ARCADIS

Albany County Water Purification District

Capital Improvements Plan Engineering Report

SPDES Nos. NY0026875 and NY0026867

EPG No. 110936

June 2023

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Acronyms and Abbreviations

AA	Average annual
ACWPD	Albany County Water Purification District
BFE	Base flood elevation
BFP	Belt filter press
BOD_5	Biological oxygen demand
$cBOD_5$	5-day carbonaceous biological oxygen demand
BUD	Beneficial use determination
cf	Cubic feet
CIP	Capital Improvement Plan
CRIS	Cultural Resource Information System
CRRA	Community Risk and Resiliency Act
CSO	Combined sewer overflow
DAFT	Dissolved air flotation thickener
DEC	Department of Environmental Conservation
FEMA	Federal Emergency Management Agency
FIRMette	Flood insurance rate map
FOG	Fats, oils, and grease
fps	Feet per second
ft	Feet
GIS	Geographic information system
Gpd	Gallons per day
gpm	Gallons per minute
HP	Horsepower
hr	Hour
I&C	Instrumentation and controls
IUP	Intended Use Plan
MD	Maximum daily

MGD	Millions of gallons per day
mg/L	Milligrams per liter
MM	Maximum monthly
MW	Maximum weekly
ND	No Data
NH_3-N	Ammonia
NRCS	Natural Resources Conservation Service
NYS	New York State
OOS	Out of service
PEJA	Potential environmental justice area
PS	Primary sludge
psig	Pounds per square inch gauge
SCADA	Supervisory Control and Data Acquisition
SCFM	Standard cubic feet per minute
SFHA	Special flood hazard area
SPDES	State Pollution Discharge Elimination System
TDH	Total dynamic head
TKN	Total Kjeldahl Nitrogen
TR-16	*Guides for the Design of Wastewater Treatment Works*, 2011 Edition
TS	Total solids
TSS	Total suspended solids
USDA	United States Department of Agriculture
VFD	Variable frequency drive
WAS	Waste activated sludge

Executive Summary

The Albany County Water Purification District (ACWPD) owns and operates two wastewater treatment plants, the North Plant and the South Plant, which both discharge to the Hudson River. The Plants were both designed in 1970 and put into operation in 1974. Each Plant employs conventional activated sludge for secondary treatment. Operational staff have been proactively maintaining equipment to their greatest extent possible at each Plant, however, much of the liquid treatment infrastructure is original and more frequent equipment breakdown is contributing to ongoing maintenance challenges. Furthermore, due to the age of the equipment, sourcing replacement parts has become increasingly difficult in recent years.

As part of this project the current condition of liquid treatment train process units was evaluated, and process units were assigned a risk score. Risk scores were then used to inform Capital Improvement Plan priority projects over a ten-year period. For each process unit the recommended alternative, priority, and project costs in 2025 dollars are summarized in **Table ES- 1**. Please note that the project costs include the following markups:

- Legal, Administration and Engineering: 30%
- General Requirements and Overhead and Profit (O&P): 25%
- Construction Contingency: 30%
- Inflation: 7% per year

However, it should be noted that the high voltage electric system upgrades included a contingency of 20%.

Table ES- 1. Summary of Recommended Alternatives

Unit Process	Recommended Alternative	Priority	Project Cost (2025 $ in Millions)		
			North Plant	South Plant	Total
Mechanical Screening	Install three new multi-rake chain driven mechanical bar screens.	0 to 5 Years	$7.2	-	$7.2
Influent Pumps	Install New Influent Pumps	6 to 10 Years	$9.6	$5.6	$15.2
Grit System	Install Baffled Vortex Grit Chambers	0 to 5 Years	$11.5	$9.0	$20.5
Primary Clarifiers	Replace In-kind	0 to 5 Years	$9.5	$8.2	$17.7
Process Aeration	Install Turbo Blowers and New Diffusers	6 to 10 Years	$26.9	$9.9	$36.8
Secondary Clarifiers	Install Spiral Scraper Collection Mechanisms	0 to 5 Years	$22.3	$12.9	$35.2
Disinfection	No Action	-	-	-	-
Plant Water Pumps	Replace In-kind	0 to 5 Years	$1.7	$1.7	$3.4
SCADA System	Upgrade SCADA System	6 to 10 Years	$5.9	$6.5	$12.4
High Voltage Electrical Distribution	Upgrade High Voltage Electrical System	0 to 5 Years	$18.1	$8.5	$26.6
	Phase 1 Subtotal (0 to 5 Years)		*$70.3*	*$40.3*	*$110.6*
	Phase 2 Subtotal (6 to 10 Years)		*$42.4*	*$22.0*	*$64.4*
	Total		**$112.7**	**$62.3**	**$175.0**

1 Project Background and History

The Albany County Water Purification District (ACWPD) owns and operates two wastewater treatment plants, the North Plant and the South Plant, which both discharge to the Hudson River. The North Plant serves a portion of the Cities of Albany, Cohoes, and Watervliet, parts of the Towns of Colonie and Guilderland and the Villages of Colonie, Menands and Green Island. The South Plant serves 90 percent of the City of Albany as well as the entire Port of Albany. A map of the North Plant sewersheds from the 2011 *Albany Pool CSO Long Term Control Plan* is shown in **Figure 1** and the South Plant sewersheds is shown in **Figure 2**.

1.1 Site Information

1.1.1 Location

The North Plant is located at 1 Canal Road South in the Village of Menands on the west bank of the Hudson River. The North Plant property boundaries are defined on the west by Canal Road South and on the East by NYS Route 787. Based on data from the New York State (NYS) Geographic Information System (GIS) Clearinghouse the North Plant tax parcel spans approximately 28.6 acres.

The South Plant is located at 209 Church Street in the City of Albany on the west bank of the Hudson River. The South Plant property boundaries are defined on the south and west by railroad systems and on the east by Church Street. There is a fuel storage and distribution facility directly north of the South Plant property which is owned by Global Companies LLC. Based on data from the NYS GIS Clearinghouse the South Plant tax parcel spans approximately 31.4 acres.

The site locations of the North and South Plants are shown in **Figure 3**.

1.1.2 Geologic Conditions

Arcadis obtained soils information from the *United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS)* Soil Surveys. The soil type at the North Plant is primarily classified as urban land (65.4%) and is surrounded by areas of loamy udorthents (10.2%), dumps (9.5%), teel silt loam (7.8%), and ponded medihemists and hydraquents (6.8%). The hydrologic soil ratings at the North Plant include Group A, Group A/D, and Group B/D. The NRCS defines soil groups as follows:

- Group A – Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- Group B – Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- Group C – Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that

have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

- In dual hydrologic groups such as A/D and B/D the first letter is for drained areas and the second is for undrained areas.

The South Plant property is classified as 100% urban land. Hydrologic soil data Is not available on the Web Soil Survey for the South Plant.

The full soil reports for the North and South Plants are available in **Appendix C** and **Appendix D**.

1.1.3 Environmental Resources

According to the NYS DEC Environmental Resource Mapper, the North Plant is partially located within a state regulated wetland check zone. A wetland check zone is defined by the NYS DEC as an area surrounding a wetland that may also contain wetlands. It is recommended to request a more precise delineation from the NYS DEC to determine the actual wetland boundary prior to undertaking a project within a check zone. The North Plant also lies within an area of significant natural communities with rare plants or animals present and is in the vicinity of mussels listed as endangered or threatened. The NYS DEC defines significant natural communities as locations of rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and ecological areas. The North Plant discharges to the Hudson River, a Class C water body, which then flows to a Class A waterbody below the Castleton Bridge. Based on the Cultural Resource Information System (CRIS) online mapper the North Plant is not an archeologically sensitive area.

The South Plant also lies within an area of significant natural communities with rare plants or animals present. The South Plant is in the vicinity of mussels listed as endangered or threatened and there are areas of freshwater wetlands south of the Plant. **Figure 4a-e** show the Environmental Resource Mapper for the North and South Plants. The South Plant also discharges to the Hudson River, a Class C water body, which then flows to a Class A waterbody below the Castleton Bridge. Based on the CRIS online mapper the South Plant is not an archeologically sensitive area.

1.1.4 Floodplain Considerations

Federal Emergency Management Agency (FEMA) published flood insurance studies for the Hudson River and the flood insurance rate maps (FIRMettes) that include both the North and South Plants are available in **Figure 5** and **Figure 6**.

Based on the review of the FIRMette map number 36001C0211D, published by FEMA with the effective date of March 16, 2015, the North Plant is in the 500-year floodplain. The 500-year floodplain is defined by FEMA as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and/or areas protected by levees from 1% annual chance flood.

Arcadis reviewed the *New York State Flood Risk Management Guidance for Implementation of the Community Risk and Resiliency Act*, dated August 2020 (CRRA). The base flood elevation (BFE) at the North Plant is approximately 22.0 feet, and an additional three feet of freeboard accounts for sea level projections to protect critical equipment at elevation 25.0 feet. New electrical equipment will be installed above elevation 25.0 and will comply with the requirements of the CRRA.

Based on the review of the FIRMette map number 36001C0194D published by FEMA with the effective date of March 16, 2015, the South Plant is partially located in the 500-year floodplain and partially in the 100-year floodplain. The 100-year floodplain is defined by FEMA as an area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. The 100-year floodplain is also referred to by FEMA as a special flood hazard area (SFHA) or base flood.

The BFE at the South Plant is approximately 20.0 feet, the South Plant does not have a tide gate like many of the CSO outfalls that the City of Albany owns and operates, and therefore if a flood did reach elevation 20, the South Plant would be entirely surcharged. New electrical equipment will be installed above elevation 20.0 feet and will comply with the requirements of the CRRA.

1.1.5 Environmental Justice Areas

The NYS DEC defines potential environmental justice areas (PEJAs) as U.S. Census block groups of up to 500 households each that had populations that met or exceeded at least one of the following criteria:

- At least 52.42% of the population in an urban area reported themselves to be members of minority groups; or
- At least 26.28% of the population in a rural area reported themselves to be members of minority groups; or
- At least 22.82% of the population in an urban or rural area had household incomes below the federal poverty level.

Identifying PEJAs ensures resources such as funding opportunities and enforcement of environmental laws and regulations are addressed fairly in disproportionally impacted communities. The North and South Plants are located within and serve communities that have been identified by DEC as Potential Environmental Justice Areas as shown in **Figure 7**.

1.2 Ownership and Service Area

The ACWPD owns and operates the North and South Plants and serves a combined population of 190,473 residents as of 2022.

The North Plant is located at 1 Canal Road South in the Village of Menands and serves a part of the Cities of Albany, Cohoes, and Watervliet, portions of the Towns of Colonie and Guilderland and the Villages of Colonie, Menands and Green Island. ACWPD owns and operates the interceptors that convey wastewater and combined sewage to each Plant and each community served own and operate their respective collection systems and trunk sewers. The North Plant primarily serves combined sewer systems from Cohoes, Watervliet and Green Island. The North Plant also receives wastewater from Albany, Colonie and Guilderland conveyed directly to the plant via the Patroon Creek Interceptor. Per the November 2016 report *Albany County Sewer District North Plant Biosolids*, ACWPD reported receiving fats, oils, and grease (FOG) at the North Plant. Based on data provided for FOG received at the Scavenger Station, the FOG currently received on average is approximately 16,500 gallons per day (gpd) at 2% total solids (TS).

The South Plant is located at 209 Church Street in the City of Albany and serves 90 percent of the City of Albany as well as the entire Port of Albany. The South Plant primarily serves the combined sewer system from Albany. The South Plant accepts liquid sludge from the Town of Bethlehem, which is combined with primary sludge and

waste activated sludge (WAS) in the sludge holding tanks. As of 2018, the South Plant accepts an average of 9,000 gpd at 4.2% TS from the Town of Bethlehem.

Population estimates are summarized in **Table 1** below for each community served by the ACWPD. It should be noted that the ACWPD serves a portion of the Town of Colonie and the Town of Guilderland. **Table 1** shows the total population in each community from decennial census data for the purpose of estimating change in population over time, however ACWPD serves approximately 51% of the Town of Colonie and 15% of the Town of Guilderland. Estimates of the actual population served by ACWPD based on data from March 2022 to February 2023 are also summarized in **Table 1**.

Table 1. Population of Contributing Communities per Decennial Census Data – 2000, 2010, 2020

Name	Total Population (2000 Census)	Total Population (2010 Census)	Total Population (2020 Census)	Average Percent Increase	Population Served by ACWPD (2022 Estimate)
City of Albany	95,150	97,740	95,430	0.1%	99,402
City of Cohoes	15,530	16,150	16,580	3.2%	17,931
City of Watervliet	10,340	10,240	9,810	-2.7%	10,363
Town of Colonie[1]	79,200	81,490	82,130	1.8%	42,000
Town of Guilderland[2]	33,520	35,260	35,740	3.1%	5,538
Village of Colonie	7,910	7,780	7,560	-2.2%	7,792
Village of Menands	3,910	3,990	3,830	-1.0%	4,490
Village of Green Island	2,290	2,620	2,880	10.8%	2,957
Total	**247,850**	**255,270**	**253,960**	**1.2%**	**190,473**

1 In 2022 ACWPD served an estimated population of 42,000 in the Town of Colonie based on average flow from March 2022 to February 2023 and an assumed usage of 130 gpd per person.

2 In 2022 ACWPD served an estimated population of 5,538 in the Town of Guilderland based on average flow from March 2022 to February 2023 and an assumed usage of 130 gpd per person.

The average percent increase in population for the individual communities and total population served by ACWPD were calculated as the average of the increase from 2000 to 2010 and the increase from 2010 to 2020. Overall, the total population has remained nearly stagnant, with a total average increase of 1.2%. For the purpose of this evaluation, a conservative estimate of current loadings plus ten percent was used to evaluate the design capacity for biological treatment, as significant population growth is not expected in the area.

1.3 Existing Facilities and Present Condition

The North and South Plants were both designed in 1970 and put into operation in 1974, each plant employs conventional activated sludge for secondary treatment. At both the North and South Plant incoming wastewater

passes through mechanical bar screens and is pumped to the constant velocity grit channels then flows via gravity to primary clarifiers, aeration basins, and secondary clarifiers. The North Plant effluent is disinfected with sodium hypochlorite in chlorine contact channels and sodium bisulfide is dosed in the effluent flume to control and reduce chlorine residual. The South Plant uses ultraviolet (UV) disinfection to treat secondary clarifier effluent before effluent is discharged. The solids handling process includes thickening WAS via dissolved air flotation thickeners (DAFTs), dewatering of primary sludge (PS) and thickened WAS via belt filter presses (BFPs), then dewatered cake is incinerated. Ash slurry from the incinerators is stored in onsite ash storage lagoons at each Plant, which are cleaned out annually. The County has a beneficial use determination (BUD) to utilize the ash as a landfill alternative daily cover.

The North Plant operates under *State Pollution Discharge Elimination System* (SPDES) permit No. NY0026875, most recently issued on December 1, 2009. The current North Plant SPDES permit is summarized in **Table 2** and available in **Appendix A**.

Table 2. Summary of North Plant SPDES Permit NY0026875

Parameter	Basis	Limit	Unit
Flow	Monthly Average	35	MGD
$cBOD_5$	Monthly Average	25	mg/L
		7,300	lbd
	7-day Average	40	mg/L
		12,000	lbd
TSS	Monthly Average	30	mg/L
		8,800	lbd
	7-day Average	45	mg/L
		13,000	lbd
TKN as N	Monthly Average (June 1 – October 31)	15.2	mg/L
Coliform, Fecal	30-day geometric mean	200	No./100 mL
	7-day geometric mean	400	No./100 mL

The South Plant operates under SPDES permit No. NY0026867, most recently issued on December 1, 2009. The current South Plant SPDES permit is summarized in **Table 3** and available in **Appendix B**.

Table 3. Summary of South Plant SPDES Permit NY0026867

Parameter	Basis	Limit	Unit
Flow	12-Month Rolling Average	29	MGD
$cBOD_5$	Monthly Average	25	mg/L
		4,000	lbd
	7-day Average	40	mg/L
		6,300	lbd
TSS	Monthly Average	30	mg/L
		4,800	lbd
	7-day Average	45	mg/L
		7,100	lbd
TKN as N	Monthly Average (June 1 – October 31)	15.4	mg/L
Coliform, Fecal	30-day geometric mean	200	No./100 mL
	7-day geometric mean	400	No./100 mL

Permit updates are expected to be issued to the North and South Plants with modifications to effluent nitrogen limits in terms of ammonia (NH_3-N) or Total Kjeldahl Nitrogen (TKN) and peak design flows as described in each Plant's wet weather operating plan. With permit modifications yet to be established, Arcadis assumed full nitrification to evaluate the required capacity of the activated sludge system at each Plant. The anticipated wet weather operating plan peak design flows were also used to evaluate process unit upgrades, as summarized in **Table 4** below.

Table 4. North Plant and South Plant Wet Weather Operating Plan Peak Flows

Treatment Process	North Plant Peak Flow (MGD)	South Plant Peak Flow (MGD)
Headworks	88	45
Primary Treatment	88	45
Secondary Treatment	55	29
Disinfection	88	45

1.3.1 Plant Upgrades

Since the original plant design and construction in 1970, several processes have been upgraded.

1.3.1.1 Headworks

In 2003, the original mechanical bar screens at the North and South Plants were replaced with Suez Infilco Degremont (IDI) climber screens. In March 2022, the South Plant IDI climber screens were upgraded to a chain-driven multi-rake screen technology by Headworks International as part of the Beaver Creek Clean River Project.

The influent pumps at each plant were upgraded in 1999. At the North Plant, three of the existing influent pumps were replaced with 283 HP Ingersoll Dresser centrifugal pumps with VFDs. Two of the original constant speed Allis Chalmers units are remaining. At the South Plant four 150 HP Ingersoll Dresser centrifugal pumps were installed with VFDs. Two of the original constant speed Worthington centrifugal pumps remain at the South Plant.

1.3.1.2 Secondary Treatment

In 1993, the North and South Plants' aeration systems were upgraded. Mechanical surface aerators were removed from three aeration tanks at each Plant and replaced with fine bubble diffusers and aeration process piping. The three remaining tanks at the North Plant and one remaining tank at the South Plant are used as wet weather storage. A new blower building was constructed to house two Atlas Copco single stage centrifugal blowers to supply process air to the converted aeration tanks.

1.3.1.3 Disinfection

The disinfection systems at the North and South Plants were upgraded in 2014. The North Plant disinfection systems consists of two sodium hypochlorite storage tanks with a total volume of 28,000 gallons, and two sodium bisulfate storage tanks with a total volume of 5,500 gallons. The associated dosing systems for the North Plant system ensure effective pathogen reduction and total residual chlorine control. The South Plant disinfection system consists of a UV system, with redundant channels to ensure pathogen inactivation.

1.3.1.4 Miscellaneous Improvements

There have also been select improvements to the electrical distribution systems. Motor Control Centers (MCCs) were upgraded at the North and South Plants in 2015. The North Plant MCC upgrades included the preliminary treatment building, aeration control building, blower building, return sludge pump station, solids building, grease building, and administration building. The South Plant MCC upgrades included the preliminary treatment building, aeration control building, return sludge pump station, sludge holding tank electric room, solids building, grease building, and administration building.

1.4 Definition of the Problem

The North and South Plants were placed in operation in 1974 and need extensive upgrades due to aging infrastructure. Much of the process equipment at each Plant is original construction; equipment breakdown is contributing to ongoing operation and maintenance challenges and sourcing replacement parts has become increasingly difficult in recent years. Frequent breakdown and maintenance challenges have also led to problems with unit redundancy. For example, frequent maintenance requirements to remove grit accumulation in the existing channels requires units to be out of service frequently, and effectively reduces the number of units available for wet weather operations. Additionally, technologies installed in the 1970s are antiquated compared to technologies employed today, and existing process units are past their useful life. The North and South Plants

serve a population of approximately 190,473 residents in the surrounding communities, and it is essential that the existing infrastructure is upgraded and maintained to meet treatment standards and continue serving these communities.

As part of this project the current condition of liquid treatment train process units was evaluated, and process units were assigned a risk score. Risk scores were used to inform Capital Improvement Plan priority projects over a ten-year period. Site aerials of the North and South Plants are shown in **Figure 8** and **Figure 9**. The process units assessed as part of this project included:

1. Mechanical screening
2. Influent pumping
3. Grit removal
4. Primary clarification
5. Process aeration
6. Secondary clarification
7. Disinfection
8. Plant water pumping
9. SCADA systems
10. High voltage electric distribution

1.5 Financial Status

ACWPD generates income directly from its eight member municipalities to compensate for expenses associated with O&M of the Plants, as well as debt service for capital improvement projects. Bills are sent to the municipalities twice annually. ACWPD also generates income through the collection of scavenger waste tipping fees and through grey water sales. Debt service obligations are shared across the member communities at fixed percentages based on the flow allocation reserved for each community in the ACWPD charter. The O&M cost obligations are split at a varying percentage based on actual wastewater flow received from each community over the previous six months. The total community revenue projected for 2023 is $11,305,283, which excludes tipping fees and grey water sales. The debt service obligations for fixed expenses and O&M obligations are divided amongst member communities as summarized in **Table 5**.

Table 5. 2023 Summary Debt Service Obligations

Member Community	Fixed Debt Service Obligation	O&M Obligation
City of Albany	54.4%	62.5%
Town of Colonie	14.4%	12.8%
Village of Colonie	4.1%	2.1%
Town of Guilderland	1.7%	1.6%
Village of Menands	2.4%	2.7%
City of Watervliet	4.3%	5.2%
Village of Green Island	11.9%	3.1%
City of Cohoes	6.8%	9.9%
2023 Total Debt Service Obligation	**$1,034,505**	**$10,270,778**

As of May 2023, the ACWPD has reserve balance accounts as summarized in **Table 6**.

Table 6. Balance of Reserve Accounts as of May 2023

Reserve Account	Balance as of May 2023
Unreserved Fund Balance	$6,775,410
Debt Reserve	$1,049,895
Capital Reserve	$217,425
Repair Reserve	$228,340
Retirement Reserve	$252,350

ACWPD has two projects on the intended use Plan (IUP) annual list for 2023 as summarized in **Table 7**.

Table 7. ACWPD Projects on 2023 IUP Annual List

Project Number	Total Cost	IUP Amount	Total Score	IUP Description
C4-5419-06-00	$51,837,000	$51,837,000	68	Planning, design, and construction of sludge processing upgrades for the North and South Plants to protect the Hudson River.
C4-5419-07-00	$5,947,000	$5,947,000	43	Planning, design, and construction of screening upgrades to protect the Hudson River.

2 Historical Operations and Performance

A review of historical data was completed by Arcadis to evaluate historical operations and performance at the North and South Plants. Data for each Plant from January 2018 to December 2022 is summarized for influent and effluent quality, primary clarifier performance, and biological treatment parameters.

Observed historical influent concentrations were evaluated via statistical analyses to remove outliers by assuming a log-normal distribution and removing data points where concentrations were greater than or less than two or three standard deviations of the mean. Average concentrations and yearly average loadings were calculated based on data within two standard deviations of the mean. Maximum monthly (MM), maximum weekly (MW), and maximum daily (MD) loadings were calculated based on data within three standard deviations of the mean. The MD values are the maximum from the set of all daily data points. The MM and MW values are the maximum from a 30-day moving average and 7-day moving average of the data, respectively.

2.1 North Plant

Historical influent flows have been estimated by use of the effluent flow metering at the North Plant, assuming flow out of the Plant is equal to flow into the Plant. Effluent flows and peaking factors for the North Plant are shown in **Table 8**.

Table 8. North Plant Historical Effluent Flow and Peaking Factors – 2018 to 2022

Year	Average Effluent Flow, MGD				Peaking Factors		
	AA	MM	MW	MD	MM	MW	MD
2018	22.1	27.6	33.6	49.3	1.2	1.5	2.2
2019	22.7	26.9	33.7	69.8	1.2	1.5	3.1
2020	19.4	24.8	29.7	59.4	1.3	1.5	3.1
2021	20.2	24.9	32.3	53.4	1.2	1.6	2.6
2022	20.1	33.7	38.5	62.6	1.7	1.9	3.1
Average	**20.9**	**27.6**	**33.6**	**58.9**	**1.3**	**1.6**	**2.8**

Influent loads and peaking factors for the North Plant are shown in **Table 9** and **Table 10** for 5-day biological oxygen demand (BOD_5), total suspended solids (TSS), ammonia (NH_3-N), and Total Kjeldahl Nitrogen (TKN). Influent TKN data was not available for 2022.

Table 9. North Plant AA Historical Influent Loadings – 2018 to 2022

Year	AA Influent Load, lbd			
	BOD_5	**TSS**	**NH_3-N**	**TKN**
2018	34,839	58,776	2,235	5,265
2019	35,004	54,886	2,288	5,214
2020	29,809	39,353	2,590	5,712
2021	28,756	39,691	2,790	4,876
2022	30,451	46,289	2,378	ND
Average	**31,772**	**47,799**	**2,456**	**5,267**

Table 10. North Plant Historical Influent Loading Peaking Factors – 2018 to 2022

Parameter	Average Loading PF (2018 – 2022)		
	MM	**MW**	**MD**
BOD_5	1.5	1.9	4.1
TSS	1.7	2.4	5.7
NH_3-N	1.3	1.6	2.2
TKN	1.3	1.4	2.3

Effluent concentrations are summarized in **Table 11**. As shown, effluent concentrations have consistently been below SPDES Permit limits for the North Plant.

Table 11. North Plant Historical Average Annual Effluent Concentrations – 2018 to 2022

Year	AA Effluent Concentrations, mg/L			
	BOD_5	**TSS**	**NH_3-N**	**TKN**
2018	3.9	6.9	2.7	4.2
2019	4.0	6.6	3.6	5.0
2020	3.9	8.4	ND	3.6
2021	4.9	10.2	ND	5.4
2022	6.3	10.8	ND	6.2
Average	**4.6**	**8.6**	**3.1**	**4.9**

2.2 South Plant

Historical influent flows have been estimated by use of the effluent flow metering at the South Plant, assuming flow out of the Plant is equal to flow into the Plant. As part of the mechanical bar screen upgrade an influent control structure was designed to include a flow meter and modulating flow control gate in an existing manhole upstream of the preliminary treatment building. The new influent flow meter is expected to be online later this year in 2023. Effluent flows and peaking factors for the South Plant are shown in **Table 12**.

Table 12. South Plant Historical Effluent Flow and Peaking Factors - 2018 to 2022

Year	Average Effluent Flow, MGD				Peaking Factors		
	AA	MM	MW	MD	MM	MW	MD
2018	23.4	29.5	33.1	39.1	1.3	1.4	1.7
2019	23.3	27.4	33.9	38.9	1.2	1.5	1.7
2020	20.3	27.4	30.3	40.3	1.3	1.5	2.0
2021	22.3	27.8	33.1	38.8	1.2	1.5	1.7
2022	20.3	25.9	30.3	40.3	1.3	1.5	2.0
Average	**21.9**	**27.6**	**32.1**	**39.5**	**1.3**	**1.5**	**1.8**

Influent loads and peaking factors for the South Plant are shown in **Table 13** and **Table 14** for BOD_5, TSS and NH_3-N. There is no NH_3-N data available in 2018 or 2019 and influent TKN data was not available for the South Plant.

Table 13. South Plant AA Historical Influent Loadings - 2018 to 2022

Year	AA Influent Load, lbd		
	BOD_5	TSS	NH_3-N
2018	14,428	23,401	ND
2019	13,812	21,204	ND
2020	11,545	17,800	1,234
2021	13,055	18,439	1,387
2022	13,817	16,705	1,156
Average	**13,331**	**19,510**	**1,259**

Table 14. South Plant Historical Influent Loading Peaking Factors – 2018 to 2022

Parameter	Average Loading PF (2018 – 2022)		
	MM	**MW**	**MD**
BOD_5	1.4	1.7	3.3
TSS	1.4	1.9	4.1
NH_3-N	1.2	1.3	1.3

Effluent concentrations are summarized in **Table 15**. As shown, effluent concentrations have consistently been below SPDES Permit limits for the South Plant.

Table 15. South Plant Historical Average Annual Effluent Concentrations

Year	AA Effluent Concentrations, mg/L		
	BOD_5	**TSS**	**NH_3-N**
2018	2.7	5.7	ND
2019	2.8	5.6	ND
2020	3.6	8.0	1.3
2021	3.6	8.8	1.0
2022	3.4	8.3	1.0
Average	**3.2**	**7.3**	**1.1**

3 Process Unit Risk Scoring Analysis

Arcadis developed risk scores for each of the process units included in the liquid treatment train study. The risk scores were used to prioritize project upgrades and to determine an estimated timeline to complete the process unit upgrades.

3.1 Approach

The risk scores are comprised of three components: (1) condition score, (2) criticality score, and (3) redundancy factor. Condition and criticality scores are on a scale of one to five, where one represents an excellent score and five represents a poor score. A score of one, or excellent was only assigned in rare circumstances that the process unit was in exceptional condition.

The condition score for each unit process includes unique scores for physical condition and performance condition. The physical condition score was determined based on visual inspection of each unit process during site visits conducted in December 2022. Physical condition accounts for condition of mechanical equipment, instrumentation and controls (I&C), and electrical components. In calculating the overall physical condition score mechanical condition score was weighted at 60% while I&C and electrical were weighted at 20% each. Since upgrades to any mechanical component will likely include I&C and electrical upgrades to that process as needed, the physical condition score was more heavily based on the mechanical equipment to provide greater variability in scoring between each process unit. Structural condition scores were uniformly good across most process units; therefore, the structural component was excluded from the final condition score. Performance scores for each process were calculated as the average of individual scores (one to five) assigned for the following:

- existing capacity,
- regulatory compliance,
- reliability of process equipment,
- operations and maintenance issues,
- and obsolescence of existing equipment.

