface, if present.

In addition, the historical map review indicated that 26 locations could retain pre-1919 Historic period archaeological resources (Table 3-1). Comparison was then made of the 26 potential Historic period archaeological resource locations to locations of proposed GI facilities. GI infrastructure will avoid 22 of the 26 locations with potential Historic period resources. Another location has been impacted by the confluence of two storm sewer/gravity mains with a number of manholes at the intersection.

The final three locations were then visually inspected to determine whether other factors could indicate that the locations retained sufficient integrity to warrant a recommendation for archaeological monitoring during construction of a GI facility. Significant cutting was visually confirmed at one location (Map Key 4).

One of the remaining areas, north of the intersection of Benton and 35th Streets NW (Map Key 3), is the location of the Britt farmstead as noted on the 1861 Boschke map. This location appears to lack substantial impacts based on both desktop analysis as well as visual inspection. Permeable pavement will be placed within and near Area 3. The other remaining area, west of the intersection of Tunlaw Road and Benton Street (Map Key 26), will have planter bioretention facilities installed. That area is the location of several unidentified structures on the 1861 Boschke map. Monitoring is recommended at both areas during construction-related excavations.

4 Summary and Recommendations

This Phase IA archaeological assessment has been prepared to evaluate the potential for archaeological resources within PR-A in northwest Washington, DC. Siting of the specific types of GI technologies to be implemented and the GI facility locations has been completed. The current proposed undertaking consists of approximately 140 bioretention and permeable pavement facilities in the project area. These facilities will be located within District roadways, parking areas, and sidewalks and will require excavations to between 3 feet and 7 feet below the current surface.

This assessment considered the probability for the presence of Native American and Historic period archaeological sites. Research included reviewing historic contexts, the DC HPO site files, and a number of historical maps to determine the presence of archaeological sites, historical cemeteries, and historical structures. Now-buried stream courses and the location of Civil War earthworks were also determined for each project area. These data provided an understanding of potential locations within each project area for both Native American and Historic period archaeological resources.

These locations were then compared with modern impacts to the project area. The impacts included the identification of locations that have undergone significant amounts of elevation change or impacts by modern construction such as buildings or by installation of major infrastructure elements including water mains and combined sewers. All but elevation increase could result in the destruction of archaeological resources, while significant elevation increase (greater than 5 feet) could result in the burial of archaeological resources.

The assessment of the project area resulted in the identification of specific locations that Stantec recommends for either avoidance or monitoring during construction of the GI facilities. These locations were subsequently field inspected to identify any potential factors that could have resulted in the destruction of archaeological resources but were not captured in the desktop assessment. When identified, the locations were deleted from the list of locations recommended for monitoring during GI facility construction.

The PR-A assessment indicated that most but not all of the proposed GI locations would avoid the 28 identified potential archaeological resources. Of the 28, 22 locations are likely to be avoided. Two locations appear to have been impacted by storm sewer and water main installation, while another is of uncertain location. Visual inspection indicated that one location had been impacted by cutting associated with road construction. The remaining two locations have potential pre-World War I Historic period structures (Britt farmstead residence and associated outbuildings present on the 1861 Boschke map at Map Key 3 and several unidentified structures on the 1861 Boschke map at Map Key 26) that appear not to have been significantly impacted by previous grading, filling, or construction-related excavations. Stantec recommends monitoring at these two locations.

This assessment has reviewed a number of information sources that can be used to predict whether archaeological resources may once have been present at a particular location and other sources of information that identify likely causes of archaeological site destruction. However, there remains a

potential throughout the project area for archaeological remains associated with unmapped historical structures or Civil War encampments and waste disposal locations, among others, and Native American encampments. Such resources are typically termed Unanticipated Archaeological Discoveries. We recommend that an Unanticipated Archaeological Discoveries Plan be prepared and implemented by the DCCR GI project team and its contractors during the construction of GI facilities within PR-A.

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Appendix A Qualifications of Key Personnel

PAUL P. KREISA, PhD, RPA. Senior Archaeologist, Principal Investigator
PhD, Anthropology, University of Illinois at Urbana-Champaign, 1990
MA, Anthropology, Northern Illinois University, 1984
BA, Anthropology, University of Wisconsin, Oshkosh, 1981
Register of Professional Archaeologists (RPA)
Dr. Kreisa is a Senior Archaeologist and Principal Investigator for Stantec (formerly Greenhorne & O'Mara). Since joining the company in 2005, he has directed the investigations of several Colonial and Antebellum plantation sites; conducted numerous survey and evaluation projects for public and private sector clients in Maryland, New Jersey, Pennsylvania, Virginia, West Virginia, and Washington, DC; and created a Postbellum archaeological context for Prince George's County, Maryland, and an archaeological resources management plan for the redevelopment of St. Elizabeths Hospital in Washington, DC. With more than 30 years' experience at all levels of archaeological consulting, Dr. Kreisa has directed numerous Phase I survey, Phase II evaluation, and Phase III mitigation investigations at Historic and precontact Native American sites in the Mid-Atlantic, Mid-South, Southeast, Midwest, and Great Plains. Clients have included DOD facilities, US Army Corps of Engineers districts, GSA, NPS, state transportation agencies, local governments, and private developers. He has experience in completing Section 106 and NEPA documentation and complying with state and local regulations. Dr. Kreisa was previously a member of the Wisconsin SHPO staff and president of the Council for Maryland Archeology, the organization of professional archaeologists in Maryland, from 2011–2012.

JACQUELINE M. MCDOWELL, MA. Background and Archival Research
MA, Anthropology, Northern Illinois University, 1986
BS, Anthropology, Northern Illinois University, 1984
Ms. McDowell joined Stantec (formerly Greenhorne & O'Mara) as a planner in 2009. Since 2005, she has conducted research for cultural resources projects in Maryland, Pennsylvania, Virginia, West Virginia, and Washington, DC. She has more than 20 years' experience in conducting archival research with primary and secondary sources and incorporating the research into historic contexts and background research sections for reports. Ms. McDowell also has nearly 30 years of field and research experience in all phases of archaeological research and reporting in the Mid-Atlantic and Midwest, including both precontact Native American and Historic period sites. She has authored numerous reports for clients including DOD and GSA as well as state agencies and private developers for Section 106, NEPA, and state-level historic preservation legislation.

GERI J. KNIGHT-ISKE, MA, RPA. Archaeologist
MA, Anthropology, Monmouth University, 2015
BA, Anthropology, University of Nebraska at Lincoln, 2009
Mrs. Knight-Iske joined Stantec (formerly Greenhorne & O'Mara) in 2011 and has five years of archeological experience in New Jersey, Maryland, Virginia, West Virginia, and Washington, DC, and four years of archeological experience in Nebraska. She has performed and supervised fieldwork, artifact analysis, archival research, report production, and GIS map making for reports. Mrs. Knight-Iske also has experience in NEPA and Section 106 compliance.

Appendix B NADB Form

NADB – REPORTS CITATION FORM

Complete items 3 and 5-14. The State Historic Preservation Office will record information for items 1 through 4.

1. DOCUMENT NO. _____
2. SOURCE _____ AND SHPO – ID _____
3. FILED AT

District of Columbia State Historic Preservation Office

4. UTM COORDINATES

Zone _____ Easting _____ Northing _____
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Zone _____ Easting _____ Northing _____

5. AUTHORS Paul Kreisa, PhD, RPA, Jacqueline McDowell, MA, and Geri J. Knight-Iske, BA, Stantec Consulting Services Inc.

6. YEAR __2016_____
   Year published.

7. TITLE Phase IA Archaeological Assessment of the DC Water Green Infrastructure Project —Potomac River Project A

8. PUBLICATION TYPE (circle one)

   1. Monograph or Book
   2. Chapter in a Book or Report Series
   3. Journal Article
   4. Report Series
   5. Dissertation or Thesis
   6. Paper presented at a Meeting
   7. Unpublished or Limited Distribution Report
   8. Other

9. INFORMATION ABOUT PUBLISHER/PUBLICATION

Follow the American Antiquity style guide for the type of publication circled.

Stantec Consulting Services Inc., Laurel, Maryland. Submitted to the District of Columbia Water and Sewer Authority. Report on file, District of Columbia State Historic Preservation Office.

10. STATE/COUNTY (Referenced by report. Enter as many states, counties, or towns, as necessary. Enter all, if appropriate. Only enter Town if the resources considered are within the town boundaries.)

STATE 1 **DC** COUNTY TOWN **Washington, D.C**.

STATE 1 **DC** COUNTY TOWN **Washington, D.C**.

STATE 1 **DC** COUNTY TOWN **Washington, D.C**.

Continuation, see 14

11. WORKTYPE (circle all code numbers that are appropriate)

0 General Management Plan/Environmental Document
1 Cultural Resources Research Plan
2 Statement for Management
3 Outline of Planning Requirements
4 Cultural Resources Preservation Guide
5 Development Concept Plan
(6) New Area Study/Reconnaissance Study
7 Boundary Study
8 Interpretive Prospectus
9 Special Planning/Management Study
10 Historical Study
11 Primary Document – Original
12 Primary Document – Translation
13 Advertisement
14 Popular Culture/History Document
15 Journal/Periodical
20 Historical Resource Study
21 Historical Base Map
22 Historical Handbook Text
23 Park Administrative History
24 Special History Study
30 Archeological General Considerations
(31) Archeological Overview and Assessment
32 Archeological Identification Study (Phase I)

33 Archeological Evaluation Study (Phase II)
34 Archeological Data Recovery (Phase III)
35 Archeological Collections and Non-Field Studies
36 Socio-Cultural Anthropology Study
37 Social Impact Statement
38 Ethnohistory Study
39 Special Archeology/Anthropology Study
40 Field Reconnaissance, Sampling
41 Field Reconnaissance, Intensive
42 Paleo-environmental Research
43 Archeometrics
44 Archeoastronomical Study
46 Remote Sensing
47 Archeozoological Study
48 Archeobotanical Study
49 Bioarcheological Study
50 Historic Buildings Report-Beginning February 1956
51 Historic Buildings Report After February 1957-Part I
52 Historic Buildings Report-Part II
54 Historic Buildings Report-After March 1960-Part III
56 HSR-Administrative Data-After December 1971
57 HSR-Historical Data
58 HSR-Archeological Data
59 HSR-Architectural Data
61 Historic Structures Preservation Guide-After December 1971
62 Historic Structures Report-After October 1980
63 Cultural Landscape Report (Historic Grounds Report)
64 Ruins Stabilization and Maintenance Report
70 Scope of Collection Statement
71 Historic Furnishings Report-After October 1980
72 Collection Condition Survey
73 Collection Storage Plan
82 Collection Management Plan (Collection Preservation Guide)
83 Special Curatorial Study
84 Archeological Field Work, Indeterminant
85 Archeological Survey, Indeterminant
86 Field Reconnaissance, Minimal
87 Underwater Survey
88 Resource/Site Based Work, Indeterminant
89 Minimal/Informal Site Visitation
90 Oral History
91 Subsurface Activity, Indeterminant
92 Testing/Limited Excavation
93 Major Excavation

94 Underwater Resource/Site Based Work
95 Artifact/Collection Based Study/Report
96 Literature Synthesis/Review/Research Design
97 Intensive Determination of Surface Characteristics
98 Environmental Research
99 Geomorphological Study
100 Geological Study
101 Paleontological Study
102 Population Reconstruction
103 Rock Art Study
104 Architectural Photography
105 Architecture Site Plan
106 Architectural Floor Plan
107 HABS Drawing
108 Physical Anthropology Study
109 Boat Survey
110 Other (Furnish a Keyword in Keyword Category 1 to identify the nature of this study.)

12. KEYWORDS and KEYWORD CATEGORIES
0 Types of Resources (or "no resources")
1 Generic Terms/Research Questions/Specialized Studies
2 Archeological Taxonomic Names
3 Defined Artifact Types/Material Classes
4 Geographic Names or Locations
5 Time
6 Project Name/Project Area
7 Other keywords

Enter as many keywords (with the appropriate keyword category number) as you think will help a person (1) who is trying to understand what the report contains or (2) who is searching the database for specific information. Whenever appropriate, record the number of acres studied in a document.

Washington, DC [6]
19th century [5]
Elevation change analysis [1]
Burleith neighborhood [7]
Washington, DC [4]
Phase IA [7]
DC Clean Rivers Project [7]
Historical map research [1]
Green Infrastructure [7]
Glover Park neighborhood [7]

Continuation, see 14

13. FEDERAL AGENCY N/A (DC Water and Sewer Authority)

14. CONTINUATION/COMMENTS (include item no.)

15. FORM COMPLETED BY

Name	Paul P. Kreisa	Date	9 May 2016
Address	6110 Frost Place		
City	Laurel	State	Maryland
Zip	20707		

Telephone Number (301) 982-2866

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DRAFT

DC Clean Rivers Project
Green Infrastructure Program

Potomac River Project A
Monitoring And Unanticipated Archaeological Discoveries

WORK PLAN

Submitted to:
Dr. Ruth Trocolli
DC Historic Preservation Office
1100 4th Street SW
Suite 650-E
Washington, DC 20024

DC Water (Owner) proposes to conduct archaeological documentation during monitoring of two construction locations and/or in the event that unanticipated archaeological discoveries are encountered during construction-related excavations, within green infrastructure (GI) facility locations within the boundary of Potomac River Project A (PR-A). This Monitoring and Unanticipated Archaeological Discoveries Work Plan (Work Plan) provides guidance to the Design-Builder and the Design-Builder's Archaeologist on procedures to follow during the monitoring of construction-related activities at two locations and/or when an unanticipated discovery of potential archaeological resources occurs. This Work Plan specifies notification procedures to be followed, field recovery and documentation methods to be implemented, post-field recovery analyses to be conducted, and final documentation to be filed with the DC Historic Preservation Office (HPO).

This Work Plan provides a process for the Owner (including through the Owner's Archaeologist) to inform DC HPO of the intent to monitor construction-related activities at two locations and/or of an unanticipated discovery, and provide the Design-Builder with approval (including through the Design-Builder's Archaeologist) to implement the appropriate field documentation as described in this Work Plan, inform DC HPO when field documentation has been completed with a requested date for resumption of construction, conduct post-field analyses as appropriate, complete a DC HPO archaeological site form, if appropriate, and file event documentation with DC HPO, including a technical report upon completion of the overall project. In turn, DC HPO will review the documentation and if appropriate, conduct a site visit and provide Owner with approval to resume construction activities. The proposed archaeological investigations shall be conducted in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation,* and the DC Preservation League's online *Guidelines for Archaeological Investigations in the District of Columbia*.

I. Overview of the Archaeological Investigation

As part of DC Water's Long Term Control Plan to reduce combined sewer overflows to the District's waterways, the DC Clean Rivers Project (DCCR) will construct green infrastructure (GI) facilities in Washington, DC. Kreisa et al. (2016) conducted a Phase IA archaeological site potential assessment ("Phase IA assessment") for the GI to be implemented in the Potomac River sewershed under PR-A.

Siting of the specific types of GI technologies to be implemented and the GI facility locations has been completed. The following GI technologies are being considered for implementation: planter bioretention, curb extension bioretention, alley permeable pavement, and parking lane permeable pavement. Bioretention facilities have been sited in the existing green spaces between the roadway and sidewalk (i.e., existing planting strips) or in the parking lane of the existing roadway; occasionally the bioretention facilities are enhanced with adjacent subsurface storage (without a surface expression). The maximum depth of excavation will be 7 feet below ground surface. Permeable pavement would be placed in existing parking lanes or in alleys. The estimated maximum depth of excavation for installation of permeable pavement is 5 feet below the current pavement surface.

