



PROJECT DESIGN AND SAMPLING PLAN

Sampling Domestic Wells Located Downgradient of Four Biosolids and/or Wastewater Disposal Sites for PFAS

Department of Natural Resources and Environmental Control

Division of Water

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Table of Contents

1.0 INTRODUCTION	4
2.0 CLEAN DELAWARE New Market BIOSOLIDS APPLICATION SITE.....	9
2.1 Background Information	9
2.2 Downgradient Domestic Well Sampling	9
3.0 CLEAN DELAWARE HARBESON BIOSOLIDS APPLICATION SITE	11
3.1 Background Information	11
3.2 Downgradient Domestic Well Sampling	11
4.0 SYNAGRO/TOWN OF GEORGETOWN BIOSOLIDS/WASTEWATER APPLICATION SITE	13
4.1 Background Information	13
4.2 Downgradient Domestic Well Sampling.....	13
5.0 INLAND BAYS BIOSOLIDS/WASTEWATER APPLICATION SITE.....	18
5.1 Background Information	18
5.2 Downgradient Domestic Well Sampling	18
6.0 SAMPLE IDENTIFICATION AND LABELING	22
7.0 QUALITY ASSURANCE AND QUALITY CONTROL	22
8.0 SAMPLING FREQUENCY AND PROJECT SCHEDULE	22
9.0 SUMMARY	23
REFERENCES	23



List of Tables

Table 1. Groundwater discharge sites selected for PFAS in wastewater study.....	5
Table 2. USEPA PFAS MCLs for Drinking Water (US EPA, 2024)	7
Table 3. Selected Domestic Wells to be Sampled near Clean Delaware New Market Site	9
Table 4. Selected Domestic Wells to be Sampled near Clean Delaware Harbeson Site	11
Table 5. Selected Domestic Wells to be Sampled near Town of Georgetown / Synagro Site	14
Table 6. Selected Domestic Wells to be Sampled near Town of Georgetown Site	16
Table 7. Selected Domestic Wells to be Sampled near Inland Bays Hettie Lingo and Tower Site.....	19
Table 8. Selected Domestic Wells to be Sampled near Inland Bays WWTF Wastewater Disposal Site.....	20

List of Figures

Figure 1. Site Location Map of the Biosolids Domestic Well Study	6
Figure 2. Sampling Location Map near Clean Delaware New Market Site	10
Figure 3. Sampling Location Map near Clean Delaware Harbeson Site.....	12
Figure 4. Sampling Location Map near Synagro/Town of Georgetown Site.....	15
Figure 5. Sampling Location Map near Town of Georgetown East Site	17
Figure 6. Sampling Location Map near Inland Bays Hettie Lingo and Tower Fields.....	19
Figure 7. Sampling Location Map near Inland Bays North and South Burton Fields.....	21



1.0 INTRODUCTION

The initial Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Water (Water) Project Design and Sampling Plan for PFAS in Biosolids was prepared in October 2022 (DNREC, 2022), field sampling was completed in April 2024, and a data summary report is available at <https://dnrec.delaware.gov/waste-hazardous/remediation/pfas/and-wastewater/>. The initial study looked at the concentration of PFAS in biosolids from five different wastewater treatment facilities and the concentration of PFAS in soil and groundwater at one long term biosolids land application site. A second DNREC Water Project Design and Sampling Plan was developed to further study groundwater impacts at five additional biosolids land application sites (DNREC, 2024). This plan was finalized in August 2024, and sampling activities began in November 2024. The second biosolids PFAS study data summary report was published in May 2025 and is available at <https://dnrec.delaware.gov/waste-hazardous/remediation/pfas/and-wastewater/>.

For wastewater disposal facilities, DNREC's initial study looked at seven spray irrigation and rapid infiltration basin facilities. The Project design and sampling plan was initially published in April 2023, revised in October 2023 and sampling began in July 2023 and concluded in July 2024. This data summary report was published in March 2025 and is available at <https://documents.dnrec.delaware.gov/dwhs/remediation/water/PFAS/Wastewater/PFAS-in-Wastewater.pdf>. In November 2025, DNREC published a project design and sampling plan for the sampling of thirty-six additional wastewater treatment and disposal facilities, sampling began in December 2025 and concluded in May 2026. Once published, the data summary report will be posted at <https://dnrec.delaware.gov/waste-hazardous/remediation/pfas/and-wastewater/>.

Laboratory analytical results from samples collected during the aforementioned studies indicated that PFAS compounds are not only present in biosolids and wastewater, but also in soils that have received biosolids application or wastewater disposal and in groundwater sampled from monitoring wells at the application sites.

The next phase of the PFAS study began in February 2026. A study plan to sample domestic wells located downgradient of the Clean Delaware Milton Site was developed, and the plan was implemented in July 2026. domestic wells were sampled for PFAS as part of this study.

This document outlines the next phase of DNREC PFAS studies and addresses the potential presence of PFAS in drinking water samples collected from domestic wells located downgradient of the four remaining biosolids application sites that were not part of the July 2026 study. Two of these facilities (Sussex County Inland Bays and Town of Georgetown/Synagro) have or had shared biosolids application and wastewater disposal facilities. Sites selected for this study are shown in Table 1 and include domestic wells located near facilities sampled during the Phase II wastewater disposal and Phase II biosolids studies. This study will evaluate domestic wells completed within the unconfined aquifer, listed in Sections 2 through 5 of this document (hereafter, the “domestic well study”).



Site Name	Approximate Application Acres	Number of Domestic Wells to be Sampled
Clean Delaware Milton Site*	170	N/A*
Clean Delaware New Market Site ¹	34	11
Clean Delaware Harbeson Site	24	10
Sussex County Hettie Lingo ^{2,3} , Tower Site, and North & South Burton	255	23
Town of Georgetown/ Former Synagro Site Fields 1, 2, 3, 4 ^{4, 5} , Goslee, Prettyman, and Prettyjohn Woods	330	54**

Table 1 - Biosolids and Wastewater Disposal Sites Associated with this PFAS Study

* Domestic wells downgradient of the Clean DE Milton Site were sampled as part of DNREC's February 2026 study.

** Some wells were previously sampled by DNREC WHS.

¹ Application of biosolids and residuals ceased in 2013. Traditional agricultural practices continue at this site.

² Beginning in 1993 through the mid 2000's, Mountaire was permitted to land apply Class B biosolids at this site. Sussex County applied biosolids beginning in the mid 2000's and ceased application in 2012.

³ Spray irrigation activities began in 2012 on the north end of the field and by 2017 the entire field was dedicated to spray irrigation.

⁴ Fields 22 and 24 were formerly known as field 7. Currently under the spray irrigation program, field 22 is known as fields 2 and 3 and field 24 is known as field 4.

⁵ Spray irrigation activities began in 2009 and continue to date. Class B biosolids application began in 1993 and ceased in 2016.

