Site Selection Final Report

Wastewater Monitoring for COVID-19

Montgomery County

November 1st, 2022

Prepared By

IEI

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1.0 Introduction

Wastewater monitoring for COVID-19 virus provides a consistent and reliable data source which indicate disease incidence in a selected geographical region. The data collected over time can be used as a reliable indicator of disease trends in a community.

As new variants arise and case numbers fluctuate in unpredictable ways, a framework is necessary to fill the gap in data collection to assist with public health decision making as well as for future pandemic preparations.

Other advantages of wastewater monitoring over individual testing are that it requires much less effort, resources and cost, is noninvasive and provides data for a larger community in a shorter time.
Additional benefits are listed below;

- It is a valuable tool to proactively detect and characterize pathogenic agents circulating in a community.
- Wastewater analysis results can be used as an early warning system for communicable diseases.
- It's non-invasive and all individuals in a community contributing to a sewage collection system can be tested at once.
- Clinical testing will provide only a subset of individuals that consent to testing but this captures more data.
- Pre-symptomatic and asymptomatic cases will not be accounted for reported case numbers.
- Over the counter self-test has become increasingly popular and many of those results (positive or negative) will not be reflected in statistics.
  (Self-tests result also depends on the performer and the stage of the infection)

However, the data is only useful if the wastewater monitoring framework is implemented with careful planning to achieve the objectives of the county or authority. Factors to consider when planning;

- Identification and optimization of monitoring location based on numerous factors - The wastewater monitoring locations should be selected with care to map out the community to be monitored, identify zoning, sewer sheds (GIS maps) and sampling locations with access for sampling activities.
- Normalization of wastewater results.
- Modeling wastewater results against community level data.
- Refining the response framework based on county resources.

Wastewater monitoring is more useful in trend analysis, setting baselines and reporting progressive data with threshold level comparisons, rather than a single snapshot in time. Therefore, an established baseline and framework is necessary to obtain useful data.

2.0 Methodology

2.1 Preliminary Wastewater Sampling Site Selection

The Following sites on Table 01, were proposed to Montgomery County and the University of Maryland (UMD) as possible sampling locations with sufficient sewer network coverage for PCSA (Primary Care Service Area) areas of interest; in the report titled "Site Selection for Wastewater Monitoring, Montgomery County" on October 13th 2022. These preliminary selections were based on the following criteria

1. Demographic Factors - SDI (Social Deprivation Index)
2. Covid-19 case history
3. Population Density
4. PCSA Regions – Primary Care Service Areas, Data received from Montgomery County
5. Zip Code Boundaries

PCSA (Primary Care Service Area) by HRSA Region	Zip code	Possible Sampling Locations
Silver Spring	20904	No Pumping Stations
	20902	Pumping station (06068001P) BasinMB 6068 Name: ARCOLA – Feeds partially from zip code 20904. (To be confirmed by WSSC)
Gaithersburg/Germantown/Damascus	20877	Pumping Station 13014001P, Muddy branch (abandoned), 16997001P, King Farm and 98001001W
	20874	Seneca Creek Wastewater treatment Plant
	20871/ 20872	Damascus WWTP treatment plant.
Rockville	20850	Rock creek sewer pump station and Rockville sewer pump stations; 05143001P (TO confirm with WSSC on how many stations are available and the corresponding sewer network)
	20814/ 20817	No Pumping Station. Possible pumping station downstream at zip code 20816; 07001052P, Brookmont.
Poolesville	20837	Poolesville treatment plant, 19721 Beall St, Poolesville, MD 20837.
	20841	Pumping station (15071001P) Hoyes Mill
Olney	20832	Pumping station; 05169001P, Reddy Branch
	20833	Two pumping stations; 05179001P, North Branch and 26004001P, Olney

Table 01: Proposed sampling sites for COVID-19 monitoring in wastewater for Montgomery County

2.2 Phase 2: Down-Selection of Sampling Sites

As the next step we obtained input from the Washington Suburban Sanitary Commission (WSSC) and conducted site visits on October 18th 2022, to identify which of the proposed sampling locations were viable for regular sampling events

The following Table 02 provides a summary of the selection criteria considered for sampling sites based on site visits and input received from WSSC, followed by detailed maps of sewer network around each of the sampling points selected.

PCSA	Zip code	Possible Sampling Locations	Site Selection or Elimination
1. Silver Spring	20902	Pumping station (06068001P) BasinMB 6068 Name: ARCOLA – Feeds partially from zip code 20904.	Arcola was determined as a suitable sampling site after considering factors such as depth, flow rate and sample point.
2. Gaithersburg/ Germantown/ Damascus	20877	Pumping Station 13014001P, Muddy branch (abandoned)	Muddy Branch Pump station is no longer in operation
		Wexford pump station	Selected based on the geographical location, flow rate and appropriate sampling point.
	20874	Seneca Creek Wastewater treatment Plant	Already being sampled for COVID-19, therefore eliminated from this list
	20871/ 20872	Damascus WWTP treatment plant.	Already being sampled for COVID-19, therefore eliminated from this list
3. Rockville	20850	Rock creek sewer pump station and Rockville sewer pump stations; 05143001P	Eliminated after site visit due to chemical injection taking place at lift station
		16997001P. King Farm	King Farm was determined as a suitable site for sampling. Manhole at location with favorable depth and flow rate.
	20814/ 20817	Possible pumping station downstream at zip code 20816; 07001052P, Brookmont.	Brookmont site was eliminated due to the site only collecting from 7 houses. The sample will not be sufficient to represent a zip code.

PCSA	Zip code	Possible Sampling Locations	Site Selection or Elimination
4. Poolesville	20837	Poolesville treatment plant, 19721 Beall St, Poolesville, MD 20837.	Eliminated for the time being as it is not under WSSC authority.
	20841	Pumping station (15071001P) Hoyles Mill	Hoyles Mill Sewer pump Station was determined as a suitable sampling site. Manhole at location with favorable depth and flow rate.
6. Olney	20832	Pumping station; 05169001P, Reddy Branch	Reddy Branch sewer pump station was determined as a suitable site after considering factors such as depth, flow rate and sample point.
	20833	Two pumping stations; 05179001P, North Branch and 26004001P, Olney	North Branch sewer pump station was selected site for site visit and then eliminated due to complications in sending a tube down to the wet well from the location the unit was to be stationed.

Table 02: Phase 2 down-selection of sampling sites based on WSSC input and site visit information

The maps on the following pages showcase the distribution of sewer network (purple lines), sewer basins (blue) and mini basins(pink) along with zip code boundaries(black).