The Phase IA assessment was based on historical and archaeological background research and on archaeological site potential in part based on predictive site location models. Recommendations for construction monitoring were based on an analysis of these information sources. Initially, background research was conducted to determine the probability that unrecorded archaeological sites are present within PR-A. This included reviews of DC HPO archaeological site files to determine whether known archaeological sites were located within the project area; locations of now-buried streams to determine locations with high potential for Native American sites; and several historical maps to identify the locations of pre-World War I structures, Civil War earthworks, and streetcar lines.

The PR-A area was also evaluated to determine whether the potential locations of archaeological resources had been impacted by previous development-related activities. Elevation change (also known as cut and fill) analysis was conducted for PR-A to determine whether areas were buried by significant amounts of fill or whether areas, primarily upland rises or ridges, significantly decreased in elevation through mechanical cutting. Other impacts examined include the presence of sewers and water mains and overall development.

Areas identified as having a potential for archaeological resources that have been impacted by development were not further considered. Each location identified as having a potential for archaeological resources that had not been impacted by development, was then field-checked to determine whether other factors mitigated against the potential presence of archaeological resources. The remaining locations were recommended for monitoring during the construction of the GI facilities.

Initially, 28 potential archaeological resource locations were identified within PR-A, 22 of which are likely to be avoided. Two locations appear to have been impacted by storm sewer and water main installation. One location (a previously reported Native American site) might not actually be within PR-A. One location has been impacted by cutting associated with road construction. The remaining two locations are potential pre-World War I Historic period structure complexes, one associated with the Britt farmstead first depicted on an 1861 map (Map Key Area 3), and the other an unidentified structure complex, also depicted on the 1861 Boschke map (Map Key Area 26) (see Figures 1 and 2).

Kreisa et al. (2016) recommended monitoring at these two locations and preparation of this Monitoring and Unanticipated Archaeological Discoveries Work Plan.

In response, the Owner has prepared this Monitoring and Unanticipated Discoveries Work Plan to provide guidance to the Design-Builder and the Design-Builder's Archaeologist on procedures to follow when monitoring is necessary or when an unanticipated archaeological resource is discovered. Further, this Work Plan specifies notification procedures to be followed, field recovery and documentation methods to be implemented, post-field recovery analyses to be conducted, and final documentation to be filed with DC HPO. The Work Plan provides this guidance for both unanticipated archaeological discoveries that may be made at any of the GI facilities that comprise the areas of ground disturbance associated with the PR-A project area as well as the monitoring of ground-disturbing activities at the two locations suggested by Kreisa et al. (2016).

II. Overview of the Work Plan

The Owner has prepared this Work Plan to provide guidance to the Design-Builder and the Design-Builder's Archaeologist on procedures to follow during construction activities at two locations and in the event that an unanticipated archaeological resource is discovered. The locations where ground disturbance will take place during the PR-A construction are depicted in Figure 1. The two locations recommended for monitoring, May Key Areas 3 and 26, are depicted in Figure 2.

The Owner anticipates four distinct discovery types could occur—structural remains, historic infrastructure, deposits of artifacts, and human remains. This Work Plan specifies notification procedures to be followed, field recovery and documentation methods to be implemented, post-field recovery analyses to be conducted, and final documentation to be filed with the DC Historic Preservation Office (HPO). The Work Plan provides this guidance for unanticipated archaeological discoveries that may be made at any of the GI Facilities that comprise the areas of ground disturbance associated with PR-A and for monitoring at Map Key Areas 3 and 26.

This Work Plan is not intended to identify and document non-archaeological materials located during construction-related excavations. Non-archaeological materials include artifacts found in fill deposits and functioning infrastructure or non-functioning infrastructure, structural remains, or artifact deposits that can be demonstrated to be 50 years of age or less.

This Work Plan is intended to be operationalized at all areas of surficial ground disturbance within the entire PR-A project area footprint. That footprint and its areas of surface disturbance are depicted in Figure 1.

III. Notification Procedures

When an archaeological resource as described in this plan is encountered during construction, the Design-Builder will initiate the following procedures:

1. Stop work at the find location;
2. Contact Owner or designated representative; and
3. Secure the find location (can include fencing or coverage with steel plates; if to be covered with gravel or dirt, consult with DC HPO before taking this action).

In turn, the Owner or designated representative will:

1. Contact by phone and email DC HPO within 24 hours of work stoppage to notify DC HPO of the potential find (Owner intends to provide sufficient information at the time of notification to initiate consultation/coordination with DC HPO); and
2. Provide DC HPO representatives with an opportunity to visually examine the resource prior to or during any archaeological excavation or documentation efforts.

The Design-Builder's Archaeologist will:

1. Conduct a reconnaissance of the location within 24 hours of the find making a determination as to whether the find constitutes a resource (as defined in this Work Plan);
2. Consult and coordinate on appropriate field investigations/documentation of the resource with DC HPO and Owner (Owner intends to provide sufficient information at the time of notification to initiate consultation/coordination with DC HPO);
3. Complete field investigation/documentation of the resource;
4. Consult with DC HPO and Owner as to whether the resource constitutes an archaeological site;
5. Complete all post-discovery procedures as detailed in the remainder of this Work Plan, including, if needed, completion of an archaeological site form as directed by DC HPO; and
6. File an Unanticipated Discovery Reporting Form to DC HPO along with other documentation (site form, feature forms, photographs) that may be required.

If human remains are located, the Design-Builder will initiate the following procedures:

1. Stop work at the find location;
2. Contact concurrently the District Police and Owner or designated representative; and
3. Secure the find location (can include fencing or coverage with steel plates; if to be covered with gravel or dirt, consult with District Police and DC HPO before taking this action).

In turn, the Owner or designated representative will:

1. Contact by phone and email DC HPO within 24 hours of work stoppage to notify DC HPO of the potential find (if not a crime scene);
2. Provide DC HPO representatives with the opportunity to visually examine the remains (if not a crime scene); and
3. Consult with DC HPO as to reburial of the remains upon conclusion of all required forms of documentation.

The Design-Builder's Archaeologist will:

1. Conduct a reconnaissance of the location within 24 hours of the find making a determination as to whether the find consists of human remains (if not a crime scene);

2. Consult and coordinate on appropriate recovery/documentation of the remains with DC HPO and Owner;
3. Complete recovery/documentation of the remains;
4. Consult with DC HPO and Owner as to whether the remains constitute an archaeological site;
5. Complete all post-discovery procedures as detailed in the remainder of this work plan and in consultation and coordination with DC HPO, potentially including analysis of the remains by a qualified human skeletal analyst; and
6. File an Unanticipated Discovery Reporting Form to DC HPO along with other documentation that may be required.

In turn, the Owner requests that DC HPO:

1. Provide evaluation of unanticipated discovery documentation within 24 business hours after Owner provides said documentation.
2. If the provided materials are acceptable, DC HPO will inform the Owner that construction activities may proceed at the find location.

For Map Key Areas 3 and 26, the Owner or designated representative intends to:

1. Contact by phone and email DC HPO 24 hours prior to the onset of construction activities within Map Key Areas 3 and 26
2. Require the Design-Builder's Archaeologist to monitor all construction-related excavations within Map Key Areas 3 and 26 until such point as a professional determination can be made that the area lacks archaeological resources;
3. Consult and coordinate with DC HPO on appropriate field investigation techniques and documentation if an archaeological resource is encountered;
4. Provide DC HPO representatives with an opportunity to visually examine the ongoing construction excavation or archaeological excavation and documentation efforts if a resource is present;
5. Complete field investigation/documentation of the resource;
6. Consult with DC HPO and Owner as to whether the resource constitutes an archaeological site;
7. Complete all post-discovery procedures as detailed in the remainder of this Work Plan, including, if needed, completion of an archaeological site form as directed by DC HPO;
8. File an Unanticipated Discovery Reporting Form to DC HPO along with other documentation (site form, feature forms, photographs) that may be required.

The remainder of this Work Plan identifies typical field investigation and documentation protocols for types of archaeological resources that could be encountered during ground-disturbing undertakings associated with the PR-A project area.

In the event that any artifacts, features, structural remains, or elements not discussed in this Work Plan are located during construction, the Design-Builder will cease all work in the immediate vicinity

of the find and contact the Owner and the Design-Builder's Archaeologist. The Owner will then notify and consult with DC HPO on the appropriate treatment and documentation of the find.

IV. Documentation Procedures

If the Owner indicates to the Design-Builder the need to document the find, the Design-Builder shall identify a qualified Archaeologist to perform the work in accordance with this Work Plan. The Design-Builder shall submit to the Owner, for approval, the qualifications of the Design-Builder's Archaeologist.

Once approved, the Design-Builder's Archaeologist shall perform the appropriate documentation procedure as agreed to by the Owner and DC HPO and in accordance with this Work Plan and the procedures specific to the type of discovery, as indicated below.

V. Documentation for Types of Unanticipated Archaeological Discoveries

The following sections provide the procedures for documentation of each type of Unanticipated Archaeological Discovery.

Structural Remains

Included in this category are intact elements associated with the architecture of buildings. Such elements may have originally been located outside of streets but have been incorporated into streets during widening, or may have been located within the street originally for ease of delivery and access.

1) Foundation/Footing; Cellar Access; Steps; Coal Chutes

This category consists of the remains of buildings typically along or close to the street. Foundations, cellar access, and steps may have been incorporated into the street during widening, while coal chutes are more likely to have been located within the street for ease of delivery.

The Design-Builder's Archaeologist shall remove loose debris from find, photograph, take descriptive measurements as needed (length, width, etc.), plot location of find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

Once completed, the Design-Builder's Archaeologist informs DC HPO and Owner that all necessary field documentation has been completed by preparation and transmittal of an Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

2) Wells; Cisterns; Privies

These structures were often used as garbage dumps in urban settings and thus have a high potential for containing significant archaeological materials. Wells and privies are more often located to the rear of residences (privies often along an alleyway) and may be found during green infrastructure

construction located in alleys. Cistern locations are more variable. Only those wells, cisterns, or privies demonstrably greater than 50 years in age will be documented.

The Design-Builder's Archaeologist shall remove loose debris from find, photograph, take descriptive measurements as needed (length, width, etc.), plot location of find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation.
The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

The Design-Builder's Archaeologist shall direct excavations of the interior deposits of the structure. Up to two (2) square meter of the deposits shall be recovered from each structure to serve as a sample for the mitigation of construction-related impacts to the remainder of deposits, if all shall not be excavated. Excavations shall be in a controlled manner by one (1) by one (1) meter test unit, when possible. Excavations shall proceed in ten (10) centimeter levels with all soils screened through ¼-inch mesh. In the case of privies, one ten (10) liter soil sample per cultural level shall be collected for flotation analysis. Vertical stratigraphic profiles shall be drawn and photographed and appropriate documentation forms (Feature, Test Unit, and Level) completed.

Once completed, the Design-Builder's Archaeologist informs DC HPO and Owner that all necessary field documentation has been completed by preparation and transmittal of an Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

Infrastructure Remains
Included in this category are common transportation infrastructure elements that are most likely to be uncovered during construction excavations. However, modern road widening and infrastructure improvements may have impacted these elements.

The nature of these resources will typically consist of a linear corridor (such as streetcar tracks, gutters, sewer pipes) that could be repeatedly encountered within areas of subsurface disturbance. If the resource is "typical" for its category, and can be documented as such by historical information, the Design-Builder's Archaeologist will fully document the first instance of the resource but collect less detailed information for other occurrences of the resource. While no historically-mapped locations of streetcar tracks are present within the PR-A project area, guidance is included here in the event that poorly documented remains are encountered.

1) All Road-related Infrastructure
This category includes buried gutters (stone, brick, and cobbles), light/traffic control bases, historic water (lead) or sewer (brick) lines, and road and sidewalk surfaces that are demonstrably greater than 50 years in age. Functioning infrastructure shall not be documented.

For the first encounter with these resources, the Design-Builder's Archaeologist will conduct a site visit to take descriptive measurements as needed (length, width, etc.), prepare a drawing of the resource in plan and if appropriate profile view, plot location of the find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the limits of disturbance (LOD).

For recurrent encounters within a specific road-related infrastructure category, if the resource is not unique, the Design-Builder's Archaeologist will conduct a site visit, plot location of the find on a PR-A project area map, and update the original Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

Once completed, the Design-Builder's Archaeologist shall inform DC HPO and the Owner that all necessary field documentation has been completed by transmittal of an updated Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

If the resource continues along the same street, the Design-Builder's Archaeologist will continue to visually inspect the feature during construction excavations to determine that no unusual characteristics are present. If none are present, the Design-Builder's Archaeologist will occasionally photograph the resource and plot its location on a PR-A project area map. The Owner will file an amended reporting form with DC HPO.

2) Streetcar-related Infrastructure

There appears to be no potential for the presence of buried remains associated with the District streetcar system within the PR-A project area. However, this section is included to provide guidance in the event that poorly documented remains are encountered within the PR-A project area. In that event, such remains are most likely to be tracks, ties, and signal bases. The Owner anticipates that the typical streetcar track will consist of the electrical-powered third-rail slot system as was typically employed in the District. This track will be considered typical while other track or propulsion systems will be considered atypical.

For the first encounter with a typical slot-style track, the Design-Builder's Archaeologist will conduct a site visit to take descriptive measurements as needed (length, width, etc.), prepare a drawing of the resource in plan and if appropriate profile view, plot location of the find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

For recurrent encounters with the slot-style track category, the Design-Builder's Archaeologist will conduct a site visit to take descriptive measurements as needed (length, width, etc.), plot location of the find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

For other propulsion systems or unique track alignments (intersections, side tracks, spurs, and the like) the Design-Builder's Archaeologist will conduct a site visit to take descriptive measurements as needed (length, width, etc.), prepare a drawing of the resource in plan and if appropriate profile view, plot location of the find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

Once completed, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of the Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. If the resource constitutes a typical or ordinary example previously reviewed by DC HPO, the Owner will provide notice to DC HPO that construction activities will resume immediately after documentation has been completed. If the resource is unique, DC HPO will review the submitted documentation material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

If the resource continues along the same street, the Design-Builder's Archaeologist will continue to visually inspect the feature during construction excavations to determine that no unusual characteristics (track intersections, sidings, unusual propulsion systems, and the like) are present. If none are present, the Design-Builder's Archaeologist will occasionally photograph the resource and plot its location on a PR-A project area map. The Owner will then file an amended reporting form with DC HPO.

Artifact Deposits

Artifacts from fill deposits or other disturbed deposits shall not be documented or recovered during the construction. However, the Owner recognizes the potential for the presence of artifacts, Historic and Native American, to be present below fill deposits. Potential artifact concentrations include building demolition debris, bottle dumps, other historic artifact deposits, and deposits of Native American artifacts. The Design-Builder shall document and recover artifact concentrations for Historic period artifacts. Single Historic period items, especially of poorly known context, shall not be documented or recovered. All Native American artifacts from non-fill deposits shall be documented and recovered.

