ROCKAWAY VALLEY REGIONAL SEWERAGE AUTHORITY

MORRIS COUNTY, NEW JERSEY

ENGINEER'S FIVE YEAR PLANNING REPORT

PREPARED BY:
KLEINFELDER

MARCH 2023

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EXECUTIVE SUMMARY

The 2023 Five Year Planning Report has been prepared in accordance with Article II, Section 202 of the Service Contract between the Rockaway Valley Regional Sewerage Authority (RVRSA) and its member municipalities dated July 1, 1976. The last Five Year Planning Report was prepared in 2018. This report presents a summary of the following:

- RVRSA's history
- Wastewater Management Planning status
- Current and future NJPDES Permit effluent limits
- Capacity Assurance Program status
- Plant Performance
- Recommendations from the last inspection report
- Major projects performed during the last 5 year period
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Wastewater Management Planning

On November 7, 2016, NJDEP adopted new regulations governing WQMPs and WMPs. These newly adopted regulations modified significant procedural requirements for WMPs. The NJDEP also adopted amendments to the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, and the Highlands Water Protection and Planning Act Rules, N.J.A.C. 7:38. Particularly, N.J.A.C. 7:14A-4.3 of the NJPDES rules, and N.J.A.C. 7:38-1.1(k) of the Highlands Water Protection and Planning Act Rules, were amended to ensure that they remain consistent with the new WQMP rules.

The current NJDEP approved sewer service map showing the currently applicable wastewater service areas for RVRSA is presented in Figure 3. The entire Morris County WMP remains a work in progress; however, the following municipal chapters have been adopted over the last decade (Chatham Township – Adopted January 30, 2014; Jefferson Township – Adopted June 30, 2015; Mine Hill Township – Adopted October 1, 2020; Washington Township - Adopted July 24, 2012; and Florham Park Borough - Adopted February 23, 2012).

In 2020, Morris County in cooperation with the Highlands Council updated its buildout flows to RVRSA. At that time, the total projected buildout flow for the RVRSA sewer service area was 14.344 mgd. The county continues to work on finalizing its WMP, so an adopted total buildout flow is not currently available. However, site specific amendments continue to be processed as the full WMP is prepared. As recently as July 22, 2022, a site-specific WMP amendment was adopted for Mine Hill Township granting a projected wastewater flow of 0.085 mgd to be received by RVRSA.

It is anticipated that as future court mandated and other affordable housing developments, as well as non-affordable housing developments and other projects progress through planning, design, and approval stages, that the current projected flow for RVRSA of 14.3 mgd will be increased. In

this regard, RVRSA's current NJPDES permit provides separate sets of effluent limits at flows of 12 mgd and 15 mgd. It is noted that Kleinfelder's 2018 Facility Planning Study was based on a future flow of 14.3 mgd.

Current and Future Effluent Limits

RVRSA is currently operating under a NJPDES permit that became effective on October 1, 2019 and expires on September 30, 2024. This permit provides separate sets of effluent limits at flows of 12 mgd and 15 mgd. RVRSA adjudicated the 2019 permit, disputing effluent limitations for dissolved oxygen and ammonia nitrogen at the future flow of 15 mgd that were not consistent with the limitations that were approved by NJDEP within the anti-degradation study performed by Kleinfelder. The adjudication of this permit remains pending. The effluent limits at 12 mgd and 15 mgd are listed in Tables 1 and 2, respectively in Section 4.0 of this report.

Capacity Assurance Program

The Capacity Assurance regulations (N.J.A.C. 7:14A-22.16) state, "If the average flow over 12 consecutive months, as reported in DMRs by the permittee of a treatment plant, reaches or exceeds 95 percent of the permitted flow of that treatment plant, the permittee, in coordination with participating municipalities and sewerage authorities, shall… conduct a capacity analysis… and submit a capacity analysis report within 180 days..."

RVRSA's most recent annual average flow was 9.141 mgd, which is 76% of the 12 mgd permitted flow. Therefore, RVRSA is currently well below the 95% threshold, and is not required to submit a capacity analysis report at this time.

However, it is noted that during the prolonged wet period of 2018 through mid-2019, the 12 month average flow reached 10.762 mgd, which is only 0.6 mgd less than the 11.4 mgd threshold flow corresponding to, 95% of 12 mgd. Therefore, prolonged wet periods increase the risk of triggering capacity assurance requirements.

Industrial Pretreatment Program

The RVRSA is a delegated local agency of the NJDEP and administers an Industrial Pretreatment Program (IPP) within the service area of the authority. Through this program, permits are issued to users of the system that discharge significant quantities of non-domestic wastewater. Kleinfelder updated the local limits for the IPP program in 2017. As IPP permits were renewed, the new local limits have been incorporated into the permits. There is a total of fifteen (15) permitted industrial users under the IPP program.

The total yearly average flow for all permitted industrial users was 729,368 gpd based on the monthly averages, or approximately 8.2 percent of total average plant flow during 2021.

Industrial users pay surcharges to the RVRSA for the treatment of their high strength wastewater to cover the additional costs of treatment and sludge disposal.

Upon renewal of each IPP permit, RVRSA reviews the capacity requirements of the discharger and reduces the permitted discharge capacity to that which can be justified. Permitted industrial

users who decide to keep their gallonage are charged annually as necessary per the unused capacity charge requirement.

It is also noted that RVRSA has requested that several industrial users sample for PFAS compounds and that RVRSA has also been sampling WWTP influent and effluent for PFAS compounds. The reason for this is that NJDEP has indicated that in the future a surface water quality standard may be established for PFAS compounds, and if this occurs, effluent limits for PFAS compounds may follow if RVRSA effluent is found to have a reasonable potential to cause the surface water quality standard to be exceeded.

Plant Performance

RVRSA reliably complied with its key effluent limitations during the most recent two year period from January 2021 through December 2022.

It is also significant to note that because of RVRSA's approach to control of its biological treatment process, nitrate-nitrogen is removed to consistently low levels despite not having a mandate from NJDEP to remove nitrate-nitrogen. This is a win-win situation as it improves water quality while at the same time reducing energy costs and alkalinity consumption, thereby precluding the need and cost to add an external source of alkalinity.

RVRSA's rotary drum thickening system is producing a thickened sludge concentration averaging approximately 5.4% solids, which is a significant improvement over the average 4.4% solids concentration produced by the original gravity belt thickeners. This significant increase in performance results in approximately a 23% reduction in sludge disposal costs.

Annual Inspection Recommendations

The recommended actions for the wastewater treatment plant, meter chambers and siphon chambers are summarized in Tables 9, 10 and 11, in Section 7.0 of this report.

Major Projects Performed During the Last 5 Year Period

The Major Projects performed over the last five (5) years are listed in the table below.

Contract	Project	Construction Cost	Current Status
Contract 38 & 39	Construction of Monroe Street and Harrison Ave pump stations to replace section of the interceptor destroyed by Hurricane Irene, and repairs to a portion of the Jersey City Trunk Sewer	$5.2 million	Construction completed in 2018 and in operation. Received $4.8M from FEMA in 2018.
Contract 40	Upgrades to the Final Clarifiers	$ 5.65 million	Construction completed in 2021

Contract	Project	Construction Cost	Current Status
Contract 41	Construction of new effluent filtration facility, chemical storage tanks and pumps for chemical addition to remove phosphorus, a new ammonia feed system to prevent formation of disinfection byproducts and replacement of piping between the final clarifiers through the flow meter chamber to the chlorine contact tanks including new meter chamber isolation valve	$ 11.06 million	Currently in construction. Expect construction completion in 2023
Contract 42	Emergency repair of a portion of the 54-inch interceptor at West Main Street in Boonton	$2.06 million	Completed in 2018
Contract 43	Rehabilitation of the Canal Side Park Siphon Inlet Chamber, replacement of the Siphon Outlet Chamber at Pocket Park, and replacement of the 48-inch interceptor (104 LF) at Washington Street.	$ 4.26 million (estimated)	Design completed. Bidding anticipated in 2023
Contract 44	Replacement of the WWTP emergency generators and related switchgear	$10.6 million estimated	Currently in final design. Bidding anticipated in 2023

Expansion-Related Activities

An expansion in permitted capacity can be achieved either by re-rating the capacity of existing facilities or by physically expanding the capacity of the existing facilities via the construction of improvements. To formally assess whether RVRSA's WWTP could be re-rated to a capacity greater than 12 mgd, RVRSA engaged Kleinfelder to perform a comprehensive facility planning study for the objective of which was to develop a specific plan for near term and long term improvements to address current and future needs, including capacity expansion, compliance with the new effluent limitation for total phosphorus (TP), and aging infrastructure. Both short term and long term planning was needed to ensure that future improvements be identified now so that near term improvements are implemented in a manner that is compatible with future improvements.

Regarding the issue of capacity expansion via re-rating, the detailed hydraulic and process capacity assessments performed as part of Facility Plan development resulted in the conclusion that the following plant components do not have adequate capacity to support a re-rating to a permitted capacity greater than 12 mgd: final clarifiers, and chlorine contact tanks. Therefore, it will not be possible to expand the WWTP capacity above 12 mgd without increasing the capacity of these plant components.

Kleinfelder's analysis was based on an anti-degradation assessment of the effluent limitations that would likely be required at a future flow of 14.3 mgd which was based on the County's draft

build-out analysis at the time the study was initiated. Consistent with NJDEP's subsequent issuance of effluent limits for a future flow of 15 mgd, it is likely that the future flow could be greater than 14.3 mgd.