The existing capacity of the plant process units was evaluated based on the most conservative guidelines from *Recommended Standards for Wastewater Facilities,* 2014 Edition (10 States Standards) or *Guides for the Design of Wastewater Treatment Works,* 2011 Edition (TR-16). The overall condition score was defined as the maximum score between physical condition and performance to show the most conservative final risk score.

In the scope of capital improvements planning, criticality was broadly defined as the plant-wide consequence should one unit process fail. The criticality scores for each unit process were calculated as the weighted average scores for the following subcategories:

- Operations and maintenance – 20%
- Safety of plant staff – 30%
- Regulatory compliance – 30%
- Level of service – 10%
- Backup unit – 10%

Weights for the criticality scores were developed with ACWPD based on the County's priority when process units fail. As a result, safety of Plant staff and regulatory compliance were assigned the highest weights as these are perceived as the highest priority. It should be noted that backup units are not required for many of the unit processes that were evaluated. However, since backup units are included in the asset management framework, it is included as part of the criticality score but assigned a relatively low weight compared to the other criticality weighted scores.

The redundancy factor was calculated using **Equation 1** to account for the quantity of units required to meet permitted capacity at each plant compared with the number of operational units that are installed at each plant. The redundancy factor calculation uses total operational units; however, there are processes at the North Plant and South Plant that have nonoperation units, so the total operational units was used to calculate redundancy factors which more accurately reflects the existing redundancy for each process during the time the condition assessments were completed in December 2022. Considering much of the equipment is antiquated and replacement parts are difficult to source if a unit was installed but in need of repairs it was not considered as an available redundant unit.

Equation 1 $$redundancy\ factor = 1 - \frac{no.operational - no.needed}{no.operational}$$

The final risk scores were calculated using **Equation 2**, accounting for the maximum condition score, the criticality score, and the redundancy factor. Based on **Equation 1**, the redundancy factor will reduce the overall risk score is redundant units are available. The risk score as defined in **Equation 2** was used to prioritize upgrades for the unit processes at each plant.

Equation 2 $$risk\ score = maximum\ condition\ score \times criticality\ score \times redundancy\ factor$$

3.2 Results

The risk scores are tabulated in **Appendix E** of this report for the North and South Plants. The final risk scores were color coded in green, yellow, and red to indicate project prioritization. Scores from zero to 10 are green to represent low priority projects and can be pursued at a later date (6 to 10 years) from the date of the CIP. Scores from 10 to 15 are yellow to represent intermediate priority projects and should be pursed within the next 5 years. Any process unit with a risk score higher than 15 is red and should be pursed in the next two years. The Supervisory Control and Data Acquisition (SCADA) system received a high risk score at both plants due to age of equipment and poor condition and criticality scores, however is not included in the priority project list below. SCADA upgrades are recommended to be coupled with the process aeration system upgrades during year six to 10; when more complex dissolved oxygen (DO) probes and integrated controls will be implemented.

Based on the results, the North Plant priority process units to upgrade include:

- grit removal system
- plant water pumps, and
- high voltage electric distribution system.

The North Plant grit removal system uses antiquated technology and is past its useful life. Due to poor grit removal, there are significant operation and maintenance concerns with grit accumulation resulting in substantial labor to manually clean out the grit channels, which is compounded by grit carry over into the primary clarifiers during wet weather events. The combination of relatively poor scores for physical condition, performance, and

criticality resulted in a high risk score for grit removal. The North Plant plant water pumps also show significant wear due to age of the equipment. In addition, two plant water pumps were not operational during the site visits in December 2022. This resulted in a high redundancy factor and further elevated risk score for the plant water pumps since the solids handling incineration process is dependent on the operation of this process unit. The high voltage electric distribution system has been in place from the original plant construction in the early 1970's, with minor improvements over the years. The existing equipment does not meet current standards, therefore was assigned a high condition score. A reliable power supply is essential for operations and resulted in high criticality scores for this process units.

Based on the results, the South Plant priority process units to upgrade include:

- grit removal and
- high voltage electric distribution system.

The South Plant grit removal system also uses antiquated technology and is past its useful life. There are performance concerns with significant grit accumulation occurring in the existing channels during wet weather events. The combination of relatively poor scores for physical condition, performance, and criticality resulted in a high risk score for grit removal. Similar to the North Plant, the high voltage electric distribution system had a poor risk score because both systems remain in place from the original plant construction in the early 1970s. The equipment does not meet current standards and are essential for optimal plant operation, which resulted in high condition and criticality scores. A reliable power supply is essential for plant operations and resulted in a high criticality score for the high voltage distribution system.

4 Alternatives Analysis

Alternatives were evaluated for the process units that were included in the condition assessments and risk scoring, excluding the South Plant mechanical bar screens. Since the South Plant mechanical bar screens were replaced in March 2022 this process unit is not recommended for capital improvements in the near term

4.1 North Plant Mechanical Bar Screens

The existing mechanical bar screens at the North Plant are single-rake climber screens manufactured by Infilco-Degremont. Two of the mechanical bar screens were installed in 2003 with the third installed in 2011. The existing bar screens have long rake cycle times caused by the significant travel distance to rake screenings from the basement to the loadout conveyer. Long rake cycle times are compounded by the fact that each climber screen only has one rake head to remove screenings from the channel. The combination of long rake cycle times and single-rake climbers results in significant blinding of the screens particularly during wet weather events. Currently, the screens are operated in manual mode since the level sensors are non-operational. The 1-inch spacing of the existing bars allows for screenings and debris to pass through the bar clear spacing, impacting plant performance in downstream processes. Upgrade alternatives for the North Plant mechanical screens were evaluated as part of a preliminary engineering report (*North Plant Screenings Upgrades Preliminary Engineering Report)* completed by Arcadis in June 2022, attached in **Appendix F**.

4.1.1 Alternative 1.1: No Action

Alternative 1.1 includes taking no action and leaving the existing mechanical bar screens in service at the North Plant. There are no costs associated with this alternative.

4.1.2 Alternative 1.2: New Mechanical Bar Screens

Alternative 1.2 includes replacing the existing climber screens with chain and sprocket multi-rake bar screens that have multiple rake heads to remove screenings more frequently. The chain and sprocket bar screen technology will continue to provide constant contact between the rake head and the bar screen for effective screenings removal in deep channels. This upgrade includes the removal of the existing IDI climber screens and installation of new multi-rake chain driven mechanical bar screens, a new screenings conveyor, and diverter gate to send screenings to standby/duty screw washer compactors, required building modifications, and instrumentation and controls. Design parameters and cost to upgrade the bar screens are presented in **Table** 16**.** The cost estimated is sourced from the *North Plant Screenings Upgrades Preliminary Engineering Report* and escalated to 2025 dollars with an annual escalation factor of 7%. The screenings alternatives analysis is discussed in detail in the *North Plant Screenings Upgrades Preliminary Engineering Report,* attached in **Appendix F**.

Table 16. Alternative 1.2: North Plant New Mechanical Bar Screens

Parameter	North Plant
Bar Screen Qty	3
Approach Velocity at Average Flow, fps	1.3
Bar Clear Opening	3/8”
Minimum Screen Motor HP	3
Conveyor Length, ft	60
Conveyor Width, ft	2
Minimum Conveyor Drive HP	3
Diverter Gate Size (WxH)	40” x 60”
Screw Compactor Loading, cf/hr	100
Screw Compactor Motor HP	5
Total Cost (2025 Dollars)	**$7,160,000**

4.2 Influent Pumping

There are five existing influent pumps at the North Plant. Three of the pumps were manufactured by Ingersoll Dresser and each have a rated flow of 17,000 gpm at 55.5 ft TDH. The other two units were manufactured by Allis Chalmers, and each have a rated flow of 15,300 gpm at 53 ft TDH. The three Ingersoll Dresser units operate on variable frequency drives (VFDs), based on wet well level; while the Allis Chalmers units are constant speed and operated on an as needed basis.

The South Plant has six existing influent pumps. Four of the units were manufactured by Ingersoll Dresser and each have a rated flow of 9,400 gpm at 45.5 ft TDH. The other two units were manufactured by Worthington, and each have a rated flow of 6,900 gpm at 45 ft TDH. The four Ingersoll Dresser units operate on variable frequency drives (VFDs) based on wet well level, while the Worthington units are constant speed and operated on an as needed basis.

The pumps are monitored and controlled by a Cold-Standby Programmable Logic Controller (PLC). The level in the wet well is measure by redundant bubbler systems. Each bubbler system has redundant compressors, and the pressure transmitter is commercial grade.

4.2.1 Alternative 2.1: No Action

Alternative No. 2.1 includes taking no action and leaving the existing influent pumps in service at the North and South Plants. There are no costs associated with this alternative.

4.2.2 Alternative 2.2: Install New Influent Pumps

Alternative No. 2.2 includes the installation of five new centrifugal end suction influent pumps at each Plant, with design parameters as shown in **Table 17**. At each Plant, the influent pumps will have the same capacity, and all operate on VFD. The new influent pumps were sized to meet the anticipated SPDES permit peak flow limits of 88 MGD for the North Plant headworks and 45 MGD for the South Plant headworks; with one unit out of service. With five total units proposed for each Plant, there is space to install an additional sixth pump in the future should flow or redundancy requirements change. The control system will include true redundancy and the pressure transmitter on the bubbler system will be industrial grade with all appropriate certifications.

The opinion of probable cost for this alternative included demolition of existing pumps, VFDs and concrete pads; new centrifugal end suction pumps, new VFDs, new concrete pads, new discharge piping and plug valves, electrical, and instrumentation and controls.

Table 17. Alternative 2.2: Influent Pumps Replace In-kind

Parameter	North Plant	South Plant
Pump Qty	5 (N+1)	5 (N+1)
Pump Design Point	15,300 gpm @ 55 ft TDH	7,800 gpm @ 46 ft TDH
Rated HP	268	125
Total Flow, MGD (1 OOS)	88	45
Total Project Cost (2025 Dollars)	**$9,550,000**	**$5,610,000**

4.3 Grit Removal

The existing grit removal systems at the North and South Plants consist of rectangular constant velocity grit channels with chain-and-bucket grit collectors, bucket elevators, and a screw conveyor that conveys grit to a dumpster in the loading bay to be hauled off-site. Wastewater is pumped to the grit influent chamber via the influent pumps, grit is distributed into five (5) 8-foot-deep channels at North Plant, but only 4 are operable; and three (3) 8.5-foot-deep channels at the South Plant. The grit collectors are currently operated on a local timer and the grit system is not integrated with the Plant SCADA network. The grit conveyors are in a Class 1 Division 1 classified room, but the control system and electrical installation is not classified. The grit conveyors do not have any personnel safety measures as required by OSHA. They do not have equipment protection instrumentation and the housing is fully corroded.

Both the North and South Plants experience significant grit accumulation, especially during wet weather events. With the existing equipment, plant staff must routinely drain a grit tank and manually remove grit buildup in the bottom of the channel via shovel and buckets. This is a very labor-intensive process requiring multiple staff to be directed away from other duties onsite. During wet weather events, the North Plant experiences excessive carry-over of grit into the primary clarifiers. This issue is amplified when screens are blinded, and screenings carry over into grit occurs, reducing the grit removal efficiency in the grit channels. Carry-over of grit to downstream unit

processes decreases the treatment efficiency and increases maintenance to clean out the downstream tanks and to maintain the mechanical equipment exposed to grit.

The existing grit removal systems are at the end of their useful life and the grit removal technology is antiquated compared to conventional grit systems. There is also observable surface damage to the existing concrete channels due to age and wear. The existing technology targets removal of particle size greater than or equal to approximately 250 microns; whereas current day conventional technologies target particle size removal of 100 microns and greater at peak flow. Converting to a new conventional grit removal system would reduce grit accumulation in the grit channels and primary clarifiers during wet weather events and significantly reduce labor-intensive maintenance.

4.3.1 Alternative 3.1: No Action

Alternative No. 3.1 includes taking no action and leaving the existing grit removal system in service at the North and South Plants. There are no costs associated with this alternative.

4.3.2 Alternative 3.2: Replace In-kind

Alternative No. 3.2 includes replacing all existing mechanical equipment in-kind, new instrumentation and control system, and completing repairs to the existing concrete tanks as needed. The design parameters and cost estimate for Alternative 3.2 are shown in **Table 18**.

The cost estimate for this alternative included demolition of all existing mechanical equipment that is to be replaced, new chain-and-bucket grit collectors, bucket elevators, a new grit screw conveyor, stainless steel slide gates at the influent of each grit channel, surface and structural concrete repairs for the existing grit channels, and new instrumentation and controls. The new control system will include all the provisions to be integrated with the Plant SCADA system.

Table 18. Alternative 3.2: Grit Removal Replace In-kind

Parameter	North Plant	South Plant
Grit Channel Qty	5	3
Peak Flow though Headworks, MGD	88	45
Grit Collector Drive HP	1	1
Conveyor Drive HP	1	1
Total Cost (2025 Dollars)	**$7,860,000**	**$4,170,000**

While this is the least costly alternative to upgrade the grit removal system, it must be noted that chain-and-bucket grit removal systems are an inefficient grit removal technology relative to modern day grit removal technology, including head cells and vortex channels. Replacement in-kind may continue to result in grit accumulation in the grit removal channels and grit carry over into downstream processes during wet weather.

4.3.3 Alternative 3.3: Install Head Cells

Alternative No. 3.3 includes the construction of new head cells to be used for grit removal. The existing grit channels are 8 ft deep at the North Plant and 8.5 ft deep at the South Plant. The proposed head cell design requires tank depths of 18.8 ft deep at the North Plant and 16.3 ft deep at the South Plant. The existing grit channels at the North Plant and South Plant are built directly above the influent pump rooms so it is not feasible to increase the depth of the existing grit channels due to the underlying construction. Therefore, the head cell tanks would need to be constructed adjacent to the existing preliminary treatment buildings and connected to existing infrastructure upstream and downstream.

The proposed locations for the head cell system at each plant are shown in **Figure 10** and **Figure 11**. In this alternative the existing influent pump discharge headers for each pump would be replaced with one combined discharge header to control flow distribution to the head cells. The discharge header would be routed outside the existing preliminary treatment building to the new head cell system. Grit removed by the head cells would be pumped from the head cell sumps to new grit washer units. Dewatered grit would then be hauled off site. Effluent from the head cells flows over weirs to a combined effluent channel, which would be tied into the existing primary clarifier influent channel.

Hydro International provided head cell quotes as summarized in **Table 19**. With the proposed system, all units would be in service during peak flows of 88 MGD at the North Plant and 45 MGD at the South Plant.

Table 19. Alternative 3.3: Head Cells

Parameter	North Plant	South Plant
Head Cell Quantity	3	2
Treatment Capacity, MGD	88	45
Head Cell Diameter	12-foot	12-foot
Trays per Head Cell	10	8
Grit Pumps	3	2
Grit Washer Units	3	2
Total Cost (2025 Dollars)	**$15,420,000**	**$10,510,000**

The cost estimate for this alternative includes excavation and construction of new concrete head cell tanks, influent channels and effluent channels, head cell tray assemblies, grit pumps and washers, electrical, instrumentation and controls, and bypass pumping. The new control system will include all the provisions to be integrated with the Plant SCADA system.

4.3.4 Alternative 3.4: Install Baffled Vortex Grit Chambers

Alternative No. 3.4 includes the construction of new baffled vortex grit chambers to be used for grit removal. The existing grit channels are 8 ft deep at the North Plant and 8.5 ft deep at the South Plant. The proposed baffled

vortex grit chamber design requires a grit chamber tank depth of 19.5 ft deep at the North Plant and 16.2 ft deep at the South Plant. It is not feasible to increase the depth of the existing grit channels due to underlying construction, therefore the baffled vortex grit chamber tanks would need to be constructed adjacent to the existing preliminary treatment buildings and connected to existing infrastructure upstream and downstream.

The proposed locations for the baffled vortex grit chamber system at each plant are shown in **Figure 12** and **Figure 13.** In this alternative the existing influent pump discharge headers for each pump would be replaced with one combined discharge header to control flow distribution to the grit chambers. The discharge header would be routed outside the existing preliminary treatment building to the new baffled vortex grit chamber system. Grit removed by the vortex chambers was pumped from each tank sump to new grit washing units. Dewatered grit was assumed to be hauled off site as per current operations. Effluent from the baffled vortex grit chambers flows into a combined effluent channel, which would be tied into the existing primary clarifier influent channel.

Smith and Loveless provided quotes for baffled vortex grit chamber equipment as summarized in **Table 20**. The proposed system, assumes all units are in service during peak flows of 88 MGD at the North Plant and 45 MGD at the South Plant.

Table 20. Alternative 3.4: Baffled Vortex Grit Chambers

Parameter	North Plant	South Plant
Vortex Grit Chamber Qty	2	2
Treatment Capacity, MGD	88	45
Grit Chamber Diameter, ft	20	18
Grit Pump Qty	2	2
Grit Washer Qty	2	2
Total Cost (2025 Dollars)	**$11,480,000**	**$8,960,000**

The cost estimate for this alternative includes excavation and construction of new concrete tanks, influent channels and effluent channels, grit chamber mechanisms, grit pumps and washing units, electrical, instrumentation and controls, and bypass pumping. The new control system will include all the provisions to be integrated with the Plant SCADA system.

4.4 Primary Settling Tanks

The existing primary settling tanks were installed as part of the original construction in the early 1970s. Primary influent enters the existing tanks through feed gates and settled solids are removed with chain-and-flight collection mechanisms. Primary effluent flows over effluent weirs to a common primary effluent channel and is conveyed to the aeration tanks. The skimmers are manual and required operators to turn them throughout the day. The collectors are controlled from the Motor Control Center (MCC) and there is not remote monitoring.

4.4.1 Alternative 4.1: No Action

Alternative No. 4.1 includes taking no action and leaving the existing primary settling tanks in service at the North and South Plants. There are no costs associated with this alternative.

4.4.2 Alternative 4.2: Replace In-kind

Alternative No. 4.2 includes replacing all existing mechanical equipment in-kind and completing repairs to the existing concrete tanks as needed. The design parameters and cost estimate for Alternative 4.2 are shown in **Table 21**.

The cost estimate for this alternative included demolition of all existing mechanical equipment that is to be replaced, new chain-and-flight collection mechanisms and drives, stainless steel slide gates at the influent of each primary settling tank, new effluent weirs, surface and structural concrete repairs for the existing primary settling tanks, electrical equipment, and new instrumentation and controls. The new control system will include all the provisions to be integrated with the Plant SCADA system.

Table 21. Alternative 4.2: Primary Settling Tank Replace In-kind

Parameter	North Plant	South Plant
Tank Qty	4	4
Tank Size (LxW)	200'x40'	130'x33'
Feed Gate Qty	16	16
Feed Gate Size (LxW)	24"x24"	15"x15"
Effluent Weirs LF	880	720
Effluent Weirs Size (LxW)	7'-4" x 9"	9'-4" x 9"
Peak SOR, gpd/ft^2	2,290	2,440
Drive HP	1/2	1/2
Total Cost (2025 Dollars)	**$9,530,000**	**$8,180,000**

4.5 Process Aeration System

The North Plant has three aeration tanks with diffused air while the other three tanks are mainly used for wet weather storage. Similarly, the South Plant has three aeration tanks with diffused air and one tank that is used for wet weather storage.

At North plant one of the three aeration tanks with diffused air has luminescent Dissolved oxygen (LDO) sensors that are in good condition. Air valves do not have motorized actuators, so air flow control is manual. Primary flow into each aeration tank is measure at a Parshall flumes which use ultrasonic level units that are passed the useful life. The thermal mass air flow meters are in poor condition. At South plant there is no LDO monitoring and there are no air flow control valves.

Blowers at both plants are not integrated into the SCADA system. Each blower is controlled by an Allen Bradley SLC 5/05 PLC which most of its parts are already discontinued or the end of life is on March 31, 2014.

The aeration systems were designed for a monthly average TKN limit of 15.2 mg/L at the North Plant and 15.4 mg/L at the South Plant. Arcadis evaluated the capacity of the existing activated sludge system to meet the anticipated future SPDES permit modifications. The future process air demand was evaluated assuming full nitrification through the summer with an effluent NH_3-N concentration of 9 mg/L to account for the anticipated changes to the SPDES permits at each Plant.

4.5.1 Alternative 5.1: No Action

Alternative No. 5.1 includes taking no action and leaving the existing blowers and diffusers in service at the North and South Plants. There are no costs associated with this alternative.

4.5.2 Alternative 5.2: Turbo Blowers and Diffusers

This alternative includes the installation of three new turbo blowers at the North and South Plants, installation of new fine bubble diffusers, air distribution piping and manifolds, new electrically actuated stainless-steel step-feed gates, and automated DO controls.

To size new turbo blowers process air demand was calculated for the North and South Plants under the following assumptions:

- BOD oxidation only in the winter (9.2°C)
- BOD oxidation and full nitrification in the summer (24°C)
- Historical average influent concentrations and flow and load peaking factors were used for the North Plant and South Plant.
- The North Plant design condition used a MM flow of 35 MGD, corresponding to the existing SPDES permit flow.
- The South Plant design condition was current condition loadings plus ten percent at 30.4 MGD.

The new blowers at the South Plant are expected to fit in the existing blower building. However, the North Plant will need a new blower building to accommodate the additional unit, which is required to maintain N+1 redundancy. Proposed site locations for the new process air blowers are shown in **Figure 14** for the North Plant and **Figure 15** for the South Plant.

For this alternative one additional aeration tank at the North Plant will need to be converted to diffused air to allow operational flexibility and ensure future permit limits can be met year-round. Under this alternative the North Plant has four operational aeration tanks, and the South Plant maintains three operational aeration tanks. New diffusers will be installed in the existing and newly converted tanks as the existing diffusers are reaching the end of their useful life. The design criteria and opinion of probable cost are presented in **Table 22**.

Table 22. Alternative 5.2: Install Turbo Blowers and New Diffusers

Parameter	North Plant	South Plant
Aeration Tank Qty	4	3
Blower Qty	3	3
Rated HP	400	300
SCFM (current min. day - design MW)	5,100 – 41,600	1,238 – 13,215
Discharge Pressure, psig	6.4 – 7.4	7.1 – 8.1
Step-feed Gate Qty	18	8
Step-feed Gate Size (LxW)	48” x 48”	36” x 36”
New Blower Building (LxW)	40’x30’	-
Total Cost (2025 Dollars)	**$26,920,000**	**$9,850,000**

4.6 Secondary Clarifiers

The existing secondary clarifiers are center feed concrete tanks with perimeter weirs and baffles that were installed as part of the original construction in the early 1970s. There are six 110-foot diameter secondary clarifiers at the North Plant and four 100-foot diameter secondary clarifiers at the South Plant each equipped with 1 HP drives each. At each plant, mixed liquor flows by gravity from the aeration tanks to a common secondary clarifier influent channel. This channel is equipped with coarse bubble diffusers and aeration is provided by three Hoffman centrifugal blowers to maintain mixing in the channel. Secondary effluent flows by gravity from the effluent chamber of each clarifier to a common pipe that conveys the flow to disinfection. Settled secondary sludge is collected via draft tube collection mechanisms and returned to the head of the Plant or wasted. The existing secondary clarifier technology is antiquated and does not have modern scum and sludge collection and is past its useful life. Collector drives have torque protection, but they are not monitored by the Plant SCADA system. During the December 5, 2022 site visit, Clarifier No. 6 perimeter weir and effluent channel separated from the concrete tank wall and was inoperable for a period of months. Tanks are routinely out of service and affect ability to maintain permit compliance.

4.6.1 Alternative 6.1: No Action

Alternative No. 6.1 includes taking no action and leaving the existing secondary clarifiers in service at the North and South Plants. There are no costs associated with this alternative.

4.6.2 Alternative 6.2: Spiral Scraper Collection Mechanisms

This alternative includes replacing all mechanical equipment associated with the secondary clarifiers and secondary clarifier influent channels, completing concrete repairs as needed, and replacing the existing draft tube

collection mechanisms with spiral scraper type mechanisms. The design criteria and cost are presented in **Table 23.**

The cost estimate for this alternative includes demolition of existing mechanical equipment, new spiral scraper collection mechanisms, clarifier drives, stainless steel weirs and baffles, stainless steel slide gates in the RAS chamber of each clarifier, stainless steel slide gates in the effluent chamber of each clarifier, and concrete repairs as needed. Equipment associated with the clarifier influent channels includes new blowers, coarse bubble diffusers, stainless steel slide gates at the influent to each clarifier, and concrete repairs as needed. Costs for electrical work, instrumentation and controls is also included.

Table 23. Alternative 6.2: Secondary Clarifiers Spiral Scraper Collection

Parameter	North Plant	South Plant
Clarifier Qty	6	4
Clarifier Diameter, ft	110	100
Peak SOR, gpd/ft^2	970	1,020
Drive HP	1	1
Influent Gate Qty	6	4
Influent Gate Size (LxW)	36” x 36”	30” x 30”
Effluent Gate Qty	6	4
Effluent Gate Size (LxW)	30” x 30”	24” x 24”
RAS Gate Qty	6	4
RAS Gate Size (LxW)	18” x 18”	16” x 16”
Total Cost	**$22,260,000**	**$12,940,000**

4.7 Disinfection

The disinfection systems at the North Plant and South Plant were upgraded in 2014. Both systems are in good operating conditions and are not expected to need an upgrade within the next 10 years.

4.7.1 Alternative 7.1: No Action

Alternative No. 7.1 includes taking no action and leaving the existing disinfection systems in service at the North and South Plants. There are no costs associated with this alternative.

4.8 Plant Water Pumps

The North and South Plants have two sets of plant water pumps. Each Plant has three main plant water pumps that supply the incinerators with cooling water and two auxiliary plant water pumps for sludge thickening the DAFTs. The existing pumps are constant speed and have a shared 20-inch suction header which is supplied by the secondary clarifier effluent. The three main units pump plant water through a wedge wire strainer located upstream of the incinerators. The North Plant main plant water pumps have a design point of 2,250 gpm at 185 ft TDH, and the North Plant auxiliary plant water pumps have a design point of 900 gpm at 70 ft TDH. The existing strainer has 12-inch flanged connections and a 150 PSIG pressure rating at 150°F. While only one of each type of pump is typically in operation, there are several units out of service. Maintenance and repairs are difficult to complete due to the age and obsolescence of the existing pump technology so it will be necessary to upgrade these pumps to maintain incinerator operations in the near future. There is only one pressure transmitter to measure system pressure and it does not have diaphragm seal which is required for this application. All pressure gauges on the pump discharge do not work. The plant water pumping system can run in automatic mode. However, the day of the site visit pumps were running in local at both plants.

4.8.1 Alternative 8.1: No Action

Alternative No. 8.1 includes taking no action and leaving the existing plant water pumps in service at the North and South Plants. There are no costs associated with this alternative.

4.8.2 Alternative 8.2: Replace In-Kind

Alternative No. 8.2 includes a full replacement in-kind of the existing split case horizontal centrifugal plant water pumps and auxiliary plant water pumps, and installation of a new strainer at the North and South Plants. The existing pumps and strainers at each plant would be removed and replaced with new units, with design parameters as shown in **Table 24**.

Table 24. Alternative 8.2: Plant Water Pumps Replace In-kind

Pump System	Parameter	North Plant	South Plant
Plant Water	Qty	3	3
	Pump Design Point	2,250 gpm @ 185 ft TDH	2,250 gpm @ 185 ft TDH
	Rated HP	150	150
Auxiliary Plant Water	Qty	2	2
	Pump Design Point	900 gpm @ 70 ft TDH	900 gpm @ 70 ft TDH
	Rated HP	25	25
Total Cost (2025 Dollars)		**$1,670,000**	**$1,670,000**

The cost estimate for this alternative includes demolition of the existing equipment and concrete pads, new split case horizontal centrifugal pumps, new strainers, concrete pads for the pumps and strainers, new suction and discharge piping and valves between the upstream and downstream plug valves on each pump, electrical, and instrumentation and controls.

4.9 SCADA System and Network

The existing SCADA system at both Plants is Proficy iFix (version 5.1. There is a standalone server running in a Windows 7 computer at each plant with no SCADA client computers. Microsoft ended support for Windows 7 operating system on January 14, 2020. Servers are licensed as development which allows configuration of the system. The license is in a dangle that it is connected to the computer into a USB port. It uses IGS driver to communicate with Allen Bradley PLCs, GE9 to communicate with RX3i PLCs as manufacture by Emerson, and Modbus RTU driver to communicate with the remote sites. The SCADA servers are configured to log historical data locally and due to limitations on the hard drive capacity, historical data is automatically deleted after 6 months. Data is also saved in the form of excel reports using XLReporter software.

The SCADA network at North Plant has a combination of multimode fiber optic and coaxial cables and not all buildings are connected to the network. The SCADA network at South Plant uses single mode fiber optic backbone network but most of the fiber optic segments are owned by the Internet Service Provider (ISP). There is no connection between the SCADA networks and the IT Network so SCADA data is transferred to the County network manually. HVAC and power monitoring systems are also part of the SCADA network and there is not physical or logical separation. CCTV and access control are part of the IT networks.

4.9.1 Alternative 9.1: No Action

Alternative 9.1 includes taking no action and leaving the existing instrumentation and controls in service at the North and South Plants. There are no costs associated with this alternative.

4.9.2 Alternative 9.2: SCADA System and Fiber Optic Network

Alternative 9.2 includes construction of a secure fiber optic network that allows speed of up to 10 Gbps. Fiber optic will be installed in separate conduits and new duct backs will be required to reach all buildings at each Plant. Network redundancy will be incorporated via ring topology with nodes at each building. The SCADA network will be physically separated from other networks. Network and control system equipment will be locked to avoid unauthorized access inside the facilities. The SCADA network will be connected to the IT network using a Demilitarized Zone (DMZ) following the perdue model for Industrial Control Systems (ICS). This connection will allow the SCADA network to be properly monitored and protected by IT specialist while making accessible SCADA data at the enterprise level.