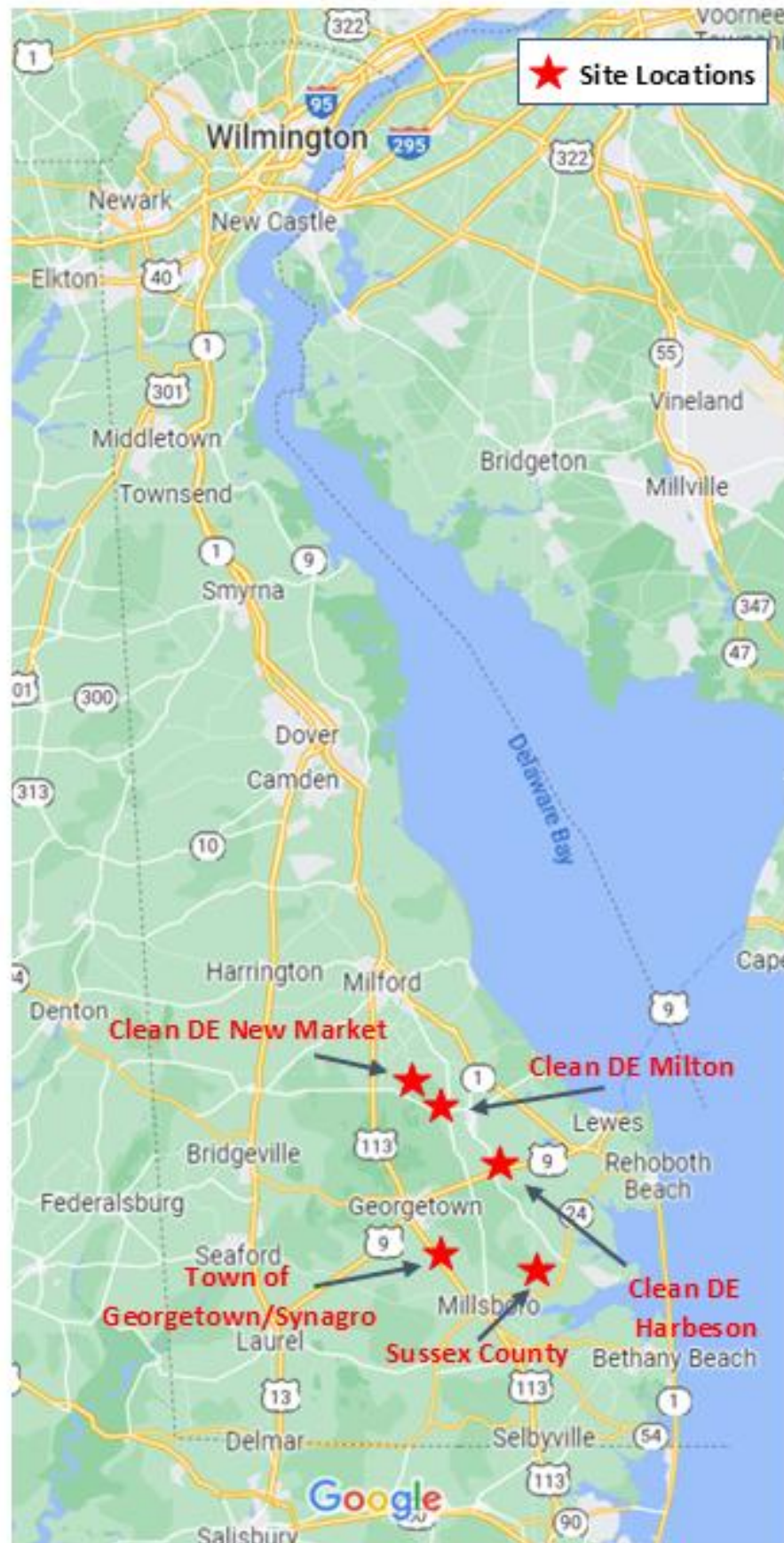


Figure 1. Site Location Map of the Biosolids and Wastewater Disposal Facility Domestic Well Study.



As research on PFAS and their potential impacts continues to evolve, Drinking Water Standards may be revised. The most current drinking water standards from USEPA can be found at <https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas>. As of September 2026, EPA’s 2024 PFAS National Primary Drinking Water Regulation (NPDWR) established the standards presented in Table 2; however, EPA has proposed changes to several of these standards.

Compound	Final MCLG	Final MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (ppt) (also expressed as ng/L)
PFOS	Zero	4.0 ppt
PFHxS	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
HFPO-DA (commonly known as GenX Chemicals)	10 ppt	10 ppt
Mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS	1 (unitless) Hazard Index	1 (unitless) Hazard Index

Table 2. USEPA PFAS Drinking Water MCLs (MCLG = maximum contaminant level goal)

Maximum Contaminant Levels (MCLs) for drinking water are established under the USEPA National Primary Drinking Water Regulations (USEPA, 2009). MCLs for several PFAS compounds were established by the USEPA in April 2024 (USEPA, 2024a). These criteria are applicable to finished drinking water only (after treatment) under the NPDWR for regulated public drinking water systems, and not to “raw” water samples collected from a surface water body or from groundwater. In addition to the MCLs for PFNA, PFHxS, PFBS and/or HFPO-DA, these compounds are to be combined and used in the calculation of a Hazard Index MCL, as noted on USEPA’s website (USEPA, 2024b), to determine whether an exceedance of the Hazard Index criterion has occurred.

In May 2026, USEPA proposed rescinding the drinking water regulations for PFHxS, PFNA, HFPO-DA, and the Hazard Index mixture of these three PFAS plus PFBS, while retaining the PFOA and PFOS MCLs. These proposed changes had not been finalized as of September 2026. DNREC and the Department of Health and Social Services, Division of Public Health (DPH) have retained the 2024 EPA MCLs for PFAS in public drinking water systems when evaluating domestic wells. Regardless of future regulatory changes, all PFAS analytical results generated during this study will be retained and may be reevaluated using updated regulatory criteria as they become available.

Currently, when PFAS are detected in private drinking water in Delaware at concentrations above the USEPA’s established MCLs for public water systems for PFAS compounds listed in Table 2, DNREC implements a response plan. The response plan may include mitigation, monitoring and studies to determine alternate sources of drinking water and/or water treatment to ensure that water supplies are safe to consume. USEPA’s MCLs are used as threshold concentrations to characterize the downgradient areas for mitigation and have been used by DNREC as threshold concentrations since the values were proposed by EPA in March 2023.



USEPA's MCLs were used to evaluate the levels of PFAS in groundwater sampled from on-site monitoring wells and will also be used to detect the potential existence of PFAS in downgradient domestic wells. The Project Design and Sampling Plan (DNREC, 2024) indicated that four groundwater samples would be collected from each selected on-site monitoring well to detect possible seasonal change and to raise the statistical confidence level of the data. However, upon reviewing two quarters of monitoring well data, a determination was made that sufficient monitoring well data had been collected to identify PFAS concentrations exceeding applicable drinking water thresholds and to characterize groundwater conditions warranting downgradient domestic well sampling. At this time, a determination was made that more than two quarters of data was unnecessary and downgradient domestic wells require sampling for PFAS in accordance with this Project Design and Sampling Plan.

Hydrogeological reports prepared by the wastewater treatment facilities as well as by DNREC Water staff were reviewed to determine the groundwater flow direction in the land application areas. Geographic Information System (GIS) mapping, available hydrogeologic data, groundwater flow maps, and well location data were used to identify downgradient domestic wells proximate to site boundaries. Three zones were further delineated to prioritize sequence of sampling: 0 – 500 ft (Zone 1), 500 – 1,000 ft (Zone 2), and 1,000 ft – 1,500 feet (Zone 3). Only domestic wells that are known or believed to be screened in the unconfined aquifer (*shallow wells*) will be sampled. While DNREC's intent is to primarily sample domestic wells in Zone 1, sampling activities will also include select domestic wells from Zone 2 and Zone 3 based on the approximate groundwater flow direction and universe of closer monitoring wells to the study sites. The inclusion of select domestic wells in Zone 2 and Zone 3 during initial sampling activities will help ensure off-site migration of PFAS impacted groundwater is not missed. Should domestic well results from this study indicate additional sampling is appropriate downgradient of sites beyond Zone 3, additional sampling will be conducted in the second phase of this study.