Therefore, before proceeding with design of improvements to expand capacity of the final clarifiers and chlorine contact tank, it is recommended that the Facility Plan be updated based on a future flow of 15 mgd and the effluent limitations established by NJDEP for a future flow of 15 mgd.

In summary, the following expansion-related activity should occur within the next 5 year period: Update the Facility Plan Report based on a future flow of 15 mgd and the effluent limits established by NJDEP for a future flow of 15 mgd.

Recommended Major Projects for the Next 5 Year Period

The recommended major projects for the next 5 year period and their estimated costs are presented in the table below.

Project	Description	Budgetary Construction Cost	Funding Source
Contract 43	Rehabilitation of the Canal Side Park Siphon Inlet Chamber, replacement of the Siphon Outlet Chamber at Pocket Park, and replacement of the 48-inch interceptor (104 LF) at Washington Street. Bidding anticipated in 2023.	$4.3 million	NJEIFP loan
Contract 44	Replacement of the existing generators and related switchgear at the WWTP. Currently in final design with bidding anticipated in 2023.	$10.6 million	NJEIFP loan
Contract 45	Replacement of the Main Substation at the WWTP	$6.9 million	NJEIFP loan to be sought
Contract 46	Replacement of Unit Substations at the WWTP	$6.9 million	NJEIFP loan to be sought
Contract 47	Relining or relocating the Jersey City Trunkline	TBD	TBD
Contract 48	Renovation of the old Administration Building	$4.0 million	TBD
Contract 49	• Replacement of valves at the return activated sludge system and related piping modifications • Oxidation Channels improvements • Control Building elevator repairs • Backflow preventer for the city water system	TBD	TBD
50	Lining of the Boonton Siphons from Canal Side Park to Pocket Park, and from the STP Siphon – Inlet Chamber to the Preliminary Treatment Building	$3.4 million	TBD

In addition to the projects listed above, it is recommended that RVRSA continue its efforts to implement a comprehensive Geographical Information System (GIS) based Asset Management Program integrated with a work order system to provide a comprehensive inventory of all RVRSA assets and a structured system to implement repairs, rehabilitations and replacement in a manner that achieves RVRSA's level of service goals while minimizing life cycle costs.

1.0 INTRODUCTION

The 2023 Five Year Planning Report has been prepared in accordance with Article II, Section 202 of the Service Contract between the Rockaway Valley Regional Sewerage Authority (RVRSA) and its member municipalities dated July 1, 1976, which states the following:

> "*The Authority may at any time and at its discretion alter, improve, enlarge and extend the System in any respect or renew or replace any part thereof and issue Bonds to finance such work; provided, however, that on or before the fifth anniversary of the date on which the System or any part thereof shall be placed in operation, and on or before the expiration of each five-year period thereafter, the Consulting Engineer shall prepare and submit to the Authority a report concerning the necessity for enlargement or extension within the next succeeding five-year period."*

The last Five Year Planning Report was prepared by Kleinfelder and was submitted to the RVRSA in December 2018.

For the benefit of new RVRSA Board Members, this report begins with an overview of RVRSA's history and the construction of its facilities.

2.0 RVRSA HISTORY

The RVRSA was formed in 1971 as the result of a Stipulation of Settlement dated July 30, 1971 between Jersey City and the Town of Dover, Town of Boonton, Township of Boonton, Borough of Rockaway, Township of Rockaway, Township of Denville, Township of Randolph, Borough of Victory Gardens and Wharton Sewerage Authority. The Settlement Agreement required RVRSA to assume ownership of and operate an existing wastewater treatment plant ("WWTP") located in the Township of Parsippany-Troy Hills, and the associated Jersey City Trunk Sewer, both of which were previously owned by Jersey City. The Settlement Agreement also required RVRSA to "construct an interceptor sewer for the collection of sewage and shall construct and/or acquire and/or enlarge a new sewage treatment facility...".

In 1972, RVRSA initiated facilities planning for a new WWTP to be constructed at the site of the existing WWTP acquired in 1971, and for a new interceptor system to convey wastewater flow from the municipalities to be served by the RVRSA, starting in Wharton, to the new WWTP. During the facilities planning process, the RVRSA project was divided into distinct components: the new regional interceptor sewer, the branch interceptors which connect the regional interceptor to the existing municipal wastewater collection systems, and the new WWTP.

Preparation of the final Facilities Plan was completed in 1977. In June 1976, RVRSA received a combined federal grant for design and construction of the interceptor system. Construction of the 14.7 mile long regional interceptor, which was designed for an ultimate average daily flow of 21 mgd, was completed in 1985. The alignment of the interceptor generally follows the Rockaway River, and for approximately 40% of its length is situated in the bed of the abandoned Morris Canal. The main interceptor ranges in diameter from 24-inches to 60-inches, includes four (4) siphons, and was originally designed to convey flow entirely by gravity, i.e. without pumping.
Construction of the branch interceptors was completed in 1987. A total of four (4) branch interceptors were constructed: (1) Jackson Brook Branch Interceptor, (2) Mill Brook Branch Interceptor, (3) Oak Street Branch Interceptor, and (4) Green Pond Brook Branch Interceptor.

A total of twenty-three (23) meter chambers were also constructed to enable metering of flow for billing purposes.

In July 1980, RVRSA received a federal grant for design of the new WWTP. The facilities designed were those recommended in the 1981 *New Wastewater Treatment Facilities Basis of Design* report prepared by Elson T. Killam Associates, Inc., which included primary and secondary treatment, sludge thickening and anaerobic digestion, and provisions for the possible future addition of effluent filtration and denitrification facilities. Following RVRSA's 1981 application for a construction grant to fund the project, and due to a reduction in available federal funds, the New Jersey Department of Environmental Protection (NJDEP) required that the project be divided into two (2) segments and that the design capacity of the facility be reduced from 24 mgd to 12 mgd. Under this arrangement, the primary treatment and solids handling facilities were deferred to a second segment to be constructed at a later date, and the effluent filtration and denitrification facilities remained as possible future additions to the WWTP.

Funding for the Segment 1 facilities was subsequently received, construction was completed, and the new treatment facilities were placed into operation with a design capacity of 12 mgd in September of 1985. The Segment 1 wastewater treatment facilities consisted of a Preliminary Treatment Building housing influent screens and aerated grit chambers, oxidation channels, final clarifiers, chlorine contact tanks, two dechlorination tanks, cascade aeration steps, and a Control Building.

Since construction of the new solids handling facilities was deferred to Segment 2, the Segment 1 wastewater treatment facilities were operated with the existing sludge facilities acquired through the 1971 Settlement Agreement, which consisted of primary settling tanks serving as gravity thickeners, a single dissolved air flotation thickener (DAF), and a vacuum filter for dewatering.

Updated facilities planning for the Segment 2 solids handling facilities was initiated in 1982 with the aid of a federal grant. Planning was completed in 1984 and the resulting recommendations for RVRSA's long term Sludge Management Strategy consisted of sludge thickening, sludge dewatering, in-vessel composting and off-site contract disposal of compost. A 1986 revision of the Sludge Management Strategy recommended the use of two (2) new DAF units and construction of sludge storage tanks to provide sludge thickening for either short term sludge disposal at the Township of Wayne incinerator or the long term recommendation of sludge dewatering and in-vessel composting.

Based on subsequent successful pilot testing in 1987 of a then new thickening device – a gravity belt thickener (GBT) – the Sludge Management Strategy was modified to substitute GBTs for the previously recommended DAFs. On September 20, 1988, RVRSA received a federal grant for construction of the new sludge thickening facilities, bids were received February 17, 1989 and construction was completed in 1990. The design capacity of the Segment 2 sludge thickening facilities was 12 mgd.

In June 2006, a Biosolids Management Study was completed by Rothberg, Tamburini and Winsor which presented an updated evaluation of long term sludge management alternatives, since nearly 20 years had passed since RVRSA's long term Sludge Management Strategy had been developed recommending sludge thickening followed by sludge dewatering and in-vessel composting.

The report presented the evaluation of ten (10) biosolids management alternatives to provide sufficient capacity for current and future sludge production resulting from the treatment of current and future wastewater flows as well as the additional sludge produced from the future requirement to remove phosphorus. The recommended alternative consisted of thickening, dewatering, lime stabilization and landfill disposal.

Improvements to implement the recommended alternative were subsequently designed by Rothberg, Tamburini and Winsor, and bids were received in November 2007. However, the bids significantly exceeded the engineer's estimate resulting in all bids being rejected as adequate funds were not available.

In order to identify modifications to reduce cost, a follow up study was performed as presented in the 2008 Biosolids Facilities Evaluation Report prepared by Hatch Mott MacDonald (HMM). The 2008 Biosolids Facilities Evaluation Report recommended that:

- Construction of dewatering and lime stabilization facilities be delayed,
- Improved thickening facilities with sufficient capacity for current and future sludge production be designed and constructed based on the use of rotating drum thickeners,
- The air mixing system in the sludge storage tanks be replaced with pump driven mixing systems to reduce the volume of air requiring odor control,
- The truck loading facility be enclosed for improved odor control, and
- The installation of a new odor control system to replace the ineffective existing system.

The recommended improvements were designed by HMM in 2009, a construction contract (Contract 37) was awarded in 2010 and the improvements were placed into operation in 2012.