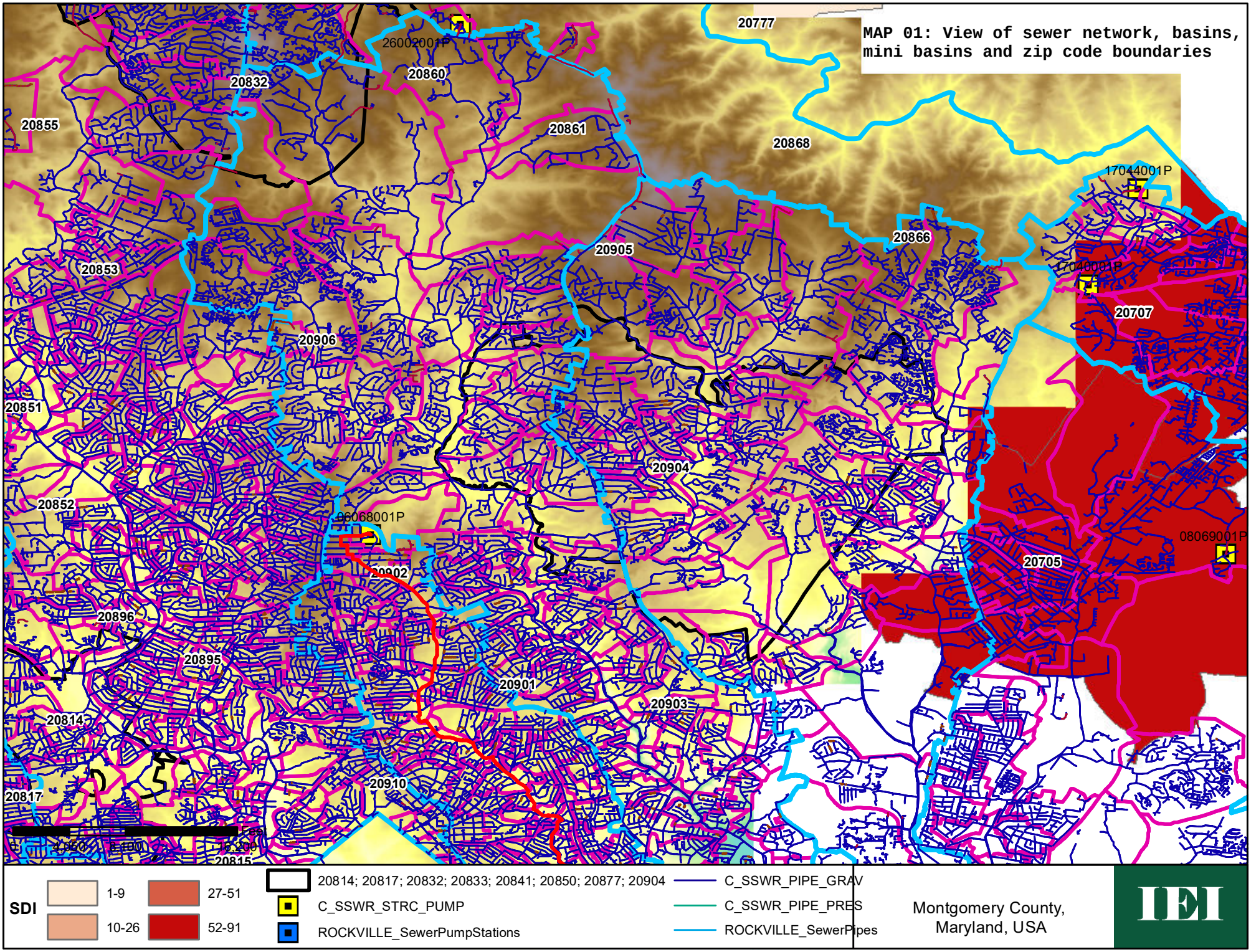
Maps 1 through 3 on the following pages, shows enlarged views of the PSCA regions of interest along with sewer basins and mini basins. The final selections were made by considering as much of the sewer network inside the sewer
basins/mini basins which fall into the zip code boundary of interest.

More in-depth data was collected from site visits and these were considered in the final selection process for site viability on practical implementation.

Some of the site visit information considered are;

- Daily flow rate at pumping station
- Secure location for sampler unit installation
- Depth of the sampling location
- Site accessibility, Safety and other logistics

The final list of selected sites are provided in the next section, along with the GIS maps utilized for selections.


MAP 01: View of sewer network, basins, mini basins and zip code boundaries
20777
26002001P
20860
20832
20855
20861
20868
17044001P
20866
20905
20853
17040001P
20707
20906
20851
20904
20852
06068001P
08069001P
20902
20705
20896
20895
20901
20903
20814
20910
20817
20815
SDI
1-9
10-26
27-51
52-91
20814; 20817; 20832; 20833; 20841; 20850; 20877; 20904
C_SSWR_STRC_PUMP
ROCKVILLE_SewerPumpStations
C_SSWR_PIPE_GRAV
C_SSWR_PIPE_PRES
ROCKVILLE_SewerPipes
Montgomery County, Maryland, USA
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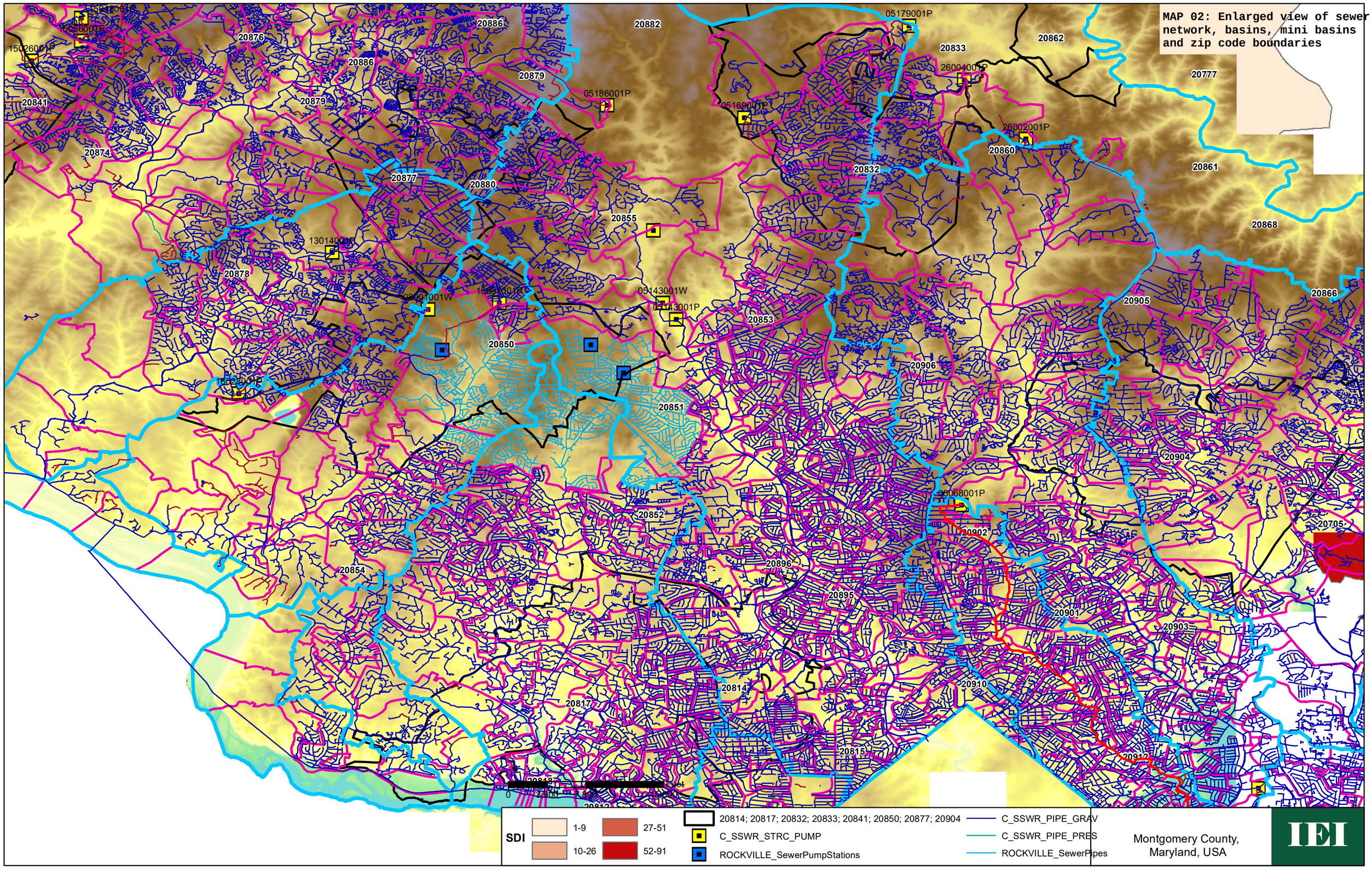
MAP 02: Enlarged view of sewer network, basins, mini basins and zip code boundaries