2.0 CLEAN DELAWARE NEW MARKET SITE BIOSOLIDS APPLICATION SITE

2.1 Background Information

The Clean Delaware New Market Site Class B biosolids application site was historically permitted for the land application of sludge (biosolids) from 1992 to 2013. Biosolids were required to be treated to Class B pathogen reduction requirements prior to being accepted by Clean Delaware for land application. Additional land- applied materials include brewery wastewater and grease trap waste. The site was originally permitted in 1992 and consists of approximately 34 acres of land suitable for application. The Project Design and Sampling Plan (DNREC, 2024) contains detailed descriptions of site operations, site layout and the locations of PFAS sampling from on-site groundwater monitoring wells.

In general, groundwater flows to the north and northeast beneath the application area. Four groundwater monitoring wells were selected for the PFAS in Biosolids Study, 1 upgradient, 1 side-gradient, and 2 downgradient. One or more of the 2 downgradient wells sampled were above USEPA's MCLs for PFOA, PFOS, and PFHxS. Sampling of downgradient domestic shallow wells has, therefore, been prioritized.

2.2 Downgradient Domestic Well Sampling

A total of 11 domestic wells in Zone 1 were identified downgradient of the Clean Delaware New Market land application site. DNREC will request permission to sample all domestic wells listed in Table 3 as part of this study. There were no downgradient domestic wells in Zones 2 and 3. Table 3 provides basic information about these wells and Figure 2 shows the location of the wells relative to the site.

Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
NM-DW01	54	3/18/2004	Ellendale, DE	1
NM-DW02	55	2/20/1985	Ellendale, DE	1
NM-DW03	50	6/22/1985	Ellendale, DE	1
NM-DW04	65	3/23/1988	Ellendale, DE	1
NM-DW05	54	6/8/1990	Ellendale, DE	1
NM-DW06	Unknown	Unknown	Ellendale, DE	1
NM-DW07	Unknown	Unknown	Ellendale, DE	1
NM-DW08	Unknown	Unknown	Ellendale, DE	1
NM-DW09	Unknown	6/8/1990	Ellendale, DE	1
NM-DW10	Unknown	5/8/1990	Ellendale, DE	1
NM-DW11	Unknown	3/18/2004	Ellendale, DE	1

Table 3. Selected Domestic Wells to be Sampled near Clean Delaware New Market Application Site.

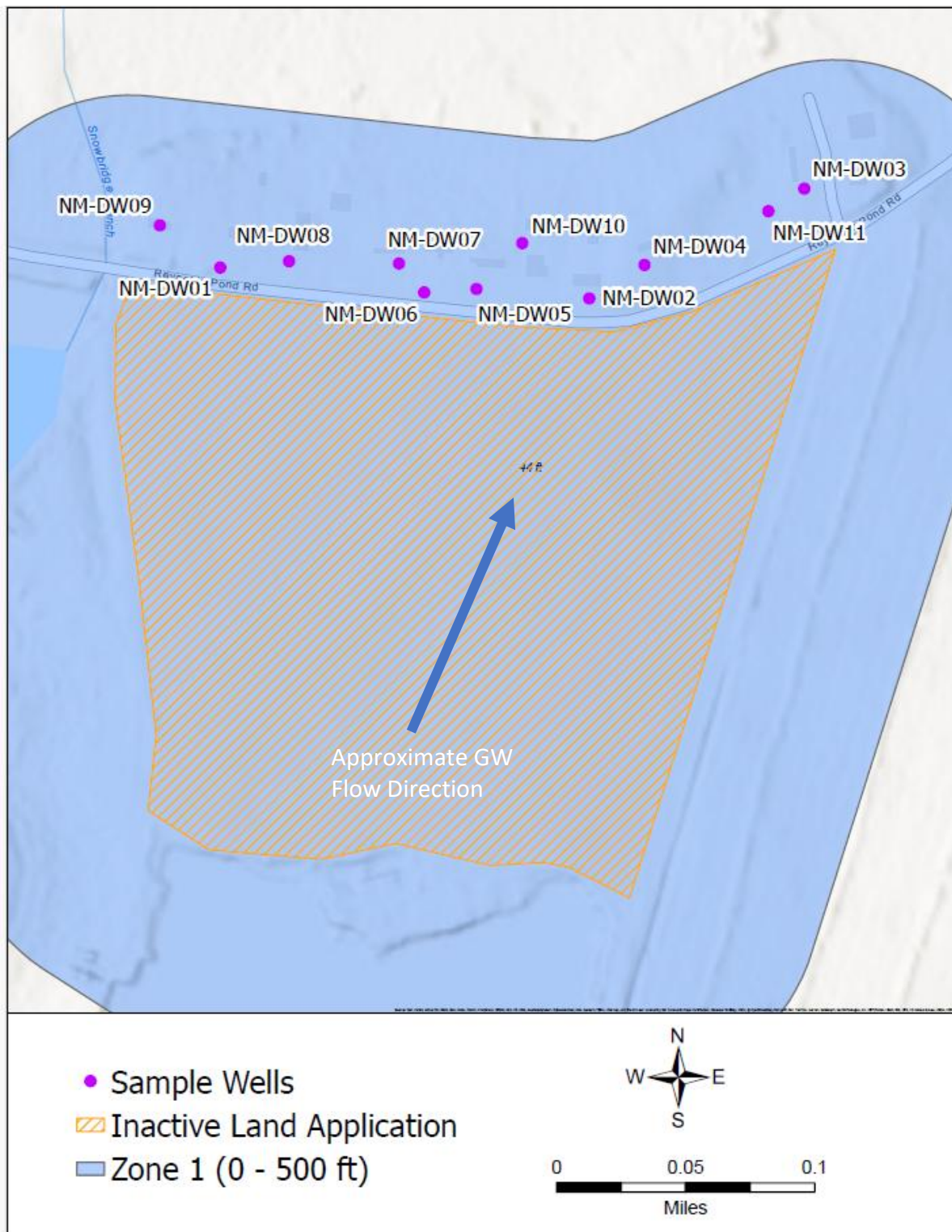


Figure 2. Sampling Location Map adjacent to Clean Delaware New Market Site.

3.0 CLEAN DELAWARE HARBESON SITE BIOSOLIDS APPLICATION SITE

3.1 Background Information

The Clean Delaware Harbeson Site Class B biosolids application site is permitted and currently actively utilized for the land application of sludge (biosolids). Biosolids are required to be treated to Class B pathogen reduction requirements prior to being accepted by Clean Delaware for land application. Additional materials land applied include brewery wastewater and grease trap waste. The site was originally permitted in 1992 and consists of approximately 24 acres of land suitable for application. The Project Design and Sampling Plan (DNREC, 2024) contains detailed descriptions of site operations, site layout, and the locations of PFAS sampling from the on-site groundwater monitoring wells.

In general, groundwater flows to the northeast beneath the application area. Four groundwater monitoring wells were selected for the PFAS in Biosolids Study, including one upgradient well and three downgradient wells. Due to an unusually low water table during sampling activities, to date it was only possible to collect one sample from the upgradient monitoring well. One or more of the three downgradient wells sampled were above USEPA's MCLs for PFOA, PFOS, PFNA and PFHxS. Sampling of downgradient domestic shallow wells has, therefore, been prioritized.

3.2 Downgradient Domestic Well Sampling

A total of 10 domestic wells in Zone 1 were identified downgradient of the Clean Delaware Harbeson land application site. DNREC will request permission to sample all domestic wells listed in Table 4 during this study. There was one well in Zone 2 and no downgradient wells in Zone 3. Table 4 provides basic information about these wells and Figure 3 shows the location of the wells relative to the site.

Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
CH-DW01	68	7/17/1998	HARBESON, DE	2
CH-DW02	55	6/14/1977	HARBESON, DE	1
CH-DW03	77	4/26/1978	HARBESON, DE	1
CH-DW04	70	11/2/2005	HARBESON, DE	1
CH-DW05	Unknown	Unknown	HARBESON, DE	1
CH-PW06	Unknown	Unknown	HARBESON, DE	1
CH-PW07	Unknown	Unknown	HARBESON, DE	1
CH-PW08	Unknown	Unknown	HARBESON, DE	1
CH-PW09	Unknown	Unknown	HARBESON, DE	1
CH-PW10	Unknown	Unknown	HARBESON, DE	1

Table 4. Selected Domestic Wells to be Sampled near the Clean Delaware Harbeson Application Site.

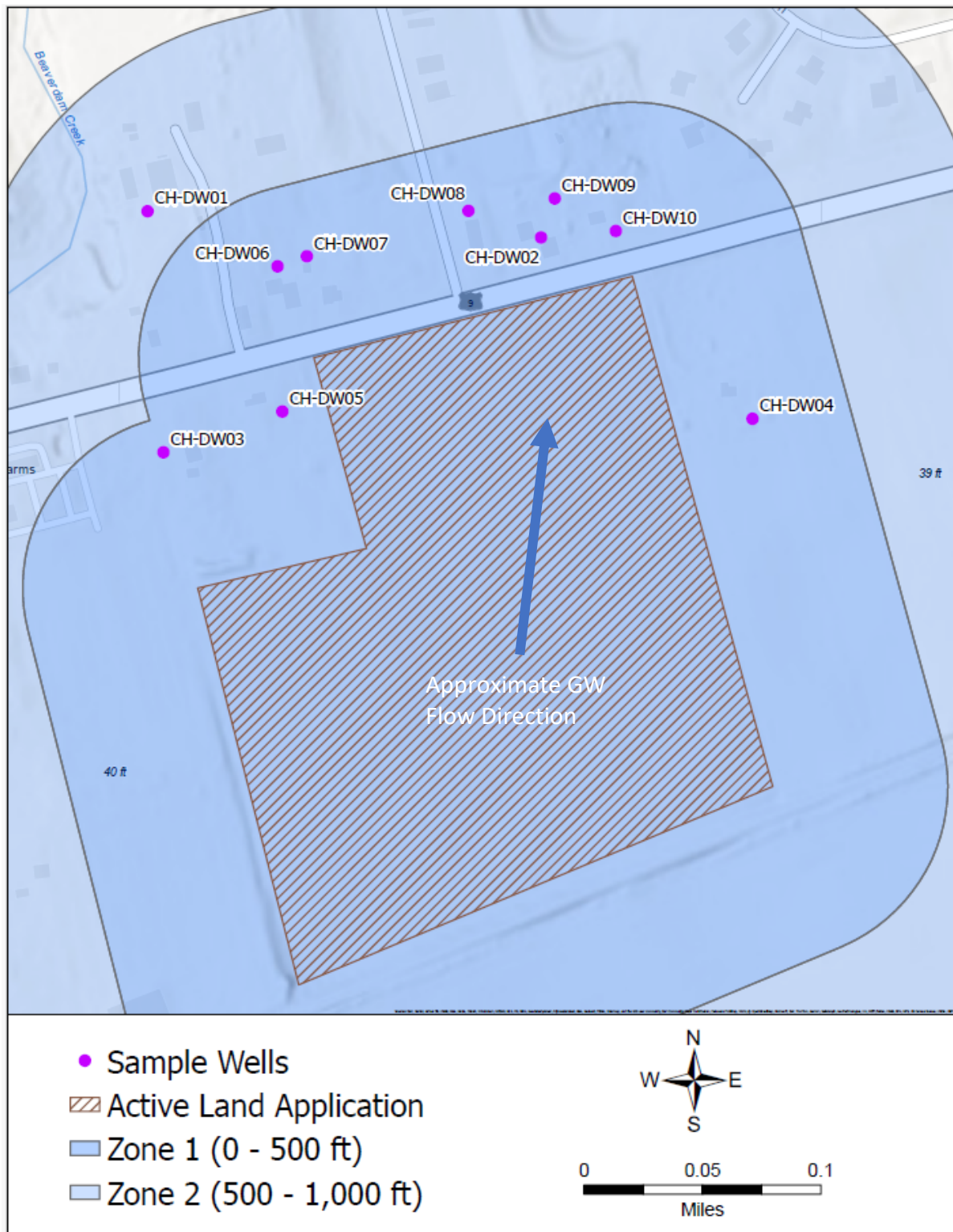


Figure 3. Sampling Location Map adjacent to Clean Delaware Harbeson Application Field.

4.0 TOWN OF GEORGETOWN WASTEWATER DISPOSAL AND FORMER SYNAGRO BIOSOLIDS APPLICATION SITES

4.1 Background Information

The Town of Georgetown is authorized to operate and maintain the WTF to treat domestic wastewater from the Town of Georgetown and to spray irrigate the treated effluent onto permitted agricultural spray fields located in Sussex County, Delaware. The WTF was authorized to operate prior to 1992 and collects wastewater from all residential, commercial, industrial, and institutional facilities within its municipal boundaries. The WTF spray irrigates treated wastewater on land at Town of Georgetown Field 1, Baxter Farms (Field 2, Field 3, Field 4, Goslee Farm, and Prettyman Farm) and Pettyjohn Woods (Figure 4). Historically Class B biosolids, primarily generated at Vlastic foods in Millsboro, DE., were land applied for 23 years (from 1993 to 2016) at Baxter Farms Field 2, Field 3, Field 4, Goslee Farm and Prettyman Farm. The biosolids were comprised of wastewater treatment solids generated in the production of pickle products and wastewater from the site's restrooms. Additionally, Class B biosolids generated from the town of Georgetown, the Town of Selbyville, the Town of Laurel, and other sources as approved by DNREC Water, were also permitted to be applied. The application fields currently receive spray-irrigated wastewater from the Town of Georgetown wastewater treatment facility. Spray Fields 2, 3, and 4 (formerly biosolids application Field 7 and Field 22), along with the Goslee and Prettyman farms, comprise approximately 330 acres of land. This acreage was previously permitted for biosolids application and is currently permitted for spray irrigation. Additionally, Fields 1 and Pettyjohn Woods receive spray irrigated wastewater from the Town of Georgetown. The Project Design and Sampling Plans (DNREC, 2024 and DNREC, 2025) contain detailed descriptions of site operations, site layout and the locations for PFAS sampling from groundwater monitoring wells.

In general, groundwater flows to the east and southeast beneath the application area. Five groundwater monitoring wells were selected for the PFAS in Biosolids Study (1 upgradient, 1 side-gradient, and 3 downgradient) and three additional wells (1 upgradient and 2 downgradient) from dedicated wastewater disposal sites were selected. One or more of the 5 downgradient wells sampled were above USEPA's MCLs for PFOA, PFOS, and PFNA. Sampling of downgradient domestic shallow wells has, therefore, been prioritized.

4.2 Downgradient Domestic Well Sampling

A total of 54 domestic wells were selected at the Town of Georgetown (former Synagro) biosolids application and wastewater disposal sites for this PFAS study (Tables 5 and 6). 43 wells (38 downgradient, three upgradient, and two side-gradient) are nearby the sites shown in Figure 4 and eleven wells (ten downgradient and one upgradient) are in wastewater disposal sites shown in Figure 5. The 22, 24, and 8 selected domestic wells are in Zones 1, 2, and 3, respectively. The domestic wells selected downgradient from Town of Georgetown wastewater disposal fields (Fields 2, 3, 4, Goslee, and Prettyman) are shown in Figure 4 and their basic information is listed in Table 5. Similarly, the wells selected downgradient from Town of Georgetown wastewater disposal fields (Field 1 and Pettyjohn Woods) are shown in Figure 5 and their basic information is listed in Table 6.