Following the washout of a portion of the interceptor system caused by Hurricane Irene in 2011, an evaluation of alternatives found that construction of a new 3.0 mgd pumping station was a lower cost alternative than replacing the washed-out portion of the interceptor with a new interceptor pipe. As a result, RVRSA's conveyance system now includes a 3.0 mgd pumping station, i.e., the Monroe Avenue Pumping Station which was placed into service in 2018.

A plant schematic is presented in Figure 1 on the following page. An aerial site plan showing the corresponding physical location of each existing major plant component is presented on Figure 2.

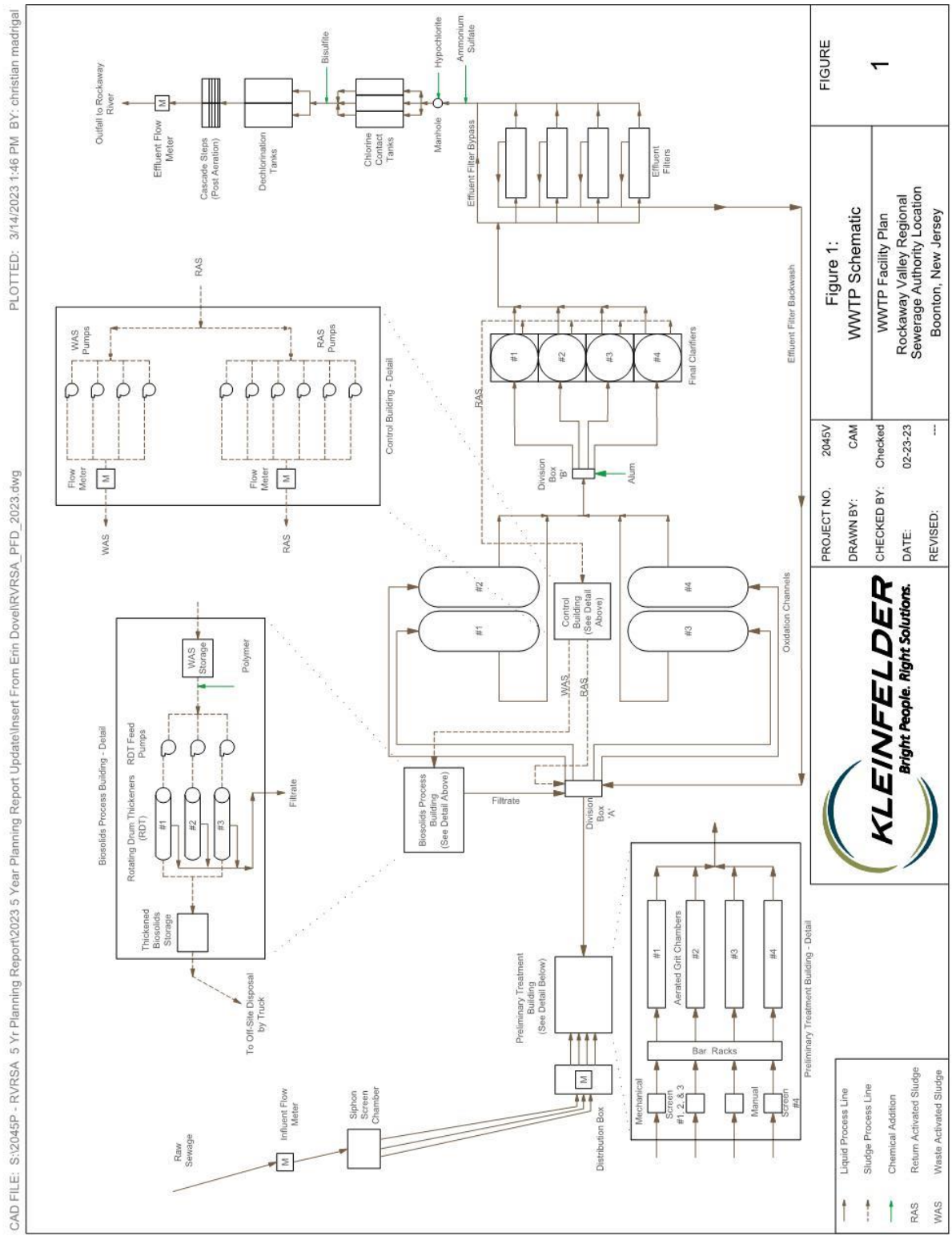
Figure 1:
WWTP Schematic
WWTP Facility Plan
Rockaway Valley Regional
Sewerage Authority Location
Boonton, New Jersey
FIGURE
1
PROJECT NO. 2045V
DRAWN BY: CAM
CHECKED BY: Checked
DATE: 02-23-23
REVISED: ---
KLEINFELDER
Bright People. Right Solutions.
Outfall to Rockaway River
Effluent Flow Meter
Cascade Steps (Post Aeration)
Dechlorination Tanks
Bisulfite
Chlorine Contact Tanks
Hypochlorite
Ammonium Sulfate
Manhole
Effluent Filter Bypass
Effluent Filters
Effluent Filter Backwash
Final Clarifiers
#1
#2
#3
#4
RAS
WAS
Control Building - Detail
WAS Pumps
RAS Pumps
Flow Meter
Division Box 'B'
Alum
Control Building (See Detail Above)
Oxidation Channels
Biosolids Process Building - Detail
Rotating Drum Thickeners (RDT)
RDT Feed Pumps
WAS Storage
Polymer
Filtrate
Thickened Biosolids Storage
To Off-Site Disposal by Truck
Biosolids Process Building (See Detail Above)
Division Box 'A'
Preliminary Treatment Building (See Detail Below)
Preliminary Treatment Building - Detail
Aerated Grit Chambers
Bar Racks
Mechanical Screen #1, 2, & 3
Manual
Screen #4
Distribution Box
Siphon Screen Chamber
Influent Flow Meter
Raw Sewage
Liquid Process Line
Sludge Process Line
Chemical Addition
Return Activated Sludge
Waste Activated Sludge
CAD FILE: S:\2045P - RVRSA 5 Yr Planning Report\2023 5 Year Planning Report Update\Insert From Erin Dovel\RVRSA_PFD_2023.dwg
PLOTTED: 3/14/2023 1:46 PM BY: christian madrigal


FIGURE 2:
AERIAL SITE PLAN
WWTP Facility Plan
Rockaway Valley Regional
Sewerage Authority
Boonton, New Jersey
Rockaway River
A = Preliminary Treatment Facilities
B = Distribution Box
C = Administration Building
D = Main Substation
E = Siphon Cleanout Chamber
F = Division Box "A"
G = Division Box "B"
H = Biosolids Process Building
I = Oxidation Channels
J = Maintenance Building
K = Storage Facilities
L = Outfall to Rockaway River
M = Chlorine Contact/ Post Aeration
N = Final Clarifiers
O = Chemical Building
P = Unit Substation No.1
Q = Unit Substation No.2
R = Control Building
S = Effluent Filters
2022 Bing Aerial Imagery
PROJECT NO.: 2045
DRAWN: February 2023
DRAWN BY: ELD
CHECKED BY: TDB
FILE NAME: RVRSA_Fac Plan
0
175
350
Feet
KLEINFELDER
Bright People. Right Solutions.
150 College Road West, Suite 100, Princeton, NJ 08540
Tel: 609-924-8821 www.kleinfelder.com
Greenbank Road
Rockaway River
Boonton Reservoir
bing
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The fundamental purpose of RVRSA's facilities is to protect public health and water quality while providing wastewater conveyance and treatment services to the residents, commercial establishments and industries within its sewer service area. The sewer service area of the RVRSA is established through NJDEP's wastewater management planning rules as further described in the next section of this report.

3.0 WASTEWATER MANAGEMENT PLANNING

3.1 Regulations

The New Jersey Department of Environmental Protection (NJDEP) administers the Statewide Water Quality Management (WQM) Planning rules (N.J.A.C. 7:15) in conjunction with the Statewide WQM Plan, which together constitute the Continuing Planning Process conducted pursuant to the Water Quality Planning Act, the Water Pollution Control Act, and the federal Clean Water Act (CWA). The primary purpose of the WQM Planning Program is to establish policies, procedures, and standards which, wherever attainable, help to restore, enhance and maintain the chemical, physical and biological integrity of the waters of the State, including ground waters, and the public trust therein, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water.

In accordance with the state WQM Planning Act and federal CWA Section 208, the State designated twelve area-wide WQM Planning Areas in New Jersey. The area-wide WQM plans (formerly known as 208 plans), as part of the Statewide WQM Plan, are umbrella plans, each with various adopted components that address different aspects of water resource planning.

One of the critical components of each area wide WQMP is Wastewater Management Plans (WMPs). The intended purpose of the WMPs is to project future development, estimate the wastewater management needs associated with that development, and specify the preferred wastewater treatment alternative for all areas of the State. These plans also provide the vehicle to ensure that sewer service is not extended into environmentally sensitive areas. WMPs also identify public water supply service areas of water purveyors and identify the water supply needs associated with proposed development. Lastly, because WMPs project future land use and shape the pattern and density of development through the wastewater management alternatives selected within given areas, these plans are instrumental in quantifying existing and future nonpoint source pollution loads and in implementing best management practices to reduce those pollutant loads.