MAP 03: Enlarged view of sewer network, basins, mini basins and zip code boundaries

20842
20838
20842
20839
20841
20837
20874
20871
20872
20876
20877
20878
20879
20880
20882
20886
20833
20862
20832
20855
20853
20850
20906
20851
20852
20905
20904
20902
20860
20861

15052005
15050001P
15066001P
15066001P
15069001P
15052001P
15046001P
15056001P
15026001P
15071001P
13014001P
16002001P
16007001P
05179001P
05186001P
05169001P
26004001P
26002001P
05143001W
05143001P
06068001P
09001001W

0 3,900 7,800 15,600 Feet

SDI
1-9
10-26
27-51
52-91

20814; 20817; 20832; 20833; 20841; 20850; 20877; 20904
C_SSWR_STRC_PUMP
ROCKVILLE_SewerPumpStations
C_SSWR_PIPE_GRAV
C_SSWR_PIPE_PRES
ROCKVILLE_SewerPipes

Montgomery County, Maryland, USA

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3.0 Conclusion - Final Site Selection

The finalized list of sites selected for wastewater sampling for COVID-19 in Montgomery County.

PCSA	Sewer network Zip codes which feed to the location (Based on sewer basin maps)	Site Name and Address	Sampling Location	SDI	Case rate
Silver Spring	20901, 20902,20903, 20906, 20910, 20912, 20832(GIS Analysis)	Arcola WWTP - (06068001P) 2001 Henderson Avenue, Wheaton, MD 20902	Wet well, Depth 18 Ft	High	High

PCSA	Sewer network Zip codes which feed to the location (Based on sewer basin maps)	Site Name and Address	Sampling Location Description	SDI	Case rate
Gaithersburg	20874, 20876, 20886	Wexford (15063001P) 21225 Seneca Crossing Dr. Germantown, MD 20876	Wet well. Depth 15ft	High	High

PCSA	Sewer network Zip codes which feed to the location (Based on sewer basin maps)	Site Name and Address	Sampling Location Description	SDI	Case rate
Rockville	20850, 20854	King Farm (16997001P) 315 Pure Spring Crescent Rockville, MD 20850	Manhole. 13 Ft	Medium	Medium

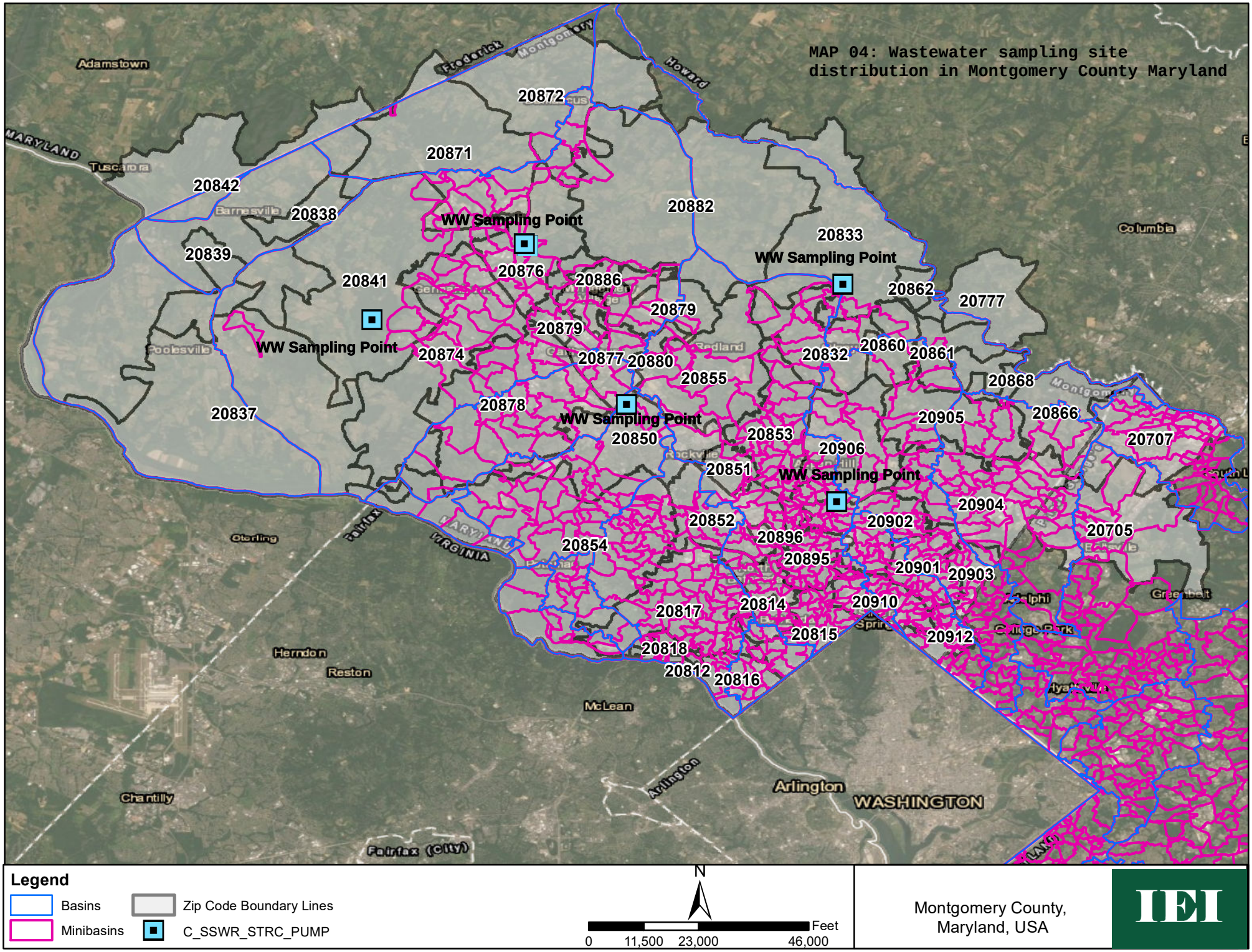
PCSA	Sewer network Zip codes which feed to the location (Based on sewer basin maps)	Site Name and Address	Sampling Location Description	SDI	Case rate
Poolesville	20841, 20874	Hoyles Mill (15071001P), 15001 Hoyles Mill Rd, Boyds, MD 20841	Manhole. Depth 15 ft. Daily Flowrate - 295,000 Gallons/day.	Medium	Medium