New SCADA system will be installed at each Plant. The front-end hardware and software will include:

1. High availability fault tolerant server.
2. Redundant Human Machine Interface (HMI) Servers.
3. Virtualization software.
4. SCADA clients will run as Thin clients workstations.
5. Redundant Historian servers.

6. Network Attached Storage (NAS).
7. Backup management software.
8. Network Time Protocol (NTP) Appliance.
9. Uninterruptable Power Supplies (UPS)
10. Layer 2 and Layer 3 ethernet switches.
11. Firewalls.
12. Fiber Patch Panels.

The cost estimate for the new SCADA system is presented in **Table 25** and includes the front end hardware and software, SCADA software and network configuration and electrical installation including excavation and fill of the new duct banks.

Table 25. Alternative 9.2: New SCADA System

Parameter	North Plant	South Plant
Front-End Hardware and Software	2	2
SCADA software and Network Configuration	100	60
Electrical Installation (including sitework and duct banks)	20	18
Total Cost (2025 Dollars)	**$5,870,000**	**$6,480,000**

4.9.3 High Voltage Electric Distribution

Electrical service enters the North Plant via two overhead 115 kilovolt (kV) utility (National Grid) owned transmission lines. These 115kV transmission lines deliver power to the main substation. Only a single transmission line is used at any given time and the utility can switch which transmission line is being used as needed. This provides a level of redundancy for electricity coming into the site. The main substation is comprised of two substation style transformers rated 7500/9375/10500 kVA and with a 13200Y/7620 secondary voltage. Both main substation transformers each serve a single outdoor 15kV metal enclosed switchgear. Only a single main substation transformer is used at any given time with the other being a true redundant backup. The metal enclosed switchgear is configured in a main-tie-main configuration with the tie breaker being closed most of the time and one of the main breakers in the open position. The metal enclosed switchgear is comprised of several 15kV feeder compartments with electro-mechanical style protection relays. Each 15kV feeder is routed underground around the site to the six unit substations. The unit substations are comprised of 15kV switches and a pad-mounted transformer. The unit substations transform the electrical power distributed from the main substation to usable electric that can be used throughout the North Plant.

At the North Plant most of the high voltage electrical systems are original to the site and date back to the early 1970s. Equipment has reached the end of its useful life, begun to show signs of wear due to age of the

equipment, and in the case of the metal enclosed switchgear, is using outdated technology and protective devices. At the main substation the configuration of electrical into the metal enclosed switchgear (overhead bus) and transformers has been problematic in the past causing plant wide outages. The overhead configuration allows debris, items, wildlife, etc. to come in contact with the overhead/exposed bus and cause an outage. The unit substations the switches have been identified as problematic across the site. Most switches do not operate correctly and have begun to show wear due to age. Given their current condition, in the event a switch requires operation, facility staff go to the main substation and perform a complete shutdown, then operate the local switch. This current method of operating the unit substations defeats original intent and what one would expect if the system were modern and operating as intended. Instances were observed in which unit substation transformers had oil leaking. The medium voltage cabling at the North Plant is also original, dating to the early 1970s.

Electrical service enters the South Plant via two underground 15kV circuits (Church Street Circuit & Pearl Street Circuit). These circuits both enter a single outdoor 15kV metal enclosed switchgear. Only a single utility circuit is used at any given time providing a level of redundancy to the site. The metal enclosed switchgear is configured with two main breakers (one for each 15kV circuit). The main breaker associated with the 15kV circuit being used is in the closed position while the other main breaker is in the open position. The metal enclosed switchgear is comprised of several 15kV feeder compartments with electro-mechanical style protection relays. Each 15kV feeder is routed underground around the site to the five unit substations. The unit substations are comprised of 15kV switches and a pad-mounted transformer. The unit substations transform electrical power distributed from the main substation to usable electric that can be used throughout the South Plant.

At the South Plant most of the high voltage electrical systems are original to the site and date back to the early 1970s. Equipment has reached the end of its useful life, begun to show signs of wear due to age of the equipment, and in the case of the metal enclosed switchgear, is using outdated technology and protective devices. Regarding the unit substations the switches have been identified as problematic across the site. Most switches do not operate correctly and have begun to show signs of wear due to age. Given their current condition, in the event a switch requires operation facility staff go to the main substation and perform a complete shutdown, then operate the local switch. This current method of operating the unit substations defeats original intent and what one would expect if the system were modern/operating as intended. Instances were observed in which unit substation transformers had oil leaking. All underground medium voltage cabling has been recently replaced at the South Plant.

4.9.4 Alternative 10.1: No Action

Alternative 10.1 includes taking no action and leaving the existing high voltage electric distribution systems in service at the North and South Plants. There are no costs associated with this alternative.

4.9.5 Alternative 10.2: Upgrade High Voltage Electric Distribution System

Alternative 10.2 includes replacing major components of the North Plant and South Plant high voltage electric distribution systems. Given the age, condition, and criticality of the high voltage electrical systems, it is recommended that existing major components be replaced in-kind. At the North Plant this includes the 115kV circuit switches, main substation transformers, metal enclosed switchgear, unit substation switches/transformers, along with all associated underground medium voltage cabling from the main substation to each unit substation. At the South Plant this includes the metal enclosed switchgear and unit substation switches/transformers. It is

recommended that 15kV disconnect switches be added to each incoming utility circuit to allow the South Plant the option to isolate the switchgear without utility involvement. Medium voltage cabling is not included in the South Plant upgrade as it was recently replaced. The design criteria and opinion of probable cost are presented in **Table 26.**

Table 26. Alternative 10.2: Upgrade High Voltage Electric Distribution System

Parameter	North Plant	South Plant
115kV circuit switches - Main Substation	2	-
15kV disconnect switches – Main Substation	-	2
115kV substation transformers – Main Substation	2	-
15kV switchgear – Main Substation	1	1
Cast coil type transformers – Unit Substations	8	6
Switches – Unit Substations	10	10
Total Cost (2025 Dollars)[1]	**$18,070,000**	**$8,480,000**

[1] Note that the total cost for the high voltage electric upgrades include a contingency of 20%.

It is recommended the existing high voltage configuration remain as is with equipment replacements in-kind as described for each Plant. Implementing these recommendations will ensure the most reliable, modern, redundant, and robust electrical systems are put in place to support the site/operations for the foreseeable future.

5 Alternatives Analysis Summary

5.1 North Plant

Based on risk scores and alternatives analysis the following process unit upgrades are recommended as summarized in **Table 27**. The cost to upgrade all recommended equipment in 2025 dollars is $112.7 million.

Table 27. North Plant Summary of Recommended Alternatives

Unit Process	Recommended Alternative	Capital Cost (2025 $ in Millions)
Mechanical Screening	Install three new multi-rake chain driven mechanical bar screens	$7.2
Influent Pumps	Install New Influent Pumps	$9.6
Grit System	Install Baffled Vortex Grit Chambers	$11.5
Primary Clarifiers	Replace In-kind	$9.5
Process Aeration	Install Turbo Blowers and New Diffusers	$26.9
Secondary Clarifiers	Install Spiral Scraper Collection Mechanisms	$22.3
Plant Water Pumps	Replace In-kind	$1.7
SCADA System	Upgrade SCADA System	$5.9
High Voltage Electrical Distribution	Upgrade High Voltage Electrical System	$18.1
Total (2025 Dollars)		**$112.7**

5.2 South Plant

Based on risk scores and alternatives analysis the following process unit upgrades are recommended as summarized in **Table 28**. The cost to upgrade all recommended equipment in 2025 dollars is $62.3 million.

Table 28. South Plant Summary of Recommended Alternatives

Unit Process	Recommended Alternative	Capital Cost (2025 $ in Millions)
Influent Pumps	Install New Influent Pumps	$5.6
Grit System	Install Baffled Vortex Grit Chambers	$9.0
Primary Clarifiers	Replace In-kind	$8.2
Process Aeration	Install Turbo Blowers and New Diffusers	$9.9
Secondary Clarifiers	Install Spiral Scraper Collection Mechanisms	$12.9
Plant Water Pumps	Replace In-kind	$1.7
SCADA System	Upgrade SCADA System	$6.5
High Voltage Electrical Distribution	Upgrade High Voltage Electrical System	$8.5
Total (2025 Dollars)		**$62.3**

6 Capital Improvement Plan Prioritization

Capital improvement upgrades were prioritized into two phases based on risk scores and funding opportunities. Phase 1 includes process unit upgrades recommended to be completed in zero to five years and Phase 2 includes process unit upgrades recommended to be completed within six to 10 years.

6.1 0 to 5 Years

Phase 1 of upgrades should be pursued in five years from this CIP report. The recommended alternatives and associated costs for the North Plant are summarized in **Table 29**, with a total project cost of $70.3 million. The recommended alternatives and associated costs for the South Plant are summarized in **Table 30**, with a total project cost of $40.3 million. ACWPD may pursue funding through the state revolving fund (SRF) and grants through the NYS Water Infrastructure Improvement (WIIA) grant program and the Water Quality Improvement Project (WQIP) grant program. *ACWPD* may be eligible for a $10 million WQIP grant and combined funding from the SRF, BIL grants and/or WIIA grants for the remaining funding needs.

Table 29. North Plant - 0 to 5 Year Priority Projects and Opinion of Probable Cost in 2025 Dollars

Unit Process	Alternative	Capital Cost (2025 $ in Millions)
North Plant Mechanical Screening	Install three new multi-rake chain driven mechanical bar screens.	$7.2
Grit System	Install Baffled Vortex Grit Chambers	$11.5
Primary Clarifiers	Replace In-kind	$9.5
Secondary Clarifiers	Install Spiral Scraper Collection Mechanisms	$22.3
Plant Water Pumps	Replace In-kind	$1.7
High Voltage Electrical Distribution	Upgrade High Voltage Electrical System	$18.1
Total (2025 Dollars)		**$70.3**

Table 30. South Plant - 0 to 5 Year Priority Projects and Opinion of Probable Cost in 2025 Dollars

Unit Process	Alternative	Capital Cost (2025 $ in Millions)
Grit System	Install Baffled Vortex Grit Chambers	$9.0
Primary Clarifiers	Replace In-kind	$8.2
Secondary Clarifiers	Install Spiral Scraper Collection Mechanisms	$12.9
Plant Water Pumps	Replace In-kind	$1.7
High Voltage Electrical Distribution	Upgrade High Voltage Electrical System	$8.5
Total (2025 Dollars)		**$40.3**

6.2 6 to 10 Years

The influent pumps at the North and South Plants are recommended for upgrade during Phase 2, in six to 10 years, since they are in relatively good condition with a risk score of 8.2 at the North Plant and 10.9 at the South Plant. Also based on the age of the process aeration system and anticipated future permit limits, it is recommended to upgrade the process aeration within six to 10 years and at the same time upgrade the SCADA system to allow for automated DO controls. The total cost to upgrade both the North Plant and South Plant six to 10 year projects is $42.4 million and $22.0 Million in 2025 dollars, as shown in **Table 31** and **Table 32**, respectively.

Table 31. North Plant - 6 to 10 Year Priority Projects and Opinion of Probable Cost in 2025 Dollars

Unit Process	Alternative	Capital Cost (2025 $ in Millions)
Influent Pumps	Install New Influent Pumps	$9.6
Process Aeration	Install Turbo Blowers and New Diffusers	$26.9
SCADA System	Upgrade SCADA System	$5.9
Total		**$42.4**

Table 32. South Plant - 6 to 10 Year Priority Projects and Opinion of Probable Cost in 2025 Dollars

Unit Process	Alternative	Capital Cost (2025 $ in Millions)
Influent Pumps	Install New Influent Pumps	$5.6
Process Aeration	Install Turbo Blowers and New Diffusers	$9.9
SCADA System	Upgrade SCADA System	$6.5
Total		**$22.0**

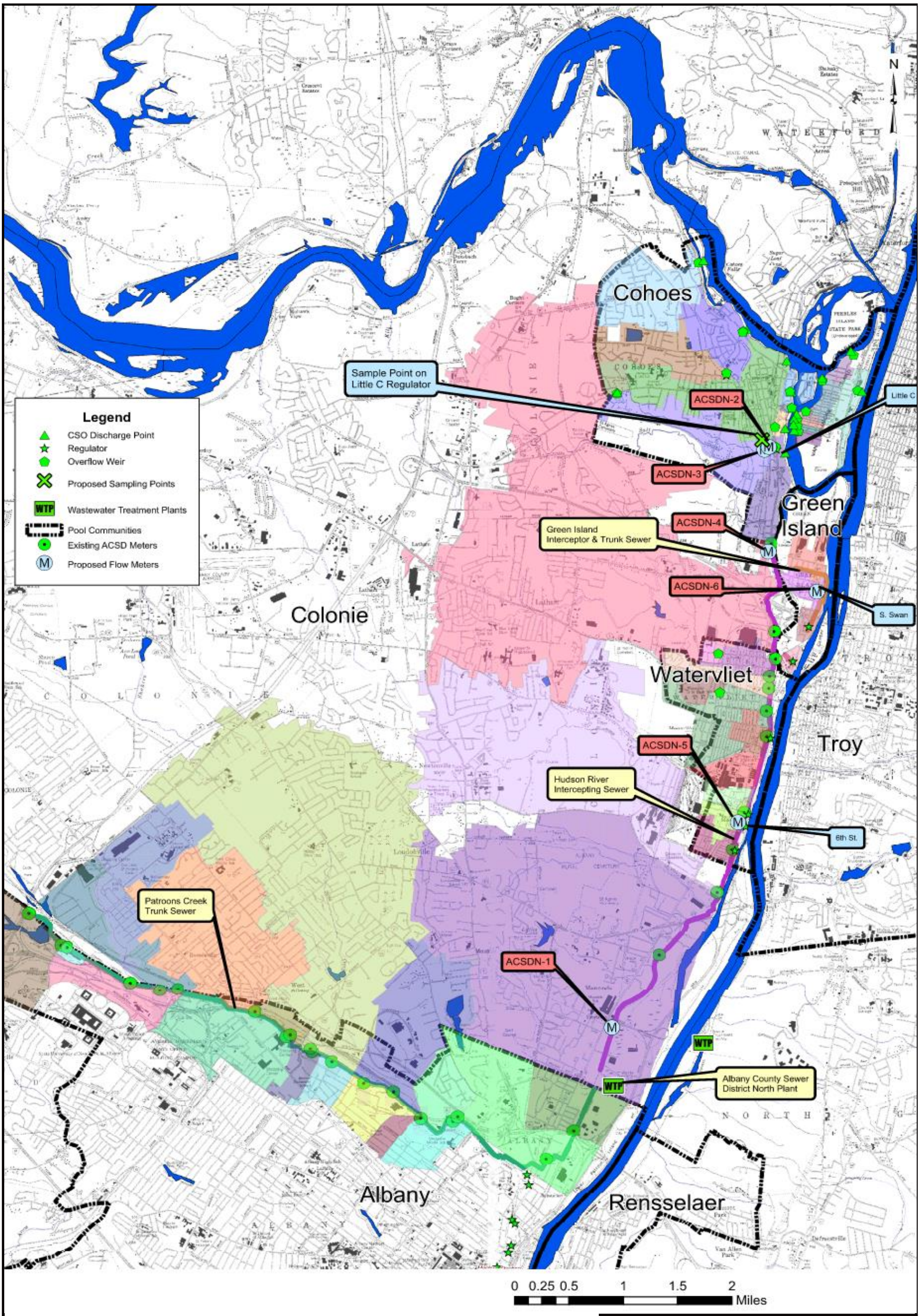
7 Proposed Project Schedule

The proposed project schedule for completion of the capital improvements included in this report is shown in **Table 33**.

Table 33. Proposed Project Schedule

Milestone	Phase 1: 0 to 5 Year Priority	Phase 2: 6 to 10 Year Priority
Design Initiation	January 2024	January 2028
Construction Start	January 2025	January 2029
Construction Completion	January 2029	January 2032

Figures



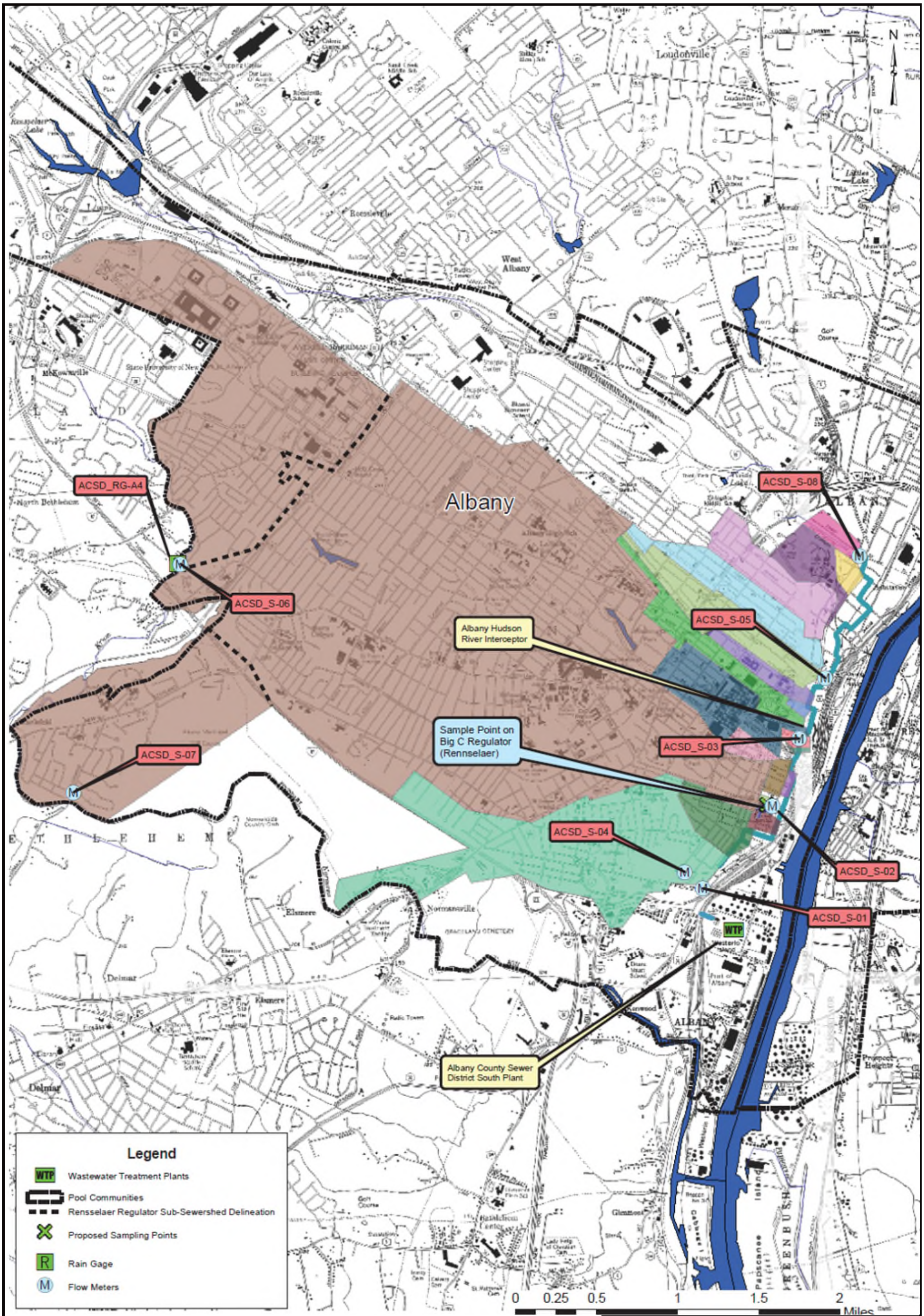
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

OVERALL SERVICE AREA – NORTH PLANT

ARCADIS

FIGURE 1

6/14/2023 12:55:06 PM



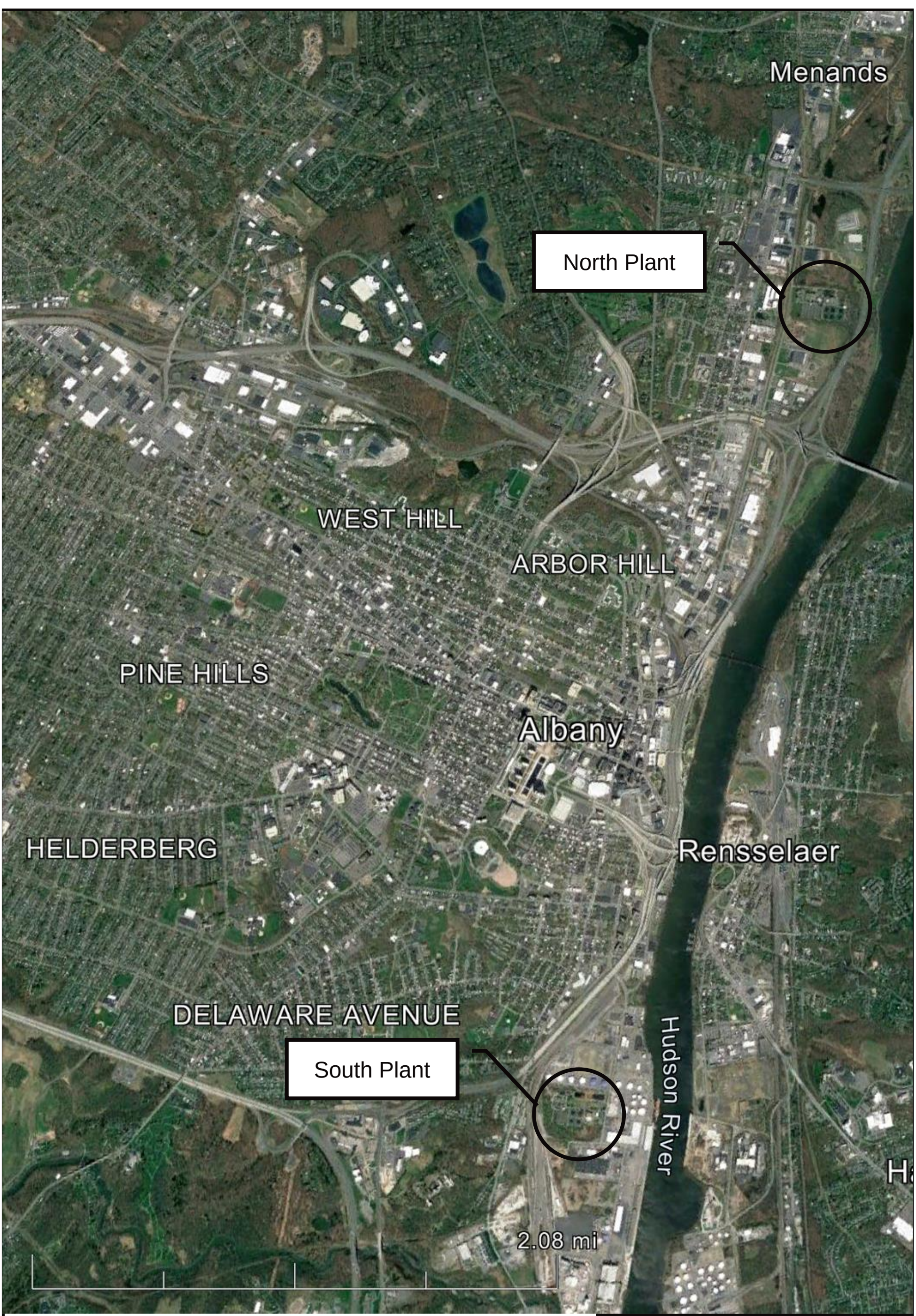
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

OVERALL SERVICE AREA – SOUTH PLANT

ARCADIS

FIGURE 2

6/16/2023 8:17:25 AM



ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

SITE LOCATIONS – NORTH PLANT AND SOUTH PLANT

ARCADIS

FIGURE 3

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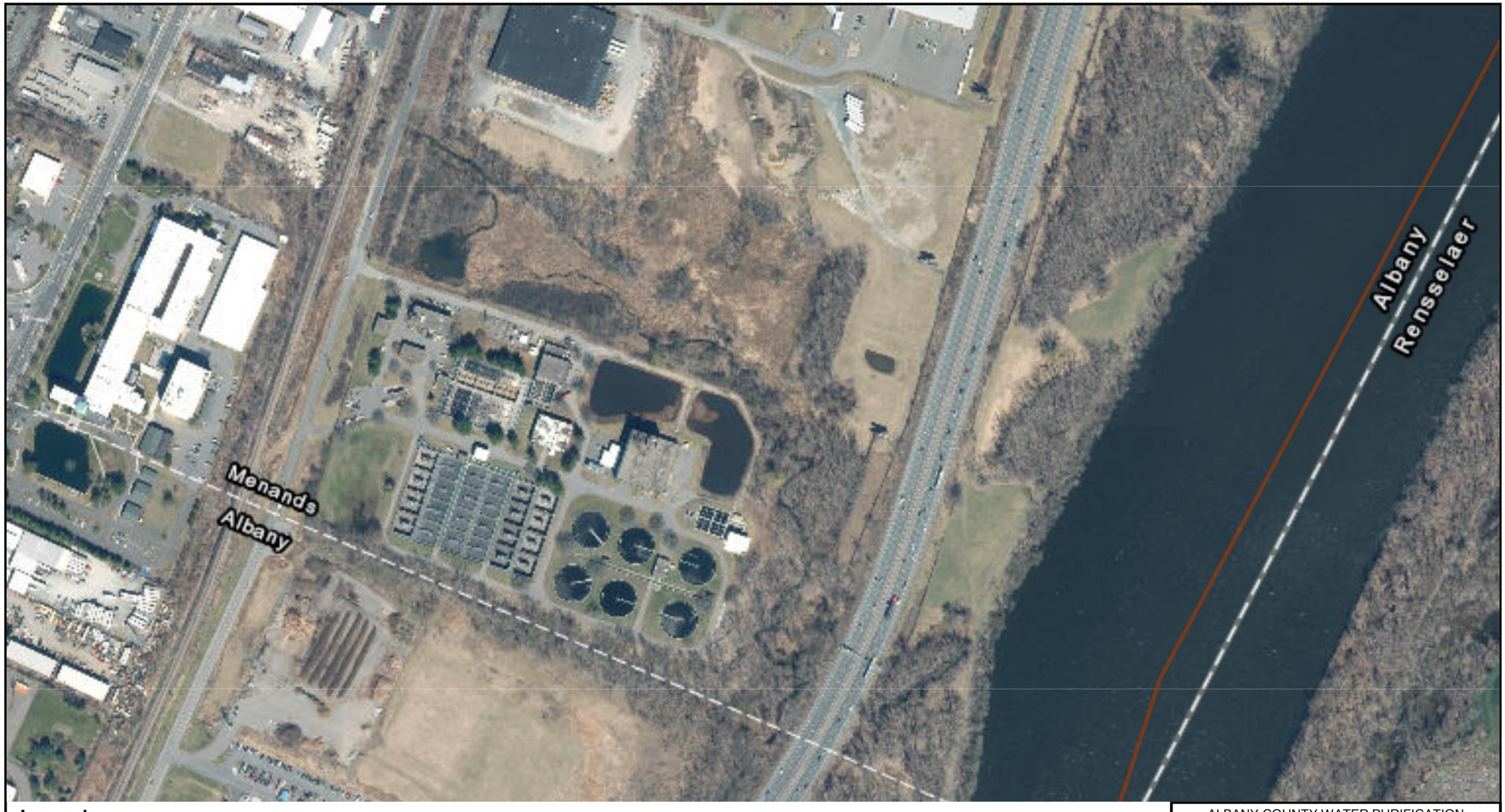


Legend:

Imperiled Mussels

Mussel Screening Ponded Waters

Mussel Screening Streams

ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

NORTH PLANT DEC ENVIRONMENTAL RESOURCE MAPPER MUSSEL SCREENING STREAMS

ARCADIS

FIGURE **4a**

6/14/2023 11:46:01 AM

Legend:

- State Regulated Freshwater Wetlands (Outside of the Adirondack Park)
- State Regulated Wetland Checkzone
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

NORTH PLANT DEC ENVIRONMENTAL RESOURCE MAPPER WETLANDS

ARCADIS

FIGURE **4b**

6/14/2023 11:46:01 AM

Legend:

Imperiled Mussels

Mussel Screening Ponded Waters

Mussel Screening Streams

6/14/2023 12:51:22 PM

ALBANY COUNTY WATER PURIFICATION
DISTRICT CAPITAL IMPROVEMENTS PLAN
ENGINEERING REPORT

SOUTH PLANT DEC ENVIRONMENTAL RESOURCE MAPPER MUSSEL SCREENING STREAMS

ARCADIS

FIGURE
4c

Legend:

- State Regulated Freshwater Wetlands (Outside of the Adirondack Park)
- State Regulated Wetland Checkzone
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

SOUTH PLANT DEC ENVIRONMENTAL RESOURCE MAPPER WETLANDS

ARCADIS

FIGURE **4d**

6/14/2023 12:51:08 PM

Legend:

- Significant Natural Communities
- Natural Communities Near This Location
- Rare Plants or Animals

ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

SOUTH PLANT DEC ENVIRONMENTAL RESOURCE MAPPER NATURAL COMMUNITIES AND RARE PLANTS AND ANIMALS

ARCADIS

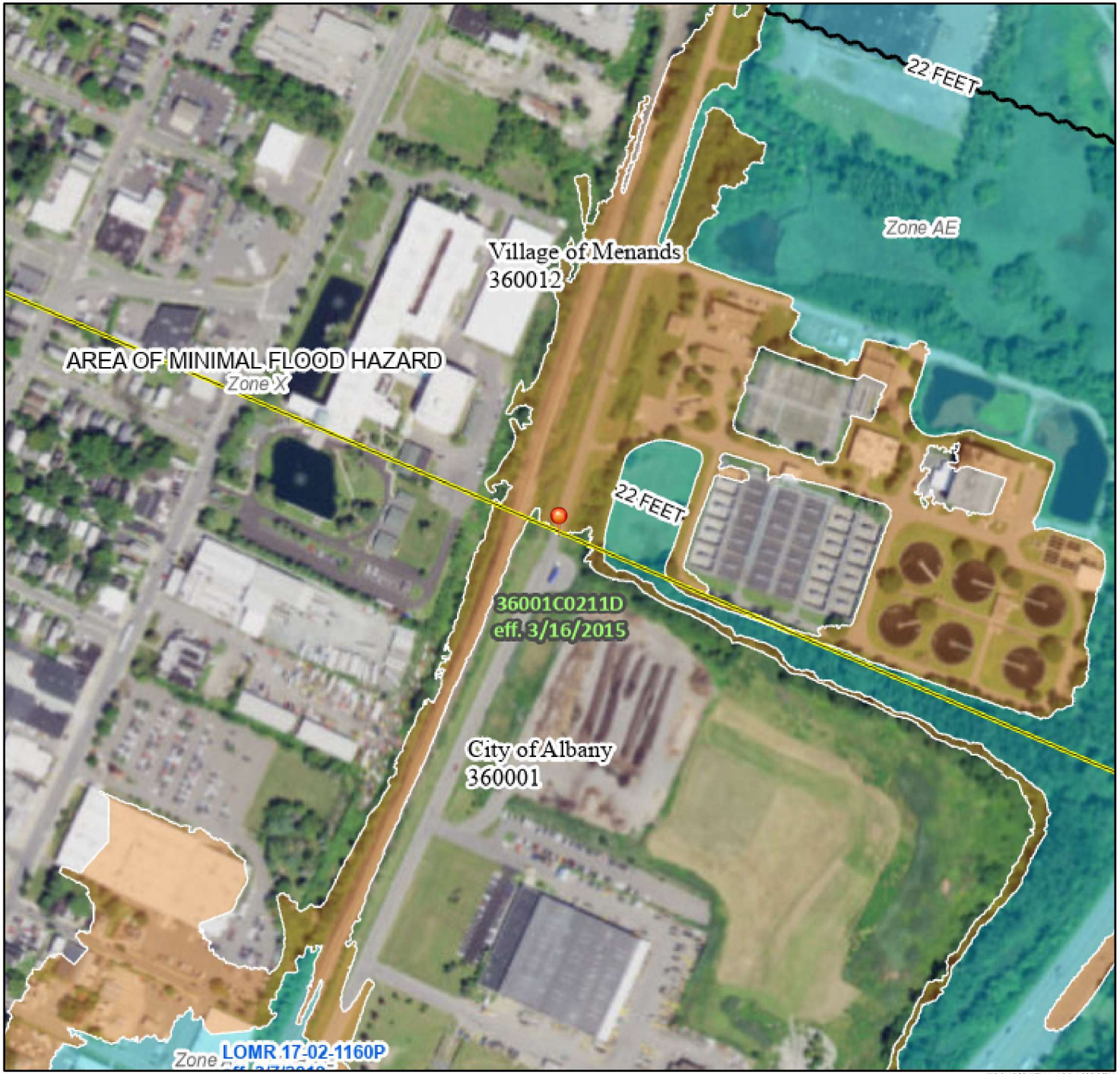
FIGURE 4e

6/14/2023 12:55:06 PM

National Flood Hazard Layer FIRMette

FEMA

73°44'15"W 42°40'46"N



73°43'37"W 42°40'20"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/21/2023 at 2:06 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

73°45'47"W 42°38'2"N

73°45'10"W 42°37'36"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

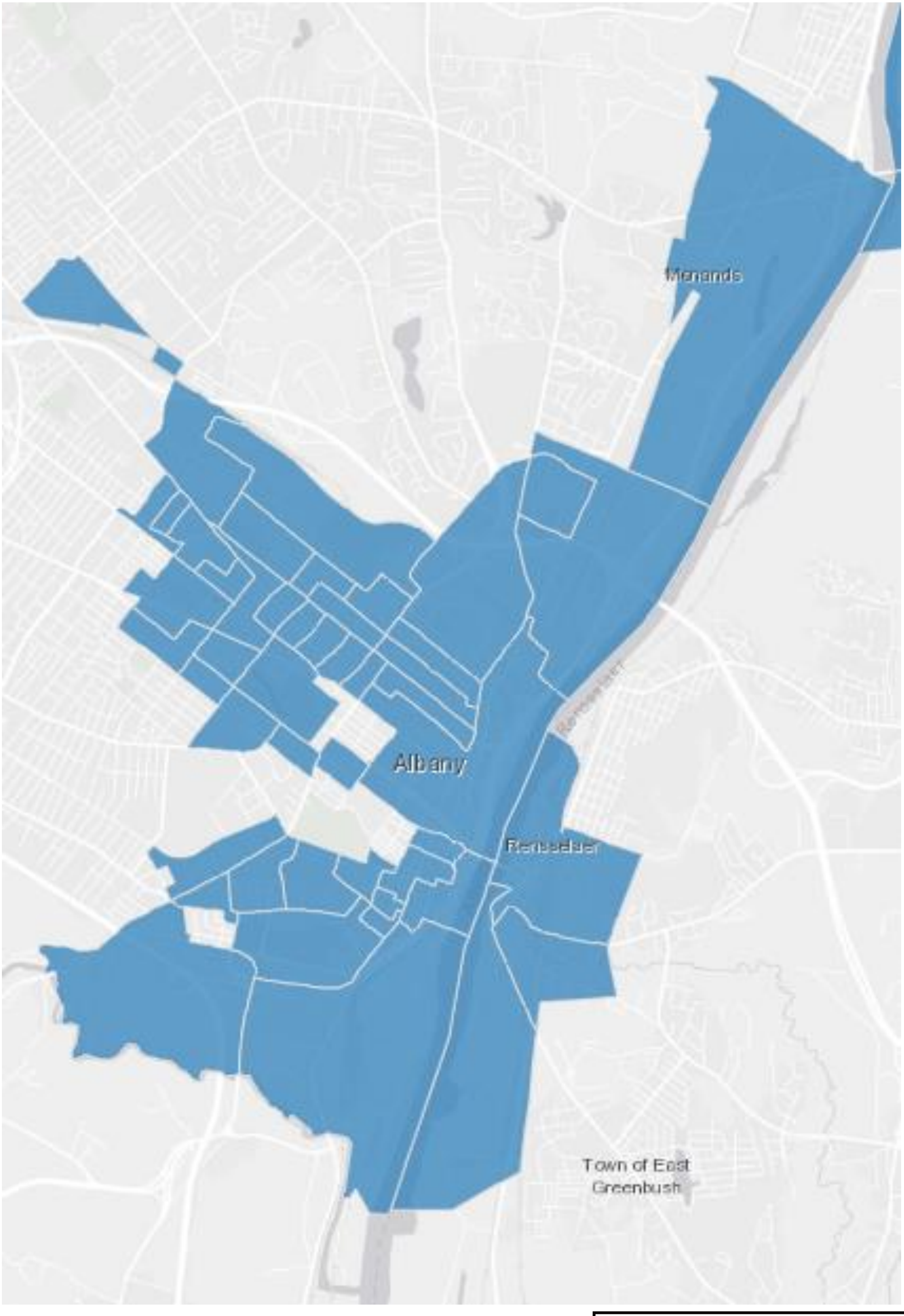
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/21/2023 at 1:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



ALBANY COUNTY WATER PURIFICATION
DISTRICT CAPITAL IMPROVEMENTS PLAN
ENGINEERING REPORT

NYS DEC POTENTIAL ENVIRONMENTAL
JUSTICE AREAS –
NORTH PLANT AND SOUTH PLANT

ARCADIS

FIGURE
7

6/14/2023 12:55:06 PM

Legend

1. Mechanical screening
2. Influent pumping
3. Grit removal
4. Primary clarification
5. Process aeration
6. Secondary clarification
7. Disinfection
8. Plant water pumping
9. SCADA systems
10. High voltage electric distribution

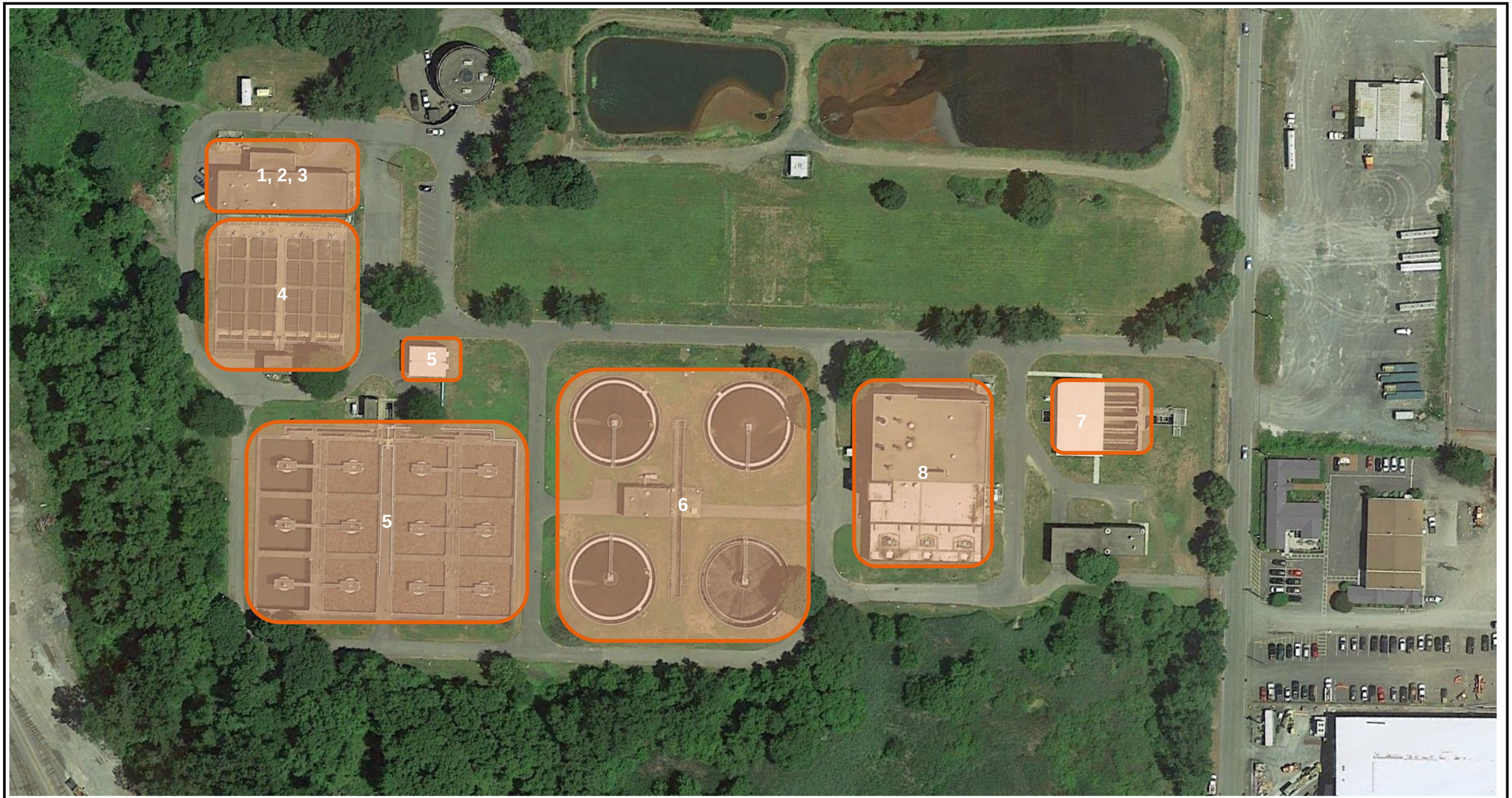
ALBANY COUNTY WATER PURIFICATION
DISTRICT CAPITAL IMPROVEMENTS PLAN
ENGINEERING REPORT

EXISTING PROJECT SITE – NORTH PLANT

ARCADIS

FIGURE
8

6/14/2023 11:46:01 AM



Legend

1. Mechanical screening
2. Influent pumping
3. Grit removal
4. Primary clarification
5. Process aeration
6. Secondary clarification
7. Disinfection
8. Plant water pumping
9. SCADA systems
10. High voltage electric distribution

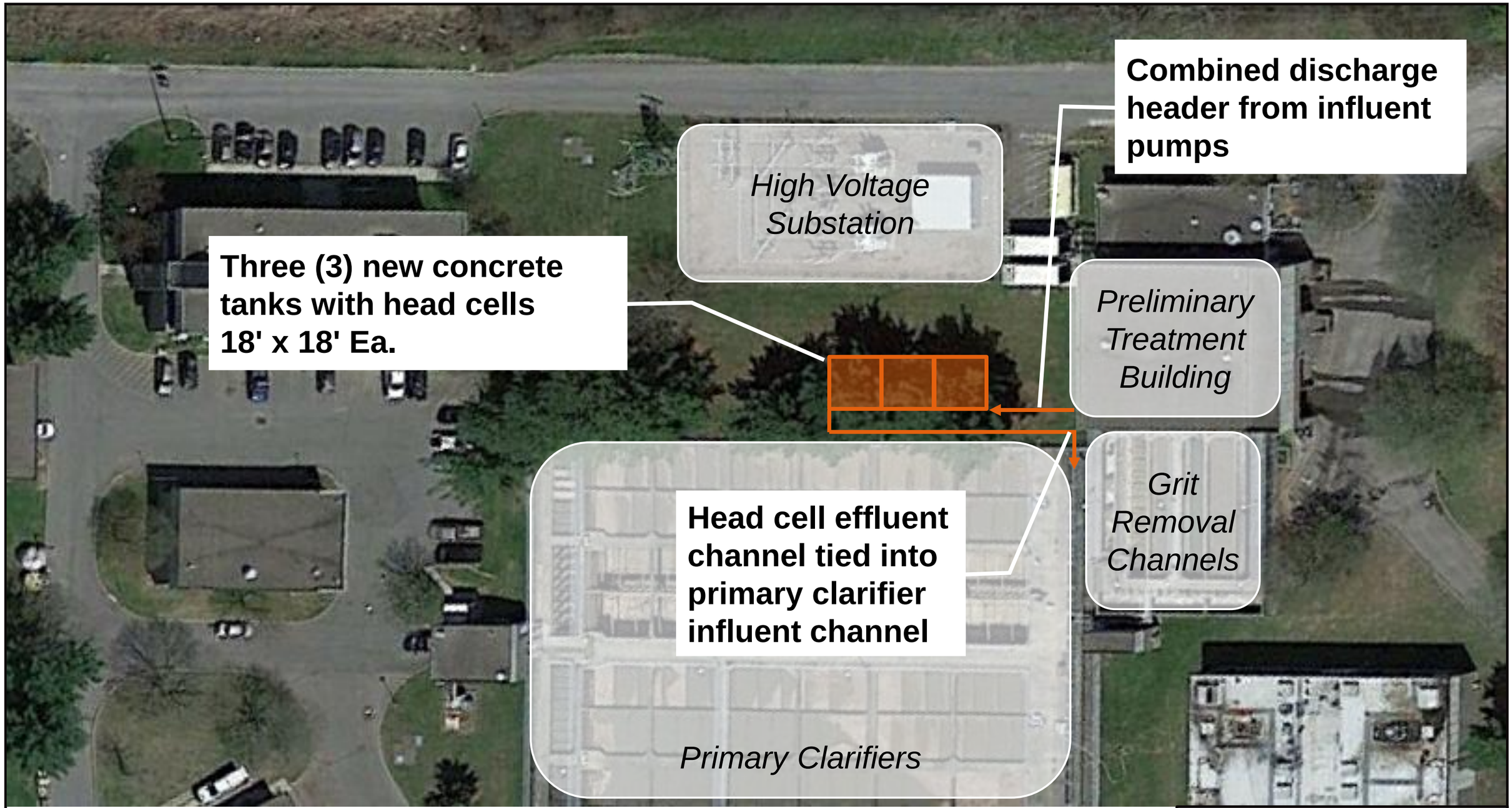
ALBANY COUNTY WATER PURIFICATION
DISTRICT CAPITAL IMPROVEMENTS PLAN
ENGINEERING REPORT

EXISTING PROJECT SITE – SOUTH PLANT

ARCADIS

FIGURE
9

6/14/2023 12:51:58 PM



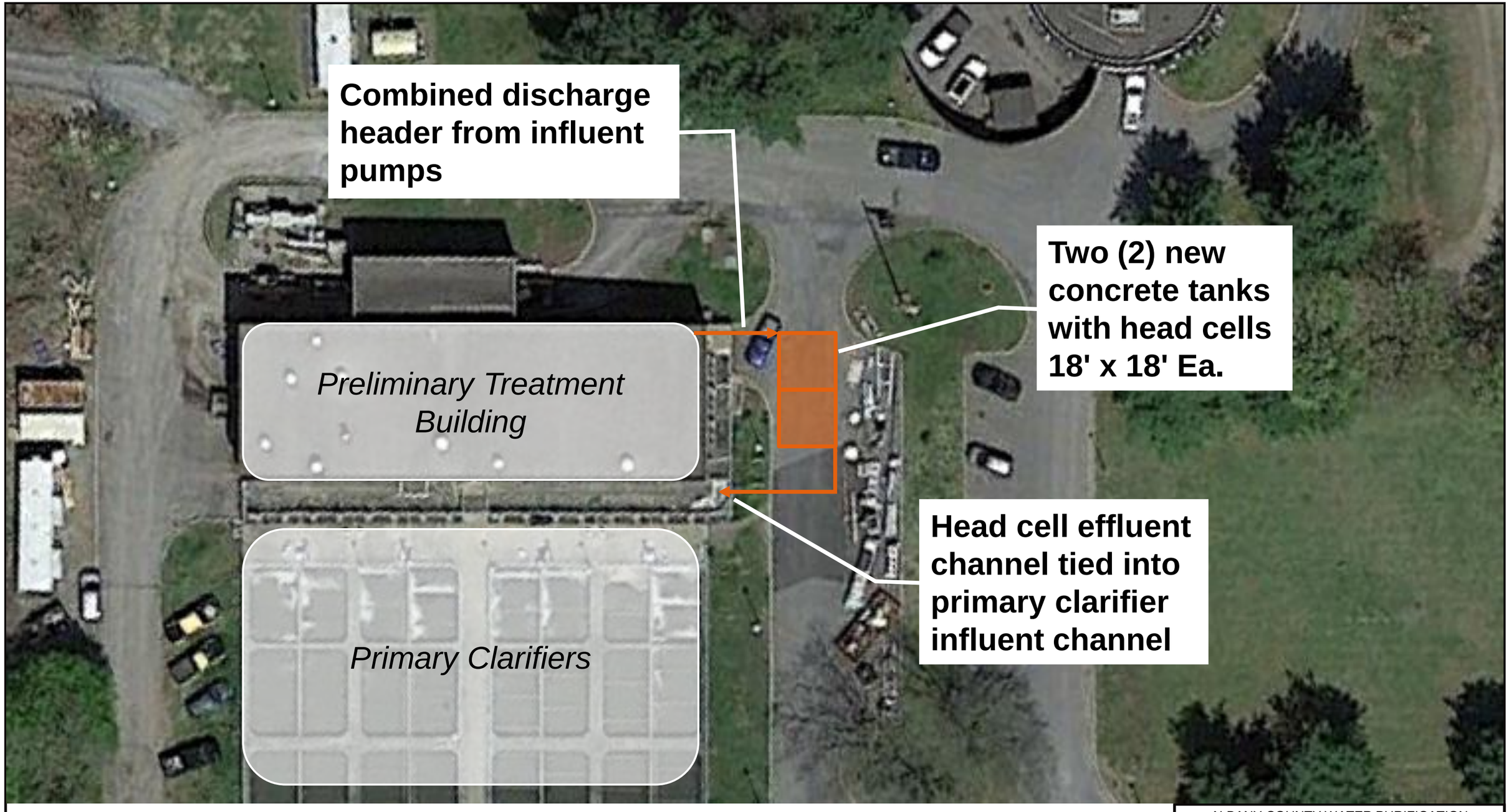
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

NORTH PLANT LAYOUT - ALTERNATIVE 3.3 INSTALL HEAD CELLS

ARCADIS

FIGURE **10**

6/14/2023 11:46:01 AM



ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

SOUTH PLANT LAYOUT - ALTERNATIVE 3.3 INSTALL HEAD CELLS

ARCADIS

FIGURE 11

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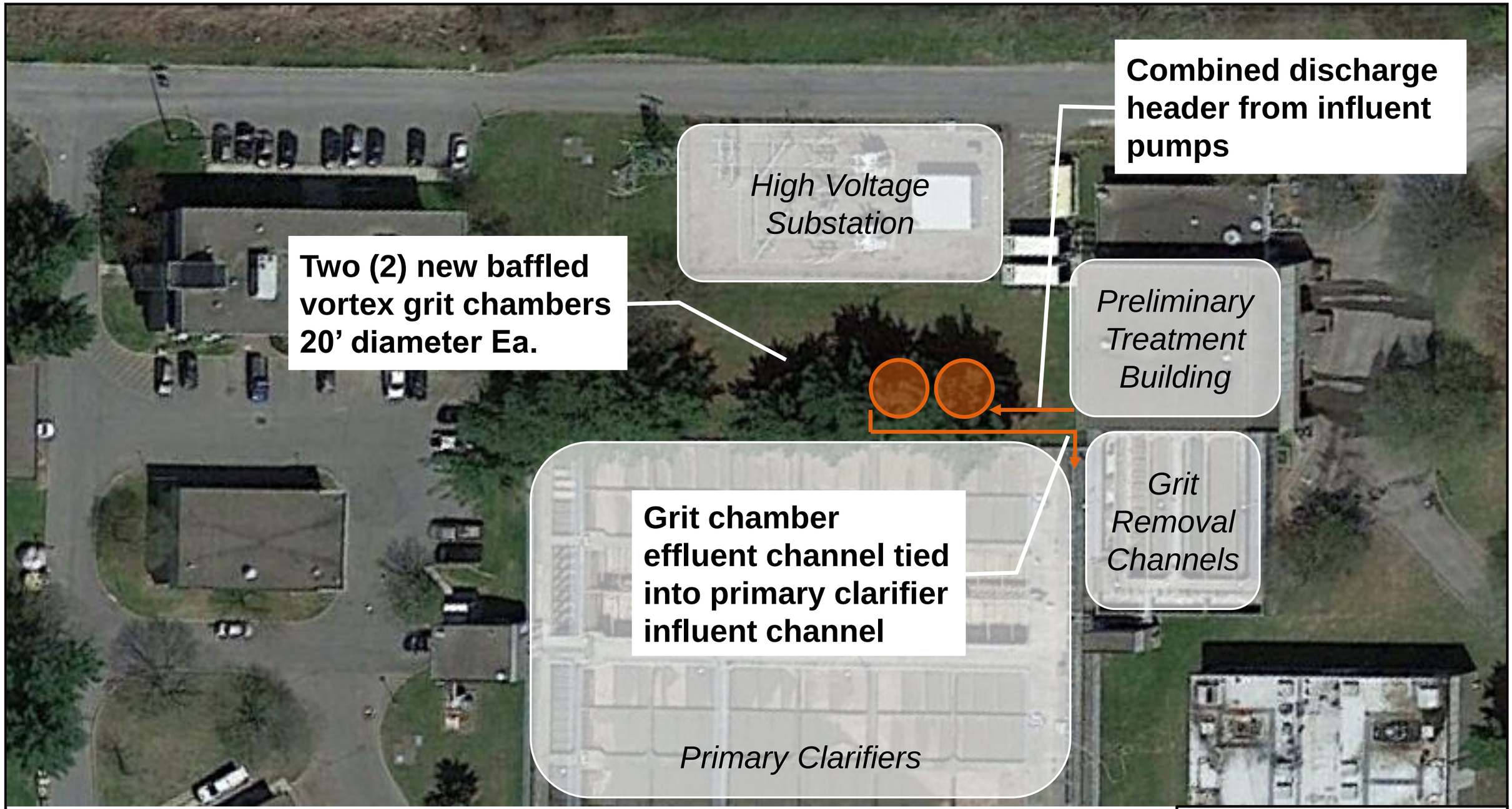


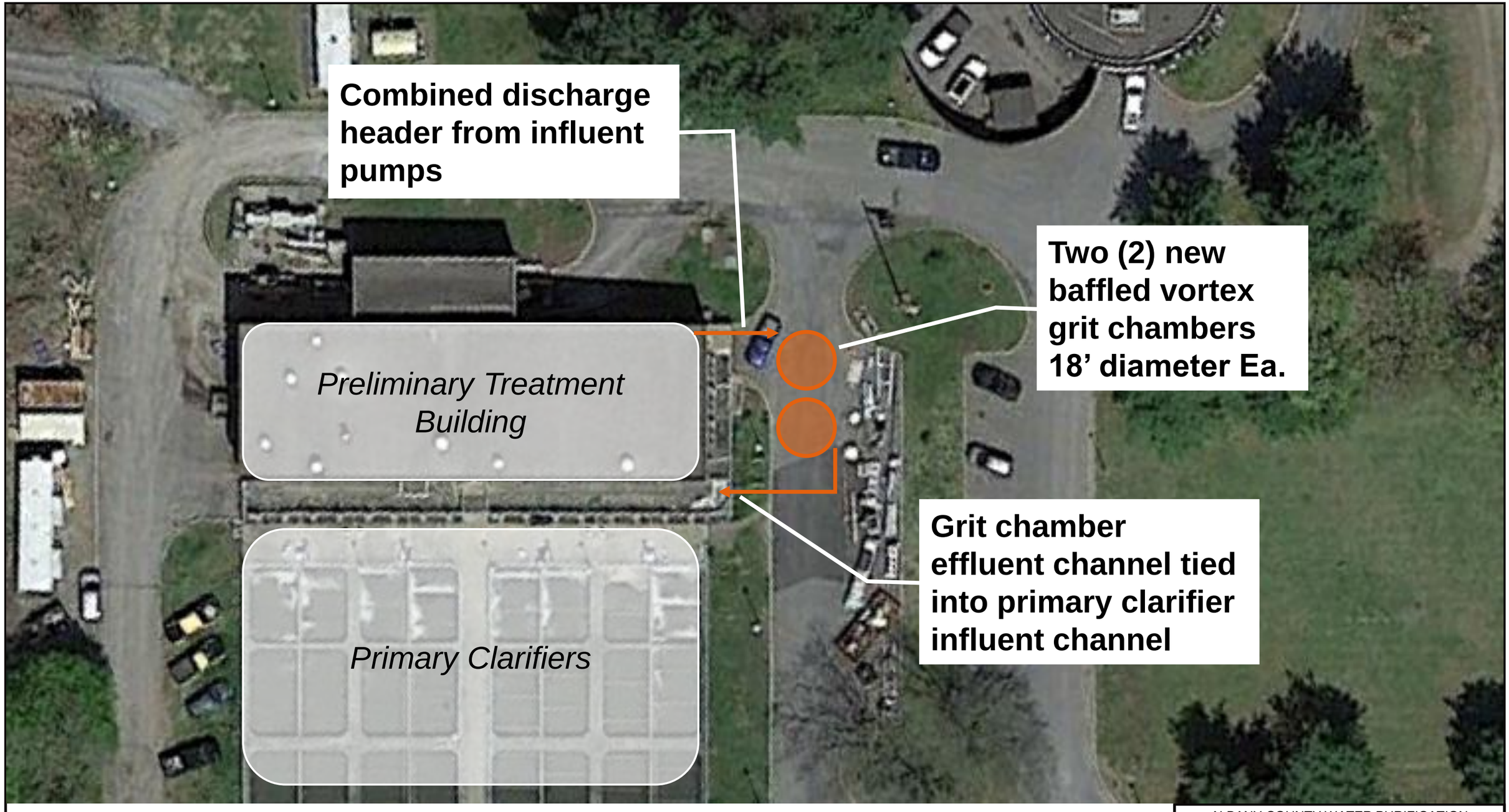
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