WQMPs must be updated periodically by WMPs to reflect and respond to changes in municipal zoning, State and regional planning activities, and regulatory standards, and to ensure that the most up to date information is fully incorporated into decisions concerning wastewater management choices. To accomplish these continuing planning process objectives, WMPs are not static, but are intended to be updated every six years. Procedures for the modification of water quality management plans, either through amendment or revision are specified in the WQM Planning rules.

WMPs are especially important because of their impact on NJDEP-regulated activities, such as land use permitting. According to the WQM Planning Act and the WQM Planning rule, NJDEP shall not undertake, or authorize through the issuance of a permit, any project or activity that

affects water quality and conflicts with the applicable sections of adopted WQM Plans or the Statewide WQM Planning rules. The rules establish a mechanism for the determination of consistency between proposed projects or activities requiring departmentally issued permits and the WQM Plans.

3.2 Current Status and Sewer Service Area

From the perspective of a wastewater utility such as RVRSA, the WMP is important for two (2) reasons. First, the future sewer service area map defines what areas, when developed, will be served by each wastewater utility. Areas outside of any wastewater service area, if developed, will be served by septic systems. Second, the "planning flow" is specified in the WMP through an analysis of the projected future wastewater flow under build-out conditions. The permitted flow of any wastewater facility may not be higher than the planning flow designated in the applicable WMP.

The RVRSA Wastewater Management Plan was originally submitted in March 1991. Amendments and updates to the Plan were subsequently submitted in April 1992, March 1995, May 1996, January 1997, March 1997, June 1997, October 1997, August 1999, February 2001, and February 2006 (not approved). In 2008, the WQM Planning rules were readopted with significant amendments, making counties the responsible WMP agencies. Accordingly, Morris County submitted a draft County-wide WMP in December 2009 for all areas in Morris County except those municipalities conforming to the Highlands Planning Area (i.e., "conforming" municipalities), which are working with the Highlands Council to develop their WMP chapters. NJDEP has not yet acted on this draft submittal. The three (3) "conforming" municipalities in the RVRSA Sewer Service Area are the Townships of Randolph and Rockaway, and the Borough of Wharton.

In 2010, NJDEP issued Administrative Order 2010-03 which, among other directives, extended the deadline for all WMP agencies to submit a WMP, directed the Department to hold public meetings to discuss the draft sewer service areas being developed, and to respond to public inquiries regarding the draft sewer service areas. In 2012, P.L. 2011, c.203 was enacted which modified the WQM Planning program. Most importantly, it allows WMP agencies to bifurcate the submittal of their WMP by requiring that at least that portion of a WMP designating sewer service areas (compliant with the Department's regulatory criteria) be submitted within 180 days of enactment. In other words, the sewer service area maps could be submitted and approved separately from the overall WMP, in particular, the build-out analysis. Upon such a submittal, the Department would review applications for site-specific amendments, which were not previously permitted where WMPs were out of date, under the WQM Planning rules.

Accordingly, the NJDEP adopted the Future Wastewater Service Area Map for Morris County on April 25, 2013. The RVRSA service areas are included within the Northeast WQMP Areas. The adopted sewer service area map for Morris County excludes the "conforming" municipalities, which are being updated by the Highlands Council. Therefore, the currently applicable wastewater service areas within the "conforming" municipalities remain in the service areas published by NJDEP in its prior mapping update of April 9, 2013. As previously indicated, the three (3) "conforming" municipalities in the RVRSA Sewer Service Area are the Townships of Randolph and Rockaway, and the Borough of Wharton.

On November 7, 2016, NJDEP adopted new regulations governing WQMPs and WMPs. These newly adopted regulations modified significant procedural requirements for WMPs. The NJDEP also adopted amendments to the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, and the Highlands Water Protection and Planning Act Rules, N.J.A.C. 7:38. Particularly, N.J.A.C. 7:14A-4.3 of the NJPDES rules, and N.J.A.C. 7:38-1.1(k) of the Highlands Water Protection and Planning Act Rules, were amended to ensure that they remain consistent with the new WQMP rules.

The current NJDEP approved sewer service map showing the currently applicable wastewater service areas for RVRSA is presented in Figure 3 on the following page. The entire Morris County WMP remains a work in progress; however, the following municipal chapters have been adopted over the last decade (Chatham Township – Adopted January 30, 2014; Jefferson Township – Adopted June 30, 2015; Mine Hill Township – Adopted October 1, 2020; Washington Township - Adopted July 24, 2012; and Florham Park Borough - Adopted February 23, 2012.

3.3 Future Flow

Prior to 2006, the average daily future flow projection (i.e., the "planning flow") in all prior draft WMPs was 12.0 mgd. In 2001, RVRSA performed a flow projection to Year 2010. Growth projections were obtained from each municipality to determine the future service flow; commercial, industrial, and infiltration/inflow estimates were added to the residential flows. The total average daily Year 2010 flow projection for the RVRSA was projected to be 13.67 mgd by adding the then-committed (but unconnected) flow to the sum of the then-existing average daily flow and the projections of future flows provided by municipalities in 1999.

As determined through the prior Clarifier Equipment Replacement and Phosphorus Removal Process Optimization Final Report prepared by Gannett Fleming dated November 2011, the existing RVRSA plant is capable of treating an average daily flow of at least 13.67 mgd.

In response to the 2004 State Plan growth projections, the Morris County Planning Board developed an updated future flow projection as part of its Morris County Cross Acceptance Report. Based on 2002-2003 recorded flows and the 2004 State Plan Cross Acceptance projections, the average daily future wastewater flow for RVRSA was projected to be 13.93 mgd. This value was incorporated into the February 2006 WMP amendment. NJDEP rejected the February 2006 WMP Amendment, citing "deficiencies and inconsistencies" as well as the need to wait for the Highlands Regional Master Plan. In addition, it should be noted that the Department was in the process of crafting significant changes to its WQM planning rules, which were later adopted in 2008. As previously indicated, Morris County submitted a county-wide WMP in response to the 2008 WQMP rule amendments.

The 2009 WMP submission included a projected future flow for RVRSA of 12.547 mgd, which reflected changes to sewer service areas and methods for projecting future flows in the new rule. Because neither the proposed 2006 nor the 2009 WMP amendments were adopted by NJDEP, the currently applicable planning flow, as well as the permitted flow, for RVRSA remains 12.0 million gallons per day (mgd).

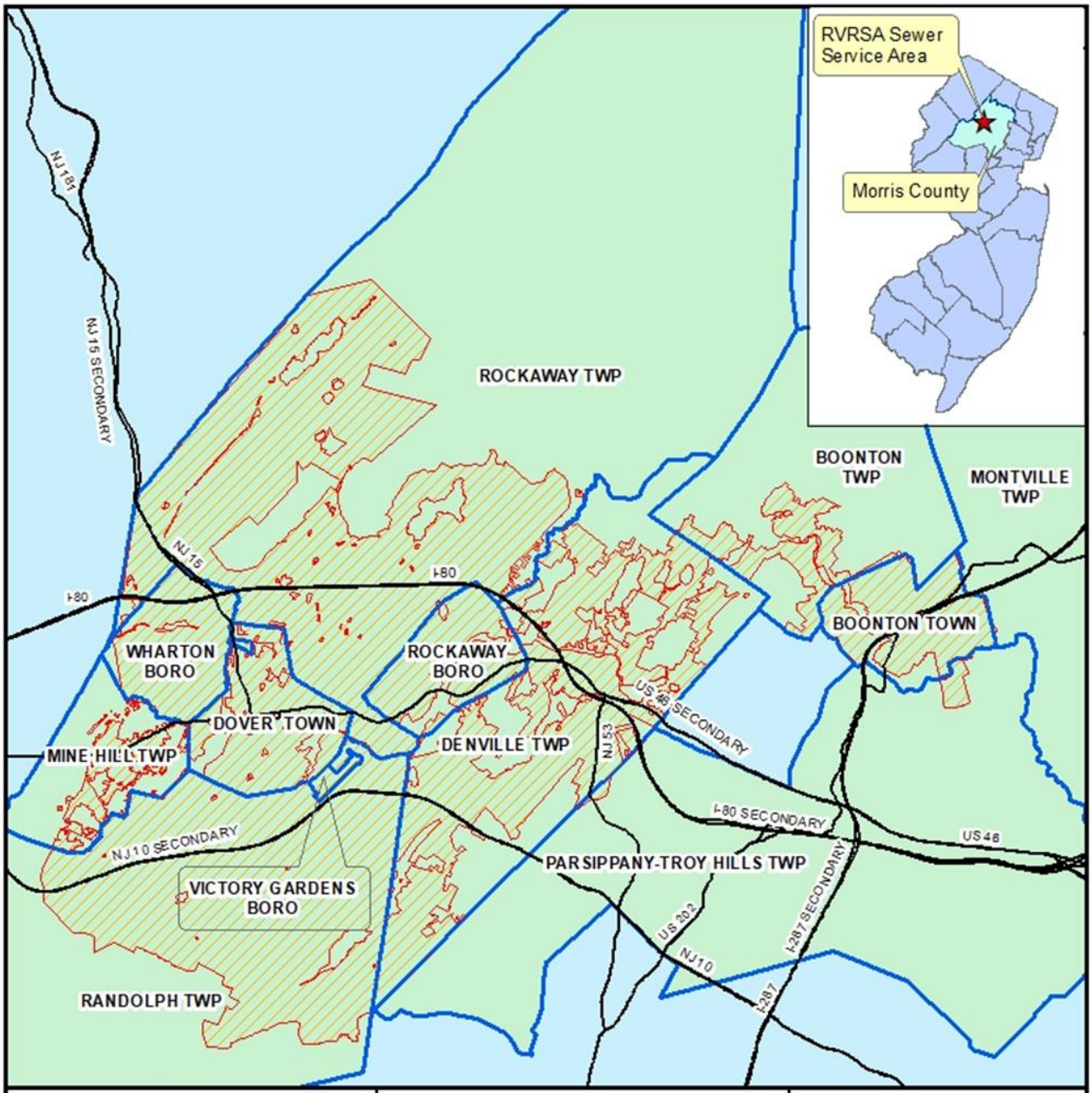

FIGURE 3:
SEWER SERVICE AREA FOR RVRSA

RVRSA Engineer's Five Year Planning Report
Rockaway Valley Regional Sewerage Authority