1) Building Demolition Debris
Typically this category will consist of deposits of disarticulated bricks and perhaps concrete. The debris field could indicate the presence of a foundation below the debris or it could have been used as fill.

The Design-Builder's Archaeologist shall remove loose debris from find, photograph, take descriptive measurements as needed (length, width, etc.), plot location of find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

Once completed, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of an updated Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

2) Bottle Dump
Bottle dumps are evidence of historic trash disposal and are often located in low areas such as filled ravines. The bottles often provide a great deal of significant historical information. Bottle dumps that are demonstrably less than 50 years in age will not be documented.

The Design-Builder's Archaeologist shall conduct a site visit to collect an adequate sample of the bottles, identify the depositional context of the find, plot the location of the find on a PR-A project area map, and prepare a Feature Documentation Form. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the find within the LOD.

Once completed, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of an updated Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

3) Other Historic Artifacts
Deposits of Historic artifacts in non-fill contexts can provide significant information on the lives of ordinary citizens of the District. Such deposits can include kitchen-related and personal items ranging from broken dishes to buttons and shoes that are demonstrably greater than 50 years in age.

The Design-Builder's Archaeologist shall remove loose debris from the area, photograph, take descriptive measurements as needed (length, width, etc.), and plot the location of the find on a PR-A project area map. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the artifact deposits within the LOD.

The Design-Builder's Archaeologist shall direct excavations of the artifact-bearing deposits. Up to 2% of the area of the deposits shall be recovered to serve as a sample for the mitigation of construction-related impacts to the remainder of deposits, if all shall not be excavated. Excavations shall be completed in a controlled manner by one (1) by one (1) meter test unit. Excavations shall proceed in ten (10) centimeter levels with all soils screened through ¼-inch mesh. Vertical stratigraphic profiles shall be drawn and photographed and appropriate documentation forms (Test Unit and Level) completed.

Once completed, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of an updated Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

4) Native American Artifacts

Native American artifacts are often difficult to identify, but include such things as stone tools (projectile points, scrapers, drills, etc.), pottery fragments, fire-cracked rock, and stone tool manufacturing debris.

The Design-Builder's Archaeologist shall remove loose debris from the area, photograph, take descriptive measurements as needed (length, width, etc.), and plot the location of the find on a PR-A project area map. The Design-Builder's Archaeologist will advise DC HPO as to whether it is likely that the feature extends beyond current limits of excavation. The Design-Builder's Archaeologist may require use of a backhoe or other excavator to expose the artifact deposits within the LOD.

The Design-Builder's Archaeologist shall direct excavations of the artifact-bearing deposits. Up to 2% of the area of the deposits shall be recovered to serve as a sample for the mitigation of construction-related impacts to the remainder of deposits, if all shall not be excavated. Excavations shall be completed in a controlled manner by one (1) by one (1) meter test unit. Excavations shall proceed in ten (10) centimeter levels with all soils screened through ¼-inch mesh. Vertical stratigraphic profiles shall be drawn and photographed and appropriate documentation forms (Test Unit and Level) completed.

Once completed, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of an updated Unanticipated Archaeological Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities.

If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

Archaeological Monitoring at Map Key Areas 3 and 26

Kreisa et al. (2016) identified two areas with heightened potential for the presence of archaeological resources at which green infrastructure facilities will be placed. Designated Map Key Areas 3 and 26 on Figure 1, the two areas are locations of mid-nineteenth century farmsteads (see Figure 2). Map Key Area 3, north of the intersection of 39th Street NW and W Street NW, is the location of the easternmost two structures depicted on the 1861 Boschke map as belonging to J.G. Dashiel. Both alley and parking lane permeable pavement, with the potential to disturb the initial 5 feet below surface, will be installed in this area. Map Key Area 26, west of the intersection of Tunlaw Road NW and Benton Street NW, is the location of two unnamed structures depicted on the 1861 Boschke map. Both planter bioretention and parking lane permeable pavement, with the potential to disturb the initial 7 feet and 5 feet below surface, respectively, will be installed in this area.

The Owner or designated representative will inform DC HPO of the intent to have the Design-Builder's Archaeologist monitor all construction-related excavations at these two locations 24 hours prior to the initiation of any such excavations. The Design-Builder's Archaeologist will monitor all construction-related excavations until such a time as in the professional opinion of the Design-Builder's Archaeologist, the location has no potential for the presence of archaeological resources.

If during monitoring the Design-Builder's Archaeologist determines that an archaeological resource is present, the normal work flow described in the Notification Procedures and Documentation sections will be followed. The DC HPO will be contacted and the appropriate field investigation technique and documentation will be identified, generally conforming to those discussed here for Structural Remains, Infrastructure Remains, or Artifact Deposits. DC HPO will have the opportunity to conduct a site visit prior to or during the archaeological field investigations. Upon completion of the field visit, the Design-Builder's Archaeologist will compile all appropriate documentation as defined for Structural Remains, Infrastructure Remains, or Artifact Deposits. The Owner will provide such documentation to DC HPO by transmittal of the Unanticipated Archaeological Discovery Reporting Form and associated documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

Human Remains

When human remains are located, regardless of the categories that follow, the first step is always to stop work and inform the District police.

1) Modern Human Remains

Modern human remains will typically be on or just below the surface with no indications of the presence of a coffin. If modern human remains are uncovered, this is a potential crime scene. No involvement of the Owner, the Design-Builder, or DC HPO is required. The Design-Builder is restricted in conducting work until the area is released by the Police.

There are no documentation requirements for modern human remains.

2) Historic Human Remains
Historic period buried human remains will most likely be skeletal elements that are associated with a coffin or coffin furniture (metal parts of a coffin left after the wood has decomposed). If Historic period buried human remains are uncovered, the Design-Builder is restricted in conducting work until the area is released by the District Police and District's Office of the Chief medical Examiner (OCME). The Design-Builder is to stop work and immediately contact the District Police (who in turn will contact the OCME) and the Design-Builder's Archaeologist. The Owner will notify DC HPO concurrently of the find by phone and email.

After release of the location by District Police, and assuming that the District Police and/or OCME have not collected the remains, the Design-Builder's Archaeologist shall begin the recovery of the burial. The Design-Builder's Archaeologist shall include a forensic anthropologist on a field team to hand excavate both the remains and any coffin or coffin furniture elements that are present. All remains and coffin/coffin furniture shall be recovered. The burial shall first be completely exposed and documented by photographs and line drawings. Remains shall be documented on a Skeletal Inventory From provided by the Design-Builder's Archaeologist. After removal of the remains, any remaining coffin/coffin furniture elements shall be exposed and documented through photographs, line drawings, and on a Burial Inventory Form or Archaeological Feature Form provided by the Design-Builder's Archaeologist. Any soils removed to expose either the burial or coffin/coffin furniture shall be screened through ¼-inch mesh.

DC HPO will field verify that proper removal and documentation has been conducted within 24 hours of notification by the Owner of completion of field recovery. Once recovery is complete, the Design-Builder's Archaeologist shall inform DC HPO and the Owner that all necessary field documentation has been completed by transmittal of the Unanticipated Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

Upon removal, the Design-Builder shall transport the skeletal remains and coffin/coffin furniture to a secure facility for further documentation, to include determination of age, sex, race, and pathologies, if present. Upon completion of the analysis, the Owner shall consult with DC HPO regarding the final disposition of the remains and notify the Design-Builder of the appropriate disposition. With Owner approval, the Design-Builder shall follow procedures provided by the Owner and approved by DC HPO.

3) Native American
Native American buried human remains will most likely be poorly preserved skeletal elements with no coffin or coffin furniture present. The remains may be positioned in any number of ways, but typically not prone. If Native American buried human remains are uncovered, the Design-Builder is to stop work and immediately contact the District Police (in turn notifying OCME) and the Design-Builder's Archaeologist. The Owner will notify DC HPO concurrently of the find by phone and email. The Owner is restricted in conducting work until the area is released by the District Police.

After release of the location by the District Police, and assuming that the District Police and/or OCME have not collected the remains, the Design-Builder's Archaeologist shall begin the recovery of the burial. The Design-Builder's Archaeologist shall include a forensic anthropologist on a field team to hand excavate both the remains and any funerary artifacts that are present. All remains and funerary artifacts shall be recovered. The burial shall first be completely exposed and documented by photographs and line drawings. Remains shall be documented on a Skeletal Inventory From provided by the Design-Builder's Archaeologist. Following removal of the skeletal remains, any remaining funerary items shall be excavated and removed. If not already photographed and included in line drawings and form documentation, the funerary items shall be documented on a Burial Inventory Form or Archaeological Feature Form provided by the Design-Builder's Archaeologist, prior to removal.

DC HPO will field verify that proper removal and documentation has been conducted within 24 hours of notification by the Owner of completion of field recovery. Once recovery is complete, the Design-Builder's Archaeologist informs DC HPO and the Owner that all necessary field documentation has been completed by transmittal of the Unanticipated Discovery Reporting Form and other appropriate documentation. Such materials may also include an archaeological site form, if requested by DC HPO. DC HPO will review the submitted material and if appropriate, provide the Owner with a notice to proceed with construction activities. If DC HPO has not responded within one business day after receipt of the material, construction activities at the find site shall be resumed.

Upon removal, the Design-Builder shall transport the skeletal remains and funerary items to a secure facility for further documentation, to include determination of age, sex, race, and pathologies, if present. Upon completion of the analysis, the Owner shall consult with DC HPO regarding the final disposition of the remains and notify the Design-Builder of the appropriate disposition. With Owner approval, the Design-Builder shall follow procedures provided by the Owner and approved by DC HPO.

VI. Artifact Analysis

If artifacts are collected, the items shall be cleaned, inventoried, and analyzed. The artifacts shall be labeled and packaged in accordance with the DC Preservation League's *Guidelines for Archaeological Investigations in the District of Columbia*. Based on the type of artifacts recovered (e.g., Historic period or Native American), the Design-Builder's Archaeologist shall select, for approval by the Owner, an appropriate artifact analysis regime. In general, the analysis shall identify artifact types and time periods of manufacture. The results of the artifact analysis shall be reviewed and organized to address project goals and shall be documented in a technical report of investigations. These materials shall be temporarily-stored in a climate controlled and secure archaeology laboratory and shall be transferred, along with any digital files such as photographs, GPS and GIS files, and artifact databases, among others, to DC HPO or the landowner (if not the District of Columbia) upon completion of the project.

VII. Documentation

In the event of an unanticipated discovery, the Owner will consult with DC HPO to determine whether an Archaeological Site Form will be completed. Upon completion of all required field documentation, the Design-Builder's Archaeologist will complete and provide to DC HPO an Unanticipated Discovery Reporting Form.

Upon completion of all PR-A GI-associated ground disturbing activities, the Design-Builder's Archaeologist will prepare a draft Technical Report that combines all results of unanticipated discoveries and monitoring investigations. This report will be prepared in accordance with DC Preservation League's *Guidelines for Archaeological Investigations in the District of Columbia* as outlined here:

- Introduction, including the results of previous investigations;
- Field and Laboratory Methods;
- Historic Context;
- Research Design, including specific research questions appropriate to the historic context;
- Results of Field Investigations;
- Results of Artifact Analysis, including any specialized analyses conducted;
- Summary and Recommendations, which will address the proposed research questions and provide NRHP evaluations;
- References Cited;
- Artifact Catalog;
- Copies of all archaeological site forms and Unanticipated Discovery Reporting Forms.

VIII. References cited

Boschke, A.

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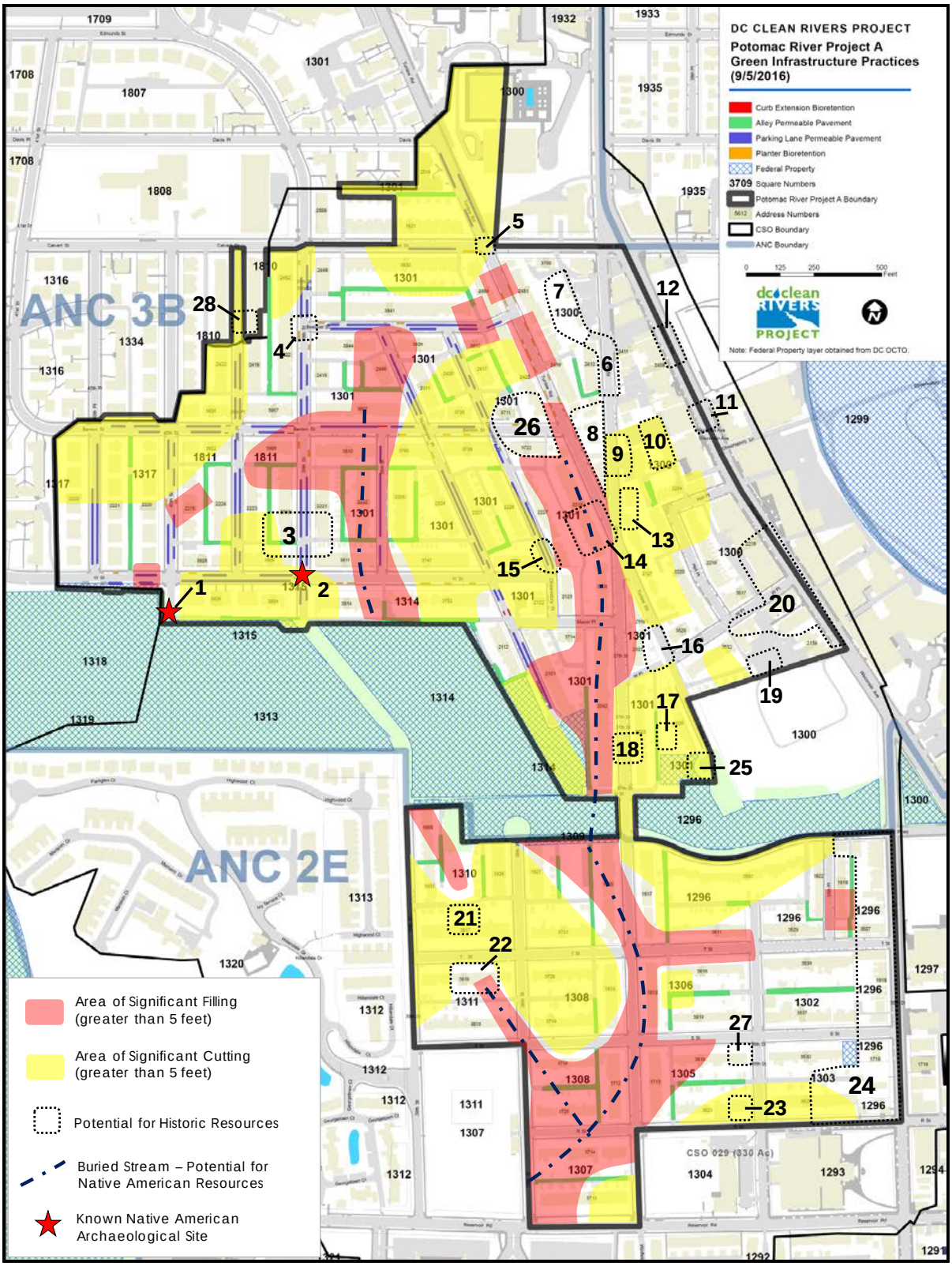

Figure 1: PR-A GI locations of green infrastructure facilities, areas of potential archaeological resources, and Map Key Areas 3 and 26 recommended for monitoring.