NORTH PLANT LAYOUT - ALTERNATIVE 3.4 INSTALL BAFFLED VORTEX GRIT CHAMBERS

ARCADIS

FIGURE **12**

6/14/2023 11:46:01 AM



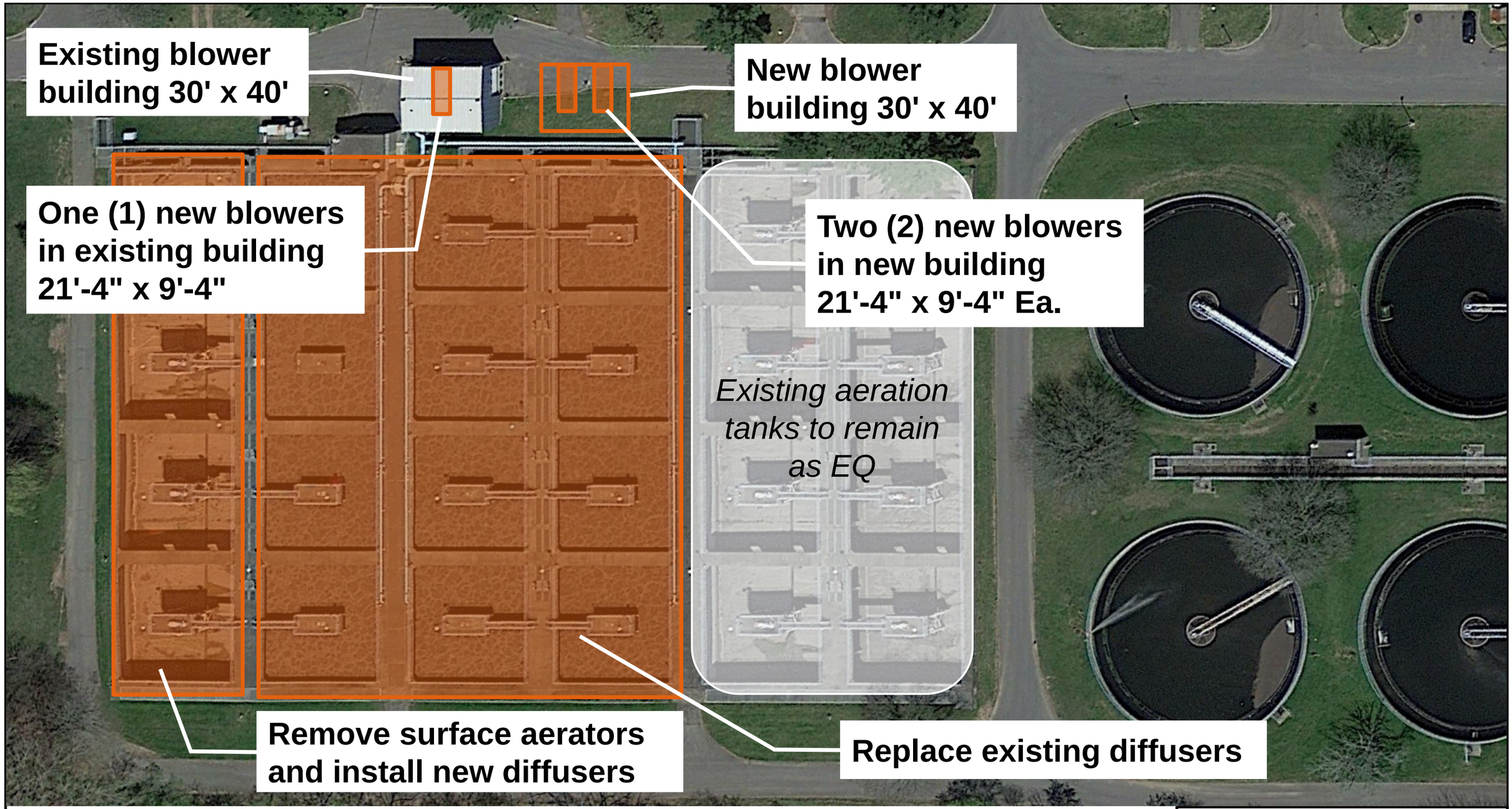
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

SOUTH PLANT LAYOUT - ALTERNATIVE 3.4 INSTALL BAFFLED VORTEX GRIT CHAMBERS

ARCADIS

FIGURE 13

6/14/2023 11:46:01 AM



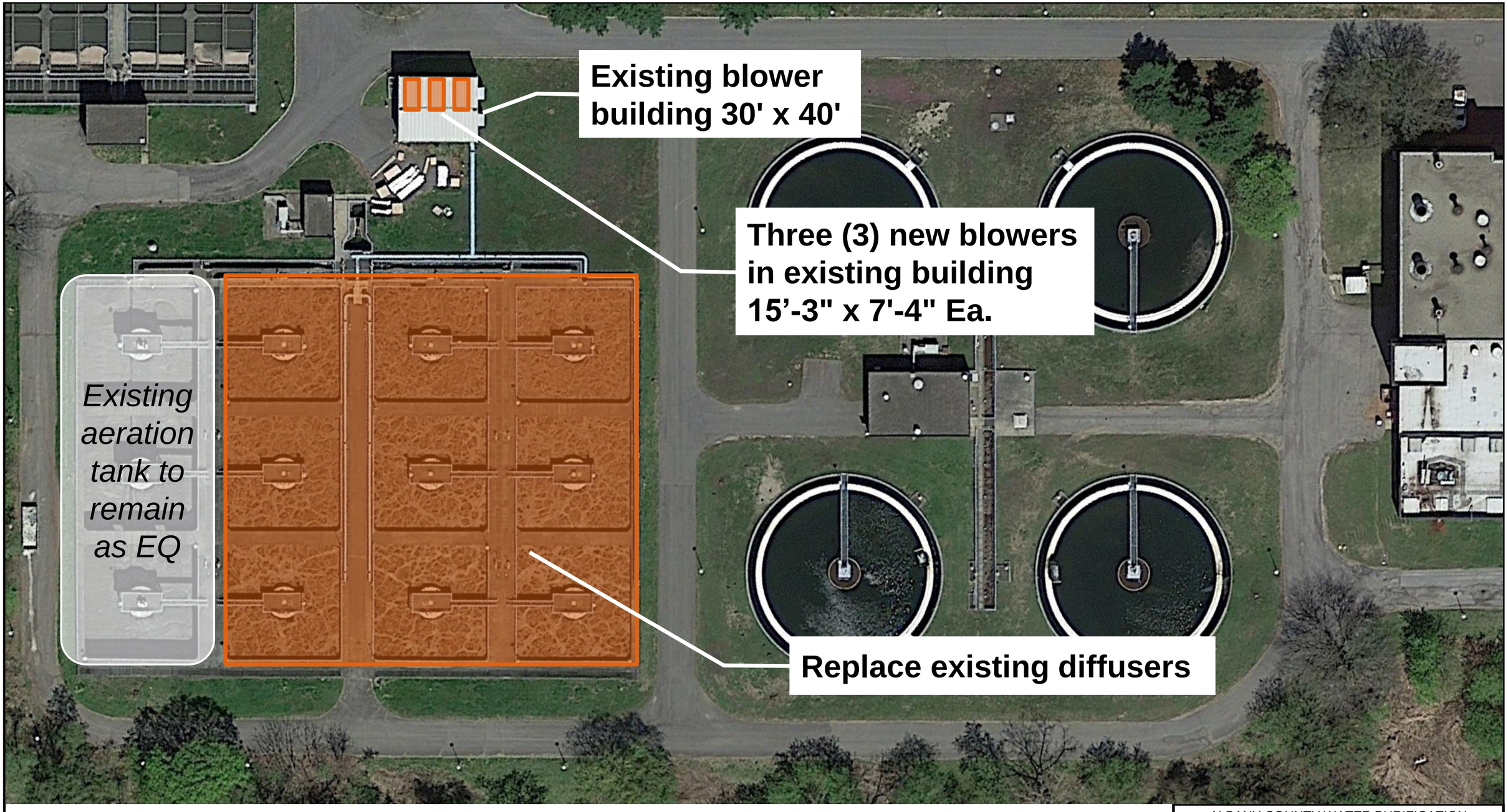
ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN ENGINEERING REPORT

NORTH PLANT LAYOUT - ALTERNATIVE 5.2 INSTALL TURBO BLOWERS AND NEW DIFFUSERS

ARCADIS

FIGURE 14

6/14/2023 11:46:01 AM



ALBANY COUNTY WATER PURIFICATION DISTRICT CAPITAL IMPROVEMENTS PLAN
ENGINEERING REPORT

SOUTH PLANT LAYOUT - ALTERNATIVE 5.2 INSTALL TURBO BLOWERS AND NEW DIFFUSERS

ARCADIS

FIGURE
15

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Appendix A

North Plant SPDES Permit No. NY0026875

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

Fact3 99

Industrial Code:	4952	SPDES Number:	NY 0026875
Discharge Class (CL):	05	DEC Number:	4-0126-00138/00001
Toxic Class (TX):	N	Effective Date (EDP):	05/01/05
Major Drainage Basin:	13	Expiration Date (ExDP):	04/30/10
Sub Drainage Basin:	01	Modification Dates:	03/11/09, 12/1/09
Water Index Number:	HR		
Compact Area:			

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: Albany County Sewer District Attention: Executive Director

Street: P.O. Box 4187

City: Albany State: NY Zip Code: 12204

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: Albany County Sewer District - North WWTP

Location (C,T,V): Menands (V) County: Albany

Facility Address: P.O. Box 4187

City: Albany State: NY Zip Code: 12204

NYTM -E: 603.9 NYTM - N: 4725.4

From Outfall No.: 001 at Latitude: 42 ° 40 ' 28 " & Longitude: 73 ° 43 ' 57 "

into receiving waters known as: Hudson River Class: C

and; (list other Outfalls, Receiving Waters & Water Classifications)

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: Albany County Sewer District

Street: P.O. Box 4187

City: Albany State: NY Zip Code: 12204

Responsible Official or Agent: Brian J. Derry, Process Control Engineer Phone: (518) 447-1624

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:

RPA/RWE
Bureau of Water Permits
Albany County DOH
EPA Reg. II – Michelle Josilo
Cheryle Webber
NYSEFC

Deputy Chief Permit Administrator: Stuart M. Fox

Address: Division of Environmental Permits
625 Broadway
Albany, NY 12233-1750

Signature: Stuart M. Fox Date: 10/21/09

PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Type I or Type II Action Levels are monitoring requirements, as defined below in Note 2, that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE.: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.

DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.

MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.

30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.

RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level.

FINAL PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year unless otherwise noted	Hudson River	12/01/09	04/30/10

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Location Inf.	Location Eff.	
Flow	Monthly average	35	mgd			continuous	recorder		X	(2)
$CBOD_5$	Monthly average	25	mg/l	7300	lbs/d	1/day	24-hr. comp.	X	X	(1)
$CBOD_5$	7 day average	40	mg/l	12000	lbs/d	1/day	24-hr. comp.		X	
Solids, Suspended	Monthly average	30	mg/l	8800	lbs/d	1/day	24-hr. comp.	X	X	(1)
Solids, Suspended	7 day average	45	mg/l	13000	lbs/d	1/day	24-hr. comp.		X	
Solids, Settleable	Daily Max.	0.3	ml/l			6/day	grab		X	
pH	Range	6.0-9.0	SU			6/day	grab		X	
Nitrogen, TKN (as N) (June 1 - October 31)	Monthly average	15.2	mg/l			1/day	24-hr. comp.		X	(5)
Temperature	Daily Maximum	Monitor	Deg.F			6/day	grab		X	
Effluent Disinfection required: [ ] All Year [X] Seasonal from May 1 to October 31										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml			1/day	grab		X	(4)
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml			1/day	grab		X	(4)
Chlorine, Total Residual	Daily Max.	0.60	mg/l			6/day	grab		X	(3) (4)

FOOTNOTES:
(1) Effluent shall not exceed 15 % and 15 % of influent concentration values for $CBOD_5$ & TSS respectively. The permittee is not required to calculate percent removals on days when daily average flows exceed 35 mgd.
(2) For purposes of the permittee's compliance with 6 NYCRR 750-2.9(c), this permit is being issued consistent with the terms of the attached Stipulation of Settlement (attachment 1).
(3) Monitoring of this parameter applies only if chlorine is used for disinfection. This is an interim limit. See the TRC Compliance Schedule in this permit.
(4) Disinfection is not required during the period from November 1 through April 30.
(5) Monitoring is not required from November 1 through May 31.

ACTION LEVELS AND MONITORING

OUTFALL NUMBER	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
001	Municipal	Hudson River	12/01/09	04/30/10

PARAMETER	EFFLUENT LIMIT		EFFLUENT ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
			TYPE II				
Copper, Total			4.0	lbs/day	1/month	24hr.comp.	
Zinc, Total			12.4	lbs/day	1/month	24hr.comp.	
WET - Acute Invertebrate			16.5	TUa	1/quarter	See footnote	(1)
WET - Acute Vertebrate			16.5	TUa	1/quarter	See footnote	(1)
WET - Chronic Invertebrate			63	TUc	1/quarter	See footnote	(1)
WET - Chronic Vertebrate			63	TUc	1/quarter	See footnote	(1)

FOOTNOTES:

(1) Whole Effluent Toxicity (WET) Testing:

Testing Requirements - WET testing shall consist of Acute and, if necessary, Chronic testing. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is **55:1** for acute, and **63:1** for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency : **Once each calendar quarter, beginning January 1 and ending December 31, during calendar years ending in _0_ and _5_.**

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (20) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

BEST MANAGEMENT PRACTICES

The permittee shall implement the following Best Management Practices (BMPs). These BMPs are designed to implement operation & maintenance procedures and utilize the District-owned treatment facilities and interceptors to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. The BMPs shall be developed in accordance with Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995.

1. System Maintenance/Inspection - The permittee shall develop a written maintenance and inspection program for all District-owned flow recording devices, interceptors, and regulators. The purpose of this program is to minimize the occurrence of dry weather overflows related to District-owned appurtenances and insure that the maximum amount of wet weather flow is conveyed to the POTW for treatment. This program shall consist of inspections with required repair, cleaning and maintenance done as needed. This program shall consist of a minimum of monthly inspections. Increased maintenance/inspection may be required for problem areas.

   Inspection reports shall be completed indicating visual inspection, debris removed, any observed flow, incidence of rain or snowmelt, condition of equipment, repairs performed or work required. These reports shall be in a format approved by the Region 4 Office (see example attachment) and submitted to the Region with the monthly operating report (Form 92-15-7).

2. Maximum Use of Collection System for Storage - Not applicable

3. Industrial Pretreatment - The District will implement its federally approved Pretreatment Program.

4. Maximize Flow to POTW - Not applicable. See BMP #5.

5. Wet Weather Operating Plan - The permittee shall update the existing wet weather operating plan which contains procedures so as to operate unit processes to treat maximum flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation. The revised wet weather operations plan shall be written in accordance with the NYSDEC publication Wet Weather Operating Practices for POTWs With Combined Sewers, and submitted for review and approval by **Approved Phase 1 Albany Pool CSO LTCP + 12 months***.

   The treatment plant shall be capable of receiving the peak design flows for all process units. The treatment plant shall be capable of: receiving a minimum of 88 MGD through the plant headworks; a minimum of 55 MGD through the primary treatment works and disinfection works, and a minimum of 55 MGD through the secondary treatment works during wet weather. The interceptor and headworks must be capable of delivering these flows during wet weather. The wet weather operating plan shall be revised and resubmitted any time the treatment plant or operations at the treatment plant are modified.

   A revised wet weather operating plan must be submitted whenever the POTW and/or sewer collection system is replaced or modified. However, when this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent of the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT.

6. Prohibition of Dry Weather Overflow - Dry weather overflows from the combined sewer system are prohibited. Upon the permittee's inspection, the permittee shall promptly abate any impairment in the operation or function of a regulator, and report the abated action within 2 hours to (1) the Regional Water Engineer in accordance with 6NYCRR Part 750-2.8(b)(2); and (2) the tributary community. Should the permittee observe a dry weather overflow resulting from any other cause, the permittee will report to the tributary community in order for appropriate action to be taken.

BEST MANAGEMENT PRACTICES – Continued

7. Control of Floatable and Settleable Solids - Not applicable.

8. Combined Sewer System Replacement - Not applicable.

9. Combined Sewer/Extension - Not applicable.

10. Sewage backups - Not applicable.

11. Septage and Hauled Waste - The discharge or release of septage or hauled waste upstream of a CSO is prohibited.

12. Control of Run-off - Not applicable.

13. Public Notification - Not applicable.

14. Characterization and Monitoring - Not applicable.

15. Annual report - The permittee shall submit a comprehensive annual report summarizing implementation of the best management practices (BMPs) required above. The report shall list existing documentation of implementation of the BMPs and shall be prepared using the Department's checklist and Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995 as guidance. The permittee must submit a completed copy of the checklist along with the annual report. The actual documentation shall be stored at a central location and be made available to DEC upon request. The annual report shall include, but not be limited to, a summary of bypassed flows at the POTW, including volume and frequency and related rainfall volumes in the service area. The first annual report shall also include: a list of all flow recording devices and pump stations that the permittee owns and/or operates; flow summaries, actual or estimated, from flow recording devices, metering pits and/or service areas; and a current map of the District-owned collection system showing locations of pump stations and regulators. The report shall be submitted by January 31st of each year to the Regional Water Engineer and to the Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505.

*Upon review and approval of Phase 1 of the Albany Pool CSO LTCP, the Department may approve the section(s) regarding potential modifications to the District's two treatment plants prior to the complete approval of the LTCP. All comments made by the District to the section(s) of the LTCP regarding treatment plant modifications will be addressed to the District by the Department in writing and the Department will provide the District with the commencement date of this action.

LONG TERM CONTROL PLAN

The Albany County Sewer District accepts combined sanitary wastewater and stormwater from the four communities listed below, as indicated by an asterisk (*). The permittee agrees to assist and support the development and implementation of the long term solution to address the CSO discharges from the respective communities as defined in this permit.

The six permittees listed below have entered into an agreement to cooperatively develop a Phase I long-term CSO control plan (LTCP) by September 2009 in accordance with their respective SPDES permits:

NY 002 5747	City of Albany*	NY 003 1046	City of Cohoes*
NY 003 3031	Village of Green Island*	NY 003 0899	City of Watervliet*
NY 009 9309	City of Troy	NY 002 6026	City of Rensselaer

The four communities listed above (as delineated by an asterisk (*)) discharge combined sanitary wastewater and storm water to an interceptor sewer which transports it to the POTWs which are owned and operated by the County Sewer District. The treatment plants are listed below:

NY 002 6875	Albany County Sewer District, North WWTP
NY 002 6867	Albany County Sewer District, South WWTP.

I. In order to develop a complete and comprehensive LTCP, the permittee will participate in the development of the LTCP as delineated in this permit. In order to accomplish this, at a minimum, the permittee shall assist its four member communities with the following elements:

1. Actively participate in the Public Participation Plan developed by the above 6 communities;
2. Regularly attend meetings related to the Albany Pool;
3. Provide all information requested by the four communities necessary to evaluate the possibility of expansion of the POTW's primary and secondary capacity, including increasing the size of the interceptor sewer and modification of regulator structures, as well as any other reasonable alternatives related to the District's facilities;
4. Provide all information requested to the four communities necessary to characterize the Districts owned facilities and to develop cost/performance curves for the alternatives evaluated above;
5. Share any additional information relating to the LTCP with the Albany Pool members and their consultants; and
6. The permittee shall participate in the evaluation of all alternatives assessed by the Albany Pool, whether related to the District owned systems (1) or not. Upon submission of the LTCP to the Department for approval, the District shall identify any disagreements in writing within fourteen days.

II. Phase II

Upon the completion of the Phase I LTCP, the Department may propose a modification to the permittee's SPDES permit which has the potential to include improvements of District-owned and operated facilities (Treatment plants (North and South), interceptors and regulating chambers) in accordance with 6NYCRR – Part 621.

SCHEDULE OF COMPLIANCE

a) Total Residual Chlorine

Action Code	Outfall Number(s)	Compliance Action	Due Date
	001	The Permittee shall submit an approvable Engineering Report that identifies the facilities necessary to achieve compliance with the water quality based effluent limitation of 0.6 mg/l for total residual chlorine (TRC). The department will reevaluate the TRC limit at that time, at the permittee's request, if further information regarding disinfection practices in the Albany Pool area of the Hudson River are available.	Approved Phase I LTCP + 12 months*
		The Permittee shall submit approvable final plans and specifications, as well as a schedule of construction, for the facilities described in the approved Engineering Report.	DEC Approval of Engineering Report + 6 months
		The Permittee shall commence construction of the facilities described in the approved plans and specifications in accordance with the approved schedule of construction. Beginning with the commencement of construction, the permittee shall submit progress reports every 6 months detailing the work done in accordance with the approved engineering plans and specifications and schedule of construction.	DEC Approval of Plans and Specifications + 12 months
		The Permittee shall complete construction of the facilities described in the above plans and specifications.	

**Upon review and approval of Phase 1 of the Albany Pool CSO LTCP, the Department may approve the section(s) regarding potential modifications to the District's two treatment plants prior to the complete approval of the LTCP. All comments made by the District to the section(s) of the LTCP regarding treatment plant modifications will be addressed to the District by the Department in writing and the Department will provide the District with the commencement date of this action.

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

b) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice in accordance with 6NYCRR Part 750-2.7. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

c) The permittee shall submit copies of any document required by the above schedule of compliance to NYSDEC Regional Water Engineer **and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505**, unless otherwise specified in this permit or in writing by the Department.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU)- an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(p) and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated August 2, 1984 .

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservations Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS - Continued

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

   a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

   b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

   a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

   b. The permittee shall adequately inspect each SIU at a minimum frequency of once per year.

   c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

   d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

   a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

   b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

   c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(vii).

   d. Pursuant to 40 CFR 403.5(c), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS - Continued

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial Pretreatment Program in accordance with the approved pretreatment program.

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Permits and Compliance Branch; USEPA Region 2; 290 Broadway, 20th floor NY, NY 10007-1866; a periodic report, prepared and submitted in accordance with the consistent periodic reporting format established by the Department in the document entitled NYSDEC POTW Periodic Pretreatment Report - 1994, that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be ANNUAL, with reporting period(s) ending on DECEMBER 31st.

The periodic report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Program Implementation, to include:

   a. Any interference, upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards who are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(vii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(vii).

DISCHARGE NOTIFICATION REQUIREMENTS

a) The permittee shall, except as set forth in (c) below, maintain the existing identification signs at all outfalls to surface waters, which have not been waived by the Department in accordance with 17-0815-a. The sign(s) shall be conspicuous, legible and in as close proximity to the point of discharge as is reasonably possible while ensuring the maximum visibility from the surface water and shore. The signs shall be installed in such a manner to pose minimal hazard to navigation, bathing or other water related activities. If the public has access to the water from the land in the vicinity of the outfall, an identical sign shall be posted to be visible from the direction approaching the surface water.

The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT

SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name: _____

Permittee Contact: _____

Permittee Phone: ( ) - ### - ####

OR:

NYSDEC Division of Water Regional Office Address :

NYSDEC Division of Water Regional Phone: ( ) - ### -####

b) For each discharge required to have a sign in accordance with a), the permittee shall provide for public review at a repository accessible to the public, copies of the Discharge Monitoring Reports (DMRs) as required by the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of this permit. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be at the business office repository of the permittee or at an off-premises location of its choice (such location shall be the village, town, city or county clerk's office, the local library or other location as approved by the Department). In accordance with the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of your permit, each DMR shall be maintained on record for a period of three years.

c) If, upon November 1, 1997, the permittee has installed signs that include the information required by 17-0815-a(2)(a), but do not meet the specifications listed above, the permittee may continue to use the existing signs for a period of up to five years, after which the signs shall comply with the specifications listed above.

d) The permittee shall periodically inspect the outfall identification signs in order to ensure that they are maintained, are still visible and contain information that is current and factually correct.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:

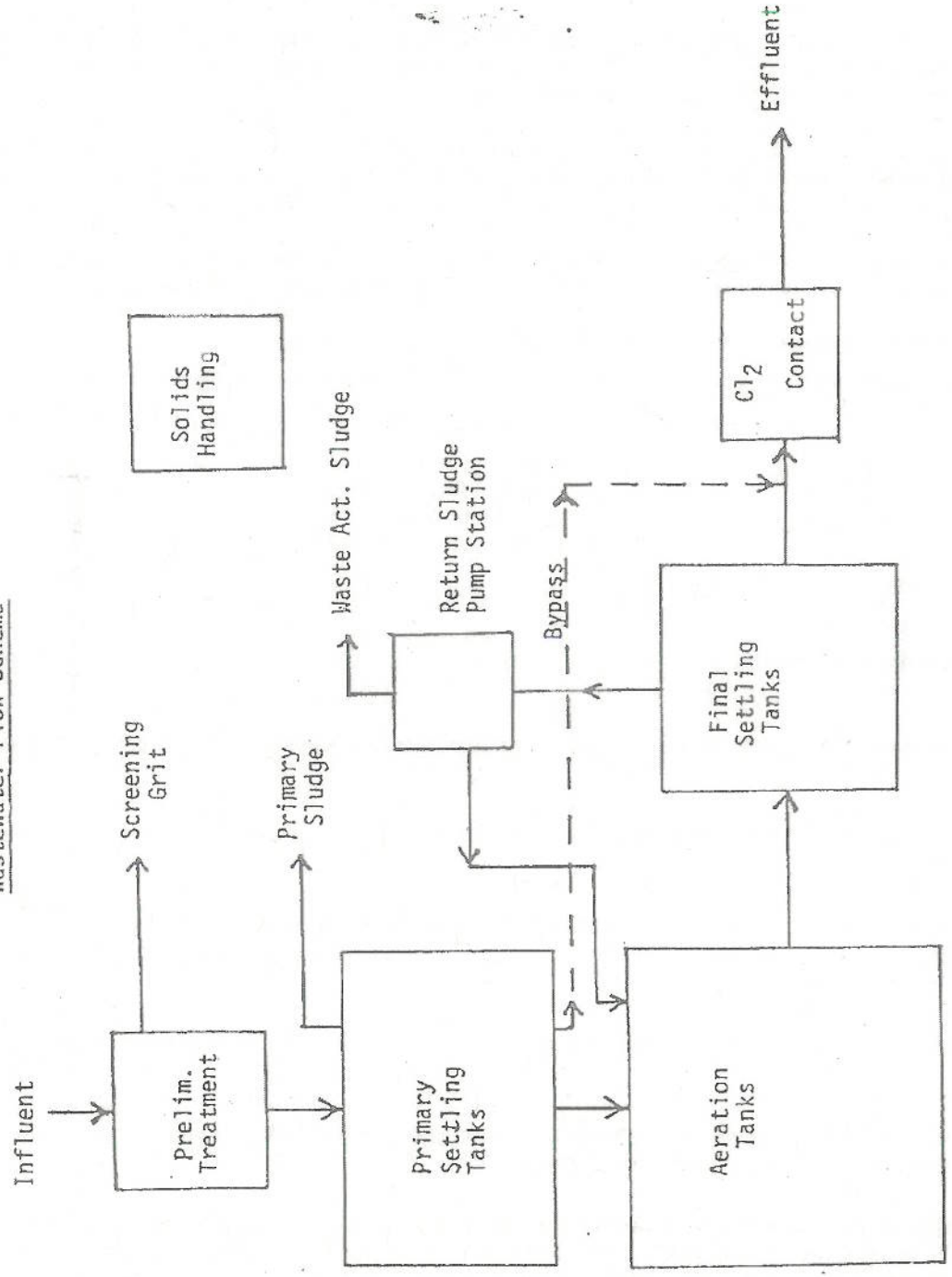

Figure 1
Wastewater Flow Scheme

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to 6 NYCRR Part 750-1.2(a) and 750-2 for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of at least five years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each 1 month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

[X] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:

[X] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the <u>original</u> (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
625 Broadway
Albany, New York 12233-3506
Phone: (518) 402-8177

Send the first <u>copy</u> (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer
1150 North Westcott Road
Schenectady, NY 12306

Phone: (518) 357-2045

Send an **additional <u>copy</u>** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6 NYCRR Part 750-1.2(a) and 750-2.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences , The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

Appendix B

South Plant SPDES Permit No. NY0026867

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

First3.99

Industrial Code: 4952
Discharge Class (CL): 05
Toxic Class (TX): N
Major Drainage Basin: 13
Sub Drainage Basin: 01
Water Index Number: HR
Compact Area:

SPDES Number: NY 0026867
DEC Number: 4-0101-00020/00001
Effective Date (EDP): 05/01/05
Expiration Date (ExDP): 04/30/10
Modification Dates: 03/11/09, 12/01/09

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: Albany County Sewer District
Street: P.O. Box 4187
City: Albany

Attention: Executive Director

State: NY Zip Code: 12204

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: Albany County Sewer District - South WWTP
Location (C,T,V): Albany (C) County: Albany
Facility Address: P.O. Box 4187
City: Albany State: NY Zip Code: 12204
NYTM -E: NYTM - N:
From Outfall No.: 001 at Latitude: 42 ° 31 ' 14 " & Longitude: 73 ° 45 ' 34 "
into receiving waters known as: Hudson River Class: C

and; (list other Outfalls, Receiving Waters & Water Classifications)

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: Albany County Sewer District
Street: P.O. Box 4187
City: Albany State: NY Zip Code: 12204
Responsible Official or Agent: Brian J. Derry, Process Control Engineer Phone: (518) 447-1624

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:

RPA/RWE
Bureau of Water Permits
Albany County DOH
EPA Reg. II – Michelle Josilo
Cheryle Webber
NYSEFC

Deputy Chief Permit Administrator: Stuart M. Fox

Address: Division of Environmental Permits
625 Broadway
Albany, NY 12233-1750

Signature: Stuart M. Fox

Date: 10/21/09

PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions' include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Type I or Type II Action Levels are monitoring requirements, as defined below in Note 2, that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE.: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.

DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.

MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.

30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.

RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level.

FINAL PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year unless otherwise noted	Hudson River	12/01/09	04/30/10

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Location Inf.	Location Eff.	
Flow	12-Month Rolling Average	29	mgd			continuous	recorder		X	(2)
$CBOD_5$	Monthly average	25	mg/l	4000	lbs/d	1/day	24-hr. comp.	X	X	(1)
$CBOD_5$	7 day average	40	mg/l	6300	lbs/d	1/day	24-hr. comp.		X	
Solids, Suspended	Monthly average	30	mg/l	4800	lbs/d	1/day	24-hr. comp.	X	X	(1)
Solids, Suspended	7 day average	45	mg/l	7100	lbs/d	1/day	24-hr. comp.		X	
Solids, Settleable	Daily Max.	0.3	ml/l			6/day	grab		X	
pH	Range	6.0-9.0	SU			6/day	grab		X	
Nitrogen, TKN (as N) (June 1 - Oct 31)	Monthly average	15.4	mg/l			1/day	24-hr. comp.		X	(5)
Temperature	Daily Maximum	Monitor	Deg F			6/day	grab		X	
Effluent Disinfection required: [ ] All Year [X] Seasonal from May 1 to October 31										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml			1/day	grab		X	(4)
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml			1/day	grab		X	(4)
Chlorine, Total Residual	Daily Max.	0.60	mg/l			6/day	grab		X	(3) (4)

FOOTNOTES:
(1) Effluent shall not exceed 15 % and 15 % of influent concentration values for $CBOD_5$ & TSS respectively. The permittee is not required to calculate percent removals on days when daily average flows exceed 29 mgd.
(2) For purposes of the permittee's compliance with 6 NYCRR 750-2.9(c), this permit is being issued consistent with the terms of the attached Stipulation of Settlement.
(3) Monitoring of this parameter applies only if chlorine is used for disinfection. This is an interim limit. See the TRC Compliance Schedule in this permit.
(4) Disinfection is not required during the period from November 1 through April 30.
(5) Monitoring is not required from November 1 through May 31.