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321 Wall Street, Princeton, NJ 08540
609-924-8821 • www.kleinfelder.com

Major Roads
RVRSA Sewer Service Area
Municipalities in RVRSA, including Mine Hill Township as a customer

Source:
2022 NJDEP Sewer Service Areas
2011 NJDOT Road Network
1998 NJDEP Municipal Boundaries

PROJECT #:	2045P
DRAWN:	12/06/2022
DRAWN BY:	ELD/LTS
CHECKED BY:	TBD
FILE NAME:	S:\2045P - RVRSA 5Yr Planning Report\GIS\2045P_SSA_2023Update.mxd

0 4,500 9,000
Feet

In 2020, Morris County in cooperation with the Highlands Council updated its buildout flows to RVRSA. At that time, the total projected buildout flow for the RVRSA sewer service area was 14.344 mgd. The county continues to work on finalizing its WMP, so an adopted total buildout flow is not currently available. However, site specific amendments continue to be processed as the full WMP is prepared. As recently as July 22, 2022, a site-specific WMP amendment was adopted for Mine Hill Township granting a projected wastewater flow of 0.085 mgd to be received by RVRSA.

It is anticipated that as future court mandated and other affordable housing developments, as well as non-affordable housing developments and other projects progress through planning, design and approval stages, that the current projected flow for RVRSA of 14.3 mgd will be increased.

It is noted that Kleinfelder's Wastewater Treatment Plant Facility Plan Report dated March 2018 was based on a projected future flow of 14.3 mgd.

4.0 CURRENT AND FUTURE EFFLUENT LIMITS

The RVRSA is currently authorized to discharge 12 mgd of treated wastewater to the Rockaway River within the Township of Parsippany – Troy Hills in Morris County, in accordance with the requirements of its New Jersey Pollutant Discharge Elimination System (NJPDES) Discharge to Surface Water (DSW) permit (NJPDES #NJ0022349). RVRSA discharges to the Rockaway River just downstream of the Boonton Reservoir. Figure 4 on the following page shows the RVRSA wastewater treatment plant (WWTP), outfall location (DSN# 001A), and the receiving water (Rockaway River downstream of Boonton Dam).

RVRSA is currently operating under a NJPDES permit that became effective on October 1, 2019 and expires on September 30, 2024. This permit provides separate sets of effluent limits at flows of 12 mgd and 15 mgd. RVRSA adjudicated the 2019 permit, disputing effluent limitations for dissolved oxygen and ammonia nitrogen at the future flow of 15 mgd that were not consistent with the limitations that were approved by NJDEP within the anti-degradation study. The adjudication of this permit remains pending.

The currently effective effluent limits at 12 mgd are listed in Table 1 which follows Figure 4.

The future effluent limits at 15 mgd are listed in Table 2.

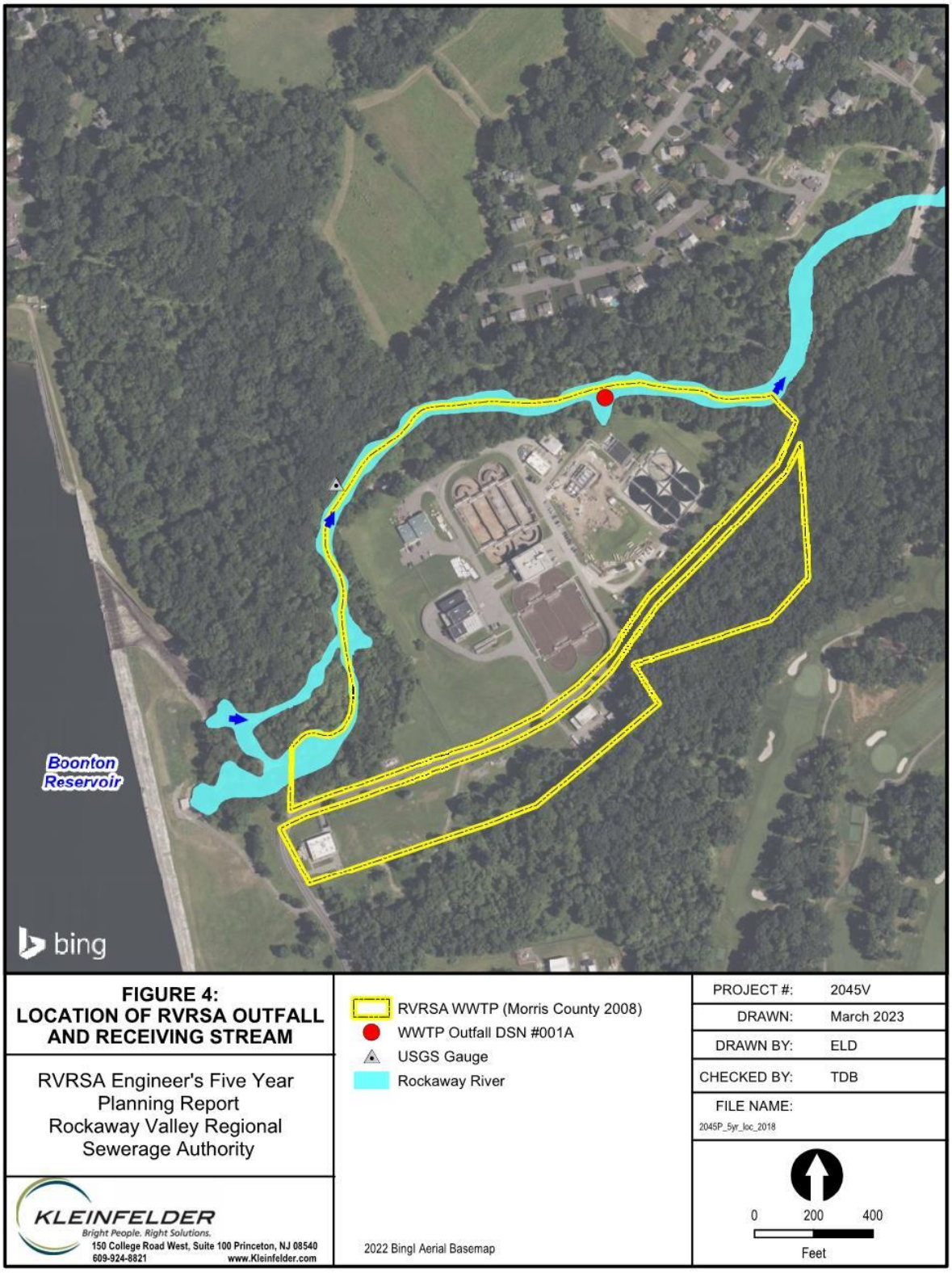
Boonton Reservoir
bing
FIGURE 4:
LOCATION OF RVRSA OUTFALL AND RECEIVING STREAM
RVRSA Engineer's Five Year Planning Report
Rockaway Valley Regional Sewerage Authority
KLEINFELDER
Bright People. Right Solutions.
150 College Road West, Suite 100 Princeton, NJ 08540
609-924-8821 www.Kleinfelder.com
RVRSA WWTP (Morris County 2008)
WWTP Outfall DSN #001A
USGS Gauge
Rockaway River
2022 Bingl Aerial Basemap
PROJECT #: 2045V
DRAWN: March 2023
DRAWN BY: ELD
CHECKED BY: TDB
FILE NAME:
2045P_5yr_loc_2018
0 200 400
Feet

Table 1: Currently Effective Effluent Limits (12 mgd)

Parameter	Effluent Limit	Limit Type
pH (s.u.)	6.0	Instantaneous Minimum
	9.0	Instantaneous Maximum
TSS (mg/L)	30	Monthly Average
	45	Weekly Average
	85%	Minimum Percent Removal
Oil and Grease (mg/L)	10	Monthly Average
	15	Instant Maximum
Ammonia-N Summer (mg/L)	1.8	Monthly Average
	3.3	Daily Maximum
Ammonia-N Winter (mg/L)	6.0	Monthly Average
	10.9	Daily Maximum
E. Coli (#/100ML)	126	Monthly Geometric Average
	Report	Instant Maximum
$CBOD_5$ (mg/L)	8	Monthly Average
	12	Weekly Average
	85%	Minimum Percent Removal
Chronic WET	43%	IC25
Chlorine Produced Oxidants (mg/L)	0.015/0.02	Monthly Average/Minimum Detection Limit
	0.025	Daily Maximum
Dissolved Oxygen (mg/L)	6	Weekly Average Minimum
Total Phosphorus (mg/L)	0.76	Monthly Average
Nickel (µg/L)	84.0	Monthly Average
	116.9	Daily Maximum
Zinc (µg/L)	171.8	Monthly Average
	219.1	Daily Maximum
Copper (µg/L)	54.3	Monthly Average
	72.4	Daily Maximum
Phenol	13.9	Monthly Average
	22.8	Daily Maximum

In Table 1, the "Summer" period is May through October, and the "Winter" period is November through April. For the purpose of this report, limits are expressed as concentration and/or percent removal (i.e. load limits are not included).