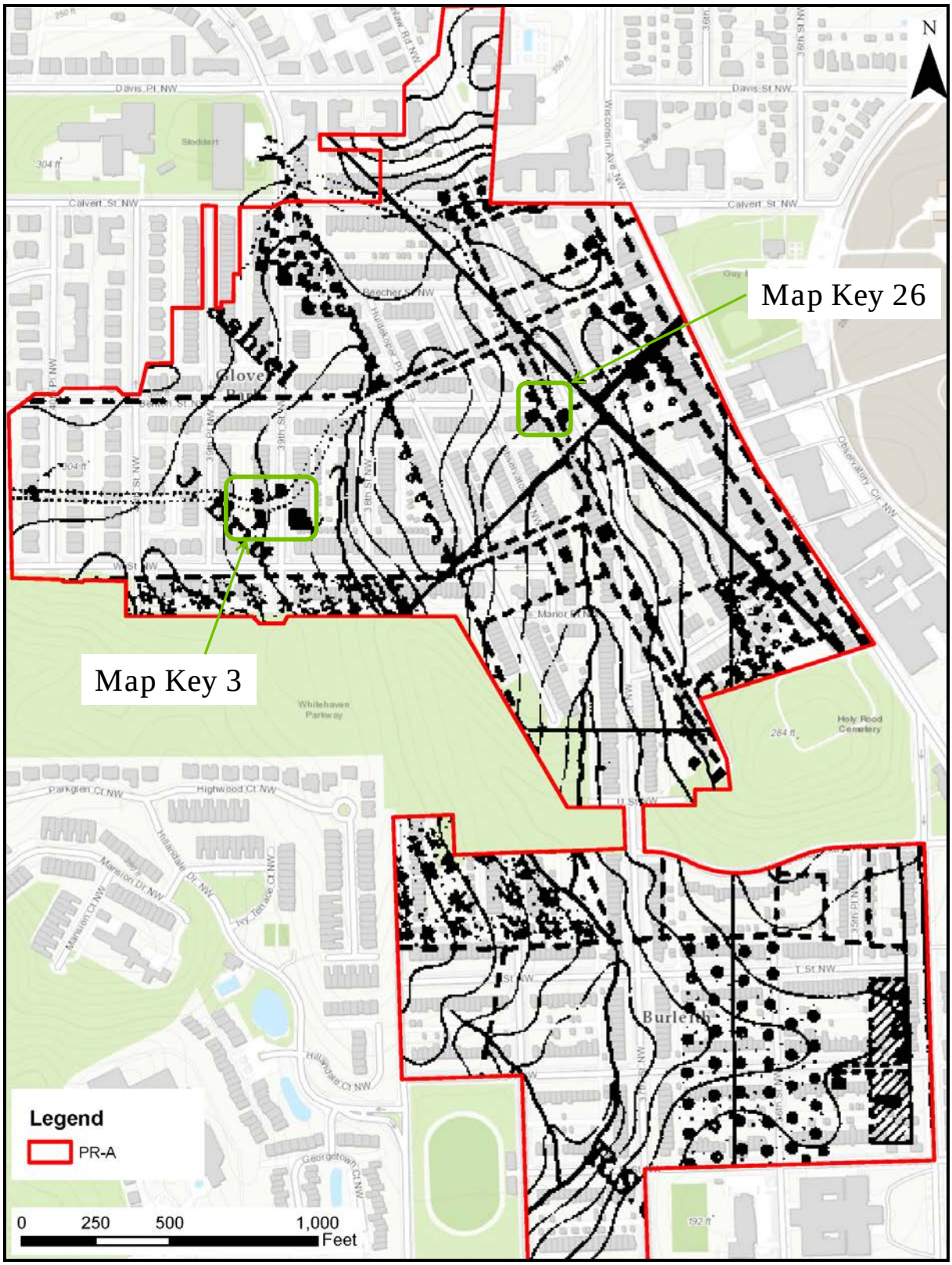

Figure 2: 1861 Boschke map with Map Key Areas 3 and 26 highlighted.

APPENDIX M

HISTORIC PRESERVATION DOCUMENTATION

SECTION 9B ASSESSMENT OF EFFECTS

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

DC CLEAN RIVERS PROJECT
GREEN INFRASTRUCTURE

SECTION 9B ASSESSMENT OF EFFECTS REPORT
POTOMAC RIVER PROJECT A

August 2016

Prepared for:

Prepared by:

Program Consultants Organization
Blue Plains Advanced Wastewater Treatment Plant
5000 Overlook Avenue, SW
Washington, DC 20032

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Abbreviations

Amended Consent Decree	First Amendment to Consent Decree (January 2016)
APE	Area of Potential Effect
APP	Alley Permeable Pavement
AOE	Assessment of Effects
CBR	Curb Extension Bioretention
Consent Decree	2005 Consent Decree
CSO	Combined Sewer Overflow
DCCR	DC Clean Rivers Project
DC Inventory	DC Inventory of Historic Sites
DC SHPO	DC State Historic Preservation Office
DC Water	District of Columbia Water and Sewer Authority
DOE	Determination of Eligibility
DOJ	Department of Justice
EPA	Environmental Protection Agency
GI	Green Infrastructure
LTCP	Long Term Control Plan
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PBR	Planter Bioretention
PPP	Parking Lane Permeable Pavement
PR-A	Potomac River Project A

All photographs, tables, and figures, unless otherwise noted, were created by EHT Traceries in 2016.

1 Introduction

The District of Columbia Water and Sewer Authority (DC Water) has proposed green infrastructure (GI) projects for implementation in the Potomac River sewershed, known as Potomac River Project A (PR-A). This assessment of effects (AOE) documents the impacts anticipated from the different types of GI on historic and cultural resources throughout PR-A area. Potential effects will be evaluated for designated, eligible, and potentially eligible historic resources listed in the National Register of Historic Places (NRHP) and the DC Inventory of Historic Sites (DC Inventory).

Since 1996, DC Water has been an independent authority of the District of Columbia providing water conveyance and wastewater treatment services to the District and regional customers. The DC State Historic Preservation Office (DC SHPO) reviews DC Water projects under Section 9B of DC Law 2-144 *Historic Landmark and Historic District Protection Act* of 1978, as amended March 2, 2007, and its implementing regulations "District of Columbia Municipal Regulations Title 10A Historic Preservation." The legislation and its implementing regulations direct the Mayor, heads of subordinate agencies, or heads of independent agencies with jurisdiction over an undertaking to take into account the effect of that undertaking on properties listed in or eligible for listing in the DC Inventory and/or the NRHP.

1.1 Project Background

DC Water is implementing a Long Term Control Plan (LTCP), also referred to as the DC Clean Rivers Project (DCCR), in order to reduce combined sewer overflows (CSOs) to the Anacostia and Potomac Rivers and Rock Creek. DCCR is being implemented in accordance with the first amendment to the Consent Decree (Amended Consent Decree), which was amended in January 2016 and supersedes the 2005 Consent Decree (Consent Decree).

DCCR is comprised of a variety of projects including pumping station rehabilitation, targeted sewer separation, a system of underground storage/conveyance tunnels, and GI. The project currently under consideration, PR-A, is the second of several projects planned by DC Water which will use GI to reduce CSOs. Rock Creek Project A was previously submitted for review.

PR-A falls within the Potomac River GI Area which includes the sewersheds that drain to CSOs 027, 028, and 029 outfall structures, where a combination of stormwater and wastewater (combined sewage) discharges to the Potomac River during heavier rain events. Prior to the start of the LTCP's implementation, the outfall structures discharged 953 million gallons of combined sewage to the Potomac River in an average year. DCCR is required to reduce this volume and the volume discharged from the forty-seven active CSOs in the District by ninety-six percent system wide.

As indicated in the Amended Consent Decree, GI will be constructed in the Potomac River GI Area to manage 133 impervious acres to the 1.2 inch retention standard. The 1.2 inch retention standard is defined as the volume of runoff equivalent to 1.2 inches of rain falling on an impervious surface.

The Amended Consent Decree's requirements for the Potomac River GI Area indicate that the GI implementation will be broken down into three contracts which will be phased for planning and construction. The PR-A project is the first GI project for the Potomac River sewershed and is designed to

meet the Amended Consent Decree requirement to manage 1.2 inches of stormwater runoff from the first forty-four impervious acres of the total 133 impervious acres needed for the Potomac River GI Area.

1.2 Proposed Undertaking

As part of DC Water's LTCP to reduce CSOs to the District waterways, DCCR intends to construct GI facilities in northwest Washington, DC. The PR-A Project Area is a small area within the larger Potomac River GI Area that is being used at this time to test the effectiveness of the GI technologies in capturing stormwater during rain events and allowing the excess stormwater that does not infiltrate into the soils below to flow into the sewer system at an appropriate rate.

Specific locations and types of facilities to be constructed are presented in this report and include bioretention, permeable pavement, and subsurface storage. The bioretention facilities have been sited in existing green spaces between the roadway and sidewalk (i.e., existing planting strips, referred to as Planter Bioretention or PBR) or extended into the roadway (referred to as Curb Extension Bioretention or CBR). The permeable pavement has been sited in the parking lanes along streets (referred to as Parking Lane Permeable Pavement or PPP) and in alleys (referred to as Alley Permeable Pavement or APP).

1.3 Project Area

PR-A is located within the Glover Park/Burleith neighborhoods in northwest Washington, DC. The project area, which is partially bisected by Whitehaven Parkway, part of Glover-Archbold Park, is located mostly to the south of Calvert Street NW, to the west of Wisconsin Avenue NW, and Thirty-Fifth Street NW, to the east of the Forty-First Street NW, and Thirty-Ninth Street NW, and to the north of Reservoir Road NW. The project area as it sits within the Potomac River GI Area is outlined in **Figure 1.1**.

In all, PR-A covers approximately 130 acres of land. The neighborhoods within the PR-A area are residential in nature, with a variety of single and multi-family dwellings, including single-family houses, duplexes, and attached rowhouses. A variety of architectural styles are evident in these buildings, including Colonial Revival, Tudor Revival, Craftsmen, and Art Deco. The neighborhoods are cohesive in scale and architectural style and appear to retain much of the integrity associated with the original construction of the houses, with limited visible alterations and/or additions.

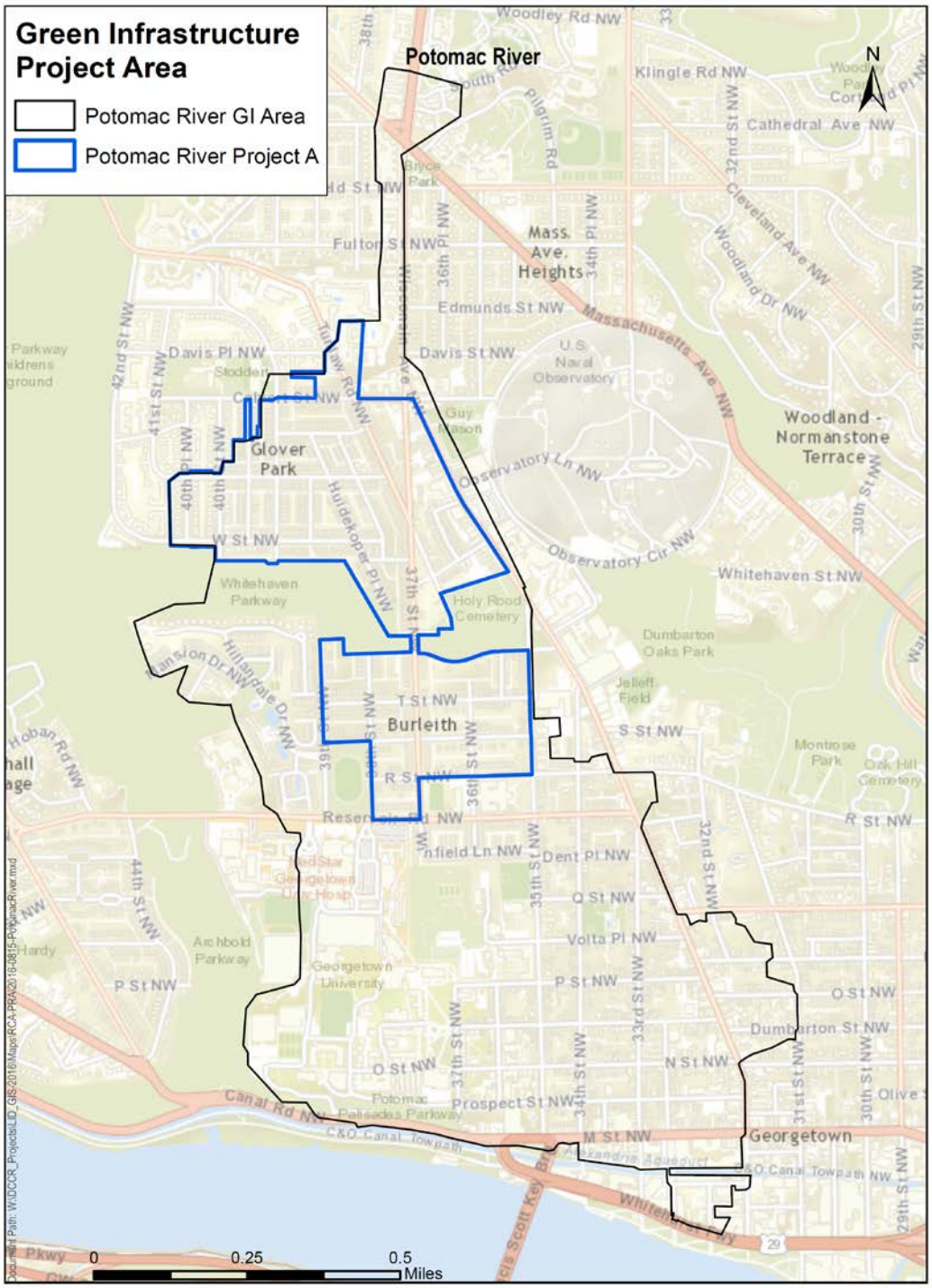

Figure 1.1: Potomac River GI Area and Potomac River Project A – PR-A
(DC Water, 2016)

1.4 Methodology

In order to meet the Amended Consent Decree schedule, this report was undertaken in a way to assess effects as quickly and efficiently as possible. In consultation with DC SHPO, it was assumed that all resources are potentially eligible for listing on both the DC Inventory and NRHP. This approach allows the AOE to be written prior to completing the research required for the full Determinations of Eligibility (DOE) for potentially eligible resources within the project boundaries. Once this initial report is complete, DOEs will be prepared for the following resources: Glover Park neighborhood, Burleith neighborhood, Holy Rood Cemetery, and the Western High School Field House. Pending the completion of the DOEs on these properties, this report will be revised if any resources are determined not to be eligible.

Research was conducted on previously undocumented resources, which included permits to build from the Martin Luther King, Jr., Memorial Library, Washingtoniana Room, newspaper research, photo and print research, and map research.

1.5 Report Organization

The following report outlines the Area of Potential Effect (APE), identifies the potential and designated historic resources within the APE, describes the GI technologies to be implemented within the project area and their proposed locations, and assesses the effects these technologies would have on the surrounding resources.

The complete drawing set for PR-A can be found in **Appendix A** of this report.

2 Identification of Historic Resources

Section 9B regulations define a historic property as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the DC Inventory and/or the NRHP. The identification of resources within the defined APE was conducted through review of existing documentation, on-site survey, and consultation with DC SHPO.