Of the 43 domestic wells originally selected for this study in Figure 4, 18 remain. 14 were successfully sampled by DNREC's Division of Waste and Hazardous Substances (WHS) in 2026 as part of a separate PFAS study, prior to the initiation of this study. WHS also attempted to sample 11 additional domestic wells included in the Division of Water's study area; however,



some wells could not be sampled because the property owners could not be contacted or declined to participate. This study will complete sampling of the 18 remaining domestic wells in the Division of Water's study area listed in Figure 4 that were not previously sampled by WHS. Additionally, the 11 domestic wells listed in Figure 5 will also be sampled as part of this study for a total of 29 domestic wells. WHS and the Division of Water use the same laboratories and analytical methods for their sampling efforts. Data collected by WHS from domestic wells listed in Figure 4 will be incorporated into the Division of Water's study report.

Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
SN-DW01	42	11/6/1975	Georgetown, DE	2
SN-DW02	55	2/18/1998	Georgetown, DE	1
SN-DW03	65	8/13/1998	Georgetown, DE	1
SN-DW04	78	7/29/1999	Georgetown, DE	2
SN-DW05	65	1/24/2001	Georgetown, DE	1
SN-DW06	58	3/24/2003	Georgetown, DE	2
SN-DW07	70	5/22/2003	Georgetown, DE	1
SN-DW08	67	2/20/2004	Georgetown, DE	1
SN-DW09	60	Unknown	Georgetown, DE	2
SN-DW10	65	11/2/2004	Georgetown, DE	2
SN-DW11	60	9/21/2004	Georgetown, DE	2
SN-DW12	80	10/18/1976	Georgetown, DE	2
SN-DW13	58.5	6/8/1977	Georgetown, DE	3
SN-DW14	80	2/27/1998	Georgetown, DE	1
SN-DW15	79	9/18/1995	Georgetown, DE	2
SN-DW16	70	1/28/1993	Georgetown, DE	3
SN-DW17	60	11/29/1991	Georgetown, DE	3
SN-DW18	58	7/7/1994	Georgetown, DE	2
SN-DW19	60	7/25/2006	Georgetown, DE	1
SN-DW20	65	10/1/2007	Georgetown, DE	1
SN-DW21	80	5/16/2013	Georgetown, DE	1
SN-DW22	50	7/10/2015	Georgetown, DE	1
SN-DW23	60	5/23/2016	Georgetown, DE	1
SN-DW24	70	4/15/2016	Georgetown, DE	1
SN-DW25	60	4/6/2017	Georgetown, DE	2
SN-DW26	60	5/11/2017	Georgetown, DE	2
SN-DW27	105	1/4/2018	Georgetown, DE	1
SN-DW28	75	1/13/2021	Georgetown, DE	2
SN-DW29	60	3/24/2021	Georgetown, DE	1
SN-DW30	60	3/23/2021	Georgetown, DE	1
SN-DW31	60	12/1/2021	Georgetown, DE	1
SN-DW32	50	6/16/2022	Georgetown, DE	1
SN-DW33	57	5/25/2023	Georgetown, DE	2
SN-DW34	58	12/11/2024	Georgetown, DE	2
SN-DW35	50	12/6/2024	Georgetown, DE	2
SN-DW36	60	4/25/2025	Georgetown, DE	1
SN-DW37	60	9/2/2025	Georgetown, DE	2
SN-DW38	Unknown	Unknown	Georgetown, DE	1
SN-DW39	Unknown	Unknown	Georgetown, DE	2
SN-DW40	Unknown	Unknown	Georgetown, DE	1
SN-DW41	75	7/13/2006	Georgetown, DE	2
SN-DW42	Unknown	5/5/2015	Georgetown, DE	3
SN-DW43	60	7/22/2021	Georgetown, DE	3

Table 5. Selected Domestic Wells to be Sampled near Town of Georgetown/ Former Synagro Application Fields as shown in Figure 4.

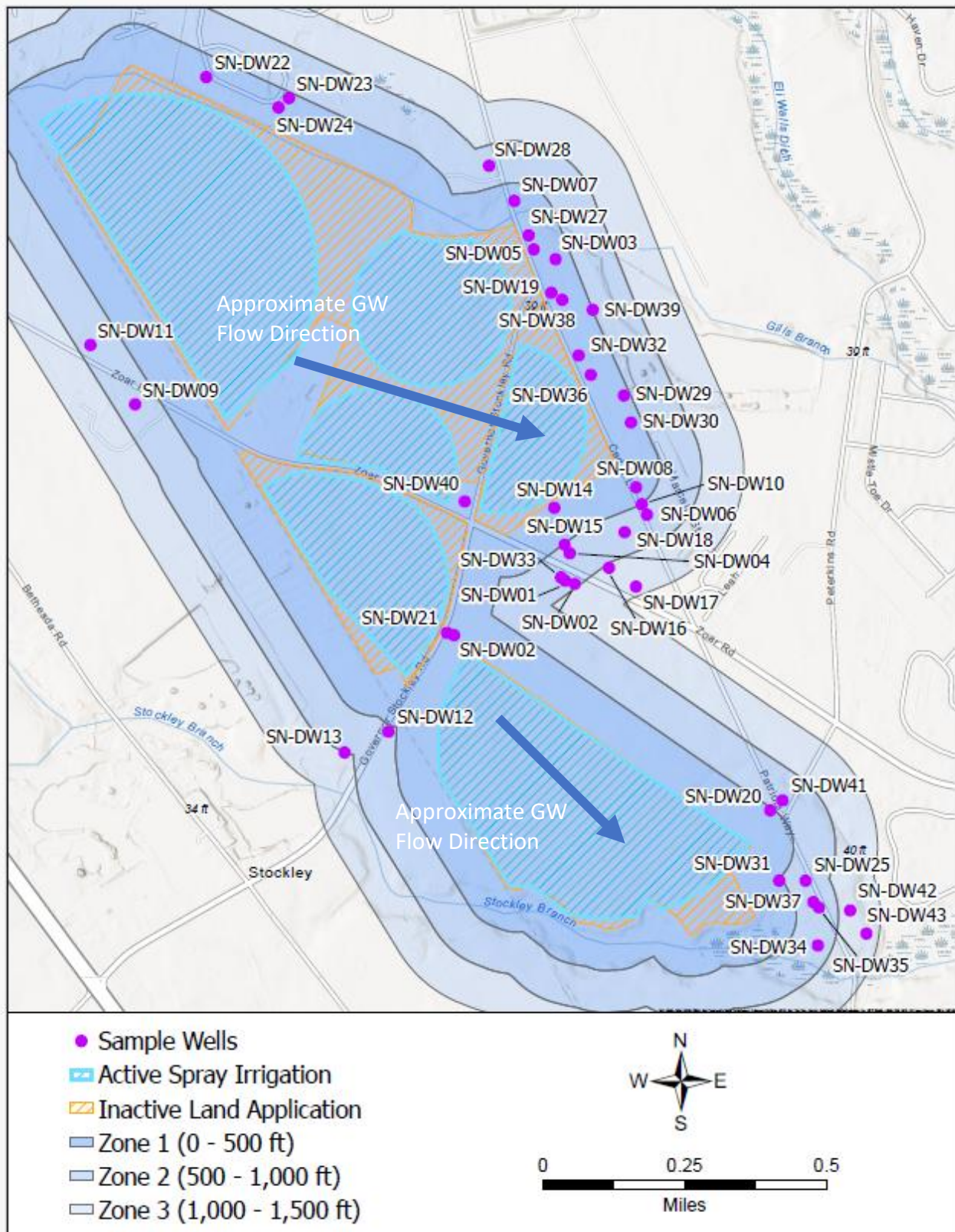


Figure 4. Selected Domestic Wells to be Sampled from the Town of Georgetown and Former Synagro Biosolids Application/Wastewater Disposal Fields.



Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
GT-DW01	65	4/7/2005	Georgetown, DE	2
GT -DW02	75	7/2/2001	Georgetown, DE	2
GT -DW03	69	5/10/2003	Georgetown, DE	1
GT -DW04	65	10/28/2003	Georgetown, DE	2
GT -DW05	65	3/11/2004	Georgetown, DE	2
GT -DW06	77	4/4/1991	Georgetown, DE	2
GT -DW07	65	8/22/1990	Georgetown, DE	3
GT -DW08	57	11/10/2005	Georgetown, DE	3
GT -DW09	82	10/4/2007	Georgetown, DE	3
GT -DW10	60	6/9/2020	Georgetown, DE	1
GT -DW11	65	4/7/2005	Georgetown, DE	2

Table 6. Selected Domestic Wells to be Sampled near Town of Georgetown Application Fields as shown in Figure 5.

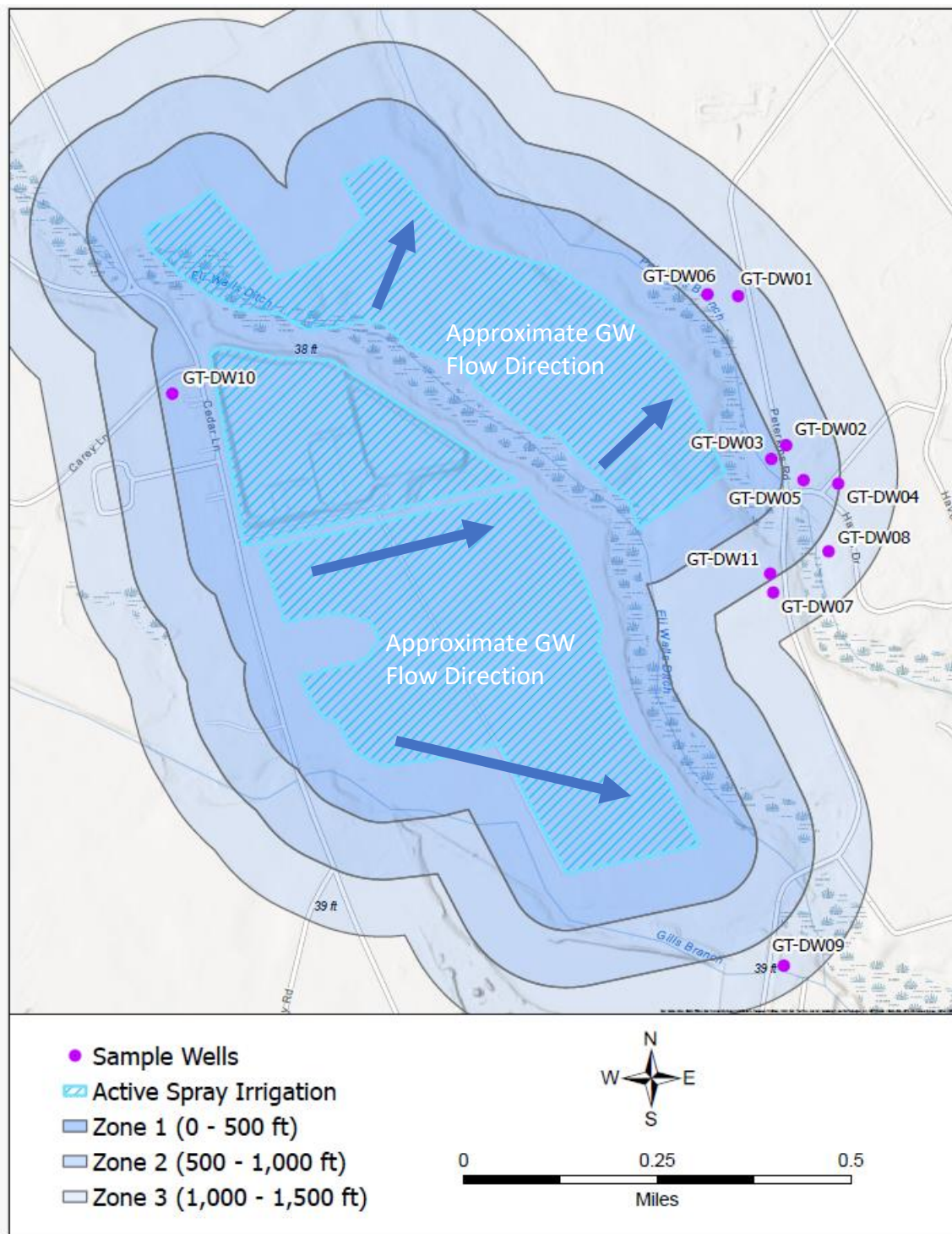


Figure 5 Selected Domestic Wells to be Sampled near the Town of Georgetown Wastewater Disposal Fields.



5.0 INLAND BAYS BIOSOLIDS APPLICATION AND WASTEWATER DISPOSAL SITE

5.1 Background Information

The Inland Bays WTF was authorized to operate prior to 1992 to treat domestic wastewater from Sussex County's wastewater service territories. The treated effluent is spray irrigated onto 432.5 acres of County Owned agricultural fields via eight center pivot (North Field, North Burton, South Burton, South Field, North Hettie Lingo, West Hettie Lingo, East Hettie Lingo, and South Hettie Lingo) spray irrigation systems (Figures 6 and 7). Historically Class B biosolids were land applied at the Inland Bays Biosolids application site. Biosolids application commenced in 1993 on the Hettie Lingo Farm and ceased at Hettie Lingo in 2012. Beginning in 2012, portions of Hettie Lingo were permitted for the spray irrigation of treated wastewater effluent generated by the Sussex County Inland Bays Regional Wastewater Treatment Facility. Currently, the entire Hettie Lingo field receives spray irrigation of treated wastewater effluent. The Tower Field was originally permitted in 2015 and continues to be an active Class B biosolids application location site. The Hettie Lingo Fields consists of approximately 130 acres of land and the Tower Field approximately 29 acres of land suitable for land application. Additionally, the north Burton and south Burton fields consist of approximately 95 acres of land. The Project Design and Sampling Plan (DNREC, 2024) contains detailed descriptions of site operations, site layout and the locations for PFAS sampling from groundwater monitoring wells.

In general, groundwater flows to the south or southeast beneath the application area. Five groundwater monitoring wells were selected for sampling in this PFAS in Biosolids Study (1 upgradient, 1 side-gradient, and 3 downgradient) and four additional wells (1 upgradient and 3 downgradient) from the dedicated wastewater disposal sites were selected. One or more of the 6 downgradient wells sampled were above USEPA's MCLs for PFHxS and PFOA. Sampling of downgradient domestic shallow wells has, therefore, been prioritized.

5.2 Downgradient Domestic Well Sampling

A total of 23 domestic wells downgradient of the Inland Bays Biosolids application and wastewater disposal sites were selected for PFAS study. Ten wells were downgradient of the Inland Bays wastewater disposal sites (Table 7) and thirteen wells were downgradient of the Inland Bays Hettie Lingo and Tower land application site (Table 8). The eight, eight, and seven selected domestic wells are in Zones 1, 2, and 3, respectively. One well within Zone 1, located side-gradient (further west) of well SX-DW01 was excluded from the study due to estimated groundwater flow direction. The domestic wells selected downgradient of the Inland Bays wastewater disposal sites are shown in are shown in Figure 6 and their basic information is listed in Table 7. Table 8 provides basic information about selected downgradient of the Inland Bays Hettie Lingo and Tower land application site and Figure 7 shows the location of the wells relative to the site.