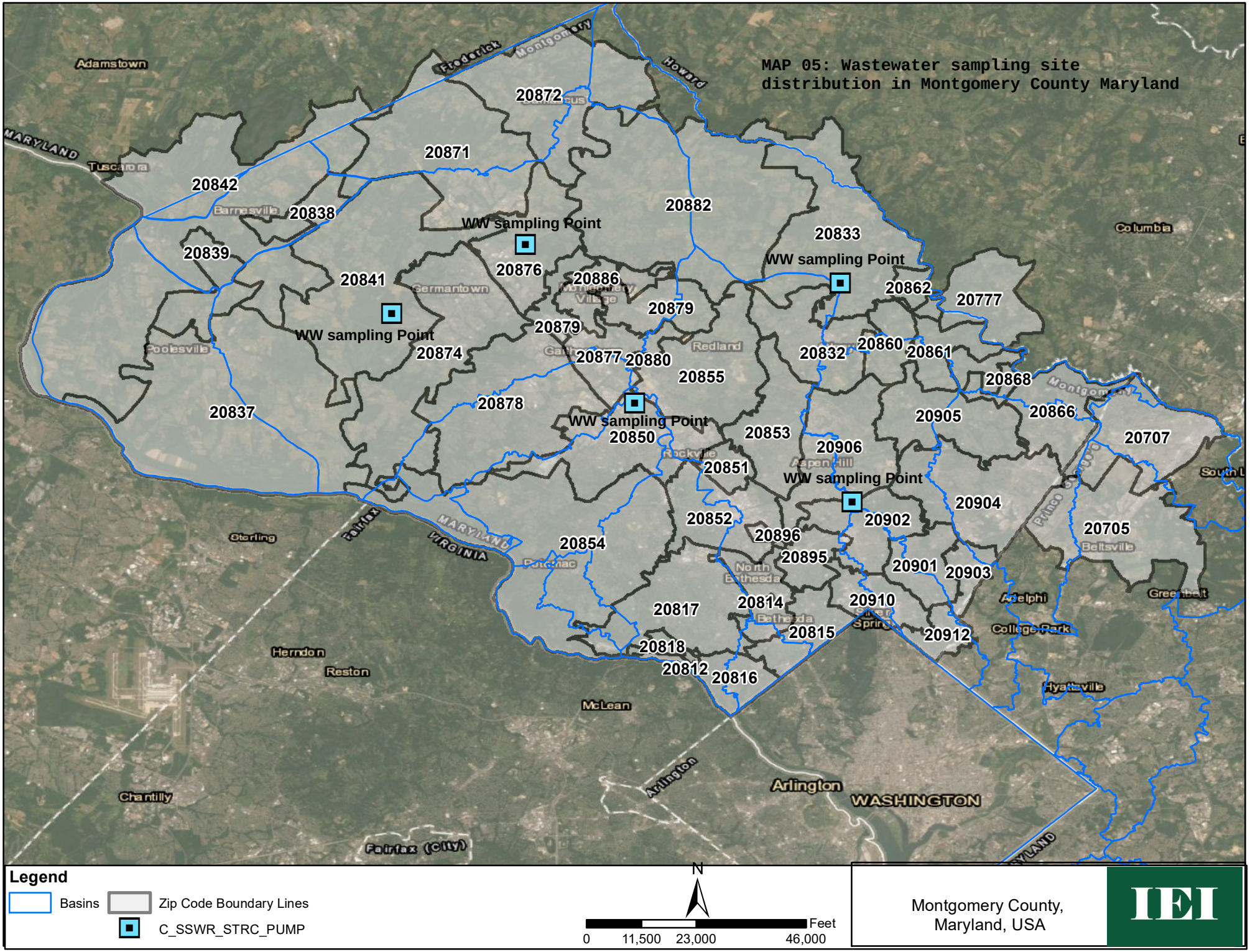
PCSA	Sewer network Zip codes which feed to the location (Based on sewer basin maps)	Site Name and Address	Sampling Location Description	SDI	Case rate
Olney	20832, 20833	Reddy Branch (05179001P) 2611 Brighton Dam Rd, Brookville MD 20833	Wet well. Depth 30 Ft, Daily Average flow is 64,000 Gallons/day	Medium	Medium

The simplified maps 4-5 presented in the following pages showcase the distribution of the sampling sites in Montgomery County and the sewer basin and mini basin demarcations.

The maps were created with data provided by WSSC.

Appendix 1 provides full site visit notes collected on site visits conducted on October 18th 2022.