2.1 Delineation of Area of Potential Effect

The APE encompasses a geographic area where potential adverse effects on historic properties may occur as a result of the project.

The APE for this project was delineated to include views and viewsheds to and from the surrounding area. The boundaries reflect the outer limits from which views towards the proposed GI technologies may reasonably generate visual effects, particularly along major streets and vistas. These visual impacts will not be far reaching as the GI technologies will not reach higher than eighteen inches. Thus the APE follows the same boundary as the PR-A Project Area boundary almost exactly, seen in **Figure 2.1**.

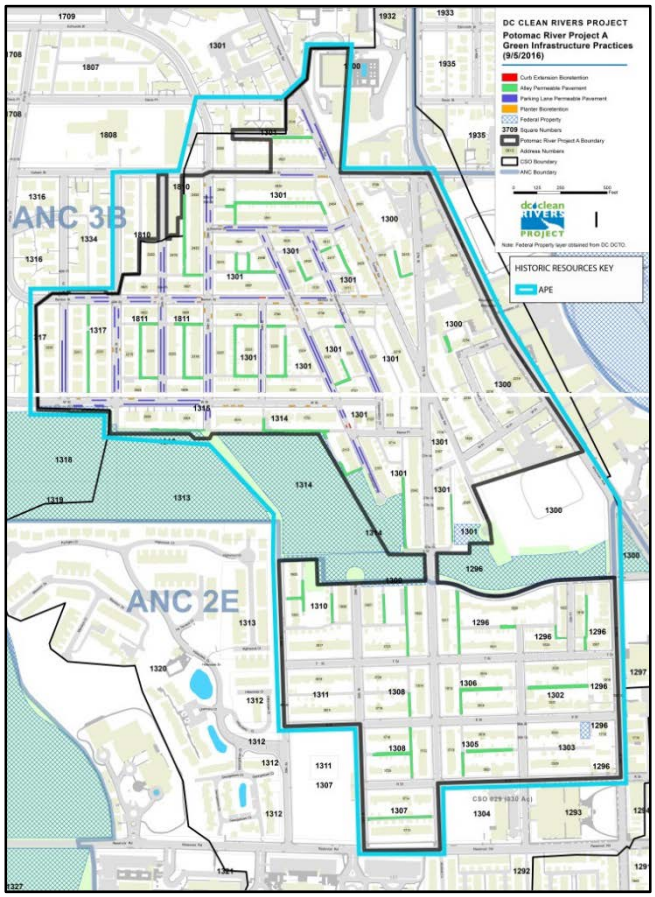

Figure 2.1: Area of Potential Effect for PR-A
(DC Water, 2016)

2.2 Identification of Historic Resources

The following are NRHP and DC Inventory listed, eligible, or potentially eligible historic resources that are located within the APE of the project, which, as mentioned above in **Section 2.1**, follows the boundaries of the project area.

2.2.1 Stoddert Elementary School

Date: 1932

Architect: Albert L. Harris

Designation: Determined Eligible for Listing in DC Inventory and NRHP

The Stoddert Elementary School, shown in **Image 1,** is located at 4001 Calvert Street NW. The oldest portion of the school was constructed in 1932, and was designed by Municipal Architect Albert L. Harris (1869-1933). Harris was the second Municipal Architect of the District. He served from 1921 until his death in 1933. Born in Wales, Harris immigrated to Pittsburg in 1893, but got his start as an architect in the Chicago firm of Henry Ives Cobb. In 1898, he moved to Baltimore to join the firm Wyatt & Nolting, and then moved on to Washington, DC in 1900 where he joined the firm Hornblower & Marshall. At this position he worked on the Museum of Natural History in DC and the U.S. Customs House in Baltimore. He graduated with a formal degree in architecture from George Washington University in 1912 and began to teach at the school. Harris also went on to teach at Catholic University, and in 1920 began to work for then Municipal Architect Snowden Ashford. Harris would go on to take over Ashford's position the following year.

During his tenure as Municipal Architect, Harris worked on multiple municipal buildings, including firehouses, field houses, and most notably schools. As Municipal Architect, some of his more notable designs include the Bird House (1928) and Reptile House (1931) at the National Zoological Park, Gallinger Municipal Hospital (also known as Hospital Square, 1923) and the Palisades Firehouse (Engine Company No. 29, 1925). He also greatly contributed to the George Washington University campus, including Corcoran Hall (1922), Stocktan Hall (1922), and Hattie M. String Hall (1922). A few of the schools he contributed to include Western High School (now known as the Duke Ellington School for the Arts, 1925 addition), Blanche Kelso Bruce School (1927 addition), Janney Elementary School (1925), Chain Bridge Road School (1923), and Stoddert Elementary School (1932). Harris' range of buildings covered a

Image 1: View of Stoddert Elementary School, looking north\west.

range of architectural styles, including Renaissance, Gothic, Elizabethan, and Colonial Revival.

Stoddert was one of his last school designs and he utilized his heavily favored Colonial Revival design for the school building. By the 1930s, Harris had moved on from standard eight classroom school houses, to the larger sixteen to twenty room buildings employed at Stoddert. Despite a major rear addition executed recently, the school retains it simple and elegant Colonial Revival elements, including its stone quoins, round, divided-light arched window, Tuscan-column entry porch, classical entablature, and pedimented roof. The school was determined eligible by the DC SHPO under the Multiple Property Listing, *Public School Buildings of Washington, D.C., 1862 to 1960*, as an example of Property Sub-Type No. 5: The Office of the Municipal Architect, Albert L. Harris, 1921 to 1934, (DC SHPO 2009). As the building continues to retain its integrity, location, design, workmanship, and association, and continues to be an excellent example of public architecture and the design aesthetic of the middle of the twentieth century, Stoddert Elementary School is eligible for listing in both the NRHP and the DC Inventory.

2.2.2 Whitehaven Parkway

Date: 1913-1935

Designation: Potentially Eligible for Listing in DC Inventory and NRHP

Image 2: East section of Whitehaven Parkway at the corner of Whitehaven Parkway NW and Thirty-Seventh Street NW, looking west.

The Whitehaven Parkway, seen in **Image 2**, is located in northwest Washington, DC. It is located north of the neighborhood of Burleith, south of the neighborhood of Glover Park, and east of Glover-Archbold Park. Whitehaven Parkway is one of various parkways that reflects the culmination of various national trends at the turn of the twentieth century in Washington, DC, the City Beautiful movement's emphasis on integrated urban green space, the advent of automobiles, and the rapid development of road systems and popularity of outdoor recreation. The development of parkways in the District were guided by the McMillan Commission's recommendation to extend the scheme of parks and parkways, as presented by Pierre L'Enfant.

Ancillary to the major parkways along the Potomac River and Rock Creek are a number of related "strip" or "border" parks. Whitehaven Parkway is considered a minor park and parkway system that failed to materialize west of Rock Creek. While it was conceived to extend from the Palisades Park to Massachusetts Avenue NW, through the Glover-Archbold Park. Today it exists merely as a road leading to the park, then as a green extension of the park, and then again as a brief parkway that ends as Wisconsin Avenue NW.

Under the Multiple Property Listing, *Parkways of the National Capital Region, 1913-1965*, Whitehaven Parkway is potentially eligible for listing in the DC Inventory and the NRHP. Though the strip park was

never constructed to its full intended design, the remnants still provide a glimpse into the intention of the City Beautiful Movement and the National Capital Planning Commission and the National Park Service's concerted efforts to weave parkland throughout Washington, DC.

2.2.3 Burleith Neighborhood

Date: 1870s through 1930s

Designation: Potentially Eligible for Listing as a Historic District in the DC Inventory and NRHP

Burleith is located in northwest Washington, DC. The mostly rectangular-shaped neighborhood is bound to the north by Whitehaven Parkway, to the east by Thirty-Fifth Street NW, the south by Reservoir Road NW, and to the west by Thirty-Ninth Street NW. The neighborhood is immediately surrounded by the Glover Park to the north, Georgetown to the south and east, and Hillandale to the west. Burleith and Hillandale are often mistaken as one neighborhood. However, the neighborhoods were subdivided at separate times and by separate developers.

Though there was settlement on the land known as Burleith as early as the mid eighteenth century, the area was not formally subdivided until the late nineteenth century. After moving to Washington, railroad baron Frederick W. Huidekoper acquired the land known as Burleith and began to subdivide the tract. The first subdivision occurred on March 25, 1887, and included T Street NW (historically W Street), R Street NW (historically U Street), Thirty-Ninth Street NW, Thirty-Eighth Street NW, Thirty-Seventh Street NW, Thirty-Sixth Street NW, and S Street NW (historically V Street). On July 14, 1887, the subdivision was expanded to include U Street NW (historically Y Street), and to include more sections of T Street NW (W Street), Thirty-Ninth Street NW, Thirty-Eighth Street NW, Thirty-Seventh Street NW, Thirty-Sixth Street NW, and S Street NW (historically V Street). The final subdivision of the neighborhood occurred several years later, on May 12, 1891. This final subdivision expanded the boundaries of the Burleith neighborhood south to Reservoir Road NW (historically New Cut Road), and east to Thirty-Fifth Street NW (LOC 2002).

Image 3: The north side of 3600 block of S Street NW, looking east, in the Burleith neighborhood.

Building permits for the neighborhood show a variety of single-family detached and attached multi-family dwellings , seen in **Image 3**, that mostly date from the early twentieth century into the mid twentieth century. The majority of this neighborhood was developed during the mid-1920s and features buildings that were built by the firm Shannon & Luchs Construction Company and the designs were executed by their architect Arthur B. Heaton (1875-1951), a prolific local Washington, DC architect.

Heaton worked for Shannon & Luchs from 1917 to 1932 and between 1923 and 1928, together they constructed over 500 homes in the Burleith neighborhood. The development departed from many of Washington's traditional rowhouse neighborhoods, adding architectural distinction and variation. The promotional brochure prepared by Shannon & Luchs in 1926 touted the "ideal location" of Burleith as "adjacent to historic old Georgetown," with the southern boundary "formed by the holdings of two great educational institutions: Georgetown University and the Convent of the Visitation." The western border, the brochure continued, "is the magnificent estate of the Archbold family," which, "it has been intimated," will be "given to the city to form a part of Glover-Archbold Parkway," and to the north are "tracts recently purchased by the U.S. Government for purposes of forming a connecting link between Glover-Archbold Parkway and the Rock Creek Park system" (Shannon & Luchs 1926). Heaton, already a well-established architect by the time he came under employ with Shannon & Luchs, utilized multiple design aesthetics to create an engaging and aesthetically pleasing neighborhood. The styles he implemented in Burleith include Traditional English and Italian styles, Colonial Revival, Tudor, and even Beaux Arts, although this is less prevalent in the Burleith neighborhood.

Burleith is potentially eligible for listing in the NRHP and DC Inventory as the product of Washington, DC developer Shannon & Luchs. The neighborhood remains largely intact, with few additions and alterations to the cohesive neighborhood design, and continues to remain an "ideal location" in the city of DC. The neighborhood is also potentially eligible as an intact collection of buildings designed by famed architect Arthur B. Heaton.

2.2.4 Glover Park Neighborhood

Date: 1890s through late 1930s

Designation: Potentially Eligible for Listing as a Historic District in DC Inventory and NRHP

The neighborhood of Glover Park is located in northwest Washington, DC. Today, the irregularly shaped neighborhood is bound by Fulton Street NW, to the north, Wisconsin Avenue NW, to the east, Whitehaven Parkway to the south, and Glover-Archbold Park to the west. The neighborhood is immediately surrounded by Cathedral Heights to the north, Massachusetts Heights to the northwest, Woodley Park and Observatory Circle to the east, and Burleith to the south.

Image 4: The south side of 3800 block of Calvert Street NW, looking west, in the northern portion of Glover Park.

The present day neighborhood of Glover Park includes the historic northern extension of Georgetown. The boundaries of this subdivision were Tunlaw Road NW, (historically Back Street) to the west, to the northeast Wisconsin Avenue NW, (historically High Street), to the east Thirty-Fifth Street NW (historically Fayette Street),

and to the south Whitehaven Parkway (historically West Street). In 1907, the 104-acre tract of land owned by butcher Henry Kengla was auctioned. The estate was purchased by Charles Carroll Glover and the remaining tract of land was subdivided between 1925 and 1937.

Building permits for the neighborhood show a variety of single-family detached and attached dwellings, multi-family dwellings, public, and commercial buildings that mostly date from the late-nineteenth century into the mid-twentieth century. The majority of this neighborhood was developed during the early twentieth century into the late 1930s and features a significant number of single-family rowhouses and apartment buildings that were designed by George T. Santmyers (1889-1960), one of Washington's most prolific architects (MLK). An example of a contiguous block of rowhouses can be seen in **Image 4**.

Santmyers, born in Fort Royal, VA, is credited with designing over 15,500 buildings in his almost fifty year career as a Washington, DC architect. Some of his most notable works include Meridian Manor at 1424 Chapin Street NW, (1926), 1901 Connecticut Avenue NW, (1927), Macomb Gardens at 2800 Woodley Road NW, (1941), and the Delano at 2745 Twenty-Ninth Street NW, (1941). He executed a range a styles, including Colonial Revival, Tudor Revival, Gothic Revival, Moorish Revival, Art Deco, and Art Moderne, to name a few. Glover Park is one of the largest examples of his work, mainly executed in the Colonial Revival and Tudor Revival styles with Art Deco and Art Moderne apartment buildings.

Glover Park is potentially eligible to be listed in the DC Inventory and NRHP as a historic district as an example of late-nineteenth to mid-twentieth century development with buildings designed by one of the city's most significant architects. The whole of the neighborhood, almost exclusively designed by Santmyers, is one of the most intact collections of Santmyers' work in the city where he was so prolific. Also, the neighborhood retains its integrity as a large percentage of the homes and apartment buildings hold their original Santmyers design and show little evidence of alteration or additions.

2.2.5 Western High School Field House

Date: 1931

Designation: Potentially Eligible for Listing in DC Inventory and NRHP

The north and south cottages, together with the athletic field and track, located at 1600 Thirty-Eighth Street NW, comprise the Field House of the former Western High School. Western High School, now known as Duke Ellington School of the Arts, is located at 3500 R Street NW, two blocks east of the Field House. The building was originally built between 1897 and 1898 by Municipal Architect Harry B. Davis and had athletic fields located directly behind the building. The school rapidly expanded and saw major additions in 1910 and again in 1925 by Municipal Architects Snowden Ashford and

Image 5: The north and south cottages constructed as part of Western High School, taken from the field, looking east.

Albert L. Harris, respectively. These large expansions took away the space for athletic fields directly adjacent to the school building.

In 1925, the current site of the Field House was chosen. However, push back from the neighbors, led by the wealthy and powerful Mrs. Anne Archbold, delayed construction for many years. The Burleith neighborhood largely protested the closing of R Street NW, between Thirty-Eight and Thirty Ninth Streets NW, (*Evening Star* 1928). After six years of legal battles, the Western High School Field House eventually opened on November 22, 1931 (*Evening Star* 1931).