One well southeast of the Hettie Lingo Farm was sampled WHS in 2026 as part of a separate PFAS study prior to the initiation of this study. This study will complete sampling of the domestic wells in the Division of Water's study area, as listed in Figures 6 and 7, that were not previously sampled by WHS. It should be noted that WHS Division of Water's sampling efforts use the same labs and analytical methods. WHS data for domestic wells listed in Figures 6 and 7 will be incorporated into the Division of Water's study report as appropriate.



Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
IB-DW01	68	8/1/2003	Millsboro, DE	2
IB-DW02	85	9/15/2003	Millsboro, DE	2
IB-DW03	72	1/9/2004	Millsboro, DE	1
IB-DW04	73	7/27/2004	Millsboro, DE	2
IB-DW05	60	9/13/2005	Millsboro, DE	3
IB-DW06	57	5/2/2019	Millsboro, DE	3
IB-DW07	Unknown	Unknown	Millsboro, DE	3
IB-DW08	Unknown	Unknown	Millsboro, DE	3
IB-DW09	Unknown	Unknown	Millsboro, DE	3
IB-DW10	Unknown	Unknown	Millsboro, DE	1

Table 7. Selected Domestic Wells to be Sampled near Inland Bays WWTF Biosolids Application and Wastewater Disposal Fields as shown in Figure 6.

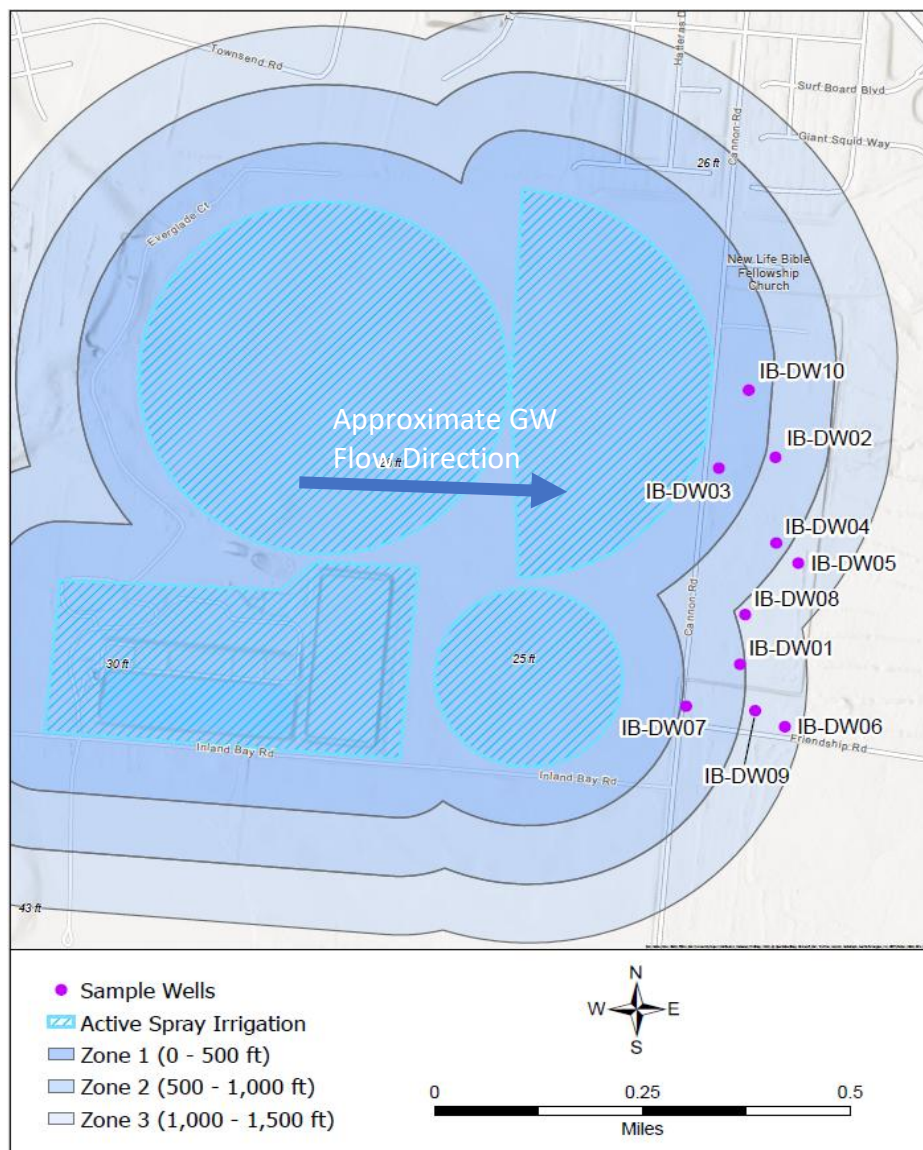


Figure 6. Site location map for domestic wells near the Inland Bays WTF and disposal site North and South Burton Fields).



Local ID	Total Depth (ft)	Date Installed	Well Location	Zone
HL-DW01	70	8/9/1997	Millsboro, DE	1
HL-DW02	<Null>	<Null>	Millsboro, DE	2
HL-DW03	60	9/5/2002	Millsboro, DE	1
HL-DW04	70	4/23/2004	Millsboro, DE	1
HL-DW05	60	3/10/1995	Millsboro, DE	2
HL-DW06	60	6/12/1992	Millsboro, DE	1
HL-DW07	65	7/21/2005	Millsboro, DE	1
HL-DW08	98	5/24/2006	Millsboro, DE	2
HL-DW09	83	9/8/2007	Millsboro, DE	2
HL-DW10	48	12/1/1987	Millsboro, DE	1
HL-DW11	Unknown	Unknown	Millsboro, DE	2
HL-DW12	Unknown	Unknown	Millsboro, DE	3
HL-DW13	Unknown	Unknown	Millsboro, DE	3

Table 8. Selected Domestic Wells to be Sampled near Inland Bays WWTF Wastewater Disposal Fields as shown in Figure 7.