MAP 04: Wastewater sampling site distribution in Montgomery County Maryland
Adamstown
Frederick
Montgomery
Howard
MARYLAND
Tuscarora
Barnesville
Poolesville
Columbia
Rockville
Gaithersburg
Montgomery Village
Olney
Sandy Spring
Silver Spring
Takoma Park
Adelphi
Greenbelt
College Park
Hyattsville
Bethesda
Potomac
Fairfax
VIRGINIA
Sterling
Herndon
Reston
McLean
Arlington
Chantilly
Fairfax (city)
WASHINGTON
20872
20871
20842
20838
20882
20839
20841
20876
20886
20879
20879
20874
20877
20880
20855
20878
20837
20850
20853
20906
20851
20852
20854
20896
20895
20817
20814
20818
20815
20812
20816
20910
20912
20901
20903
20904
20902
20705
20905
20866
20707
20868
20860
20861
20832
20862
20777
20833
WW Sampling Point
WW Sampling Point
WW Sampling Point
WW Sampling Point
WW Sampling Point
Legend
Basins
Minibasins
Zip Code Boundary Lines
C_SSWR_STRC_PUMP
N
0
11,500
23,000
46,000
Feet
Montgomery County, Maryland, USA
IEI


MAP 05: Wastewater sampling site distribution in Montgomery County Maryland
20872
20871
20842
20838
20839
20841
20882
20833
20876
20886
20862
20777
20879
20879
20874
20877
20880
20832
20860
20861
20855
20868
20878
20866
20905
20853
20850
20906
20707
20851
20904
20852
20902
20705
20896
20854
20895
20901
20903
20817
20814
20910
20815
20912
20818
20812
20816
WW sampling Point
WW sampling Point
WW sampling Point
WW sampling Point
WW sampling Point
Adamstown
Frederick
Howard
Columbia
Barnesville
Germantown
Poolesville
Redland
Rockville
Aspen Hill
Sterling
Fairfax
Potomac
North Bethesda
Bethesda
Silver Spring
Adelphi
Greenbelt
College Park
Beltsville
Herndon
Reston
McLean
Arlington
Chantilly
Fairfax (city)
WASHINGTON
Hyattsville
MARYLAND
VIRGINIA
Legend
Basins
Zip Code Boundary Lines
C_SSWR_STRC_PUMP
N
0
11,500
23,000
46,000
Feet
Montgomery County, Maryland, USA
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Appendix 1

Complete Site Visit Notes.

Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	Arcola WWTP - (06068001P)
Address	2001 Henderson Avenue, Wheaton
Zip Code	MD 20902
PCSA area	Silver Spring
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	Pump Station
Station Pumps to	Blue Plains
Unit in a secure area	Yes. Lot of foot traffic in area. Unit requires to be inside the building for security. Outside is not an option. Not gated or fenced in the back
Electric outlet available	Yes
Distance from point to electric outlet	Adjacent
Distance to suction point (Ft)	20 Ft
Depth from point to flow (Ft)	7 Ft
Available upstream/downstream sampling points (Address; POC information)	None
Collection from sewer network area?	20901, 20902,20903, 20906, 20910, 20912, 20832(GIS Analysis)
Other	This is a shallow wet well. Flow rate is 13,000 - 25,000 Gallons per day.

Arcola - Images

Arcola WWPS wet well and the conduit for possible tube insert.

Arcola WWPS wet well top view.

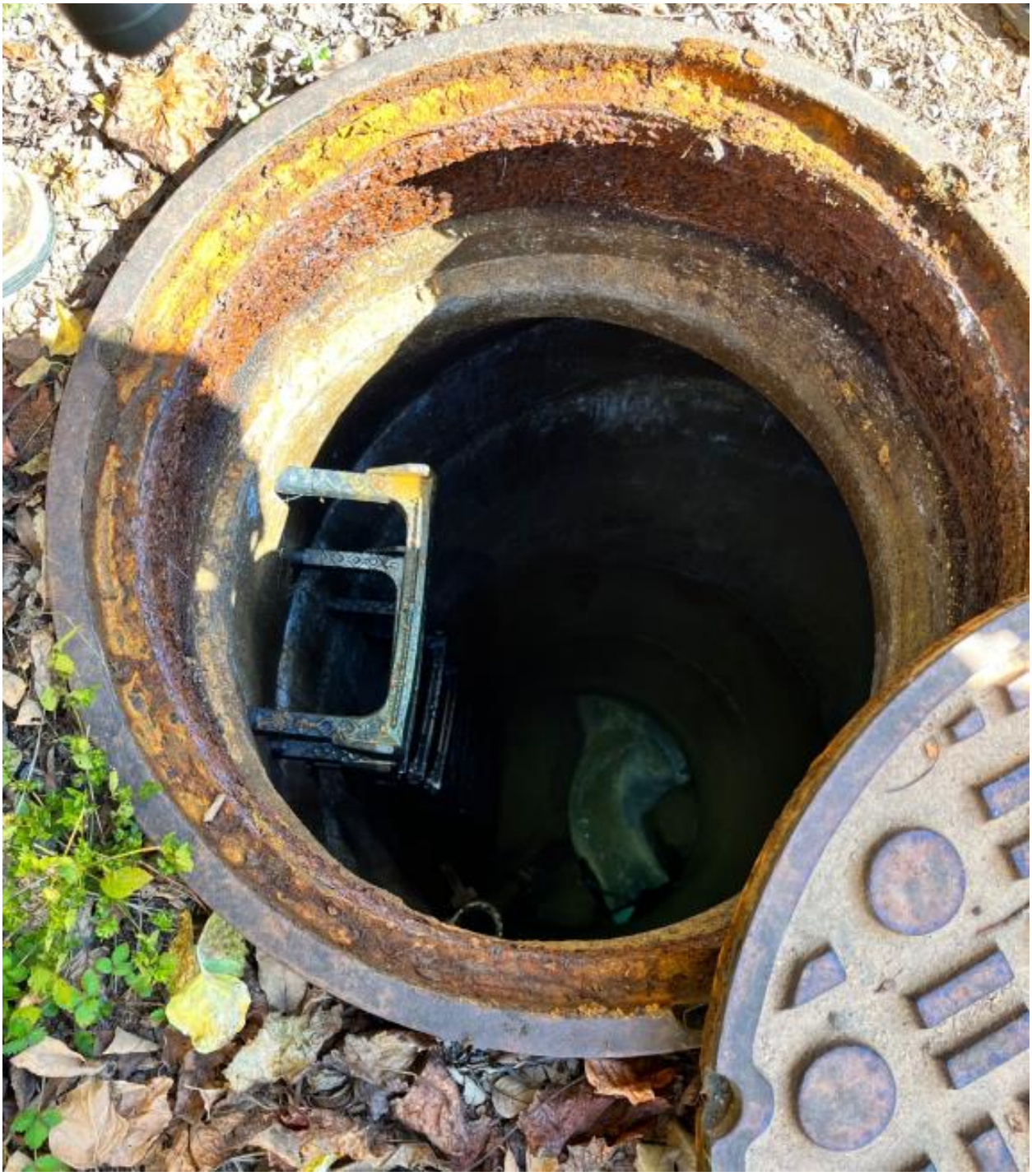
Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	King Farm WWPS - (16997001P)
Address	315 Pure Spring Crescent Rockville
Zip Code	MD 20850
PCSA area	Gaithersburg/Germantown/Damascus
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	Pump Station
Station Pumps to	Blue plains
Unit in a secure area	No
Electric outlet available	Possible to draw an electric line from an adjacent shed. Not for manhole.
Distance from point to electric outlet	
Distance to suction point (Ft)	About 35-40 Ft
Depth from point to flow (Ft)	Wet well is pproximately 30 ft. Manhole is about 15 ft depth
Available upstream/downstream sampling points (Address; POC information)	Yes. Manhole with much less depth. Two manholes available but the smaller one out of the two would be preferred.
Collection from sewer network area?	20850, 20854
Other	This is the only station from Rockville. Flow Rate is 975,000 gallons per day. 3600 gallons/minute. If using the manhole use the GLS unit with bracketing. Some shopping centers feed into it.