ACTION LEVELS AND MONITORING

OUTFALL NUMBER	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
001	Municipal	Hudson River	12/01/09	04/30/10

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
					TYPE II				
Copper, Total				4.6		lbs/day	1/month	24hr.comp.	
Zinc, Total				8.2		lbs/day	1/month	24hr.comp.	
WET - Acute Invertebrate				20.1		TUa	1/quarter	See footnote	(1)
WET - Acute Vertebrate				20.1		TUa	1/quarter	See footnote	(1)
WET - Chronic Invertebrate				75		TUc	1/quarter	See footnote	(1)
WET - Chronic Vertebrate				75		TUc	1/quarter	See footnote	(1)

FOOTNOTES:

(1) Whole Effluent Toxicity (WET) Testing:

Testing Requirements - WET testing shall consist of Acute and, if necessary, Chronic testing. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is **67:1** for acute, and **75:1** for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency : **Once each calendar quarter, beginning January 1 and ending December 31, during calendar years ending in _0__ and _5_.**

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (20) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

BEST MANAGEMENT PRACTICES

The permittee shall implement the following Best Management Practices (BMPs). These BMPs are designed to implement operation & maintenance procedures and utilize the District-owned treatment facilities and intercetors to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. The BMPs shall be developed in accordance with Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995.

1. System Maintenance/Inspection - The permittee shall develop a written maintenance and inspection program for all District-owned flow recording devices, interceptors, and regulators. The purpose of this program is to minimize the occurrence of dry weather overflows related to District-owned appurtenances and insure that the maximum amount of wet weather flow is conveyed to the POTW for treatment. This program shall consist of inspections with required repair, cleaning and maintenance done as needed. This program shall consist of a minimum of monthly inspections. Increased maintenance/inspection may be required for problem areas.

   Inspection reports shall be completed indicating visual inspection, debris removed, any observed flow, incidence of rain or snowmelt, condition of equipment, repairs performed or work required. These reports shall be in a format approved by the Region 4 Office (see example attachment) and submitted to the Region with the monthly operating report (Form 92-15-7).

2. Maximum Use of Collection System for Storage - Not applicable

3. Industrial Pretreatment - District will implement its federally approved Pretreatment Program.

4. Maximize Flow to POTW - Not applicable. See BMP #5.

5. Wet Weather Operating Plan - The permittee shall update the existing wet weather operating plan which contains procedures so as to operate unit processes to treat maximum flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation. The revised wet weather operations plan shall be written in accordance with the NYSDEC publication Wet Weather Operating Practices for POTWs With Combined Sewers, and submitted for review and approval by **Approved Phase 1 Albany Pool CSO LTCP + 12 months***.

   The treatment plant shall be capable of receiving the peak design flows for all process units. The treatment plant shall be capable of: receiving a minimum of 56 MGD through the plant headworks; a minimum of 40 MGD through the primary treatment works and disinfection works, and a minimum of 40 MGD through the secondary treatment works during wet weather. The interceptor and headworks must be capable of delivering these flows during wet weather. The wet weather operating plan shall be revised and resubmitted any time the treatment plant or operations at the treatment plant are modified.

   A revised wet weather operating plan must be submitted whenever the POTW and/or sewer collection system is replaced or modified. However, when this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent of the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT.

6. Prohibition of Dry Weather Overflow - Dry weather overflows are prohibited. Upon the permittee's inspection of its regulating chamber, the permittee shall promptly abate any impairment within the regulator. If the impairment has led to a dry weather overflow, the permittee will report it to; 1) the Regional Water Engineer in accordance with 6NYCRR Part 750-2.8(b)(2); and 2) the tributary community. Should the permittee observe a Dry Weather Overflow resulting from any other cause, the permittee will report to the tributary community in order for appropriate abatement action to be taken.

7. Control of Floatable and Settleable Solids - Not applicable.

8. Combined Sewer System Replacement - Not applicable.

BEST MANAGEMENT PRACTICES - Continued

9. Combined Sewer/Extension - Not applicable.

10. Sewage backups - Not applicable.

11. Septage and Hauled Waste - The discharge or release of septage or hauled waste upstream of a CSO is prohibited.

12. Control of Run-off - Not applicable.

13. Public Notification - Not applicable.

14. Characterization and Monitoring - Not applicable.

15. Annual report - The permittee shall submit a comprehensive annual report summarizing implementation of the best management practices (BMPs) required above. The report shall list existing documentation of implementation of the BMPs and shall be prepared using the Department's checklist and Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995 as guidance. The permittee must submit a completed copy of the checklist along with the annual report. The actual documentation shall be stored at a central location and be made available to DEC upon request. The annual report shall include, but not be limited to, a summary of bypassed flows at the POTW, including volume and frequency and related rainfall volumes in the service area. The first annual report shall also include: a list of all flow recording devices and pump stations that the permittee owns and/or operates; flow summaries, actual or estimated, from flow recording devices, metering pits and/or service areas; and a current map of the District-owned collection system showing locations of pump stations and regulators. The report shall be submitted by January 31st of each year to the Regional Water Engineer and to the Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505.

*Upon review and approval of Phase 1 of the Albany Pool CSO LTCP, the Department may approve the section(s) regarding potential modifications to the District's two treatment plants prior to the complete approval of the LTCP. All comments made by the District to the section(s) of the LTCP regarding treatment plant modifications will be addressed to the District by the Department in writing and the Department will provide the District with the commencement date of this action.

LONG TERM CONTROL PLAN

The Albany County Sewer District accepts combined sanitary wastewater and stormwater from the four communities listed below, as indicated by an asterisk (*). The permittee agrees to assist and support the development and implementation of the long term solution to address the CSO discharges from the respective communities as defined in this permit.

The six permittees listed below have entered into an agreement to cooperatively develop a Phase I long-term CSO control plan (LTCP) by September 2009 in accordance with their respective SPDES permits:

NY 002 5747	City of Albany*	NY 003 1046	City of Cohoes*
NY 003 3031	Village of Green Island*	NY 003 0899	City of Watervliet*
NY 009 9309	City of Troy	NY 002 6026	City of Rensselaer

The four communities listed above (as delineated by an asterisk (*)) discharge combined sanitary wastewater and storm water to an interceptor sewer which transports it to the POTWs which are owned and operated by the County Sewer District. The treatment plants are listed below:

NY 002 6875	Albany County Sewer District, North WWTP
NY 002 6867	Albany County Sewer District, South WWTP.

I. In order to develop a complete and comprehensive LTCP, the permittee will participate in the development of the LTCP as delineated in this permit. In order to accomplish this, at a minimum, the permittee shall assist its four member communities with the following elements:

1. Actively participate in the Public Participation Plan developed by the above 6 communities;
2. Regularly attend meetings related to the Albany Pool;
3. Provide all information requested by the four communities necessary to evaluate the possibility of expansion of the POTW's primary and secondary capacity, including increasing the size of the interceptor sewer and modification of regulator structures, as well as any other reasonable alternatives related to the District's facilities;
4. Provide all information requested to the four communities necessary to characterize the Districts owned facilities and to develop cost/performance curves for the alternatives evaluated above;
5. Share any additional information relating to the LTCP with the Albany Pool members and their consultants; and
6. The permittee shall participate in the evaluation of all alternatives assessed by the Albany Pool, whether related to the District owned systems (1) or not. Upon submission of the LTCP to the Department for approval, the District shall identify any disagreements in writing within fourteen days.

II. Phase II

Upon the completion of the Phase I LTCP, the Department may propose a modification to the permittee's SPDES permit which has the potential to include improvements of District-owned and operated facilities (Treatment plants (North and South), interceptors and regulating chambers) in accordance with 6NYCRR – Part 621.

SCHEDULE OF COMPLIANCE

a) Total Residual Chlorine

Action Code	Outfall Number(s)	Compliance Action	Due Date
	001	The Permittee shall submit an approvable Engineering Report that identifies the facilities necessary to achieve compliance with the water quality based effluent limitation of 0.6 mg/l for total residual chlorine (TRC). The department will reevaluate the TRC limit at that time, at the permittee's request, if further information regarding disinfection practices in the Albany Pool area of the Hudson River are available.	Approved Phase I LTCP + 12 months*
		The Permittee shall submit approvable final plans and specifications, as well as a schedule of construction, for the facilities described in the approved Engineering Report.	DEC Approval of Engineering Report + 6 months
		The Permittee shall commence construction of the facilities described in the approved plans and specifications in accordance with the approved schedule of construction. Beginning with the commencement of construction, the permittee shall submit progress reports every 6 months detailing the work done in accordance with the approved engineering plans and specifications and schedule of construction. The Permittee shall complete construction of the facilities described in the above plans and specifications.	DEC Approval of Plans and Specifications + 12 months

**Upon review and approval of Phase I of the Albany Pool CSO LTCP, the Department may approve the section(s) regarding potential modifications to the District's two treatment plants prior to the complete approval of the LTCP. All comments made by the District to the section(s) of the LTCP regarding treatment plant modifications will be addressed to the District by the Department in writing and the Department will provide the District with the commencement date of this action.

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

b) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice in accordance with 6NYCRR Part 750-2.7. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

c) The permittee shall submit copies of any document required by the above schedule of compliance to NYSDEC Regional Water Engineer **and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505,** unless otherwise specified in this permit or in writing by the Department.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU)- an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(p)and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated August 2, 1984.

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservations Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

   a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS – Continued

b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

b. The permittee shall adequately inspect each SIU at a minimum frequency of once per year.

c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(vii).

d. Pursuant to 40 CFR 403.5(e), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial Pretreatment Program in accordance with the approved pretreatment program.

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS – Continued

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Permits and Compliance Branch; USEPA Region 2; 290 Broadway, 20th floor NY, NY 10007-1866; a periodic report, prepared and submitted in accordance with the consistent periodic reporting format established by the Department in the document entitled NYSDEC POTW Periodic Pretreatment Report - 1994, that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be ANNUAL, with reporting period(s) ending on DECEMBER 31st.

The periodic report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Program Implementation, to include:

   a. Any interference, upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards who are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(vii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(vii).

DISCHARGE NOTIFICATION REQUIREMENTS

a) The permittee shall, except as set forth in (c) below, maintain the existing identification signs at all outfalls to surface waters, which have not been waived by the Department in accordance with 17-0815-a. The sign(s) shall be conspicuous, legible and in as close proximity to the point of discharge as is reasonably possible while ensuring the maximum visibility from the surface water and shore. The signs shall be installed in such a manner to pose minimal hazard to navigation, bathing or other water related activities. If the public has access to the water from the land in the vicinity of the outfall, an identical sign shall be posted to be visible from the direction approaching the surface water.

The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT

SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name: _____

Permittee Contact: _____

Permittee Phone: ( ) - ### - ####

OR:

NYSDEC Division of Water Regional Office Address :

NYSDEC Division of Water Regional Phone: ( ) - ### -####

b) For each discharge required to have a sign in accordance with a), the permittee shall provide for public review at a repository accessible to the public, copies of the Discharge Monitoring Reports (DMRs) as required by the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of this permit. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be at the business office repository of the permittee or at an off-premises location of its choice (such location shall be the village, town, city or county clerk's office, the local library or other location as approved by the Department). In accordance with the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of your permit, each DMR shall be maintained on record for a period of three years.

c) If, upon November 1, 1997, the permittee has installed signs that include the information required by 17-0815-a(2)(a), but do not meet the specifications listed above, the permittee may continue to use the existing signs for a period of up to five years, after which the signs shall comply with the specifications listed above.

d) The permittee shall periodically inspect the outfall identification signs in order to ensure that they are maintained, are still visible and contain information that is current and factually correct.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:

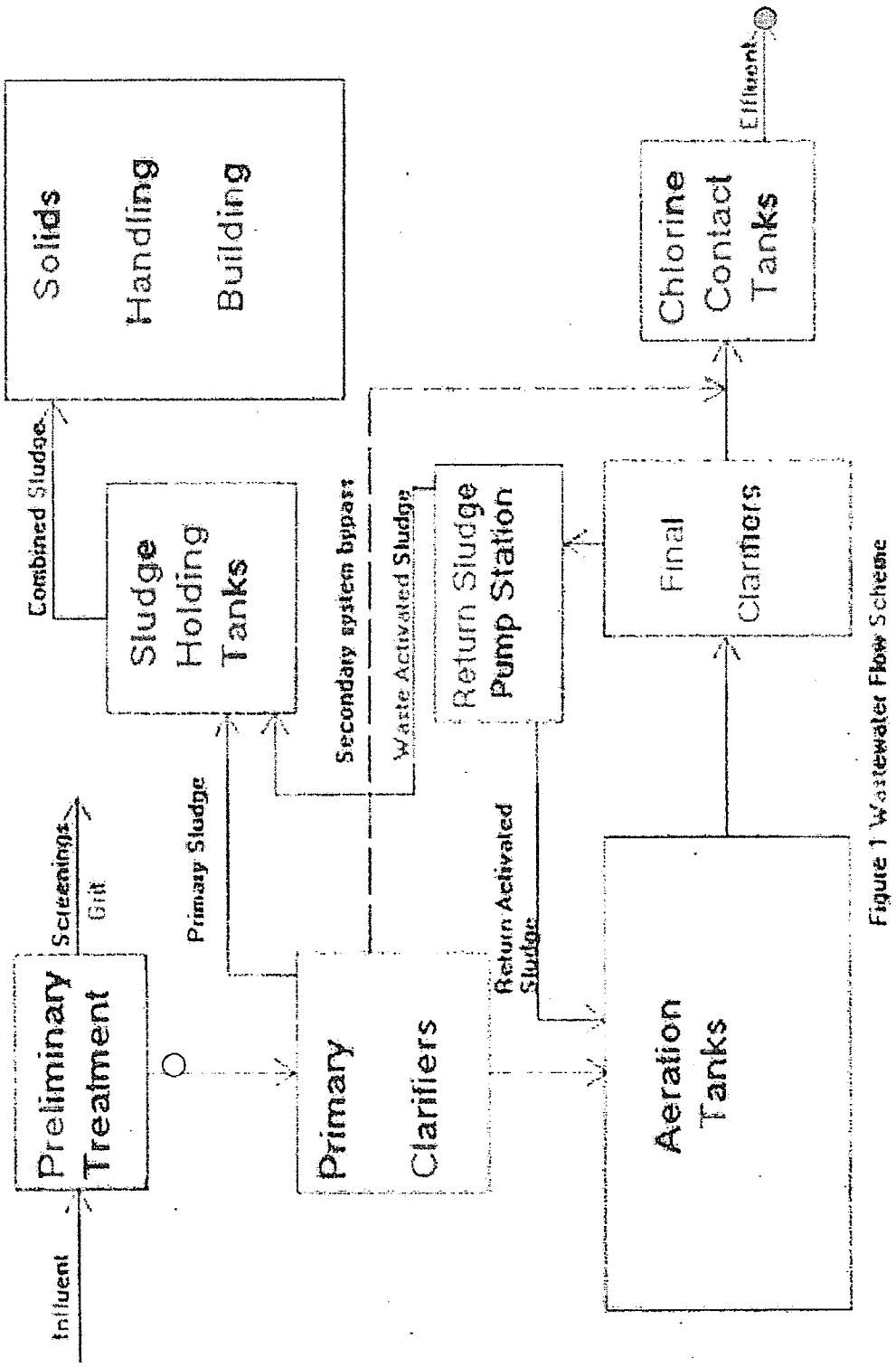

Figure 1 Wastewater Flow Scheme

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to 6 NYCRR Part 750-1.2(a) and 750-2 for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of at least five years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each 1 month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

[X] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:

[X] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
625 Broadway
Albany, New York 12233-3506

Phone: (518) 402-8177

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer
1150 North Westcott Road
Schenectady, NY 12306

Phone: (518) 357-2045

Send an **additional copy** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6 NYCRR Part 750-1.2(a) and 750-2.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences , The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

In the Matter of the

Department Initiated Permit Modification
ACSD North Plant – DEC ID Number: 4-0126-00138/00001
SPDES Number: NY 002-6875

ACSD South Plant – DEC ID Number: 4-0101-00020/00001
SPDES Number: NY 002-6867

Stipulation of Settlement

The Stipulation of Settlement is hereby made as of the 13th day of October, 2005 by and between the NYS Department of Environmental Conservation (hereinafter "Department") and the County of Albany, acting by and through the Albany County Sewer District (hereinafter "District").

WHEREAS, the District is required to maintain a State Pollutant Discharge Elimination System ("SPDES") Permit for the operation of each of the two (2) Wastewater Treatment Plants ("WTTP") known as the South Plant and the North Plant, and

WHEREAS, on February 11, 2004 the Department issued a notice of intent to implement the Department Initiated Permit Modifications set forth in the caption above due to the amendment of the regulation governing the administration of SPDES permits (Title 6 of the official compilation of the Codes, Rules and Regulations of the State of New York [6 NYCRR] Part 750); and

WHEREAS, by letter dated October 7, 2004, the District requested that the Department schedule a hearing pursuant to the Uniform Procedures Act (6 NYCRR 621.14); and

WHEREAS, by letter dated October 14, 2004 the Department initiated the hearing process; and

WHEREAS, the Hon. P. Nicholas Garlick, Office of Hearings and Mediation Services, was appointed hearing officer; and

WHEREAS, the parties have engaged in detailed settlement negotiations and are jointly desirous of resolving this matter to avoid the risks and burdens of a protracted administrative proceeding/litigation and to achieve resolution; and

WHEREAS, the District's Board duly approved the terms of this settlement on October 12, 2005.

NOW, THEREFORE, upon the mutual premises stated and in consideration of same, the parties agree as follows:

1. For purposes of compliance with 6 NYCRR section 750-2.9(c), the SPDES permit for the South Plant will be modified with a hydraulic re-rating of its design flow permit limit from 25 mgd, to an annual average of 29 mgd, without requiring the District to submit an engineering report; and, all "other limits" in said permit shall remain unchanged.

   Compliance with requirements of Section 750-2.9 [c] for the South plant will be determined by a simple comparison between the annual average flow to the treatment plant, calculated at the end of each calendar year, to 95% of 29 mgd (27.55 mgd).

   Compliance with the permit limitation of 29 mgd as a twelve-month rolling average is a separate requirement of the SPDES permit for the South plant and is determined each month. The monthly average flow will be calculated (by dividing the sum of each day's flow by the number of days in the month). This will be reported on the DMR, but there will be no limit for monthly average flow – only a requirement to report it. The twelve-month rolling average will then be calculated by adding the current month and previous 11 months of monthly average flow values and dividing by 12. This value will be reported on the DMR and compared to a numerical limit (29 mgd) to determine permit compliance.

   Compliance with the requirements of Part 750-2.9 [c] will be determined once per year. Compliance with the SPDES permit flow limitation will be determined once per month.

   This same compliance format shall apply to the North Plant such that compliance with Part 750 will be determined by a simple comparison between annual average flow and permitted flow and compliance with the permit limit will be determined by calculating the monthly average flow and comparing it to the monthly average permit limit of 35 mgd. The District, pursuant to the Uniform Procedures Act (ECL Article 70), may request a modification of the North plant's permit to modify the monthly average flow limitation of 35 mgd to a 12-MRA limit of 35 mgd. The Department agrees that it will not unreasonably withhold the issuance of a permit with this modification.

   Nothing herein shall prevent or affect the capability of the Department, pursuant to the Uniform Procedures Act (ECL Article 70), to seek a modification of the permits for the South and North plants.

2. The District hereby withdraws its request for an administrative hearing on the issue of the modification of the District's North and South Plants SPDES Permit, and waives its right to hearing or to otherwise contest the issuance of the draft SPDES Permits.

3. The modification of the SPDES Permit for the North and South Plants shall be issued by the Department within ten (10) days of the effective date of this Stipulation.

4. None of the parties hereto shall be in default of compliance with this Stipulation if such party is unable to comply with any of the provisions set forth herein by reason of a force majeure event. The term force majeure as used herein is defined as acts of God, actions of a national or local government body or court, war, strike or catastrophe as to any of which the negligence or willful misconduct of the party is not a proximate cause.

5. Nothing in this Stipulation precludes any party hereto from seeking to enforce the terms, provisions and conditions of this Stipulation against the other non-complying party hereto.

6. No modification of this Stipulation shall be effective unless and until all the parties to this Stipulation approve such modification in writing.

7. This Stipulation, and the Exhibits annexed hereto, constitute the entire agreement between the parties with respect to the settlement of this hearing request, and supersedes and replaces all prior negotiations, proposed agreements and agreements, whether written or unwritten.

8. This Stipulation is effective as of the date first set forth above.

Dated: October 20, 2005

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BY: _____
Michael P. Naughton, Esq.
Associate Counsel

Dated: October 13, 2005

ALBANY COUNTY SEWER DISTRICT

BY: _____
Peter R. Anderson
Executive Director

Appendix C

North Plant USDA NRCS Web Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Albany County, New York

May 17, 2023

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Albany County, New York
Survey Area Data: Version 20, Sep 10, 2022

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

Date(s) aerial images were photographed: Aug 15, 2021—Nov 8, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Du	Dumps	2.6	9.5%
Mh	Medihemists and Hydraquents, ponded	1.9	6.8%
Te	Teel silt loam	2.1	7.8%
Ug	Udorthents, loamy	2.8	10.2%
Ur	Urban land	17.7	65.4%
W	Water	0.1	0.2%
Totals for Area of Interest		**27.1**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Albany County, New York

Du—Dumps

Map Unit Setting

National map unit symbol: 9pfk
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Mh—Medihemists and Hydraquents, ponded

Map Unit Setting

National map unit symbol: 9pgs
Elevation: 10 to 2,400 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Medihemists, Ponded

Setting

Landform: Marshes, swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile

H1 - 0 to 70 inches: mucky peat

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.20 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 22.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A/D
Ecological site: F101XY004NY - Mucky Depression
Hydric soil rating: Yes

Description of Hydraquents

Setting

Landform: Marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave

Typical profile

H1 - 0 to 9 inches: mucky silty clay
H2 - 9 to 70 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A/D
Ecological site: F101XY004NY - Mucky Depression
Hydric soil rating: Yes

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Fluvaquents
Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Granby
Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

Stafford
Percent of map unit: 1 percent
Hydric soil rating: No

Te—Teel silt loam

Map Unit Setting
National map unit symbol: 9phv
Elevation: 600 to 1,800 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

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

Description of Teel

Setting
Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Silty alluvium

Typical profile
H1 - 0 to 8 inches: silt loam
H2 - 8 to 29 inches: silt loam
H3 - 29 to 60 inches: fine sandy loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 18 to 24 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F101XY002NY - Low Floodplain
Hydric soil rating: No

Minor Components

Wakeland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: No

Hamlin

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

Raynham

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Scio

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 2 percent

Rhinebeck

Percent of map unit: 1 percent
Hydric soil rating: No

Wayland

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Ug—Udorthents, loamy

Map Unit Setting

National map unit symbol: 9pj1
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition
Udorthents, loamy, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Typical profile
H1 - 0 to 4 inches: loam
H2 - 4 to 70 inches: channery loam

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Minor Components

Unnamed soils
Percent of map unit: 10 percent

Ur—Urban land

Map Unit Setting
National map unit symbol: 9pj8
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile
H1 - 0 to 6 inches: variable

Minor Components

Unnamed soils
Percent of map unit: 10 percent

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

W—Water

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (North Plant)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (North Plant)

Map Scale: 1:3,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Albany County, New York
Survey Area Data: Version 20, Sep 10, 2022

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

Date(s) aerial images were photographed: Aug 15, 2021—Nov 8, 2021

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

Table—Hydrologic Soil Group (North Plant)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Du	Dumps		2.6	9.5%
Mh	Medihemists and Hydraquents, ponded	A/D	1.9	6.8%
Te	Teel silt loam	B/D	2.1	7.8%
Ug	Udorthents, loamy	A	2.8	10.2%
Ur	Urban land		17.7	65.4%
W	Water		0.1	0.2%
Totals for Area of Interest			**27.1**	**100.0%**

Rating Options—Hydrologic Soil Group (North Plant)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Appendix D

South Plant USDA NRCS Web Soil Survey

United States Department of Agriculture

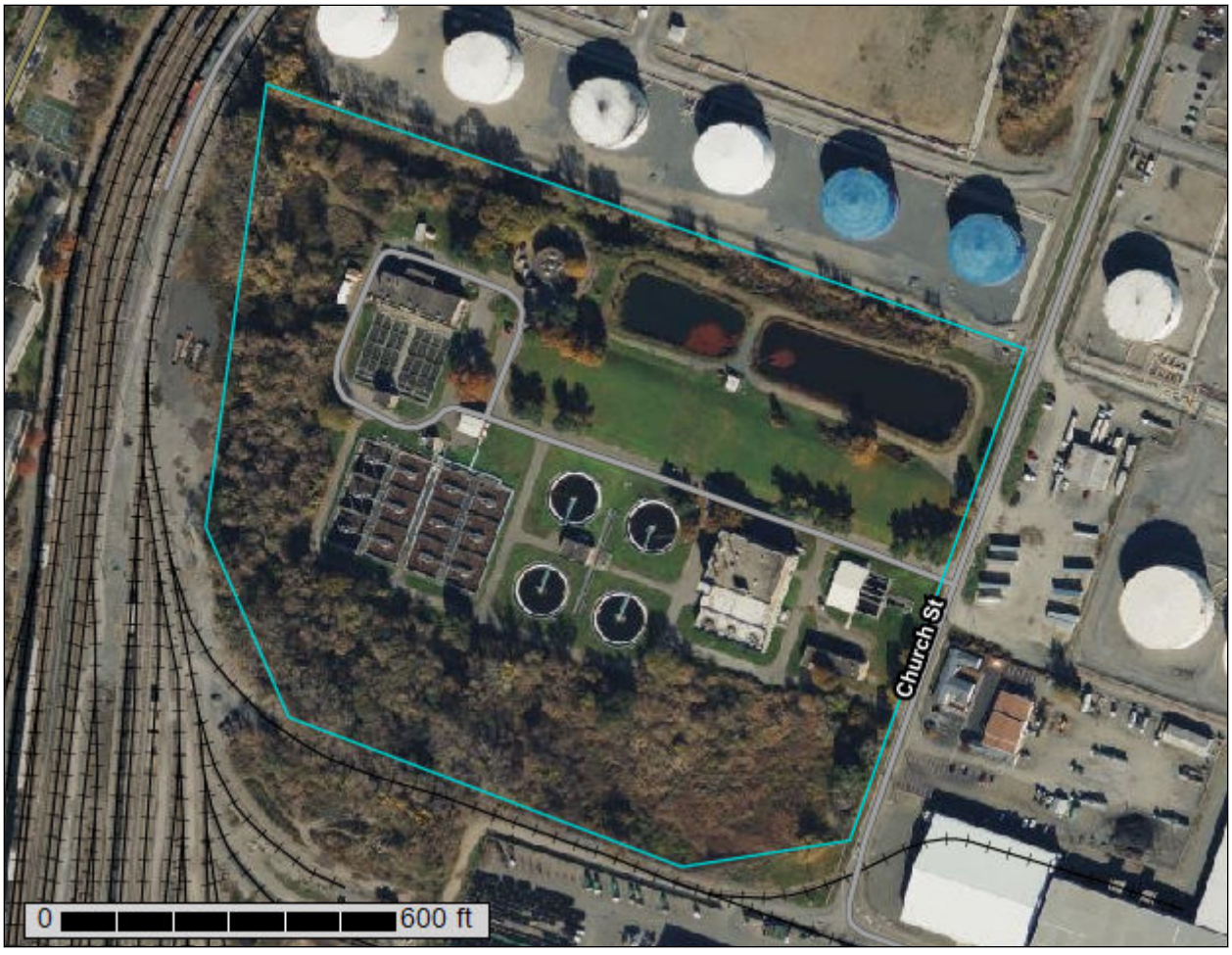
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Albany County, New York