While the building permit has not yet been uncovered, research suggests the building was most likely designed by then Municipal Architect Albert L. Harris. Harris, as previously discussed in this report (see *Stoddert Elementary School*) was the District's second Municipal Architect, and held the position between 1921 and 1933. Designs for public school buildings, including field houses, fell on the municipal architect, suggesting that the Western High School Field House was a Harris design. Harris's Park View Playground and Field House was added to the DC Inventory and NRHP in 2013 for its association with Harris and his purpose-built, public aesthetic, the Colonial Revival design with Tudor elements, and its embodiment of characteristics illustrating the evolution of recreational architecture (NPS 2013). The Western High School Field House, also a public, purpose-built structure, retains its integrity as a recreational building executed in the Colonial Revival style. The building continues to retain its integrity, location, design, workmanship, and association, and, therefore, is potentially eligible for listing in the NRHP and DC Inventory.

2.2.6 Holy Rood Cemetery

Date: 1832-1930s

Designation: Potentially Eligible for Listing in DC Inventory and NRHP

Holy Rood Cemetery, shown in **Image 6**, is located at 2126 Wisconsin Avenue NW, at the southern end of Glover Park neighborhood. It is immediately surrounded by commercial buildings to the north, Wisconsin Avenue NW, to the east, and Whitehaven Parkway to the south and west. The cemetery grounds were founded by Holy Trinity Catholic Church in 1832 as their third burial ground. Originally named the Trinity Church Upper Burial Ground, the cemetery was enlarged in 1850 and again in 1870, when the entrance was moved to Wisconsin Avenue NW, then known as High Street. In the In 1942, Holy Trinity Catholic Church transferred into

Image 6: Holy Rood Cemetery, taken from the center of the cemetery, looking west.

the archdiocese of Washington, and Holy Rood Cemetery was given to Georgetown University, the current owner of the land. The last known plot to be sold was in 1915, but the University did not officially close the cemetery for burials until 1984. At that time, the number of burials at Holy Rood Cemetery was greater than 7,000 (Hoya 2011).

Most of the people interred at Holy Rood are German and Irish immigrants who were parishioners of Holy Trinity Catholic Church. The cemetery is the final resting grounds to several prominent DC businessmen, including tavern owner John Tennally, who founded Tenleytown. It is also possibly the best documented slave burial ground in the District, with over 1,000 free and enslaved African-Americans buried there. As the grave-markers of the salves were probably wooden, they did not survive. However, Holy Trinity Church kept accurate interment records (Fletcher 2002).

Holy Rood Cemetery holds significant historical importance as one of the largest and best documented slave burial grounds in the District of Columbia and, while the markers do not survive, the historical records are still available. The cemetery is potentially eligible to be listed in the DC Inventory and NRHP as a religious space that retains its integrity, location, design, workmanship, and association, as well as being one of the few remaining known slave burial grounds in the city.

3 Green Infrastructure Implementation

3.1 Green Infrastructure Technologies

The PR-A Project Area boundary is located along the western edge of the Potomac River GI Area and includes approximately 130 acres. The project boundary was selected for the following reasons:

- Feasibility of design and construction;
- Desirable monitoring locations; and
- Inclusion of sites with proposed GI implementation.

All of the GI controls in PR-A will be constructed in the public right-of-way, specifically in planter strips, alleys, and roadways. Two different types of GI technology will be used in the project area, including bioretention in the planter strips (PBR) and as curb extensions (CBR) and permeable pavement in the parking lanes (PPP) and in alleys (APP). Subsurface storage may extend beneath sidewalks adjacent to some bioretention. All of these technologies are described below. The locations of GI are shown in **Figure 3.5** below.

3.1.1 Bioretention Facilities

Bioretention facilities are shallow, vegetated depressions that collect runoff, filter, and temporarily detain the runoff before allowing it to infiltrate the in-situ soils or conveying it to a suitable outlet (such as an existing sewer or stormwater pipe). The maximum depth of excavation for bioretention is seven feet, which includes the depressed area, a layer of engineered soil, and an aggregate storage layer. These facilities will include trees, shrubs, perennials, and groundcover plantings. These systems mimic natural hydrology to reduce CSOs.

As in natural systems, water is stored in the spaces between the soil particles and aggregate. Some is used by the plants and re-released to the atmosphere through evapotranspiration and some of this water may infiltrate the ground, depending on existing soil conditions. The remainder is returned to the sewer system via a perforated underdrain at a slower rate.

Two variations on bioretention are currently planned for PR-A:

- Planter Bioretention (PBR) will be located in the existing green space, between the curb and sidewalk. PBR facilities will have an open metal grille/grate around all four sides, which will not exceed eighteen inches in height. Step-out zones will be provided as required when PBRs are adjacent to existing parking. A rendering of the facility can be seen in **Figure 3.1**.

- Curb Extension Bioretention (CBR) will extend the existing curb into the roadway to a width equivalent to the existing parking lane, where appropriate, based on traffic safety studies. CBRs are typically located near intersections and can offer pedestrian safety benefits while managing stormwater. PBR will be combined with CBR between the back of the curb and the sidewalk in some locations where space allows. In these instances, the CBRs will have an open metal grille/ grates around three sides, open to the street, which will not exceed four inches in height. CBRs

will have varying widths, depending on the width of the parking lane, but will always remain within the public right-of-way. A rendering of the facility can be seen in **Figure 3.2**.

Figure 3.1: Rendering of a Planter Bioretention Facility (DC Water, 2016)

Figure 3.2: Rendering of a Curb Bioretention Facility (DC Water, 2016)

3.1.2 Permeable Pavement

Permeable pavement will be used to replace traditional impervious pavements in existing parking lanes and alleys as they offer similar functionality with respect to vehicle and pedestrian traffic. Permeable pavement for the parking lane will be porous asphalt to match the existing surface material along the roadway. In alleys, the surface material will be either porous asphalt, or pervious concrete pavement or pavers, intended to match the existing surface material as closely as possible in each alley.

The maximum depth of excavation for permeable pavement is five feet, which includes the depth of the pavement material itself and required engineered base, and an aggregate storage layer. As with bioretention, water is temporarily stored in the spaces between the aggregate. Some of this water may infiltrate the ground, depending on existing soil conditions, and whether or not an impermeable liner is required to protect existing infrastructure. Perforated underdrains return remaining stormwater volume to the existing underground sewer infrastructure at a slower rate.

Two variations of permeable pavement are currently planned for PR-A:

- Permeable pavement currently proposed in existing parking lanes, is referred to as Parking lane Permeable Pavement (PPP). All PPP built in this project will remain within the public right-of-way. A rendering of the facility can be seen in **Figure 3.3**.

- Permeable pavement currently proposed in alleyways is referred to as Alley Permeable Pavement (APP). All APP built in this project will remain within the public right-of-way. A rendering of the facility can be seen in **Figure 3.4**.

Figure 3.3: Rendering of a Parking Lane Permeable Pavement Facility (DC Water, 2016)

Figure 3.4: Rendering of an Alley Permeable Pavement Facility (DC Water, 2016)

3.1.3 Subsurface Storage

Subsurface storage will be used to store stormwater beneath the sidewalks adjacent to some bioretention facilities. Capturing the excess runoff and redistributing it back into the sewer system at a slower rate will aid in the control of overflows. Subsurface storage consists of gravel laid underneath the sidewalk, which will be replaced in kind when construction is complete. Because it is an extension of bioretention, water is temporarily stored in the spaces between the aggregate, just like bioretention. Some of this water may infiltrate the ground, depending on existing soil conditions, and whether or not an impermeable liner is required to protect existing infrastructure. Perforated underdrains return remaining stormwater volume to the existing underground sewer infrastructure at a slower rate. Where executed, the sidewalks will be replaced in kind after construction is completed.

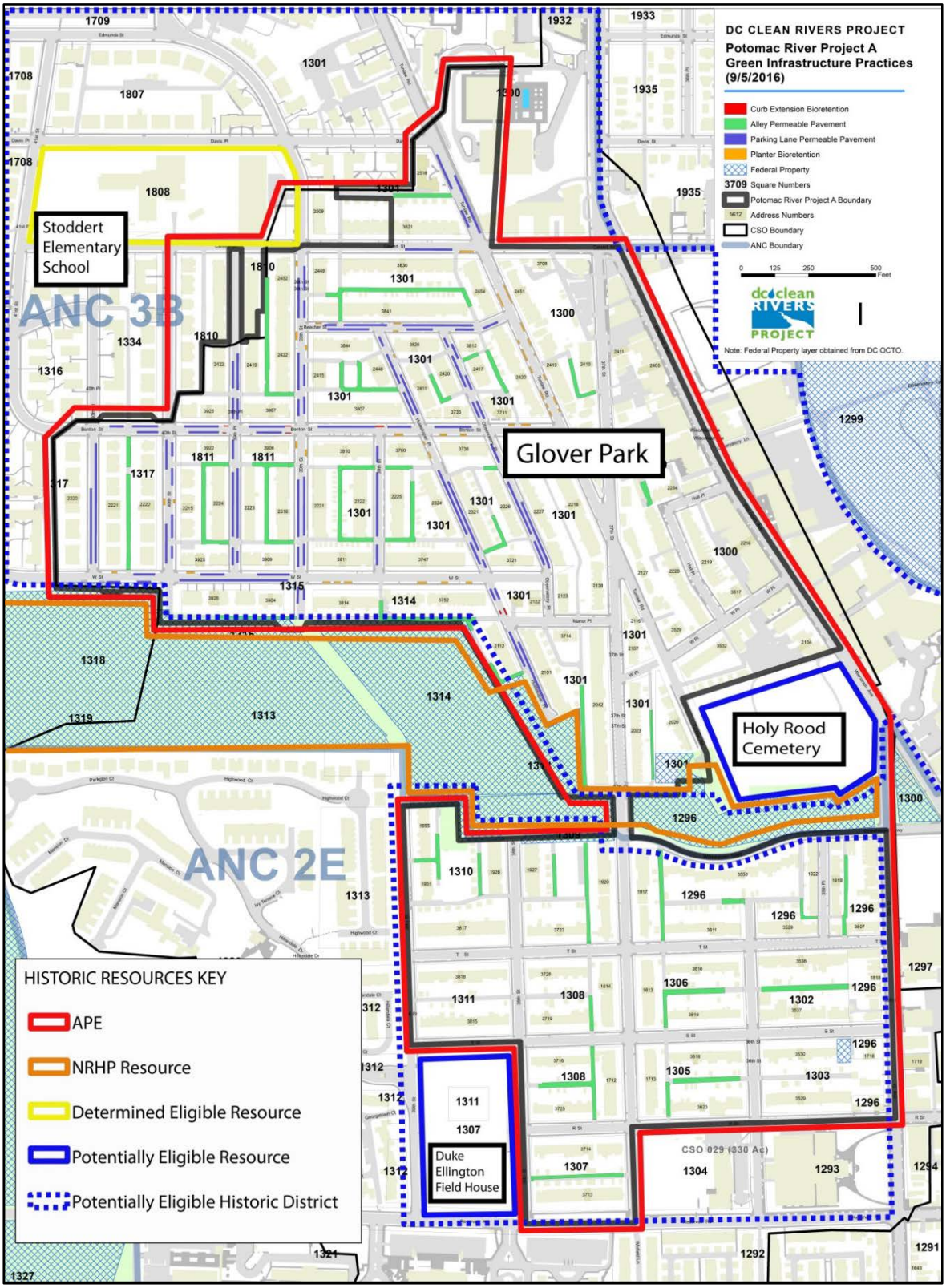

Figure 3.5: Proposed Locations of GI Technologies within PR-A Project Area (DC Water, 2016).

3.2 Locations of Green Infrastructure Controls

The following description of the location of each proposed GI technology corresponds to the drawings that can be found in **Appendix A** of this report. The technologies are described by square and street. The dimensions are all close approximations, rounded to the nearest foot. The locations of controls may shift slightly or be eliminated. However, the number of controls will not increase and general locations will not change. Also, any trees that are selected for removal will be replaced in kind either at or near their original locations. An overview of the locations and different technologies together for the project area can be seen in **Figure 3.5**.

3.2.1 Square 1296

Drawings: Appendix A - C-34, C-35, C-38, and C-39

A total of four APPs will be installed within Square 1296, which spans from Thirty-Seventh Street NW, to Thirty-Fifth Street NW, between T Street NW, and Whitehaven Parkway NW. There are additional parts of the square to the south of T Street NW, but no controls will be implemented in these spaces. The westernmost APP, which stretches from T Street NW, to Whitehaven Parkway NW, will be thirteen feet wide and 240 feet long. Two smaller sections of APP will be installed in the central alley in the square. The APP to the west will be nine feet wide and eighty-six feet long, and the one to the east will be six feet wide and 129 feet long. The fourth APP will be in the easternmost portion of the square; it will be ten feet wide and 297 feet long.

3.2.2 Square 1300

Drawings: Appendix A – C-02, C-04, C-07, C-08, C-12, C-13, C-17, C-18, C-22, C-23, C-24, C-25, and C-29

Square 1300 stretches from the Russian Embassy, north of Calvert Street NW, south to Holy Rood Cemetery, between Tunlaw Road NW, and Wisconsin Avenue NW. A 220-foot-ling, eight-foot-wide PPP will be installed on the east side of Tunlaw Road NW, just north of Calvert Street NW.

Altogether, seven PBRs will be installed along the east side of Tunlaw Road NW, stretching from Calvert Street NW, to the intersection with Thirty-Seventh Street NW. Moving from north to south, the PBRs will be seventy-two feet long by four feet wide, thirty-five feet long by four feet wide, thirty-one feet long by four feet wide, ten feet long by four feet wide, twenty-two feet long by four feet wide, thirty-one feet long by four feet wide, and thirteen feet long by four feet wide, respectively. All seven PBRs will have adjacent subsurface storage. Only one tree will need to be removed to accommodate the northernmost PBR. A new tree will be planted to replace the existing tree.

Two APPs will be constructed within the square. The northernmost will be 203 feet long and nine feet wide and it will be located in the alley between Tunlaw Road NW and Thirty-Seventh Street NW. A smaller, 111-foot-long, seven-foot-wide APP will be located in the alley north of Hall Place NW.

3.2.3 Square 1301

Drawings: Appendix A – C-03, C-04, C-05, C-06, C-07, C-10, C-11, C-12, C-15, C-16, C-17, C-20, C-21, C-22, C-23, C-28, C-29, C-30, and C-31

Square 1301 is very large and is composed of multiple blocks in the Glover Park neighborhood. It is bounded by Thirty-Ninth Street NW, to the west, Tunlaw Road NW, to the east, Davis Place NW, to the north, and W and U Streets NW, to the south. The square will be broken down by block.

3.2.3.1 Square 1301 (from Davis Place NW, to Calvert Street NW, between Thirty-Ninth Street NW, and Tunlaw Road NW)

Drawings C-03, C-04, C-05, C-06, and C-07

One APP will be constructing in the eastern portion of the alley. It will be 217 feet long and thirteen feet wide. Two PPPs will be constructed along the west side of Tunlaw Road. Both will be eight feet wide. However, the PPP to the north will be 130 feet long, and the PPP to the south will be sixty-one feet long.

3.2.3.2 Square 1301 (from Calvert Street NW, to Beecher Street NW, between Thirty-Ninth Street NW, and Tunlaw Road NW)

Drawings C-05, C-06, C-07, C-10, C-11 and C-12

Five APPs will be installed in the alley, and they will be a combined 626 feet long, with a width that will range from seven to thirteen feet, depending on the width of the alley.