Table 2: Future Effluent Limits (15 mgd)

Parameter	Effluent Limit	Limit Type
pH (s.u.)	6.0	Instantaneous Minimum
	9.0	Instantaneous Maximum
TSS (mg/L)	30	Monthly Average
	45	Weekly Average
	85%	Minimum Percent Removal
Oil and Grease (mg/L)	10	Monthly Average
	15	Instant Maximum
Ammonia-N Summer (mg/L)	1.8*	Monthly Average
	3.3*	Daily Maximum
Ammonia-N Winter (mg/L)	5.0*	Monthly Average
	10.9*	Daily Maximum
E. Coli (#/100ML)	126	Monthly Geometric Average
	Report	Instant Maximum
$CBOD_5$ (mg/L)	8	Monthly Average
	12	Weekly Average
	85%	Minimum Percent Removal
Chronic WET	46%	IC25
Chlorine Produced Oxidants (mg/L)	0.014/0.02	Monthly Average/Minimum Detection Limit
	0.024	Daily Maximum
Dissolved Oxygen (mg/L)	6	Weekly Average Minimum
Total Phosphorus (mg/L)	0.76	Monthly Average
Nickel (µg/L)	84.0	Monthly Average
	116.9	Daily Maximum
Zinc (µg/L)	171.8	Monthly Average
	219.1	Daily Maximum
Copper (µg/L)	54.3	Monthly Average
	72.4	Daily Maximum
Phenol	13.9	Monthly Average
	22.8	Daily Maximum

In Table 2, the "Summer" period is May through October, and the "Winter" period is November through April. For the purpose of this report, limits are expressed as concentration and/or percent removal (i.e. load limits are not included). * Indicates that load limits were held at 12 mgd loads (subject of adjudicatory hearing request).

5.0 CAPACITY ASSURANCE PROGRAM

5.1 Regulations, Requirements and Activities

The Capacity Assurance regulations (N.J.A.C. 7:14A-22.16) state, "If the average flow over 12 consecutive months, as reported in DMRs by the permittee of a treatment plant, reaches or exceeds 95 percent of the permitted flow of that treatment plant, the permittee, in coordination with participating municipalities and sewerage authorities, shall… conduct a capacity analysis… and submit a capacity analysis report within 180 days..."

As shown in Table 3 below, the most recent annual average flow was 9.141 mgd, or 76% of the 12 mgd permitted flow. Therefore, RVRSA is currently well below the 95% threshold, and is not required to submit a capacity analysis report at this time.

However, it is noted that during the prolonged wet period of 2018 through mid-2019, the 12 month average flow reached 10.762 mgd, which is only 0.6 mgd less than the 11.4 mgd threshold corresponding to, 95% of 12 mgd.
.

Table 3: RVRSA Quarterly Average and Rolling Annual Average Flows

Year	Quarter	Average Quarterly Flow (MGD)	Rolling Annual Average Flow (MGD)
2018	Q1	9.597	8.511
	Q2	9.824	8.671
	Q3	9.469	9.132
	Q4	11.792	10.170
2019	Q1	11.348	10.608
	Q2	10.438	10.762
	Q3	8.369	10.487
	Q4	8.995	9.788
2020	Q1	8.888	9.173
	Q2	8.728	8.745
	Q3	7.489	8.525
	Q4	8.628	8.433
2021	Q1	9.526	8.593
	Q2	8.583	8.556
	Q3	9.070	8.952
	Q4	8.511	8.923
2022	Q1	8.917	8.770
	Q2	10.064	9.141
	Q3	7.268	8.912
	Q4	8.481	8.599

5.2 Industrial Pretreatment Program Permitted and Actual Flows

The RVRSA is a delegated local agency of the NJDEP and administers an Industrial Pretreatment Program (IPP) within the service area of the authority. Through this program, permits are issued to users of the system that discharge significant quantities of non-domestic wastewater. Kleinfelder updated the local limits for the IPP program in 2017. As IPP permits were renewed, the new local limits have been incorporated into the permits.

There is a total of fifteen (15) permitted industrial users under the IPP program, comprised of five (5) categorical users, five (5) significant users, and five (5) users of concern. These users include a large non-carbonated beverage (juice and iced teas) manufacturer, a plastics manufacturer, two (2) metal finishing companies, a large regional shopping mall with 30 restaurants, and two (2) large regional hospitals, namely, St. Clare's Hospital in the Township of Denville, and St. Clare's Hospital in the Town of Dover. St. Clare's also has a smaller hospital in Boonton.

A future user of concern, TerrAscend, NJ, a grower and processor of cannabis, is expected to be permitted shortly (2023).

Table 4 presents a summary of the permitted and actual flows for each industrial user during 2021.

Table 4: Industrial User Permitted and Actual Flows – 2021

Industrial User	Permitted Flow (gpd)	2021 Average Flow (gpd)
Anthony & Sons Bakery	6,000	3,318
Cibao Meat Products	10,225	4,418
Dimensional Merchandising Inc.	11,800	9,352
Enteris Biopharma	11,000	6,241
Howmet Corp	73,000	49,322
Lakeland Bus Line	6,500	506
McWilliams Forge	7,900	9,911
NJMG	22,680	14,643
Picatinny Arsenal	500,000	153,489
Polyfil Corporation	1,700	901
Refresco	450,000	238,740
Rockaway Townsquare Mall	246,231	134,470
St. Clare's Hospital (Boonton)	16,000	14,045
St. Clare's Hospital (Denville)	80,000	61,595
St. Clare's Hospital (Dover)	78,000	28,543
Total	**1,521,036**	**729,494**

As shown in Table 3:

- The total yearly average flow for all permitted industrial users was 729,494 gpd based on the monthly averages, or approximately 8.2 percent of total average plant flow during 2021.
- Refresco (formally Whitlock Packaging) in the Borough of Wharton contributed the highest yearly average flow of 238,740 gpd.
- Picatinny Arsenal had the greatest difference between permitted flow (500,000 gpd) and actual yearly average flow (153,489) leaving 346,511 gpd of remaining flow. It should be noted that Picatinny Arsenal has a Utility Service Contract, which was signed in September 1985 with the Authority. In the contract, Picatinny Arsenal is granted the 500,000 gpd permitted monthly average and is therefore exempt from the unused capacity charge requirement.

It is also noted that Refresco is the largest contributor of CBOD loading into the system. In addition, Rockaway Townsquare Mall in the Township of Rockaway contributes a large amount of CBOD, TSS, and NH3-N into the system. Both Refresco and Rockaway Townsquare Mall have requested and received variances for CBOD loading and TSS loading for Rockaway Town square Mall. In addition, Anthony & Sons Bakery has also received a variance for CBOD loading. Refresco, Anthony & Sons Bakery and Rockaway Townsquare Mall all pay surcharges to the RVRSA for the treatment of their high strength wastewater to cover the additional costs of treatment and sludge disposal.

Upon renewal of each IPP permit, RVRSA reviews the capacity requirements of the discharger and reduces the permitted discharge capacity to that which can be justified. Permitted industrial users who decide to keep their gallonage are charged annually as necessary per the unused capacity charge requirement.

It is also noted that RVRSA has requested that several industrial users sample for PFAS compounds and that RVRSA has also been sampling WWTP influent and effluent for PFAS compounds. The reason for this is that NJDEP has indicated that in the future a surface water quality standard may be established for PFAS compounds, and if this occurs, effluent limits for PFAS compounds may follow if RVRSA effluent is found to have a reasonable potential to cause the surface water quality standard to be exceeded.

6.0 PLANT PERFORMANCE

6.1 NJPDES Permit Compliance

RVRSA consistently and reliably complies with the NJPDES Permit effluent limitations currently in effect. A summary of 2021 and 2022 performance for RVRSA's key effluent parameters is presented in Tables 5 and 6 below.

Based on the data presented in Table 5 on the following page and Table 6, RVRSA complied with its key effluent limitations for: CBOD, TSS, ammonia nitrogen, nitrate-nitrogen and total phosphorus.

It is also significant to note that RVRSA removes nitrate-nitrogen to consistently low levels without having a mandate from NJDEP to remove nitrate-nitrogen.

This is a win-win situation as it improves water quality while at the same time reducing energy costs and alkalinity consumption, which avoids the need to add costly chemicals to provide the alkalinity consumed during the nitrification process.