ACWPD South Plant



May 17, 2023

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

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

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

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

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

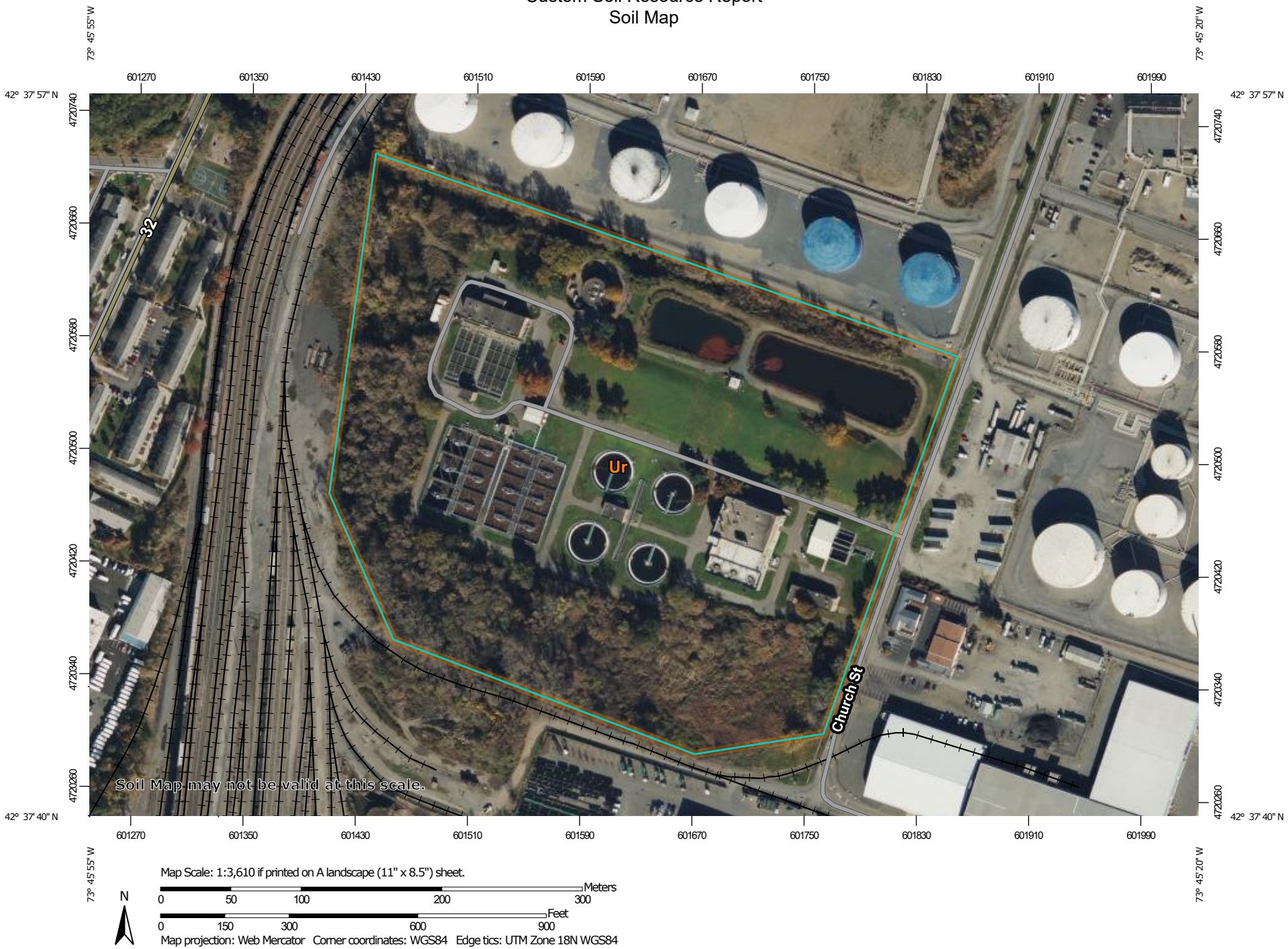
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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



Map Scale: 1:3,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Albany County, New York
Survey Area Data: Version 20, Sep 10, 2022

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

Date(s) aerial images were photographed: Aug 15, 2021—Nov 8, 2021

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ur	Urban land	31.6	100.0%
Totals for Area of Interest		**31.6**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Albany County, New York

Ur—Urban land

Map Unit Setting

National map unit symbol: 9pj8
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Udorthents

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

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Appendix E

North Plant and South Plant Unit Process Risk Scores

Table 1
Overall Risk Scores: North Plant and South Plant
Albany County Water Purification District

Area	Condition							Criticality						Redundancy Factor			Risk Score
	Mechanical Equipment	Structural	I&C	Electrical	Physical Condition	Performance	Condition Score	O&M	Safety	Regulatory Compliance	Level of Service	Back up Unit	Criticality Score	No. Needed	No. Operational	N+1 Factor (Operational)	
	60%	0%	20%	20%	Wt Avg	Avg		20%	30%	30%	10%	10%					
North Plant																	
NP Influent Pumping	3	2	5	3	**3.3**	**2.8**	**3.3**	2	2	5	1	5	**3.1**	4	5	0.8	**8.2**
NP Mechanical Screening	4	2	5	3	**4.0**	**3.6**	**4.0**	4	3	5	1	5	**3.8**	2	3	0.7	**10.1**
NP Grit Removal	5	3	5	3	**4.6**	**3.6**	**4.6**	5	4	2	4	5	**3.7**	3	3	1.0	**17.0**
NP Primary Clarifiers	3.5	2	4	3	**3.5**	**3.6**	**3.6**	3	2	3	3	5	**2.9**	5	4	1.3	**13.1**
NP Process Aeration System	3	2	5	3	**3.4**	**3.4**	**3.4**	2	2	4	3	5	**3.0**	**4**	3	1.3	**13.6**
NP Process Aeration Blowers	2	2	2	2	**2.0**	**3.0**	**3.0**	2	2	4	2	5	**2.9**	**2**	2	1.0	**8.7**
NP Secondary Clarifiers	5	2	3	3	**4.2**	**3.4**	**4.2**	3	2	4.5	3	5	**3.4**	5	5	1.0	**14.1**
NP Disinfection	2	2	3	2	**2.2**	**2.2**	**2.2**	2	3	5	2	5	**3.5**	2	2	1.0	**7.7**
NP Plant Water Pumping	5	2	5.0	3	**4.6**	**5.0**	**5.0**	5	2	5	5	5	**4.1**	2	1	2.0	**41.0**
NP SCADA System	-	-	5	-	**5.0**	**4.2**	**5.0**	3	5	5	4	3	**4.3**	1	1	1.0	**21.5**
NP High Voltage Electric Distribution	-	-	-	4	**4.0**	**3.9**	**4.0**	5	5	5	4	5	**4.9**	1	1	*1.0*	**19.6**
South Plant																	
SP Influent Pumping	5	2	3	3	**4.2**	**3.2**	**4.2**	2	2	5	1	5	**3.1**	5	6	0.8	**10.9**
SP Mechanical Screening	1	5	1	1	**1.0**	**1.2**	**1.2**	1	3	5	1	5	**3.2**	2	3	0.7	**2.6**
SP Grit Removal	5	2	5	3	**4.6**	**3.8**	**4.6**	5	4	2	4	5	**3.7**	3	3	1.0	**17.0**
SP Primary Clarifiers	3.5	2	3	3	**3.3**	**4.0**	**4.0**	3	2	3	4	5	**3.0**	5	4	1.3	**15.0**
SP Process Aeration System	3	2	5	3	**3.4**	**3.0**	**3.4**	2	2	4	3	5	**3.0**	**3**	3	1.0	**10.2**
SP Process Aeration Blowers	2	2	2	2	**2.0**	**2.6**	**2.6**	2	2	4	2	5	**2.9**	**2**	2	1.0	**7.5**
SP Secondary Clarifiers	4	2	3	3	**3.6**	**3.8**	**3.8**	3	2	4.5	4	5	**3.4**	4	4	1.0	**13.0**
SP Disinfection	2	2	1	2	**1.8**	**1.6**	**1.8**	2	3	5	2	5	**3.5**	3	2	1.5	**9.5**
SP Plant Water Pumping	4	2	3.5	3	**3.7**	**5.0**	**5.0**	3	2	3	2	5	**2.8**	2	3	0.7	**9.3**
SP SCADA System	-	-	5	-	**5.0**	**4.2**	**5.0**	3	5	5	2	3	**4.1**	1	1	1.0	**20.5**
SP High Voltage Electric Distribution	-	-	-	4	**4.0**	**3.9**	**4.0**	5	5	5	4	5	**4.9**	1	1	*1.0*	**19.6**

Table 2
Performance Scores: North Plant and South Plant
Albany County Water Purification District

Process	Capacity	Regulatory	Reliability	O&M Issues	Obsolescence	Overall Performance Score
North Plant						
NP Influent Pumping	1	1	4	4	4	**2.8**
NP Mechanical Screening	1	4	5	5	3	**3.6**
NP Grit Removal	1	2	5	5	5	**3.6**
NP Primary Clarifiers	1	4	4	5	4	**3.6**
NP Process Aeration System	5	5	2	2	3	**3.4**
NP Process Aeration Blowers	4	5	2	2	2	**3.0**
NP Secondary Clarifiers	1	4	3	4	5	**3.4**
NP Disinfection	3	1	2	3	2	**2.2**
NP Plant Water Pumping	5	5	5	5	5	**5.0**
NP SCADA System	3	5	4	5	4	**4.2**
NP High Voltage Electric Distribution	3	2	4.5	5	5	**3.9**
South Plant						
SP Influent Pumping	1	1	5	5	4	**3.2**
SP Mechanical Screening	1	1	1	2	1	**1.2**
SP Grit Removal	2	2	5	5	5	**3.8**
SP Primary Clarifiers	3	4	4	5	4	**4.0**
SP Process Aeration System	2	5	2	2	4	**3.0**
SP Process Aeration Blowers	2	5	2	2	2	**2.6**
SP Secondary Clarifiers	3	4	3	4	5	**3.8**
SP Disinfection	1	1	2	3	1	**1.6**
SP Plant Water Pumping	5	5	5	5	5	**5.0**
SP SCADA System	3	5	4	5	4	**4.2**
SP High Voltage Electric Distribution	3	2	5	5	5	**3.9**

Appendix F

North Plant Screenings Upgrades Preliminary Engineering Report

Albany County Water Purification District

North Plant Screenings Upgrades

Preliminary Engineering Report

June 2022

North Plant Screening Upgrades

Preliminary Engineering Report

June 2022

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Contents

Tables

Appendices

Acronyms and Abbreviations

ACI	American Concrete Institute
ACPH	Air Changes Per Hour
ACWPD	Albany County Water Purification District
ASCE	American Society of Civil Engineers
BFE	Base Flood Elevation
CF	Cubic Feet
CFM	Cubic Feet Per Minute
CRRA	Community Risk and Resiliency Act
CSO	Combined Sewer Overflows
CSS	Combined Sewer System
CW SRF	Clean Water State Revolving Fund
CY	Cubic Yards
DIP	Ductile Iron Pipe
el	Elevation
FEMA	Federal Emergency Management Agency
FIRM	Federal Insurance Rate Map
ft	feet
fpm	Feet Per Minute
fps	Feet Per Second
gpm	Gallon per Minute
HMI	Human Machine Interface
hr	Hour
hp	Horsepower
in	Inches
LTCP	Long Term Control Plan
MG	Million Gallons
mgd	Million Gallons Per Day
min	Minute
MOP	Manual of Practice (Water Environment Federation)

NFPA	National Fire Protection Association
NYS DEC	New York State Department of Environmental Conservation
NYS EFC	New York State Environmental Facilities Corporation
NPDES	National Pollutant Discharge Elimination System
NR	Not Required
NWRI	National Water Research Institute
PER	Preliminary Engineering Report
ppm	Parts per million
RPZ	Reduced Pressure Zone
sec	Second
SLC	Synchronous Link Control
SPDES	State Pollution Discharge Elimination System
SLC	Synchrony Logic Controller
UNMWPE	Ultra-High Molecular Weight Polyethylene
Ur	Urban Land
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VFD	Variable Frequency Drive
wc	Water Column
WSEL	Waster Surface Elevation

1 Project Background and History

The Albany County Water Purification District (ACWPD) retained Arcadis, to evaluate the replacement of their mechanical bar screen equipment at their North Plant. The North Plant is permitted to discharge 35 million gallons per day (mgd), on a monthly average flow, and must receive for treatment a minimum of 88 mgd through the headworks pursuant to its New York State Department of Environmental Conservation (NYS DEC) State Pollution Discharge Elimination System (SPDES) Permit (refer to **Appendix A**). The North Plant was constructed in the early 1970's with upgrades to the screening equipment taking place in 2004 (replacement of two mechanical bar screens) and 2010 (replacement of the third mechanical bar screen).

1.1 Site Information

1.1.1 Location

The existing bar screens are located in the Preliminary Treatment Building at the North Plant. The North Plant is located at 1 Canal Road South in the Village of Menands near the border with the City of Albany. See **Figure B-1** in **Appendix B** for a site location map.

1.1.2 Geological Conditions

According to the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), the surface soils in this area mainly fall under the Urban Land (Ur) category.

1.1.3 Environmental Resources

A search of NYS DEC's online Environmental Resource Mapper indicated the following:

- Hudson River classification is C, suitable for fishing.
- The Project site is located in the vicinity of tidal river – Hudson River Estuary.
- The Project site is located in the vicinity of Shortnosed Sturgeon.
- The Project site is located in the vicinity of Atlantic Sturgeon.

1.1.4 Floodplain Considerations

Based on the review of the Flood Insurance Rate Map (FIRM), map number 36001C0211D published by the Federal Emergency Management Agency (FEMA) with the effective date of March 16, 2005, the project site is located in the 500-year floodplain. See **Appendix C** for the FIRM Map. The 500-year floodplain is defined by FEMA as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and/or areas protected by levees from 1% annual chance flood.

Arcadis reviewed the *New York State Flood Risk Management Guidance for Implementation of the Community Risk and Resiliency Act*, dated August 2020 (CRRA). The base flood elevation (BFE) at the project location is approximately 22.0, with the additional three feet of freeboard to account for sea level projections the level of

protection critical equipment is elevation 25.0. The existing operating floor level of the Preliminary Treatment Building is at elevation 27.0. New electrical equipment will be installed above the operating floor level and will comply with the requirements of the CRRA.

1.1.5 Environmental Justice Areas

The Project site is located in Potential Environmental Justice Area and serves a significant minority population. See figure **B-2** in Appendix B for figure showing the Potential Environmental Justice Area.

1.2 Ownership and Service Area

The North Plant is owned, operated, and maintained by Albany County. The North Plant services the Cities of Cohoes, Watervliet and a portion of Albany as well as the Towns of Guilderland and Colonie and the Villages of Colonie, Green Island and Menands.

1.3 Existing Facilities and Present Condition

The existing mechanical bar screens at the North Plant are single-rake climber screens manufactured by Infilco-Degremont. Two of the mechanical bar screens were installed in 2003 with the third installed in 2011. Each are installed in 5-foot-wide channels, are 47-feet tall and are equipped with 1-inch bar spacing. Pursuant to operational staff interviews, the mechanical bar screens are operating as expected with normal wear and tear for their age, except for the control systems. The synchronous link control (SLC) and human machine interface (HMI) are no longer working, and the ultrasonic level sensors are not functioning, meaning that the mechanical bar screens cannot be operated based on differential head as designed. Currently the raking mechanism for each mechanical bar screen is operated on a time basis set by the operator: 3 to 4 times per hour during dry weather flows, and continuously during wet weather events. The existing conveyor belt is interlocked with the screens and operates when the screens are running. The conveyor belt width is 2-feet and operates at a speed of 20 fpm. The screenings are currently conveyed to a 10 cubic yards (CY) dumpster which is emptied once every two weeks on average.

1.4 Definition of the Problem

The age of the existing mechanical bar screens ranges from 12 to 18 years. The long rake cycle times caused by the significant travel distance to deliver screenings to the conveyer on the single-rake climbers results in significant blinding of the screens and elevated waster surface elevations (WSELs) upstream of the screens. The 1-inch spacing of the existing bars allows for screenings and debris to pass through the bar screens impacting plant performance in downstream processes.

1.5 Financial Status

The ACWPD is seeking to finance the project with Clean Water State Revolving Fund (CW SRF) loans and available grant funding. Loan payments will be included in the 2023 operating budget under capital expenditures.

2 Alternatives Analysis

Bar screens are used in wastewater treatment plants to remove objects and debris that could potentially damage downstream equipment or block flow channels and piping systems. Rags and other debris are often the main contributor to increased equipment maintenance and failure. Operational personnel have witnessed rags and debris passing though the bar screens and causing issues in downstream processes.

Arcadis evaluated three different options for improving influent screen equipment at the North Plant:

- Alternative No. 1: No action.
- Alternative No. 2: Replacing the mechanical climber-type bar screens with 1-inch bar spacing with new mechanical multi-rake catenary driven mechanical bar screens with 3/8-inch bar spacing.
- Alternative No. 3: Replacing the mechanical climber-type bar screens with 1-inch bar spacing with new mechanical multi-rake chain driven mechanical bar screens with 3/8-inch bar spacing.

2.1 Flows and Loads

The ACWPD provided Arcadis with daily flows between January 2020 and May 2022. The average daily flow was found by taking the average of the daily flows provided. The maximum hourly flow is based on the minimum flow the North Plant must receive for treatment in accordance their SPDES Permit. Based on Figure 2.2 of Manual of Practice (MOP) 8 - *Design of Municipal Wastewater Treatment Plants*, (1992), the minimum hourly flow was estimated. The minimum hourly flow was estimated to be 70% of minimum average daily flow in the last three year (12.5 mgd occurred on September 2020). **Table 1** shows the design flow conditions.

Table 1: North Plant Design Flows

Parameter	Units	Flows		
		Avg. Day	Maximum Hourly Flow	Minimum Hourly Flow
Influent Flow	mgd	20.8	88.0	8.8

Currently, the North Plant removes approximately 1 cubic feet of screenings per million gallons (CF/MG) treated. Figure 9.7 of MOP 8 indicates that 3.0 CF/MG is the average volume of screenings removed for wastewater treatment plants with 1-inch bar spacing.

Decreasing the bar screen spacing to 3/8-inch will increase the future screening loadings. Figure 9.7 of MOP 8 indicates that the national average screenings removed for 3/8-inch bar spacing is 9 CF/MG treated. Assuming 33 percent of that value to reflect current conditions with a 50 percent margin of error, a screening removal rate of 4.5 CF/MG treated was selected as the design criteria for upgrading the bar screens with existing flow conditions. At the current average daily flow of 20.8 mgd, the anticipated daily and weekly screenings removal is 3.5 CY and 24 CY, respectively. The maximum hourly flow of 88 mgd indicates that the maximum screenings removal is approximately 16.5 cubic feet per hour (CF/hr).

2.2 Alternative No. 1

Alternative No. 1 includes taking no action and leaving the existing mechanical bar screen systems in service. There are no costs associated with this alternative.

2.3 Alternative No. 2

Alternative No. 2 includes the installation of three new multi-rake catenary driven mechanical bar screens, a new conveyer, a new screenings diverter gate and two new grinder/washer compactors.

The existing climber-type bar screens would be removed and replaced with new multi-rake catenary drive mechanical bar screens each sized for 44 mgd with 3/8-inch bar spacing. The screen approach velocity at average day flow conditions with two screens in operation will be 1.25 fps and at maximum hourly flow conditions with two screens in operation is approximately 2.3 feet per second (fps).

The grinder/washer/compactors would clean and compact the additional screenings anticipated with the smaller bar spacing on the new mechanical bar screens. The screenings will be discharged through the grinder/washer/compactor discharge chutes into a screenings dumpster.

This alternative includes modifications to the existing unloading enclosure to provide space to install the new grinder/washer/compactors.

See **Figure B-3** in **Appendix B** for a sketch of this alternative. The cost of this alternative is approximately $6,240,000, and is summarized in **Appendix D**.

2.4 Alternative No. 3

Similarly to Alternative No. 2, Alternative No. 3 Includes the installation of three new multi-rake chain driven mechanical bar screens, a new conveyer, a new screenings diverter gate and two new grinder/washer compactors. The difference between Alternatives No. 2 and No. 3 is how the rakes are driven. Alternative No. 2 uses a catenary mechanism to drive the rakes and Alternative No. 3 utilizes a chain.

The existing climber-type bar screens would be removed and replaced with new multi-rake chain driven mechanical bar screens each sized for 44 mgd with 3/8-inch bar spacing. The screen approach velocity at average day flow conditions with two screens in operation will be 1.25 fps and at maximum hourly flow conditions with two screens in operation is approximately 2.3 feet per second (fps).

The grinder/washer/compactors would and compact the additional screenings anticipated with the smaller bar spacing on the new mechanical bar screens. The screenings will be discharged through the grinder/washer/compactor discharge chutes into a screenings dumpster.

This alternative also includes modifications to the existing unloading enclosure to provide space to install the new grinder/washer/compactors.

See **Figure B-4** in **Appendix B** for a sketch of this alternative. The cost of this alternative is approximately $5,840,000, and is summarized in **Appendix D**.

2.5 Findings

Arcadis reviewed the screenings alternatives, and we offer the following comments:

- Alternative No. 1 does not address the long cycle times of the existing screens or the impact of screenings passing through the existing screens and into downstream processes.
- Alternatives No. 2 and 3 both have approach velocities at average flow conditions between 1.25 and 3 fps in accordance with the *Recommended Standards for Wastewater Facilities* (10 States Standards).
- Alternative No. 2 has the highest capital cost.
- Alternatives No. 2 and 3 address both the cycle time of the screens and the concerns with screenings passing through the mechanical bar screens and into downstream processes.

3 Recommended Alternative

The recommended alternative is Alternative No 3 which includes installation of three new multi-rake bar screen systems. The three existing climber-type mechanical bar screens will be replaced with multi-rake bar screens, including new electrical, wiring, logic and control. The mechanical bar screens will be operated based on differential head across the screen, therefore level sensors will be installed upstream and downstream of each mechanical bar screen. The new multi-rake system will handle the increased screenings loads (the new bar screens will provide capacity to meet 88 mgd with two screens in operation). The existing screenings conveyor system will be replaced, and downstream of the conveyor will be a diverter gate to direct screenings to one of the two (duty and standby) grinder/washer/compactors. The new conveyor will be installed in the same location as the existing conveyer. An addition to the existing loading enclosure will be constructed to house the grinder/washer/compactors, the addition will be constructed of concrete block to match the existing building.

3.1 Materials, Equipment and Systems

The major components of the upgrade will include mechanical bar screens, a screenings conveyor, diverter gate and grinder/washer/compactors. Refer to Instrumentation and Electrical sections for additional appurtenances.

3.1.1 Mechanical Bar Screens

The mechanical bar screens will be chain-and-rake type screens with multiple rakes mounted on link chains. The lower sprocket at the bottom provides the rakes with the ability to hit the base plate of the unit frame with a scraping, shovelling action that moves debris up the screen, eliminating accumulation at the bottom of the channel. The mechanical bar screens will be designed in general conformance with the design criteria shown in **Table 2.**

Table 2: Mechanical Bar Screen Design Criteria

Criteria	
Maximum Flow per Screen (mgd)	44.0 (Two units in operation)
Average Flow per Screen (mgd)	10.4 (Two units in operation)
Minimum Flow per Screen (mgd)	2.9 (Three units in operation)
Approach Velocity Through Screen (fps) at Average Flow	1.3
Bar Clear Opening (in)	3/8
Motor hp, Minimum	3

3.1.1.1 Bar Screen Assembly

The screen bars will also be constructed of 1/4-inch by 3/4-inch Type 316 SS bars. The side fabrication will be 304 SS bent plate with a minimum of 3/16-inch cross section. The dead plate will be 1/4-inch thick Type 304 SS. The discharge chute will be constructed of the 11-gauge Type 304 SS and bolted to the dead plate. Link slides will be constructed of UV stable UHMWPE rollers and Type 304 SS supports. A manually attached discharge chute extender will be provided if the conveyor is out of service that will be constructed of 11-gauge Type 304 SS.

3.1.1.2 Drive Head and Clutch

The drive sprockets, end castings and shaft will all be constructed of Type 304 SS. Bearings shall be greased ball bearing type, non-self-aligning, sealed and lubricated. A torque limiting clutch will be provided on the output shaft of the drive assembly. It will be a ball-detent type which transmits torque through balls retained in detents of two opposing steel plates held against the balls by adjustable spring pressure. Each torque limiter will be equipped with a limit switch.

3.1.1.3 Rakes and Buckets

Rakes will be 1-inch by 4-inch UV stable UHMWPE with a serrated edge. The thru bar scrapers will be a minimum 3/8-inch by 5-inch Type 304 SS. Rakes and buckets will be placed every 5-feet. Rakes will be 8-inches wide, with not less than a 6 3/4-inch shelf provided for debris carrying capacity in front of the bar rack. Buckets will be provided with drain holes.

3.1.1.4 Lower Sprocket and Bearing

The lower sprocket will be constructed of Type 304 SS with a minimum tooth width of 1-inch and a bore of 2 3/4-inches. Bearings for lower sprockets will be constructed of self-lubricating Polyethylene material and be maintenance-free. A ceramic collar will be bonded onto the stub shaft.

3.1.1.5 Chain

Chains will be heavy duty roller type with a minimum weight of 6 lbs/ft and constructed of Type 304 SS. Chains will be engineered for continuous, submerged duty without any lubrication and will run with tracks on both sides of the self-contained frame.

3.1.2 Screenings Conveyor

The conveyor will transport screenings from the new mechanical bar screens to a diverter gate that will discharge screenings into one of two grinder/washer/compactors. The conveyor will be sized to accommodate the additional screenings that will be removed due to the smaller 3/8-inch bar spacing. The conveyor will be designed in general conformance with the design criteria shown in **Table 3.**

Table 3: Screenings Conveyor Design Criteria

Criteria	
Conveyed Material	Screenings
Maximum Solids Content of Conveyed Material (%)	40
Density of Conveyed Material (lbs/ft^3)	55
Conveyer Capacity (lbs/hr)	500
Minimum Conveyor Belt Width (in)	24
Approximately Belt Length (ft)	60
Inclination	Horizontal/Inclined
Maximum Belt Speed (ft/min)	100
Minimum Conveyor Drive Motor Size (hp)	3
Conveyor Drive Motor Electrical Power	240V, 3PH, 60HZ
Conveyor Direction Capability	Forward and Reverse

3.1.2.1 Conveyor Belt

Belt conveyor will include two-ply synthetic carcass belt with rated tension of 220 pounds per square inch-width and 1/8-inch by 1/16-inch moderately oil-resistant nitrile covers. Belt will have factory-installed Type 304 SS, hinged, bolted mechanical fasteners, drawn and recessed into belt cover.

3.1.2.2 Pulleys

Pulleys will be welded steel or cast-iron drum-type with necessary shafting, bearings, and take-up devices with ample adjustment. Head pulleys will be a minimum of 12-inch diameter and two inches wider than width of belt. Tail pulleys will be a minimum of 12- inch diameter and two inches wider than width of belt. Pulleys will be secured to shafts with compression bushings.

3.1.2.3 Belt Scrapers

Two spring tensioned belt scrapers will be installed at each end of the conveyor. Scrapers will have polyurethane blades actuated by two separate, adjustable springs so that each blade operates independently.

3.1.2.4 Drip Pan

Drip pans will be provided beneath entire length of each conveyor. Drip pans will be at least 1/8-inch thick 304 Type SS, center-pitched, and 6-inches wider than overall belt width. A 4-inch diameter PVC drain will convey drippings back to the screen channel.

3.1.3 Diverter Gate

The diverter gate will transfer screenings from the screenings conveyer to the grinder/washer/compactors. The diverter gate will be used to change the direction of flow of screenings to either of the grinder/washer/compactors. The gate will be motor operated and have a hand wheel provided for manual operation. The diverter gate will be constructed of Type 304 SS and designed in general conformance with the design criteria shown in **Table 4.**

Table 4: Diverter Gate Design Criteria

Criteria	
Gate Width (in)	40
Gate Height (in)	60
Duty Type	Bifurcated
Motor Type	3-phase, 480-Volt

3.1.4 Grinder/Washer/Compactors

The grinder/washer/compactors will be installed in the loading enclosure adjacent to the screen area. Screenings will be conveyed to the grinder/washer/compactors via the belt conveyer; the diverter gate will be used to divert the screenings to one of the grinder/washer/compactors. The grinder/washer/compactors will be designed in general conformance with the design criteria shown in **Table 5.**

Table 5: Grinder/Washer/Compactor Design Criteria

Criteria	
Type	Screw compactor
Feed Mechanism	Hopper with Grinder
Number of Units	1 duty, 1 standby
Screenings Loading	100 cf/hr
Motor	5 HP

The screenings will be processed by grinding, washing, and compacting, processing the screenings in this manner will significantly reduce the volume (up to 50%) of material.

A fully integrated unit will streamline the process and simplify the controls. Under average screenings loading conditions, one unit will be duty and able to handle screenings associated with the entire range of design flows while still having a standby unit available. Approximately 15 gpm of wash water at 40 psi is required for each running unit. Plant water will be used for the wash water.

3.2 Instrumentation and Control

Both automatic and local controls for the Mechanical Bar screens will be provided. A single Master Control Panel (MCP) control three bar screens, two grinder washer compactors, belt conveyor, and diverter gate. The MCP will be furnished with an Allen Bradley PLC and OIT. Each bar screen, grinder washer compactor, belt conveyer and diversion gate will be furnished with their own Local Control Panels. These local control enclosures will have pushbuttons and indicating lights allowing local control of the respective equipment in case of PLC failure.

Control and monitoring signals for each Bar Screen will be hardwired from its VFD to the MCP, and to its Local Control Panel. Similarly, control and monitoring signals for each Grinder Washer Compactor will be hardwired from the respective MCC to the MCP, and to its Local Control Panel. There will be two automatic modes of operation, one based on differential level across the screen; and two, on timer.

There will also be a local control station near the bottom of each screen with an emergency stop pushbutton. These local control stations will be located in the screenings channel and will be NEMA 7 rated.

Automatic and local controls for the screening conveyor will be provided. Automatic and remote controls will be handled by the MCP. The screening conveyor will be interlocked with the mechanical bar screens, when the bar screen is in operation the conveyor will be in operation.

Each grinder/washer/compactor will be provided with automatic and local controls. Automatic and remote controls of each grinder/washer/compactors will be handled by the MCP. Interlocks with the screening conveyor will be provided ensuring that the Grinder Washer Compactor is in operation when the conveyor is running and for an adjustable time (initially set at 1 minute) after the conveyor stops.

3.3 Electrical

The area classification for the North Plant Preliminary Treatment Building screening area is Class 1, Division 1. The screening area will be retrofitted with three (3) replacement mechanical bar screens, a replacement screenings conveyor, a screening diverter gate and two (2) grinder/washer/compactor units.