To the north of the block, a 164-foot-long, eight-foot-wide PPP will be constructed, along the south side of Calvert Street NW. Just to the east, in the northeast corner of the block, a PBR will be constructed. It will be fifty-three feet long and six feet wide and will have adjacent subsurface storage under the sidewalk. Two trees will need to be removed to accommodate the planter, but will be replaced once construction is completed. Another PBR will be constructed on the east side of the block, along the west side of Tunlaw Road NW. It will be fifty-four feet long and four feet wide and will also have adjacent subsurface storage under the sidewalk. Also, two trees will need to be removed to accommodate the planter, but will be replaced once construction is completed.

On the south side of the block, along the north side of Beecher Street NW, three PPPs and two PBRs will be constructed. The PBRs will both be four feet wide with adjacent subsurface storage. The PBR to the west will be twenty-four feet in length, while the PBR to the east will be twenty-eight feet in length. The PPPs will all be eight feet wide and, moving from west to east, will be forty-four feet, 150 feet, 139 feet, and 111 feet in length, respectively.

The west side of the block will hold two PPPs, along the east side of Thirty-Ninth Street NW. The control to the north will be ninety-one feet long and eight feet wide, while the control to the south will be sixty-five feet long and eight feet wide.

3.2.3.3 Square 1301 (from Beecher Street NW, to Benton Street NW, between Thirty-Ninth Street NW, and Huidekoper Place NW)

Drawings C-10, C-11, C-15, and C-16

Three APPs will be installed in the alley, all nine feet in width. Two will run from north to south and will be ninety-seven and ninety-eight feet in length. The third will run from Huidekoper Place NW, to the center of the block; it will be nine feet wide and 213 feet long. A rendering of the proposed APP is shown in **Figure 3.6**.

Figure 3.6: Rendering of the proposed APP located in the center of Square 1301.
Located within the heart of the Glover Park neighborhood, this GI facility will not alter the potential historic district.
(DC Water, 2016)

The north side of the block will hold a PPP along the south side of Beecher Street NW. It will be eight feet wide and 154 feet long. To the east side of the block, three PPPs will be constructed on the west side of Huidekoper Place NW. All three will be eight feet wide and, moving from north to south, the will be thirty-eight, one hundred eleven, and eighty-seven feet in length, respectively.

Two PPPs will be constructed to the south, as well as one CBR, along the north side of Benton Street NW. Both PPPs will be eight feet wide; the PPP to the west will be 198 feet long and the one to the east will be eighty-two feet long. The CBR, which will be located between the two PPPs, will be thirty-five feet long and six feet wide. A rendering of the proposed CBR is shown in **Figure 3.7**.

Figure 3.7: Rendering of the proposed CBR along the north side of Benton Street NW
Located within the heart of the Glover Park neighborhood, this GI facility will not alter the potential historic district. (DC Water, 2016)

One PBR and two more PPPs will be constructed on the west end of the block, along the east side Thirty-Ninth Street NW. Both will be eight feet wide; the PPP to the north will

be seventy-three feet long and the PPP to the south will be sixty-six feet long. To the north, an eighteen-foot-long, six-foot-wide PBR will be constructed. It will also have adjacent subsurface storage beneath the sidewalk.

3.2.3.4 Square 1301 (from Beecher Street NW, to Benton Street NW, between Huidekoper Place NW, and Observatory Place NW)

Drawings C-11, C-12, C-16, and C-17

Two continuous APPs will be constructed in the middle of the alley. The APP running from north to south will be ninety-five feet long and nine feet wide, while the APP that runs east to west will be thirty-five feet long and eight feet wide.

To the north of the block a PBR and PPP will be constructed along the south side of Beecher Street NW. The PBR, located to the west, will be nineteen feet long and four feet wide with adjacent subsurface storage beneath the sidewalk. The PPP to be constructed to the east will be ninety-nine feet long and eight feet wide. A rendering of the PPP along the south side of Beecher Street NW, is shown in **Figure 3.8.**

Figure 3.8: Rendering of the proposed PPP along the south side of Beecher Street NW

Located within the heart of the Glover Park neighborhood, this GI facility will not alter the potential historic district. (DC Water, 2016)

On the east side of the block, along the west side of Observatory Place NW, three PPPs will be constructed, all eight feet in width. Moving from north to south, the PPPs will be thirty-five feet, one hundred eighteen, and fifty-nine feet in length. Another PPP will be constructed on the south end of the block, along the north side of Benton Street NW. It will be eight feet wide and 134 feet long.

Along the west side of the block, one PPP and on PBR will be constructed along the east side of Huidekoper Place NW. The PPP will be eight feet wide and one hundred fifty eight feet long. The PBR will be thirteen feet long and four feet wide. It will also have adjacent subsurface storage under the sidewalk.

3.2.3.5 Square 1301 (from Beecher Street NW, to Benton Street NW, between Observatory Place NW, and Tunlaw Road NW)

Drawings C-11, C-12, and C-17

Two separate sections of APP with be constructed in the alley. The APP located to the west, which runs from east to west, will be sixty feet long and seven feet wide. The second APP, located to the east, which runs from north to south, will be 387 feet long and four feet wide. Two PPPs will be installed to the north, along the south side of Beecher Street NW. Both will be eight feet wide; the PPP to the west will be seventy feet long and the PPP to the east will be sixty feet long.

Eight PBRs will be constructed on this square block; six of which will be on the east side and two on the south. The six on the east side, which will be located along the west side of Tunlaw Road NW, will be four feet wide. Moving from north to south, the PBRs will be sixteen, forty-six, twenty-five, thirty-five, eighteen, and twenty-two feet in length, respectively. All of the PBRs along Tunlaw will have adjacent subsurface storage constructed beneath the sidewalk. The two PBRs to the south of the block will be installed along the north side of Benton Street NW. Both will be six feet wide and will have adjacent subsurface storage. The PBR to the east will be thirty-four feet long and the one to the west will be twenty-two feet long. Two trees will need to be removed to accommodate the new controls; however, the trees will be replaced in kind.

Three more PPPs will be constructed along the east side of Observatory Place NW. Each will be eight feet in width. Moving from north to south, the PPPs will be fifty-nine, fifty-seven, and seventy-two feet in length, respectively.

3.2.3.6 Square 1301 (from Benton Street NW, to W Street NW, between Thirty-Ninth Street NW, and Thirty-Eighth Street NW)

Drawings C-15, C-16, C-20, and C-21

Two APPs will be constructed in the alley of the square block which will run north to south and east towards Thirty-Eighth Street NW. The two APPs will eight to ten feet wide and a combined 536 feet in length.

Three PPPs will be constructed on the east side, along the west side of Thirty-Eight Street NW. All three will be eight feet wide. Running north to south, the PPPs will be sixty-one, 222, and seventy-one feet in length, respectively. On the west side of the square block, two PPPs and one PBR will be constructed. The PPPs, both eight feet wide, will be 205 and seventy-four feet in length, moving north to south, respectively. The PBR, which will be located towards the corner of Thirty-Ninth Street NW, and Benton Street NW, will be twenty-four feet long and six feet wide. It will also have adjacent subsurface storage under the sidewalk.

3.2.3.7 Square 1301 (from Benton Street NW, to W Street NW, between Thirty-Eighth Street NW, and Huidekoper Place NW)

Drawings C-16, C-21, and C-22

Three APP controls will be constructed in the alley. The APP to the north, which will be on the Thirty-Eighth Street NW, side, will be seven feet wide and 101 feet long. The two other APPs to the south will be continuous. The one running from east to west will be eleven feet wide and 111 feet long, while the one running north to south will be ten feet wide and 205 feet long.

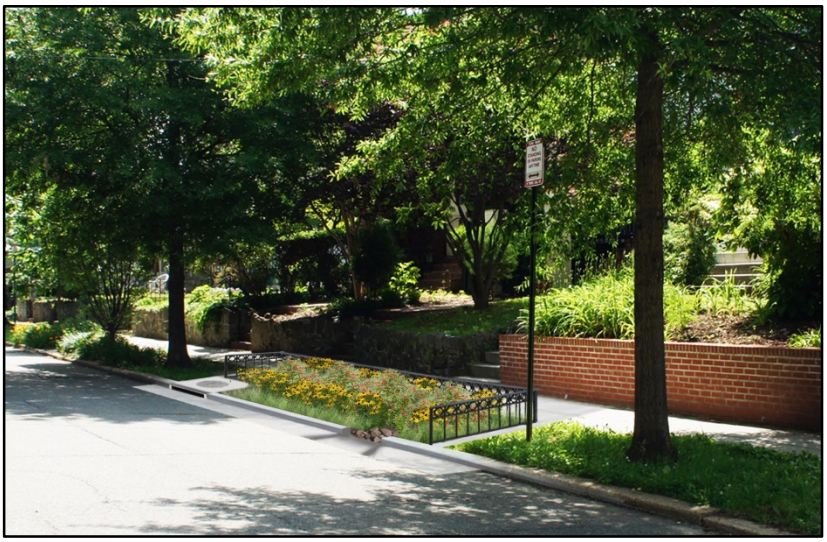

Figure 3.9: Rendering of the proposed PBR along the south side of Benton Street NW

Located within the heart of the Glover Park neighborhood, this GI facility will not alter the potential historic district. (DC Water, 2016)

Along the north side of the square, a PBR will be constructed. It will be thirty-two feet long and six feet wide and will run along the south side of Benton Street NW. The PBR will have adjacent subsurface storage under the sidewalk. One tree will need to be removed to accommodate the control, but it will be replaced in kind. A rendering of the proposed PBR is shown in **Figure 3.9**.

Two PPPs and two PBRs will be constructed on the east side of the square, along the west side of Huidekoper Place NW. The PBRs, from north to south, will thirteen feet long by four feet wide and seventeen feet long by five feet wide, respectively. Both will have subsurface storage beneath the adjacent sidewalk. Just to the south, two PPPs will be constructed. The PPP to the north will be 244 feet long and eight feet wide, and the PPP to the south will be eighty-three feet long and eight feet wide.

3.2.3.8 Square 1301 (from Benton Street NW, to W Street NW, between Huidekoper Place NW, and Observatory Place NW)

Drawings C-16, C-17, and C-22

Two separate APPs will be installed in the alley of this square block. The APP to the north, by Observatory Place NW, will be eight feet wide and fifty feet long. The APP to the south, by Huidekoper Place NW, will be nine feet wide and 197 feet long.

Two PBRs will be constructed on the north side of the square, along the south side of Benton Street NW, and both will have adjacent subsurface storage beneath the sidewalk. The PBR to the west will be thirty-three feet long and six feet wide, while the PBR to the east will be twenty-four feet long and six feet wide.

The PBR to the east will also require the removal of one existing tree. The tree however, will be replaced in kind.

Three PPPs will be constructed on the east side of the square, along the west side of Observatory Place NW; each will be eight feet wide. Running north to south, the PPPs will be eighty feet in length, 224 feet in length, and eighty-nine feet in length, respectively. Two more PPPs will be constructed on the west side of the block, along the east side of Huidekoper Place NW, and both will also be eight feet wide. The PPP to the north will be 264 feet long and the PPP to the south will be thirty feet long.

3.2.3.9 Square 1301 (from Benton Street NW, to Manor Place NW, between Observatory Place NW, and Tunlaw Road NW)

Drawings C-17, C-22, and C-23

Only one GI control will be constructed within this square. It will be located towards the west, along the east side of Observatory Place NW. It will be an eight-foot-wide, 278-foot-long PPP.

3.2.3.10 Square 1301 (from W Street NW, to Manor Place NW, between Huidekoper Place NW, and Observatory Place NW)

Drawings C-22

One PPP and one CBR will be constructed within the square, both to the west, along the east side of Huidekoper Place NW. The PPP will be eight feet wide and forty-one feet long. The CBR will be twenty-eight feet long and six feet wide.

3.2.3.11 Square 1301 (from Manor Place NW, to U Street NW, between Huidekoper Place NW, and Thirty-Seventh Street NW)

Drawings C-28, C-29, C-30, and C-31

An APP, running north to south, will be installed in the square from U Street NW, north. It will be eleven feet wide and 371 feet long. Also, a PPP will be installed on the west side, long the east side of Huidekoper Place NW. It will be 268 feet long and eight feet wide.

3.2.3.12 Square 1301 (from Tunlaw Road NW, to Thirty-Seventh Street NW, and U Street NW)

Drawings C-23, C-29, C-31

One APP will be installed in alley, running north to south. It will be 256 feet long and six feet wide.

3.2.4 Square 1302

Drawings: Appendix A - C-39

One APP will be installed in the alley, running east to west. It will be 331 feet long and ten feet wide.

3.2.5 Square 1303

Drawings: Appendix A - C-43

No work is currently proposed in this square.

3.2.6 Square 1305

Drawings: Appendix A - C-42 and C-43

Two separate APPs will be installed in the square, one running east to west, and the other north to south. The APP running east to west will be eleven feet wide and 249 feet long. The APP running north to south, located closer to R Street NW, will be seven feet wide and 127 feet long.

3.2.7 Square 1306

Drawings: Appendix A - C-38 and C-42

Two continuous APPs will be installed in this square, one running east to west, and the other north to south. The APP running east to west will be twelve feet wide and 199 feet long. The APP running north to south, located closer to S Street NW, will be nine feet wide and 142 feet long.

3.2.8 Square 1307

Drawings: Appendix A - C-41, C-42, and C-44

One APP will be installed in the alley, running east to west. It will be 343 feet long and eight feet wide.

3.2.9 Square 1308

Drawings: Appendix A - C-37, C-38, C-41, and C-42

Square 1308 stretches across S Street NW. The north portion of the square, bound by T, S, Thirty-Ninth, and Thirty-Eight Streets NW, will include one APP, running from north to south. It will be seven feet wide and 129 feet long. The south portion of the square, bound by S, R, Thirty-Ninth, and Thirty-Eight Streets NW, will include two APPs. The APP running from north to south will be seven feet wide and 272 feet long. The APP running east to west will be twelve feet wide and 190 feet long.

3.2.10 Square 1309

Drawings: Appendix A - C-33, C-34, C-37, and C-38

Two separate APPs will be installed in this square, both running north to south. The APP to the west will be eleven feet wide and 157 feet long. The APP to the east will be twelve feet wide and 216 feet long.

3.2.11 Square 1310

Drawings: Appendix A - C-32, C-33, C-36, and C-37

Four APPs will be installed in this square, three will be combined, located to the west, and one will be separate, running north to south to the east. The three combined APPs will be five feet wide by ninety-one feet long, thirteen feet wide by ninety-nine feet long, and fourteen feet wide by sixty-two feet long. The fourth APP to the east will be nine feet wide and 161 feet long.

3.2.12 Square 1311

Drawings: Appendix A - C-36, C-37, C-40, and C-41

No work is currently proposed in this square.

3.2.13 Square 1314

Drawings: Appendix A – C-20, C-21, C-22, and C-28

Three separate APPs will be installed in the alley between Square 1314 and Whitehaven Parkway. One will run north to south and will be nine feet wide and sixty-two feet long. Adjacent to that APP, another will run east to west along Whitehaven Parkway. It will be seven feet wide and 353 feet long; a rendering of this proposed APP is shown in **Figure 3.10**. A third APP will be installed to the southeast, at Huidekoper Place NW and Whitehaven Parkway. It will be seven feet wide and 173 feet long. Though the APPs in this square will abut Whitehaven Parkway, no work will be executed on NPS land.