Table 5: RVRSA Plant Influent and Effluent Data – 2021

Month	Influent CBOD5 (mg/L)	Influent TSS (mg/L)	Effluent Flow (MGD)	Effluent CBOD5 (mg/L)	Effluent TSS (mg/L)	Effluent Ammonia Nitrogen (mg/L)	Effluent Nitrate Nitrogen (mg/L)	Effluent Phosphorus (mg/L)
Jan	172	219	9.324	5.00	6.00	2.30	2.40	0.12
Feb	180	211	9.074	6.00	9.00	3.00	2.50	0.17
Mar	143	179	10.180	7.00	11.00	2.20	4.50	0.20
Apr	178	187	9.294	7.00	7.00	2.10	2.00	0.30
May	197	201	8.424	5.00	5.00	1.30	1.60	0.40
Jun	214	218	8.031	6.00	5.00	1.60	1.50	0.40
Jul	224	223	8.071	5.00	4.00	1.30	1.50	0.40
Aug	234	225	8.731	5.00	4.00	1.50	1.10	0.20
Sep	177	156	10.408	6.00	5.00	1.40	2.90	0.20
Oct	222	214	8.804	5.00	4.00	1.60	1.50	0.60
Nov	191	195	8.833	4.00	2.00	2.60	1.90	0.30
Dec	233	207	7.897	4.00	3.00	2.10	1.90	0.20
Avg.	**197**	**203**	**8.923**	**5.42**	**5.42**	**1.92**	**2.11**	**0.29**

Effluent Limits:
(1) Effluent CBOD Limit = 8 mg/L
(2) Effluent TSS Limit = 30 mg/L
(3) Effluent Ammonia Nitrogen Limit = 1.8 mg/L summer, 3.3 mg/L winter
(4) Effluent Phosphorus Limits = 0.76 mg/L
(5) Effluent Nitrate Nitrogen – no limit

Table 6: RVRSA Plant Influent and Effluent Data – 2022

Month	Influent CBOD5 (mg/L)	Influent TSS (mg/L)	Effluent Flow (MGD)	Effluent CBOD5 (mg/L)	Effluent TSS (mg/L)	Effluent Ammonia Nitrogen (mg/L)	Effluent Nitrate Nitrogen (mg/L)	Effluent Phosphorus (mg/L)
Jan	236	213	8.119	6.00	6.00	2.30	3.30	0.40
Feb	221	185	9.426	7.00	8.00	3.10	2.70	0.40
Mar	220	189	9.207	6.00	6.00	2.10	2.10	0.70
Apr	163	158	11.836	6.00	5.00	2.10	1.70	0.20
May	189	184	9.625	5.00	4.00	0.90	2.40	0.40
Jun	213	198	8.731	5.00	4.00	2.00	1.50	0.30
Jul	207	208	7.519	4.00	3.00	1.00	0.40	0.40
Aug	238	214	7.001	3.00	2.00	0.60	0.40	0.40
Sep	204	216	7.285	4.00	2.00	1.20	0.50	0.50
Oct	199	200	7.622	5.00	4.00	1.10	0.40	0.40
Nov	252	207	7.982	5.00	4.00	1.20	0.50	0.50
Dec	240	183	9.84	6.00	6.00	1.10	1.00	0.30
Avg.	**215**	**196**	**8.683**	**5.17**	**4.50**	**1.56**	**1.41**	**0.41**

6.2 Sludge Thickening

As described in Section 2, RVRSA's Segment 2 solids handling facilities were placed into operation in 1990 and utilized gravity belt thickeners (GBTs) to thicken waste activated sludge (WAS) prior to disposal. As also described in Section 2, based on the recommendations of the 2008 Biosolids Facilities Evaluation Report, design was initiated in 2009 for Contract 37 Sludge Thickening Facilities Modifications, and construction was substantially complete in 2012. The key element of this project was the replacement of GBTs with Rotary Drum Thickeners (RDTs) to enhance the thickening process and to increase its capacity.

Thickened WAS from the RDTs is combined with scum and then loaded into tanker trucks for offsite disposal. RVRSA's current five year contract for the disposal of sludge is with the Passaic Valley Sewerage Commissioners (PVSC) located in Newark, New Jersey. The RVRSA also has a separate contract with Interstate Waste Services to haul and dispose of grit and screenings. The performance of RVRSA's rotary drum thickening system during 2021 and 2022 is presented in Tables 7 and 8, respectively.

Table 7: RVRSA Rotary Drum Thickener Performance – 2021

Month	Average Thickened Sludge % Solids
January	5.78
February	5.56
March	5.9
April	5.27
May	6.01
June	6.07
July	4.91
August	5.2
September	4.8
October	5.4
November	5.96
December	5.87

Table 8: RVRSA Rotary Drum Thickener Performance - 2022

Month	Average Thickened Sludge % Solids
January	5.2
February	5.7
March	5.1
April	5
May	5.4
June	5.7
July	6
August	6.2
September	7
October	5.9
November	6.6
December	6.3

Based on the data presented in Tables 7 and 8, RVRSA typically produces thickened sludge concentration in the range of 5% to 6% solids, with an average concentration of approximately 5.4% solids. This is a 23% increase in the average solids concentration compared to the average solids concentration from the GBTs of 4.4% as reported in the 2006 Biosolids Management Study report referenced in Section 2.0. The 23% increase in sludge concentration results in a 23% reduction in the volume of sludge requiring disposal and thus the sludge disposal costs.

7.0 ANNUAL INSPECTION RECOMMENDATIONS

An annual inspection of RVRSA's wastewater facilities was conducted in 2022. The resulting recommended actions from the inspection for the wastewater treatment plant, meter chambers and siphon chambers are summarized in Tables 9, 10, and 11, respectively.

Table 9: Annual Inspection Summary of Recommended Actions for the WWTP

Plant Area	Recommended Actions
Preliminary Treatment Building and Distribution Box	• Replace corroded overhead pipe supports. • Repair ceiling beams to allow use of the overhead hoisting equipment. • Recoat Distribution Box gate operators. • Remove abandoned electrical conduits and wires. • Replace the existing backflow preventers (2) and pressure reducing valve and provide gauges and valves at the hose bibbs • Evaluate options to determine if there is a cost effective approach to the problem of grit accumulation in the Distribution Box. • Evaluate grit removal system for optimal operation • Increase the drain size of Vactor truck drain pad and evaluate options to provide higher volume and pressure of flushing water.
Division Box A	• Monitor Division Box A for settling of solids. If the settling of solids becomes a problem, consider using mechanical mixers rather than diffused air for mixing. • Label gates to avoid confusion regarding the function of each gate.
Oxidation Channels	• Replace variable effluent weirs with fixed weir plates as part of a future project. • Replace the aeration equipment as part of a future project. • Repair leaking expansion joint at the common wall between Oxidation Channel No. 3 and No 4. • Replace wooden railings at the chambers for the aerator drives and bearings with aluminum or FRP railings. • Repair leaking vertical expansion joints at the wall sections common to the basement of the Control Building. • Consider providing davit crane hoisting equipment to facilitate maintenance and replacement of the rotor motors.
Division Box B	• Label gates to avoid confusion regarding the function of each gate.
Chlorine Contact & Dechlorination Tanks	• Provide new coatings at the slide gate operators. • Provide slide gate operator at CCT-1
Chemical Building Storage Shed	• Evaluate whether the existing split face block provides adequate spill containment for the sodium hypochlorite storage area. Also evaluate the need for spill containment for the chemical delivery trucks. • Replace the service water strainer. • Replace the service water pumps to reliably and efficiently meet the current and future service water demands and consider simplifying the service water piping.

Plant Area	Recommended Actions
	• Install a perimeter roof railing system at the Chemical Building for worker safety. • Evaluate Chemical Building for future upgrades. • At the storage shed, recoat the structural steel members and replace the metal roofing.
Biosolids Processing Facility	• Evaluate scum pump installation to address safety. • Provide scum pump on-off controls in the sludge loading building within sight of the truck loading operation. • Evaluate potential modifications to the sludge loading building's ventilation control system to reduce the natural gas demand for heating.
Control Building	• Consider replacement of the 36 year old RAS pumps. • Modify routing of seal water piping and electrical conduits at the RAS pumps to improve access for lifting/rigging. • Relocate rotor VFDs to provide minimum clearance required by the NEC. • Evaluate methods for cleaning exterior level of the building.
Maintenance Building	• Provide NEC required fused disconnect switch on the secondary side of the 480V-208/120V transformer serving this building. • On the primary side of the transformer, provide a fused disconnect or a label identifying where the primary disconnect switch or circuit breaker is located.
Electrical Substations and Outdoor MCC	<u>Main Substation:</u> • Initiate planning to replace this nearly 30 year old substation as well as the cables from the Main Substation to Unit Substations No. 1 and No. 2. <u>Unit Substation No. 1:</u> • Initiate planning to replace this nearly 30 year old substation. • In the meantime, repairs are needed due to severe corrosion at the base of the substation. <u>Motor Control Center MCC-12:</u> • Initiate planning to replace this nearly 30 year old MCC.
WWTP Site	• Replace damaged fencing along the southern perimeter of the site. • Remove accumulated debris from the storm drain headwall outlet on the southern side of the site.
Old Administration Building	• Periodically clean roof drainage scuppers to prevent ponding of water on the roof. • Investigate options to control erosion of the embankment at the south side of the building. • Begin planning for replacement of the main distribution panel and transformer. • Implement the recommended interior and exterior modifications presented the recent study to evaluate upgrade needs to achieve RVRSA's desire future use for this building