Each mechanical bar screen system to be identical and is anticipated to include but not limited to the following electrical components; a bar screen drive motor (3HP), local control station, upstream/downstream level sensors with associated transmitter, and a single/common PLC based control panel for all three (3) mechanical bar screen systems. With the screen room classification in mind it is proposed to install the PLC based control panel outside of the classified space while all other equipment/devices are installed within the screen room local to the mechanical bar screen equipment.

Like that of the mechanical bar screen systems, the discharge conveyor is anticipated to include the following electrical components; a drive motor (1HP), local control station, an emergency pull cord, and a relay-based control panel. It is proposed to install the control panel outside of the classified space while all other equipment/devices are installed within the screen room local to the discharge conveyor. The discharge conveyor will be interlocked with the mechanical bar screens to ensure simultaneous system operation.

Each grinder/washer/compactor system to be identical and is anticipated to include but not limited to the following electrical components; a drive motor (5HP), local control station, water solenoid valve, and a single/common PLC based control panel for both grinder/washer/compactor systems. Like mentioned above it is proposed to install the PLC based control panel outside of the classified space while all other equipment/devices get installed within the screen room local to the grinder/washer/compactor equipment. The discharge conveyor will be interlocked with the mechanical bar screens and discharge conveyor to ensure they all run simultaneously as one complete system.

As part of the project the lighting in the screening area operating floor level will be replaced and new electric unit heaters will be installed in the unloading enclosure.

4 Project Schedule

Significant project milestones are outlined below:

- Complete Planning Phase: June 2022
- Complete Plans and Specifications: November 2023
- Notice to Proceed for Construction: April 2024
- Construction Completion: April 2025

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Appendix G

Opinion of Probable Cost

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

Project Summary

Alternative	North Plant Opinion of Probable Cost (2025 Dollars in Millions)	South Plant Opinion of Probable Cost (2025 Dollars in Millions)	Total Cost (2025 Dollars in Millions)
NP Mechanical Screening	$7.2	-	$7.2
New Influent Pumps	$9.6	$5.6	$15.2
Grit Removal - Replace In-kind	$7.9	$4.2	$12.0
Grit Removal - Head Cells	$15.4	$10.5	$25.9
Grit Removal - Vortex	$11.5	$9.0	$20.5
Primary Clarifiers - Replace In-kind	$9.5	$8.2	$17.7
Process Aeration - New Blowers and Diffusers	$26.9	$9.9	$36.8
Secondary Clarifiers - Replacement with Spiral S	$22.3	$12.9	$35.2
Plant Water Pumps - Replace In-kind	$1.7	$1.7	$3.4
SCADA Upgrade	$5.9	$6.5	$12.4
High Voltage Electrical Distribution	$18.1	$8.5	$26.6

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Alternative 3 Chain driven multi-rake bar screens

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
General Construction	1	LS	$3,313,000	$ 3,313,000
Electrical Construction	1	LS	$332,000	$ 332,000

	SUBTOTAL	$	3,650,000
LEGAL, ADMINISTRATION, ENGINEERING	**20%**	$	730,000
GENERAL REQUIREMENTS AND O&P	**10%**	$	365,000
CONSTRUCTION CONTIGENCY	**30%**	$	1,095,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$	1,315,000
OPINION OF PROBABLE CONSTRUCTION COST Point Estimate		**$**	**7,160,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - New Influent Pumps

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	10%	$	287,000
Centrifugal End Suction Pump with VFDs	5	EA	$405,000	$	2,025,000
Concrete Pads	2	CY	$1,500	$	3,000
Discharge Piping	5	EA	$23,000	$	115,000
Suction and discharge plug valves	10	EA	$72,495	$	725,000
Electrical	1	LS	25%	$	717,000
Instrumentation	1	LS	12%	$	344,000
Miscellaneous Items	1	LS	10%	$	287,000
			SUBTOTAL	**$**	**4,510,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	1,353,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	1,128,000
CONSTRUCTION CONTIGENCY			**30%**	$	1,353,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	1,210,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**9,550,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Grit Removal - Replace In-kind

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	5%	$	134,000
New Amwell chain and bucket equipment	5	EA	$472,500	$	2,363,000
48"x72" 316SS slide gates with electric actua	5	EA	$40,163	$	201,000
Concrete Surface Repair without Rebar	50	SF	$546	$	27,000
Concrete Surface Repair with Rebar	60	SF	$607	$	36,000
Expansion joint repair	100	LF	$334	$	33,000
Nonstructural Minor Crack Repair	50	LF	$212	$	11,000
MOPO	1	LS	5%	$	128,000
Electrical	1	LS	10%	$	256,000
Instrumentation	1	LS	10%	$	256,000
Miscellaneous Items	1	LS	10%	$	256,000
			SUBTOTAL	**$**	**3,710,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	1,113,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	928,000
CONSTRUCTION CONTIGENCY			**30%**	$	1,113,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	995,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**7,860,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

North Plant - Grit Removal - Head Cells

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Selective Demolition	1	LS	5%	$ 89,000
60-inch combined influent pump discharge header	160	LF	$1,100	$ 176,000
Concrete	800	CY	$2,000	$ 1,600,000
Grout Fill	3	CY	$1,500	$ 5,000
Piles	1200	LF	$200	$ 240,000
Head Cell Mechanical Equipment	3	EA	$758,700	$ 2,276,000
MOPO	1	LS	5%	$ 215,000
Bypass pumping	1	LS	$125,000	$ 125,000
Sheeting and Shoring	1	LS	$100,000	$ 100,000
Site Work/Piping	1	LS	20%	$ 859,000
Electrical	1	LS	15%	$ 645,000
Instrumentation	1	LS	12%	$ 516,000
Miscellaneous Items	1	LS	10%	$ 430,000
			SUBTOTAL	**$ 7,280,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$ 2,184,000
GENERAL REQUIREMENTS AND O&P			**25%**	$ 1,820,000
CONSTRUCTION CONTIGENCY			**30%**	$ 2,184,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$ 1,952,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$ 15,420,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Grit Removal - Vortex

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Selective Demolition	1	LS	5%	$ 147,000
50 MGD Vortex Grit Removal Mechanisms	2	EA	$171,416	$ 343,000
48"x72" 316SS slide gates with electric actuators	4	EA	$40,163	$ 161,000
Grit Pumps	2	EA	$50,625	$ 101,000
Grit Washer Classifiers	2	EA	$177,876	$ 356,000
PLC Main Control Panels	2	EA	$84,375	$ 169,000
Concrete	800	CY	$2,000	$ 1,600,000
Piles	1000	LF	$200	$ 200,000
MOPO	1	LS	10%	$ 293,000
Bypass pumping	1	LS	$125,000	$ 125,000
Sheeting and Shoring	1	LS	$100,000	$ 100,000
Site Work/Piping	1	LS	25%	$ 733,000
Electrical	1	LS	15%	$ 440,000
Instrumentation	1	LS	12%	$ 352,000
Miscellaneous Items	1	LS	10%	$ 293,000
			SUBTOTAL	**$ 5,420,000**
		LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$ 1,626,000
		GENERAL REQUIREMENTS AND O&P	**25%**	$ 1,355,000
		CONSTRUCTION CONTIGENCY	**30%**	$ 1,626,000
		COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$ 1,453,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$ 11,480,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Primary Clarifiers - Replace In-kind

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	10%	$	329,000
Clarifier Equipment	4	EA	$550,800	$	2,203,000
24"x24" 316SS slide gates with electric actuators	16	EA	$31,050	$	497,000
Centrifugal Blowers	2	EA	$84,221	$	168,000
Air piping and coarse bubble diffusers	1	LS	$250,000	$	250,000
Effluent weirs	88	EA	$2,000	$	176,000
Concrete Surface Repair without Rebar	100	SF	$546	$	55,000
Concrete Surface Repair with Rebar	50	SF	$607	$	30,000
Expansion joint repair	100	LF	$334	$	33,000
Nonstructural Minor Crack Repair	100	LF	$212	$	21,000
Misc Metals	1	LS	10%	$	220,300
Electrical	1	LS	15%	$	468,000
Instrumentation	1	LS	12%	$	374,000
Miscellaneous Items	1	LS	5%	$	156,000
			SUBTOTAL	**$**	**4,500,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	1,350,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	1,125,000
CONSTRUCTION CONTIGENCY			**30%**	$	1,350,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	1,207,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**9,530,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Process Aeration - New Blowers and Diffusers

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Demolition	1	LS	2%	$ 158,140
Site Work	1	LS	20%	$ 132,000
New Building	1,200	SF	$350	$ 420,000
Slab Foundation	1,200	SF	$200	$ 240,000
Turbo Blowers	3	EA	$1,800,000	$ 5,400,000
Ceramic Disc Diffusers	1	LS	$1,072,000	$ 1,072,000
Air piping and valves	1	LS	$450,000	$ 450,000
Automated Valves for DO Control	17	EA	$35,000	$ 595,000
48"x48" influent gates with electric actuators	4	EA	$37,800	$ 151,000
36"x36" influent gates with electric actuators	17	EA	$34,088	$ 579,000
48"x48" step-feed gates with electric actuators	18	EA	$39,150	$ 705,000
Concrete Surface Repair without Rebar	100	SF	$546	$ 55,000
Concrete Surface Repair with Rebar	50	SF	$607	$ 30,000
Expansion joint repair	50	LF	$334	$ 17,000
Nonstructural Minor Crack Repair	100	LF	$212	$ 21,000
Bypass pumping	6	EA	$118,000	$ 708,000
Electrical	1	LS	10%	$ 895,000
Instrumentation	1	LS	7%	$ 627,000
Miscellaneous Items	1	LS	5%	$ 448,000
			SUBTOTAL	**$ 12,710,000**
			LEGAL, ADMINISTRATION, ENGINEERING **30%**	$ 3,813,000
			GENERAL REQUIREMENTS AND O&P **25%**	$ 3,178,000
			CONSTRUCTION CONTIGENCY **30%**	$ 3,813,000
			COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS **7.0%**	$ 3,408,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$ 26,920,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Secondary Clarifiers - Replacement with Spiral Scraper Type Equipment

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Selective Demolition	1	LS	5%	$ 409,150
Clarifier equipment	6	EA	$803,250	$ 4,820,000
Stainless steel weirs and baffles	6	EA	$373,500	$ 2,241,000
Secondary clarifier influent channel blowers	3	EA	$98,381	$ 295,000
Air piping and coarse bubble diffusers	1	LS	$250,000	$ 250,000
36"x36" influent gates with electric actuators	6	EA	$34,088	$ 205,000
30"x30" effluent gates with electric actuators	6	EA	$32,738	$ 196,000
18"x18" RAS chamber gates with electric actuators	6	EA	$29,363	$ 176,000
Concrete Surface Repair without Rebar	100	SF	$546	$ 55,000
Concrete Surface Repair with Rebar	50	SF	$607	$ 30,000
Expansion joint repair	100	LF	$334	$ 33,000
Nonstructural Minor Crack Repair	100	LF	$212	$ 21,000
MOPO	1	LS	5%	$ 409,150
Bypass pumping	6	EA	$118,000	$ 708,000
Electrical	1	LS	5%	$ 409,150
Instrumentation	1	LS	3%	$ 245,490
			SUBTOTAL	**$ 10,510,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$ 3,153,000
GENERAL REQUIREMENTS AND O&P			**25%**	$ 2,628,000
CONSTRUCTION CONTIGENCY			**30%**	$ 3,153,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$ 2,818,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$ 22,260,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Plant Water Pumps - Replace In-kind

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective demolition	1	LS	10%	$	49,900
Main PW Pumps	3	EA	$86,400	$	259,000
Auxilliary PW Pumps	2	EA	$28,890	$	58,000
Strainer	1	EA	$79,650	$	80,000
Piping and valves - main PW pumps	3	EA	$20,996	$	63,000
Piping and valves - auxiliary PW pumps	2	EA	$18,244	$	36,000
Concrete Pads	2	CY	$1,500	$	3,000
Electrical	1	LS	30%	$	150,000
Instrumentation	1	LS	18%	$	90,000
			SUBTOTAL	**$**	**790,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	237,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	198,000
CONSTRUCTION CONTIGENCY			**30%**	$	237,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	212,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$**	**1,670,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - Upgrade SCADA System

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
NP Construction Hardware and Software	1	LS	$1,161,314	$	1,161,000
NP SCADA Software Configuration	1	LS	$445,891	$	446,000
NP Electrical (Including Duct Bank)	2000	IF	$580	$	1,160,000

	SUBTOTAL	**$**	**2,770,000**
LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$	831,000
GENERAL REQUIREMENTS AND O&P	**25%**	$	693,000
CONSTRUCTION CONTIGENCY	**30%**	$	831,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$	743,000
OPINION OF PROBABLE CONSTRUCTION COST Point Estimate		**$**	**5,870,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

North Plant - High Voltage Electric Upgrade

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Conduct short circuit, coordination, load flow, and arc flash hazard analysis	1	EA	$25,000	$ 25,000
Demolition/Temporary Power	1	LS	$250,000	$ 250,000
115kV circuit switches - Main Substation	2	EA	$250,000	$ 500,000
115kV substation transformers - Main Substatio	2	EA	$1,125,000	$ 2,250,000
15kV switchgear - Main Substation	1	EA	$1,500,000	$ 1,500,000
Cast coil style transformers - Unit Substations	8	EA	$250,000	$ 2,000,000
Unit substation switches	10	EA	$75,000	$ 750,000
Underground medium voltage feeders	4200	LF	$313	$ 1,315,000
Site work	1	LS	5%	$ 430,000
			SUBTOTAL	**$ 9,020,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$ 2,706,000
GENERAL REQUIREMENTS AND O&P			**25%**	$ 2,255,000
CONSTRUCTION CONTIGENCY			**20%**	$ 1,804,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$ 2,288,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$ 18,070,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

South Plant - New Influent Pumps

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	10%	$	123,000
Centrifugal End Suction Pump with VI	5	EA	$222,750	$	1,114,000
Concrete Pads	2	CY	$1,500	$	3,000
Discharge Piping	5	EA	$23,000	$	115,000
Suction and discharge valves	10	EA	$48,330	$	484,000
Electrical	1	LS	25%	$	429,000
Instrumentation	1	LS	12%	$	206,000
Miscellaneous Items	1	LS	10%	$	172,000
			SUBTOTAL	**$**	**2,650,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	795,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	663,000
CONSTRUCTION CONTIGENCY			**30%**	$	795,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	711,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$**	**5,610,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

South Plant - Grit Removal - Replace In-kind

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Selective Demolition	1	LS	5%	$ 72,000
New Amwell chain and bucket equipn	3	EA	$405,000	$ 1,215,000
24"x66" 316SS slide gates with electri	3	EA	$34,088	$ 102,000
Concrete Surface Repair without Reb	100	SF	$546	$ 55,000
Concrete Surface Repair with Rebar	50	SF	$607	$ 30,000
Expansion joint repair	20	LF	$334	$ 7,000
Nonstructural Minor Crack Repair	100	LF	$212	$ 21,000
MOPO	1	LS	5%	$ 66,000
Electrical	1	LS	10%	$ 132,000
Instrumentation	1	LS	10%	$ 132,000
Miscellaneous Items	1	LS	10%	$ 132,000
			SUBTOTAL	**$ 1,970,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$ 591,000
GENERAL REQUIREMENTS AND O&P			**25%**	$ 493,000
CONSTRUCTION CONTIGENCY			**30%**	$ 591,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$ 529,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$ 4,170,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

South Plant - Grit Removal - Head Cells

Description	a	Unit	Unit Cost	2023 COST TOTAL
Selective Demolition	1	LS	5%	$ 66,000
48-inch combined influent pump discharge header	110	LF	$1,100	$ 121,000
Concrete	600	CY	$2,000	$ 1,200,000
Grout Fill	3	CY	$1,500	$ 5,000
Piles	800	LF	$200	$ 160,000
Head Cell Mechanical Equipment	2	EA	$704,600	$ 1,409,000
MOPO	1	LS	5%	$ 145,000
Bypass pumping	1	LS	$100,000	$ 100,000
Sheeting and Shoring	1	LS	$100,000	$ 100,000
Site Work/Piping	1	LS	20%	$ 579,000
Electrical	1	LS	15%	$ 434,000
Instrumentation	1	LS	12%	$ 347,000
Miscellaneous Items	1	LS	10%	$ 290,000
			SUBTOTAL	**$ 4,960,000**
			LEGAL, ADMINISTRATION, ENGINEERING **30%**	$ 1,488,000
			GENERAL REQUIREMENTS AND O&P **25%**	$ 1,240,000
			CONSTRUCTION CONTIGENCY **30%**	$ 1,488,000
			COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS **7.0%**	$ 1,330,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$ 10,510,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

South Plant - Grit Removal - Vortex

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	5%	$	116,000
30 MGD Vortex Grit Removal Mechanisms	2	EA	$166,016	$	332,000
Grit Pumps	2	EA	$50,625	$	101,000
Grit Washer Classifiers	2	EA	$177,876	$	356,000
PLC Main Control Panels	2	EA	$84,375	$	169,000
Concrete	600	CY	$2,000	$	1,200,000
Piles	800	LF	$200	$	160,000
MOPO	1	LS	10%	$	232,000
Bypass pumping	1	LS	$125,000	$	125,000
Site Work/Piping	1	LS	25%	$	580,000
Electrical	1	LS	15%	$	348,000
Instrumentation	1	LS	12%	$	278,000
Miscellaneous Items	1	LS	10%	$	232,000
			SUBTOTAL	**$**	**4,230,000**
			LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$ 1,269,000
			GENERAL REQUIREMENTS AND O&P	**25%**	$ 1,058,000
			CONSTRUCTION CONTIGENCY	**30%**	$ 1,269,000
			COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$ 1,134,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**8,960,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

South Plant - Primary Clarifiers - Replace In-kind

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	10%	$	274,000
Clarifier Equipment	4	EA	$427,700	$	1,711,000
15"x15" 316SS slide gates with electric actuators	16	EA	$27,950	$	447,000
Centrifugal Blowers	2	EA	$84,221	$	168,000
Air piping and coarse bubble diffusers	1	LS	$250,000	$	250,000
Effluent weirs	80	EA	$2,000	$	160,000
Concrete Surface Repair without Rebar	100	SF	$546	$	55,000
Concrete Surface Repair with Rebar	50	SF	$607	$	30,000
Expansion joint repair	50	LF	$334	$	17,000
Nonstructural Minor Crack Repair	100	LF	$212	$	21,000
Misc Metals	1	LS	10%	$	171,100
Electrical	1	LS	15%	$	386,000
Instrumentation	1	LS	12%	$	309,000
Miscellaneous Items	1	LS	5%	$	129,000
			SUBTOTAL	**$**	**3,860,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	1,158,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	965,000
CONSTRUCTION CONTIGENCY			**30%**	$	1,158,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	1,035,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**8,180,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

South Plant - Process Aeration - New Blowers and Diffusers

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	2%	$	59,040
Turbo Blowers	3	EA	$483,440	$	1,450,000
Ceramic Disc Diffusers	1	LS	$736,999	$	737,000
Air piping and valves	1	LS	$200,000	$	200,000
48"x48" influent gates with electric actuators	4	EA	$37,800	$	151,000
36"x36" influent gates with electric actuators	10	EA	$34,088	$	341,000
36"x36" step-feed gates with electric actuators	8	EA	$34,088	$	273,000
Automated Valves for DO Control	13	EA	$30,000	$	390,000
Concrete Surface Repair without Rebar	100	SF	$546	$	55,000
Concrete Surface Repair with Rebar	50	SF	$607	$	30,000
Expansion joint repair	100	LF	$334	$	33,000
Nonstructural Minor Crack Repair	100	LF	$212	$	21,000
Bypass pumping	6	EA	$61,000	$	366,000
Electrical	1	LS	5%	$	158,000
Instrumentation	1	LS	7%	$	221,000
Miscellaneous Items	1	LS	5%	$	158,000
			SUBTOTAL	**$**	**4,650,000**
			LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$ 1,395,000
			GENERAL REQUIREMENTS AND O&P	**25%**	$ 1,163,000
			CONSTRUCTION CONTIGENCY	**30%**	$ 1,395,000
			COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$ 1,247,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**9,850,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

South Plant - Secondary Clarifiers - Replacement with Spiral Scraper Type Equipment

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective Demolition	1	LS	5%	$	237,400
Clarifier equipment	4	EA	$631,125	$	2,525,000
Stainless steel weirs and baffles	4	EA	$339,188	$	1,357,000
Secondary clarifier influent channel blowers	3	EA	$98,381	$	295,000
Air piping and coarse bubble diffusers	1	LS	$200,000	$	200,000
30"x30" influent gates with electric actuators	4	EA	$32,738	$	131,000
24"x24" effluent gates with electric actuators	4	EA	$31,050	$	124,000
16"x16" RAS chamber gates with electric actuators	4	EA	$29,025	$	116,000
Concrete Surface Repair without Rebar	100	SF	$546	$	55,000
Concrete Surface Repair with Rebar	50	SF	$607	$	30,000
Expansion joint repair	100	LF	$334	$	33,000
Nonstructural Minor Crack Repair	100	LF	$212	$	21,000
MOPO	1	LS	5%	$	237,400
Bypass pumping	6	EA	$61,000	$	366,000
Electrical	1	LS	5%	$	237,000
Instrumentation	1	LS	3%	$	142,000
			SUBTOTAL	**$**	**6,110,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	1,833,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	1,528,000
CONSTRUCTION CONTIGENCY			**30%**	$	1,833,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	1,638,000
OPINION OF PROBABLE CONSTRUCTION COST		**Point Estimate**		**$**	**12,940,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

South Plant - Plant Water Pumps - Replace In-kind

Description	Qty	Unit	Unit Cost		2023 COST TOTAL
Selective demolition	1	LS	10%	$	49,900
Main PW Pumps	3	EA	$86,400	$	259,000
Auxilliary PW Pumps	2	EA	$28,890	$	58,000
Strainer	1	EA	$79,650	$	80,000
Piping and valves - main PW pumps	3	EA	$20,996	$	63,000
Piping and valves - auxiliary PW pum	2	EA	$18,244	$	36,000
Concrete pads	2	CY	$1,500	$	3,000
Electrical	1	LS	30%	$	150,000
Instrumentation	1	LS	18%	$	90,000
			SUBTOTAL	**$**	**790,000**
LEGAL, ADMINISTRATION, ENGINEERING			**30%**	$	237,000
GENERAL REQUIREMENTS AND O&P			**25%**	$	198,000
CONSTRUCTION CONTIGENCY			**30%**	$	237,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS			**7.0%**	$	212,000
OPINION OF PROBABLE CONSTRUCTION COST	**Point Estimate**			**$**	**1,670,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost
Albany County Water Purification District Capital Improvement Plan

South Plant - Upgrade SCADA System

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
SP Construction Hardware and Softw	1	LS	$1,161,314	$ 1,161,000
SP SCADA Software Configuration	1	LS	$445,891	$ 446,000
SP Electrical (Including Duct Bank)	2500	IF	$580	$ 1,450,000

	SUBTOTAL	**$**	**3,060,000**
LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$	918,000
GENERAL REQUIREMENTS AND O&P	**25%**	$	765,000
CONSTRUCTION CONTIGENCY	**30%**	$	918,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$	821,000
OPINION OF PROBABLE CONSTRUCTION COST Point Estimate		**$**	**6,480,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.

2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.

3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Opinion of Probable Construction Cost

Albany County Water Purification District Capital Improvement Plan

South Plant - High Voltage Electric Upgrade

Description	Qty	Unit	Unit Cost	2023 COST TOTAL
Conduct short circuit, coordination, load flow, and arc flash hazard analysis	1	EA	$25,000	$ 25,000
Demolition/Temporary Power	1	LS	$200,000	$ 200,000
15kV disconnect switches - Main Substatior	2	EA	$150,000	$ 300,000
15kV switchgear - Main Substation	1	EA	$1,250,000	$ 1,250,000
Cast coil style transformers - Unit Substatio	6	EA	$250,000	$ 1,500,000
Unit substation switches	10	EA	$75,000	$ 750,000
Site work	1	LS	5%	$ 201,250

	SUBTOTAL	**$**	**4,230,000**
LEGAL, ADMINISTRATION, ENGINEERING	**30%**	$	1,269,000
GENERAL REQUIREMENTS AND O&P	**25%**	$	1,058,000
CONSTRUCTION CONTIGENCY	**20%**	$	846,000
COST ESCALATION FACTOR PER YEAR TO 2025 DOLLARS	**7.0%**	$	1,073,000
OPINION OF PROBABLE CONSTRUCTION COST Point Estimate		**$**	**8,480,000**

The following assumptions and references were used to develop the opinion of probable construction cost:

1. All unit costs are in 2023 dollars. Equipment installation is estimated at 35% of equipment cost (unless included in cost provided by manufacturer) and included in the unit cost.
2. All items are rounded to the nearest $1,000. All subtotals rounded to nearest $10,000.
3. Site work/piping, electrical and instrumentation cost percentages based on past project experience.

Appendix H

Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: Capital Improvements Plan Engineering Report

Date of Report: May 2023

Professional Engineer's Name: Robert E. Ostapczuk, PE - NY 078979-1

Signature: 

Date: May 30th, 2023

Appendix I

Smart Growth Assessment Form

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by an authorized representative of the applicant, preferably the project engineer or other design professional.[1]

Section 1 – General Applicant and Project Information

Applicant: Albany County Water Purification District Project No.:

Project Name: Capital Improvements Plan Engineering Report - North & South Plants

Is project construction complete? ☐ Yes, date: ☑ No

Please provide a brief project summary in plain language including the location of the area the project serves:

This project include upgrades for the existing liquid stream treatment processes at the North Plant and South Plant, including mechanical screening (North Plant only), influent pumping, grit removal, primary clarification, process aeration, secondary clarification, and plant water pumping. This project also include upgrades to the SCADA systems and high voltage electric distribution at each plant.

Section 2 – Screening Questions

A. Prior Approvals

1. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☐ Yes ☑ No
2. If yes to A(1), what is the project number(s) for the prior approval(s)? Project No.:
3. If yes to A(1), is the scope of the previously-approved project substantially the same as the current project? ☐ Yes ☐ No

If your responses to A(1) and A(3) are both yes, please proceed to Section 5, Signature.

B. New or Expanded Infrastructure

1. Does the project involve the construction or reconstruction of new or expanded infrastructure? ☐ Yes ☑ No

Examples of new or expanded infrastructure include, but are not limited to:

(i) The addition of new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant where none existed previously;

(ii) An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing wastewater treatment system; and OR

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

(iii) An increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant.

If your response to B(1) is no, please proceed to Section 5, Signature.

Section 3 –Smart Growth Criteria

Your project must be consistent will all relevant Smart Growth criteria. For each question below please provide a response and explanation.

1. Does the project use, maintain, or improve existing infrastructure?
   ☐ Yes ☐ No

   Explain your response:

2. Is the project located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center, as such terms are defined herein (please select one response)?

   ☐ Yes, my project is located in a municipal center, which is an area of concentrated and mixed land uses that serves as a center for various activities, including but not limited to: central business districts, main streets, downtown areas, brownfield opportunity areas (see *www.dos.ny.gov* for more information), downtown areas of local waterfront revitalization program areas (see *www.dos.ny.gov* for more information), areas of transit-oriented development, environmental justice areas (see *www.dec.ny.gov/public/899.html* for more information), and hardship areas (projects that primarily serve census tracts or block numbering areas with a poverty rate of at least twenty percent according to the latest census data).

   ☐ Yes, my project is located in an area adjacent to a municipal center which has clearly defined borders, is designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibits strong land use, transportation, infrastructure, and economic connections to an existing municipal center.

   ☐ Yes, my project is located in an area designated as a future municipal center in a municipal or comprehensive plan and is appropriately zoned in a municipal zoning ordinance

   ☐ No, my project is not located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center.

   Explain your response and reference any applicable plans:

3. Is the project located in a developed area or an area designated for concentrated infill development in a municipally-approved comprehensive land use plan, local waterfront revitalization plan, and/or brownfield opportunity area plan?

   ☐Yes ☐No

   Explain your response and reference any applicable plans:

4. Does the project protect, preserve, and enhance the State's resources, including surface and groundwater, agricultural land, forests, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources?

   ☐Yes ☐No

   Explain your response:

5. Does the project foster mixed land uses and compact development, downtown revitalization, brownfield redevelopment, the enhancement of beauty in public spaces, the diversity and affordability of housing in proximity to places of employment, recreation and commercial development, and the integration of all income and age groups?

   ☐Yes ☐No

   Explain your response:

6. Does the project provide mobility through transportation choices including improved public transportation and reduced automobile dependency?

   ☐Yes ☐No ☐N/A

   Explain your response:

7. Does the project involve coordination between State and local government, intermunicipal planning, or regional planning?

   ☐Yes ☐No

   Explain your response and reference any applicable plans:

8. Does the project involve community-based planning and collaboration?

   ☐Yes ☐No

   Explain your response and reference any applicable plans:

9. Does the project support predictability in building and land use codes?

   ☐Yes ☐No ☐N/A

   Explain your response:

10. Does the project promote sustainability by adopting measures such as green infrastructure techniques, decentralized infrastructure techniques, or energy efficiency measures?

    ☐Yes ☐No

    Explain your response and reference any applicable plans:

11. Does the project mitigate future physical climate risk due to sea-level rise, storm surges, and/or flooding, based on available data predicting the likelihood of future extreme weather events, including hazard risk analysis data, if applicable?

    ☐Yes ☐No

    Explain your response and reference any applicable plans:

Section 4 – Miscellaneous

1. Is the project expressly required by a court or administrative consent order? ☐ Yes ☐ No

   If yes, and you have not previously provided the applicable order to EFC/DOH, please submit it with this form.

Section 5 – Signature

By signing below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: Albany County Water Purification District	Phone Number: 518-447-1611
Name and Title of Signatory: Robert Ostapczuk, PE - Arcadis of New York, Inc.	
Signature: 	Date: 6/16/2023