King Farm - Images

From Top - View into the well at King Farm WWPS



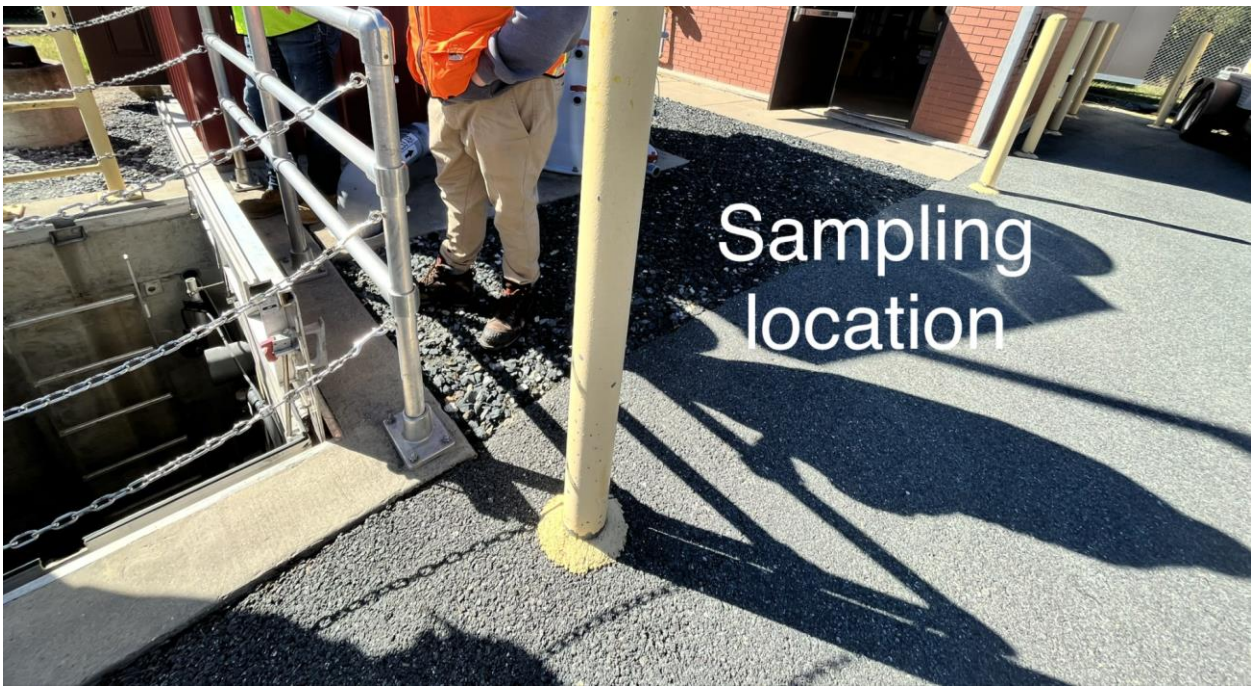
From Top – View into the manhole adjacent to King farm WWPS. Sewer running into the pump station.

Adjacent Manhole locations at King Farm WWPS.

Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	Preserve at Rock Creek - (05143001P)
Address	16621 Heartwood Drive, Rockville
Zip Code	MD 20855
PCSA area	Rockville
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	Pumping Station
Station Pumps to	Blue plains
Unit in a secure area	Secure, Inside a chamber
Electric outlet available	Yes
Distance from point to electric outlet	adjacent to unit
Distance to suction point (Ft)	
Depth from point to flow (Ft)	30 Ft
Available upstream/downstream sampling points (Address; POC information)	Two possible sampling points. One before injection of chemical and one after injection.
Collection from sewer network area?	20853, 20855
Other	A chemical injection occurs every hour on the hour. The chemical is to breakdown fats, oils and greese (FOG). Flow rate 15,000 gallons/day. Significantly low flow at night.



Deep wet well access at Rock creek wastewater pump station (WWPS)

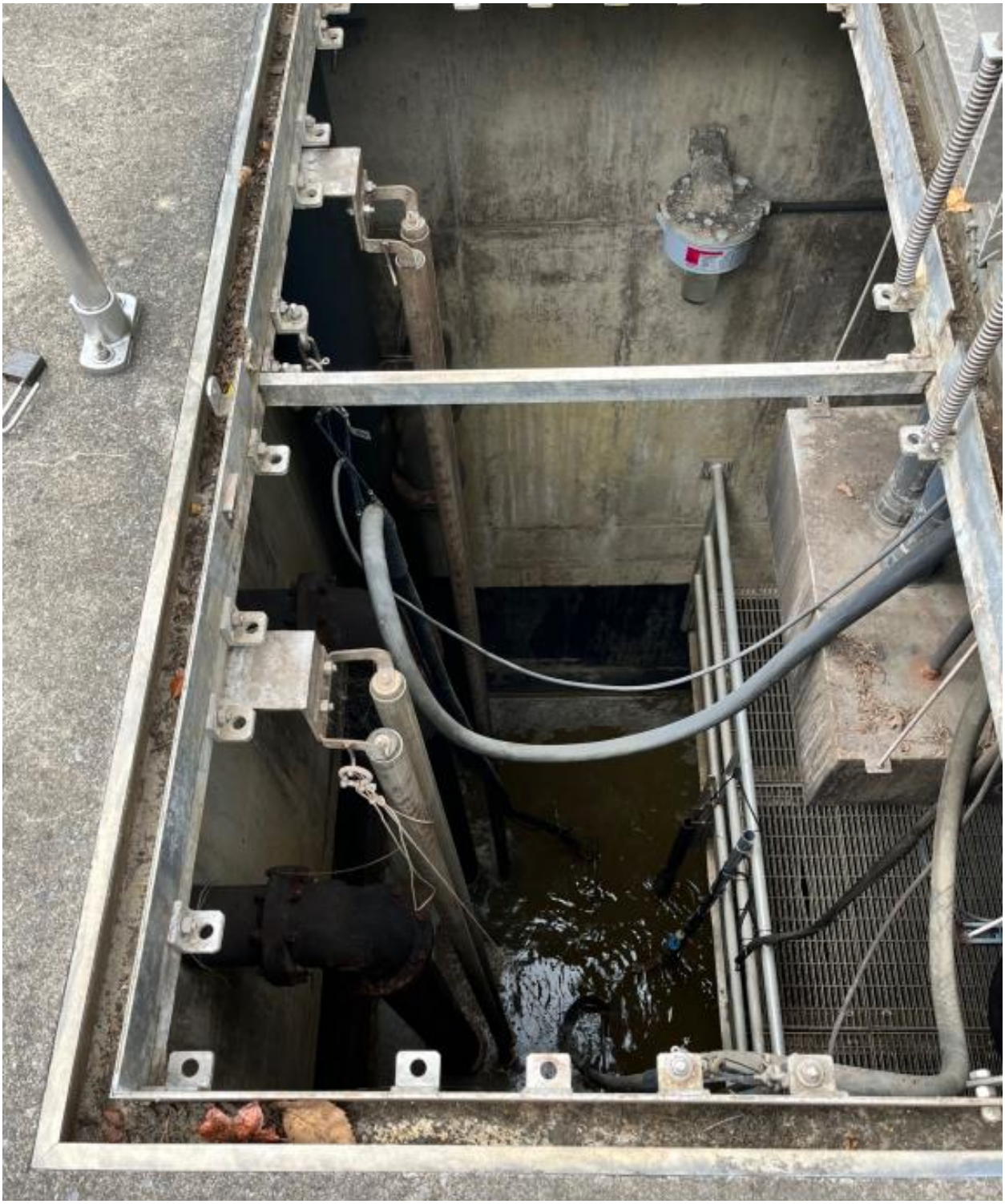
Hourly Chemical injection to sewer flow for F.O.G (Fats, oils and grease) breakdown at Rock Creek WWPS

Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	Hoyles Mill (15071001P)
Address	15001 Hoyles Mill Rd, Boyds
Zip Code	MD 20841
PCSA area	Poolsville
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	Pumping station
Station Pumps to	Seneca WRRF
Unit in a secure area	Gated and fenced in. Secure
Electric outlet available	Yes, but may need to use the battery because the unit will stand outsid
Distance from point to electric outlet	5ft
Distance to suction point (Ft)	About 20 ft
Depth from point to flow (Ft)	20 ft
Available upstream/downstream sampling points (Address; POC information)	Manhole behind it is only 10-12 Ft in depth. Preferred sampling point
Collection from sewer network area?	20841, 20874
Other	Daily Flow rate - 295,000 Gallons/day.

Hoyles Mill wet well access point.



Inside the wet well at Hoyles Mill pump station

Adjacent Manhole at Hoyles Mill WWPS

Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	Reddy Branch (05179001P)
Address	2611 Brighton Dam Rd, Brookville
Zip Code	MD 20833
PCSA area	Olney
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	Pump station
Station Pumps to	Blue Plains
Unit in a secure area	Yes
Electric outlet available	Yes
Distance from point to electric outlet	No more than 5 ft
Distance to suction point (Ft)	30 ft
Depth from point to flow (Ft)	10-15 Ft
Available upstream/downstream sampling points (Address; POC information)	No adjacent manholes observed
Collection from sewer network area?	20832, 20833
Other	Has a conduit to run the tubing through. Daily Average flow is 64,000 Gallons/day. Depth is a concern unless the unit is mounted inside the first under ground level, which requires to be opened up by a WSSC person and air quality measures need to be taken before entering. Confine space entry risk. Probably not able to change tubing as often, so need a mechanism to flush out the tube periodically.

Wet well at Reddy Branch WWPS

The ground level floor for composite unit placement and the conduit for tubing.

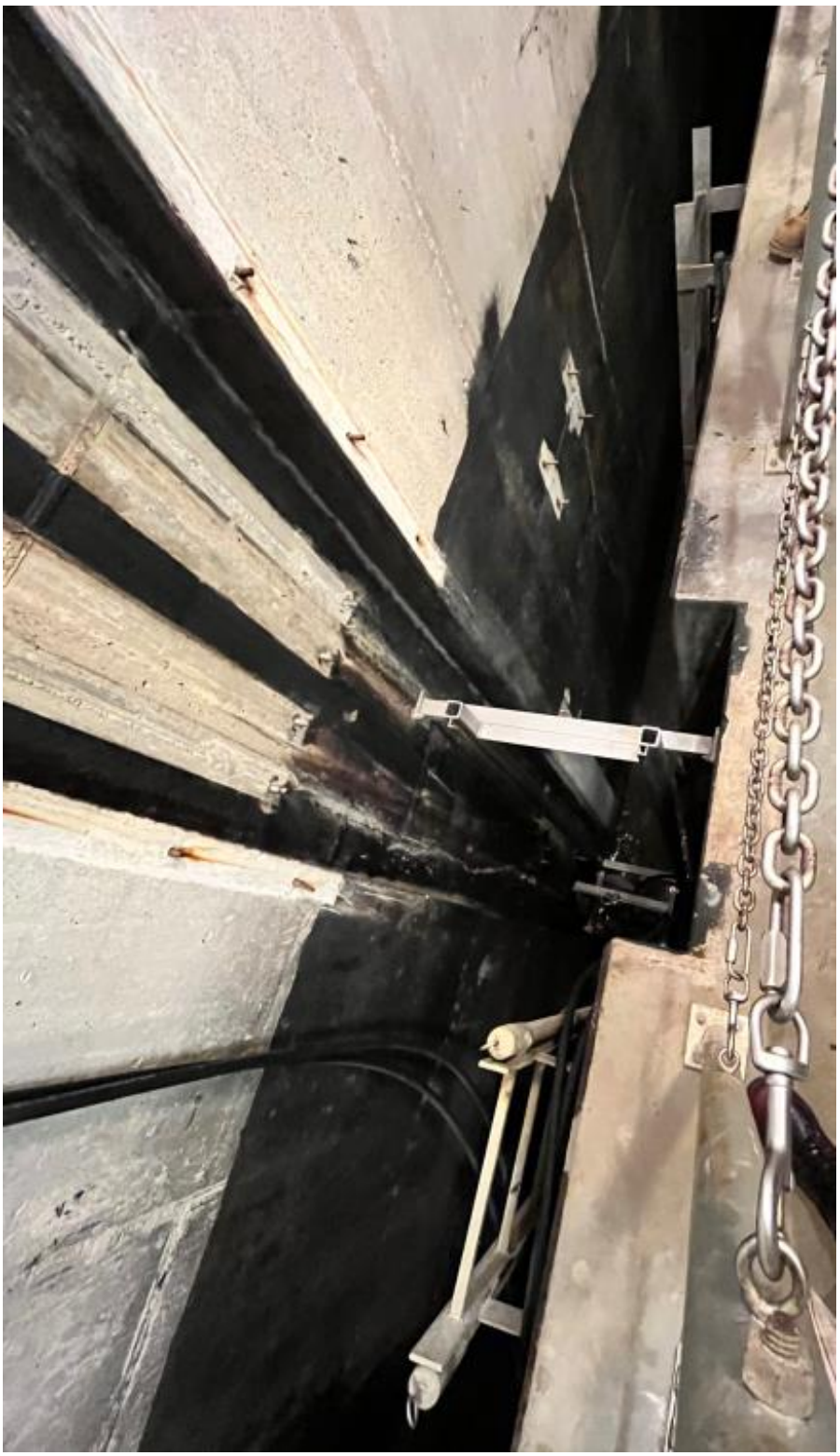
Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	Olney WWPS (26004001P)
Address	18823 Quarrymen Terrace Brookville
Zip Code	MD 20833
PCSA area	Olney
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