Table 10: Summary of Recommended Actions for the Meter Chambers

Chamber	Recommended Actions
STP	• Investigate odor control system for potential need to replace activated carbon. • Install grab bars for exterior chamber access ladder.
BT-1	• Repair delaminating brick at flume approach/entrance. • Repair delaminating brick at flume exit. • Clean areas of corroded concrete and repair with appropriate bonding agent and repair mortar.
BT-2	• Verify/optimize operational strategy for carbon scrubber and exhaust fan.
DV	• Repair two (2) exterior areas of damage to chamber with appropriate bonding agent and repair mortar. • Review hazardous location/explosion-proof rating requirements based on location of top-side electrical equipment.
RT-5	• Provide code-compliant (wet location) and/or more permanent power wiring for Bioxide system for adjacent siphon chamber. • Investigate increasing exhaust airflow and/or adding chemicals upstream to help stem the advancement of concrete corrosion within the chamber.
RT-4	• Verify properly rated sump pump and wiring appropriate to the environment.
R-2	• Clean areas of corroded concrete at piping entrance and repair with appropriate bonding agent and repair mortar. • Review hazardous location/explosion-proof rating requirements based on location of top-side electrical equipment.
R-3	• Review hazardous location/explosion-proof rating requirements based on location of top-side electrical equipment.
RT-3A	Decommissioned
RT-2	• Verify properly rated sump pump and wiring appropriate to the environment. • Review hazardous location/explosion-proof rating requirements based on location of top-side electrical equipment.
RT-1	• Verify/optimize operational strategy for carbon scrubber and exhaust fan.
R-1	• Verify properly rated sump pump and wiring appropriate to the environment. • Check flood hazard elevation to determine if a waterproof access hatch is warranted to prevent inflow.
Picatinny	• Verify properly rated sump pump and wiring appropriate to the environment. • Review hazardous location/explosion-proof rating requirements based on location of top-side electrical equipment.
W-2	• Monitor cracking of the chamber walls and make repairs if this condition continues to deteriorate.
D-1	• Repair concrete pad for the traffic box.

Table 11: Summary of Recommended Actions for the Siphon Chambers

Chamber	Recommended Actions
STP – Inlet	• Clean all areas of corroded concrete and repair with appropriate bonding agent and repair mortar. • Repair all gate operators and ensure proper gate operation. • Recoat bench stands and other similar items on top-side of chamber. • Provide proper hold-open devices for access hatches. • Investigate increasing exhaust airflow and/or adding chemicals upstream to help stem the advancement of concrete corrosion within the chamber.
Denville – Inlet	• Repair all gate operators and ensure proper gate operation. • Clean flow path of rags. • Clean all areas of corroded concrete and repair with appropriate bonding agent and repair mortar. • Investigate increasing exhaust airflow and/or adding chemicals upstream to help stem the advancement of concrete corrosion within the chamber. • Minor cleanup of branches/brush from perimeter fencing
Denville – Outlet	• Improve safety of exterior chamber access ladder by installing larger standoffs to afford proper grip of ladder.
Boonton – Inlet	• Repairs will be provided under Contract 43
Rockaway – Inlet	• Repair all gate operators and ensure proper gate operation. • Clean all areas of corroded concrete and repair with appropriate bonding agent and repair mortar. • Investigate increasing exhaust airflow and/or adding chemicals upstream to help stem the advancement of concrete corrosion within the chamber. • Provide appropriate power wiring to Bioxide system (per previous comment for Meter Chamber RT-5).
Rockaway – Outlet	• Further investigate cracked benching. If not active, repair/seal all cracks with epoxy or epoxy-modified resin.
Dover – Outlet	• Consider replacing heavy, potentially dangerous 2-piece access casting.

8.0 MAJOR PROJECTS PERFORMED DURING LAST 5 YEAR PERIOD

For purposes of this report, Major Projects are defined as projects that are funded through the acquisition of debt, typically via the New Jersey Environment Infrastructure Financing Program which funds projects through a market rate loan from the New Jersey Infrastructure Bank together with an interest free loan from the NJDEP.

The major projects performed over the last five (5) years are listed in Table 12 below.

Table 12: Major Projects Performed 2018 – 2022

Contract	Project	Construction Cost	Current Status
Contract 38 & 39	Construction of Monroe Street and Harrison Ave pump stations to replace section of the interceptor destroyed by Hurricane Irene, and repairs to a portion of the Jersey City Trunk Sewer	$5.2 million	Construction completed in 2018 and in operation. Received $4.8M from FEMA in 2018.
Contract 40	Upgrades to the Final Clarifiers	$5.65 million	Construction completed in 2021
Contract 41	Construction of new effluent filtration facility, chemical storage tanks and pumps for chemical addition to remove phosphorus, a new ammonia feed system to prevent formation of disinfection byproducts and replacement of piping between the final clarifiers through the flow meter chamber to the chlorine contact tanks including new meter chamber isolation valve	$11.06 million	Currently in construction. Expect construction completion in 2023
Contract 42	Emergency repair of a portion of the 54-inch interceptor at West Main Street in Boonton	$2.06 million	Completed in 2018
Contract 43	Rehabilitation of the Canal Side Park Siphon Inlet Chamber, replacement of the Siphon Outlet Chamber at Pocket Park, and replacement of the 48-inch interceptor (104 LF) at Washington Street.	$4.26 million estimated	Design completed. Bidding anticipated in 2023.
Contract 44	Replacement of the WWTP emergency generators and related switchgear	$10.6 million estimated	Currently in final design. Bidding anticipated in 2023.

In addition, Table 12 does not include the many corrective and preventive maintenance activities performed by RVRSA or the small but important projects paid for with retained earnings, such as the Grit Conveyor Replacement Project which was completed in March 2020 and the Service Water System Improvements Project which was completed in December 2021. In addition, RVRSA is implementing a comprehensive Geographical Information System (GIS) based Asset Management Program integrated with a work order system to provide a comprehensive inventory of all RVRSA assets and a structured system to implement repairs, rehabilitations and replacement in a manner that achieves RVRSA's level of service goals while minimizing life cycle costs.

9.0 EXPANSION-RELATED ACTIVITIES

As described in Section 1, Article II, Section 202 of the Service Contract between the Rockaway Valley Regional Sewerage Authority (RVRSA) and its member municipalities dated July 1, 1976

requires that "the Consulting Engineer shall prepare and submit to the Authority a report concerning the necessity for enlargement or extension within the next succeeding five-year period." The process of enlargement or extension is more commonly referred to as "expansion."

An expansion in permitted capacity can be achieved either by re-rating the capacity of existing facilities or by physically expanding the capacity of the existing facilities via the construction of improvements. To formally assess whether RVRSA's WWTP could be re-rated to a capacity greater than 12 mgd, RVRSA engaged Kleinfelder to perform a comprehensive facility planning study for the objective of which was to develop a specific plan for near term and long term improvements to address current and future needs, including capacity expansion, compliance with the new effluent limitation for total phosphorus (TP), and aging infrastructure. Both short term and long term planning was needed to ensure that future improvements be identified now so that near term improvements are implemented in manner that is compatible with future improvements.

Regarding the issue of capacity expansion via re-rating, the detailed hydraulic and process capacity assessments performed as part of Facility Plan development resulted in the conclusion that the following plant components do not have adequate capacity to support a re-rating to a permitted capacity greater than 12 mgd: final clarifiers, and chlorine contact tanks. Therefore, it will not be possible to expand WWTP capacity above 12 mgd without increasing the capacity of these plant components.

Kleinfelder's analysis was based on an anti-degradation assessment of the effluent limitations that would likely be required at a future flow of 14.3 mgd which was based on the County's draft build-out analysis at the time the study was initiated. Consistent with NJDEP's subsequent issuance of effluent limits for a future flow of 15 mgd, it is likely that the future flow could be greater than 14.3 mgd.

Therefore, before proceeding with design of improvements to expand capacity of the final clarifiers and chlorine contact tank, it is recommended that the Facility Plan be updated based on a future flow of 15 mgd and the effluent limitations established by NJDEP for a future flow of 15 mgd.

In summary, the following expansion-related activity should occur within the next 5 year period: Update the Facility Plan Report based on a future flow of 15 mgd and the effluent limits established by NJDEP for a future flow of 15 mgd.

10.0 RECOMMENDED MAJOR PROJECTS FOR THE NEXT 5 YEAR PERIOD

The recommended major projects for the next 5 year period and their estimated costs are presented in Table 13.

Table 13: Recommended Major Projects for Next 5 Year Period

Project	Description	Budgetary Construction Cost	Funding Source
Contract 43	Rehabilitation of the Canal Side Park Siphon Inlet Chamber, replacement of the Siphon Outlet Chamber at Pocket Park, and replacement of the 48-inch interceptor (104 LF) at Washington Street. Bidding anticipated in 2023.	$4.26 million	NJEIFP loan
Contract 44	Replacement of the existing generators and related switchgear at the WWTP. Currently in final design with bidding anticipated to in 2023.	$10.6 million	NJEIFP loan
Contract 45	Replacement of the Main Substation at the WWTP.	$6.9 million	NJEIFP loan to be sought
Contract 46	Replacement of Unit Substations at the WWTP	$6.9 million	NJEIFP loan to be sought
Contract 47	Relining or relocating the Jersey City Trunkline	TBD	TBD
Contract 48	Renovation of the old Administration Building	$4.0 million	TBD
Contract 49	• Replacement of valves at the return activated sludge system and related piping modifications • Oxidation Channels improvements • Control Building elevator repairs • Backflow preventer for the city water system	TBD	TBD
50	Lining of the Boonton Siphons from Canal Side Park to Pocket Park, and from the STP Siphon – Inlet Chamber to the Preliminary Treatment Building	$3.4 million	TBD