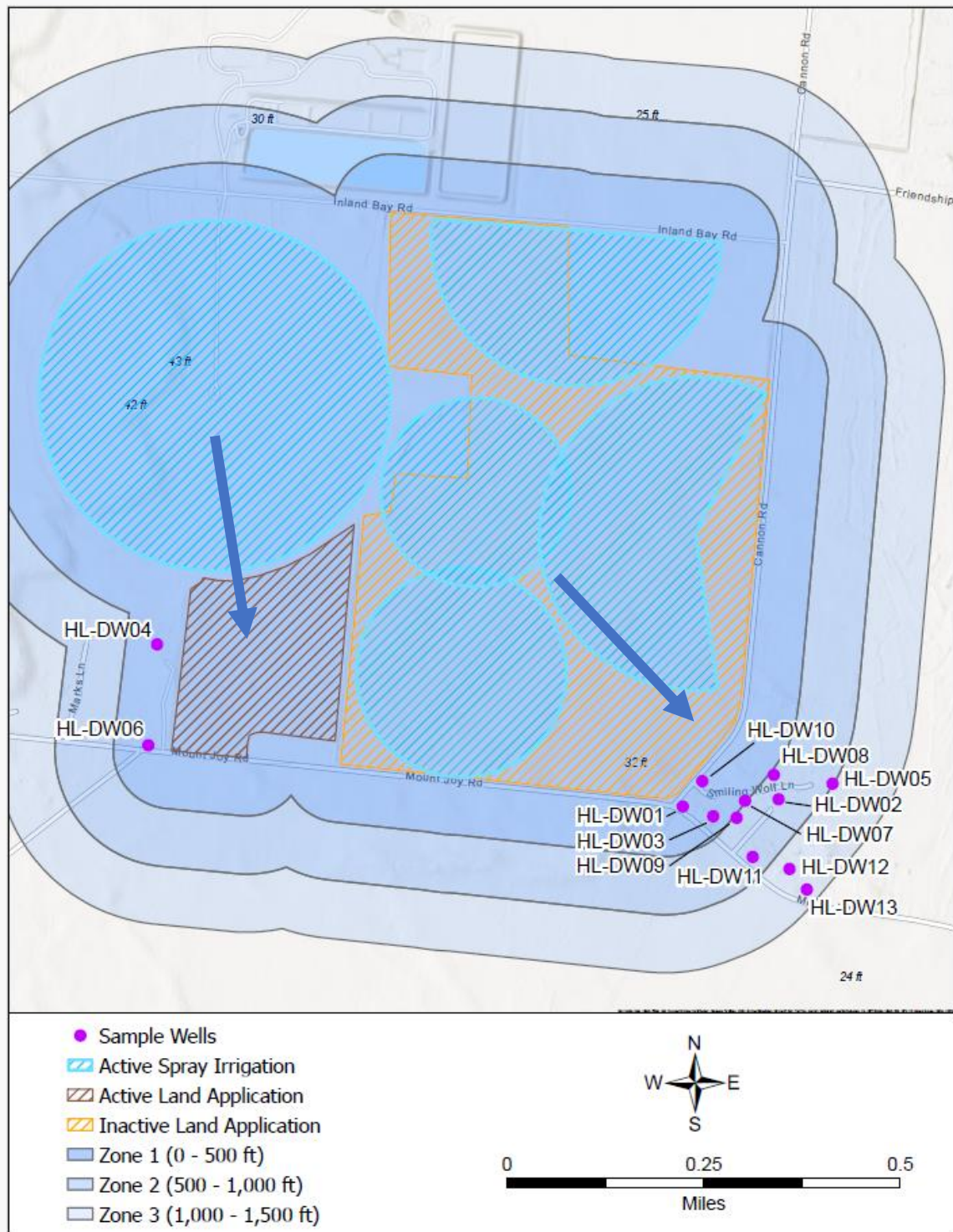


Figure 7. Sampling Location Map adjacent to Inland Bays WWTF Tower and Hettie Lingo Fields.

6.0 SAMPLE IDENTIFICATION AND LABELING

Samples collected from domestic wells for this study will be identified using the following labeling format:

Site Code-DW+Local Well ID, where Site Code identifies the facility or facilities that the domestic well is located downgradient of or is associated with for purposes of this study. Site codes are defined as follows: NM = Clean Delaware New Market Site, CH = Clean Delaware Harbeson Site, SN=Town of Georgetown/Synagro Sites, GT = Town of Georgetown Sites, IB = Inland Bays Sites, and HL = Hettie Lingo and Tower Sites; DW = drinking water; DNREC ID is the unique well permit ID issued by DNREC; and *Quarter* is the number of the quarter of the sampling event. For example, CH-DW72101 will be the domestic well sample associated with the Clean Delaware Harbeson Farm site, with DNREC well ID 72101.

For this study, every effort will be made to collect a drinking water sample prior to any treatment at each residence. If it is not possible to collect a pre-treatment sample, a post-treatment sample will be collected. “-POST” will be added to the sample ID if a sample is collected post treatment and the type of treatment will be noted in the field sampling log. If at a treatment system (or multiple treatment systems are) is in operation at a residence, and it is possible to collect samples from each end, two samples: one pre-treatment and one post-treatment will be collected. “-POST” will be added to the sample ID of the post-treatment sample. The type of treatment (i.e., reverse osmosis, activated carbon), treatment location (i.e., point of use, or point of entry), and the date of last maintenance (such as filter/membrane replacement) will be noted in the field sampling log. For PFAS analysis, sediment or ceramic filtration, ultraviolet purification and water softener systems will not be considered a “treatment system” in this study, and there is no need to collect a “-POST” sample. For the analysis of DPH parameters (DHSS, 2024); however, pre-treatment and post-treatment samples will be collected for any well with treatment system(s) installed at the residence.

7.0 QUALITY ASSURANCE AND QUALITY CONTROL

A Quality Assurance Project Plan (QAPP) will be developed for this study before the start of sampling. DNREC Water will select qualified contractors and laboratories to perform sample collection and analysis. These contractors will be required to submit Standard Operating Procedures (SOPs) and Quality Assurance and Quality Control Plans (QA/QC) to DNREC for approval prior to contracting. All samples will be analyzed using DNREC modified USEPA Method (1633M). Appendix I presents the analyte list of Method 1633M.

8.0 SAMPLING FREQUENCY AND PROJECT SCHEDULE

One time sampling will be conducted from selected wells as specified in Sections 2.0 through Section 6.0 for this study. USEPA MCLs (EPA, 2024a) will be used as threshold concentrations to characterize the downgradient areas for mitigation. If detections from domestic wells exceed PFAS threshold concentrations, treatment options will be offered to homeowners. Additional sampling may be conducted when deemed necessary.

This project design and sampling plan was finalized in September 2026 and field sampling is anticipated to begin in Q4 2026. Sampling will be coordinated with the DPH, to collect general drinking water parameters.

9.0 SUMMARY

DNREC Division of Water intends to conduct a follow-up study on the impacts of Class B biosolids land application on groundwater by sampling domestic wells downgradient of biosolids application sites where PFAS has been detected in onsite groundwater monitoring wells. A total of 73 domestic wells, downgradient of the four remaining current or historic Class B biosolids land application sites that were not included in the July 2026 study, will be sampled. Two of these facilities (Sussex County Inland Bays and Town of Georgetown/Synagro) currently have, or historically had, shared biosolids application and wastewater disposal facilities. A potential total of 103 groundwater samples will be collected. This estimate assumes that pre- and post- treatment samples will be collected from 20 residences and that 10 additional samples will be collected following the initial sampling event to further delineate potential PFAS impacts to domestic wells. This estimated total does not include any QA/QC samples collected by the field team. Field sampling is expected to begin in the fourth quarter of 2026.

REFERENCES

- DHSS, 2024: Private Well Owners (<https://dhss.delaware.gov/dph/lab/privdw.html>)
- DNREC, 2022: PROJECT DESIGN AND SAMPLING PLAN- PFAS -PFAS in Biosolids: Characterization and Fate (<https://documents.dnrec.delaware.gov/dwhs/remediation/watar/PFAS-Project-Design-and-Sampling-Plan-Biosolids.pdf>)
- DNREC, 2024: PROJECT DESIGN AND SAMPLING PLAN – PFAS in Groundwater Associated with Class B Biosolids Land Application Sites (<https://documents.dnrec.delaware.gov/dwhs/remediation/watar/PFAS-Project-Design-and-Sampling-Plan-Biosolids-Monitor-Wells.pdf>)
- DNREC, 2025: PROJECT DESIGN AND SAMPLING PLAN - Per- and Polyfluoroalkyl Substances (PFAS) in Groundwater from Monitoring Wells at Wastewater Treatment and Disposal Facilities (<https://documents.dnrec.delaware.gov/dwhs/remediation/watar/Phase-II-PFAS-Wastewater-Project-Design-and-Sampling-Plan.pdf>)
- USEPA, 2009. National Primary Drinking Water Regulations: <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>
- USEPA, 2024a: EPA’s Final PFAS National Primary Drinking Water Regulation: Monitoring and Reporting (https://www.epa.gov/system/files/documents/2024-04/pfas-npdwr_fact-sheet_monitoring_4.8.24_0.pdf)
- USEPA, 2024b. Fact Sheet – Understanding the Final PFAS National Primary Drinking Water Regulation Hazard Index Maximum Contaminant Level: https://www.epa.gov/system/files/documents/2024-04/pfas-npdwr_fact-sheet_hazard-index_4.8.24.pdf.