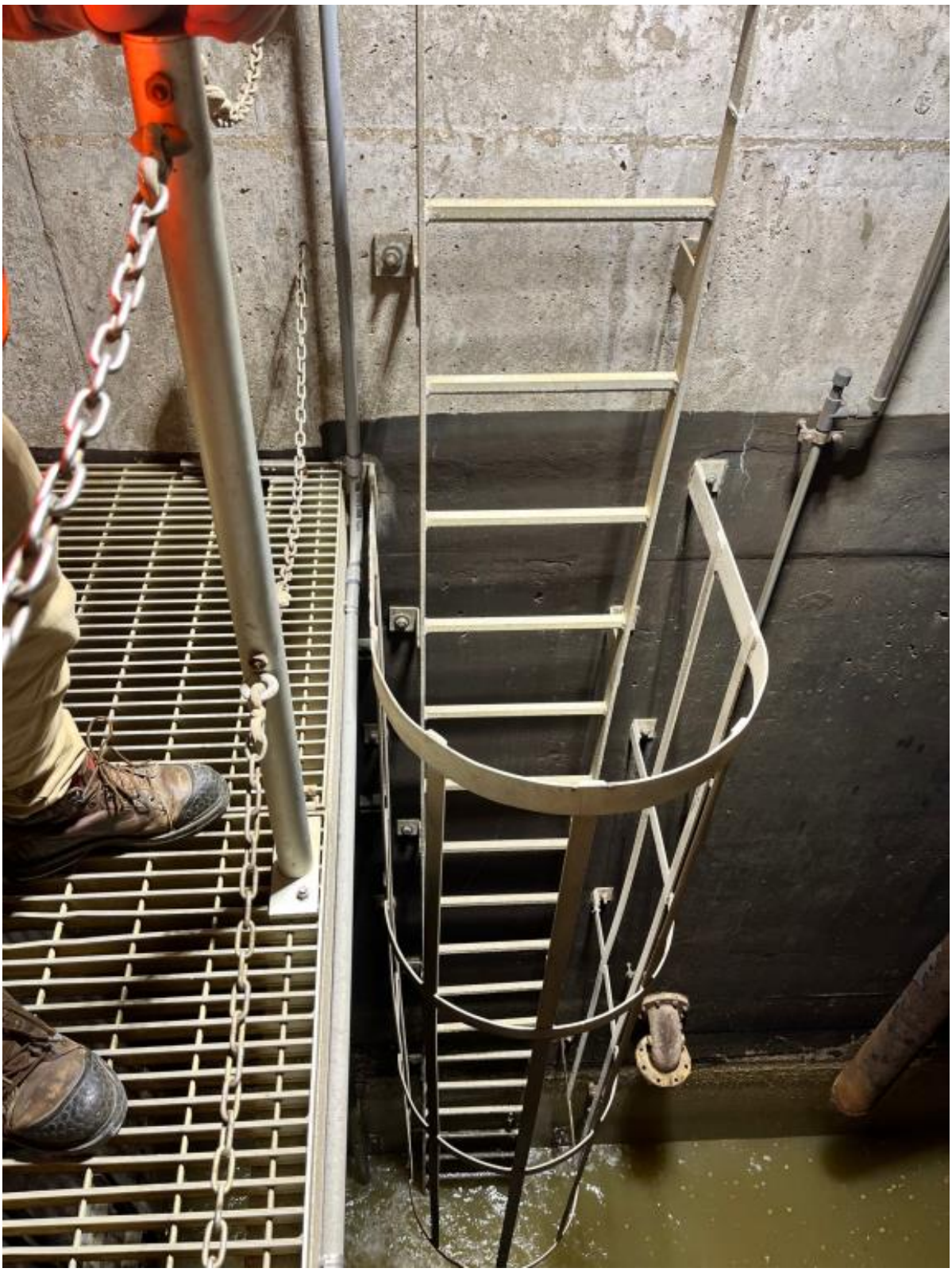
WWTP/ Pumping Station/Manhole	Pump station
Station Pumps to	Blue Plains
Unit in a secure area	Yes. Inside
Electric outlet available	Yes.
Distance from point to electric outlet	2 Ft
Distance to suction point (Ft)	
Depth from point to flow (Ft)	Approximately 22 Ft Vertical. More (5-8 ft) if you account for the horizontal distance which is necessary.
Available upstream/downstream sampling points (Address; POC information)	
Collection from sewer network area?	20833, 20832
Other	Flow rate just under a million. Significant influent from a hospital. The unit have to be moved out of the way if they need to perform grinder repairs.

Outside entrance to wet well at Olney WWPS. Approximately 25 ft Deep.

Inside chamber for composite sampler unit placement at Olney.



Deep wet well at Hoyles WWPS



Deep wet well at Hoyles WWPS

Montgomery County Waste water monitoring for COVID-19
Site Visit Check List

Site Name	North Branch
Address	18234 B Wickham Rd, Olney
Zip Code	MD 20832
PCSA area	Olney
POC Name and Number	JEFFREY BERNIER, Section Manager – Plant Engineering 301.206.7905 (O) 240.521.4462 (C) jeffrey.bernier@wsscwater.com

WWTP/ Pumping Station/Manhole	pump station
Station Pumps to	blue plains
Unit in a secure area	unit will stand outside. Gated, fenced in, secured area
Electric outlet available	has the ability to get an extension code out. Battery will be the most likely
Distance from point to electric outlet	
Distance to suction point (Ft)	about 26-30 Ft
Depth from point to flow (Ft)	About 25-30 Ft
Available upstream/downstream sampling points (Address; POC information)	None
Collection from sewer network area?	20855, 20853, 20851,
	More pressured flow. Contain the composite sampler unit inside a upside down 55gallon plastic drum to prevent freezing. Secure the outside tubing in a pool noodle to prevent freezing during winter months. There is a pipe line that lets air into the chamber, which can be utilized to send our tubing in. Flow Rate - 140, 000 gallons a day

6

North Branch WWPS wet well entrance

North Branch WWPS wet well entrance

North Branch wet well air supply pipe as the possible access point for sample tube line.