On the north side of the square, six PBRs will be installed. All six will have adjacent subsurface storage and will be six feet wide. Moving from west to east, the PBRs will be twenty-nine feet long, twenty-four feet long, thirty feet long, thirty-five feet long, twenty-five feet long, and twenty-three feet long, respectively. The installation of each PBR will require the removed of one existing tree, but all six will be replaced in kind.

Along the east side of the square, two PPPs and one CBR will run on the west side of Huidekoper Place NW. The CBR, to be located at the corner of Huidekoper Place NW, and Manor Place NW, will be sixteen feet long and six feet wide. The PPP to the north of

Figure 3.10: Rendering of the proposed APP on the south side of Square 1314.
Note that though it is directly adjacent to Whitehaven Parkway, it will not have an adverse effect on the park and will be executed in concrete to match the existing alley. (DC Water, 2016)

the CBR will be forty-two feet long and eight feet wide and the PPP to the south will be 133 feet long and eight feet wide.

3.2.14 Square 1315

Drawings: Appendix A - C-20

One APP, running east to west, will be constructed in Square 1315. It will be five feet wide and 292 feet long, and though the APP will abut Whitehaven Parkway, no work will be executed on NPS land. Two PPPs will be constructed in this square, one to the north and one to the east. The PPP to the north, along the south side of W Street NW, will be 377 feet long and eight feet wide. The PPP to the east, along the west side of Thirty-Ninth Street NW, will be sixty-four feet long and eight feet wide.

3.2.15 Square 1317

Drawings: Appendix A - C-14 and C-19

Square 1317 is bisected by Fortieth Place NW. A PPP will be installed in the portion to the west. It will be along the west side of Fortieth Street NW, and will be 263 feet long and eight feet wide.

In the portion to the east, two APPs will be installed in the alley. The APP to the north will be ten feet wide and 115 feet long. The APP to the south will be ten feet wide and 356 feet long. On the north side of this portion of the square one PPP will be installed. It will be seventy-one feet long and eight feet wide. To the east of the square, two PPPs will be installed flanking a PBR. The PPPs will both be eight feet wide; the one to the north will be 110 feet long and the one to the south will be 146 feet long. The PBR will be twenty-four feet long and six feet wide. One tree will need to be removed to accommodate the control, but it will be replaced in kind. One PPP and one PBR will be constructed to the south, along the north side of W Street NW. The PBR will be twenty feet long and six feet wide and it will have adjacent subsurface storage. The PPP will be seventy-four feet long and eight feet wide. To the west, one long PPP will be installed on the east side of Fortieth Place NW. It will be eight feet long and 422 feet long.

3.2.16 Square 1318

Drawings: Appendix A - C-19

Two PPPs will be located on the north side of this square, along the south side of W Street NW. The PPP to the west will be seventy-eight feet long and eight feet wide, while the PPP to the east will be eighty-four feet long and eight feet wide. Though the PPPs in this square will abut Whitehaven Parkway no work will be executed on NPS land.

3.2.17 Square 1334

Drawings: Appendix A – C-14

Two PPPs will be installed on the south side of the square. The PPP to the east will be eighty-nine feet long and eight feet wide. The PPP to the west will be forty-nine feet long and eight feet wide.

3.2.18 Square 1810

Drawings: Appendix A – C-05, C-10, and C-15

Square 1810 is bisected by Thirty-Ninth Place NW. Three PPPs will be installed in the portion to the west, as well as one CBR. Two of the PPPs will be constructed along the west side of Thirty-Ninth Place NW, and both will be eight feet wide. The PPP to the north will be 102 feet long and the one to the south will be seventy three feet long. The third PPP will be located on the north side of Benton Street NW, on the south side of the square. It will be eight feet wide and 118 feet long. The CBR will be located just to the east of this PPP. It will be twenty feet long and four feet wide.

In the portion to the east, two continuous APPs will be constructed, one running north to south and the other east to west. The APP running north to south will be eight feet wide and 428 feet long. The APP running east to west will be seven feet wide and 106 feet long. On the east side, two PBRs and three PPPs will be constructed. The PPPs will all be eight feet wide and, moving north to south, will be 152, 133, and sixty-one feet long, respectively. The PBR to the north will be nineteen feet long and six feet wide and the PBR to the south will be thirty-one feet long and six feet wide. Both will have adjacent subsurface storage. There will be one PPP and one CBR installed on the south side. The PPP will be 123 feet long and eight feet wide, while the CBR, located to the east of the PPP, will be twenty-five feet long and four feet wide. Two more PPPs will be installed on the west side of this portion of the square; both will be eight feet wide. The PPP to the north will be 129 feet long and the one to the south will be seventy-one feet long.

3.2.19 Square 1811

Drawings: Appendix A – C-15 and C-20

Square 1810 is also bisected by Thirty-Ninth Place NW. The portion to the west will have two continuous APPs in the alley. The APP to the north, which runs east to west, will be eight feet wide and 107 feet long. The APP to the south will be seven feet wide and 374 feet long. On the north side of this portion of the square, one PPP and one CBR will be installed. The PPP will be eight feet wide and 110 feet long, while the CBR, located just to the east, will be fifteen feet long and four feet wide.

Three PPPs will be located on the east side, along the west side of Thirty-Ninth Place NW; all three will be eight feet wide. Moving from north to south, the PPPs will be sixty-seven, 223, and sixty-two feet in length, respectively. To the south, an eight-foot-wide, eighty-three-foot-long PPP will be constructed along the north side of W Street NW. Just to the west, a thirty-foot-long, six-foot-wide PBR will be constructed. It will have adjacent subsurface storage beneath the sidewalk. Four PPPs and one PBR will be constructed on the west side, along the east side of Fortieth Street NW. All four of the PPPs will be eight feet wide, and moving from north to south, they will be fifty-two, fifty-nine, eighty-four, and forty-two feet long, respectively. The PBR will be twelve feet long and six feet wide and will have a small amount of subsurface storage beneath the sidewalk.

The east portion of the square will have two continuous APPs in the alley, as shown in the rendering in **Figure 3.11**. The APP to the north, which runs east to west, will be eight feet wide and 155 feet long. The APP to the south will be eight feet wide and 382 feet long. On the north side of this portion of the square, one PPP and one CBR will be installed. The PPP will be eight feet wide and ninety-three feet long, while the CBR, located just to the east, will be twenty-five feet long and four feet wide.

Figure 3.11: Rendering of the proposed APP in Square 1811.
This proposed APP will be asphalt to match the existing alley.
(DC Water, 2016)

Two PPPs will be located on the east side, along the west side of Thirty-Ninth Street NW; both will be eight feet wide. Moving from north to south, the PPPs will be 210 and seventy feet in length, respectively. Additionally, on the northeast corner of the square, along Thirty-Ninth Street NW, a twenty-six-foot-long, six-foot-wide PBR will be constructed. It will have adjacent subsurface storage and one tree will need to be removed to accommodate the control. The existing tree will be replaced in kind. To the south, an eight-foot-wide, 119-foot-long PPP will be constructed. Two PPPs will be constructed on the west side, along the east side of Thirty-Ninth Place NW. Both will be eight feet wide, and moving from north to south, they will be 237 and forty-three feet long, respectively.

4 Identification of Effects

4.1 Criteria for Adverse Effect

Section 9B of DC Law 2-144 requires "the head of the independent agency with direct jurisdiction over the undertaking to take into account the effect of the undertaking on any property listed or eligible for listing in the DC Inventory…" (DC Official Code § 6-1108.02). As neither Section 9B nor the associated regulations define the criteria of effect, the assessment of effects presented here is based on the criteria of adverse effect as defined in the National Historic Preservation Act 36 CFR § 800.5. The criteria of adverse effect are defined in the NHPA as follows:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. [36 CFR 800.5(a)(1)]

Examples of adverse effects may include physical destruction or damage, alterations that are inconsistent with the *Secretary's Standards for the Treatment of Historic Properties*, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, removal of the property from its historic location, change of the character of the property's use or of contributing physical features within the property's setting, introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features, neglect or deterioration (except in certain religious or cultural cases), and transfer, lease, or sale of property out of Federal ownership or control without adequate preservation controls.

The following analysis is an assessment of the effects of the project on DC Inventory and NRHP eligible or listed historic properties and is based upon the Section 9B criteria of adverse effect.

4.2 Assessment of Effects

The determination of effects is organized by the historic properties located within the APE, then in turn by the GI technology being implemented within, adjacent to, or near the resource.

4.2.1 Stoddert Elementary School

Stoddert Elementary School was determined eligible for listing in the DC Inventory and NRHP by the DC HPO in 2009 for its Colonial Revival design by Municipal Architect Albert L. Harris. The east end of the property is located in the northwest corner of the APE for PR-A Project Area.

4.2.1.1 Bioretention Facilities

No bioretention facilities will be constructed on or directly adjacent to Stoddert Elementary School. There would be no adverse effect on the eligible historic resource.

4.2.1.2 Permeable Pavement

No subsurface storage will be constructed on or adjacent to Stoddert Elementary School. Therefore, there would be no adverse effect on the eligible historic resource.

4.2.1.3 Subsurface Storage

No subsurface storage will be constructed on or adjacent to Stoddert Elementary School. Therefore, there would be no adverse effect on the eligible historic resource.

4.2.2 Whitehaven Parkway

Whitehaven Park is potentially eligible for listing in the DC Inventory and the NRHP. The park runs between the two major sections of the PR-A Project Area.

4.2.2.1 Bioretention Facilities

No bioretention facilities will be constructed on or directly adjacent to the Whitehaven Parkway. Therefore, there would be no adverse effect on the potential historic resource.

4.2.2.2 Permeable Pavement

Three APPs will be installed in the alleys directly adjacent to the northern and eastern edges of the west side of the parkway. Although the permeable pavement will be directly adjacent to the NPS land, it will remain completely within the public right-of-way and it will not touch or alter any parkland. Furthermore, no construction equipment or work will be executed on any NPS land. The permeable pavement material will be designed to replicate the current conditions in the alley and after construction the visible effects on the alleys will be negligible; therefore, there would be no adverse effect on the potential historic resource.

4.2.2.3 Subsurface Storage

No subsurface storage will be constructed on or directly adjacent to the Whitehaven Parkway. Therefore, there would be no adverse effect on the potential historic resource.

4.2.3 Burleith Neighborhood

The Burlieth neighborhood is potentially eligible to be designated as a historic district listed in the DC Inventory and NRHP. Almost the entire neighborhood is included in the southern portion of the APE for PR-A Project Area.

4.2.3.1 Bioretention Facilities

No bioretention facilities will be constructed in or directly adjacent to the Burlieth neighborhood. Therefore, there would be no adverse effect on the potential historic resource.

4.2.3.2 Permeable Pavement

While multiple permeable pavement facilities will be installed in the alleys throughout the neighborhood, the material of the APP will be chosen specifically for each location, essentially replacing the material being removed with a new permeable material that matches the existing in color. After construction is complete, there will be negligible visual effects on the alleys; therefore, there would be no adverse effect on the potential historic resource.

4.2.3.3 Subsurface Storage

No subsurface storage will be constructed on or directly adjacent to the Burleith neighborhood. Therefore, there would be no adverse effect on the potential historic resource.

4.2.4 Glover Park Neighborhood

The Glover Park neighborhood is potentially eligible for listing in both the DC Inventory and the NRHP. Almost the entire neighborhood is included in the northern portion of the PR-A Project Area and falls within the APE.

4.2.4.1 Bioretention Facilities

While multiple bioretention facilities will be constructed within the Glover Park neighborhood, either in the existing green space between the sidewalks and curbs or in newly constructed curb extensions, the new curb heights will remain consistent with the existing curbs. In addition, the only new material being introduced will be an open, metal grill/grate installed to protect the bioretention facilities. These grilles will have a maximum height of eighteen inches, causing a negligible effect on the resource; therefore, there would be no adverse effect on the potential historic resource.

4.2.4.2 Permeable Pavement

While multiple permeable pavement facilities will be implemented throughout the neighborhood, the material of the PPP or APP will be chosen specifically for each location, essentially replacing the material being removed with a new permeable material that matches the existing in color. After construction is complete, there will be negligible visual effects on the streets and alleys; therefore, there would be no adverse effect on the potential historic resource.

4.2.4.3 Subsurface Storage

While multiple subsurface storage facilities will be constructed beneath the sidewalks within the neighborhood, once construction is completed, the sidewalks will be replaced in kind. There will be no visible evidence that the GI control is present; therefore, subsurface storage would have no adverse effect on the potential historic resource.

4.2.5 Western High School Field House

Western High School Field House is directly adjacent to the southwest corner of the PR-A Project Area and is included within the APE. The Field House is potentially eligible for listing in both the DC Inventory and the NRHP.

4.2.5.1 Bioretention Facilities

No bioretention facilities will be constructed directly adjacent to the Field House. Therefore, there would be no adverse effect on the potential historic resource.

4.2.5.2 Permeable Pavement

Both alleys across Thirty-Eighth Street NW., and the Field House will be removed and replaced with APP. There will be no change in look, height, or orientation of the alley. The material of the APP will be chosen specifically for both locations, essentially replacing in kind, the material being removed. After construction is complete, there will be negligible visual effects on the alleys. No PPP facilities will be constructed adjacent to resource; therefore, there would be no adverse effect on the potential historic resource.

4.2.5.3 Subsurface Storage

No subsurface storage will be constructed on or directly adjacent to the Field House. Therefore, there would be no adverse effect on the potential historic resource.

4.2.6 Holy Rood Cemetery

Located directly adjacent to the east side of the PR-A Project Area, and within the APE, Holy Rood Cemetery is potentially eligible for listing in the DC Inventory and NRHP.

4.2.6.1 Bioretention Facilities

No bioretention facilities will be constructed on or directly adjacent to Holy Rood Cemetery. Therefore, there would be no adverse effect on the potential historic resource.

4.2.6.2 Permeable Pavement/Pavers

No permeable pavement will be constructed on or directly adjacent to Holy Rood Cemetery. Therefore, there would be no adverse effect on the potential historic resource.

4.2.6.3 Subsurface Storage

No subsurface storage will be constructed directly adjacent to Holy Rood Cemetery. Therefore, there would be no adverse effect on the potential historic resource.

4.3 Determination of Effect

Based on the analysis above, it has been determined that the implementation of GI technologies throughout the project area will not cause adverse effects on historic resources within the APE. DC Water has determined that there would also not be any adverse effects on properties that are potentially eligible for listing on the DC Inventory and NRHP. **Table 4.1** is a Summary of Adverse Effect.

Table 4.1: Summary of Adverse Effect

Resource	Bioretention Facilities	Permeable Pavement/Pavers	Subsurface Storage
Stoddert Elementary School	N/A	N/A	N/A
Whitehaven Parkway	N/A	No Adverse Effect	N/A
Burleith	N/A	No Adverse Effect	N/A
Glover Park	No Adverse Effect	No Adverse Effect	No Adverse Effect
Western High School Field House	N/A	No Adverse Effect	N/A
Holy Rood Cemetery	N/A	N/A	N/A

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Appendix A: PR-A Project Drawing Set

(PROVIDED AS A SEPARATE BOUND DOCUMENT)